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Work-Site Intervention Effectiveness.

Cynthia C. Pileski

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WORK-SITE INTERVENTION EFFECTIVENESS

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Work-Site Intervention Effectiveness

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This project evaluates a work-site health promotion pilot program to determine the effectiveness of administering programs in the workplace. The program was administered from 1996-2001 in a company with 124 employees, 29 males and 28 females participated. Evaluations were performed to assess health status, determine a health care cost-savings, and identify changes in absenteeism. The findings demonstrate that there were improvements in the health status of the group over time; the mean number of risk factors reduced was 1.26 per participant. A savings of $26,459 in health care costs was estimated as a result of lowering modifiable health risks and usage of medical self-care resources. The program as currently designed was not effective in lowering the absenteeism rate. This paper reviews the methods used, presents the findings, evaluates the outcomes, describes the work-site setting, analyzes the cost-benefit, and recommends action steps for improvement.
PROJECT OVERVIEW

Research Question

Is a health promotion program at the work-site effective in improving health status, lowering health care costs, and reducing absenteeism?

Overview

A work-site health promotion program was evaluated to demonstrate its effectiveness. The program selected was conducted over a six-year period from 1996 to 2001. The employer, Healthtrax, was located in Connecticut with multi-site locations throughout the Northeast. A majority of the employees were white collar, and several held positions as health and fitness professionals. The program included 124 employees and spouses, 29 males and 28 females ages ranging from 20 to 56. Employees were offered an incentive by Healthtrax to participate in the program. 100% of the employees with benefits participated in the program, 124 out of 124. Yet, only 57 employees were included in the study sample due to incomplete data on the remaining 67 employees.

Significance of Research

This research benefits the working community by demonstrating that a health promotion program can be effective at the work-site. As a result, the project establishes a need for public health and industry to collaborate on health promotion initiatives.

Background on Wellness Field

The Surgeon General’s Report on Health Promotion and Disease Prevention in 1979 called attention to promotion of a healthy lifestyle in the effort to prevent disease. Quantifiable health objectives on a national level were needed to measure progress as community groups, states,
employers, and professional organizations tackled the problems related to unhealthy lifestyle habits. Healthy People 2000 was launched in 1990 to address two primary goals: 1) to increase quality and years of healthy life, and 2) to eliminate health disparities among different populations. The Healthy People initiative does not implement programs, but does provide a means of measuring national health status. 350 national membership organizations and 250 state health, mental health, substance abuse, and environmental agencies collaborated to create the national health objectives. Several goals were met by 2000, and new goals were established for the updated version. In 2000, Healthy People 2010 was released with new objectives including 28 focus areas and 467 specific objectives. Healthy People 2010 continues to be an important benchmarking tool for health promotion.

The National Institute for Occupational Safety and Health (NIOSH) announced in 2003 a new initiative, Steps to a Healthier US Workforce. The goals include: 1) preventing work related illness, injury, and disability, and 2) promoting healthy living and lifestyles to reduce and prevent chronic diseases. The new initiative brings together occupational health & safety and health promotion in response to these shared goals. By uniting these groups, NIOSH is promoting its mission to protect and improve working conditions and the worksite environment. Steps to a Healthier US Workforce and Healthy People 2010 are both examples of national initiatives to promote

Groundbreaking research was performed by the Health Enhancement Research Organization (HERO), which was published in the Journal of Occupational & Environmental Medicine in 1998. The study examined the relationship between modifiable health risks and health care expenditures. Six large companies with 46,026 employees were included in the study. The employees completed health risk appraisals and biometric screenings; researchers reviewed the medical costs attributed to the ten modifiable risk factors. The study compared differences in the average annual medical expenditures between the high-risk and low-risk groups. The high-risk group had significantly higher health care costs than did low-risk group in seven of the ten risk
categories. Those with depression had 70% higher expenditures, high stress 46%, high blood
glucose 35%, extremely high or low body weight 21%, tobacco (former) 20%, tobacco (current)
14%, high blood pressure 12%, and sedentary lifestyle 10%. This study demonstrated that higher
health care costs are associated with modifiable health risks, and as a result gives motivation to
industry to implement health promotion at the workplace in an effort to control rising health care
costs.

This paper evaluates a small pilot work-site intervention project conducted in New England
during from 1996 to 2001. The following section discusses evaluation methods, evaluation risk
criteria, intervention methods, analysis methods, and the statistical significance of the study.
METHODS

This project used existing de-identified data and records to analyze the effectiveness of the work-site intervention program. Data was collected using the following methods: 1) Health Risk Appraisal (HRA), 2) Communication Survey, 3) Biometric Screening, 4) Interview Method, 5) Participant Satisfaction Survey, and 6) Medical Self-Care Survey.

All data was de-identified and formatted into EXCEL spreadsheets for confidentiality. The results are presented in aggregate form using figures and tables to display pre and post intervention outcomes. After reviewing the data, 57 of the 124 participants were selected for the study because they had completed all required evaluations.

Evaluation Methods

Participants were administered the HealthCalc® HRA, a 7-page survey booklet with 70 questions. The survey questions were multiple choice, yes/no, and numeric. The subject categories included health history, safety, tobacco, nutrition, stress, exercise, women’s health, preventive exams, biometric measures, and readiness to change. The questionnaire was given to employees during the company’s benefits enrollment period. It was included with paperwork required for enrollment in the health promotion program. A comprehensive 12-page results review was generated by HealthCalc software for those who completed the HRA. Results were reviewed with the participant during the next phase of the program.

The PREP Profile System® was used to evaluate communication and problem solving styles through a short one-page survey in which questions were formatted using a Likert Scale. Participants were asked to select a response according to “how you would describe yourself” and “how others would describe you”. The PREP survey was administered during the benefits enrollment period, and required for participation in the program. A 15-page report was generated
using the PREP software. Results were reviewed with the participant during the next phase of the program.

Once employees were enrolled in the program, confidential biometric screenings were held on an appointment basis during work hours. The testing conducted by certified technicians included Blood Pressure, Total Cholesterol, Height, and Body Weight. The finger-stick Blood Cholesterol test was done with a Cholestech machine. A sphygmometer and stethoscope were used to test Blood Pressure. Participant Body Weight was measured with a Tanita scale. Height was measured in inches during the screening. Participants received their results during the appointment. Once the screening was complete, Body Mass Index (BMI) was calculated using the HealthCalc software at a later date.

Data was also collected through interview by the program’s health educator, the Health Coach. An intake sheet with 12 questions was used by the Health Coach to interview the participant regarding personal goals, personal interests, and priorities. During the interview session the HRA and PREP survey results were reviewed and updated. The interview data in combination with the other evaluation tools was used to develop an action plan for the intervention phase of the program. The Health Coach and the participant also determine 5 personal goals to be evaluated at the end of the program.

The Satisfaction Survey was mailed to current participants during the program. Participants were asked to complete and return the survey, but it was not considered mandatory. The survey was designed with questions using a Likert Scale, and participants were invited to comment on their satisfaction with the program. The responses were compiled in a confidential report used for program evaluation by the program director and company management.

**Evaluation Risk Criteria**

Once the HRA and screening data was compiled, the participants’ risk factors were categorized into high risk, normal risk, or low risk. The personal goals for behavior change were
not used in the assessment of risk level. The measurement criteria used to evaluate risk is listed below in 11 categories.

BMI results in the normal range are under 25. Overweight is between 25 and 29.9 BMI. The obese category is 30 and over. For evaluation purposes the high-risk category included all results 25 and over, which included both overweight and obese. Total Cholesterol is considered borderline high-risk if over 200 mg/dl and high-risk if over 240 mg/dl. The results of 240 mg/dl or above were considered high-risk. Blood Pressure is considered in the normal range when below 120 mmHg in systolic and below 80 mmHg in diastolic. The high-risk group is 140/90 mmHg and above. Tobacco usage greater than 0 per day is considered high-risk. This included smoking cigarettes, cigars or smokeless tobacco. The measurement of Nutrition is a combination of scores on the HRA, which included consumption of bread, veggies, fruit, dairy, meat, and a high-fat diet. When the final score was <50, then Nutrition is considered high-risk. Fruits & Vegetables Consumption is high-risk if the number consumed was <5 per day.

Physical Activity is measured by using the American College of Sports Medicine (ACSM) classification for risk level. Using the HRA data, a VO_2 max is estimated based on gender, age, BMI and activity level. Physical Activity is considered at risk if the results are below average or well below average. Seat Belt Usage is considered high-risk if used <90% of the time. The measurement of a participant’s Stress Level is a combination of scores for coping ability, feeling tired/worn-out/used-up/exhausted, social support, and physical activity. When the final score was <50, then the stress level is high-risk. High-risk for Alcohol Usage is when a woman consumes more than 7 alcoholic beverages per week or more than 14 for a male participant. The HRA question included beer, wine, liquor or wine coolers. Low Back Safety is high-risk if the participant does not use proper lifting technique as described in the HRA and does not do stretching exercises for the lower back and thighs.
**Intervention Methods**

During the intervention phase of the program each participant was assigned a Health Coach. Once the evaluation surveys and screenings were completed, a confidential meeting was scheduled between the Health Coach and the participant to set goals and develop an action plan. This one-on-one meeting was called the continuous health improvement planning (CHIP) session.

During the CHIP session the Health Coach reviewed the results of the HRA, biometric screening, and PREP survey and identified 5 personal goals for the participant. Together with the participant, the Health Coach designed an intervention plan to help him or her reach these goals and the plan was implemented. Also, during this initial CHIP session, the participant selected the desired level of follow-up by the Health Coach. A Level 1 follow-up included the minimum program requirements, whereas a Level 5 follow-up provided the maximum amount of coaching available. A Level 5 program would consist of the annual CHIP session, behavior support materials mailed/emailed, monthly personal contact by phone/email, goals broken down into smaller stages with more accountability, and quarterly face to face meetings with the Health Coach. Based upon his or her selection, the Health Coach tailored the type of intervention to each individual participant.

The health promotion program included a reward system to encourage goal accomplishment. At the conclusion of the first CHIP session, the Health Coach informed participants that if they completed 4 of the 5 goals over the next year, they would be awarded an incentive prize. Examples of prizes included long-sleeve fleece jackets and $40 gift certificates. Each year the participants were eligible for a new incentive prize.

Throughout the year the Health Coach monitored progress and provided follow-up coaching. At the next CHIP session the goals were evaluated and the personal intervention plan was updated for the following year.
A medical self-care initiative was an additional component of the program. Participants were instructed on how to use the guide, *Health at Home: Your Complete Guide to Symptoms, Solutions, & Self-Care* and the 24-hour nurse call-center. The goal was to encourage appropriate use of the health care system when necessary. Both tools use algorithms to determine the appropriate level of care for each situation, which may include urgent care, specialist care, primary care, or self-care.

The effectiveness of the intervention phase is evaluated annually using the program’s measurement tools: HRA, biometric screening, interview session, satisfaction survey, and the medical self-care survey.

**Analysis Methods**

The data from the evaluation phase and the outcomes from the intervention phase are used for the cost-benefit analysis in Chapter 10. This chapter analyses health expenditures, medical self-care savings, absenteeism cost, and obesity cost. The administration of the program is also analyzed in Chapter 8.

The health expenditure cost-benefit analysis is based upon the data provided from the Health Enhancement Research Organization (HERO) Study, “The Relationship Between Modifiable Health Risks and Health Care Expenditures”. HERO identified health care cost differences by comparing the medical claims costs associated with different risk factor groups. The HERO health expenditure data included insurance claims for inpatient and outpatient medical services used by participating employees; pharmaceutical costs were not included. To determine the risk factor data, the study examined the health risk appraisals and screenings from 46,026 employees. Based upon the HERO outcomes the difference in health care costs between risk factor groups was estimated by using the number of risks factors reduced in the sample population. An estimated savings was determined by subtracting the low-risk costs from the high-risk costs. A cost-benefit analysis was then performed to assess the program cost in comparison with the estimated health expenditure savings (the benefit). Although, the HERO research did not study the reduction
in costs associated with reducing risk factors since it was not an intervention study, therefore changes in costs for reducing risks could be potentially higher or lower than the HERO data, a limitation of the study.

The medical self-care component of the program was evaluated using a written survey with 17 questions. Participants were surveyed regarding their usage of the medical self-care guide, Health at Home: Your Complete Guide to Symptoms, Solutions, & Self-Care and the 24-hour nurse call-center. The survey asked participants whether or not the guide and call-center helped them to avoid unnecessary physician visits and ER visits. Results were compiled confidentially and used to evaluate the effectiveness and cost-benefit of the program. A cost-benefit analysis was performed using the actual cost of program and the estimated savings benefit of avoided visits. The employer’s insurance carrier provided the average cost of a physician visit and ER visit for the company.

Absenteism is an important trend to track since it is possible to quantify change from year to year. The absenteeism cost analysis compares the net change in sick days for the sample population. The number of sick days per year is self-reported on the HRA questionnaire by each participant. A cost is then determined for productivity lost during sick days using average company salary with a formula from Harris Rothenberg International, a human resource risk analysis firm. The cost analysis is capable of demonstrating either a savings or an increased cost dependent upon whether or not the number of sick days decreased or increased.

The rising cost of obesity mirrors the growing obesity epidemic in the U.S. population. Health economist, Roland Strum and physiatrist, Kenneth Wells undergo an economic analysis in their study entitled, “The Effects of Obesity, Smoking, and Problem Drinking on Chronic Medical Problems and Health Care Costs”. They identify an annual increase in health care costs per obese subject. This annual increase can be applied to the number of participants with obesity for an economic analysis of the sample population.
The various elements of program administration are analyzed to determine if there is a correlation with the success rate. The administration of the program is evaluated by examining program length, frequency of follow-up, and goal achievement. Length of employee participation is quantified by number of months. Frequency of the Health Coach's follow-up is measured in degrees ranging from Level 1 to Level 5. Goal achievement is evaluated by comparing the quantitative measurement of goal accomplishment to the subjective view of the Health Coach during the CHIP session. For all of these comparisons, the success rate used was a percentage of goals accomplished by the participant.

**Statistical Significance**

This program was designed to be a pilot study to evaluate outcomes prior to the investment of additional resources. The sample size was 57 participants; as a result of this small sample the power of the study was not sufficient enough to test statistical significance. Typically a study would strive to have 80% power, which is enough to detect the smallest worthwhile effect 80% of the time. The following chapter reviews the group outcomes of the HRA categorized by risk factor.
Chapter 3

RISK FACTOR OUTCOMES BY CATEGORY

Typically in group-outcomes analysis, the results are examined by reviewing the net change in each category. This type of analysis does not demonstrate the progress that has been made by the individual. It is possible for 10 participants to have lowered their risk levels and 10 others to have increased their risk level, thereby resulting in a net change of zero. Examining the net change only would washout any progress that was made by the 10 individuals. If the reduction in risk is examined separately from the increase in risk—progress for the program can be demonstrated and a negative trend if present can be analyzed separately.

Of the 124 participants, 57 completed the Health Risk Appraisal (HRA) twice for a comparison of risk change. The average age was 35 in Test 1 and 39 in Test 2. The average length in between tests was 47 months.

The HRA assessed risk levels for the twelve modifiable risk factors listed below. The following results are analyzed by category of risk factor. Due to the confidentiality of participant health information the individual results will not be presented in this evaluation. The mean measures from the biometric screenings for weight, total cholesterol, and blood pressure are presented in Chapter 5. A chart is provided with risk reduction results (Table 1, Appendix) and risk increase results (Table 2, Appendix).

58% of those considered high-risk for their overall nutrition habits were able to lower their risk to normal (30 out of 52). No participants increased their nutrition risk level. 31% of those considered high-risk for their consumption of fruits and vegetables were able to lower their risk to normal (17 out of 55); no participants added this risk factor.
55% of the physical activity high-risk category was able to lower their risk to normal (28 out of 51); one individual had an increase in risk level from normal to high. 75% improved their risk of not wearing seat belts from high-risk to normal (9 out of 12). One individual had an increase in risk rating in the seat belt category from normal to high.

The cholesterol category had the least improvement and the number of high-risk people continued to increase. No participants were able to lower their high-risk cholesterol level (0 out of 6). Additionally, nine participants increased their risk from normal to high due to higher cholesterol results. This increase could potentially be attributable to increasing age, which was not controlled for in this pilot study. Blood glucose results were incomplete in the data.

71% of those at high-risk for systolic blood pressure were able to lower their risk level to normal (5 out of 7). Yet, an additional five participants increased their blood pressure risk to high, thereby canceling any overall improvements in this category. 67% of those at high-risk for diastolic blood pressure were able to lower their risk level to normal (4 out of 6), while four increased their risk level. Subjects can have an increase in blood pressure with age, which was not controlled for in this pilot study.

All five in the high-risk category for stress were able to lower their risk to normal. Two participants increased their risk level to high. On the initial BMI test there were 28 in the high-risk category; 4 were able to lower their risk to normal while 5 more increased their risk to high. Initially no high-risk participants were reported in the alcohol category. In the second test, however, four participants reported high-risk behavior. Drinking and driving results were incomplete. All three in the high-risk category for low back safety were able to lower their risk to normal. No participants added this risk factor.

The self-reported data on tobacco usage from the HRA survey was compared to the data collected in person through the CHIP interview session. Whereas only one participant acknowledged smoking in the HRA survey, five additional participants revealed that they were current smokers by setting goals to quit smoking with their Health Coach. Of the five, three were
successful in accomplishing the goal. In the second HRA survey two reported still smoking, which is consistent with the interview data. One additional smoker elected not to set a quit goal and is still a smoker. The total number of reported smokers at the start of the program was six; three smokers remained at the end of the program.

The areas that demonstrated the largest improvements were nutrition, physical activity and seat belt usage – a combined reduction of 84 risk factors. The cholesterol high-risk category continued to grow in numbers, especially since not one of the high-risk participants was able to lower this risk. Alcohol showed a negative trend by changing from no high-risk to four in the high-risk category. Overall improvements in the categories of blood pressure and BMI were canceled out due to the addition of more high-risk participants. Minor improvements were made in stress, low back safety and tobacco use.

**Self-Reported Overall Health**

Self-reported overall health was also an outcome reported in the HRA. Participants can rate their overall health as poor, fair, good or excellent. The self-reported results showed dramatic improvement in perceived health status between Time 1 and Time 2.

Responses were sorted into two categories. The high-risk group included the poor and fair responses, whereas the low-risk group included the good and excellent responses. 64% (34 of 53) improved from high-risk to low-risk. Only one participant increased from low to high risk. 34% (18 of 53) remained in the same category with little or no change. Four participants did not respond.

**Potential Sources of Study Bias**

The participants appeared both to overstate and under-estimate their self-reported status. Of the 34 who reported an improvement in health status, 21 did not meet their goals in the quantitative analysis. Out of the 18 who reported no health status change, 8 reached their program goals. In addition to the possible bias of self-reporting, there may be several explanations for the difference between the self-reported health and achievement of health goals. There may have been improvements that were not measured but were perceived to be an improvement in overall health by
the individual, or there may have been normal variability in the testing, i.e. blood pressure, that did not show improvements, or other explanations not measured in this study.

There is a possibility that participants would have lowered their risk level without the benefit of the program. Additionally there is the chance that employees who were ready to change were more likely to elect into the program, a form of selection bias. Also, the HRA responses may have been affected by the participants' awareness of being monitored by the program. These potential forms of bias are a limitation of the study, which was not designed as an experiment where individuals were randomly assigned into program and non-program (control) groups.
QUANTIFIABLE RISK FACTOR OUTCOMES

Below the results are presented as quantifiable outcomes. A net change in the number of risk factors is determined by comparing the two testing periods. A successful outcome can be measured by the number of risk factors reduced. A table of outcome results is provided in Table 3, Appendix.

**Maximum Risk Comparison**

The maximum number of risk factors for the group is 684. With 57 participants, they could each potentially have a maximum of 12 risk factors. The first HRA test reported 227 risk factors that were considered high risk or 33% of the maximum. The second HRA test showed a reduction in the number of high-risk factors by 74 for a net total of 153 risks or 22% of the maximum. This outcome demonstrates a 11% reduction of the maximum risk (Figure 1, Appendix).

**Group Net Change**

Out of the maximum 684 risk factors, 227 were reported in the first test and 153 in the second. All 57 participants reduced a total of 106 risks. 32 risks were increased, leaving a net reduction of 74 risks by the group.

**Overall Group Change**

61% of participants lowered their risks (35 of 57). 26% (15 of 57) had no net change in their number of risks, and 12% (7 of 57) increased their number of risks.

**Individual Net Change**

The number of risk factors per participant range from 0 to 7, out of a maximum of 12. The mean average number of risk factors per participant in the first test was 3.98 risk factors, and 2.72 in...
the second test. Therefore the group of 57 participants demonstrated a mean average decrease of
1.26 risk factors from start to finish of the program.

Future Work-sites - Forecasting Success

As stated above, the mean average number of risk factors decreased for this population was
1.26 per participant. Based upon the proven success of this group, we can use this data to forecast
the success of a new work-site of comparable size and demographics. For example, a company with
200 employees would potentially be able to reduce 252 risk factors after implementing the program.
We can forecast this by multiplying 1.26 by 200 employees, which would result in an estimated
future reduction of 252 risk factors.
BIOMETRIC SCREENING RESULTS

The biometric screenings demonstrate a negative trend in all three main categories: cholesterol, blood pressure, and body weight. Although improvements were made individually, the group overall has shown increased risk in these measurable categories (Table 4, Appendix).

**Weight**

Obesity is a risk factor for type 2 diabetes, heart disease, cancer, high blood pressure, stroke, gallbladder disease, liver disease, osteoarthritis, gout, pulmonary problems and infertility. During the screening three measures were taken for comparison: BMI, body weight, and body fat percentage.

BMI is a measure of weight relative to height; BMI = (weight in pounds / height in inches\(^2\)) \times 703. A BMI in the normal range is under 25, overweight is 25-29.9, and obese is over 30. The group’s mean averages were 25.9 for the first test and 26.1 for the second test. Both outcomes were in the overweight range with an increase of 1%. The prevalence of overweight and obesity in males was 55% in Test 1, which increased to 62% in Test 2. For females the prevalence was 43% in Test 1, which decreased to 39% in Test 2. In comparison with NHANES\(^{11}\) the prevalence of both genders is less than the prevalence of overweight and obesity among U.S adults age 20 or over. NHANES also indicates that the prevalence of overweight and obesity in the U.S. population is increasing dramatically. For males the national rate was 59% (1988-1994 NHANES), which increased to 69% (1999-2002 NHANES). The U.S. prevalence for females was 51% (1988-1994 NHANES), which increased to 62% (1999-2002 NHANES).

The group’s body weight mean average was 169 in the first test and 171 in the second test. With an average net weight gain of 1.39 pounds over the testing period, annualized to 0.35
pounds/year. The trend indicates a 1% increase in the mean average, and therefore a small increase in risk for the group.

The group’s body fat percent mean average was 23.2% in the first test and 23.6% in the second test. A risk level comparison for body fat is dependent upon gender and age, so a group risk assessment is not possible. The trend shows a 2% increase in the mean average of body fat. All three measures for weight indicate the risk of being overweight is increasing and should be a concern for the group.

**Total Cholesterol**

Total blood cholesterol is a risk factor for heart disease, stroke, and diabetes. The results from a total cholesterol screening are considered borderline high-risk if over 200 mg/dl, and high-risk if over 240 mg/dl. The group’s mean average increased from 188 to 192 mg/dl, thereby remaining in the normal risk category.

A full lipid profile test, which would differentiate high-density lipoprotein (HDL) from low-density lipoprotein (LDL), was not conducted. HDL is known as the good cholesterol since as a lipoprotein it carries cholesterol through the bloodstream to the liver to be processed and eliminated. LDL is considered the bad cholesterol since it is the primary cause of arterial blockage and cholesterol buildup.

**Blood Pressure**

High blood pressure increases the risk of heart attack, stroke, kidney failure, eye damage, congestive heart failure, and atherosclerosis. The results from a blood pressure screening are considered in the normal range if below 120 mmHg in systolic and below 80 mmHg in diastolic. High-risk is considered above 140/90 mmHg. The group’s first test mean average results were 117/74 mmHg; the second test results were 121/76 mmHg. The group exhibited an increase of 3%, which increased its average risk level to slightly above normal.

Weight, total cholesterol, and blood pressure all increase with age based on population studies. If results were age adjusted in this study, there could potentially be less increased risk in all
three biometric measures. In this analysis it would be difficult to quantify the change attributable to
the aging process since there is no control group with which to compare results.
INTERVIEW OUTCOMES

During the CHIP interview session, the Health Coach and the participant review the results from the HRA and biometric screenings. Together they set personal goals based upon the participant’s readiness to change and his or her results. These personal goals were tracked separately from the HRA and biometric screening outcomes.

**Personal Goals Achieved**

80% of those who selected a nutrition goal achieved that goal (35 of 44). 77% of those who selected physical activity achieved that goal (37 of 48). 71% improved their safety awareness (5 of 7). 70% of those who elected to visit a health care provider did accomplish their goal (26 of 37). 60% quit smoking (3 of 5). 60% improved their coping skills to lower stress (12 of 20). 38% lost weight (10 of 26). From the weight loss group, 6 out of 13 males reached their goals, whereas only 4 of the 13 females achieved their goals.

**Overall Goal Accomplishment**

The goal accomplishment range was from 38% to 80%. An average of 68% of the goals selected by participants were achieved (128 of 187).

**Goal Selection & Success Rates**

Exercise and nutrition goals were most frequently selected by participants and also had the highest success rates. Visiting a health care provider was the 3rd most frequently selected goal and the 3rd highest success rate. Weight loss was the fourth most popular goal and had the lowest success rate. Stress, safety and smoking goals were selected the least by participants. Table 5 in the Appendix has the goals ranked by frequency of selection.

In comparing the selection of goals and the success rate, we can determine that the goals most frequently selected have the higher success rates, whereas the less frequently selected goals
have lower success rates. An assumption could be made that the goals that are easier to accomplish are selected more frequently by participants eager to succeed.
PREP PROFILE RESULTS

The PREP survey was administered to evaluate both communication and problem solving styles. (See Appendix A for a copy of the survey.) Results helped give insight to the participants on their usual communication methods and their approach to solving problems. As an evaluation tool of the health promotion program, the survey results were available to the Health Coach. The Health Coach utilized the results to gain an understanding of how the participant would typically manage personal health issues. In utilizing this information the Health Coach can then adapt to the particular style of the participant, thereby customizing an effective personal intervention plan.

Communication Style

Participants with an objective style are very specific and to-the-point in their communication during their interviews with the Coach. They typically do not take the time to get to know their Coach personally, and are efficient and results-oriented in their goal setting.

Participants with a personal style are feelings-centered in their communication during interviews with the Coach; they will communicate on a more personal level. Their style can be persuasive and convincing in nature. They may be less direct than an objective communicator, and focus more on the personal aspect of the discussion. They are very open to decision-making support from the Coach.

Problem Solving Style & Health Improvement Planning

Innovative problem solvers enjoy the creative process during goal setting and planning, but may not remain focused on the completion of tasks required to meet their goals. Decisions tend to be based upon “gut-feelings” with a review of the facts a second priority.
Systematic problem solvers look for structure in their plan and enjoy creating the system to reach their goals. Decisions tend to be backed up with data and factual information. They would be effective in the implementation process as long as it remains organized.

Survey Results

56% of the participants communicated with an objective style, 40% had a personal style of communication, and 4% could use either style to communicate. The participants’ problem-solving styles were 47% systematic and 46% innovative, with 7% demonstrating either style.

Using Results to Customize the Program

The health promotion program was designed to be most effective for a systematic problem solver with a personal style of communication. Through utilizing this type of health promotion program, the systematic/personal communicator would be most successful in reducing risk factors. Based upon this premise the innovative/objective communicator would achieve fewer goals as an outcome.

An analysis of the outcomes revealed the opposite was true. The innovative/objective communicators had the highest percentage success at 77% (10 out of 13). The innovative/personal communicators had the second highest success percentage at 69% (9 out of 13). The systematic/objective communicators had 61% success (11 out of 18) and the systematic/personal communicators had only 56% success (5 out of 9). The four participants who would use either style equally were not included.

The PREP survey could potentially be a useful tool in predicting success for certain styles of communication and problem solving. The survey results could also be utilized to customize the health promotion program in an effort to maximize the outcomes of all communication styles.
Chapter 8

PROGRAM ADMINISTRATION ANALYSIS

**Months in Program & Success Rate**

One research question was whether employees who participated longer were more likely to achieve their goals. We would predict that there is a correlation between the months in the program and the participant’s success rate. In this analysis we are evaluating personal goals accomplished, not the number of risks reduced. The months of participation range from 12 to 74 months. The mean number of months in the program is 47, almost 4 years.

Of the 57 participants, 21 reached 80% or more of their goals. Participants were broken down by length of time in the program into 3 groups (Figure 2, Appendix). Group 1 has 4 employees with one year of participation. Group 2 has 6 employees with 2-4 years’ participation. Group 3 has 11 employees with 5-6 years’ participation.

Employees who participated longer were more likely to reach their goals; 42% (95%CI=26-61) of the employees participating for 5-6 years achieved their success goals, whereas only 31% (95%CI=13-58) of employees participating for one year reached their goals and 33% (95%CI=16-56) of employees participating for 2-4 years succeeded (Table 6, Appendix). Since all of the confidence intervals overlap each other there were no statistically significant differences between the groups. However, the power of the study was low due to small sample size, so it is feasible that significant differences would not be detectable even if they existed. Despite these limitations of this pilot study, the results are of practical value to the employer when deciding if there is a positive cost-benefit to administering a long-term program. The trend from the outcome data indicates that a lengthier program may result in more success, which can translate into health care cost savings.
**Health Coach’s Follow-Up Frequency**

We predicted that a high level of follow-up from the Health Coach would correlate with a successful outcome in the program. The average follow-up for the program was a 2 on a scale of 1 to 5, with 5 the most intensive follow-up.

Level 1 includes the annual HRA and biometric screening, and an annual meeting with the Health Coach. Level 2 includes the annual HRA and biometric screening, an annual meeting with the Health Coach, and support materials mailed or emailed. Level 3 includes the annual HRA and biometric screening, an annual meeting with the Health Coach, support materials mailed or emailed, and personal contact by Health Coach by phone or email quarterly. Level 4 includes the annual HRA and biometric screening, an annual meeting with the Health Coach, support materials mailed or emailed, personal contact by Health Coach by phone or email monthly, and goals broken down into smaller stages with more accountability. Level 5 includes the annual HRA and biometric screening, an annual meeting with the Health Coach, support materials mailed or emailed, personal contact by Health Coach by phone or email monthly, goals broken down into smaller stages with more accountability, and quarterly face to face meetings.

Employees who selected the higher level of follow-up were more likely to reach their goals; 50% (95%CI=25-75) of the employees participating in Level 1 reached their goals and only 28% (95%CI=16-44) of Level 2 reached their goals. Whereas 50% (95%CI=22-78) of Level 3 and 100% (95%CI=21-100) of Level 4 reached their goals (Table 7, Appendix). Results for Level 5 were not available since no participants selected it. All of the first four levels have wide confidence intervals that overlap with each other. As a result, there is no statistical significance between the different levels. Due to the low power of the study the differences may not have been measurable because of the study size.

From a practical standpoint the results can be utilized in program administration and staff planning. Level 1 and 2 combined make up the low follow-up group. Of this group 33% did meet their goals; the remaining 67% did not meet their goals. Level 3 and 4 combined make up the high
follow-up group. Of this group 56% met their goals; the remaining 44% did not meet their goals (Table 8, Appendix). A practical interpretation of the outcomes is that a larger percentage of the high follow-up group did meet its goals.

As a result of the findings it would make sense to encourage participants to select high levels of follow-up to improve their success; however, the Transtheoretical Model of behavior change does not recommend promoting higher levels of follow-up to participants who are not ready to make lifestyle changes. Another implication of the findings is that the more motivated participant may have selected a higher level of follow-up, whereas the less motivated person may have chosen fewer follow-ups, which is a potential source of bias.

**Measuring Goal Accomplishment**

The program goal for each participant is to reach 80% of the personal goals that are set with the Health Coach in the beginning of the program and evaluated at the end. The Health Coach determines if 80% of the goals are met and has the ability to award an incentive prize during the second one-on-one interview.

To evaluate the program, a comparison should be made between a quantitative analysis of the goals achieved and the subjective view of the Health Coach during the interview. 36 participants (63%) reached their goal as judged in person by the Health Coach, whereas only 21 participants (37%) reached their goal in the quantitative analysis. This means that an extra 15 participants received an incentive prize at the discretion of the Health Coach; this resulted in an additional $600 in program expenses over a purely quantitative allocation.

The Health Coach most likely was encouraging continued participation by rewarding the participant even though they did not meet the 80% goal. An alternative approach to this end might be to lower the participant goal from 80% to 75% to allow more liberal rewarding of goals. With this change, 26 participants would have legitimately earned an incentive.
**Participant Satisfaction Survey**

Satisfaction surveys were distributed to all participants in 1997, 1998, and again in 2002. Response rates were 34% (17 of 50) in 1997, 21% (22 of 104) in 1998 and 48% (34 of 71) in 2002 (Appendix B). Initially the first two surveys were mailed to participants. On the third survey, the response rate increased when surveys were distributed by the Health Coach in person at conclusion of the CHIP session. In the survey, participants evaluated the program’s effectiveness and the quality of coaching. The participants also included comments on the program’s ability to help avoid health problems and provide the motivation for behavior change.

Overall the participants were satisfied with the program, with 94% reporting a favorable impression in 1997, 91% in 1998 and 100% in 2002. Respondents felt the CHIP session was helpful, informative and professional. The overall impression was favorable for 100% of the participants in all three years. The Health Coach was rated as knowledgeable by 100%, 91% and 100%, respectively, in the three survey years. However the Health Coach’s performance was positive for only 86% in the second survey, compared to 94% in the first and 100% in the third.

On each of the three surveys, 59%, 50%, and 56% of the respondents used the medical self-care guide. A high majority of those who used it plan to use it again in the future. It was useful in preventing unnecessary visits to health care providers and the emergency room. 40%, 55%, and 74% think it saved them money on health care.

On each of the three surveys, 24%, 14%, and 21% of the respondents used the nurse call center. 75%, 100%, and 71% of those who used it plan on using it again. As was the case with the medical self-care guide, participants considered it useful in preventing unnecessary visits to health care providers and the emergency room. A majority of the participants felt it was a highly valuable employee benefit. (A cost-benefit analysis of both the medical self-care guide and the nurse call center is available in Chapter 10.)

The respondents also made recommendations to improve the program. An increase in motivational follow-up by the Health Coaches was suggested. Additionally, the participants would
like to see incentives offered periodically throughout the program for motivation. They would like
to have journals provided as a reporting tool for increased accountability to the Health Coach. Also
requested was an improved explanation of how a participant could best utilize the program. One
respondent requested the addition of an Employee Assistance Program.

A comparison of actual results and self-reported results was not possible since the survey
results were compiled anonymously to preserve confidentiality. See Appendix J for complete
survey results.

**Program Participation**

124 employees and spouses participated in the program over the six-year period. All
employees who were eligible for benefits did elect to participate. By lowering medical insurance
premiums, the company provided a financial incentive to employees who chose to participate. None
of the participants dropped out of the program voluntarily, but some did leave employment and
therefore left the program. As a result there is no follow-up data as to why an employee would have
left the program voluntarily. The inability to track participants who leave is a limitation of the
work-site setting.
Management Support

The support of management is critical to the success of a program at the work-site. Support can include providing funding and leadership, setting group goals, defining organizational goals, and providing a physical location. Funding may also include:

- Direct and Indirect Payroll – implementation staff, HR/Benefits Department support
- Participant Payroll – time off for participation and scheduling coverage
- Health Insurance Subsidy – subsidizing the cost of health insurance premiums as incentive for employees to participate
- Subcontracted Services – nurse call center, disease management
- Materials – HRA, PREP survey, incentive prizes, medical self-care guides, health education, resource library
- Biometric screenings – total cholesterol, HDL, blood pressure, blood glucose, weight; and
- Miscellaneous expenses – travel, printing, postage, promotional materials.

In addition to the cost of implementation, management must provide the goals for the organization that will be addressed by the program. A system of measurement for goal success should be in place prior to kick-off. Management should define goals such as improved productivity through reduced absenteeism or injury prevention. Other goals potentially include lower health care costs, better teamwork/morale, and lower workers’ compensation costs.

Once the initial HRA and screening data is compiled, a group meeting with management and the program director should be held to review results. The HRA report will identify health risks to target for improvement. In the review of Healthtrax’s initial data the five targets were BMI, blood
pressure, seat belt usage, nutrition, and physical activity. A program plan was developed to address the health risks and quantify goals.

Participation from the company’s management team sets a healthy example for employees. Employees expect management to lead by example. By participating the management team is emphasizing the importance of the program. This type of leadership can impact the success of the program.

The company provides the physical locations for the program’s implementation. Necessary are conference rooms for private screenings and CHIP sessions. Secure space is needed for the Health Coach to keep records and work. Employers can also provide a resource library of health education materials, an employee fitness center, locker rooms for bikers and runners, walking trails, and recreation space. Management support is a key component of a successful work-site program. A major challenge would be faced without adequate funding, competent leadership, specific goals, and convenient space.

**Work-Site, Community and School Setting Comparison**

The work-site is a unique setting because it provides the health promotion program an existing system of communication and structure. Industry has methods of communicating to its employees such as email, paycheck attachments, company newsletters, employee websites, inboxes, electronic bulletin boards, and postings throughout buildings. Surveys and promotional materials can be distributed in accordance with a company’s communication policy. The space and time required to participate are also typically provided by the employer.

Alternative settings for comparison include community-based health promotion programs and school-based programs. Depending upon the target population each setting has its advantages and challenges. Community programs can target the entire family, whereas school based programs benefit only children and young adults. Typically they do not overlap.

Community-based programs are centered on the residents of a particular area, some of whom work outside of the community. The program can be successful in bringing together a
multitude of groups such as senior centers, churches, community service organizations, PTOs, and local government. Challenges may arise in working with the various leadership committees of each group to establish common goals and program structure. The implementation of the community program may also require collaboration from the local health department, the parks and recreation department, local hospitals, and health and fitness centers. As a result, highly coordinated communication efforts may be required and may not be as effective. For implementation, the program may need to have several locations and times to be convenient for participants. Typically, community programs do not target employees who work in the community but live elsewhere.

School-based programs address the needs of the student population through health education, physical education, outdoor recess, and after school activities such as athletic teams, marching band and dance. One-on-one health counseling is not typically provided to students to address their health risks such as poor nutrition, exercise, stress management, obesity, tobacco use, alcohol and drug use, and risky sexual behavior. Parent opinion may be an obstacle when getting consent for a program or addressing certain health promotion topics. Typically the children and young adults are the focus of the program, not the entire family.

Various programs need to be in place to meet national objectives, such as Healthy People 2010. When developing local Public Health initiatives all settings should be considered in the planning. No single program can address the needs for every population center.
COST BENEFIT ANALYSIS

A cost-benefit analysis of the program strengthens the case for health promotion in the workplace. Employers must make a commitment of time and funding when they choose to sponsor a program at their company. For those who have a vested interest such as stockholders, board of directors or owners, demonstrating a return on investment (ROI) helps justify the decision to implement a program. There are four different cost-benefit analyses of the program in this section.

**Health Expenditure Cost-Benefit Analysis**

This analysis is based upon the data provided from the Health Enhancement Research Organization (HERO) Study, "The Relationship Between Modifiable Health Risks and Health Care Expenditures". Included in the study were 46,026 employees from 6 large health care purchasers who completed HRAs and biometric screenings. The authors of the study concluded that common modifiable health risks are associated with short-term increases in the likelihood of incurring health expenditures and in the magnitude of those expenditures. Thus, we can estimate a health expenditure savings for a company using the reduction in modifiable health risks from a health promotion program.

This cost-benefit analysis identifies the number of participants who have changed their status from high-risk to low-risk in the program. The data used is based upon the number of risks reduced by the individual from the HRA outcomes; the five personal goals set during the interview session are not incorporated into the data. Increased risk was not used in the cost-benefit analysis.

**Modifiable Health Risks:**
1) **Body Weight:** BMI reduced to < 25,
2) **Stress Level:** improved coping, tiredness, social support, and physical activity,
3) **Quit Smoking:** quit using tobacco products,
4) **Exercise Habits:** improved aerobic fitness to good, excellent or superior,
5) **Blood Pressure:** reduced to < 140/90 or diastolic reduced to < 100,
6) **Cholesterol:** total cholesterol
reduced to < 240, 7) Alcohol: total beverages consumed weekly reduced to < 7 for females, < 14 for males, 8) Depression: not measured in this program, 9) Blood Glucose: data was incomplete in this program, and 10) Nutrition: not included because the direction of causality is not clear.17

Using the HRA outcomes and HERO data, we can project a reduction in medical expenditures over a short-term period if individuals reduce their risk factors. Table 9 in the Appendix provides a savings estimate per risk factor; multiply the medical expenditure savings amount per risk factor by the number of risks reduced to get total estimated savings. For example, a participant reducing body weight from high-risk to low-risk has a projected annual medical expenditure savings of $747. There were 4 participants who lowered their risk to equal $2,988 in estimated savings. This savings estimate is short-term and is not projected beyond the one year.

There are a total of 43 risks reduced equaling $20,708 in estimated short-term savings for the group. This is the estimated economic benefit for the company.

The cost of implementing the program was $125 per participant per year or $10.42 monthly. The estimated total program cost from 1996-2001 for the 57 participants was $28,175 based upon their length of participation in the program.

The number of participants through the 6 years fluctuated with employment eligibility; starting with 50 and growing to 135 employees and spouses. Data for all program participants was not complete. For the "apples to apples" comparison, a total of 57 employees and spouses had complete data and are included in this cost-benefit analysis. Additional costs were incurred from terminated employees, but are not included in the cost analysis.

To analyze the cost-benefit, divide the estimated savings of $20,708 into the cost of $28,175; this results in a cost-benefit ratio of 1: 0.73. The company’s return on investment (ROI) is 73 cents on the dollar. From this analysis we would project that every dollar spent on the program could potentially produce a return of 73 cents in medical expenditure savings (Table 9, Appendix). This cost-benefit analysis is a conservative estimate and does not include productivity savings due to reduced absenteeism, injury prevention, and improved work quality. Although impossible to
determine if an injury has been prevented, improved health can also have an impact on lowering workers’ compensation costs.

**Medical Self-Care**

A survey was completed with participants to determine usage of the medical self-care program, which included *Health at Home: Your Complete Guide to Symptoms, Solutions, & Self-Care* and access to a 24-hour nurse call-center. Table 10 in the Appendix details the survey cost-benefit results. 71 participants completed the survey in 2002.

The survey asked participants whether or not the guide and call center helped them to avoid unnecessary physician and emergency room (ER) visits. According to respondents, 15 physician visits and 9 ER visits were avoided in one year due to usage of the guide and call center. The employer’s insurance carrier supplied the cost information: the average cost of a physician visit is $90 and an ER trip averages $489. A total savings of $5751 was realized in avoided unnecessary visits. The medical self-care guide and the nurse call center contributed equally to the savings.

The average savings per survey respondent in one year is $81, whereas the cost of the medical self-care program was $32 in the first year and $28 for subsequent years. In the first year, for every dollar invested the company saved $2.50, a 1:2.5 return on investment (ROI). The ROI estimate improves to 1:2.9 in the second year due to reduction in materials cost (Table 10, Appendix).

Compared to other components of the program, medical self-care has the fastest ROI. It is a program that can have a short-term result on lowering health care costs, impacting utilization trends and creating a culture of self-responsibility versus entitlement. Combining a medical self-care program with a health promotion program, as was done here, can have a strong impact on reducing the trend towards higher health care costs.

**Absenteeism Cost Analysis**

The mean average number of sick days per year did not significantly vary from one test to the second; 1.58 compared to 1.65 annually (total of 90 sick days in test 1 and 94 in test 2). Yet if
compared individually, 26 participants reported a decrease in the number of sick days, 19 had no change, and 12 showed an increase in the number of sick days. Of the 12, four had reported a significant increase of 4 or more sick days.

Using the net change in absenteeism numbers, the following is a cost analysis of absenteeism. The average company yearly salary is $43,916 per employee in 2002. By calculating salary, benefits, and overhead costs we estimate a full labor cost of $124,502 per employee using a formula provided by Harris Rothenberg International, a human resource consulting firm specializing in risk analysis. Over the course of a 260-day work-year the cost of absenteeism equals $479 per day. A total of 90 sick days at a cost of $43,110 were reported in test 1 compared to 94 sick days at a cost of $45,026 in test 2. This represents an increase of $1,916 due to lost productivity over the testing period.

The sick day data was collected from the HRA; since the number of annual sick days was self-reported it could be subject to recall bias or a reporting artifact. Additionally, the company is in the retail industry and several employees are shift-workers. This type of employee may have someone cover his or her shift when sick, representing less of a loss in productivity than typical.

To reduce unnecessary sick days it would be recommended to launch an awareness campaign using medical self-care strategies. The long-range goal would be to increase productivity. On a smaller scale, the 12 employees who had an increase in sick days should be offered in a confidential manner a disease management option to identify and cope with their sick care concerns.

**Obesity Cost-Analysis**

Research on the health risks of obesity has linked obesity to high rates of chronic disease more so than smoking, drinking or living in poverty. Health economist, Roland Strum and physiatrist, Kenneth Wells have determined there is an annual increase of $395 in health care costs per obese person. We can compare this amount to $230 for smoking and $150 for heavy drinking from the Strum and Wells data.
In the first HRA, 22 tested in the overweight category for BMI and 6 in the obese category. In the second test, four were able to lower their risk from overweight to normal. Five participants who were in the normal category to start became overweight. One participant changed from overweight to obese. The second HRA totals had 22 in the overweight category (no change from the first HRA) and 7 in the obese category (one more than in the first HRA). Using the Strum and Wells economic data and HRA survey data, a cost-analysis would project an excess of $2765 in medical expenditures directly attributed to obesity (7 obese multiplied by $395). The rise in obesity in this population is something to monitor closely due to its added effect of increasing health care costs; however, it is unclear whether this was an effect of the program, since there are higher increases in prevalence of obesity in the general population based on NHANES national data, and there was no control group for this study.
RECOMMENDED ACTION STEPS

The following chapter details actionable steps for the company and the program managers. The recommendations are based upon a complete evaluation of the work-site health promotion program.

**Health Risk Appraisal and Screenings**

Increase the focus on healthy body weights and cholesterol levels. Promote physical activity, low back safety and nutrition to continue the positive trend. Closely monitor blood pressure to ensure the negative trend does not continue. Increase alcohol awareness for the group. Continue to monitor tobacco users to determine when their readiness to quit is at peak. Target those at risk for high stress to manage and refer when necessary.

**Quantifiable Risk Factors**

Continue to work towards lowering the average number of risk factors per participant. The starting average of four risk factors was then reduced to three in the second test. Without too much change to the program, a maintenance goal of three for the following testing period would be acceptable.

**Interview Outcomes**

Participants selecting the more challenging goals such as smoking cessation and weight loss should receive more mandatory follow-up from the Health Coach. If participants have selected a low follow-up frequency, then their personal goals should be re-evaluated periodically and changed based upon actual readiness.

**Personal Strengths Profile (PREP)**

This program works most effectively with participants who have an innovative problem solving style and communicate objectively. This style enjoys creating their personal intervention
plan and is results-oriented. A recommended action step would be to identify methods to improve the success rates of the participants who have systematic/personal style. Persons with this style need more data to support their decisions, organized steps for their implementation plan, and more guidance and support from the Health Coach.

**Program Administration**

**Months in Program:** Encourage program participation since length of participation correlates with a successful outcome. **Follow-up Frequency:** Check in periodically with Level 1 and 2 participants to see if their readiness has increased. And if so, increase follow-up to support the participant in reaching goals. **Measuring Goal Accomplishment:** Change the participant goal from 80% to 75% to reward more participants for their goal accomplishment.

**Participant Satisfaction Survey Results:** Provide monthly journals for increased participant accountability to the Health Coach. Develop marketing methods to communicate how a participant can best utilize the program. **Group Workshops:** The addition of group workshops to the program would encourage peer support and collaboration towards change. Risk factors should be addressed that affect more than half of the group such as nutrition, physical activity, and weight management.

**Work-Site Setting**

Employer sponsored programs are essential to the success of national objectives such as Healthy People 2010 and Steps to a Healthier U.S. Workforce. The work-site setting needs to be included when developing local public health initiatives to address the health promotion needs of a community. The support of management continues to be a priority for every work-site program. Management support must include providing funding and leadership, setting group goals, defining organizational goals, and providing the physical locations required to implement a successful program. When they are present in a work setting, it is strongly advisable that local unions be brought in to collaborate on program administration.20

A worksite program evaluation conducted by Glorian Sorensen et al. demonstrated that occupational health interventions when combined with health promotion could have an added
impact on a program’s effectiveness. The study determined that levels of participation were greater and the number of contacts with management increased in the combined program. Collaboration with the company’s occupational health and safety program could lead to improved outcomes in the current program.

Industry is the largest private payer of health care expenses, second to the federal government’s Medicare and Medicaid programs. The amount of these expenses can affect a company’s profitability and survival. As a result, industry does have the financial motivation to implement a work-site health promotion program. Yet, they do not have the knowledge and tools required for a successful program. The Public Health field can contribute the experience and know-how required to implement a program at the work-site. By working together industry and public health can be successful in accomplishing their mutual goals.

**Cost-Benefit Analysis**

**Health Expenditure Cost-Benefit Analysis:** A more complete analysis could be performed if the program evaluated depression and blood glucose. A reduction in risk for someone at high risk for depression would result in an estimated saving of $1510 per year. A reduction in risk due to a high blood glucose level would save an estimated $907 per year. A reduction in these two risk factors has the potential to reduce large medical expenditures, and they need to be tracked by the program.

**Medical Self-Care:** Continue to supply new participants with the medical self-care guide and all participants with access to the nurse call center. Improve usage of the medical self-care program by promoting its benefits in a marketing campaign.

**Absenteeism Cost Analysis:** Add a disease management component to the program to address increasing absenteeism and to reduce the impact of chronic illness on productivity i.e. asthma, depression. At a productivity cost of $479 per day, this negative trend in absenteeism needs to be co-managed by Human Resources.
**Obesity Cost Analysis:** Obesity for this group is a negative trend that needs to be a high priority. More than half of the participants are either overweight or obese. A special effort to address the issues surrounding weight should be made by the Health Coach during CHIP sessions. In addition, a weight loss challenge could be implemented to encourage group participation. The following chapter summarizes the findings of the study.
FINDINGS SUMMARY AND CONCLUSION

Is a health promotion program at the work-site effective in improving health status, lowering health care costs, and reducing absenteeism?

**Health Status**

Regarding the health status of the group, there were improvements in seven of the twelve health risk categories: Nutrition, Fruits & Vegetable Consumption, Physical Activity, Seat Belt Usage, Stress Level, Low-Back Safety, and Tobacco Usage. Individually, the average number of risk factors reduced was 1.26 per participant. In the self-reported group outcome, 64% of participants reported that they improved their overall health status. Overall, the health status of the group improved.

**Health Care Costs**

The second part of the research question analyzes whether or not the program could have an impact on health care costs. A health care cost-savings estimate was determined based upon the reduction in modifiable health risk factors that were accomplished over the program term. The savings estimate was $20,708.

Through the medical self-care component of the program the savings was an estimated $5751 in avoided unnecessary physician or ER visits. The total estimated reduction in health care costs equaled $26,459. This health care cost reduction is a conservative estimate and does not include savings due to possible injury prevention, improved productivity and lower workers’ compensation costs.

Ideally the program would fund itself through its savings. A reduction in expenses could fund the gap between program cost and estimated savings, although the program is already run very efficiently. A cutback in the program components could result in less successful outcomes. An
alternative would be to focus on improving health risk management, which would decrease the number of risk factors and increase the potential to save further on health care costs.

**Absenteeism**

The third part of the research question concerned whether the program would succeed in reducing absenteeism, which it did not. Instead, the group’s rate of absenteeism (based on self-report) had a small increase from 90 to 94 sick days per year. This trend should be monitored closely, even though the results showed an insignificant increase. In this study there was no investigation of reasons for taking sick days such as, children’s illness or acute sickness. Many of the potential causes of absenteeism were not addressed by this type of health promotion program.

**Conclusion**

Through the results of this program evaluation we have determined that work-site health promotion is an effective tool in health risk management. This paper also demonstrated that a work-site health promotion program could virtually fund itself in health care savings alone. Also, there is the potential to reduce workers’ compensation costs and improve productivity. The findings of this pilot study support the need for more research, with larger sample sizes and generalizability, in the area of work-site health promotion.

With 46% of the U.S. population working, it is imperative that industry is included in the planning for a healthier nation. Local unions and occupational health and safety committees also have a vested interest in worker health; bringing them to focus on improving employee health may increase program participation and lead to better results. The work-site setting must be included in public health planning in order to meet important national health objectives.
ENDNOTES


4 E2 Consulting, LLC. HealthCalc Health Risk Assessment Questionnaire; 1997; Dallas, Texas.

5 Mann, JoAn, PREP Profile Systems Inc; 1996; Bend, Oregon.


17 The HERO results find an increase in cost of $274 per individual when risk level is lowered from high to low. This increase may be due to inaccurate recollection bias of actual eating habits.


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### TABLE 1

Risk Reduction Results

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<tr>
<th>REDUCED RISKS FACTORS</th>
<th># OF RISKS IN HIGH RISK GROUP</th>
<th># RISKS REDUCED</th>
<th>% REDUCTION IN RISK</th>
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<td>Total</td>
<td>227</td>
<td>106</td>
<td>47%</td>
</tr>
</tbody>
</table>

Sample Size: 57
TABLE 2

Risk Increase Results

<table>
<thead>
<tr>
<th>INCREASED RISK FACTORS</th>
<th># OF RISKS IN LOW RISK GROUP</th>
<th># RISKS INCREASED</th>
<th>% INCREASE IN RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol</td>
<td>51</td>
<td>9</td>
<td>18%</td>
</tr>
<tr>
<td>BMI</td>
<td>29</td>
<td>5</td>
<td>17%</td>
</tr>
<tr>
<td>Systolic BP</td>
<td>50</td>
<td>5</td>
<td>10%</td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>51</td>
<td>4</td>
<td>8%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>57</td>
<td>4</td>
<td>7%</td>
</tr>
<tr>
<td>Stress</td>
<td>52</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>Fitness</td>
<td>6</td>
<td>1</td>
<td>17%</td>
</tr>
<tr>
<td>Seat belt usage</td>
<td>45</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Tobacco</td>
<td>55</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Low back safety</td>
<td>57</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Nutrition</td>
<td>5</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Fruits &amp; veg</td>
<td>2</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>460</td>
<td>32</td>
<td>7%</td>
</tr>
</tbody>
</table>

Sample Size: 57
TABLE 3

Quantifiable Risk Factor Outcomes

<table>
<thead>
<tr>
<th>HIGH-RISK</th>
<th>RISKS - TEST 1</th>
<th>RISKS - TEST 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total # risk factors</td>
<td>227</td>
<td>155</td>
</tr>
<tr>
<td>Average # of risk factors</td>
<td>3.98</td>
<td>2.72</td>
</tr>
</tbody>
</table>

AVERAGE # RISK FACTORS REDUCED

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Net risks reduced</td>
<td>72</td>
</tr>
<tr>
<td>Number of participants</td>
<td>57</td>
</tr>
<tr>
<td>Average # risks reduced per participant</td>
<td>1.26</td>
</tr>
</tbody>
</table>

PARTICIPANT NET CHANGE # PARTICIPANTS PERCENT

<table>
<thead>
<tr>
<th></th>
<th># PARTICIPANTS</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced risks overall</td>
<td>35</td>
<td>61%</td>
</tr>
<tr>
<td>Increased risks overall</td>
<td>7</td>
<td>12%</td>
</tr>
<tr>
<td>No net change to risks</td>
<td>15</td>
<td>26%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>57</td>
<td>100%</td>
</tr>
</tbody>
</table>

Sample Size: 57
Sample Size: 57
### TABLE 4

Biometric Screening Results

<table>
<thead>
<tr>
<th>BIOMETRIC OUTCOMES</th>
<th>PRE-TEST</th>
<th>POST-TEST</th>
<th>% CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cholesterol</td>
<td>188</td>
<td>192</td>
<td>2%</td>
</tr>
<tr>
<td>Blood Pressure - Systolic</td>
<td>117</td>
<td>121</td>
<td>3%</td>
</tr>
<tr>
<td>Blood Pressure - Diastolic</td>
<td>74</td>
<td>76</td>
<td>3%</td>
</tr>
<tr>
<td>BMI</td>
<td>25.9</td>
<td>26.1</td>
<td>1%</td>
</tr>
<tr>
<td>Body Weight</td>
<td>169</td>
<td>171</td>
<td>1%</td>
</tr>
<tr>
<td>Percent Body Fat</td>
<td>23.2</td>
<td>23.6</td>
<td>2%</td>
</tr>
</tbody>
</table>

Sample Size: 57

### TABLE 5

Interview Method Outcomes

<table>
<thead>
<tr>
<th>FREQUENCY OF GOALS SELECTED BY PARTICIPANTS - INTERVIEW DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rank Order</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
</tbody>
</table>

Sample Size: 57
APPENDIX A

PERSONAL STRENGTHS PROFILE SURVEY

DIRECTIONS:

Use a scale of 1 to 5, with 1 being least and 5 being most, to select your response. Darken the appropriate box (□), pressing firmly.

EXAMPLE: TALKATIVE □ □ □ □ □

DO NOT WRITE IN THIS AREA

PART I

ANSWER THIS PART ACCORDING TO • • • HOW YOU WOULD DESCRIBE YOURSELF • • • • • • • • • • •

LEAST □ □ □ □ MOST □ □ □ □

TALKATIVE □ □ □ □ □ BOLD □ □ □ □
SERIOUS □ □ □ □ □ DOMINANT □ □ □ □
RESTLESS □ □ □ □ □ KIND □ □ □ □
SELF-ASSURED □ □ □ □ □ LOYAL □ □ □ □
PLEASANT □ □ □ □ □ SPIRITED □ □ □ □
CAREFUL □ □ □ □ □ GENTLE □ □ □ □
CALM □ □ □ □ □ COMPETITIVE □ □ □ □
DARING □ □ □ □ □ SHY □ □ □ □
FLEXIBLE □ □ □ □ □ NEIGHBORLY □ □ □ □
CONVINCING □ □ □ □ □ HESITANT □ □ □ □
PRIVATE □ □ □ □ □ INDEPENDENT □ □ □ □
PRECISE □ □ □ □ □ EAGER □ □ □ □

PART II

ANSWER THIS PART ACCORDING TO • • • HOW OTHERS WOULD DESCRIBE YOU • • • • • • • • • • •

LEAST □ □ □ □ MOST □ □ □ □

BRAVE □ □ □ □ □ DEDICATED □ □ □ □
CAREFUL □ □ □ □ □ FORCEFUL □ □ □ □
INDECISIVE □ □ □ □ □ UNHURRIED □ □ □ □
LIVELY □ □ □ □ □ COURAGEOUS □ □ □ □
SPEEDY □ □ □ □ □ SYSTEMATIC □ □ □ □
CHARITABLE □ □ □ □ □ PATIENT □ □ □ □
ADMIRED □ □ □ □ □ CHEERFUL □ □ □ □
OPTIMISTIC □ □ □ □ □ ARGUMENTATIVE □ □ □ □
DEMANDING □ □ □ □ □ ENTHUSIASTIC □ □ □ □
PERSUASIVE □ □ □ □ □ IMPATIENT □ □ □ □
LOYAL □ □ □ □ □ STEADY □ □ □ □
ADVENTUROUS □ □ □ □ □ QUIET □ □ □ □

TYPE: BE SURE YOU HAVE MARKED YOUR RESPONSE FOR EACH WORD!

Name __________________________ Date __________________________

Organization __________________________ Title __________________________

(© revised 1986, John A. Mayer DIA PREP Profile Systems, Inc., Bend, Oregon)

WHEN FINISHED, PLEASE WAIT FOR FURTHER INSTRUCTIONS • • • • •
FIGURE 2

Months in Program Success Rate Graph

![Graph showing participants at or above 80% success rate over months.]

Sample Size: 57

TABLE 6

Successful Participants & Months in Program

<table>
<thead>
<tr>
<th>MONTHS</th>
<th>OUTCOME 80% OR ABOVE</th>
<th>GROUP TOTALS</th>
<th>PROPORTION</th>
<th>95% CONFIDENCE INTERVAL*</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 to 24 (Group 1)</td>
<td>4</td>
<td>13</td>
<td>0.31</td>
<td>0.13 0.58</td>
</tr>
<tr>
<td>28 to 47 (Group 2)</td>
<td>6</td>
<td>18</td>
<td>0.33</td>
<td>0.16 0.56</td>
</tr>
<tr>
<td>60 to 74 (Group 3)</td>
<td>11</td>
<td>26</td>
<td>0.42</td>
<td>0.26 0.61</td>
</tr>
<tr>
<td>TOTAL</td>
<td>21</td>
<td>57</td>
<td>0.37</td>
<td></td>
</tr>
</tbody>
</table>

Sample Size: 57

*E. B. Wilson procedure used without a continuity correction.
TABLE 7

Successful Participants & Follow-up Frequency

<table>
<thead>
<tr>
<th>FOLLOW-UP FREQUENCY</th>
<th>OUTCOME 80% OR ABOVE</th>
<th>LEVEL TOTALS</th>
<th>PROPORTION</th>
<th>LOWER</th>
<th>UPPER</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL 1</td>
<td>6</td>
<td>12</td>
<td>0.50</td>
<td>0.25</td>
<td>0.75</td>
</tr>
<tr>
<td>LEVEL 2</td>
<td>10</td>
<td>36</td>
<td>0.28</td>
<td>0.16</td>
<td>0.44</td>
</tr>
<tr>
<td>LEVEL 3</td>
<td>4</td>
<td>8</td>
<td>0.50</td>
<td>0.22</td>
<td>0.78</td>
</tr>
<tr>
<td>LEVEL 4</td>
<td>1</td>
<td>1</td>
<td>1.00</td>
<td>0.21</td>
<td>1.00</td>
</tr>
<tr>
<td>LEVEL 5</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>SUBTOTALS</td>
<td>21</td>
<td>57</td>
<td>0.37</td>
<td>0.25</td>
<td>0.75</td>
</tr>
</tbody>
</table>

Sample Size: 57

*E. B. Wilson procedure used without a continuity correction.

TABLE 8

Follow-up Frequency & Outcomes

<table>
<thead>
<tr>
<th>LEVEL 1 &amp; 2</th>
<th>LEVEL 3 &amp; 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTCOME BELOW 80%</td>
<td>32/48 67%</td>
</tr>
<tr>
<td>OUTCOME 80% OR ABOVE</td>
<td>16/48 33%</td>
</tr>
</tbody>
</table>

Sample Size: 57
## HealthASSIST Participant Survey Results

<table>
<thead>
<tr>
<th>Date</th>
<th>Surveys Distributed</th>
<th>Survey Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>50</td>
<td>17 (34%)</td>
</tr>
<tr>
<td>1998</td>
<td>104</td>
<td>22 (21%)</td>
</tr>
<tr>
<td>2002</td>
<td>71</td>
<td>34 (48%)</td>
</tr>
</tbody>
</table>

### Medical Self Care Guide: Health at Home

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>1998</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used the Guide</td>
<td>59%</td>
<td>50%</td>
<td>56%</td>
</tr>
<tr>
<td>Plan to use it again</td>
<td>100%</td>
<td>100%</td>
<td>95%</td>
</tr>
<tr>
<td>Think it is a source of good health advice</td>
<td>100%</td>
<td>100%</td>
<td>95%</td>
</tr>
<tr>
<td>Feel it is an invaluable employee benefit</td>
<td>100%</td>
<td>82%</td>
<td>95%</td>
</tr>
<tr>
<td>Used guide prior to contacting physician about a health issue</td>
<td>70%</td>
<td>73%</td>
<td>79%</td>
</tr>
<tr>
<td>Prevented an unnecessary visit to health care provider</td>
<td>60%</td>
<td>45%</td>
<td>58%</td>
</tr>
<tr>
<td>Prevented an unnecessary visit to the emergency room</td>
<td>10%</td>
<td>0%</td>
<td>26%</td>
</tr>
<tr>
<td>Think it better prepared them for a visit to health care provider</td>
<td>50%</td>
<td>64%</td>
<td>74%</td>
</tr>
<tr>
<td>Think it saved them money on health care</td>
<td>40%</td>
<td>55%</td>
<td>74%</td>
</tr>
</tbody>
</table>

### Nurse Triage Call Center: 24-Hour, Toll Free

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>1998</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used the call center</td>
<td>24%</td>
<td>14%</td>
<td>21%</td>
</tr>
<tr>
<td>Plan to use it again</td>
<td>75%</td>
<td>100%</td>
<td>71%</td>
</tr>
<tr>
<td>Find it easy to use</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Feel it is an invaluable employee benefit</td>
<td>100%</td>
<td>100%</td>
<td>86%</td>
</tr>
<tr>
<td>Used prior to contacting physician about a health issue</td>
<td>25%</td>
<td>67%</td>
<td>71%</td>
</tr>
<tr>
<td>Prevented an unnecessary visit to health care provider</td>
<td>25%</td>
<td>0%</td>
<td>61%</td>
</tr>
<tr>
<td>Prevented an unnecessary visit to the emergency room</td>
<td>0%</td>
<td>33%</td>
<td>71%</td>
</tr>
<tr>
<td>Think it better prepared them for a visit to health care provider</td>
<td>25%</td>
<td>67%</td>
<td>71%</td>
</tr>
</tbody>
</table>
### Continuous Health Improvement Planning (CHIP) Sessions

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>1998</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHIP session was helpful</td>
<td>100%</td>
<td>91%</td>
<td>100%</td>
</tr>
<tr>
<td>CHIP session was informative and professional</td>
<td>94%</td>
<td>91%</td>
<td>91%</td>
</tr>
<tr>
<td>Overall Impression of CHIP session was favorable</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Health Coach was knowledgeable</td>
<td>100%</td>
<td>91%</td>
<td>100%</td>
</tr>
<tr>
<td>Health Coach’s performance was positive</td>
<td>94%</td>
<td>86%</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Overall Impression of HealthASSIST

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>1998</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable overall impression</td>
<td>94%</td>
<td>91%</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Participants’ Comments

**Program’s Effectiveness:** The program has been very effective at getting my wife and I to discuss our health and wellness goals and work together to achieve them.

**Coaching Quality:**
- [My Health Coach] Susan is head and shoulders above the other coaches I’ve recently had. Susan is able to deliver the program. The other coaches since Sara Shannon-Tarca were not.
- Susan is helping me eat healthy.
- I thought the program was well run and an efficient use of time. I love the medical guide and I am sure I will use the nurse in the future.

**Health Problem Prevention:** I think it’s a great idea. It helps people evaluate themselves and discuss matters with someone who is out to help and prevent future health problems, and makes them aware of the proper action to be taken.

**Benefit to Employees:**
- I believe the HealthASSIST Program is a great added bonus to employees. The material provided is easy to read and very informative. I’m glad to see Healthtrax enforcing wellness into their employees. Thank you.
- Even though I have not used it much due to my health not being a problem at this time I do believe it’s a good program.
- I think HealthASSIST is great! I wouldn’t change a thing.

**Motivation:** [The] fitness prescription helped keep me motivated to obtain my goals. Nurse call center was very informative.

**Nurse Call Center:**
- The nurse call center was the most valuable tool we used especially with a small child.
- I generally don’t use the call center anymore (or as much) because my kids’ pediatrician has nurses on call 24 hours to answer questions.
- The call center would be good for people that know nothing, if you have questions that are more involved “call your doctor” was the answer!
Participants’ Recommended Changes

More Follow-up:
- I feel there should be more follow-up.
- I feel HealthASSIST is an EXCELLENT Program. I do feel consistent follow-up is essential. In the past I have received Health info on my goals, which encouraged me to be more compliant with them. It would be helpful to receive quarterly reminders (mailings, emails, phone calls, etc.) to keep us motivated throughout the year!

Intermediate Incentives: I think the program’s great. I do feel that there should be some type of incentive to receive monetary rewards…intermediate rewards could be great incentive for future participants.

Provide Record-Keeping Journals: If we are expected to keep records (food, workout journals, etc.) there should be some standard format provided — a book or originals to copy. Coaching should be quarterly and sheets, journals, etc. faxed or mailed prior to these sessions.

EAP: Could add an Employee Assistance Program.

Improve Explanation of Benefit: Do a better job of explaining what HealthASSIST is all about. How we can use it to our benefit.
TABLE 9

Cost Benefit Analysis Chart

<table>
<thead>
<tr>
<th>Modifiable Health Risk Behaviors &amp; Measures</th>
<th>Annual Medical Expenditure Savings Amount</th>
<th># of Risks Reduced (not Net reduced)</th>
<th>Estimated Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Weight</td>
<td>$747</td>
<td>4</td>
<td>$2,988</td>
</tr>
<tr>
<td>Stress Level</td>
<td>$709</td>
<td>5</td>
<td>$3,545</td>
</tr>
<tr>
<td>Quit Tobacco</td>
<td>$77</td>
<td>1</td>
<td>$77</td>
</tr>
<tr>
<td>Exercise Habits</td>
<td>$444</td>
<td>28</td>
<td>$12,432</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>$407</td>
<td>2</td>
<td>$814</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>$284</td>
<td>3</td>
<td>$852</td>
</tr>
<tr>
<td>Excessive Alcohol Use</td>
<td>-$296</td>
<td>0</td>
<td>$0</td>
</tr>
</tbody>
</table>

| Total Number of Risks Reduced              | 43                                        |
| Estimated Claims Savings                   | $20,708                                   |
| Number of Participants                     | 57                                        |
| Average Claims Savings per Participant     | $363                                      |
| Average Claims Savings per Risk Reduced    | $482                                      |
| Total Program Cost                         | $28,175                                   |
| Annual Cost per Participant                | $125                                      |
| Cost Benefit Ratio                         | 1: 0.73                                   |

Sample Size: 57
TABLE 10

Medical Self-Care Cost Benefit Analysis

2002 Utilization Survey Results

<table>
<thead>
<tr>
<th>Service or Product</th>
<th>Quantity</th>
<th>Cost Per Employee</th>
<th>Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Self-Care Guide</td>
<td>71</td>
<td>6.75</td>
<td>$479</td>
</tr>
<tr>
<td>24-hour Nurse Triage Center</td>
<td></td>
<td></td>
<td>$1,800</td>
</tr>
<tr>
<td>Total Program Cost</td>
<td></td>
<td></td>
<td>$2,279</td>
</tr>
<tr>
<td>Average Cost per Participant</td>
<td></td>
<td></td>
<td>$32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Annual Unnecessary Visits</th>
<th>Number Avoided Per</th>
<th>Average Cost of Visit</th>
<th>Projected Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician</td>
<td>15</td>
<td>$90</td>
<td>$1,350</td>
</tr>
<tr>
<td>Emergency Room</td>
<td>9</td>
<td>$489</td>
<td>$4,401</td>
</tr>
<tr>
<td>Annual Total Savings</td>
<td></td>
<td></td>
<td>$5,751</td>
</tr>
<tr>
<td>Average Savings per Participant</td>
<td></td>
<td></td>
<td>$81</td>
</tr>
</tbody>
</table>

Net Savings to Company

| One-Year ROI                      | 2.5                 |
| ROI Over 3 Years*                 | 2.9                 |

* The ROI increases over time because the guides are not purchased every year.
APPENDIX C

HealthCalc: Health Risk Assessment Questionnaire

Hard copy available on request.