

Overview

Studies conducted to date reveal that Caterpillar's Healthy BalanceSM program (the Program) has been highly successful in reducing healthcare and related costs, and in reducing health risks and improving the health status of the participating population of employees and spouses. Key findings to date include:

- High participation and retention of eligible population: 96%—incented employees, 74%—spouses
- Reduction in projected medical expenses: net savings of \$700 million projected by year 2015
- Lower medical expenses for program participants vs. non-eligibles
- Reduction in aggregate health risk: 6% decrease for low risk cohort (N = 22,114), 14% decrease for high risk cohort (N = 2,321)
- Reduction in many individual risk factors
- Improvement in self-efficacy (as measured by stage of readiness-to-change)

We attribute this success to a variety of factors. Most prominent among these are the process through which the program was developed, the unique design of our program, and the emphasis placed on ongoing evaluation and continuous improvement. These factors combine to create a program that can maximize both short- and long-term savings.

Below, we briefly review the history of the Program, as it provides a framework for the subsequent discussion of program impact. Following this, we provide details of the findings of the various evaluation studies conducted to date, documenting the success of the Program. We also summarize the findings of published studies documenting the effectiveness of the Healthtrac[®] Program which—with considerable adjustment for the Caterpillar eligible population, and its corporate culture and goals—is a core component of the Healthy Balance program.

Background

History. The Program was developed based on in-depth analysis of Caterpillar's medical and related expenditures, as well as the covered population's health risk factors and health status. These analyses were initiated in the early 1990s when Caterpillar's medical expenses were increasing at double-digit rates for the first time ever. Based on these trends and other factors (e.g., health risks of the covered population), Caterpillar projected that its healthcare costs would exceed \$1 billion/year by the year 2000.

Development process. A Task Force was formed under the direction of the Executive Office to address this serious concern. Composed of leaders from key areas throughout the organization, and including outside expert consultants, the Task Force developed a three-phased approach to reducing the company's overall

healthcare costs and medical inflation rate, while maintaining the high quality of healthcare expected by Caterpillar employees.

- Phase 1: Manage healthcare costs by creating a network of preferred providers, establishing exclusive arrangements with hospitals, and obtaining volume discounts on prescription drugs
- Phase 2: Guide network healthcare providers to enhance their delivery of high quality, cost-effective medical care by establishing evidence-based practice protocols
- Phase 3: Reduce demand for healthcare services by improving the health of Caterpillar employees and dependents.

The first two phases were successful in reducing the projected increases. By the mid-1990's, revised projections revealed that healthcare costs would be close to \$500 million by the year 2000, almost half what was predicted in the early 1990's. While successful in stemming the increase in healthcare costs, the "supply side" approaches of Phases 1 and 2 could not be expected to maintain reduction rates without compromising quality of care. Further, actuarial projections (e.g., by Deloitte & Touche and other consultants) indicated that industry-wide medical and prescription drug cost trends would return to double-digit inflation rates by the end of the decade. Caterpillar's leadership recognized that additional and lasting cost reductions could only be achieved through the "demand side" focus of Phase 3—by reducing the demand for healthcare services through improving the health of Caterpillar employees and their dependents. To this end, Phase 3, the Healthy Balance program, was created and implemented.

Healthy Balance program objectives. The Task Force's overriding objective in creating the Program was that it be consistent with, and supportive of, *Healthy People 2000/2010* goals. In particular, the Program supports *Healthy People 2010's* primary goal of increasing "*life expectancy and quality of life by helping individuals gain the knowledge, motivation, and opportunities they need to make informed decisions about their health.*"

Program design: process and features.

Broad collective experience of the Task Force aided in Program design through:

- **In-depth analyses of the health risks underlying Caterpillar's medical and absenteeism experience.**
- **Detailed review and analysis of world literature on evidence-based preventive medicine.**
- **Designing components used in proven programs documented in the professional literature and widely considered to be best practice.** The Task Force conducted extensive research, and consulted with outside experts to identify companies that were considered to have "best in class" elements of health promotion/disease prevention programs (e.g., Steelcase). Additionally, Larry Chapman, author of *Proof positive: analysis of the cost-effectiveness of worksite wellness* (3rd ed. Seattle [Wash]: Summex Corporation, 1996), has served as a consultant to the program. Caterpillar also conducted phone calls, face-to-face meetings, and on-site visits with more than 21 companies, including Boeing, Coca-Cola, Coors, First Chicago, Hersheys, Motorola, and Quaker Oats.

The following were identified as critical components of a successful program: customized self-care book and newsletter to all eligible employees; inclusion of spouses in eligible population; periodic health assessment and health promotion intervention focusing on modifiable health risks and self-efficacy; serial tracking; segmentation into low and high risk cohorts; individualized interventions, varying in type and frequency, based on level of risk and stage of readiness-to-change; strong incentives to maximize participation; integration with toll-free health information line and existing EAP, health screening exams, etc.; and, consistency with standard medical practice. Sound evidence indicates health promotion interventions are cost-effective in addressing our focus areas: smoking, hypertension, exercise, stress, substance abuse, self-care, seat-belt use, nutrition, obesity, and self-efficacy in healthcare decisions.

Healthtrac was identified as "best in class," proven by randomized controlled trials, and unequivocally effective at both cost reduction and health improvement. At the same time, we recognized deficiencies in the Healthtrac program from the standpoint of long-term participation. While Healthtrac had achieved levels ranging from 50% to 70%, we wanted to reach 100% (or as close to this as possible). Additionally, we wanted to include spouses.

We also wanted to adapt the program to reflect our corporate culture and values. All components of the Program are customized under the Healthy Balance service-mark. To this end, we worked closely with Healthtrac to develop text, questions, and responses appropriate to our culture and population. We customized the Healthtrac health assessment used in the Healthy Balance program to meet the needs of our population and the objectives of our Program. For example, questions were added to capture stages of readiness-to-change behaviors related to cigarette smoking, obesity, and physical inactivity, and to address prophylactic aspirin therapy. The personalized feedback letters were also customized for the Caterpillar population and Program.

We note that, based on the results of the Healthy Balance program, Healthtrac has incorporated many of our changes into its standard programs.

Evaluating worksite- and community-based local health promotion initiatives. Healthy Balance is the core program delivered uniformly to more than 41,000 employees and spouses at more than 142 locations around the world. In addition, non-eligible (union) employees benefit from the Program's encouragement of site-specific health promotion programs. Results from the core program drive local initiatives such as: healthy food choices in cafeterias and vending machines, smoke-free policies, subsidies for nicotine patches, on-site classes (e.g., exercise and stress management classes), walking paths, health education materials, "Lunch and Learn" sessions, "buddy" programs (e.g., for smoking cessation), lactation rooms for nursing

mothers, reimbursement for fitness clubs, on-site screenings (e.g., blood pressure, mammography, and sigmoidoscopy), safety programs, and support of community programs and events. These local initiatives are managed through cross-functional wellness teams. Most facilities have at least one Healthy Balance coordinator who receives communications on a monthly basis and attends an annual Healthy Balance Coordinator Conference.

Maximizing Program savings. The Program is designed to maximize savings and to sustain them over time. In addition to the program features listed above, the Program has several features that maximize potential program savings. They include:

- **Visible and strong support/commitment from top management.** This is demonstrated by Executive Office funding of the Program and the high visibility of top management in Program communications. Senior management is featured in videos and newsletters, and at meetings. A Corporate Health Statement supporting the Program, signed by the CEO, was disseminated to the entire Caterpillar population worldwide and was the lead article in the premier issue of the Program's in-house quarterly newsletter, *Healthy Balance News*. The newsletter features a regular, first-page column by Dr. Donald Crane, Corporate Medical Director.
- **Strong, consistent communication campaign.** A recent national study found a clear correlation between high-performing organizations and strong communications practices. (Watson Wyatt Worldwide. *1999 Communications Study. Linking Communications with Strategy to Achieve Business Goals*.) The most successful businesses are those with effective communications programs that involve senior management, link communications initiatives to corporate business objectives, and provide feedback to employees. The communications campaign that is the cornerstone of the Program includes these components and uses a variety of media: voice mail; email; website; print—e.g., memos, in-house newsletters specifically tailored to the culture and needs of the Caterpillar population (quarterly *Healthy Balance News* and bi-weekly *Cat Folks*); and, meetings. Semi-annual reports are provided to vice-presidents, and presentations are given to the Executive Office twice a year to update them on the program.
- **Promotion.** Program promotion is closely linked to the communications campaign. Just as Caterpillar weighed the development of the Program with the same rigor used to evaluate an investment in a new product, it undertook promotion of the Program with the same approach and intensity as it does the marketing of its new products. The Program service-mark used in all Program communications has become the banner for the "Caterpillar Employee Health Initiative". The Program was launched with a series of promotions, including a video featuring senior management and Program staff discussing the rationale for the Program, and the benefits to both the company and individual employees and their families; a series of over 500 on-site presentations led by business unit management and Program staff to introduce the Program and answer questions; a raffle; a line of Healthy Balance active wear to reinforce the Program name and to generate affinity and support of the Program; and, public relations activities to gain visibility for the Program in the communities in which Caterpillar sites are located. These strategies are used to continuously promote the Program. In addition, frequent updates are issued to provide feedback to employees on the success of the Program.
- **Use of strong incentives for participation and retention.** Based on research, Caterpillar determined that, to achieve maximum success, a health promotion program must have high levels of participation and retention. (Chapman, LS. The role of incentives in health promotion. *The Art of Health Promotion*, July/August 1998; 2[3]:1-4.) In order to impact the high risk healthcare users that represent 20-30% of the typical employee population, a health promotion program must reach at least 90% of the eligible population. Although voluntary, the Program incorporates a simple, but effective,

financial incentive for participation and retention. Employees who complete and return their health assessment questionnaire every six months receive a significant reduction (\$600) in their annual premium contribution. This is reflected in each paycheck, providing a frequent reminder of the value of participation.

- **Emphasis on evaluation and continuous improvement.** Caterpillar has developed an extensive data warehouse to support Program evaluation. It incorporates the following data: health assessment, medical claims, participation, prescription drug claims, and death certificates. The data warehouse facilitates rigorous analysis of program outcomes. Initial findings of these analyses are presented below. These findings have been published in the Program's quarterly in-house newsletter, issued to all employees, and presented to senior management. They have formed the basis of award nominations submitted to external organizations (*see below*). We also draw on the numerous randomized controlled published studies of the Healthtrac program, which forms the core of our Program. These studies support and substantiate our findings.

In addition, through these ongoing analyses, additional/new needs are identified and interventions are implemented. For example, recent claim analyses revealed significantly higher costs for persons with acute events related to diabetes and heart disease (e.g., heart attack). An intensive disease management program, assigning an "outcomes support" nurse to each patient, is in the pilot stages.

We recently developed a questionnaire for males age 50+ and females age 55+ to identify those people for whom prophylactic aspirin therapy may help delay and possibly prevent a cardiac event. We also developed a personalized feedback letter for these individuals. This was motivated by our review of the medical literature—e.g., the *Physicians' Health Study*, which found a 44% reduction in the incidence of heart attacks over five years for subjects in the study's aspirin therapy arm. Our initiative resulted in Healthtrac's incorporating a question on aspirin therapy into its questionnaire.

Participation in, and sponsorship of, award programs. Caterpillar participates in and sponsors award programs that seek to stimulate continuous improvement, and to identify and disseminate best practices. In 1998, the Program won the Dr. Joseph S. Solovy Award, given by the University of Illinois College of Medicine for outstanding commitment to community health promotion. The reviewers for this award included five individuals, two physicians and three community business leaders—all members of the Dean's Leadership Council. The Corinth, Mississippi Caterpillar facility won the Governor's Award for its health promotion program centered on the Healthy Balance Program. Other sites have applied for and received similar awards.

The Program also sponsors its own award, the Healthy Balance International Health Promotion Award, modeled after the C. Everett Koop National Health Award application. The intent of this award, initiated in 2000, is to recognize site-specific health promotion efforts at Caterpillar locations throughout the world that support the Healthy Balance program goals. To be eligible, programs must be aligned with Healthy People

2000 or Healthy People 2010 health promotion goals, and must provide documentation of program impact. Sites are to supplement the components of the Healthy Balance program, and avoid duplication of services. The award program allows international sites to be recognized for their health promotion efforts, and encourages other sites to implement or expand programs. To aid them in developing programs, sites can request reports summarizing the risk factors for their location in aggregate form, drawing on the health assessment findings and claims experience of their employees.

Program Evaluation: Overview

Our evaluation is co-led by Donald J. Crane, MD and Richard C. Luetkemeyer, MD. Dr. Crane, Caterpillar's Corporate Medical Director, is board-certified in occupational medicine and has practiced in this field for 27 years. Dr. Luetkemeyer is Caterpillar's Medical Director of Primary Care. Prior to this role, he was in private practice for 15 years, was Chairman of the Dept. of Medicine at the University of Illinois for 10 years, and was Program Director of the University's Internal Medicine residency program for 10 years. Both Dr. Crane and Dr. Luetkemeyer are on the faculty of the College of Medicine at the University of Illinois. Beverlee Gilmore, the Program's Health Promotion Manager, participates closely in program evaluation. Ms. Gilmore's professional career spans more than 25 years in the fields of human resources and health promotion.

We used two basic designs for our studies: pre/post study and participant/non-participant study. We performed additional in-depth studies of cohorts within these populations. Our study findings have been presented in formal employee communication, used to disseminate program results and to inform management of program success. These studies include analyses of: participation and retention; claims-actual vs. projected (i.e., without intervention); participants vs. non-participants with heart disease; self-reported data showing change in risk factors, self-efficacy (stages of readiness-to-change); and, use of healthcare services and sick days.

Our internal evaluations support the numerous published studies of the Healthtrac Program, the core of the Healthy Balance Program. Brief abstracts of the key relevant studies are included.

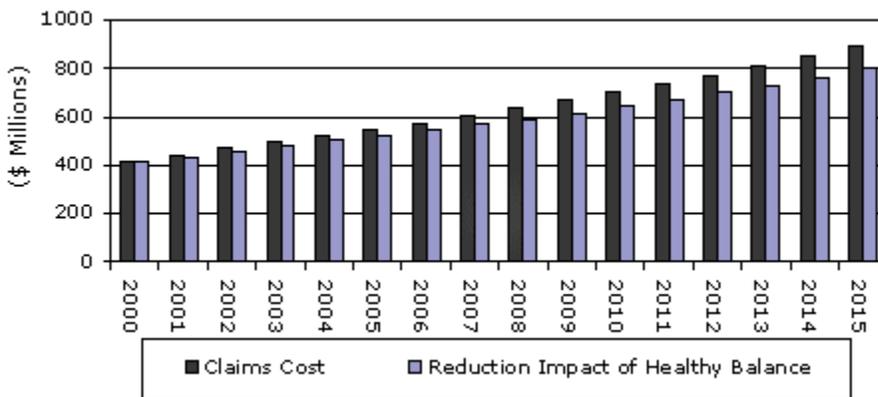
Participation and Retention

Participation and retention are fundamental to the success of a health promotion program. While remaining voluntary, the Program has achieved outstanding participation and retention. Since the implementation of the annual premium reduction in 1998, incented employee participation has been sustained at 96%. Moreover, spouse participation, which is not tied to the incentive, is constant at 74%.

Savings

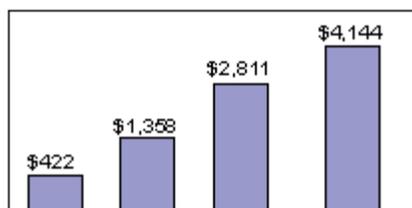
1. Reduction in current and projected medical expenditures. The Program is entering its fourth year. Since its implementation in spring 1997, several high-level claims analyses have been conducted to measure Program outcomes. Results of these analyses show large savings for Program participants, compared with non-participants/non-eligibles. Projections, based on analyses of base period data and current trends, and comparison of projected with actual medical expenditures, plus comparison of company cost vs. medical CPI and national statistics, indicate that the Program will save over \$700 million over the next 15 years. As revealed in Exhibit 1, savings are expected to increase each year.

Exhibit 1: Claims Cost Impact of the Healthy Balance Program



The basis for this projection was a study conducted by Caterpillar's Corporate Medical Department in 1995 to evaluate the impact of lifestyle choices on medical claims. The confidential data was from Company medical

Exhibit 2: Average Medical Costs Per Person Per Year by Number of Lifestyle-Related Health Risks



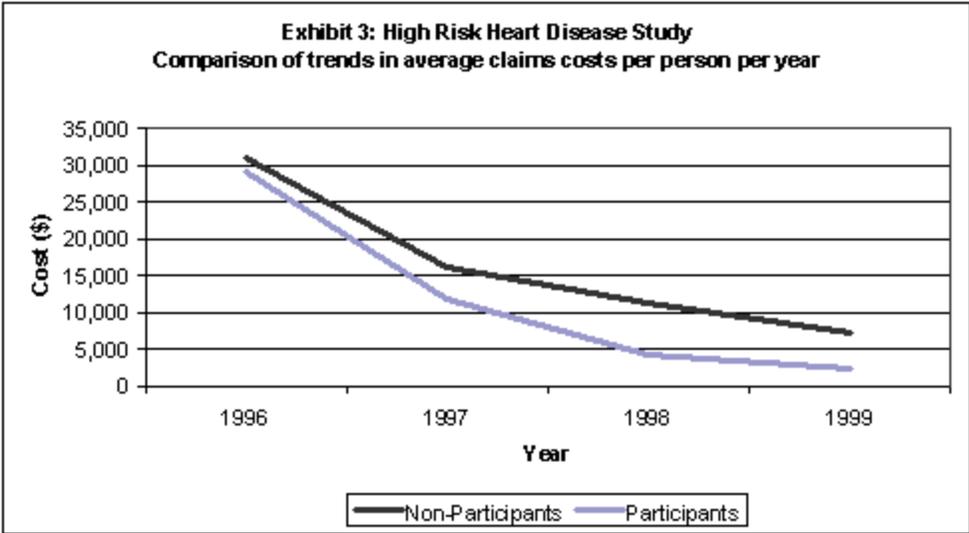
exams.

Researchers categorized employees by their modifiable health risks. Data were collected for these employees' benefits costs for the years 1985 through 1995. This analysis revealed a clear correlation between health risks and medical costs—as the number of health risks increased, medical costs increased proportionately. These data were used to estimate potential savings attributed to health risk reduction. It was concluded that a small reduction in risks—3-5% per year—could result in significant savings (> \$400 million over a ten year period). See Exhibit 2.

2. Reduction in medical claims trends. In a high-level analysis, we compared the medical claims of a large group of employees participating in the Program (N = 12,932) with a group of employees not eligible for Program (N = 13,291) from a similar geographic location (Illinois, the state with the greatest concentration of Caterpillar employees). In a two-year period, between 1997 and 1999, claims costs for non-eligibles increased at a rate 40% greater than that of participants. Costs of non-eligibles increased 35% per year while those of participants increased 25% per year. (Note: High overall trends were due to scheduled re-negotiation of provider contracts and industry-wide prescription drug rate increases. These anticipated increases were a major driver in our decision to implement a "demand-side" strategy: the Healthy Balance program.)

3. Reduction in claims for participants with heart disease. Claims analyses consistently find that heart disease consumes a disproportionate share of Caterpillar's medical expenditures. A small case study was conducted with a representative sample of Caterpillar employees suffering from heart disease. The study matched (by age and gender) all active participants (N = 8) in the Program who had a heart attack in 1996 with similar non-participants (N = 50). All study subject's costs ranging from \$10,000 to \$50,000 in the base year attributed (based on analysis of ICD-9 codes) to heart disease-related events in the year preceding Program implementation.

As depicted in Exhibit 3, average claims costs for the two cohorts were similar in 1996, the base year. Costs declined significantly for both cohorts in the following year (1997), the first year of the Program. They continued to decline in the second and third years (1998 and 1999). It is typical to see costs decline following a major medical event (e.g., a heart attack), but it is noteworthy that participants had greater declines than non-participants, most likely reflecting the long-term benefits of health promotion programs and being in a high risk module after the event. Over the three-year study period (1997-1999), average per person claims costs for participants were \$16,121 lower than those for non-participants.



Average Claims Costs Per Person Per Year

Year	Non-Participants	Participants
1996	30,883	29,188
1997	16,084	11,708
1998	11,390	4,320
1999	7,095	2,420

Reduction in health risk

1. Aggregate health risk, heart disease risk, and cancer risk. Analyses of self-reported data reveal the Program's goal of reducing health risk factors is being achieved. Table 1 displays the changes to date in risk scores. A decrease signifies a reduction in risk. The risk scores are those calculated by Healthtrac, based on findings of the Healthtrac health assessment (HA), which has proven reliability and validity as documented in numerous published studies. Low risk data are for those who completed at least two HAs (N = 22,114). The percent change is the change from the initial HA to the most current one completed. High risk data are for participants who completed the high risk program (five HAs; N = 2,321). The percent change is the change from the initial HA to the fifth one.

Table 1: Change in Risk Scores
Aggregate, Heart Disease, and Cancer

Cohort	Risk Score	Percent Change
Low Risk (N=22,114)	Average Health Risk	-6%
	Heart Disease Risk	-5%
	Cancer Risk	-5%
High Risk (N=2,321)	Average Health Risk	-14%
	Heart Disease Risk	-12%
	Cancer Risk	-15%

2. Individual risk factors. Underlying the risk reductions represented by these aggregate scores are significant reductions in many individual risk factors. These are reflected in Tables 2 and 3.

Table 2: Change in Individual Risk Factors for Low Risk Participants (N=22,114)

Risk Factor	Initial HA	Most Current HA	Percent Change	Statistical Significance
# smoking cigarettes	1,973	1,827	-7%	p < 0.001
% of pop. exercising	96	95	-1%	p < 0.001
Minutes exercised/week	158.56	171.05	8%	N/A
Fat: % of total calories	38.42	36.97	-4%	
Sat. fat: % of total calories	14.74	14.21	-4%	
Fiber: servings/day	2.65	2.83	7%	p < 0.001
Salt: servings/day	1.14	1.00	-12%	
Weight: avg. pounds over ideal weight	14.10	14.99	6%	p < 0.001
Seat belts: % of time worn	94.41	96.30	2%	p < 0.001

Stress: # with above average stress	3,997	3,009	-25%	p < 0.001
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Table 3: Participants Completing the High Risk Program

Change in Individual Risk Factors(N=2,321)

Risk Factor	Initial HA	5th HA	Percent Change	Statistical Significance
# smoking cigarettes*	442	348	-21%	p < 0.001
% of pop. Exercising	93	93	0%	
Minutes exercised/week	132.43	149.66	13%	N/A
Fat: % of total calories	41.16	37.61	-9%	
Sat. fat: % of total calories	15.63	14.39	-8%	
Fiber: servings/day	2.51	2.86	14%	p < 0.001
Salt: servings/day	1.26	1.02	-19%	
Weight: average pounds over ideal weight*	30.32	30.08	-1%	
Seat belts: % of time worn	91.47	95.53	4%	p < 0.001
Stress: # with above average stress	602	378	-37%	p < 0.001

*Excludes high risk participants who have not yet completed the high risk program, but who have reported that they have quit smoking and/or lost weight.

Increased self-efficacy

1. Stage of readiness-to-change. One of the changes that Caterpillar made to the Healthtrac health assessment (HA) was to add questions to capture stage of readiness-to-change for cigarette smoking, overweight, and physical activity. The feedback letter was adjusted to address the individual participant's risk-specific stage. The nurse health educators conducting outbound phone counseling used this information to guide their counseling calls. (Note: As a result of the changes requested by Caterpillar, Healthtrac has incorporated stages of readiness-to-change into its HAs and feedback letters for its standard programs.)

In reviewing stages of change data, a measure of self-efficacy, the key statistic is the average stage. An increase in average stage over time indicates improvement (i.e., movement from pre-contemplation, contemplation, and preparation, to action and maintenance). Table 4 displays the change in average stage. There was positive and significant (at $p < 0.001$) change in all three areas.

Table 4: Change in Average Stage of Readiness-to-Change

Cohort	Risk Factor	Percent Change	Statistical Significance
Low Risk	Smoking (N = 5,530)*	3%	$p < 0.001$
	Weight (N = 9,774)*	8%	$p < 0.001$
	Physical Activity (N = 18,787)	3%	$p < 0.001$
High Risk	Smoking (N = 879)*	3%	$p < 0.001$
	Weight (N = 1,418)*	9%	$p < 0.001$
	Physical Activity (N = 1,888)	7%	$p < 0.001$

*These data do not include the high risk participants who have not yet completed the high risk program, but who have reported that they have quit smoking and/or lost weight.

2. Healthy Balance Newsletter. We designed our in-house newsletter, the *Healthy Balance News*, to address the needs and concerns of Caterpillar employees and their families, as identified by the HA findings. The newsletter has high readership and has had a definite, positive impact on health behavior. For example, an article on aspirin therapy motivated many at-risk individuals to begin taking aspirin. Additionally, we receive testimonials from many employees stating that, as a result of reading the newsletter, they now understand the relationship between lifestyle behaviors and their health.

Resource use: office visits, sick days, and hospital days

As would be expected, the most immediate Program savings were realized through the lower use of healthcare and related services by high risk participants. This cohort had the highest use at the beginning of the Program, and thus had the greatest room for improvement. In contrast, low risk participants had relatively low use (2.62 office visits and 0.21 hospital days/participant/year). Therefore, the Program did not seek to reduce use in the low risk population, except on an individual basis when use was deemed excessive and unnecessary (e.g., "worried well"). Rather, the goal of the low risk intervention was to prevent future

health problems by reducing risks and increasing self-efficacy. In many instances this meant encouraging use—e.g., screening exams.

Table 5 displays change in use of office visits, sick days, and hospital days for those (N = 2,321) completing the high risk intervention. This included a personalized letter (following each of five HAs) with risk and/or condition-specific health improvement recommendations; health education deliverables, specific to the participant's chronic condition and/or risks; and, health education counseling calls.

Table 5: Change in Use of Office Visits, Sick Days, and Hospital Days for the High-Risk Cohort (N=2,321)

Use	Initial HA	Most Current HA	Percent Change
Doctor office visits/year	4.96	4.11	-17%
Sick days/year	4.09	4.19	3%
Hospital days/year	0.53	0.39	-28%

Overall, for this cohort, direct costs (measured based on office visits and hospital days) declined by 23%. This decline was validated by analysis of medical claims data. Additionally, there are more than 7,100 high risk participants at various stages of the Program (i.e., who haven't yet completed the high risk Program). These savings do not include those attributed to the decreased use of these other high risk participants. Studies of the Healthtrac Program have found that a large portion of the impact of the intervention is realized in the first six months of the Program. If all high risk participants were included in these calculations, the savings would be much higher. Note: See below for studies of the Healthtrac Program and validation, via claims analysis, of the accuracy of self-reported data.

Studies Documenting the Effectiveness of the Healthtrac® Program

The Healthtrac health assessment and health promotion programs have been more extensively studied than any other programs. Numerous well-designed randomized controlled studies have been conducted. This research has consistently found that Healthtrac's approach to reducing health risks and costs by helping participants change their health habits is an effective one. Reduction in health risk is accompanied by reduction in healthcare costs. Studies, published in the peer-reviewed medical and scientific literature, have

documented (ROIs) ranging from 4:1 to 10:1. Claims analyses have confirmed the self-reported reductions in healthcare service use and absenteeism. Below are brief abstracts of key studies.

1. **CalPERS.** An extensive, randomized controlled trial of cost reductions attributed to the Healthtrac program in a large group (56,000) of California public employees (CalPERS) found a significant reduction in health risk scores (10 to 12 percent) which correlated strongly with reduction in self-reported utilization (i.e., office visits, sick days, hospital days). After twelve months in the Healthtrac program the study group reported a 25 percent reduction in estimated costs. These self-reported data, derived from the health assessment, were validated by a 25 percent reduction in claims trends. Fries JF, Harrington H, Edwards R, Kent LA, Richardson N. Randomized controlled trial of cost reductions from a health education program: the California Public Employees Retirement System (PERS) study. *American Journal of Health Promotion* 1994;8(3):216-223.
2. **Bank of America.** A similar randomized controlled study was performed on a group of Bank of America retirees. The intervention group realized a 12% improvement in health risk scores at 12 months and a 23% improvement at 24 months. Self-reported utilization and associated costs were lowered by \$347 per participant in the first twelve months of the intervention, as compared to the previous period. Claims data were used to validate the self-reported data. Although the magnitude of the cost reduction was lower in the claims data (a 10% reduction), the self-reported data of both control and experimental subjects were consistent with claims data. Fries JF, Bloch DA, Harrington H, Richardson N, Beck R. Two-year results of a randomized controlled trial of a health promotion program in a retiree population: the Bank of America study. *American Journal of Medicine* 1993;94:455-462.
3. **Citibank.** Similar to Caterpillar, Citibank implemented a health promotion program with the Healthtrac Program as its core. Researchers at The MEDSTAT Group evaluated the program using a rigorous study design and calculated a return on investment of 4.5:1. That is, for every dollar spent on the program, Citibank netted \$4.50 in savings. Analytic methods included a large study population of 11,194 participants and 11,644 non-participants (a quasi control group), a two-step regression model, use of person-level claims data for measuring cost savings, and a long study period averaging 38 months. In addition, because participation was voluntary, researchers took great pains to control for possible self-selection bias, adjusting for potential confounding factors such as age, gender, employment status, and health plan coverage type. Ozminkowski RJ, Dunn RL, Goetzel RZ, Cantor RI, Murnane J, Harrison M. A return on investment evaluation of the Citibank, N.A., health management program. *American Journal of Health Promotion* 1999;14(1):31-46.
4. **High risk study.** The Healthtrac high risk program was compared to the standard Healthtrac program. Health risk scores improved by 11% in the high risk group, compared with 9% and 6% in the comparison groups. At 6 months, direct costs (office visits, hospital days) were reduced by \$304 per participant in the high risk group, compared with \$57 and \$70 in the comparison groups. Total costs (including sick days) were reduced \$484 per participant in the high risk groups versus \$87 and \$120 in the comparison groups. The High Risk Program had an ROI of 6:1, versus 4:1 in the comparison groups. Fries JF, McShane D. Reducing need and demand for medical services in high-risk persons: a health education approach. *Western Journal of Medicine* 1998;169:201-207.
5. **Identification of high risk individuals.** A key factor contributing to Healthtrac's success is its ability to identify those persons in a population who are at high risk to consume high cost healthcare resources in the near term. The ability of the Healthtrac health assessment instrument and associated interventions to identify the high risk population has been proven

in the Western Journal of Medicine study (cited above), the Citibank experience (study cited above), and Caterpillar's internal evaluation.

Summary and Next Steps

Based on the Program's impressive results to date, Caterpillar's Executive Office has recommended expansion of the program to the entire Caterpillar population, i.e., employees covered by labor contracts, retirees, and international locations (as appropriate). In addition to expanding the eligible population, more tailored interventions for targeted populations will be added. These include phone calls from in-house registered nurses/health educators to those with diseases that can be improved by education tailored to their specific disease (e.g., heart conditions, diabetes, asthma, and arthritis). Continuous evaluation of self-reported and medical claims data will drive Program improvements.