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Assessing the Impact of an Incentivized Employee Wellness Program on Participation and Weight

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**ASSESSING THE IMPACT OF AN INCENTIVIZED EMPLOYEE WELLNESS
PROGRAM ON PARTICIPATION AND WEIGHT**

by

Jennifer Fink

A Dissertation Submitted in Partial Fulfillment of the Requirements

for the Degree of Doctor of Philosophy in Urban Studies

at

The University of Wisconsin-Milwaukee

August 2014

ABSTRACT
**ASSESSING THE IMPACT OF AN INCENTIVIZED EMPLOYEE WELLNESS
PROGRAM ON PARTICIPATION AND WEIGHT**

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Jennifer Fink

The University of Wisconsin-Milwaukee, 2014
Under the Supervision of Dr. Doug Ihrke

Introduction: Employers are increasingly adopting workplace wellness programs designed to improve employee health and decrease employer costs associated with health insurance and job absenteeism. This dissertation examines the outcomes of 6,375 obese health care workers who were offered financial incentives for participating in an employee wellness program (EWP) as they relate to participation and potential change in body mass index (BMI). This study aims to contribute to three distinct literatures, including health promotion, health policy and behavioral economics. This study employs the use of two theoretical approaches to explain participation patterns in the EWP and alternative wellness activities: the health belief model and behavioral economics.

Methods: The study is a retrospective program evaluation using a dataset generated from two components of data from the health care organization. This study employed a quasiexperimental, nonequivalent, two-group design (i.e. participants and nonparticipants) examining participation rates in alternative activities offered for weight loss as well as a pretest-posttest evaluation of

change in BMI in alternative wellness activities and overall BMI change from 2013 to 2014.

Results: Of the 6,375 health care workers with BMI \geq 30 (35% of weighed employees), only 3,094 employees (47%) chose to participate in alternative activities intervention offered by the organization. The mean BMI in 2014 was 36.7 for nonparticipants and 35.5 for participants, a reduction in BMI of 1.2 ($P < 0.0001$). The results of this dissertation are positive and showed weight reduction in the obese population occurred through Aurora Health Care's EWP.

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DEDICATION

I dedicate my dissertation work to God, my family, and many friends. A special feeling of gratitude to my loving husband, Jason Fink, for your support and many words of encouragement – you have been my greatest cheerleader. To my children, thank you for all the time that was sacrificed with their Mom. I appreciate Alex, Kollyn, and Kassidy for all their support.

I also dedicate this dissertation to my parents, Sue and Richard Molenda, who have supported me throughout the process. I will always appreciate all they have done. I want thank my brother and sister, Justin Molenda and Nicole Dillette, for all their words of encouragement.

I also dedicate this work and give special thanks to my best friends Cheryl, Becky, Barb and Holly, who are true friends and have always been there to listen when I needed support; they have never left my side and are very special to me.

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Chapter 1: Introduction

An employee wellness program (EWP) was developed by Aurora Health Care's employee wellness committee; this dissertation evaluates the outcomes in obese employees of a novel incentivized workplace wellness program implemented by a large not-for-profit health care organization. Aurora is implementing an incentivized health promotion program to motivate obese employees to lose weight. I will study outcomes of weight loss as it pertains to incentives, costs and self-efficacy for employees who participated in one of the alternative weight loss activities offered to employees. This study aims to contribute to three distinct literatures, including health promotion, health policy and behavioral economics. There are numerous studies that address health promotion in the workplace (Goetzel et al., 2004; Aldana, 2001), but Aurora's EWP is innovative in that it incentivizes employees to participate in a program that helps obese employees reduce their BMI. Aurora is pioneering a different approach to incentivizing BMI reduction by providing many different opportunities for participation as well as providing no-cost activities.

The contribution to new knowledge that this dissertation adds to academics, policy makers and employers is twofold. First, by analyzing Aurora's wellness program, scholars and employers will acquire new knowledge about an innovative approach to incentivized EWP and its potential success in both participation and weight lost. Second, this evaluation is significant to debates about health care policy, including the Patient Protection and Affordable Care Act (ACA) that was implemented in early 2014 and its provisions on EWPs. Section

2705 of the ACA includes a specification of potentially momentous importance. According to the ACA, employers may use up to 30% of the total amount of employees' health insurance premiums and up to 50% for smokers to provide outcome-based wellness incentives. Such rewards can "be in the form of a discount or rebate of a premium or contribution, a waiver of all or part of a cost-sharing mechanism (such as deductibles, copayments or co-insurance), the absence of a surcharge, or the value of a benefit that would otherwise not be provided under the plan." Aurora is providing the financial incentive in the form of a discount on the employee's contribution to health insurance (the amounts and timing of incentives will be discussed later in this dissertation). Aurora is also providing 25% reimbursement to the employee for the cost of the alternative activities that have a cost associated with them. This is an example of using the ACA provisions, but Aurora is nowhere near the 30% allowed. According to the senior vice president of the EWP, it is somewhere around 10%.

I will be using two theoretical approaches to explain participation patterns in the EWP and alternative wellness activities: the health belief model and behavioral economics. In addition, I will use the social ecological model in Chapter 5: Implications, Recommendations and Conclusions to interpret the comprehensive EWP that currently exists as well as make future recommendations. The lens of behavioral economics is employed to evaluate if the financial incentives were able to encourage employees to participate, and to evaluate participation in a particular alternative wellness activity based on cost of the activity. The health belief model is applied to examine employees'

motivations and self-efficacy to participate in the interventions offered. A difficulty of this research is that I do not have access to the employees directly, but only de-identified employee information to address motivation of participation. This is a quantitative assessment of participation and weight loss in the EWP.

Aurora Health Care is a private, not-for-profit health care organization founded in 1981 whose mission is “ to promote health, prevent illness and provide state-of-the-art diagnosis and treatment, whenever and wherever they can best meet people's individual and family needs” (www.aurorahealthcare.org). Aurora is located in 31 counties in Wisconsin and Illinois and has 15 hospitals, 159 clinic sites, 70 retail pharmacies and 29,000 caregivers, including 1,500 employed physicians; it is the largest health care organization in Wisconsin. I am a current employee of this organization and received this exciting opportunity to evaluate the outcomes of Aurora’s EWP for this dissertation.

1-A. Overview

With health care costs rising, employers are faced with the decision of absorbing costs, passing them on to employees, reducing health care coverage, or a combination of these options. Regardless, both the employer and employee have the potential to be impacted negatively. Controlling these costs may minimize the negative impact to both employer and employee. The collective burden on society is great, and finding ways to reduce total health care cost warrants further research.

This research is performed to evaluate the inaugural year of Aurora's Live Well incentivized healthy weight option as part of its EWP. This program was established to help promote healthy weight at Aurora and reduce obesity among employees. Employees who have a body mass index (BMI) of less than 30 automatically qualify for a reduction in their out-of-pocket expenses. BMI is a measurement that shows the amount of fat in your body relative to weight and height. There are differing costs related to BMI; for example, obese female employees have higher average medical expenditures of between \$1,071 (BMI 30-35) and \$1,549 (BMI 35-40) than do normal-weight female employees (Finkelstein et al., 2005). Employees who have a BMI of 30 or more are given the option to participate in an alternative wellness activity in order to receive the same incentive.

Aurora has had a wellness program in place since 2006; the current program was implemented in 2011. Key goals of the all-inclusive EWP consist of:

- Build a healthier workplace through direct interventions.
- Spread wellness into the community by using best practices to influence behaviors and create a wellness culture.
- Establish wellness as a tool to achieve financial goals through cost savings and growth in revenue.
- Develop a wellness infrastructure to advance wellness at Aurora.

Aurora believes it is important to role model healthy behavior for its patients, families and caregivers. Aurora aspires to make important changes in how employees move, what they eat and how they take care of themselves long

term. Approximately 21,569 of Aurora's 29,000 employees sign up to receive Aurora health care coverage. This is very important to Aurora because they are a self-insured organization, and the health of its employees directly impacts the cost of health insurance.

This institution is an accountable care organization, a group of doctors, hospitals and other health care providers who come together voluntarily to give coordinated high-quality care to patients. The goal of coordinated care is to ensure that patients, especially the chronically ill, get the right care at the right time while avoiding unnecessary duplication of services and preventing medical errors. As the employees are often patients of the health care system they serve, the organization maintains a significant interest in helping employees maintain and improve their health through providing programs that incentivize healthy weights and weight reduction for employees defined as obese.

The organization has implemented an initiative that helps support the wellness of employees by creating an incentive for employees to lose weight and maintain a healthy weight. The health care employer provides incentives for participation in the EWP. The employee can receive a wellness credit of \$13.33 per pay period (ppd) (26 pay periods per year) for each of the three program components, for a total of \$346.58 per component and up to \$1039.74 per year.

Aurora's wellness program consists of three components:

1. Physical activity and healthy weight biometric screening for BMI wellness credit of \$13.33 ppd.

2. Health screenings, immunizations and online health risk assessment for wellness credit of \$13.33 ppd.
3. Tobacco control: employees who don't smoke get wellness credit of \$13.33 ppd.

This study will focus on the component of physical weight and healthy biometric screening for BMI. This incentive is not immediate. Employees were weighed in early 2013 and the incentives for participation began in early 2014.

According to a *RAND Health* research report on workplace wellness programs, there is no formal definition of a EWP (Mattke et al., 2013). The report distinguishes three categories of activities employers provide as part of EWP, including screening activities, which identify health risks; preventive interventions such as weight reduction and counseling; and health promotion, i.e. healthy food options provided in cafeteria. I will use these three categories in this dissertation to classify Aurora's activities.

Aurora's EWP has evolved throughout its existence. Currently, the first component, screening activities, consists of an online health risk assessment and biometric screening for BMI. A health risk assessment is a questionnaire completed by the employee that may include inquiries on the employee's engagements in nutrition, physical activity, smoking status and stress level. Starting in January 2013, biometric screening of employees' BMI was collected in person; all employees who received health insurance through this organization were required to be weighed in by a member of the employee wellness team to receive a discount on their respective health insurance premium. In total, 19,771

employees were weighed from January 2013 to March 2013. If the employee had a BMI of 30 or more or a body fat percentage in the obese range, they were considered obese and ineligible to receive the wellness credit unless he/she participated in one of the alternative wellness activities offered by the employer.

The second component is the preventive interventions (or alternative wellness activities) offered to all employees. These interventions include: Healthy Solutions at Home (HMR), Weight Watchers group meetings, Weight Watchers at work, Weight Watchers in the community, Weight Watchers online, and behavioral phone coaching through Aurora's Employee Assistance Program. These programs are offered to all employees at a discounted rate, and employees who are obese must do one of these preventive alternative wellness activities to receive the wellness credit, i.e. a discount on their health insurance. There is one additional alternative wellness activity option for obese employees; on their own they can lose 5% of their body weight to get the credit. Employees who chose this option were re-weighed in August 2013 or September 2013. Of the 2,021 employees who chose this option, 44.1% obtained the 5% weight loss and received the wellness credit.

The third component this organization provides is health promotion activities. These benefits are meant to encourage healthy lifestyles for all employees regardless of whether they qualify as a health risk. They provide an on-site flu vaccine program, fitness benefits, healthy food options in the cafeteria and the Employee Assistance Program.

1-B. Statement of the Problem

Obesity is a problem for both the individual and organizations that provide health insurance to obese employees. A national study showed that 9.1% of health care costs in 1998 were credited to obesity and had reached \$78.5 billion (Finkelstein et al., 2004). Health care costs are increasing for employers and employees; a novel way to decrease the cost of health insurance is to encourage employees to become healthier and reduce their BMI. A recent survey found that 56% of large U.S. employers see wellness programs as one of the top three approaches for cutting health care costs (Survey, 2010). One way of doing this is through implementing an incentivized EWP aimed specifically at reducing obesity in the employee population. More than one-third of the employees at Aurora are obese; this is a significant problem for the organization. To help reduce the high cost of obese employees, an incentivized EWP that credits employees for actively trying to lose weight was implemented.

A challenge arises because employees are not required to lose weight, but rather only participate in an alternative wellness activity. In order for this program to be successful at reducing costs, a significant amount of obese employees must participate as well as reduce their BMI. As 2013 was the first year of the program, its outcomes must be evaluated. I will assess this program by examining the changes in obese employee BMI from the first weights taken in January/February 2013 to the second weights taken in January/February 2014.

There is a predicament at Aurora in that participation rates in the EWP are not the total population of obese employees. The average participation rate

among employees for worksite wellness programs is less than 50%. McLellan and colleagues had a participation rate of 23%, ranging widely (10-86%) among different workgroups, and Robroek and colleagues had similar amounts with an overall median participation rate of 33%, ranging from 10-64% (McLellan et al., 2009; Robroek et al., 2009).

Of 6,375 obese patients, only 47% participated in an alternative wellness activity offered by Aurora. In order to evaluate who in the employee population is participating and who is not, I apply the health belief model to consider differences between participants and nonparticipants on demographics, including gender, age, race, job level, job location and cost. Enrollment and participation are imperative for the EWP program at Aurora to be successful. The health belief model originated as a psychological health behavior change model developed to explain and predict health-related behaviors, particularly in regard to the uptake of health services, thus this is particularly important to the application of EWP participation (Janz & Becker, 1984).

Behavioral economics will support the explanation of activities that were chosen. One archetype of behavioral economics is present bias, which has implications for healthy behaviors. This is the tendency to focus on the immediate costs and benefits of a situation and undervalue the future implications. Aurora employees will have to make significant lifestyle changes, and there is a natural propensity to procrastinate in undertaking behavior changes that have immediate costs (not having the chocolate cake), but significant benefits in the future (lower health care costs or reduction in comorbid conditions).

Aurora organized a health risk assessment that was conducted by Health Media Group Inc., an outside vendor, and was completed by employees in 2011, 2012 and 2013. The health risk assessment gives the organization an idea of where to focus its program and provides a landscape view of where its workforce is currently in regards to overall health, including the state of its employees physically, emotionally and spiritually. It also assists the organization in identifying where it needs to place its EWP resources to provide the greatest benefit. In 2012, the assessment found that obesity was a major problem among employees and demanded Aurora's attention.

The cost of health care in the U.S. is increasing at an alarming rate and could become unsustainable. This has put employers like Aurora in a very difficult position because they are bearing additional costs for each employee, especially unhealthy employees. The cost burden also has increased for employees, with premiums and co-pays increasing annually.

The objective of Aurora's EWP is to reduce costs, encourage healthy lifestyles and prevent disease by implementing educational and motivational approaches (Goetzel & Ozminkowski, 2008). The cost of health care is unsustainable and shifting costs to unhealthy employees is one potential solution to high costs of potentially preventable health conditions. Shifting the cost also could have potential devastating outcomes to those who already have limited resources. We know that those with low resources tend to be more obese, and charging them more will put an increased burden on those individuals.

1-C. Purpose

I will examine one part of an organization aiming to address its obesity crisis through incentivizing employees to participate in the EWP. It is a particularly suitable organization to research because of the different dimensions of the incentivized program, the large number of employees participating, the access to data, and the ability to acquire knowledge of what happens here so that policymakers, employers, insurance companies, researchers and scholars can learn from the results of this study. The main objective of the research is to evaluate an EWP using quantitative measures. I will accomplish this by evaluating data from 6,375 obese employees of a health care organization (Table 1.1). Of the obese employees, 3,094 (47%) participated in an alternative wellness activity to try to attain their wellness credit for 2014 and 3,281 (53%) did not participate in an alternative wellness activity.

The alternative wellness activity participation numbers are as follows:

1. Lose 5% of body weight on their own – 2,021 selected this activity; 52% were successful in losing 5% or more of their weight.
2. HMR Healthy Solutions meal replacement program with telephone coaching – 45 selected this activity and completed a 12-week program.
3. Weight Watchers group meetings (either at work or in the community) – 317 employees selected this activity and completed a 12-week program.
4. Weight Watchers online – 167 employees selected this activity and completed the 12-week program.

5. Behavioral coaching – 442 employees selected this activity and completed 3 phone calls with homework within a 12-week period.

EWP Participation	N	%
Nonparticipant	3,281	53.0
Lose 5% of body weight	2,021	31.7
Behavioral coaching/EAP	442	6.9
Weight Watchers	317	5.0
Weight Watchers online	167	2.6
HMR meal replacement	45	0.7
Other	9	0.14
Total	6,375	100

EAP = Employee Assistance Program; EWP = employee wellness program.

This study examines the impact of an incentivized EWP on BMI, which has the potential to help decrease health care costs. The theoretical framework used to guide this analysis includes behavioral economics with the use of incentives as payment for participating in alternate wellness activities. In the developing field of behavioral economics, there is a growing body of literature that indicates that incentives are among the effective interventions that can be used in health promotion research (Volpp, 2009). In the United States, approximately 80% of large employers are applying incentives to encourage healthy behavior in 2014 (Volpp, 2014)

The health belief model posits that people's beliefs about health problems, the perceived benefits of action and barriers to action and self-efficacy explain engagement (or lack of engagement) in health-promoting behaviors. A stimulus,

or cue to action, must also be present in order to trigger health-promoting behavior (Rosenstock, 1974; Janz & Becker, 1984). I chose this model to evaluate differences in participants of the alternative wellness activities versus nonparticipants based on the employee's sense of self-efficacy serving as motivation to participate. The participants need to perceive they have a health problem and perceive they would benefit from action.

This research will have an impact on how the health care organization goes forward with its current EWP. It is my endeavor to analyze where the program currently is and make valued recommendations for future improvement. This project will provide valuable knowledge for other health care organizations and employers about the advantages or disadvantages of incentivizing participation and offering five alternative activities to employees to participate in order to reduce their weight.

1-D. Research Questions and Hypotheses

This dissertation will answer three main questions and several hypotheses:

1. What are the factors influencing participation and nonparticipation in the EWP; and 1a.) Are there any differences in population demographics between participants and nonparticipants?
2. What are the factors influencing choice of alternative wellness activities?
3. What is the success of the incentivized EWP, measured by BMI for obese employees at a large health care organization?

1-E. Significance of the Study

Health care expansion is unsustainable for payers; employers are searching for innovative resolution. Experts estimate that by 2016 health care costs will consume 20% of the U.S. gross domestic product (Poisal et al., 2007).

Employers in Wisconsin and nationally need a way to reduce health care costs. Wisconsin has an enormous problem with obesity and is rated as the 25th most obese state in the nation. It remains first in terms of the percentage of African-American adults who are obese (Levi et al., 2010). A report by the Trust for America's Health and the Robert Wood Johnson Foundation noted 27.4% of Wisconsin's adult population is obese (Levi et al., 2010). The obesity rate for African-Americans in Wisconsin is 45.8%, up from 44% in 2010. The adult obesity rate in Wisconsin could reach 56.3% by 2030, according to this report (Levi et al., 2010). It is essential to put a halt on obesity, and one way this can be done is through an EWP. Aurora has started this process, but needs to ensure that the incentivized alternative wellness activities of the EWP are effective at decreasing obesity in its employees.

Health promotion programs need to show that they improve health. It is essential that EWPs document participation by, and health improvements for, their targeted populations (Goetzel et al., 2007). Aurora has a large problem with overweight and obese employees, with more than 60% of its population being overweight and obese, and the EWP effects on weight lost need to be known.

Health care workers are an important population to study because they are the caregivers to those who are ill and, ideally, should be the model of health.

The workplace is an access point for a large percentage of the population and makes for a sustainable and suitable environment to make an impact on the health of the population (Pronk et al., 2010). According to Mathews and colleagues, most working Americans devote an average of 43 hours per week to work (Matthews et al., 2012). With employees spending a significant amount of time at work, the culture of their respective organizations can have an effect on the employee. Worksites are practical locations for affecting great quantities of working adults of differing socioeconomic levels and ethnic backgrounds. A significant belief for this research is that interventions to promote behavior change in work settings can be generalizable, cost-effective and sustainable (Pratt et al., 2007). The public benefits of a healthy employed population extend well beyond the workplace.

Health disparities among different racial/ethnic groups are extensive, but there are relatively few employer-based health promotion programs that have measured their impact on health disparities among employees. The Agency for Healthcare Research and Quality reports every year on the variations in health factors associated with ethnicity in the United States (Burton et al., 2013). While recognition of disparities is rising on a national and international basis, it is uncommon for employers to gain access to data specifically related to health disparities for their employee populations. I will be taking a closer look at

Aurora's diverse workforce participation in the EWP in order to identify any differences in participation rates and outcomes among ethnic minorities.

1-F. Conceptual Framework

To be most effective, EWPs should be determined by rigorous theoretical perspectives related to health education and health promotion (Lindsay, 2000). I will examine and evaluate this program through the lens of behavioral economics and the health belief model. Behavioral economics is used to evaluate if the financial incentives were able to get employees to participate, and to evaluate participation in a particular alternative wellness activity based on cost of the activity. Behavioral economists suggest that incentives can be highly effective (Thaler & Sunstein, 2008). A concept in behavioral economics I will use is present bias; this is the phenomenon that people don't do what's in their best interest in the long term for many reasons. When making decisions, people are inclined to choose mental short cuts; we let the wants and distractions of the moment get in the way of adhering to what's best for us. Present bias is our irrationality due to our propensity to focus on the immediate benefits or costs of a situation while undervaluing future consequences. An example of this is every time a person hits the snooze button instead of going for a morning workout. I will also use status quo bias to explain participation in the self-directed option and those who did not participate. The status quo or default bias refers to people's tendency to take the path of least resistance (Volpp, 2009). There are several

studies of behavioral economics and incentives that support participation in health promotion programs discussed in literature review chapter.

The health belief model is applied to examine employees' motivations and self-efficacy to participate in the interventions offered. The health belief model contains several primary concepts that predict why people will take action to prevent, to screen for, or to control illness conditions; these include susceptibility, seriousness, benefits and barriers to a behavior, cues to action and self-efficacy. If individuals consider themselves as predisposed to a condition, believe that condition would have potentially serious consequences, believe that a course of action available to them would be beneficial in reducing either their susceptibility to or severity of the condition, and believe the anticipated benefits of taking action outweigh the barriers to (or costs of) action, they are inclined to take action that they believe will reduce their risks (Glanz et al., 2008).

The social ecological model offers a method to strengthen the assessment of health promotion within Aurora's EWP, which I will use in Chapter 5: Implications, Recommendations and Conclusions. This model focuses attention on both individual and social environmental factors as aims for health promotion interventions. It describes the significance of interventions directed at changing interpersonal, organizational, community and public policy, factors which encourage and sustain unhealthy behaviors. The model presumes that the correct changes in social environment will create changes in individuals. Thus, support of individuals in the population is essential for implementing environmental changes (McLeroy et al., 1988).

There is no single theory that dominates health education and promotion because the problems, behaviors, populations, cultures and contexts of public health practice are comprehensive and wide-ranging (National Institutes of Health, 2005). There are numerous models available to frame the EWP, which is often described in the literature as health promotion, a term that will be used interchangeably in this study. The models can be categorized in several ways, including intrapersonal, interpersonal, institutional/ organizational, community/society and policy (Table 1.2).

Table 1.2 Models Available for Employee Wellness Programs		
Level of Influence	Intervention Target	Variable of Interest
Intrapersonal	Individual	Psychological (motivations, intention, beliefs, self-efficacy, attitudes, knowledge) Biologic (health status, risk factors)
Interpersonal	Individual/dyad/small group (family, coworkers, friends)	Social support; social networks; communication patterns; norms; peer/family influence; membership in groups/departments and role responsibility; employee-supervisor relationship
Institutional/ organizational	Worksite	Social norms; participatory strategies; management style; work design; corporate climate or culture; work pace; site-specific rules/policies
Community/society	Local, state, regional, national, international community	Relationships between/among worksite and larger community related to economic, political or social factors
Policy	Government laws or standards at local, state, national and international levels	Legislative and/or regulatory approaches at multiple levels (explicit or implicit; intentional or unintentional)
<i>Source: Glanz K, Rimer BK, Viswanath K (eds.). (2008) Health Behavior And Health Education: Theory, Research, and Practice. John Wiley & Sons.</i>		

The current EWP at Aurora was not created using any theoretical model. However, it does contain many of the elements of behavioral economics and the social ecological model. The EWP program was started in 2006 because health care costs were rising and Aurora's employee population was obese. In 2008, the EWP program was put on hold because of the economic recession in the United States. In 2011, Aurora started the EWP program and completed its first health risk assessment by an outside vendor. According to Steven, a member of the EWP team involved since the beginning: "We had an obese population that needed to be addressed." The current program and alternative wellness activities offered were created from a wellness committee that helped put the initiatives into action. The high levels of obesity within Aurora elevated the focus of prevention and treatment efforts. It is vitally important to address obesity by identifying and focusing on those populations who are most impacted. After reviewing the models and literature, I have developed a number of hypotheses laid out and tested in the following chapters.

1-G. Summary of Methodology

This study has a quasiexperimental nonequivalent group design.

Quasiexperimental design is very common in health promotion research as seen in studies by Gemson and colleagues as well as Berry and colleagues to name just a few (Gemson et al., 2008; Berry et al., 2011). Descriptive statistics will be reported using percentage and count for categorical parameters, and mean and standard deviations for continuous parameters. To analyze the trends over time

within each group of interest, paired t-tests will be used when analyzing interval data. If the sample is normally distributed, nonparametric tests will be used. A chi-square test will be used to determine the proportional distribution of employee participation versus nonparticipation in the alternative wellness activities by demographic characteristics. Logistic regression will be completed to control for effect of independent variables and assess for characteristics of participants versus nonparticipants. An analysis of variance (ANOVA) model will be completed as pretest/posttest measures.

1-H. Limitations and Dissertation Overview

The study design did not lend itself to a control group, though non-enrolled employees were measured and compared for their current health behaviors and status. Those employees who were already motivated to lose weight may be a self-selected group who participated in the EWP. I also did not have direct contact with the employees because this is de-identified data, so some of my analysis does not directly correlate with individual level data, and does not reflect exactly what individuals believed. A future project will be to conduct a survey to evaluate why employees chose to participate and why they did not participate; this was not conducted as I did not have permission at this time to conduct a survey because the study is in its first year and the organization did not want to overwhelm individuals with too many undertakings. Education was not controlled for this variable was not available in the dataset,

Chapter 1 was the introduction of my dissertation and gave an outline of what I will be accomplishing in the following chapters. Chapter 2 is a substantial literature review and an in-depth look at the conceptual framework that helps guide the research questions and hypothesis. Chapter 3 is the methods section, and here I review the quantitative methods I chose for the analysis of the employee wellness data. In Chapter 4, I analyze the data and show the results of the hypothesis and larger questions. Chapter 5 is the conclusion chapter in which I discuss implications of the research and provide suggestion for improvement to Aurora's EWP.

Chapter 2: Literature Review and Conceptual Framework

2-A. Introduction and Contribution to Literature

This literature review has several distinct sections to make sure the reader understands why this research is relevant in time and place. The sections include a review of the obesity epidemic, a history and review of employee wellness programs (EWP), implications of EWP in health care settings, health care disparities, implementation of the Patient Protection and Affordable Care Act (ACA), a review of alternative activities offered by the health care institution, and the conceptual framework of the theoretical models applied.

Wellness programs add value as an important part of an organization's entire culture of health; Aurora Health Care's EWP is extremely innovative in that it provides employees with alternatives to losing weight. Through this research I will check the differential effects of various programs on outcomes. There are five alternatives offered that obese employees may choose from, including losing 5% of their weight in any way that works for the person.

The employer survey completed in the *RAND Health* study established that 60% of employers offering a wellness program stated that their programs reduced health care costs, and four-fifths reported that they decreased absenteeism and increased productivity. However, less than half of the employers reported regularly evaluating their wellness programs (Mattke et al., 2013). Evaluating the outcomes of the EWP at Aurora is vital to the future of the program and significant to several bodies of literature, including health promotion, health policy and behavioral economics.

Behavioral economics, according to the Oxford dictionary, is “a method of economic analysis that applies psychological insights into human behavior to explain economic decision-making”. One example of this is that people don’t save for retirement when they know that they should.

Behavioral economics, including the use of incentives directed at achieving particular health outcomes such as smoking cessation and reductions of body-mass index remains infrequent, Aurora has developed an innovative approach to helping obese employees succeed at reducing BMI, and these results are relevant to employers and academics similarly. The *RAND Health* study suggests that nationally only 10 percent of employers with more than 50 employees use incentives targeted at reducing BMI (Mattke et al., 2013). To date the most common reason for incentives is participation in screening activities, and the studies’ results suggest that such incentives, particularly payments above \$50, are effective. Incentives are also commonly used to increase participation in wellness interventions, such as weight loss programs, but the evidence for their effectiveness remains weak. A more granular look at program components will give valuable insights into the determinants of program success.

In the United States, many employers pay health care costs for their employees. Each year these costs increase at rates higher than the rate of inflation (Poisaal et al., 2007). Since these costs come out of company profits, employers need to absorb the costs, pass them on to employees, reduce health care coverage, or a combination of these options. Regardless, both the employer and employee have potential negative impacts. Controlling these costs may cut

the negative impact to both employer and employee. The collective burden on society is such that finding ways to cut total health care cost warrants further research, for instance, this study on the outcomes of a EWP.

2-B. Description and Critique of Scholarly Literature

Background of obesity epidemic: Obesity in the United States has steadily grown over the last 20 years and is now at epidemic proportions (Hammond & Levine, 2010). In 1990, including states participating in the Behavioral Risk Factor Surveillance System (BRFSS), no state held an obesity occurrence rate of 15% or more, and 10 states had obesity incidence rates less than 10%. Since then, obesity occurrence has intensified radically. In 2010, all 50 states had obesity frequency rates based on self-report of more than 20%, including 12 states with occurrence rates greater than or equal to 30% (CDC website, 2013). Obesity is recognized by the Centers for Disease Control and Prevention (CDC) as a major risk factor for other chronic health conditions such as diabetes, heart disease and stroke (CDC obesity wellness kit). The promoting lifestyle factors of a decrease in physical activity, poor dietary habits, tobacco use and excessive alcohol consumption also are to blame for many of these chronic conditions. Chronic diseases affect one of every two adults in the United States and are the leading cause of death and disability (CDC, 2012). Since modifiable health behaviors are the cause of many of these diseases, programs that educate and teach the skills necessary to cut health risks are required for work site health promotion programs to be effective.

The state of health in America is extremely terrifying, and the literature communicates that the predicament is growing at an alarming rate. The key signs of health in a population, as measured by the World Health Organization, show that Americans are one of the least healthy industrialized nations, even though we spend about 16.2% of the country's gross domestic product (GDP) on health care (World Health Organization, 2013). The increase of obese and overweight individuals is so severe that the World Health Organization now defines it as an "epidemic" (Ogden & Carroll, 2010). A study of Americans age 20 years or more conducted by the National Center for Health Statistics revealed that 34.2% are overweight, with a BMI between 25 and 29, 33.8% are obese, with a BMI between 30 and 40, and 5.7% are extremely obese, with a BMI more than 40 (Ogden & Carroll, 2010). These numbers are consistent with the rates of overweight and obese health care workers in the health care organization at which this research is performed. The percentages of overweight employees were 32% and obese employees topped 35%.

Nutrition has become especially important as Americans consume an increased amount of inexpensive, fast, processed foods. Exercise levels and movement habits in the United States also have decreased (Pronk et al., 2010). Childhood obesity has tripled in the past 30 years (CDC Data Stats, 2011). Overweight and obese children become overweight teenagers and, often, overweight adults. It is predicted that if these trends continue at the current rate, 86.3% of adults will be overweight and 51.1% obese by 2030 (Wang et al., 2008).

The health consequences of being overweight or obese are far-reaching. Poor fitness can lead to a multitude of secondary conditions or worsen existing conditions. Being overweight increases an individual's predisposition to type-2 diabetes, cardiovascular and heart disease, hypertension and stroke, and cancer (Ogden & Carroll, 2010). The United States has one of the greatest rates of death from heart disease; as of 2009 there were 195 deaths connected to heart disease for every 100,000 people (Berry et al., 2010). The ACA encourages work wellness initiatives, with many stipulations expected to influence workplace health promotion and prevention to decrease the problem of chronic illness and to contain expanding health care costs.

The lifestyle of the typical American combined with the lack of time, knowledge, skills and incentives to take care of personal health, contributes much to this health care crisis. Business and industry share the burden of these costs, both in increased insurance premiums as well as decreases in productivity. Employer-sponsored health insurance premiums are increasing at twice the rate of inflation (Baicker et al., 2010). In many cases, the costs of these increases are shifted to the employee via co-pays and increasing monthly premiums. Placing certain financial responsibility on the employee could create more initiative and incentives for employees to begin giving more attention to their health and well-being.

The current obesity epidemic is complex and, according to Bray, "includes genetic, environmental, social, racial/ethnic, psychological and behavioral factors" (Bray, 2008). Obesity is primarily concerned with energy imbalance in

the body involving energy taken in and energy put out. A minor positive energy balance that persists over a long time leads to weight gain (Bray, 2008). While there are a variety of influences that can encourage a positive energy balance, two predominantly important factors include incorrect dietary choices and insufficient amounts of physical activity.

In 2008, the United States spent approximately 16.2% of its GDP on health care. In total dollars, this percentage equates to nearly \$2.4 trillion. Economic forecasts conducted by the Centers for Medicare and Medicaid Services estimate that the total governmental expenditure on health care services will total about \$4.482 trillion by 2019 (Wang et al., 2008). This number is potentially devastating to the U.S. economy.

History and review of work wellness programs: Fitness and recreation programs in the workplace date back to the early 1900s. However, programs as we know them today began to evolve in the late 1950s (Tjoa et al., 2012). Originally these platforms were primarily recreation-oriented; employers provided recreation facilities such as a park or a swimming pool for employee users. Employee health programs evolved to incorporate physical fitness and broader health promotion strategies, including smoking cessation, weight loss and stress management. Leading programs appeared in such companies and organizations as PepsiCo, Sentry Insurance, Xerox, Rockwell International and NASA. Throughout the 1960s and 1970s, research surfaced regarding the benefits of offering such programs (Tjoa et al., 2012). These programs gained impetus and

popularity in the mid-to-late 70s and early 80s as a way to tackle increasing health care costs as well as improve employee productivity and retention.

Health care costs remain on the rise at a rate of more than 7% per year over the past 4 years (Mayne et al., 2013). One report conducted by the Kaiser Family Foundation and Health Research and Educational Trust (Kaiser Family Foundation, 2012) found an increase of 8-9% in 2011 and 10-year increases of 113% in employer-paid premiums and 131% in employee contributions (Kaiser report, 2012). Clearly, employers are experiencing dramatic increases in health care costs, and so are their employees.

EWPs are a core strategy to prevent disease as shown by the efforts of the National Prevention Strategy; workplaces are fundamental “partners in prevention” (National Prevention, 2011). The U.S. Department of Health and Human Services has recognized the value of EWPs, recommending them as an essential part of the Healthy People Initiatives. Healthy People 2010 recommended the amount of worksites with “50 or more employees offering nutrition and weight management services increased from 55% to 75%,” and the Healthy People 2020 objectives further that initiative by striving to “promote the health and safety of people at work through prevention and early intervention” (Healthy People 2020 Objectives). Research suggests that wellness programs are effective in reducing employers’ health care costs as seen in Treacy and colleague’s meta-evaluation of 42 studies involving wellness programs found that organizations were able to recover \$5.93 for each \$1.00 invested in EWPs. This

was a result of reductions of 26-30% in health care costs, worker's compensation and disability claims (Treacy, 2008)

The media have comprehensively reported on the U.S. health care crisis. As early as 1970, this crisis largely involved the cost of and lack of availability to care for every American (Kelton, 2007). Chronic diseases have become the leading cause of death (Schroeder, 2007). With obesity reaching epidemic levels and activity rates decreasing, we are in the middle of an obesity emergency. Health care costs have persistently risen at a rate of more than 7% per year in the past two decades, and now account for 17.9% of our nation's GDP (Mayne et al., 2013). The burden of these increases and the overall cost of health care to business and industry are considerable. The cost of obesity to U.S. businesses has been considered extensively since first reported in 1998 (Thompson et al., 1998). As obesity rates rise in this country, costs continue to increase. Finkelstein and colleagues found that high levels of obesity, i.e. a BMI > 40, accounted for only 3% of the employee population; however, they accounted for more than 27% of health care costs (Finkelstein et al., 2005)

The EWP is an employment-based activity or employer-supported benefit designed to promote health-related behaviors and disease management. It might comprise of a combination of data collection on employee health risks and population-based strategies paired with individually focused interventions to decrease health risks. There is no agreed-upon definition of a workplace wellness program, and employers define and manage their programs differently.

According to the ACA, a “wellness program is defined as a program offered by an employer designed to promote health or prevent disease.”

Employers have started using incentives to increase employee participation in wellness programs. Incentives are presented in many ways, for instance, with cash, cash equivalents, and a decrease in health plan costs. The average yearly value of incentives per employee can range from \$100 to \$500 (Berry et al., 2010). Frequently, employees can meet the requirements for incentives by going through screening for health risks or participating in a wellness program that advocated health but does not require specific health outcomes. There is compelling support that financial incentives are effective in encouraging people to do simple things on a short-term basis. Financial incentives can be extremely efficient in improving participation in health risk assessments and health screenings. But there is insufficient evidence that financial incentives do or do not create long-term behavior change (Troxel, 2012). Scholarships in the current literature have small sample sizes and insufficient ranges of incentive amounts to provide proof of employees’ long-term behavior changes (O’Donnell, 2012).

Wellness incentives are progressively becoming more prevalent as a means of increasing participation in EWPs, but they may not benefit all groups similarly. A survey conducted by Schmidt found that 56% of large U.S. employers consider wellness programs as one of the top three approaches for curbing costs. Employers want to see savings by reducing health care spending due to a

healthier workforce or from incentives organized in an approach that shifts health care cost from employers to employees (Schmidt et al., 2012).

It is debated that incentives aimed at behavioral processes (for example, efforts to lose weight) are nondiscriminatory as opposed to those focused on outcomes (for example, success at losing weight), and legal and policy differences have been described along corresponding lines (Schmidt et al., 2012). This is the case of the health care organization studied here. They offer incentives to employees to put an effort towards losing weight. They do not have to lose weight to receive the health care credit.

Some early examples of advocates of workplace interventions are Johnson & Johnson and Cleveland Clinic, which established very successful EWPs. In 1979, Johnson & Johnson was one of the first enterprises to cultivate a workplace wellness program. In 2009, it demonstrated an average annual savings of \$565 per employee, producing a return on investment equal to a range of \$1.88-\$3.92 saved for every dollar spent on its program (Henke et al., 2011). Cleveland Clinic's EWP is one of the most aggressive in the United States among health care systems. Cleveland Clinic does not hire smokers and removed all sugared beverages from its campuses in 2010. Employees are offered free membership in a number of weight management and physical activity programs if they participate fully and reach clear health goals. Employee's health insurance premiums are tied to reaching specific health goals, with those meeting goals experiencing the lowest increase in premiums. Cleveland Clinic recently announced that employees who do not participate in

the EWP will see their health insurance premiums rise by 21%. While this approach has been disapproved by some as infringing on employee rights, Cleveland Clinic has been able to nearly flatten its health care costs in the last two years (O'Donnell & Bensky, 2011).

The U.S. government has been trying for several decades to help improve the health of American through Healthy People Initiatives. One of the specific goals of Healthy People 2010 was for 75% of workplaces to offer EWPs and for 75% of employees to participate in these programs. Among the goals of Healthy People 2020 is promoting the health and safety of people at work through prevention and early intervention (Healthy People 2020). Health care and work environments are one of the five areas of focus of the 2012 Institute of Medicine Committee on Accelerating Progress in Obesity Prevention.

Approximately 60% of employees obtain health insurance coverage through their employers (Claxton et al., 2011). A study conducted in 2009 estimated that employers will pay, on average, more than \$28,000 per worker for health care by 2019 if changes are not made (Hewitt Associates, 2009).

Businesses are becoming increasingly active in employee health promotion to avoid health care spending exceeding profits. Companies that are self-insured may experience a greater health care cost burden for employees with certain diseases or who are in suboptimal health. Employees with diabetes cost 2.3 times more than those without diabetes (Dall et al. 2008). As Aurora is self-insured, it needs to reduce health care expenditures among its employees to create a sustainable program.

Health care setting: Health care organizations as a workplace serve as important test subjects, as the health care industry is a major employer and its workforce is diverse in education and income. Health care workers should be role models for health behavior for patients and the larger community, because they are educated about the risks of obesity. Health care workers present an interesting, distinctive and growing subgroup of employees. They tend to be overpoweringly female, are more educated than the general population, and their numbers have tripled since 1960 (Kocher & Sahni, 2011). Even during economic recessions, the number of health care workers has continued to grow. Registered nurses make up the largest proportion of health care workers.

Numerous health care workers participate in shift work that has been shown to have abundant negative effects on physical, social and emotional health. These include increased risk of obesity, diabetes, cardiovascular events, cancer, and gastric ulcers. In addition to increasing workers' risk of illness, sleep deprivation as a result of shift work poses serious threats to patient and worker safety (Pietrojusti et al., 2010). Demand for health care workers is growing as well as the need to recruit and retain. There are many health risks associated with the nursing and allied health care professions, and insufficient research has been done explicitly on the success of worksite wellness programs for this population (Chan & Perry, 2012).

The increasing load of preventable disease that has created jobs for health care workers in the last five decades also has made their jobs more demanding. Employers have decreased staff-to-patient ratios and currently only

hospitalize very sick patients in order to be profitable. Some health care workers claim they do not have time to participate in any activities in or outside of work because of their demanding workloads. Another hazard for health care workers is more patients are obese; this increases the risk of injury for health care workers who transfer patients.

Health risk assessment: Aurora's health risk assessment has been conducted annually since 2011 by Health Media, a company of Johnson & Johnson. The health risk assessment is broken into five separate sections: Demographics, Personal Medical History, Lifestyle Scores, Health Behaviors, and Risk Factor Prevalence. For this dissertation, I am focusing only on Health Behaviors and, more specifically, weight management.

BMI was calculated from self-reported heights and weights in 16,963 participants. According to National Heart, Blood, and Lung Institute guidelines, BMI of 18.5-24.9 kg/m² is considered normal weight in most circumstances, and excess weight is divided into three categories: overweight (25.0-29.9 kg/m²), obesity (30.0-39.9 kg/m²), and extreme obesity (≥ 40.0 kg/m²). According to Aurora's health risk assessment for 2013, 29.3% of employees reported being overweight, 24.5% obese and 6.2% extremely obese.

Employees are placed on a continuum of how motivated they are to lose weight and fall into one of five categories: Precontemplator (2.8%), Contemplator (11.5%), Preparer (25.0%), Action (30.0%) and Maintenance (28.7%).

Health care disparities: Scholarship indicates that health disparities in the United States are persistently associated with an individual's race/ethnicity,

gender, income level, educational status, sexual orientation, age and geographic location. Of these factors, the literature primarily focuses on racial and ethnic differences in the United States. It is fully recognized that minority populations are generally classified as African-Americans, Native Americans, Asian/Pacific Islanders and Hispanics; each population is more likely to develop more chronic diseases and have a higher mortality and poorer health outcomes than Americans who are classified as white (Adler & Rehkopf, 2008). Race and ethnicity are the universal method in which health disparities are measured in the United States, as seen by reporting methods in public health, most statistics are reported by racial and ethnic groups. The Institute of Medicine report titled “Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care” details inequities in medical treatment among racial minorities. Health disparities among different racial/ethnic groups are widespread, but there are relatively few employer-based health promotion programs that have measured their impact on health disparities among employees (Dan et al., 2011).

These disparities and the awareness of them are growing on a national and international basis; employers infrequently have access to data related to health disparities for their employee populations. There is only one published study, to my knowledge, that has evaluated employee health promotion programs on how they may or may not have impacted diverse workforces through program participation and health risk change. Presently, ethnic minorities, including Hispanics, African-Americans and Asians, represent about 36% of the total U.S. population (Health Equity Resource Toolkit, 2013). The

U.S. Census Bureau projects that minorities will make up the majority of the U.S. population by the year 2042. In 2050, the working-age population in the United States is estimated to be 30% Hispanic, 15% African-American, and 10% Asian compared with 15%, 13% and 5%, respectively, in 2010 (U.S. Census Bureau). Race/ethnicity, sex, age, geographic location, education, income and disability have all been tied to disparities in obesity prevalence (Health Equity Resource Toolkit, 2013).

Patient Protection and Affordable Care Act: The ACA champions work wellness initiatives with numerous provisions intended to leverage workplace health promotion and prevention as a means to reduce the burden of chronic illness and to limit the growth of health care cost (Anderko et al., 2012).

Preceding the passage of the ACA, the most important applicable federal requirements were the Health Insurance Portability and Accountability Act (HIPAA) nondiscrimination provisions. These regulations enact clear requirements and limit the maximum reward that can be offered by a group health plan's wellness program. Under the HIPAA law, the greatest reward cannot exceed 20% of the cost of health coverage. The ACA raises the acceptable rate of incentives from 20% to 30% of the price of coverage in 2014 and offers discretion to the secretaries of Labor, Health and Human Services, and the Treasury to increase the incentive to up to 50% of the cost of coverage (Anderko et al., 2012). This is a very large sum of money that could potentially be transferred to those employees who don't meet healthy measures. With the passage of the ACA, worksite wellness programs will become part of a national

public health strategy to address the increase in chronic diseases that are anticipated to cost the U.S. health care system a projected \$4.2 trillion annually by 2023 (Bodenheimer et al., 2009)

Evidence suggests that worksite wellness programs are cost-beneficial, saving companies money on health care expenditures and producing a positive return on investment. Baicker and colleagues calculated an average return of \$3.27 in medical costs for every dollar spent on worksite wellness programs (Baicker et al., 2010). The Prevention and Public Health Fund of the ACA contains many new provisions designed to improve public health and wellness. The ACA was designed to address four key prevention areas: community prevention, clinical prevention, public health infrastructure and training, and research and investigation focused on workforce wellness. Understanding significant problems that affect the American workforce is critical to improving prevention efforts.

Permitting employers to adjust premiums on the basis of employees' health-related behaviors or health outcomes could reduce some of the ACA's projected advantages. The law's objectives are universal coverage, partially to divide the costs of addressing health risks across the population and partly to discourage insurers from trying to enroll only the healthiest and least costly individuals. The health benefits possible due to wellness incentives may be greater for lower income individuals than higher income employees because lower income people may put significant value on the same level of incentive. Lower income individual's rates of poor outcomes tied to behaviors such as

smoking are often higher, and an organization associating premiums to health outcomes could lead to higher premiums for lower income individuals (Volpp, 2011). The expectation of the ACA provision is that it will improve health associated behavior and reduce the prevalence of chronic disease caused by unhealthy lifestyles, but these outcomes cannot be assumed.

Urban versus rural: A study conducted by Befort and colleagues established that there is a considerably higher prevalence of obesity in rural adults compared to urban adults in the United States. Elevated obesity levels in rural compared to urban participants were established for both non-Hispanic whites and blacks. The rural-urban obesity disparity was found among adults aged 20-39 but not for adults age 40-59 or 60-75 (Befort et al., 2012).

Classifying urban versus rural can be based on different definitions from different government agencies. There are three primary factors: population density (people per square mile), distance from the nearest city, and/or size of the nearest city (Hall et al., 2006). For this dissertation I will be using the guidelines established by the Wisconsin Area Health Education Center (AHEC) Rural-Urban Classification Codes (updated in April 2012).

Five alternative activities offered: Aurora offered five alternative activities to help obese employees lose weight. These activities differ in that some are no cost to the employees and some are expensive. Weight loss options for employees are tailored to those who desire to lose weight in a group setting, and those who and to lose weight independently. In the following section I will give a summary of each option and the costs associated with them.

Aurora reimburses 25% of the costs of the healthy weight alternative activity programs. The middle column in Table 2.1 reflects the approximate cost of the program before the 25% reimbursement.

Table 2.1 Cost of Alternative Wellness Activities		
Weight Watchers online	\$60	12-week program
Weight Watchers group	\$150	12-week program
HMR meal replacement	\$1200	12-week program

The other alternative activities include:

- Lose 5% on own; reimbursement does not apply
- Behavioral coaching through Aurora Health Care's Employee Assistance Program; no cost, so reimbursement does not apply

Option 1 – Lose 5% of weight: Employees had 8-9 months to lose 5% of their body weight. The first weigh-in occurred in January/February 2013, followed by a repeat weigh-in in August/September 2013. If employees lost 5% of their body weight on their own, they would receive the wellness credit. About half of the employees received the credit that chose this option. Aurora chose this option because 5% of a person's weight loss is a good start toward a healthy weight and could help reduce symptoms of obesity-related diseases like diabetes and hypertension. In nationally representative research, a considerable amount of obese U.S. adults who reported attempting to lose weight in the past year were successful, with 40% reporting $\geq 5\%$ weight loss and 20% reporting $\geq 10\%$ weight loss (Nicklas et al., 2012).

Option 2 – Weight Watchers in person: Weight Watchers was chosen as an option because Aurora has a relationship with the organization and already had on-site meetings for employees to attend. In a study with the National Health Service (NHS) in Europe, a third of all patients who were referred to Weight Watchers through the NHS Referral System and started a 12-session course achieved $\geq 5\%$ weight loss, which is generally related to a reduction in obesity commodities. This is the largest assessment of NHS referral to a commercial weight loss set in the United Kingdom, and results are compared with other options for weight loss available through primary care (Ahern et al., 2011).

Weight Watchers is a social support program and has strong ties to attempting to change health behaviors. For example, support groups such as Alcoholics Anonymous have recruited millions of members. New members are assigned a sponsor, who introduces the person to the group values and provides guidance on how to maintain sobriety based on experience. In other words, the sponsor's primary function is informational exchange or instrumental support. Weight Watchers also assigns members to pairs and conducts meetings for individual support to change behaviors. Two randomized trials found that individuals who participated in Weight Watchers lost approximately 5% of initial weight over 3-6 months (Heshka et al., 2003; Rippe, 1998).

Option 3 – Weight Watchers online: Weight Watchers online is a community with other people following the Weight Watchers program. They also have a webcast series to help people get going on the program. The tools include mobile tools and apps, cheat sheets and restaurant finders.

Online weight loss programs have become extensively accessible as an alternative to standard treatment; Weight Watchers have sponsored three randomized controlled trials of its program. Heshka and colleagues found that, after 26 weeks, subjects in Weight Watchers lost more weight than subjects trying to lose weight on their own after two brief sessions of dietary counseling. Compared with 15% of the self-help group, 53% of the Weight Watchers group attained weight losses of 5% of body weight or more (Heshka et al., 2000).

Option 4 – Health Management Resources: The HMR meal replacement program is offered in medical centers across the United States. It is scientifically based and supports fast, maximum weight loss and better health, according to the company.

There are several scientific base trials that were completed to show the efficacy of the HMR program. HMR's objective was to obtain accurate assessments of weight outcomes, behavioral data and side effects of an intensive behavioral weight-loss program using low-energy diets. A study conducted by Anderson and colleagues resulted in mean weight losses for obese patients who entered an intensive behavioral weight-loss program and completed 9 weeks of classes. Patients who consumed meal replacements, fruits and vegetables lost 17.0 kg in 18 weeks. Patients who consumed meal replacements alone lost 19.7 kg in 19 weeks. This study advocates that empowering patients to maintain scheduled visits, adhere to meal-replacement prescriptions, keep daily records of food consumption and physical activity, and considerably increase physical activity supported a 2 lb/week weight loss (Anderson et al., 2011).

Option 5 – Behavioral coaching option: Aurora’s Employee Assistance Program was given the task of designing a health coaching alternative for healthy weight. Task members looked at the literature to develop three session modules (Table 2.2).

Table 2.2 Behavioral Coaching: Three Sessions
Session One – Stress Management and Physical Awareness
<ul style="list-style-type: none"> • Provide an alcohol/drug abuse and mental health screening to determine if the client needs to be referred for any medical or behavioral health treatment. • Identify the client’s personal goals for the module and engage the client to “take the first step” in the change process. • Begin identifying personal issues that influence body image and difficulty losing weight. • Develop skills to deal with internal and external stresses. • Increase awareness in the body.
Session Two – Mindful Choices: Body, Mind and Emotions
<ul style="list-style-type: none"> • Review progress on personal goals. • Identify client’s strengths and challenges with body awareness and stress reduction. • Provide an introduction to concepts of emotional and/or impulsive eating and hedonic hunger. • Explore individual challenges and increase awareness about self-sabotage. • Increase body movement. Introduce positive self-talk.
Session Three – Working Through Roadblocks and Developing a Support Plan
<ul style="list-style-type: none"> • Review progress on personal goals and make an individualized plan, using learned skills to maintain the changes. • Educate regarding the “set point” theory of weight loss and how that may affect motivation. • Help client to recognize that change is a process. Encourage realistic goals and lifestyle changes. • Identify and develop a support system and resources to maintain change. • Explore ways to get back on track if setbacks occur.

2-C. Theoretical/Conceptual Framework

In this evaluation I am asking three broad questions with several hypotheses:

1. What are the factors influencing participation and nonparticipation in EWP; and 1a.) Are there any differences in population demographics between participants and nonparticipants?
2. What are the factors influencing the choice of alternative wellness activities?
3. What is the success of the incentivized EWP, measured by BMI for obese employees at a large health care organization?

These larger questions will be broken down into hypotheses in two categories and supported by two health promotion models in the study design (Figure 2.1).

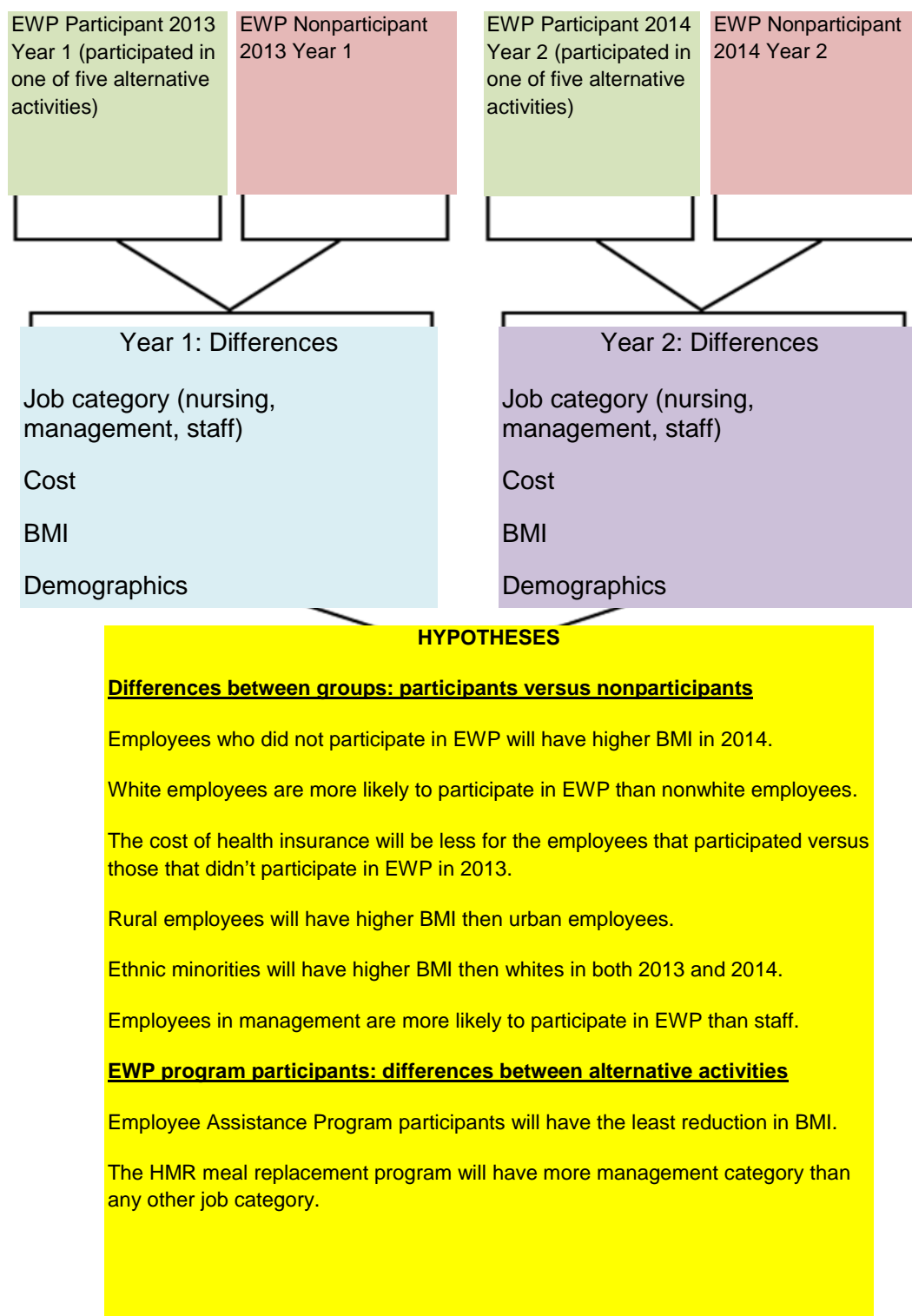


Fig. 2.1. Study design.

Behavioral economics: Behavioral economics is the study of attributes affecting the behavior of the consumer. Behavioral economists have noted that standard economic models of utility based on rational choice theory fail to account for issues of willpower, temptation and inconsistent preferences (Rabin, 1998). The self-control problem, also known in the behavioral economics literature as present bias, is that a person systematically deviates from a plan considered optimal when formulated in the past. Present bias can impede a person's ability to fulfill his or her preferences and can weaken a person's long-run welfare (O'Donoghue & Rabin, 1999). The empirical literature on the occurrence of present bias has multiplied in recent years. Scholars have cited self-control difficulties to describe many significant economic phenomena such as credit card borrowing (Ausubel, 1999; Heidhues & Köszegi, 2010).

DellaVigna and Malmendier demonstrate that individuals make inadequate decisions about gym attendance, buy a monthly health club membership, and then attend the gym infrequently. The behavior of health club attendees is consistent with a model of present bias in which the gym membership serves as a commitment to exercise more but is incompatible with expected future membership costs (DellaVigna & Malmendier, 2006). Behavioral economists have recognized the likely application of present bias to smoking and other addictive activities such as overeating. Withdrawal and nicotine cravings make the deferral of gratification remarkably hard (Volpp, 2009). Physiological and psychological addiction may be viewed merely as an expression of present bias. In the instance of smoking, present bias may rigorously limit a person's exertion

in quitting, both in terms of the start and preservation of a quit effort.

Overconsumption of tobacco relative to long-run preferences diminishes a smoker's long-term well-being (Gruber, 2001). However a smoker who wants to quit may decline cessation in order to satiate a nicotine craving.

Monetary incentives for health behavior change: A meta-analysis conducted by Kane and colleagues of randomized controlled trials on the use of incentives to promote change in health behaviors found that economic incentives increased health behavior 73% of the time (Kane et al., 2004). Some examples, including provisional cash incentives, have effectively encouraged: safe sexual habits (de Walque et al., 2012), HIV testing (Thornton, 2008) and child immunization frequencies and wellness check-ups (Gertler, 2004).

Finkelstein and colleagues offered different levels of monetary incentives for weight loss. The authors show evidence of modest weight loss at three months but no difference at six months for six-month financial payments ranging from \$7 to \$14 per percentage point of weight reduction. A few researchers have investigated lottery-based methods as conditional incentives. For instance, a lottery scheme was found to increase compliance to taking warfarin, an anticoagulant drug that prevents blood clots (Volpp et al., 2008). Volpp and colleagues incorporate an intervention in which participants are eligible for a daily lottery if they meet their weight loss goal. A key advantage of lotteries as contingent incentives is their potential cost-effectiveness. The lotteries also make use of people's tendency to overestimate the probability of rare outcomes and desire to avoid regret ("loss aversion") (Kahneman & Tversky, 1979). More

research is needed to understand the conditions under which different incentive schemes are effective.

Smokers' receptiveness to individual cash incentives generated mixed results. A systematic review conducted by Cahill and colleagues on contests and cash incentives for smoking cessation determines that while incentives increase quit rates in the short term, these gains are not sustainable (Cahill & Perera, 2011). Incentives often attract smokers who are financially motivated but unmotivated to maintain nonsmoking. It is not unexpected for a person to revert back to smoking if they joined the study predominantly for the cash incentive. Volpp and colleagues found that modest financial bonuses offered randomly through a U.S. Veterans Affairs hospital escalate short-term cessation but not long-term quits, but found in a second study that larger financial bonuses of \$250 for six-month test passage and \$400 for 12-month test passage offered through a workplace program increase both short-term cessation and lasting quits, even if monetary incentives are not powerful enough to promote long-term quitting (Volpp, 2009).

In summary, behavioral economics is a vehicle to promote behavioral change in the short term among the population by using monetary incentives. However, this approach to induce behavior change needs to be studied more comprehensively to see if they promote long term change. Employees may lose weight initially, but studies need to be conducted long term to establish if monetary incentives work over the long term.

Health belief model: The health belief model is an intrapersonal model and focuses on the individual's motivations, intentions, attitudes and health status. Health belief is a psychological model developed in the 1950s as part of an effort by social psychologists in the U.S. Public Health Service to account for the lack of public participation in health screening and prevention programs (Rosenstock et al., 1988). The main constructs of the health belief model as it relates to obese employees at Aurora are demonstrated in Figure 2.

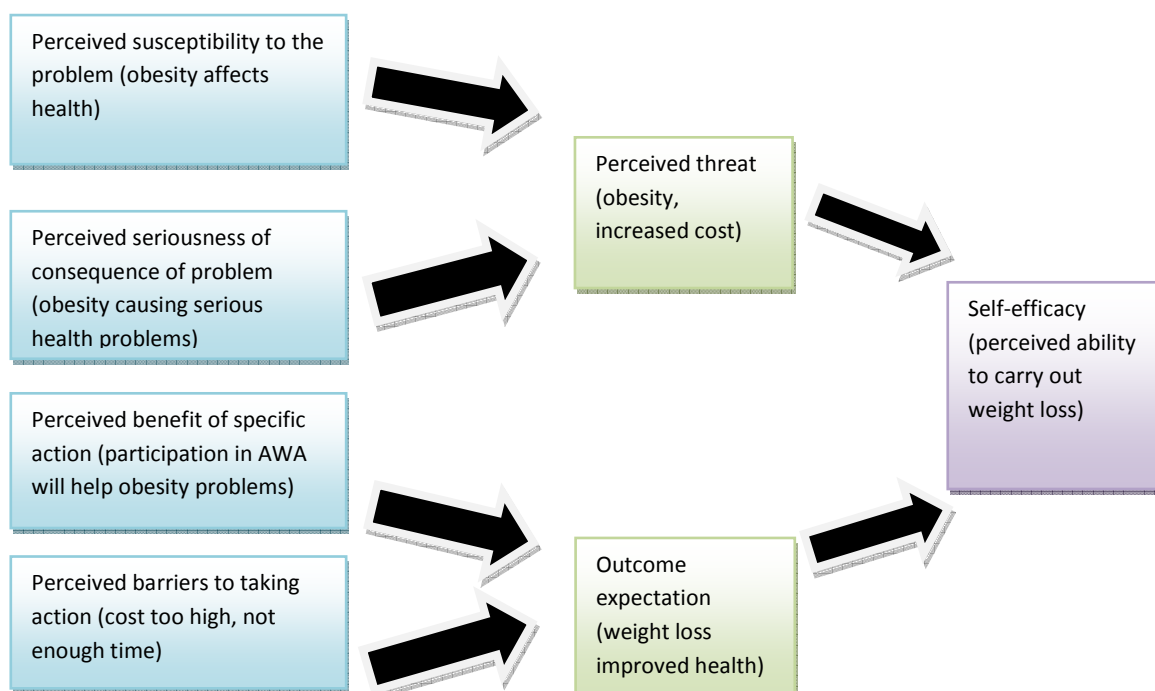


Fig. 2.2. Health belief model as it relates to employee weight loss. AWA = alternative wellness activities. (Source: Rosenstock I, Strecher V, and Becker M. (1994) The health belief model and HIV risk behavior change. In: DiClemente RJ, Peterson JL (eds.). Preventing AIDS: Theories and methods of behavioral interventions. New York: Plenum Press, pp. 5-24.)

The health belief model has been used to study a multitude of health behaviors in different populations, including influenza vaccination, high blood pressure screening, smoking cessation, exercise, nutrition, breast self-examination and sexual risk behaviors. The enduring health belief model suggests that behavioral change requires a belief that an action will be favorable and come at an appropriate cost, confidence that change is possible, and an incentive to take action. Therefore, in order for an obese Aurora employee to participate, he or she needs to believe that change is possible. Based on previous studies investigated in a meta-analysis, this approach is the most appropriate model to utilize in examining why employees participate in an EWP (Harrison et al., 1992).

The health belief model as it relates to participation in a EWP: Since participation in EWPs is normally voluntary, it seems reasonable to assume that the potential user's motivations and preferences toward various options will be an important determinant of participation. Behavioral theory has progressively been used to guide health promotion research to improve intervention effectiveness. The health belief model was developed in the 1950s to explain health behavior associated with the failure of people to participate in programs that would reduce disease risk. The health belief model infers that health behaviors are established by health beliefs and readiness to take action (Abood et al., 2003).

The constructs of the health belief model are:

- **Perceived susceptibility** refers to beliefs about the likelihood of getting a disease or condition. For instance, an employee must believe they will get a disease that is linked to obesity.
- **Perceived severity** is feelings about the significance of contracting an illness or of leaving it untreated. This includes evaluations of both medical and clinical consequences (e.g. death, disability and pain) and possible social consequences (such as the effects of conditions on work, family life and social relations). The combination of susceptibility and severity has been labeled as perceived *threat*. This could be the severity of obesity causing medical and social consequences.
- **Perceived benefits:** Even if a person perceives personal susceptibility to a serious health condition (perceived threat), whether this perception leads to behavior change will be influenced by the person's beliefs regarding perceived *benefits* of the various available actions for reducing the disease threat. Other nonhealth-related issues factor into forming perceptions, such as the financial savings related to losing weight. Thus, individuals exhibiting optimal beliefs in susceptibility and severity are not expected to accept any recommended health action unless they also perceive the action as potentially beneficial by reducing the threat.
- **Perceived barriers:** The potential negative aspects of a particular health action—perceived barriers—may act as impediments to undertaking recommended behaviors. A kind of unconscious, cost-

benefit analysis occurs wherein individuals weigh the action's expected benefits with perceived barriers—"It could help me, but it may be expensive, have negative side effects, or be unpleasant, inconvenient or time-consuming." Thus, "combined levels of susceptibility and severity provide the energy or force to act and the perception of benefits (minus barriers) provide a preferred path of action" (Rosenstock, 1974; Glanz et al., 2008).

The health belief model is a valuable approach to observe employees' motivations and preferences toward various options as an important factor of participation. I will now progress to the third and final model discussed in this dissertation, the social ecological model, which I will use to explain the current wellness program as well as provide suggestions for improvement at Aurora.

Social ecological model: The social ecological model describes how Aurora has organized its EWP to offer a strategic method of addressing the issue of obesity among its employees (Figure 1.4). Each circle in the figure represents a different layer or component of the model. Social ecological models of health behavior highlight the environmental and policy frameworks of behavior, but also incorporate social and psychological influences. Ecological models focus on multiple levels of influence, thus leading to the development of more comprehensive interventions. Social ecological models suggest that a person's behavior (e.g. participation in a worksite health promotion program) is predisposed by numerous levels of influence that include personal, interpersonal, institutional, community/society and policy variables (Glanz et al., 2008).

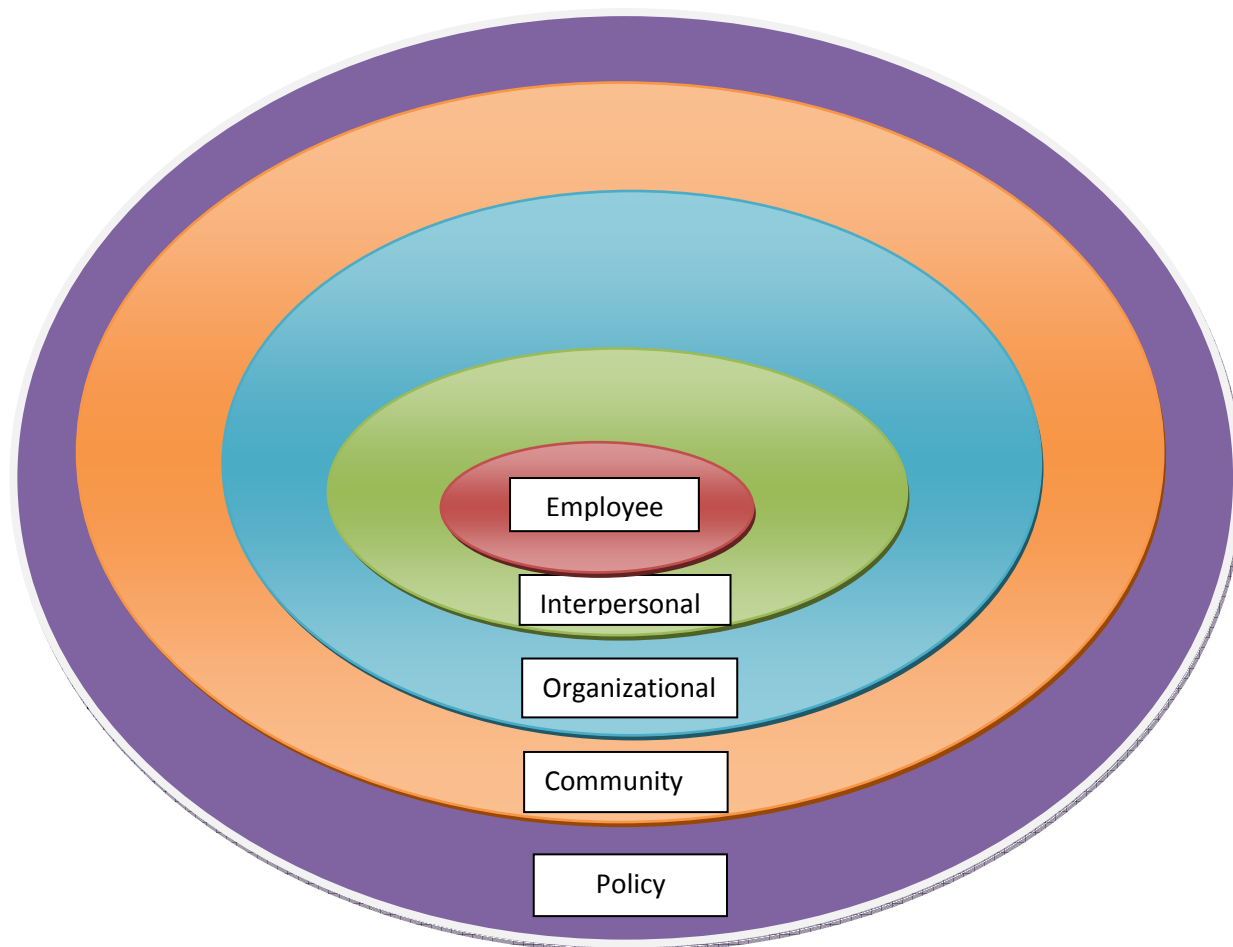


Fig. 2.3. Social ecological model. (Source: Sallis JF, Owen N, Fisher EB. (2008) *Ecological models of health behavior. Health Behavior and Health Education: Theory, Research, and Practice.* 4:465-486.)

The social ecological model is a proven approach for worksite health promotion program design (Eddy et al., 2002). The social ecological model recognizes the effects on behavior as a succession of levels, in which each level has a subsequent influence on the succeeding level. I will lay out all the levels of influence Aurora can have on obesity reduction. The social ecological model,

which is centered on a systems perspective, claims that workplace health promotion endeavors must address three critical factors:

1. Organizational factors (e.g. sociocultural, economic);
2. The work environment (e.g. physical and structural);
3. Job demands and worker characteristics.

Accordingly, the intervention needs to target job demands and worker characteristics, physical work environment, and socio-organizational environment. For example, in health care workers, specific job constraints or conditions limit or facilitate opportunities for physical movement; this may include jobs in health care such as billing and reception. Weight management strategies need to address these job demands at the workplace (McLeroy, 1988). I will assess the current focus of the EWP strategy to reduce obesity in the context of the social ecological model with three critical factors, and make positive suggestions for improvement.

Ecological models have been essential to health promotion and EWPs for more than 20 years. This model was very successful in overturning the epidemic of tobacco consumption, and there are solid projections that interventions built on ecological models have the potential to reverse the obesity epidemic. This may be possible at Aurora by improving the environments and policies that motivate physical activity and nutrition behaviors (Sallis et al., 2008). A study conducted by Williams and colleagues using the ecological model to implement weight management on hotel workers found that, by using the social ecological model,

weight reduction among employees was heading in the right direction (Williams et al., 2014).

My objective of using the ecological model of health behavior is to inform the development of comprehensive interventional approaches that can systematically target mechanisms of change at several levels of influence. Behavior change can be seen at Aurora if environments and policies support healthy selections, if social norms and social support for healthy choices are robust, and if individuals are motivated and educated to make those choices. Social ecological models for understanding obesity have been used over the last 10 years; most of them have an origin in the work of Bronfenbrenner (Bronfenbrenner, 1977). In models offered by Davison and Birch in 2001 and Story in 2008, individuals are specified as providing their cognitions, skills and behaviors, lifestyle, biology and demographics as well as the frameworks that influence individual decision-making, including the social, physical and macrolevel environments to which they are subject including families, neighborhoods and the larger cultural environment (Davison & Birch, 2001; Story et al., 2008). The social ecological model is valuable in presenting the extensive range of factors. The term *ecology* originated from biological science and, in the social ecological model, signifies the interrelations between organisms and their environments. Ecological models have advanced the behavioral sciences and public health fields focusing on the environment of people's connections with their physical and sociocultural surroundings (Stokols, 1996). A person's social environment of family, friends and workplace are rooted within the physical

location of geography and community conveniences, which is in turn established within the policy environment of different levels of government or governing bodies. All levels of the social ecological model have an influence on the behavior of the individual (Stokols, 1996).

The fundamental belief of an ecological model is that behavior has many levels of influences, frequently comprising of intrapersonal (biological, psychological), interpersonal (social, cultural), organizational, community, physical environmental, and policy. Ecological models are thought to deliver an all-embracing framework for understanding the numerous and interrelating factors of health behaviors. Of further significance, ecological models can be used to help cultivate comprehensive intervention approaches that systematically focus on procedures of change at all levels of influence (Sallis et al., 2008). According to the Institute of Medicine, an ecological model is "a model of health that emphasizes the linkages and relationships among multiple factors (or determinants) affecting health" (Sallis et al., 2008).

The Nutrition and Physical Activity Program to Prevent Obesity and Other Chronic Diseases (NPAO) at the CDC utilizes a five-level social ecological model to focus on understanding the problem of overweight and obesity. The social ecological model is a greatly adjustable structure that shows there are clear yet interconnected factors that influence a person's behavior. The model proposes there are many levels of influence, and that effective prevention and obesity reduction programs should address every level. The five levels of the social ecological model used by the NPAO are the individual, interpersonal,

organizational, community and society. The model also functions as a reminder that personal knowledge is not enough for behavior change; increasing knowledge, training skills, and creating supportive environments are all important components of behavior change (CDC website).

Many researchers investigated the social ecological model. These include: Urie Bronfenbrenner's Ecological Systems Theory (1979), which focused on the relationship between the individual and the environment; Kenneth McLeroy's Ecological Model of Health Behaviors (1988), which classified five different levels of influence on health behavior, although this did not include physical environment, which is an essential element of a social ecological model of physical activity; and Daniel Stokols' Social Ecology Model of Health Promotion (1992, 2003), which identified the core assumptions that underpin the social ecological model (Glanz et al., 2008).

If health care organizations can better understand overweight and obese employees' aspirations, the company can nurture the employee environment by providing resources and support combined with meaningful rewards.

Chapter 3: Methods

3-A. Introduction

American employers are encountering rising health care costs that may make currently provided health plans unsustainable in the long term. One way to help reduce costs and increase the health of employees is through executing an incentivized employee wellness program (EWP) aimed specifically at reducing obesity in the employee population. More than one-third of the employees at Aurora Health Care are obese; this is a significant problem for the organization. To help reduce the high cost of obese employees, an incentivized EWP that compensates employees for actively trying to lose weight was implemented. In this chapter I will establish an appropriate and suitable design for the evaluation of the EWP to answer the following questions:

1. What are the factors influencing participation and nonparticipation in an EWP; and 1a.) are there any differences in population demographics between participants and nonparticipants?
2. What are the factors influencing the choice of alternative wellness activities?
3. How successful is the incentivized EWP at a large health care organization as measured by change in body mass index (BMI) for obese employees?

3-B. Participants and Setting

Participants: The study population is comprised of Aurora employees who have a BMI of 30 or greater and were weighed by the employer in January/February 2013 and again in January/February 2014.

When obtaining the sample, I will apply a number of inclusion and exclusion criteria. I will restrict the sample to active full-time employees, part-time employees and employees assigned zero hours, all age 18 years or older. This is a multivariate analysis that will quantify the impact of EWP participation on BMI and medical costs.

More than one-third of Aurora employees are obese. In 2013, the obesity intervention of offering obese employees alternative wellness activities designed to reduce weight was implemented to help reduce the high cost of providing health care to obese employees. These activities were offered as part of an incentivized EWP that credits employees for actively trying to lose weight. The organization paid a portion of each activity that had a cost. For example, Aurora reimburses 25% of the cost of the Healthy Weight alternative wellness activity options. There was no cost for the self-directed lose 5% of body weight or behavioral coaching options. The cost of Weight Watchers online was \$60, Weight Watchers group was \$150, and HMR meal replacement was \$1,200. A shortcoming of the program is that obese employees are not required to lose weight, rather only participate in an alternative wellness activity. In order for this program to succeed at reducing costs, a significant amount of obese employees

must participate as well as reduce their BMI. As 2013 was the program's first year of implementation, the outcomes will be evaluated in this dissertation.

Of the 6,375 employees (35%) with a BMI ≥ 30 , only 3,094 employees (47%) chose to participate in alternative wellness activities offered by Aurora. In order to evaluate who in the employed population participated and who did not, I looked at possible differences in demographics. The impact of the intervention was assessed by comparing employees' average postintervention and preintervention BMI. Aurora's intervention includes five alternative wellness activities offered; I will evaluate the impact of each. Variables examined included age, race, gender, BMI, job category, total health care cost of each employee in 2012 and 2013, and urban or rural employee work location. The dependent variables are participation and BMI.

Study setting: This research project was conducted within Aurora, a large not-for-profit Milwaukee-headquartered health care system employing approximately 29,194 employees in Wisconsin. A total of 19,771 employees were weighed, with an average BMI of 28.9. The state's largest medical system, Aurora encompasses 15 hospitals, 155 clinics and 82 pharmacies, and employs 1,400 physicians with another 3,400 affiliated physicians. I am evaluating data from 6,375 obese employees in the health care setting. Of the obese employees, 3,094 (47%) participated in an alternative wellness activity to attain their wellness credit for 2014, and 3,281 (53%) did not participate in an alternative activity. Table 3.1 describes the employee population at Aurora who completed the health risk assessment in 2013.

Table 3.1 Demographic Breakdown of Aurora's Employee Wellness Program	
Number of Participants (n=16,963)	%
Gender	
Male	16.26
Female	83.74
Age Distribution	
17-29 years	15.76
30-39 years	22.21
40-49 years	2.60
50-59 years	27.87
60-69 years	11.22
>70 years	0.34
Ethnicity	
White, non-Hispanic	88.22
Black/African-American	4.67
Hispanic	2.99
Asian (Pacific Islander)	2.54
Pacific Islander	0.08
Native American Indian/Native Alaskan	0.37
Multiracial	0.52
Other	0.54
N/A	0.06
Education	
Never attended school	0.01
Elementary	0.03
Some high school	0.36
High school graduate/GED	9.82
Some college or technical school	31.61
College graduate or higher	58.07

3-C. Design

The study is a retrospective program evaluation using a dataset generated from two components of data from the health care organization. This study employed a quasiexperimental nonequivalent, two-group design (i.e. participants and

nonparticipants) examining participation rates in alternative activities offered for weight loss as well as a pretest/posttest evaluation of change in BMI by alternative wellness activities and overall BMI change from 2013 to 2014.

Many employee wellness studies use quasiexperimental designs with nonrandomized assignments and cohort analyses (Naydeck et al., 2008; Aldana et al., 2005; Sacks et al., 2009). Quasiexperimental analyses add value from large samples and from practicality. These studies are often exposed to selection bias, as wellness programs may attract healthier participants. However, the discoveries from randomized controlled studies appear to be consistent with the overall confirmatory findings in several employee wellness research reviews (Berry & Mirabito, 2011). Examples of quasiexperimental, nonrandomized group designs appear in many prevention and workplace studies (Mills et al., 2007; Pelletier, 2005). Table 3.2 diagrams the nonequivalent group design.

Table 3.2 Nonequivalent Control Groups at Pretest/Posttest				
	Pre-BMI	Treatment	Post-BMI	Difference
Experimental group (EWP participants)	Y	X	Y	PreY – PostY
Control group (EWP nonparticipants)	Y		Y	PreY – PostY

I will be evaluating preintervention BMI for employees in each variable and comparing them to postintervention BMI in the groups. See Table 3.3 for number of participants in each alternative wellness activity.

Table 3.3 Employee Wellness Program Participation	
Variable	N (%)
Nonparticipant	3,281 (52.97%)
Lose 5% of body weight	2,021 (31.67%)
Behavioral coaching	442 (6.93%)
Weight Watchers group meetings	317 (4.97%)
Weight Watcher online	167 (2.63%)
HMR meal replacement	45 (0.71%)
Other	9 (0.14%)
Total	6,375 (100%)

3-D. Predictor and Criterion Variables

I will be using two sets of data combined into one dataset for this dissertation. I will use claims data and employee wellness data. Data was provided by Aurora's Employee Wellness department and claims data was provided by the Quality department. Employee Wellness weighed 19,771 employees in January and February of 2013 and established an employee wellness database. In 2014, 17,131 employees were weighed. Employee wellness data includes employees' respective BMI, work location by zip code, job classification (divided into staff, managers and nurses). Additional employee characteristics were obtained to include gender, age and race.

The second dataset includes health insurance claims data that was linked to all obese employees via employee identification numbers. The claims data provided for this analysis were taken from 2012 and 2013. Claims data included

total pharmacy costs, total medical cost and total overall costs for each employee.

The rural/urban variable was created using the guidelines established by the Wisconsin Area Health Education Center (AHEC) Rural-Urban Classification Codes (updated in April 2012):

AHEC Rural-Urban Classification

R1 = Rural area with no population center greater than 2,500

R2 = Rural area with population center 2,500 – 9,999

R3 = Rural area with population center 10,000 – 49,999

Urban = Urbanized areas with population nucleus of 50,000 – 1 million

Large Metro = Urbanized areas of population > 1 million (e.g.

metropolitan Milwaukee)

Aurora has 367 different buildings that will be coded into two categories: rural (including R1, R2 and R3) and urban.

3-E. Procedures

Data was collected in two formats at Aurora and all employee information was de-identified for analysis. An employee wellness dataset was created by the organization in January 2013 when employee weights were originally collected. The data collected included BMI, age, gender, race, job title and zip codes of employment location. There are 367 buildings at Aurora that were coded as urban or rural per AHEC guidelines. The BMI data for 2014 was added to the 2013 dataset and the alternative wellness activities employees participated in,

including: (1) self-directed 5% total body weight loss; (2) HMR meal replacement program with telephone coaching; (3) Weight Watchers group meetings either at work or in the community; (4) Weight Watchers online; and (5) behavioral coaching administered by the Employee Assistance Program.

Claims data was broken into three variables: medical cost, pharmacy cost and total cost. Cost data was available for years 2012 and 2013. Both these datasets were merged using employee identification numbers to create the current dataset. For BMI, categories of 30-34, 35-39, and ≥ 40 were established. A BMI of ≥ 40 is considered morbidly obese. Race was compiled into three categories: White, Black and Other. Job title was separated into two dichotomous variables: Level I-I included two groups all staff and a nurses category which included all staff and managers in the staff group. Level I-II included a staff category and manager category, the staff category also included nurses. Age was grouped as ≤ 29 , 30-49, 40-49, 50-59, 60-69, and ≥ 70 years.

3-F. Statistical Analyses

Descriptive statistics are reported as percentage and frequency for categorical parameters, and as mean and standard deviation for continuous parameters. To analyze trends over time within each group of interest, paired t-tests were used when analyzing interval data. When the sample is normally distributed, nonparametric tests will be used. Logistic regression will be performed to control for the effect of independent variables to assess for characteristics of participants versus nonparticipants, this will be a binary logistic regression. A chi-square test

was used to determine the proportional distribution of alternative wellness activity participants and nonparticipants by demographic characteristics.

An Analysis of Variance (ANOVA) test was used to determine the impact the dependent variable BMI had on the independent variables of alternative wellness activities selected or no activity selected as a single pretest/posttest model to assess for BMI changes from 2013 to 2014.

3-G. Methodological Limitations

I am investigating an intervention in a setting in which randomized samples are not possible. This study is being conducted in the real-world setting of the first year of implementing an incentivized EWP. By not having the ability to randomly assign groups to the study conditions, I confront a larger chance of having systematic preexisting differences in background characteristics between the participants and nonparticipant groups. As with all quasiexperimental designs, a breakdown to address the prospect for selection bias can lead to misleading assessments of the intervention effect and possibly false conclusions about the intervention's effectiveness (Bray, 2008). In completing the logistic regression, I assess odds ratios that assist in the prediction of who is participating in the EWP.

3-H. Human Participants and Ethics Precautions

I submitted this research proposal to Aurora Health Care's Institutional Review Board, which deemed the project as not needing IRB oversight as the study population is unidentifiable. I also submitted to UW-Milwaukee's Institutional

Review Board and they deferred oversight to Aurora Health Care. A data use agreement also was completed with Aurora Health Care's compliance officer to ensure that the data collected remains protected per Health Insurance Portability and Accountability Act (HIPAA) laws. The dataset is de-identified and employee information is unknown.

Chapter 4: Results

4-A. Organization

The analysis chapter will consist of three essential segments, including a brief review of my hypotheses and theoretical models, a discussion of the results and how they are seen through the health belief model and behavioral economics, and a discussion of the analysis and findings. I am evaluating the outcomes of a workplace wellness program for obese employees implemented by Aurora Health Care using two distinct theoretical models: health belief and behavioral economics. I will use the health belief model to examine employees' motivations to participate in the intervention offered to obese employees, and behavioral economics is used to evaluate whether the financial incentives were able to encourage employees to participate and lose weight.

As stated in Chapter 3: Methods, there are three larger questions and several hypotheses that will be answered in this chapter. I will present the results of the hypotheses first and then use those findings to answer the larger questions. To recap, hypotheses appear in Box 4.1 and questions are as follows:

1. What are the factors influencing participation and nonparticipation in an employee wellness program (EWP); and 1a.) are there any differences in population demographics between participants and nonparticipants?
2. What are the factors influencing the choice of alternative wellness activities?
3. How successful is the incentivized EWP at a large health care organization as measured by change in body mass index (BMI) for obese employees?

Table 4.1 Hypotheses
<p><u>Differences between groups: EWP participants vs. nonparticipants</u></p> <ol style="list-style-type: none"> 1. Employees who did not participate in EWP will have higher BMI in 2013. 2. White employees are more likely to participate in EWP than nonwhite employees. 3. The cost of health insurance will be less for the employees that participated versus those that didn't participate in EWP in 2013. 4. Rural employees will have higher BMI then urban employees. 5. Ethnic minorities will have higher BMI then whites in both 2013 and 2014. 6. Employees in management are more likely to participate in EWP than staff. <p><u>EWP program participants: differences between alternative wellness activities</u></p> <ol style="list-style-type: none"> 7. Employee Assistance Program participants will have the least reduction in BMI. 8. The HMR meal replacement program will have more management category than any other job category.
BMI, body mass index; EWP, employee wellness program.

See Table 4.1 for participation patterns in the EWP.

Table 4.1 Employee Wellness Program Participation	
Variable	n (%)
Nonparticipant	3,281 (52.97%)
Lose 5% of body weight	2,021 (31.67%)
Behavioral coaching	442 (6.93%)
Weight Watchers group meetings	317 (4.97%)
Weight Watcher online	167 (2.63%)
HMR [®] meal replacement	45 (0.71%)
Other	9 (0.14%)
Total	6,375 (100%)

Per Table 1:

- ❖ Lose 5% of body weight – 2,021 selected this activity;

- ❖ Behavioral coaching involves the Employee Assistance Program's weight management program – 442 employees selected this activity and completed 3 phone calls with homework in between.
- ❖ Weight Watchers group meetings, either at work or in the community – 384 employees selected this activity and completed a 12-week program.
- ❖ Weight Watchers online – 167 employees elected this activity and completed the 12-week program.
- ❖ HMR meal replacement program with telephone coaching – 45 selected this activity and completed a 12-week program.

4-B. Results

There are two main areas of analysis that are presented: first, the participation in the EWP, and second, the success of the program examining a change in BMI over the year in study. In order to evaluate who in the employee population participated and who did not, the health belief model is applied to consider differences between participants and nonparticipants on demographics, including gender, age, race, job level, job location and cost. Enrollment and participation are imperative for the EWP program at Aurora to be successful. The year 2013 was the first year of the program; the first employee weights were taken in January/February 2013 and the second weights taken in January/February 2014. This program was established to help promote healthy weight at Aurora and reduce obesity among employees. Employees who have a BMI of less than 30 automatically qualify for a monetary credit. Employees who have a BMI of 30 or

more are given the option to participate in an alternative wellness activity in order to receive the same incentive. The incentive is not for weight lost, but rather participation with the goal of encouraging weight loss. This analysis assessed those employees who met the obese criteria of a BMI ≥ 30 .

Behavioral economics is used to evaluate if financial incentives were able to get employees to participate, and to evaluate participation in a particular alternative wellness activity based on cost and effort. Behavioral economists suggest that incentives can be highly effective (Thaler & Sunstein, 2008).

One concept in behavioral economics is present bias, the phenomenon that people will not do what's in their best interest in the long term for many reasons. When making decisions, people are inclined to choose mental short cuts; we let the wants and distractions of the moment get in the way of adhering to what's best for us. Another concept applied here is status quo or default bias; this refers to people's tendency to take the path of least resistance (Volpp, 2009).

Hypothesis #1 – Employees who did not participate in 2013 EWP will have a higher BMI than those who participated.

In 2013, prior to Aurora offering a monetary incentive for employees to complete an alternate wellness activity, there was no significant difference in mean BMI between those who participated in its EWP and those who did not. I hypothesized there would be a difference because EWPs tend to attract healthier employees who may have lower BMI. Starting mean BMI in 2013 is shown in Table 4.2.

Table 4.2 Mean Body Mass Index of Obese Employees in 2013						t-value	f-value
	N	Mean	SD	Minimum	Maximum		
Nonparticipant	3,748	36.5	5.78	30.0	81.9	-.077	1.03
Participant	3,037	36.6	5.68	30.0	82.9		
P=0.39. SD, standard deviation.							

The starting mean BMI was 36.5 for nonparticipants in the employee wellness program are 36.6 mean BMI for participants. The participants had a higher BMI by a small amount of 0.1. Contrary to expectations, there was no difference between these two groups at the start of the program.

Of the 6,375 obese employees who participated in the wellness program in 2013, 47% participated in one of the alternative wellness activities offered, and 53% did not participate. In 2014, the population of obese employees decreased, either from employees leaving the organization or not meeting the BMI parameter for obesity. In 2014, there were 5,451 obese employees. In order to examine quantitative data, statistics were generated, including t test. I looked at the mean difference in BMI between participants and nonparticipants. See Table 4.3 for results.

Table 4.3 Mean Difference in Body Mass Index from 2013 to 2014							
	N	Mean	SD	Min	Max	P-value	t-value
Nonparticipant	2,116	36.7	5.99	19.2	76.0	<0.0001	6.87
Participant	2,710	35.5	5.88	20.8	72.4		
P<0.0001. SD, standard deviation.							

Table 4.3 provides the mean BMI for nonparticipants was 36.7 and 35.5 for participants with a reduction in BMI of 1.2 ($P < 0.0001$) between the two groups. This indicates that those who participated in one of the EWP's alternative wellness activity had a statistically significant difference in BMI.

These results are directly linked to financial incentives to participate in the program. This is a short-term study and results may differ in the long term; additional years of evaluation are needed to assess whether financial incentives drive weight loss in the long term. My hypothesis is supported in that employees who did not participate do have a higher BMI than those who participated in 2014. Prior to the implementation of the EWP, nonparticipants had a slightly lower BMI than participants. As seen in Table 4.2, the monetary financial incentive helped influence employees not only to participate, but also to lose weight.

Hypothesis #2 – White employees are more likely to participate in EWP than nonwhite employees.

According to the literature, ethnic minorities are less likely to participate in EWPs. Population-based data has exposed significant differences in health behaviors and health risks among different racial/ethnic groups in the United States (Burton et al., 2013). Health disparities among different racial/ethnic groups are widespread, but there are relatively few employer-based health promotion programs that have measured their impact on health disparities among

employees (Dan et al., 2011). I assessed participation rates of three categories of race including black, white, and other as seen in Table 4.4.

Table 4.4 Participation in EWP by Race					
Race	Total, n (%)	Nonparticipant, n (%)	Participant, n (%)	Chi²	P-Value
Black	590 (9.3)	361 (61.1)	229 (38.8)	27.37	<0.0001
White	5,419 (85.0)	2,795 (51.6)	2,624 (48.4)		<0.0001
Others	367 (5.8)	220 (60.0)	147 (40.0)		<0.0001

There was a statistically significant correlation found ($ch^2=27.37$, $p<.0001$) between the categories of race. There were 590 (9.3%) black, 5,419 (85%) were white, and 367 (5.8%) fell into the other category. Of these 229 (38.8%) were blacks, 2,624 (48.4%) whites, and 147 (40%) in the other category participated in the EWP. Table 4.4 indicates that 38.8% of blacks and 40% of other nonwhites participated in an alternative wellness activity compared to 48.4% of whites who participated. This analysis is statistically significant in that whites are more likely to participate in alternative employee wellness activities. This is a topic I will explore in more detail in future research. Participation by all races is essential so that one group does not benefit more than the other. Aurora must focus its engagement of the program to all races so that it appeals to everyone.

Hypothesis #3 – The cost of health insurance will be less for 2013 EWP participants versus nonparticipants.

Decreasing cost of paid health insurance is a major driver of employers to establish EWPs. Baicker and colleagues found that medical costs decrease

about \$3.27 for every dollar spent on wellness programs. This average return on investment proposes that broader adoption of these programs could prove valuable for budgets and productivity as well as health outcomes (Baicker et al., 2010). As participation in Aurora's EWP is self-selected, I predicted that healthier employees who already focused on their health would participate in the program. The healthier employees would have lower health care costs. This selection bias is such that the most motivated and healthiest people disproportionately enroll in programs when they are voluntary (Baicker et al., 2010).

I found that those employees who participated in the EWP had higher health care costs in both 2012 and 2013 as seen in Tables 4.5 and 4.6, therefore my hypothesis was not supported. This result can be explained with the use of the health belief model in that those who participated had the health belief of perceived susceptibility, which is the belief of the likelihood they may get a disease or condition that is linked to obesity. These employees may have a perceived severity in that they have feelings about the consequence of contracting an illness or of leaving it untreated, which leads them to get medical treatment. The combination of susceptibility and severity has been labeled as perceived threat. This could be the severity of obesity or another disease causing medical and social consequences. Perceived benefit occurs even if an employee perceives personal susceptibility to a serious health condition (perceived threat); whether this perception leads to behavior change will be influenced by the person's beliefs regarding perceived benefits of participation in the EWP for reducing the disease threat.

Other nonhealth-related issues factor into forming perceptions, such as financial savings related to losing weight or increased quality of life. Thus, individuals exhibiting optimal beliefs in susceptibility and severity are not expected to accept any recommended health action unless they also perceive the action as potentially beneficial by reducing the threat. Employees also consider perceived barriers. The potential negative aspects of a particular health action—perceived barriers—may act as obstacles to participating in EWP. Employees who consider participation in the EWP go through a kind of unconscious, cost-benefit analysis wherein individuals weigh the action's expected benefits with perceived barriers—"It could help me, but it may be expensive, have negative side effects, be unpleasant, inconvenient, or time-consuming." Thus, "combined levels of susceptibility and severity provide the energy or force to act, and the perception of benefits (minus barriers) provide a preferred path of action" (Rosenstock, 1974; Glanz et al., 2008).

See Tables 4.5 and 4.6 for the results in years 2012 and 2013 for health care cost differences between participants and nonparticipants. Those employees with the highest cost of health insurance as seen in claims data are the employees that are most likely to participate in EWP. This may be valuable for the organization in that these health care costs can be reduced by decreasing obesity in these employees. In upcoming research I will examine costs of participants in 2014 compared to 2013 to establish if the EWP program decreased cost over one year. I will continue this research in the future, but in the interest of time I will not be reporting those results in this dissertation.

Table 4.5 Paid Health Care Costs, 2012								
Characteristics	N	Mean (\$)	SD	SE	Min	Max	t-value	P-value
Medical expenses								
Nonparticipant	2,603	5,817.3	13,441	263.4	0	160,835	-2.18	
Participant	2,696	6,707	16,055	309.2	-4,408.5	261,597		0.0291
Difference		-889.7	14,828.6	407.5				
Pharmacy expenses								
Nonparticipant	2,428	1,294.5	3,018.7	61.2621	0	46,530.1	-2.92	
Participant	2,571	1,603.8	4,318.2	85.1635	0	60,186.5		0.0035
Difference		-309.4	3,743.8	105.9				
Total paid								
Nonparticipant	2,355	7,671.5	14,633.2	301.5	0	174,396	-2.4	
Participant	2,496	8,797.1	17,831.7	356.9	-3,832.1	269,641		0.0166
Difference		-1,125.6	16,357.3	469.9				
SD, standard deviation; SE, standard error.								

Table 4.6 Paid Health Care Costs, 2013								
Characteristics	N	Mean (\$)	SD	SE	Min	Max	t-value	P-value
Medical expenses								
Nonparticipant	2,633	4,567.7	11,992.3	233.7	0	231,376	-2.17	
Participant	2,703	5,382.3	15,165.9	291.7	-446.2	217,883		0.0298
Difference		-814.6	13,692.2	374.9				
Pharmacy expenses								
Nonparticipant	2,615	1,220.5	3,290.3	64.343	0	65,918.6	-2.5	
Participant	2,642	1,501.1	4,707.6	91.5874	0	83,508.5		0.0125
Difference		-280.6	4,064.9	112.1				
Total paid								
Nonparticipant	2,443	6,148.4	13,188.8	266.8	0	237,289	-2.47	
Participant	2,541	7,210.5	16,845.4	334.2	-310.6	223,066		0.0135
Difference		-1,062	15,163.6	429.7				
SD, standard deviation; SE, standard error.								

Table 4.5 shows 2012 health care costs (in mean dollars) paid by Aurora and the patients for medical expenses, pharmacy expenses and the mean total paid for participants and nonparticipants. Of the 2,355 nonparticipants, the mean amount total paid by employee and Aurora (as the insurer) in 2012 was \$7,671.50 and total amount paid by participants was \$8,797.10. The EWP participants paid \$1,125.60 more than the nonparticipants; this is statistically significant with a P-value of 0.0166. The total paid cost of health care for the year 2013 was very similar to 2012. Employees who were nonparticipants had a mean cost of health care of \$6,148.40 and participants mean cost was \$7,210.50, a difference of \$1,062.10. This was statistically significant with a p-value of 0.0135. My hypothesis was not supported. The employees who participated were the employees who had higher total paid health care costs.

Hypothesis #4 – Rural employees will have higher BMI than urban employees.

Befort and colleagues established there is a considerably higher prevalence of obesity in rural adults compared to urban adults in the United States. Elevated obesity levels in rural compared to urban participants were established for both non-Hispanic whites and blacks in their research. The rural-urban obesity disparity was found among adults age 20-39 but not for adults age 40-59 or 60-75 (Befort et al., 2012).

The findings for this hypothesis were not significant. The percentage of rural employees had a mean BMI of 36.57 compared to a 36.56 BMI for urban employees who participated. The minor difference was not statistically significant, possibly due to the low total number of obese employees working in an urban location (9.9%). Table 4.7 provides mean BMI.

Table 4.7 Mean Body Mass Index (BMI) by Rural/Urban Location of Employees				
Rural/Urban	N	Mean BMI	Standard Deviation	Chi²
Rural	628	36.5739	5.6805	0.753
Urban	5737	36.5593	5.7402	
P=0.95.				

Hypothesis #5 – Ethnic minorities will have higher mean BMI than whites in both 2013 and 2014.

The obesity epidemic afflicting the United States impacts multitudes of people regardless of age, gender or race. But recently released statistics from the Centers for Disease Control and Prevention (CDC) show that minority groups experience obesity at even greater levels than their white counterparts. There are a number of potential reasons why minorities are experiencing higher obesity rates. In many cases these populations do not have adequate access to health information and services. Minority populations with high levels of obesity tend to live in areas where there is limited access to recreational activities, few options for healthy foods and lower levels of health education (CDC report, 2011).

Wisconsin was named the 25th most obese state in the country, according to *F as in Fat: How Obesity Threatens America's Future 2011*, a report from the Trust for America's Health (TFAH) and the Robert Wood Johnson Foundation (RWJF). Wisconsin's adult obesity rate is 27.4% (<http://healthyamericans.org/report/100/>).

Adults in racial/ethnic minorities, and those with less education or who make less money, continue to have the highest overall obesity rates. Adult obesity rates in Wisconsin were 45.8% for blacks. Nationally, obesity rates for blacks topped 40% in 15 states, 35% in 35 states, and 30% in 42 states plus the District of Columbia. Rates of adult obesity for Latinos were 21.1% in Wisconsin. National Latino obesity rates were more than 35% in four states (Mississippi, North Dakota, South Carolina and Texas) and at $\geq 30\%$ in 23 states (<http://healthyamericans.org/report/100/>).

As seen in Table 4.8, ANOVA analysis was completed and there was a statistically significant higher rate of obesity among blacks compared to whites and other categories. This hypothesis was true for blacks, but not for other category. These results are correlated with what the statistics are of obesity among the black population in Wisconsin.

Table 4.8 Employee Body Mass Index by Race, 2013					
Race	N	Mean BMI	SD	f-value	P-Value
2013					
Black	636	37.40	6.57	7.98	
Others	392	36.81	5.70		<.0001
White	5,757	36.47	5.63		
2014					
Black	502	37.16	7.52	4.46	<.0001

Others	349	36.33	6.44
White	4,597	36.38	6.65
BMI, body mass index; SD, standard deviation.			

In 2013, there were 636 obese black employees with mean BMI of 37.40, whites had mean BMI of 36.47, and the others group had a mean BMI of 36.81. The black employees did have a 0.93 BMI higher than the white employees at Aurora.

Hypothesis #6 – Employees in management are more likely to participate in EWP than staff.

Grounded on the health belief model, the management of Aurora would participate at a higher rate, as they should be more invested in the organization due to their leadership roles. Management may have a higher rate of self-efficacy because, in most cases, managers require more education and experience to be qualified for their positions and therefore are connected to the organization and see the value of participating in the EWP program.

It is known that management may have achieved higher levels of education, and studies have shown a relationship between obesity prevalence and socioeconomic status as measured by educational level or income (Sobal & Stunkard, 1989; McLaren, 2007). There are two levels of employees that are looked at in this study: Job level-I divides obese employees into those with a registered nursing degree who were considered to be in the nursing job role and all other staff, a group that includes all other employees including management.

The second level, entitled Job Level-II, separated any employee with a

management title or above (including directors, vice presidents etc.) and all other staff without a management title. This was a bit restrictive for this study because the organization did not want to provide exact titles for the employees.

Table 4.9 Employee Participation by Job Category					
	Total	Participant	Nonparticipant	Chi²	P-value
Job level-I					
Nursing, n (%)	1,690 (26.5)	695 (41.1)	995 (58.9)	32.11	<0.0001
Staff, n (%)	4,692 (73.5)	2,306 (49.1)	2,386 (50.9)		
Job level-II					
Manager, n (%)	832 (13.0)	391 (47.0)	441 (53.0)	.0003	0.9863
Staff, n (%)	5,550 (87.0)	2,610 (47.0)	2,940 (53.0)		

Of the 1,690 nursing employees 41.1% participated in the EWP and 58.9% did not participate; of the 4,692 staff employees, 49.1% did not participate. This was statistically significant that the staff participated at a higher rate than nursing employees. This may be due to the nurses not having the time to participate due to shift work or high demands in workload. As shown in Table 4.9, there was no statistical significance between staff and manager groups; 53% of both managers and staff did not participate.

Hypothesis #7 – Employee Assistance Program participants will have the least reduction in BMI.

Aurora's Employee Assistance Program is a health coaching alternative for healthy weight. The employee needs to call in three times during a 12-week

period and do homework to get the incentive. I predicted this option would result in the least reduction in BMI based on behavioral economics, the concept of status quo or default bias refers to people's tendency to take the path of least resistance (Volpp, 2009). This option has no cost to the employees and is the path of least resistance. Between the five alternative activities offered, the lowest reduction of weight occurred in those who chose the behavioral coaching program at a mean weight reduction of 1.44 pounds ($P < 0.0001$).

Table 4.10 Mean Change in Pounds Lost from 2013 to 2014 by Alternative Wellness Activities					
Alternative activity	N	Mean	SD	f-value	P-Value
Behavioral coaching	392	1.44	15.13		
HMR meal replacement	42	17.18	21.57		
Lose 5% of body weight	1,837	7.98	15.76	18.99	<0.0001
Weight Watchers group meetings	288	8.36	19.59		
Weight Watchers online	160	1.50	14.01		
SD, standard deviation.					

A General Linear Model (GLM) was performed as seen in Table 4.10, all the alternative wellness activities that were completed had a statistically significant decrease in weight, suggesting that the participants lost weight. BMI is a formula of height and weight that contributes to the score; if an employee loses weight, their BMI will be reduced as well. This table is presented in pounds so it is more understandable to the reader. Of the 42 employees who participated in the HMR meal replacement program, there was a reduction in average weight of 17.18 pounds. This is the highest cost alternative wellness activity, and had a

small number of participants, but proved to be very successful. The “lose 5% of body weight” option was chosen by 1,837 employees and had a mean weight reduction of 7.98 pounds; this was a no-cost option but results were substantial. The Weight Watchers group option was completed by 288 employees and had a reduction in weight of 8.36 pounds; this option had a cost to employees but, again, was very successful at reducing weight. The Weight Watchers online option was completed by 160 employees and had a mean weight reduction of 1.50 pounds; this option had a cost associated with it, but had no in-person accountability and was the option that had the least amount of change in weight. Overall, all options completed by obese employees proved to be successful. This has huge implications for the organization in that they may want to continue offering all the equivalent options.

Hypothesis #8 – The HMR meal replacement program will be chosen by management more than those in other job categories.

Behavioral economics plays a role in this hypothesis. Management could choose the more expensive activity at a higher rate due to management receiving a higher salary than staff in most cases and are more likely to afford this option. As the HMR program is the most costly, \$1,000 for the 12-week session, I believed this activity would be chosen more frequently by Aurora management as they may have the economic means to pay such a high price for wellness.

Table 4.11 Alternative Wellness Activity Participation by Job Category									
Level I-II	EAP	HMR	Other	Lose 5%	WW group	WW online	Total	Chi ²	P-value

Staff	389 (14.9)	33 (1.3)	6 (0.23)	1,766 (67.7)	280 (10.7)	136 (5.2)	2,610 (87.0)	16.41	0.006
Manager	53 (13.6)	12 (3.1)	3 (0.77)	255 (65.2)	37 (9.5)	31 (7.9)	391 (13.0)		
EAP, Employee Assistance Program behavioral coaching; WW, Weight Watchers.									

As seen in Table 4.11, of the 391 managers 3.1% chose the HMR meal replacement option as compared to 1.26% of the staff. My hypothesis is supported; managers did participate at a higher rate than nonmanagers. This option proved to be very beneficial in reducing BMI, but is very costly and all staff may not have the financial ability to participate. This option had a low participation rate; only 45 employees participated in this activity out of 6,375 obese employees.

What is the success of the incentivized EWP, measured by BMI and cost, for obese employees at a large health care organization? In evaluating the inaugural year of implementing an incentivized healthy weight option as part of Live Well Aurora, I have found there is a significant difference in weight loss among those who participated from those who did not. This program was established to help promote healthy weight at Aurora and reduce obesity among employees. According to these statistical assessments, it has helped reduce employee weight in the first year. The economic incentives that were offered to employees encouraged half of them to participate and lose weight as well.

The incentivized EWP measured by BMI is very successful, with a reduction in mean BMI of 1.2 for those who participated in alternative wellness

activities. A reduction in BMI is a reduction in a person's weight, as a BMI is calculated by height and weight. A reduction in weight may decrease risks of chronic conditions such as hypertension and diabetes. I retrospectively considered the cost of those who participated in the program versus those who did not, in years 2012 and 2013, and found that those who participated in the program have a higher cost paid than those who did not participate.

Table 4.12. Patient Characteristics as Predictors of the Participation in Employee Wellness Program (EWP)

Characteristic	Participants in EWP Program (N=2,941)			P-value
	N (%)	OR	95% CI	
Gender				
Female	2,597 (51.2)	1.90	1.64-2.21	<.0001***
Male (referent)				
Age				
30-39 years	540 (43.5)	1.22	0.97-1.53	0.0571
40-49 years	630 (43.4)	1.21	0.97-1.52	0.0457*
50-59 years	1,022 (54.3)	1.80	1.45-2.25	0.0013**
60-69 years	578 (58.7)	2.11	1.67-2.68	<0.0001***
70+ years	16 (48.5)	1.44	0.70-2.96	0.9567
<29 years (referent)				
BMI				
30-34	1,442 (48.1)	1.06	0.93-1.22	0.5169
35-40	893 (29.76)	1.06	0.92-1.22	0.6927
>40 (referent)				
Race				
Black	229 (38.8)	0.69	0.59-0.85	0.0245*
Other	147 (40.0)	0.76	0.61-0.97	0.4901
White (referent)				
Job Level-I				
Nursing	695 (41.1)	0.68	0.6-0.76	<0.0001***
Staff (referent)				
Job Level-II				
Staff	2,610 (47.0)	1.04	0.89-1.21	0.6295
Manager (referent)				
Work Location				
Urban	2,708 (57.37)	0.82	0.69-0.97	0.026*
Rural (referent)				

BMI, body mass index; CI, confidence interval; OR, odds ratio.
***denotes statistical significance.

I will need to look at the entire year of 2014 to find out if there is a reduction in health care costs for those who participated. This will need to be looked at in 2015; in the interest of finishing my dissertation, I will follow up with a paper on cost in 2015.

Table 4.12 addresses participation in the EWP and provides odds ratios of participation. Females are 1.90 times more likely to participate in the EWP than males. Those aged 60-69 years old are 2.11 times more likely to participate in the EWP than employees 29 years of age or less. Black employees are 0.69 less likely to participate in the EWP than whites. Nursing employees are 0.68 times less likely to participate in EWP than the staff level employees. Urban employees are 0.82 times less likely to participate in the EWP than rural employees. This table explains who in the health care organization is most likely to participate. By understanding the demographics of the participants, the organization needs to appeal to those who did not participate to raise participation rates.

Are there any differences in population demographics between those who do or do not participate in a EWP? I established several differences in populations using logistic regression for participants versus nonparticipants with characteristics considered (Table 4.12). I discovered that women participated more than men, whites more than blacks, and employees age 40-69 years more than those < 29 years, with those age 50 years or greater participating the most. Furthermore, I found that staff participated more than nurses.

Likely participants are white women over the age of 50 who have higher health care costs. The health belief model is very applicable to this cohort of

participants, in that those employees who have a perceived risk in their health are participating in the EWP. The enduring health belief model proposes that behavioral change requires a belief that an action will be favorable and come at an appropriate cost, confidence that change is possible, and an incentive to take action. Therefore, obese employees who participated believed that there was a risk to their health and change was possible, or that they could not afford the financial hit from nonparticipation.

4-C. Discussion of Analysis

Since participation in the EWP was voluntary, it seems reasonable to assume that the potential user's motivations and preferences toward various options is an important determinant of participation. The alternative wellness activity that was chosen most often was "lose 5% of body weight." This option was the least invasive in that employees could lose weight using any way that worked for them, and there was no cost. This option is applicable to the phenomenon of present bias, that people don't do what's in their best interest in the long term. When making decisions, people are inclined to choose mental short cuts; we let the wants and distractions of the moment get in the way of adhering to what's best for us. Present bias is irrationality due to our propensity to focus on immediate benefits or costs of a situation while undervaluing future consequences. This was an effortless option choice in that no immediate action was necessary to participate, and the weigh-in was not for 7-8 months. The success rate of this

alternative wellness activity was only 50%; employees who didn't succeed either did not weigh in a second time or did not obtain the 5% loss.

The second most frequently chosen alternative wellness activity was participation in behavioral coaching. This program also was offered at no cost to the employee and did not require a significant amount of time. Additionally, there was no second weigh-in required to get the credit. Aurora employees chose Weight Watchers group meetings as the third most frequently chosen option, which was more costly and time-consuming (employees had to attend 10 meetings in 12 weeks). The fourth most chosen option was Weight Watchers online and, lastly, the HMR meal replacement.

See Table 4.13 for options chosen by characteristic. There are many differences in the population and the options that are chosen.

Table 4.13 Alternate Wellness Activities Chosen by Demographics							
	Alternative Wellness Activity						Total
	Behavioral coaching	HMR meal replacement	Other	Lose 5% of body weight	Weight Watchers	Weight Watchers online	
BMI category							
30-34	203 (14.08)	16 (1.11)	3 (0.21)	1,016 (70.46)	129 (8.95)	75 (5.2)	1,442 (48.05)
35-40	124 (13.89)	18 (2.02)	4 (0.45)	602 (67.41)	100 (11.2)	45 (5.04)	893 (29.76)
40+	115 (17.27)	11 (1.65)	2 (0.3)	403 (60.51)	88 (13.21)	47 (7.06)	666 (22.19)
Gender							
Female	399 (15.36)	39 (1.5)	8 (0.31)	1,704 (65.61)	295 (11.36)	152 (5.85)	2,597 (88.06)
Male	40 (11.36)	5 (1.42)	1 (0.28)	283 (80.4)	9 (2.56)	14 (3.98)	352 (11.94)
Missing = 52							
Age							
<29 years	20 (9.3)	2 (0.93)	0	153 (71.16)	24 (11.16)	16 (7.44)	215 (7.16)
40-49 years	81 (12.86)	10 (1.59)	0	440 (69.84)	62 (9.84)	37 (5.87)	630 (20.99)
50-59 years	174 (17.03)	18 (1.76)	2 (0.2)	658 (64.38)	120 (11.74)	50 (4.89)	1,022 (34.06)
60-69 years	94 (16.26)	13 (2.25)	2 (0.35)	378 (65.4)	63 (10.9)	28 (4.84)	578 (19.26)
70+ years	4 (25)	0	0	9 (56.25)	2 (12.5)	1 (6.25)	16 (0.53)
Race							
Black/AA	32 (13.97)	1 (0.44)	2 (0.87)	173 (75.55)	16 (6.99)	5 (2.18)	229 (7.63)
Others	24 (16.33)	0	1 (0.68)	107 (72.79)	11 (7.48)	4 (2.72)	147 (4.9)

White	385 (12.83)	44 (1.68)	6 (0.23)	1741 (66.65)	290 (11.05)	158 (6.02)	2,624 (87.47)
Missing = 1							
Level I-I							
Nursing	82 (11.8)	12 (1.73)	3 (0.43)	485 (69.78)	74 (10.65)	39 (5.61)	695 (23.16)
Staff	360 (15.61)	33 (1.43)	6 (0.26)	1,536 (66.61)	243 (10.54)	128 (5.55)	2,306 (76.84)
Level I-II							
Staff	389 (14.9)	33 (1.26)	6 (0.23)	1,766 (67.66)	280 (10.73)	136 (5.21)	2,610 (86.97)
Manager	53 (13.55)	12 (3.07)	3 (0.77)	255 (65.22)	37 (9.46)	31 (7.93)	391 (13.03)
BMI, body mass index.							

Behavioral coaching through Aurora's Employee Assistance Program was chosen most often by those who had a BMI of 40 and greater, were female, were 70 years or older, fell into the other category for race, were staff level employees versus nurses, and were staff level employees versus managers. The HMR meal replacement option was chosen by those employees who had a BMI between 30 and 35, were female, were 60-60 years old, were whites, were nursing staff, and were management staff. The lose 5% option was chosen by those employees with the lowest obese BMI category of 30-35, were male, were ≤ 29 years old, were black, were nurses, and were staff level employees. Weight Watchers in person was chosen most often by employees who had a BMI greater than 40, were female, were 70 years or older, were whites, were nurses, and were staff level employees. Weight Watchers online was chosen most often by employees who had a BMI greater than 40, were female, were ≤ 29 years of age, were whites, were nurses, and were manager level employees.

These findings are very interesting in that the only option where males participated at a higher rate than females was the lose 5% option, which has no cost and allows employees to lose weight on their own. Males tend to not go to

the doctor as much as females, and this may be the case here for males in that they don't want to participate in any specific option they may feel is geared toward women. Management level staff more often chose the options that had a cost associated with it; managers chose the HMR meal replacement and Weight Watchers online.

Aurora Health Care's EWP was very successful according to the ANOVA there was a significant difference between participants and nonparticipants. Those who participated lost a mean of 6.84 pounds compared to nonparticipants who gained a mean of 1.71 pounds, see table below.

Table 4.14 Weight Loss Between Year 2013 and 2014					
	N	Mean	SD	Min	Max
Weight 2013	6,787	224.44	39.76	134.40	507.00
Weight 2014	4,824	220.70	40.83	121.00	515.00
Weight difference (2013-2014)	4,824	3.08	14.97	-57.00	120.60
Descriptive Statistics					P-value
Gender	N	Mean	SD		
Female	4133	3.20	15.21	0.141	
Male	691	2.37	13.44		
Location	N	Mean	SD		
Rural	508	4.31	15.37	0.0464	
Urban	4,304	2.91	14.92		
Race	N	Mean	SD		
Black	389	2.50	13.91	0.3953	
Other	271	2.16	12.32		
White	4,163	3.20	15.22		
Age	N	Mean	SD		
<29 years	332	1.19	17.75	0.0004	
30-39 years	972	3.44	16.52		
40-49 years	1,204	2.07	14.58		
50-59 years	1,603	3.19	14.11		
69-69 years	699	4.89	13.73		
70+ years	14	6.91	9.00		
Participation	N	Mean	SD		
No	2,119	-1.71	11.19	<0.0001	
Yes	2,705	6.84	16.43		

Alternative Activity	N	Mean	SD	
Behavioral coaching	392	1.44	15.18	<0.0001
HMR meal replacement	42	17.18	21.57	
Lose 5% of body weight	1,817	8.03	15.80	
Weight Watchers group	287	8.39	19.62	
Weight Watchers online	160	1.50	14.01	

Table 4.14 shows the difference in weight lost between gender, location, race, age, participation, and the alternative activities. It is significant that rural employees lost a greater mean weight loss than urban employees. This table also shows that there is a statistical difference in age of employees and weight lost, the older employees lost more weight than younger employees, the largest amount of weight was lost by those who were 70 and older. As seen in a previous table the MHMR meal replacement showed the greatest mean weight lost at 17.18 pounds.

Aurora's workplace is an access point for a large population and could function as a sustainable and suitable environment to make an impact on the health of the population (Pronk et al., 2010). The impact of its EWP is clear – there was a significant reduction in weight by employees in this first year. The organization implemented an initiative that helps support the wellness of employees, and provided a moderately successful incentive for participation in the EWP. Of the obese employees, 47% participated in and completed an alternative wellness activity, and some lost weight during their participation. This participation rate was similar to other organizations that provide a EWP; the average is about 50%. Going forward, Aurora will need to inspire more employees to participate in the program. This year, 2014, the company is adding

spouses of the employees into the healthy weight program, and they will also be able to receive the incentive.

As seen in the analysis chapter, the EWP that was offered to Aurora employees was successful in helping employees lose weight. This is only a one-year analysis done for this dissertation. As a future endeavor, I will be looking at the outcomes of the EWP for several years to come.

EWPs can be a great asset to employers. The one developed by Aurora's employee wellness committee was successful in that the alternative wellness activities helped obese employees lose weight (Table 4.10). By analyzing Aurora's EWP, I am adding new knowledge about an innovative approach to addressing the obesity problem in the employed population. These results add to scholarship about an innovative approach to incentivized EWP and its success in both participation and weight lost. This evaluation is significant to debates about health care policy, including the Patient Protection and Affordable Care Act (ACA) that was implemented in early 2014 and its provisions on EWPs. These outcomes prove that EWP can encourage employees to lose weight. Financial incentives were able to encourage employees to participate, and particular alternative wellness activities were chosen based on cost of the activity.

With health care costs rising, employee wellness programs have become an option for employers; instead of absorbing all the costs, they are passing them on to employees who are have rising risk of disease because of obesity.

Controlling these costs may minimize the negative impact to both employer and

employee. The collective burden on society is great, and employee wellness programs are one way to reduce total health care cost.

Chapter 5: Discussion, Recommendations and Conclusions

5-A. Discussion

Aurora Health Care has a large problem with overweight and obese employees, with more than 60% of its population designated as overweight or obese. An employee wellness program (EWP) was developed by Aurora Health Care's employee wellness committee. I evaluated the outcomes of the workplace wellness program for obese employees implemented at Aurora and found positive results.

My study examined one part of an organization trying to address its obesity crisis through an incentivized EWP. I concentrated on the healthy weight biometric screening of body mass index (BMI) in obese employees. I chose this population because obesity has become an epidemic in the United States and the world, and believe that worksite wellness programs can have an impact on many individuals. I answered three main questions – 1) What are the factors influencing participation and nonparticipation in an EWP, and 1a) are there any differences in population demographics between participants and nonparticipants? 2) What are the factors influencing the choice of alternative wellness activities? 3) How successful is the incentivized EWP at a large health care organization as measured by change in BMI for obese employees? –as well as studied eight hypotheses.

The main objective of the research was to evaluate an EWP using quantitative measures. The results presented proved that employees who participated in the EWP lost weight compared to those who did not participate.

Employees who participated in one of the EWP's alternative wellness activities had a significant reduction in mean BMI of 1.2 ($p < 0.0001$). I also found demographic population differences between those who participated and those who did not; participants were more likely to be female, older than 50, and white.

Obesity is identified by the Centers for Disease Control and Prevention (CDC) as a major risk factor for other chronic health conditions such as diabetes, heart disease and stroke. This outcome is a positive step for Aurora's mission to help decrease obesity among its employees.

A problem at Aurora, as with other organizations, is that participation rates are low in the EWP. Of the 6,375 obese patients, only 47% participated in an alternative wellness activity offered by Aurora. In order to evaluate who in the employee population is participating and who is not, I applied the health belief model to determine differences between participants and nonparticipants on demographics, including gender, age, race, job level, job location and cost. Enrollment and participation are imperative for the EWP program at Aurora to be successful. I chose this model to evaluate differences in participants of the alternative wellness activities versus nonparticipants based on employee self-efficacy being a main motivation as to whether people choose to participate. This model identified that those employees who perceived that obesity was a risk to their health and perceived they could benefit from the program participated in the EWP. These employees were often white women in their 50s or 60s. This tells Aurora that they need to focus their outreach in the next year on those who did not participate. They need to appeal to minorities, men and younger employees.

There is little published research on the demographics of who is participating in EWPs, but with the shifting of costs to unhealthy employees, it is essential to ensure all Aurora employees start to take steps toward a healthy lifestyle.

The impact of the EWP was robust; there was a significant reduction in weight by employees in this first year. The organization implemented an initiative that helps support wellness of employees, and provided a moderately successful incentive for participation in the EWP. Of the obese employees, 47% participated in and completed an alternative wellness activity, and the mean weight lost was 6.84lbs during their participation. This participation rate was similar to other organizations that provide an EWP – the average is about 50%. The choice of alternative wellness activities is valuable to look at as well. Most employees chose the alternative wellness activity that was offered at no extra cost to the employee.

The lens of behavioral economics was utilized to evaluate if the financial incentives were able to encourage employees to participate, and to evaluate participation in a particular alternative wellness activity based on cost of the activity. Statistically this evidence through this research provides confirmation that employees chose the no-cost options over the ones that had a charge associated with them.

Behavioral economists have secured an important standing in President Obama's administration. In isolating the incidence of less than sensible performance by employees, behavioral economics has significant meaning to a collection of situations in which policy intervention might be justified. One

example is the costs people impose on themselves, such as the long-term health consequences of smoking on smokers (Loewenstein et al., 2012).

The most popular option chosen was lose 5% of body weight on one's own, and the next most popular option was behavioral coaching provided by the company's Employee Assistance Program, both no-cost options. This is important as Aurora offers more choices to its employees to ensure there is not a lot of extra expense to the employee. The HMR meal replacement option was chosen the least, and the cost of this option was the highest. However, the HMR option was very effective in helping employees significantly reduce their BMI, showing the highest BMI reduction of all options.

Aurora's key goals of the EWP consist of: building a healthier workplace through direct interventions, spreading wellness into the community by utilizing best practices to influence behaviors, creating a wellness culture, impacting the communities it serves, establishing wellness as a tool to achieve financial goals through cost savings and growth in revenue, and developing a wellness infrastructure to advance wellness at Aurora. Aurora has made a significant first step toward reaching its goals by providing its employees direct interventions for obesity. I could not measure any cost savings at this time as it is too early in the program; this will need to be evaluated in 2015 and yearly thereafter. However, this research measured costs of health care for participants and nonparticipants in the previous two years, 2012 and 2013, and found that participants at Aurora have higher health care costs than nonparticipants. The cost of health care in the United States is increasing at an alarming rate, and could become unsustainable.

This has put employers like Aurora in a very difficult position because they are bearing additional costs for each employee, especially unhealthy employees. The cost burden also has increased for employees, with premiums and co-pays increasing annually.

Aurora believes it is important for employees, as health care workers, to role model healthy behavior for patients, families and other caregivers. Aurora wants to make an important change in how employees move, what they eat, and how they take care of themselves long term. By implementing the weight management portion of the EWP, they are closer to reaching their goals, but this will need to be measured over time. A challenge arises because employees are not required to lose weight, but rather participate in an alternative wellness activity. In order for this program to be successful at reducing costs, a significant amount of obese employees must not only participate but also reduce their BMI.

The *RAND Health* research report distinguishes three categories of activities employers provide as part of EWPs: screening activities, which identify health risks; preventive interventions such as weight reduction and counseling; and health promotion, i.e. healthy food options provided in a workplace cafeteria. Aurora includes all three categories within its wellness program (Mattke et al., 2013). The objective of Aurora's wellness program is to reduce costs, encourage healthy lifestyles and prevent disease by implementing educational and motivational approaches (Goetzel & Ozminkowski, 2008).

The Patient Protection and Affordable Care Act (ACA) stresses prevention and EWPs (Koh & Sebelius, 2010). The law provides employers more latitude in

rewarding staff for healthy lifestyles by increasing the allowable incentives for program participation. The limit is presently at 30% of the cost of health care paid by the employee for health behaviors, and up to 50% if an employee is a smoker. By shifting more costs to unhealthy employees, the EWP theoretically will incentivize employees to invest time in their health through fitness and proper nutrition. This review of Aurora's EWP is very timely because the law was enacted in January 2014. Aurora is shifting the cost by incentivizing the EWPs. In the inaugural year of the incentivized healthy weight program, 66.4% of employees did not receive the incentive and 33.6% did receive it.

The existing literature on EWPs does not take into consideration any racial, gender, age or job differences in the employee population. The organization comprises hospitals both in rural and urban settings. This dissertation assessed all differences in demographics and found that there are many differences in which employees choose to participate (as seen in Chapter 4: Analysis and Findings). Aurora will need to adjust its EWP to be more appealing to all employee demographics.

5-B. Recommendations

The success of incentivized EWPs depends crucially on how the incentives are timed, distributed and framed. There are numerous factors that make up insurance-premium adjustments, the most common implementation mechanism, but according to Volpp and colleagues, this option is the least effective dollar for dollar (Volpp et al., 2014). An additional important behavioral economics concept

is mental accounting; this refers to the idea that employees are inclined to group financial receipts and payments. For example, the effect of payments weakens when they're bundled into loftier amounts of money. In Aurora's case they are providing a discount on health insurance that employees will not see until the following year. According to Lowenstein and colleagues; "A \$100 discount on premiums may go unnoticed, whereas a \$100 check in the mail may register as an unexpected windfall. Increases or decreases in insurance premiums that are deducted from periodic paychecks will probably be less salient and effective than similar financial incentives provided separately" (Loewenstein et al., 2012).

Aurora may want to consider making its incentives for participation in the program more immediate, providing a check in the mail when the weight loss program chosen by the employee was completed, and possibly an extra incentive for weight lost. For those employees who have a BMI of less than 30, the incentive to maintain should be immediate as well.

The current EWP at Aurora and alternative wellness activities offered were created from a wellness committee that helped put the initiatives into action. The high levels of obesity within Aurora elevated the focus of prevention and treatment efforts. It is vitally important to address obesity by identifying and focusing on those populations most impacted. According to Goetzel and Ozminkowski, an all-inclusive wellness program will comprise multiple health promotion strategies such as "health risk assessments (HRA), health education, online interventions, health screenings, health coaching, employee involvement in the design and promotion of programs, management and senior leadership

support, dedicated staffing and resources, a culture of health, incentives and rewards, and a program evaluation strategy” (Goetzel & Ozminkowski, 2008). Aurora has done a terrific job in implementing multiple health promotion strategies by offering many alternative wellness activities, health screenings, health coaching, and the support of leadership within the organization. Aurora needs to focus its EWP on involving employees in the design of promotion activities, including younger workers, men, nurses and ethnic minorities.

Aurora’s EWP requires the adoption of a broader, multifaceted approach in the assessment and support of employee health to ensure its programs will have a more profound and long-lasting impact on the well-being of participants (Merrill et al., 2011). Cleveland Clinic’s EWP is one of the most aggressive in the United States among health care systems. Cleveland Clinic does not hire smokers and removed all sugared beverages from its campuses. Cleveland Clinic recently announced that employees who do not participate in the wellness program will see their health insurance premiums rise by 21%. While this approach has been disapproved by some as infringing on employee rights, Cleveland Clinic has been able to nearly flatten its health care costs in the last two years (O’Donnell & Bensky, 2011). I suggest that Aurora, as a health leader in Wisconsin, should remove all sugared beverages from its campuses; this is an extreme measure and will be a shock to the organization but would be in line with the World Health Organization, which is dropping its sugar intake recommendations from 10 percent of daily calorie intake to 5 percent. For an adult with normal BMI, that works out to about 6 teaspoons – or 25 grams – of

sugar per day. To put this in perspective, a can of soda may contain up to 10 teaspoons or 40 grams of sugar, more than the recommended daily intake. They are recommending this because many health problems, such as obesity, diabetes and tooth decay, are associated with excessive sugar intake (WHO March 2014 press briefing by Dr Francesco Branca, Director of Nutrition for Health and Development). This recommendation supports eliminating the selling of sugared beverages at Aurora campuses. This is in line with CVS pharmacies banning the sales of cigarettes. It is essential that significant changes be introduced to make a dent in the obesity epidemic.

The social ecological model offers Aurora a method to strengthen the assessment of health promotion within its EWP by focusing attention on both individual and social environmental factors as aims for health promotion interventions. The social ecological model describes the significance of interventions directed at changing intrapersonal, interpersonal, institutional, community and public policy, factors which encourage and sustain unhealthy behaviors. The model presumes that the correct changes in social environment will create changes in individuals. Thus, support of individuals at Aurora is essential for implementing environmental changes (McLeroy et al., 1988). As a means to explain health behavior, the ecological approach forces the organization to look for the cause of a health issue or problem from multiple perspectives. For example, eating behavior may be a function of personal knowledge and attitudes about food (intrapersonal). But, it also could be influenced by peer pressure (interpersonal), healthy food choices in company

vending machines (institutional), an ample supply of fresh fruits and vegetables in local groceries or in cafeterias (community), and the availability of free or reduced-price lunches in schools (public policy).

The ecological approach also provides the EWP planner with a perspective that requires the design of multiple intervention strategies to effectively address a health promotion problem. An example of program planning could include providing employees with information on stress management (intrapersonal), establishing stress support peer groups at work (interpersonal), providing a stress management room and physical activity programs for employees on site (institutional), providing referral to existing community-based programs and resources (community), and complying with related Occupational Safety and Health Administration regulations (public policy) (Eddy et al., 2002).

The social ecological model, which is centered on a systems perspective, claims that workplace health promotion endeavors must address three critical factors: organizational factors (e.g. sociocultural, economic); work environment (e.g. physical and structural); and job demands/worker characteristics. Accordingly, the intervention needs to target job demands and worker characteristics, physical work environment and socio-organizational environment. For example, in health care workers, specific job constraints or conditions can limit or facilitate opportunities for physical movement; this may include jobs in health care such as billing and reception. Weight management strategies need to address these job demands at the workplace (McLeroy et al., 1988).

Ecological models have been essential to health promotion and EWPs for more than 20 years. This model was very successful in overturning the epidemic of tobacco consumption, and there are solid projections that interventions built on ecological models have the potential to reverse the obesity epidemic. This may be possible at Aurora by improving the environments and policies that motivate physical activity and nutrition behaviors (Sallis et al., 2008). Behavior change can be seen at Aurora if environments and policies support healthy selections, if social norms and social support for healthy choices are robust, and if individuals are motivated and educated to make those choices. The five levels of the social ecological model used by the CDC's Division of Nutrition, Physical Activity, and Obesity are individual, interpersonal, organizational, community and society. The model also functions as a reminder that personal knowledge is not enough for behavior change; increasing knowledge, training skills and creating supportive environments are all important components of behavior change (CDC website). Aurora's EWP needs to help employees increase their knowledge of healthy behaviors, provide in-person and online training around healthful living skills, and create an environment that supports behavior change, perhaps allowing employees to work out 30 minutes on work time and eliminating unhealthy food choices from the organization's food services.

Many health care workers participate in shift work that has been shown to have abundant negative effects on physical, social and emotional health. These include increased risk of obesity, diabetes, cardiovascular events, cancer and gastric ulcers. In addition to increasing workers' risk of illness, sleep deprivation

as a result of shift work poses serious threats to patient and worker safety (Pietrojusti et al., 2010). As we need to have hospitals staffed 24 hours a day, we can't eliminate shift work in health care, but we may be able to create an environment that supports reducing stress and increasing healthy nutrition as ways to combat negative effects of shift work. Also, we could provide time for shift workers to exercise at work. There are many health risks associated with the nursing and allied health care professions; and insufficient research has been done explicitly on the success of worksite wellness programs for this population (Chan & Perry, 2012). Aurora is an ideal organization to pursue research on the effects of interventions of worksite wellness programs.

With the passage of the ACA, worksite wellness programs will become part of a national public health strategy to address the increase in chronic diseases that are anticipated to cost the U.S. health care system a projected \$4.2 trillion annually by 2023 (Bodenheimer et al., 2009). I believe Aurora is positioned to be a leader in worksite wellness programs. With the cost of health care increasing, Aurora should perform a return on investment assessment to ensure the investments it puts into the EWP are paying off financially.

Aurora should not only focus its resources on the EWP but also add a disease management component that focuses on those employees with chronic conditions and provides help to decrease symptoms of these diseases that are related to obesity and stress. PepsiCo's wellness program entitled "Healthy Living" found that seven years of continuous participation in two components of health care activities, including disease management and lifestyle management,

were associated with an average reduction of \$30 in health care cost per member per month. When PepsiCo looked at each component individually, it found that the disease management component was associated with lower costs and that the lifestyle management component was not. They estimated that disease management reduced health care costs by \$136 per member per month; this was driven by a 29% reduction in hospital admissions (Caloyeras et al., 2014). At PepsiCo, disease management is offered to employees with at least one of 10 chronic conditions and focuses on improving medication adherence and patient self-care knowledge and abilities. The 10 conditions included are: asthma, coronary artery disease, atrial fibrillation, congestive heart failure, stroke, hyperlipidemia, hypertension, diabetes, low back pain, and chronic obstructive pulmonary disease (Caloyeras et al., 2014). The disease management program typically requires six to nine months to complete (Caloyeras et al., 2014).

The leading method to make financial incentives financially sustainable for employers is to structure them into the cost of health plan premiums, ensure costs are divided by the employer and employees, and ensure incentives for reaching health goals are greater than incentives for participating in programs. This would be a change for Aurora; currently they are incentivizing employees to participate, but they should also include incentives for reaching BMI goals in future years. According to O'Donnell, "when the cost of the health promotion program is also built into the premiums, the health promotion program can be self-sustaining even before it produces health improvements that reduce medical costs or enhance productivity" (O'Donnell, 2012). At Aurora, the EWP is self-

sustaining; it is funded by the employees who have a BMI of equal to or greater than 30 and who chose not to participate in the EWP.

5-C. Future Research

There are numerous opportunities for further research in wellness programs. For one, there is a need for research in differentiated wellness programs that cater to the needs of males and females differently. This study found that there were significant differences in participation by gender, with females tending to participate at greater rates than males. There are opportunities to examine why females participate more often than males and to determine what programs would be better suited towards the needs of males in a company setting.

Future research needs to be conducted in the cost of health care, focusing on what types of EWP work most effectively to reduce health care costs for employees as well as employers.

5-D. Conclusions

The results of this dissertation are positive in that they showed weight reduction in the obese population occurred at Aurora Health Care. This result could be a short-term result as weight loss over time is harder to sustain for most individuals, who often return to their original weight. What I did learn was that participation was not equal among all demographics. Aurora will need to modify its program after getting input from the populations that were poorly represented as to what activities they would be willing to participate in.

Employers in Wisconsin and nationally need a way to reduce health care costs. Wisconsin has an enormous problem with obesity and is rated as the 25th most obese state in the nation. It remains first in terms of the percentage of African-American adults who are obese (Levi et al., 2010). A report by the Trust for America's Health and the Robert Wood Johnson Foundation noted 27.4% of Wisconsin's adult population is obese (Levi et al., 2010). The obesity rate for African-Americans in Wisconsin is 45.8%, up from 44% in 2010. The adult obesity rate in Wisconsin could reach 56.3% by 2030, according to this report. It is essential to put a halt on obesity, and one way this can be done is through employee wellness programs. Aurora has started this process, but needs to ensure that the program's incentivized alternative wellness activities are effective at decreasing obesity in all employees. The health consequences of being overweight or obese are far-reaching. Poor fitness can lead to a multitude of secondary conditions or worsen existing conditions. Being overweight increases an individual's predisposition to type-2 diabetes, cardiovascular disease, hypertension, stroke and cancer (Ogden & Carroll, 2010).

Health care organizations and employees are a vital population to study because they are the caregivers to those who are ill and, ideally, should be the model of health. Worksites are practical locations for affecting great quantities of working adults of differing socioeconomic levels and ethnic backgrounds. A significant belief for this research is that interventions designed to promote behavior change in work settings can be generalizable, cost-effective and sustainable (Pratt et al., 2007).

The ACA encourages workplace wellness initiatives, with many stipulations expected to influence health promotion and prevention as a means to decrease the problem of chronic illness and to contain expanding health care costs. Aurora is encouraging its workforce to become healthier by implementing its employee wellness program.

The contribution to new knowledge that this dissertation adds to academics, policy makers and employers is twofold. In analyzing Aurora's wellness program, scholars and employers acquired new knowledge about an innovative approach to incentivized employee wellness programs and its success in both participation and weight lost. This evaluation is meaningful to the debates in health care policy, including the Patient Protection and Affordable Care Act that was implemented in early 2014 and its provisions on wellness programs. This study contributes to three distinct literatures, including health promotion, health policy and behavioral economics.

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World Health Organization. Controlling the global obesity epidemic (undated), online: World Health Organization <<http://www.who.int/nutrition/topics/obesity/en/>> [Accessed July 17, 2013].

CURRICULUM VITAE

Jennifer Fink

EDUCATION

B.S., Carroll University Waukesha ,May 1994
Major: Psychology
Minor – Education/ History

M.S., Marian College Fond du Lac, May 2006
Major: Organizational leadership and Quality
2004-2006
Fond du Lac, Wisconsin

PhD., University Wisconsin-Milwaukee, August
2014
Major: Urban Studies Program

Dissertation Title: Assessing the Effect of an Employee Wellness Program on
Body Mass Index and Health Care Costs.

CERTIFICATIONS

Certified Clinical Research Coordinator
ACRP since April 2002.
200-Hour Registered Yoga Teacher

PROFESSIONAL EXPERIENCE

- Aurora Leadership Academy Graduate, class 8.
- Completed all activities opening a non- profit business
- Experience managing staff
- Experience preparing and managing budgets

EMPLOYMENT HISTORY

July 2002-present	Certified Clinical Research Coordinator/ Mentor Aurora Health Care Milwaukee, Wisconsin
May 14, 2001 – July 12, 2002	Clinical Trials Coordinator Rogers Memorial Hospital West Allis, Wisconsin
September, 1999 - April, 2001	Clinical Trials Coordinator Medstream Incorporated Milwaukee, Wisconsin

June, 1998 - May, 1999

Counselor Assistant
St. Mary's Hospital Mental Health
Mequon, Wisconsin

RESEARCH EXPERIENCE

Bipolar Disorder
Social Phobia
Generalized Anxiety Disorder
Major Depression
Anorexia Nervosa
Post Traumatic Stress Disorder
Attention Deficit Disorder
Obsessive Compulsive Disorder
Psoriasis
Pediatric Asthma
Asthma
Allergies
Chronic Pain
Osteoarthritis
Diabetes
Oncology
Liver Transplant
Digestive Diseases
Multiple Sclerosis
Epilepsy

Clinical Trials Position Overview

Coordinates and administers research study associated activities. Assists in project planning, and ensures that pre-established work scope, study protocol, and regulatory requirements are followed. Recruits and coordinates research subjects, as appropriate, and serves as principle administrative liaison for the project.

1. Understanding of ICH/GCP guidelines for human research
2. Understanding of Code of Federal Regulations for Human Subjects
3. Understanding Phases I-IV drug development processes
4. ECG, phlebotomy skills, and any other technical skills related to the completion of a study visit as required by the protocol.

PROFESSIONAL ACTIVITIES

Global Conference Planning Committee for 2007 for ACRP
Cerner Project Team Member September 2006-present
Website Database Team leader January 2007 –Jan 2009
ACRP- Board Member- Secretary- Jan 2008- 2013
Chair of Research Awareness committee Jan 2008- present

Member of Research communications team March 2009-present
 Planetree Committee Member July 2009- 2013

PUBLICATIONS

Effects of Natalizumab on bladder function: interim results of the TRUST study," presented at AAN 2011

"TRUST Study Results: Effects of Natalizumab on Bladder Function," for submission to ECTRIMS 2011.

PENDING PUBLICAION

Jennifer Fink, M.S.,George Morris, M.D.,Maharaj Singh, Ph.D.,David Nelson, Ph.D., M.S.,Renee Walker, Dr.P.H.,Ron A. Cisler, Ph.D., M.S. "Obesity remains underdiagnosed: Discordant documentation of obesity BMI and obesity diagnosis in patients' EMR" Journal of Patient Centered Research. (In Press)

Jennifer Fink MS, David Smith, MD, Maharaj Singh, PhD, Doug Ihrke, PhD, Ron Cisler, PhD. "Employee Wellness Program: Participation Rates Among Obese Employees and Selection Patterns of Available Alternative Activities" Journal of Health Promotion

George Morris, M.D, Kayla Chapman, B.S., David Nelson, Ph.D., M.S., Jennifer Fink, M.S. Renee Walker, Dr.P.H. Ron A. Cisler, Ph.D., M.S."A Wisconsin Physician Survey on Obesity Diagnosis and Management" American Journal of Public Health.

COMPUTER SKILLS

Microsoft Word
 Microsoft Excel
 Access
 Lotus Notes
 SPSS
 STAT
 SAS