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Cost Saving Strategy and Wellness Programs Featuring Decision Tree, Utility and Analytical Hierarchy Analysis

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ABSTRACT

Paying for healthcare is a challenge for employers and employees alike. As companies strive to find ways to reduce costs, comprehensive wellness programs are one way to control rising health care premiums. Healthy employees require less medical attention and are they less costly to insure. Cost savings are measured quantitatively and qualitatively.

Here we are going try to make clear in analysis that positive financial returns on investment in a wellness center facility are possible. The exploration will also demonstrate decisions that go beyond ROI. To gain insight into probable outcomes, decision tree methods, Bayes' Theorem, utility analysis, and analytical hierarchy process methods are used. Analysis from multiple perspectives, using various approaches, may result in to help decision makers more informed decision. Wellness programs increase productivity, reduce absenteeism, and create a happier work environment. Taking care of employees and encouraging wellness in our companies is the right thing to do and increase profitability.

Keywords: Healthcare; Cost Saving; Wellness programs

I. Introduction - What is Wellness?

The word appears in the news, on billboards, and at work. There is no single, universally accepted definition of wellness, yet some common characteristics surface in attempts at one. Some sources define wellness as a "state of well-being"; others say a "state of acceptance or satisfaction with our present condition" (Definition of Wellness). Charles B. Corbin of Arizona State University defines wellness this way: "Wellness is a multidimensional state of describing the existence of

positive health in an individual as exemplified by quality of life and a sense of well-being" (Corbin). For the purposes of this paper, we prefer the definition used by employers to control healthcare costs. Wellness is "an approach to healthcare that emphasizes preventing illness and prolonging life, as opposed to emphasis on treating diseases" (Collins English Dictionary - Complete & Unabridged 10th Edition).

In recent years, many employers have begun to offer employee benefit plans that include a wellness element. Some employers cobble together a gym membership, a coaching session, a smoking cessation plan, and call it a "wellness plan". In reality, wellness goes much further as a concept (Roberts). More than simply providing weight loss plans and similar benefits for employees and

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prospective recruits, wellness plans improve the overall health of companies. In a meta-analysis of literature on costs versus savings associated with such programs, Katherine Baicker found that medical costs fall by about \$3.27 for every dollar spent on wellness programs and that absenteeism costs fall by about \$2.73 for every dollar (Katherine Baicker). Comprehensive worksite health programs that focus on lifestyle behavior change have been shown to yield a good return on investment (ROI). In most cases, it takes about 2 to 5 years after the initial program investment to realize these savings (Dyann Matson Koffman). Wellness initiatives help control health care costs, and the added benefit of a healthy work force is a more productive work force, according to Health Care Service Corporation (Paul B. Handel).

Estimates in 2011 from the Kaiser Family Foundation predict a 9% growth rate in health care costs (Kaiser Family Foundation). As health insurance costs continue to rise, more employers consider starting wellness programs or improving existing ones. Research shows such programs can pay off in dollars, as well as in employee well-being. However, many seemingly good wellness programs fail to achieve potential due to poor implementation (Hethcock, Implement Wellness Programs Carefully). A program can have all the basics, but fail to catch on with employees if it is not fully planned, implemented, and supported; employees will not benefit from it and the company will have wasted time, money, and effort.

This paper reviews research about planning and implementing wellness programs and highlights benefits and challenges in the process. From there the focus of the paper begins with analysis of a decision demonstrating the financial benefit of wellness initiatives over time (see page 110). The overlying assumption here is that health insurance companies will provide a discount on premiums when the company demonstrates less risk based upon the implementation of a wellness program. The model allows a decision maker to input variables such as the company's annual payroll, the rate by which insurance premiums are expected to increase, premium discount rates, and costs associated with construction of a wellness facility. Limitless combinations of variables are supported. Three similar scenarios, each with only the dollar amount of the initial investment changing, illustrate the potential for Return on Investment and Internal Rate of Return over a ten-year span for demonstration of the model.

Forecasted ROI is useful information but not enough information to make a decision alone. For the company to make an informed decision, understanding willingness of employee participation in the program is critical to success. The company must understand the probability of risks and benefits as much as possible before committing to a multi-million dollar investment. To that end, we illustrate the case with a decision tree analysis (see page 114). The decision tree looks at scenarios before and after applying Bayes' Theorem to better understand the expected monetary value of the investment in terms of the size of facility to build and whether perfect information is useful in the decision. Subsequently, a Utility Analysis (see page 115) of employees participating in the program in terms of a large facility versus a small facility helps gain insight into factors that become part of management's decision portfolio of what size a facility to build. The company also has to consider how far the facility will be from the employees and how opulent a facility to build. It is useful to gauge the employee's willingness to use a facility based upon size, distance, basic features and luxury features. To do that, the Analytical Hierarchy Process reveals the preference of employees on those distinct features (see page 117).

II. Planning and Implementing a Wellness Program

Implementation of a wellness program requires a cultural change for most companies. Employees consider personal time essential. Anything a company does to influence the way employees spend their free time might be seen as intrusive. Smaller companies tend to have a more close-knit culture and because of this, it may be less difficult to implement wellness programs. This gives small companies an incentive in terms of cost management; they are more impacted by medical claims. Small companies do not have the economies of scale that large companies do to spread out increases in premiums. In terms of productivity, it takes only a few employees to affect the workforce adversely. Conversely, large companies may be able to absorb a greater number of the work force missing due to illness.

In the mid 1990's the Wellness Council of America

(WELCOA) led by Doctor David Hunnicutt introduced the cornerstone of the wellness movement. In the 2006 issue of *Absolute Advantage*, he and his team presented a further developed and refined dynamic process for helping organizations implement “best-in-class” workplace wellness programs. WELCOA calls this the “Seven Benchmarks” of results-oriented workplace wellness programs (David Hunnicutt).

- Capturing Senior Level Support
- Creating a Cohesive Wellness Team
- Collecting Data to Drive a Wellness Initiative
- Crafting an Annual Operating Plan
- Choosing Appropriate Health Promotion Interventions
- Creating a Supportive, Health-Promoting Environment
- Carefully Evaluating Outcomes

A. Capturing Support and Creating a Cohesive Team

The seven benchmarks help planners to understand that it is important for company leadership to communicate expectations regarding wellness and to follow up with significant resource allocation. The CEO’s delegation practices and the personal health practices exhibited by leadership are just as important. A wellness program requires the support of executives, as measured by their participation in the program (Hethcock, *Implement Wellness Programs Carefully*). Strong support from the CEO, middle management, and the people who coordinate the wellness program is essential. To create cohesive wellness team, the team’s history, composition, and the method of operating is critical. It is equally important to make sure the team possesses the resources necessary to carry out the plan.

B. Collecting Data

With senior level support and a team in place, focus of implementation turns to the data acquisition step. Collecting data drives a wellness initiative and produces results that will contain costs and improve employee health. It must include data collection and analysis as an integrated component. Management must understand the demographics of their employees. This includes

understanding the age, gender, and geography of the employee population. Planning may require managers to survey their employees, identify the common health risks, and determine programs that appeal to a wide range of employees. They should then use the data to classify the workforce’s biggest risks such as chronic diseases, accidents, inactivity, poor diet, smoking, and other lifestyle choices. Costly health problems like cancer, chronic pulmonary disease, diabetes, and cardiovascular diseases can be directly attributed to behaviors and life-style choices. Changing these behaviors before it is too late can significantly reduce the incidences of these diseases (Sullivan). Data should then be used to establish goals and make workplace changes that remove barriers to healthy choices. Over time, as the needs of employees change, new data should be collected to capture feedback and make necessary adjustments (Litvan). “Lay the groundwork for success in the program first by understanding your health risks. Understand your work force, your retention, and your absenteeism. If you have absence data, figure out why people are not at work” (Bruning). Once data is collected and analyzed, a plan can be designed.

C. Crafting an Operating Plan

Crafting an annual operating plan requires employers to layout a methodology for the program. The operating plan is the document that communicates what the program will accomplish. It provides organizational and individual alignment and ensures everyone moves in the same direction to achieve unified goals. Without a plan, organizations suffer from fragmentation as individuals go their own way and do their own thing. The operating plan allows for organizational and individual empowerment and it serves as an accountable communication channel with senior executives. The operating plan is also important in the event of turnover in key positions related to the company’s wellness initiative. It can prevent the loss of time, energy, and resources when orienting a new team member.

D. Choosing Interventions

Choosing appropriate health promotion interventions

encourages the company to think in terms of unique employee demographics in addition to the organizational mission and culture. There are basic programs that are appropriate for any group but for a program to be tailored to a company's needs, there are unique aspects to consider. Personalized examples such as which programs to offer or how intensive intervention will be (awareness, education, behavior change, cultural enhancement). In addition to these, decisions about how often programs will be offered and to whom they will be offered to (spouses, dependents, retirees) is an important consideration. Finally, consideration to what incentives to use to increase participation is a very important factor (David Hunnicutt).

E. Creating a Supportive Environment

To create supportive, health-promoting environment a company should take steps to encourage members to increase physical activity and to reduce tobacco use. They should promote better nutrition by thinking about vending machine offerings and strive to improve workstation ergonomics. They should try to reduce on-the-job injuries and off the job use of alcohol and other drugs. Programs that help employees manage job-related stress and those that increase participation promote good health and a better environment. A number of health care management programs offer discounts and cash reimbursements for healthy activities in an effort to encourage employee involvement. Health America's Learn & Earn Wellness Education Refund Program is one plan that offers members a refund on approved health education classes such as nutrition and wellness, smoking cessation, and weight management (Health America - Discount Programs).

F. Carefully Evaluating Outcomes

The last step of implementation is to set measurable targets and carefully evaluate outcomes. The only way to know if the initiative is working is to track progress. By measuring participation, managers know what is working and what is not. If part of the program is not working, adjustments can be made to the plan as with any business project. By understanding and promoting participation, companies can improve participant

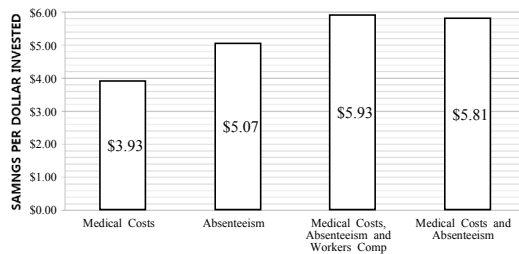
satisfaction. This leads to improvements in knowledge, attitudes, and behaviors that improve the measures of risk factors. It allows the company to control and adjust the physical environment and the corporate culture in way that augment productivity and return on investment (David Hunnicutt).

Employers launching a wellness program need to commit to it for the long haul and realize that financial returns will take time to achieve, said William L. Bruning, president and CEO of Mid-America Coalition on Health Care, a group of Kansas City-area employers, health providers and others exploring ways to improve the health care system (Bruning). A wellness plan is a long-term initiative; it must be in place for a number of years to see a return on investment. The number of years varies depending upon each company's unique characteristics, their resources, and their implementation method. Short-term ROI computation simply does not work for a wellness initiative.

III. Benefits of Implementing a Wellness Program

To understand the business case for investing in employee health, The Harvard Business Review examined existing research and then studied several organizations across a variety of industries. These organization's wellness programs have systematically achieved measurable results. In group and individual interviews, Harvard researchers met with about 300 people, including many CEOs and CFOs. They asked about what works, what does not, and what overall impact the program had on the organization. Using their findings, they identified "Six Essential Pillars" of a successful, strategically integrated wellness program, regardless of an organization's size (Leonard L. Berry). The "Six Essential Pillars" include engaged leadership at multiple levels, alignment with the company's identity, a broad and highly relevant design, broad accessibility, internal and external partnerships, and effective communications. Dr. Berry from Texas A&M says in The Harvard Business Journal, that these pillars can lead to outcomes that foster lower costs and that the savings on health care costs alone make for an impressive ROI. In the analysis that follows

this section, we demonstrate that a positive ROI is possible and how many years it might take to achieve it. Before analyzing ROI, it is important to look at additional tangible benefits of offering a wellness program.



Source: American Institute for Preventive Medicine

Figure 1. Tangible Benefits of Wellness(GlaxoSmithKline)

Healthy employees are more productive due to lower absenteeism and they can better manage stress (Noelcke). Internal studies at DuPont and General Mills found a 14-19% reduction while General Electric reported a 45% decrease in absenteeism after implementing a comprehensive wellness program. Employees enjoy higher morale, pride, trust, and commitment to the company, contributing to a vigorous organization (Leonard L. Berry). This has a positive impact on recruitment and retention of high achieving employees for companies that successfully integrate wellness into the business culture. Many employers credit wellness programs for productivity gains in areas such as reduced errors, improved efficiency, and better decision-making. Quantifying the improvement in an individual's ability to perform is difficult, but NASA found that the productivity of non-exercising office workers decreased 50% in the final two hours of the day, while exercisers worked at full pace all day (Sullivan). Employees are using the gym more than ever, with 60% now taking advantage of company offered fitness plans. Both of these statistics have grown significantly since 2005 (Srivastava).

Once employees are participating in a program, the company can benefit financially. Healthy workers require less medical care, which translates to lower medical insurance costs (Leepson). For example, health care costs are as much as 30% higher for smokers than for nonsmokers. Employees with bad diets produce 40% higher health claims than those with healthy diets. People who are 20% above their recommended body weight have

higher levels of inpatient hospital care than do those with any other health risk. In comparison to people at normal body weight, overweight people visit the hospital 140% more often (Litvan). These statistics clearly demonstrate that healthy people are less expensive to insure than unhealthy people are. When people eat right and exercise, they make the most of their minds and bodies and they reduce health risks. Another benefit of a wellness program is the sense of solidarity that develops between participating co-workers. Having lunch together, going to the gym, and various activities outside the business setting are potent experiences. Interaction with other employees gives them encouragement they need on days they feel less motivated. In this capacity, wellness programs act as team builders (Noelcke).

Offering wellness opportunities to employees is a noble, first step. It is important to understand that employees account for only 30% of health care cost, while their dependents account for the remaining 70%. All aspects of the wellness program need to reach the families of employees to be fully effective. In spite of this fact, only 30% of programs offer participation to spouses and dependents (Sullivan). Those that offer participation to families enjoy a significant competitive advantage in recruiting and retaining gifted employees.

IV. Concerns with a Implementing a Wellness Program

Making the investment in a wellness plan can be expensive, but making the wrong choice in vendor or in program implementation can be even more costly. Creating an alliance with a nationwide provider that knows the business can be a wise investment (Roberts). As mentioned earlier, offering a wellness opportunity to employees is a start but if employees do not use the program, it is destined to fail. Some wellness skeptics emphasize that few employees take advantage of wellness programs. Without incentives, full participation is difficult to achieve. Too often, the employees that are willing to take part are those that are already health-conscious. The workers that need it the most are the most likely to not participate (Leepson). If a majority of employees

do not participate in the wellness program, cost savings is unlikely.

Upfront investments in infrastructure are expensive. Initiatives that include features such as a fitness center, a healthy food cafeteria, and a program of health screenings all consume company resources. Recognizing cost savings from wellness programs must be a long-term strategy. Cost savings will only accumulate over time when the benefits of good nutrition and exercise have time to take effect. The size and timing of the results vary. Actual figures vary from one company to another and are difficult to determine with rapidly inflating medical costs. Another potential negative aspect is concern over privacy. Some employees are not comfortable with their employers tracking their health and personal activities. Some employees who smoke or those who are overweight fear they will have to pay higher healthcare premiums and their lifestyle will be a deterrent to advancement.

Successful wellness programs with high participation and good initial results may have a long-term weakness. Over the past century and a half, life expectancy has steadily increased. People enjoy longer lives, but pension systems have not been adjusted accordingly. In particular, retirement ages and funding assumptions for pensions do not fully reflect the impact of longer-lived populations. Pension plan sponsors have begun to look at ways to protect against longevity risk. Although longevity risk is a relatively new aspect of business, there are now a number of “de-risking” solutions available. Demand and technology have evolved adequately for companies and pension plans to address longevity risk on their balance sheets.

V. Methodology - Analyzing Investment Scenarios

A. IRR and ROI Calculator

In light of aforementioned aspects, it is wise for the company to address monetary concerns. By calculating return on investment and internal rate of return the company can budget more effectively when implementing a wellness program. In this section, a model illustrates the financial effect of a wellness initiative on medical insurance

premiums over time. The model demonstrates potential for health care cost savings in three scenarios. It allows changing any input variables as shown in Figure 2. In reality, a company facing a decision would adjust the variables to achieve a balance suitable for their unique needs.

For the scenarios that follow, the initial cost of the proposed fitness center is a one-time expenditure. To attract and retain a competitive workforce, the companies offer comprehensive wellness programs. They have defined the plan such that there are minimal ongoing costs. In years past, merit raises were enough to offset insurance premium increases for employees. Company profits were sufficient to cover increases in the company’s portion. Recent events including a downturn in the economy have led to predictions that payroll will remain flat for the foreseen future. As a baseline, the company will spend 10% of total payroll, or \$2.5 million dollars, on medical insurance premiums. This dollar amount is 80% of the total cost of insurance premium payments. Employees are responsible for the remaining 20% of the cost of the benefit. Estimates in 2011 from the Kaiser Family Foundation predict a 9% annual growth rate in health care costs (Kaiser Family Foundation). In these scenarios, medical costs are growing and annual employee compensation increases are flat. As an incentive to take responsibility for healthcare premiums, the company shares cost increases and decreases with the employees. Because they share cost fluctuations, they also enjoy savings attributed to the wellness program.

In the analysis that follows, the model uses a gradual scale of savings predictions on medical insurance premiums over a ten-year period. In the first year, the company has expense for construction of the wellness center. The insurance company offers an incentive by lowering premiums by 1% with compounded discounts in subsequent years. They have agreed that if the company demonstrates significant utilization of the program evidenced by reduction in claims by year 10, premiums will reduce by as much as 10%.

B. Explanation of the financial analysis models

1. Model of Scenario A-1

In scenario A-1, the company employs 250 full-time workers earning an average of \$100,000 each. Annual payroll for the company is just over \$25 million dollars. They are considering a large, \$3.2 million dollar facility from which to manage and operate the initiative. In scenarios A-2 and A-3, only the size and cost of the facilities change. This scenario demonstrates the effect

on ROI and IRR if the company chooses a medium facility for 25% less or a small facility for 50% less cost than the larger facility. Instead of spending 3.2 million, they spend \$2.4 or 1.6 million.

Based on the analysis in scenario A-1, the company can profit on a \$3.2 million-dollar wellness facility investment, resulting from annual reductions in insurance premiums over ten years. In the tenth year, IRR is **18.6%** and total savings on premiums are \$11.4 million. NPV of the investment is just over **\$3.35** million.

Variables	Input Data	Savings on Premiums	
Annual payroll	\$25,000,000	year 1	1.0%
Health Care Cost as Percent of Payroll	10.0%	year 2	2.5%
Percent of Benefit Covered by Employer	80.0%	year 3	5.0%
Percent of Benefit Covered by Employee	20.0%	year 4	6.0%
Annual Insurance Premium Inflation	9.0%	year 5	7.0%
Fitness Center Initial Investment	\$2,000,000	year 6	8.0%
Equipment for Fitness Center	\$1,000,000	year 7	8.0%
Other setup costs	\$200,000	year 8	9.0%
Total cost of fitness center	\$3,200,000	year 9	9.0%
NPV calculator (cost of capital)	7.5%	year 10	10.0%
IRR calculator	6.0%		

Wellness Initiative - Financial Review	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Fitness Center	2,000,000										
Equipment	1,000,000										
Other Setup Costs	200,000										
Medical Benefit (savings)		27,250	103,216	268,759	487,108	763,040	1,100,597	1,496,286	1,905,712	2,378,951	2,925,592
Sum of Benefit Savings	11,429,512										
Net Cash Flows	3,200,000	27,250	103,216	268,759	487,108	763,040	1,100,597	1,496,286	1,905,712	2,378,951	2,925,592
NPV	3,354,856										
IRR	18.6%										

Saving (\$\$) Calculation:												
Without Wellness	Medical Benefit Cost (Total)	3,125,000	3,406,250	3,712,813	4,046,966	4,411,193	4,808,200	5,240,938	5,712,622	6,226,758	6,787,166	7,398,011
	(Company)	2,500,000	2,725,000	2,970,250	3,237,573	3,528,954	3,846,560	4,192,750	4,570,098	4,981,407	5,429,733	5,918,409
	(Employees)	625,000	681,250	742,563	809,393	882,239	961,640	1,048,188	1,142,524	1,245,352	1,357,433	1,479,602
	Premium Increase (annual)		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
With Wellness	Medical Benefit Cost (Total)	3,125,000	3,372,188	3,583,792	3,711,017	3,802,308	3,854,400	3,856,192	3,876,014	3,844,619	3,813,477	3,741,021
	(Company)	2,500,000	2,697,750	2,867,034	2,968,814	3,041,846	3,083,520	3,092,153	3,100,812	3,075,695	3,050,782	2,992,817
	(Employees)	625,000	674,438	716,758	742,203	760,462	770,880	773,038	775,203	768,924	762,695	748,204
	Premium Increase (annual)		7.91%	6.28%	3.55%	2.46%	1.37%	0.28%	0.28%	-0.81%	-0.81%	-1.90%

Premium Increase based on <http://www.kff.org/insurance/092311nr.cfm> (Kaiser Foundation)

Figure 2. Large Facility

2. Model of Scenario A-2

Based on the analysis in scenario A-2, the company can profit from a medium \$2.4 million wellness investment with the same annual reductions in medical insurance

premiums over ten years. Because initial costs are 25% less, the IRR is **23.6%** while total savings on premiums remain constant at \$11.4 million. NPV of the investment is nearly **\$4.1 million** at this level.

Variables	Changing Cells	Savings on Premiums	
Annual payroll	\$25,000,000	year 1	1.0%
Health Care Cost as Percent of Payroll	10.0%	year 2	2.5%
Percent of Benefit Covered by Employer	80.0%	year 3	5.0%
Percent of Benefit Covered by Employee	20.0%	year 4	6.0%
Annual Insurance Premium Inflation	9.0%	year 5	7.0%
Fitness Center Initial Investment	\$1,500,000	year 6	8.0%
Equipment for Fitness Center	\$750,000	year 7	8.0%
Other setup costs	\$150,000	year 8	9.0%
Total cost of fitness center	\$2,400,000	year 9	9.0%
NPV calculator (cost of capital)	7.5%	year 10	10.0%
IRR calculator	6.0%		

Wellness Initiative - Financial Review	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Fitness Center	1,500,000										
Equipment	750,000										
Other Setup Costs	150,000										
Medical Benefit (savings)		27,250	103,216	268,759	487,108	763,040	1,100,597	1,496,286	1,905,712	2,378,951	2,925,592
Sum of Benefit Savings	11,429,512										
Net Cash Flows	2,400,000	27,250	103,216	268,759	487,108	763,040	1,100,597	1,496,286	1,905,712	2,378,951	2,925,592
NPV	4,154,856										
IRR	23.6%										

Saving (\$\$) Calculation:

Medical Benefit Cost (Total)	3,125,000	3,406,250	3,712,813	4,046,966	4,411,193	4,808,200	5,240,938	5,712,622	6,226,758	6,787,166	7,398,011
(Company)	2,500,000	2,725,000	2,970,250	3,237,573	3,528,954	3,846,560	4,192,750	4,570,098	4,981,407	5,429,733	5,918,409
(Employees)	625,000	681,250	742,563	809,393	882,239	961,640	1,048,188	1,142,524	1,245,352	1,357,433	1,479,602
Premium Increase (annual)		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%

Medical Benefit Cost (Total)	3,125,000	3,372,188	3,583,792	3,711,017	3,802,308	3,854,400	3,856,192	3,876,014	3,844,619	3,813,477	3,741,021
(Company)	2,500,000	2,697,750	2,867,034	2,968,814	3,041,846	3,083,520	3,092,153	3,100,812	3,075,695	3,050,782	2,992,817
(Employees)	625,000	674,438	716,758	742,203	760,462	770,880	773,038	775,203	768,924	762,695	748,204
Premium Increase (annual)		7.91%	6.28%	3.55%	2.46%	1.37%	0.28%	0.28%	-0.81%	-0.81%	-1.90%

Premium Increase based on <http://www.kff.org/insurance/092311nr.cfm> (Kaiser Foundation)

Figure 3. Medium Facility

3. Model of Scenario A-3

Based on the analysis in scenario A-3, the company can profit from a small \$1.6 million wellness investment with the same annual reductions in medical insurance premiums over ten years. Because initial costs are 50% less, the IRR is **31.4%** NPV of the investment is nearly **\$5 million** at this level.

An interesting feature to highlight is that in each scenario, the discounts on medical insurance premiums counteract the effect of premium inflation increases by year 8. Depending upon the size of the annual payroll

and the amount of investment in the wellness center, the model demonstrates that investment in wellness can be a profitable in terms of dollars alone. This dollar result is independent from the benefits of increased productivity, and decreased sick days. What is not taken into account is the probability of employees actually using the facility. This factor has serious connotations in terms of negotiating a rate decrease with the insurance provider. For that information, more analysis maybe required, beginning now with a decision tree and moving through Utility Analysis and finally the Analytical Hierarchy Process.

Variables	Changing Cells	Savings on Premiums	
Annual payroll	\$25,000,000	year 1	1.0%
Health Care Cost as Percent of Payroll	10.0%	year 2	2.5%
Percent of Benefit Covered by Employer	80.0%	year 3	5.0%
Percent of Benefit Covered by Employee	20.0%	year 4	6.0%
Annual Insurance Premium Inflation	9.0%	year 5	7.0%
Fitness Center Initial Investment	\$1,000,000	year 6	8.0%
Equipment for Fitness Center	\$500,000	year 7	8.0%
Other setup costs	\$100,000	year 8	9.0%
Total cost of fitness center	\$1,600,000	year 9	9.0%
NPV calculator (cost of capital)	7.5%	year 10	10.0%
IRR calculator	6.0%		

Wellness Initiative - Financial Review	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Fitness Center	1,000,000										
Equipment	500,000										
Other Setup Costs	100,000										
Medical Benefit (savings)		27,250	103,216	268,759	487,108	763,040	1,100,597	1,496,286	1,905,712	2,378,951	2,925,592
Sum of Benefit Savings	11,429,512										
Net Cash Flows	1,600,000	27,250	103,216	268,759	487,108	763,040	1,100,597	1,496,286	1,905,712	2,378,951	2,925,592
NPV	4,954,856										
IRR	31.4%										

Saving (\$\$) Calculation:												
Without Wellness	Medical Benefit Cost (Total)	3,125,000	3,406,250	3,712,813	4,046,966	4,411,193	4,808,200	5,240,938	5,712,622	6,226,758	6,787,166	7,398,011
	(Company)	2,500,000	2,725,000	2,970,250	3,237,573	3,528,954	3,846,560	4,192,750	4,570,098	4,981,407	5,429,733	5,918,409
	(Employees)	625,000	681,250	742,563	809,393	882,239	961,640	1,048,188	1,142,524	1,245,352	1,357,433	1,479,602
	Premium Increase (annual)		9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
With Wellness	Medical Benefit Cost (Total)	3,125,000	3,372,188	3,583,792	3,711,017	3,802,308	3,854,400	3,856,192	3,876,014	3,844,619	3,813,477	3,741,021
	(Company)	2,500,000	2,697,750	2,867,034	2,968,814	3,041,846	3,083,520	3,092,153	3,100,812	3,075,695	3,050,782	2,992,817
	(Employees)	625,000	674,438	716,758	742,203	760,462	770,880	773,038	775,203	768,924	762,695	748,204
	Premium Increase (annual)		7.91%	6.28%	3.55%	2.46%	1.37%	0.28%	0.28%	-0.81%	-0.81%	-1.90%
Premium Increase based on http://www.kff.org/insurance/092311nr.cfm (Kaiser Foundation)												

Figure 4. Small Facility

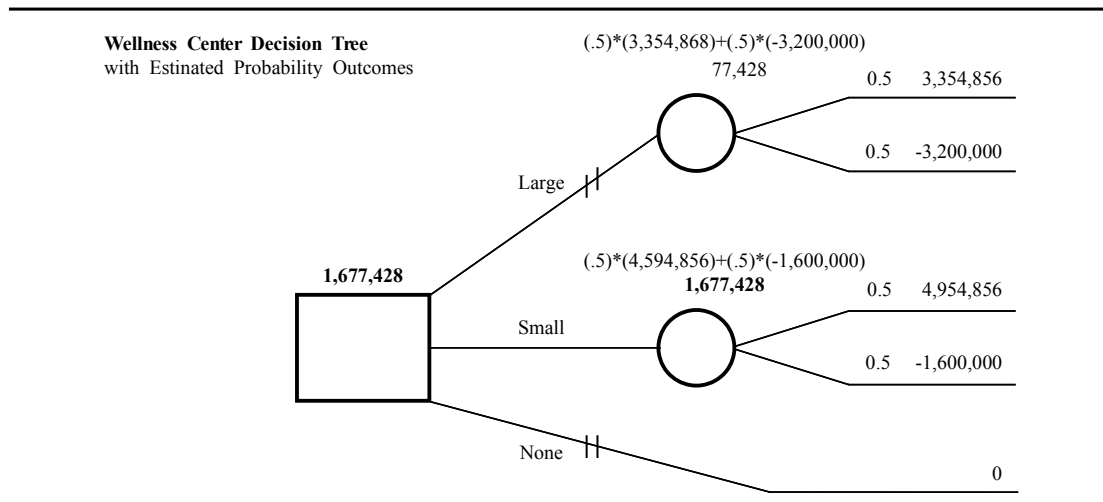


Figure 5. Decision Tree

C. Decision Tree Analysis

In the previous analysis, the company considered only Internal Rate of Return and Return on Investment owing to discounted insurance rates and based upon assumption of perfect participation in the program. The problem with the assumption is that 100% employee participation is not likely. The insurance discounts will be contingent upon some degree of participation by employees in the wellness center program. Without perfect information, the company must calculate expected monetary value of the outcomes by way of a coin toss probability assumption that 50% of the employees will use the facility. The initial decision tree depicts the chronological sequence of events with a 50:50 chance of one outcome or the other. The company’s decision is whether to build a large facility, a small facility, or to do nothing. If they choose not to build, insurance premiums will continue to rise with no offset due to discounts on rates. Should they choose to base their wellness center facility assessment on this initial decision tree alone, this analysis recommends the small facility with an EMV* of \$1.68 million. This is shown on the middle branch of the decision node. The EMV compares to and contrasts with the previous calculation of a small facility (Scenario A-3) with its NPV of \$4.9 Million and should be considered in the final decision.

D. Bayesian Analysis

To develop a more accurate picture of the probability of outcomes, the model now applies Bayes’ theorem to results of a representative survey. Based upon the survey, when we stated employee participation was high, is high 70% of the time. When we stated participation was low, is was low 80% of the time.

E. Decision Tree Posterior Probability (Bayesian Analysis)

The posterior-analysis tree depicts the sequence of decision events and incorporates the results of the Bayesian analysis. The company’s first decision is whether to invest in a survey to collect additional information. If they choose not to consult, they should base their decision on the prior analysis, the lowest branch of the tree in Appendix 1-A. If the company decides to consult the survey (upper branch), they will receive one of two possible forecasts: Survey Favorable or Survey Unfavorable. The probability of the survey being favorable or unfavorable is subjective and based upon expert opinion.

The probabilities of the subsequent forecasts are now known due to application of Bayes’ Theorem. The forecast facilitates revision of the prior distribution, and enables posterior analysis to determine the optimal decision in light of the given forecast. Because the company knows the probability of getting each forecast, they can determine

Initial Probability		Survey Result	
		High	Low
Large	High	0.5	0.5
	Low	3,354,856	-3,200,000
Small	High	1,677,428	-1,600,000
	Low	4,954,856	-1,600,000
		2,477,428	-800,000

Survey Effectiveness	
Survey Favorable	Survey Unfavorable
46%	54%

Actual Probability		Survey Result	
		High	Low
demand	High	0.70	0.20
	Low	0.30	0.80

Calculation Posterial Probability with New Information					
Survey Shows High Demand (use HIGH row of survey)					
Event	Prior	Conditional P	Joint P	Sum of H&L	Posterior P
High	0.5	0.70	0.35	0.45	0.78
Low	0.5	0.20	0.1	0.45	0.22
					1

Calculation Posterial Probability with New Information					
Survey Shows Low Demand (use LOW row of survey)					
Event	Prior	Conditional P	Joint P	Sum of H&L	Posterior P
High	0.5	0.30	0.15	0.55	0.27
Low	0.5	0.80	0.4	0.55	0.73
					1

Figure 6. Bayesian Analysis

what the best decision would be under each possible forecast and then calculate the expected value of the forecast node itself and compare it to the prior EMV. This will tell them if it is worthwhile to conduct the market research *before* committing to the expense.

In the first example, the Survey Favorable/Unfavorable is set at the pivot point of 46%~54% where the outcome for doing the survey is recommended with an EMV of \$1.7 million (see Appendix 1A). A lower favorable percentage such as 45%~55% would result in a recommendation to forego the survey and the additional costs of commissioning it for an EMV of \$1.48 million (See Appendix 1B).

Survey Effectiveness*	
Survey Favorable	Survey Unfavorable
46%	54%
45%	55%

*These numbers are subjective and are currently set at the pivot point, 46% and 54%. They can be manipulated in the model to illustrate the volatility on outcomes. 45% and 55% are where the outcomes change. See the Appendices and the accompanying spreadsheet.

F. Utility Analysis

A utility analysis of the benefit employees expect to receive from using the wellness center provides another perspective into management's decision portfolio of how large a facility to build. The analysis that follows is based upon sample putative information and is used to demonstrate the concept of Utility Analysis as it applies to this case. Figure 7 provides the Expected Monetary Value to be compared and contrasted with Figure 8 depicting the effect of a decision maker's preference for risk in terms of Utility Analysis.

Wellness Center Utility Analysis Versus Expected Value Criterion

Percentage of Employees Participating in the Wellness Center

Participation	Large Facility	Small Facility
High	35%	40%
Moderate	25%	30%
Poor	15%	20%

Probabilities	Large Facility	Small Facility
Participation	0.3	0.2
High	0.6	0.4
Moderate	0.1	0.4
Poor		

Expected Value Criterion

EV Large Facility	0.27	Based upon EV Criterion we should choose to
EV Small Facility	0.28	Build the Small Facility

Utility Analysis Standard Lottery (Reference Gamble)

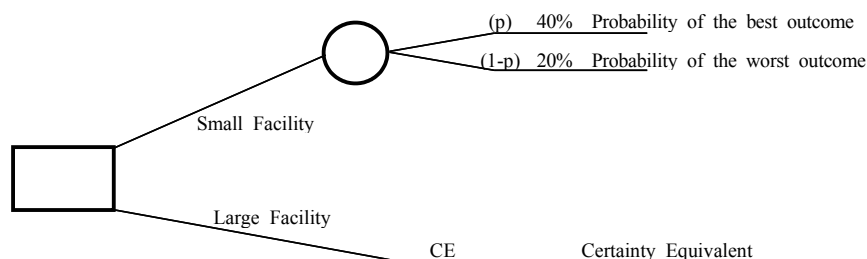
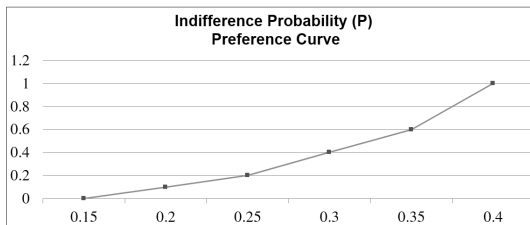


Figure 7. Expected Monetary Value

Percent of Employees	Indifference Probability (P)
40%	1.00
35%	0.60
30%	0.40
25%	0.20
20%	0.10
15%	0.00

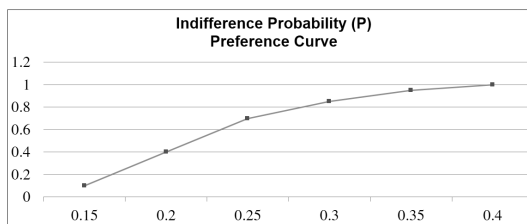


Manager's Decision is based upon being Risk Seeker

Expected Utility Criterion

EU Large Facility	0.25	Based upon EU Criterion we should choose to
EU Small Facility	0.32	Build the Small Facility

Percent of Employees	Indifference Probability (P)
40%	1.00
35%	0.95
30%	0.85
25%	0.70
20%	0.40
15%	0.10



Manager's Decision is based upon being Risk Averse

Expected Utility Criterion

EU Large Facility	0.72	Based upon EU Criterion we should choose to
EU Small Facility	0.64	Build the Large Facility

Figure 8. Utility Analysis Indifference Curve

The above scenario comparisons illustrate the volatility of a decision based upon a single factor as simple as a decision maker's preference for risk.

G. Analytical Hierarchy Process

The analytic hierarchy process (AHP) is a structured technique for organizing and analyzing decisions and is particularly useful with group decision making. To that extent, the model expands the decision criteria to reflect the choice of employees. A survey asks sample

respondents as surrogate employees how they feel about specific aspects of the wellness center such as Price, Proximity, Basic Features, and Additional Amenities. The respondents are asked to offer opinion on size of the facility itself, small, medium, and large facilities. Rather than prescribing a "correct" decision, the AHP helps decision makers find one that best suits their goal and their understanding of the problem. It provides a framework for structuring a decision problem, for representing and quantifying its elements, for relating those elements to overall goals, and for evaluating alternative solutions.

Wellness Center Pairwise Comparisons

Analytical Hierarchy Process

Pairwise Comparison on Amenities	Extra Amenities			Normalized Matrix				AVG. Weight	
	Small	Medium	Large						
Small Facility	1	2	8	0.615	0.632	0.533	0.593		
Medium Facility	1/2	1	6	0.308	0.316	0.400	0.341		
Large Facility	1/8	1/6	1	0.077	0.053	0.067	0.065		
Pairwise Comparison on Price	Price								
	Small	Medium	Large						
Small Facility	1	1/3	1/4	0.125	0.100	0.143	0.123		
Medium Facility	3	1	1/2	0.375	0.300	0.286	0.320		
Large Facility	4	2	1	0.500	0.600	0.571	0.557		
Pairwise Comparison on Proximity	Proximity								
	Small	Medium	Large						
Small Facility	1	1/4	1/6	0.091	0.059	0.111	0.087		
Medium Facility	4	1	1/3	0.364	0.235	0.222	0.274		
Large Facility	6	3	1	0.545	0.706	0.667	0.639		
Pairwise Comparison on Basic Features	Basic Features								
	Small	Medium	Large						
Small Facility	1	1/3	4	0.235	0.226	0.333	0.265		
Medium Facility	3	1	7	0.706	0.677	0.583	0.656		
Large Facility	1/4	1/7	1	0.059	0.097	0.084	0.080		
Pairwise Comparison on Factors	Factors				Normalized Matrix				AVG. Weight
	Price	Proximity	Extra Amenities	Basic Features					
Price	1	3	2	2	0.429	0.250	0.381	0.533	0.398
Proximity	1/3	1	1/4	1/4	0.143	0.083	0.048	0.067	0.085
Extra Amenities	1/2	4	1	1/2	0.214	0.333	0.190	0.133	0.218
Basic Features	1/2	4	2	1	0.214	0.333	0.381	0.267	0.299
	Extra Amenities	Price	Proximity	Basic Features					
Small Facility	0.593	0.123	0.087	0.265	×	=	=	0.345	
Medium Facility	0.341	0.320	0.274	0.656					
Large Facility	0.065	0.557	0.639	0.800					
					0.398				
					0.085				
					0.218				
					0.299				

Figure 9. Analytical Hierarchy Process

VI. Analysis of Results

Beginning on page 111, and ending on page 113, the **ROI/IRR Calculator** illustrates various levels of investment in wellness facilities and the resulting Return on Investment. It shows that companies can expect not only to offset rising healthcare costs, but to actually receive some level of ROI. The calculator is capable of reacting to changes in any combination of inputs. For demonstration purposes, the examples included here only vary the initial cost of the investment. This is sufficient to demonstrate the changing effect on ROI and IRR. The calculator is reusable and scalable to suit multiple scenarios. We can alter the negotiated savings on premiums input and see a significantly different result in ROI. Another example might be to change the annual insurance premium inflation rate. If future rates increase by less than 9% expected ROI will reduce. For example: If the company were to build a facility for which the calculator forecasts a net zero ROI, and if average insurance rates were to increase by only 8% in the future, the ROI would become negative depicting a loss on investment in strictly financial terms. It is important to recall, this is a quantitative look at return in financial terms. It does not consider qualitative benefits. A decision maker should understand that a negative ROI might mask the circumstance that the company and employees are still enjoying reduced insurance premiums. The highest ROI of the three scenarios results from scenario three, where the initial investment is lowest but all other inputs remain unchanged.

Financial calculation does not take into account how successful the company might be negotiating discounts with their health insurance provider based on some level of employee participation and utility. For that, more analysis is required. Beginning on page 114, the decision tree analysis also depicts results that suggest building the smaller facility. But here, it gives a more realistic view of expected monetary value of \$1.7 million, down from \$4.9 million based upon a simple 50:50 employee participation rate. This is a number that decision makers in the company should know and realize that the insurance provider might well understand. In negotiations the insurance company might use this information to calculate a premium discount rate schedule lower than the one suggested in the ROI calculator scenario.

For a clearer picture, posterior decision tree analysis

provides probability information. On page 114 and in Appendix 1A the revised decision tree reveals whether the company should invest in perfect information by investing in a \$10,000 survey. The survey favorable / unfavorable percentage point is subjective and can affect decision one way or the other. In this case, taking the subsequent probabilities into account, a 46:54% survey favorable/unfavorable is the break point. The example in appendix 1A recommends doing a survey with a value of perfect information as \$23,105 and an EMV of \$1.7 million. Appendix 1B shows a different outcome. Here, with favorable/unfavorable set to 45:55%, the effect is to choose not to do the survey, save the \$10,000 cost, and anticipate an EMV of \$1.68 million. This example illustrates that any one of many variables might and affect the outcome of decision tools. A decision maker should continue to seek additional information and rely on multiple sources to make the best possible decision. Each of the potential decision tree outcomes suggest building the smaller facility with the smaller initial investment as you might expect as it is yet another financial based instrument.

Some decision makers tend to be more willing to accept risk, others are risk adverse. On page 115, I feature a utility analysis that demonstrates the outcome of a decision that is contingent upon the attitude of the decision maker. For illustrative purposes the first scenario reveals that a risk tolerant manager would choose to follow the financial suggestions and build the small facility for the greater reward. On the other hand, the second example demonstrates how a manager faced with the same input data but one who is risk adverse would choose to build the large facility with a lesser payoff. It cannot be known why for certain but maybe this manager believes that the larger facility will be used by more employees therefore reducing the insurance rates more. What is known is that managers use more than purely financial data to make decisions and this is an example.

As we mentioned earlier, feasibility of financial return on investment and the rewards thereof are contingent upon the company demonstrating employee utilization of the facility. The Analytical Hierarchy Process is a useful tool to take qualitative information and turn into useful quantitative data to help management make decisions. On page 117, we use that process based upon surveys that asked employee's preferences. To illustrate the concept and to arrive at a meaningful outcome, the

respondents consider four features of wellness facilities against three optional sizes of facilities. From there I calculate a normalized matrix of each. With the data from the normalized matrix we learn something meaningful and contrary to previous financial only decision methods. Employees have indicated that a large, fully-featured, expensive facility that is some distance from their office is not as desirable as a facility that is slightly smaller, less opulent, but also less expensive and closer. They also tell us that a very small and very close facility, while convenient would not be as desirable and like to not be used if it cut too much in terms of features and amenities.

VII. Summary and Recommendations

It is the **overall decision** of this manager, in light of financial return on a facility being contingent upon employee participation; we recommend building the medium sized facility. The large facility is too risky, the return is poorer, the initial investment is greater, and the probability of being used by the greatest number of employees is not good due to admission cost and distance. These factors reduce the discount rate negotiation leverage with the insurance company. The small facility with the smallest upfront investment entices due to a very large potential for ROI. Employees have indicated they want more than a bare-bone basic facility. When measured against employee utilization, the small facility becomes a risky choice. The medium facility satisfies the desire for ROI, while protecting the investment by giving management good standing for rate discount negotiation with the insurance provider based upon predictions of employee use of the facility.

Healthcare costs are rising. As companies strive to find ways to reduce costs, comprehensive wellness programs are being initiated to control rising health care premiums. Healthy employees require less medical attention and are they generally less costly to insure. In some cases, this drives the cost of health care down. Cost savings attributed to successful wellness programs are measured in the reduction of medical premiums through Return on Investment and through increased productivity. Employees are often a company's most valuable resource.

Attracting and retaining talent is important; from a recruitment and retention perspective, successful wellness programs represent an attractive benefit to people who value their health. With a wellness program in place, a company has a better chance at attracting high quality, healthy employees initially and keeping them for the long-term.

Some sources are skeptical of returns promised by wellness programs. They contend most participants are already health-conscious; people who need it most participate least. The skeptics suggest that because the healthiest people represent only a small fraction of the company's total healthcare package, their participation offers little opportunity for the company to reduce healthcare costs. Management has to take on the difficult task of moving high-risk employees onto the program and keeping them enthusiastic about it.

As we have shown in the analysis, financial returns can vary; they could be elusive unless the organization is capable of compelling participation and finding balance for their unique circumstances. In any case, a positive return is achievable and that alone makes a strong case for investment. When companies factor in increased productivity and the benefit of attracting and retaining healthy employees, the case is even more compelling.

Finally, it is also important to re-state that financial return on investment is not the only way to measure the success of a wellness program. Wellness programs increase productivity, reduce absenteeism, and create a happier work environment. Taking care of employees and encouraging wellness in our companies is the right thing to do.

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Appendix 1A

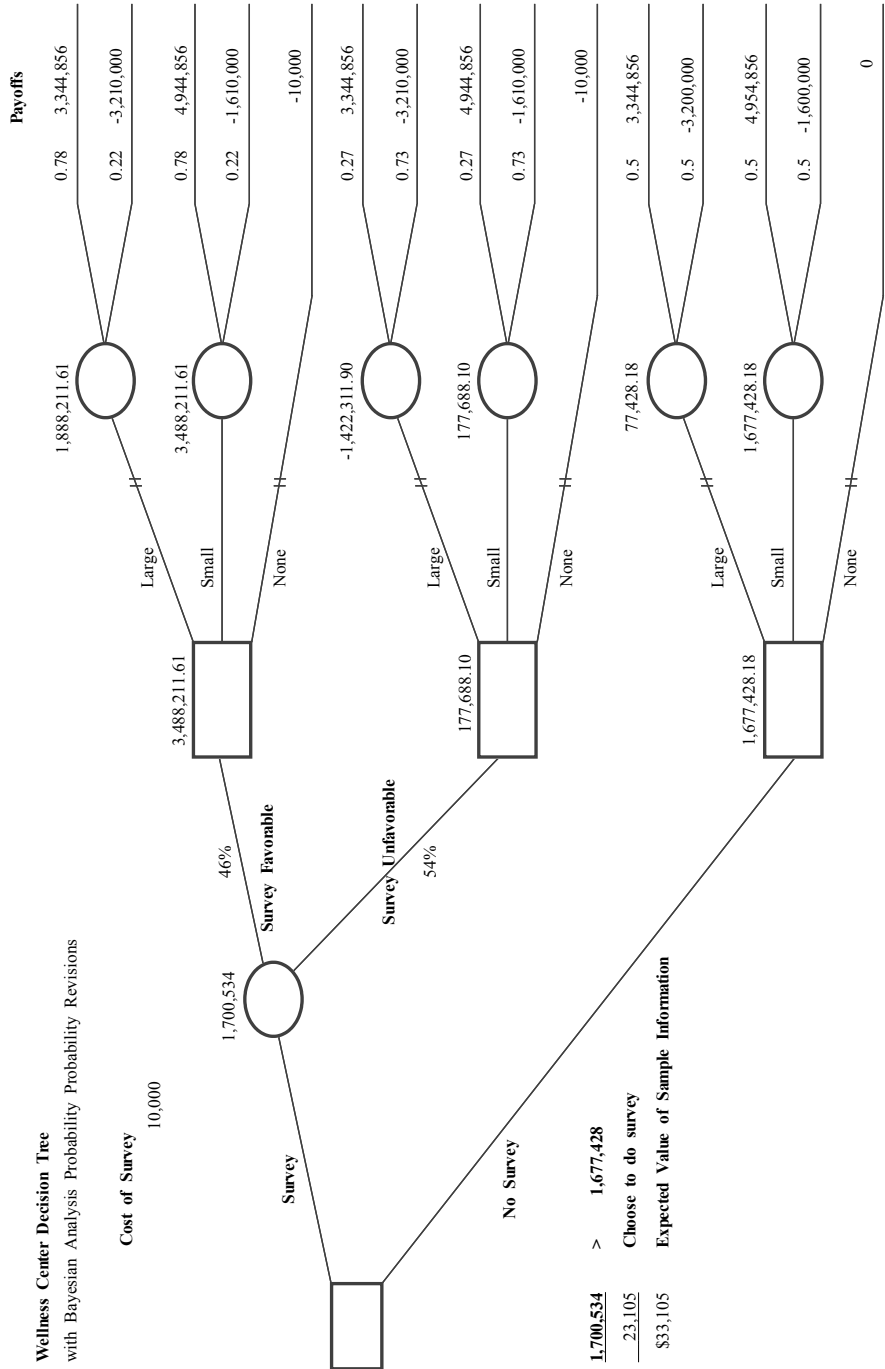


Figure 10. Decision Tree Posterior Probability - Survey Favorable

Appendix 1B

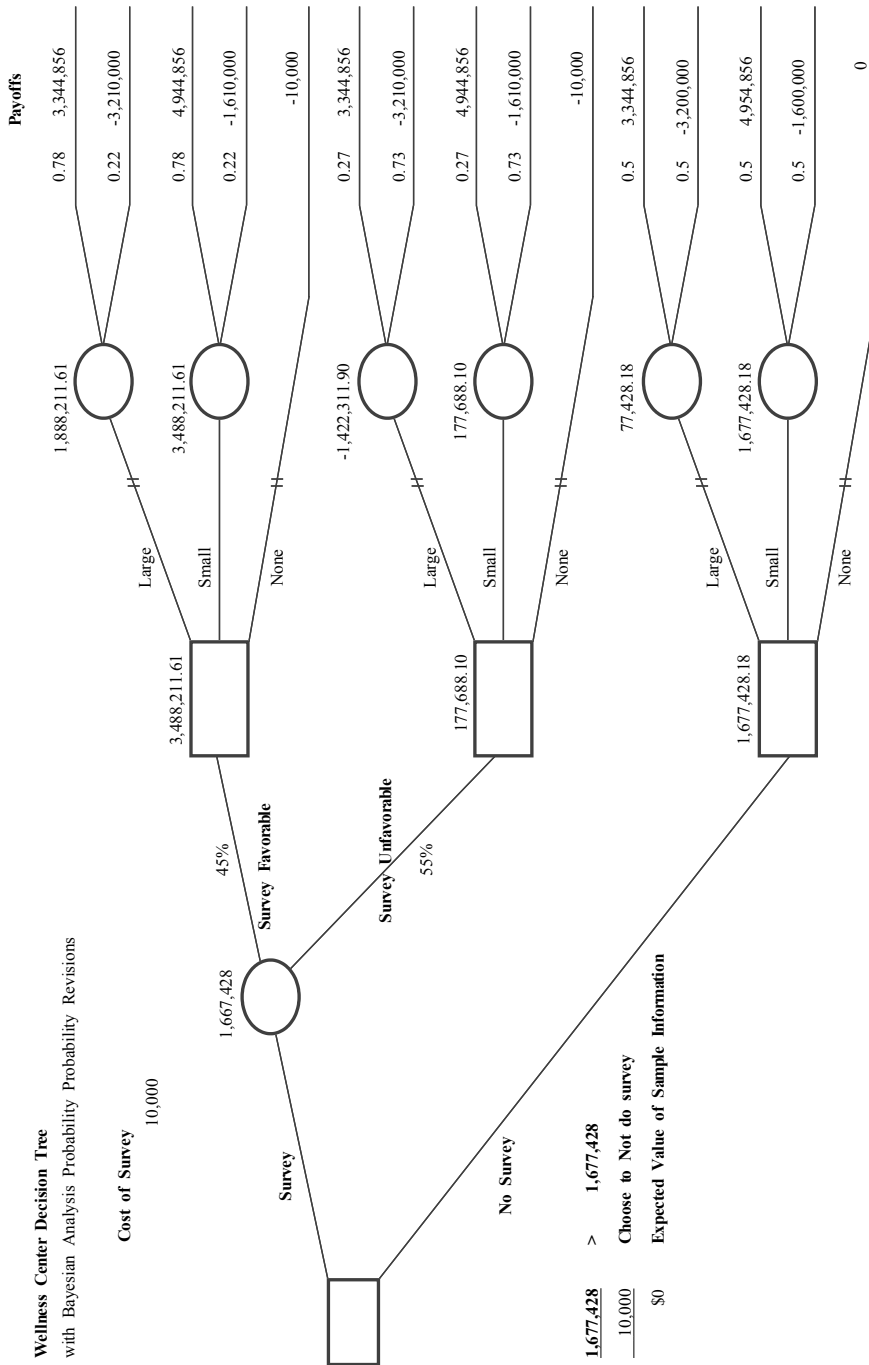


Figure 11. Decision Tree Posterior Probability - Survey Unfavorable