EVALUATING STILLWATER MEDICAL CENTER WELLNESS AT WORK

By

BRENNA BOWMAN

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Thesis Approved:

Gail Gates, PhD

Thesis Adviser

LuAnn Soliah, PhD

Janice Hermann, PhD

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Name: BRENNA BOWMAN

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Abstract:

Objective: The purpose of this study was to evaluate dietary behaviors of Stillwater Medical Center (SMC) employees and their perceptions of SMC Wellness at Work before and after implementation of the program.
Design: A pre-survey was administered to employees through SurveyMonkey in February and a post-survey was administered in August with questions about diet behaviors, attitudes and participation in the interventions.
Setting: Interventions took place in the SMC cafeteria and snack bar.
Participants*:* Two hundred and seventy-seven employees completed the pre-survey and 164 employees responded to the post-survey.
Interventions: Four interventions followed pre-survey administration: reducing sugar-sweetened beverage intake through Rethink Your Drink signage, providing nutrition facts labels on cafeteria and snack bar items, offering healthier cafeteria options through Try It Tuesdays once per month, and offering nutrition education through videos on the employee blog.
Main Outcome Measures: Mean diet scores and frequency of Try It Tuesday participation.
Analysis: T-tests were used to compare pre- and post-diet scores. Confidence intervals were used to evaluate influences on Try It Tuesday purchases. ANOVA was used to compare diet scores and Try It Tuesday participation by department.
Results: Diet scores and attitudes did not change significantly after six months of intervention. Among departments, Imaging had the highest pre-intervention diet score (15.4 ± 2.8) and Patient Access Services had the highest score post-intervention (15.0 ± 1.7). Personal taste preference had the greatest influence on Try It Tuesday purchases.
Conclusions and Implications*:* Diet scores and attitudes did not significantly change over time, possibly because the interventions were not sufficiently long or intense enough to produce an effect. Future research requires policy and more extensive environment changes in the workplace. Practitioners should implement multi-component employee wellness programs for greatest success.

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CHAPTER I

INTRODUCTION

The short-term goal of this research was to assess changes in employee dietary behaviors and habits at Stillwater Medical Center (SMC) after SMC provided nutritious options in both the hospital cafeteria and snack bar, offered health education to employees, and implemented new hospital policies and procedures related to health promotion in the workplace. Long-term goals of the intervention were to improve employee dietary behaviors, decrease employee health care costs, reduce absenteeism related to poor health, and improve overall employee health and lifestyle choices.

Obesity rates continue to climb in America. Today, over one third of American adults (35.7%) are obese, which creates an increased risk for chronic diseases such as Type 2 diabetes, heart disease, stroke and some cancers (CDC, 2013). The obesity prevalence is 32.2% in Oklahoma (CDC, 2013). People are living longer, but more and more people are developing chronic diseases due to obesity. The CDC estimates obesity-related health care costs are $147 billion annually (CDC, 2013). Increased focus is being put on worksites to implement employee wellness promotion programs due to the relationship between poor employee health and higher employer health care costs (Katz et al., 2005).

This research was needed and important because improving hospital employee dietary practices can favorably influence lifestyle choices, enhance overall health, and ultimately reduce SMC employee health care costs. The results of this work can provide a basis for evaluating health-related policies and procedures at SMC, as well as offer published research other hospitals and worksites can access for suggestions on implementing an employee health program of their own.

1.1 Research Questions

1. What are the differences between health behaviors and influences before implementation of SMC Wellness at Work and after six months of intervention?
2. How often did the employees participate in SMC Wellness at Work interventions?
3. What factors influenced participation in SMC Wellness at Work programs?
4. What were the differences in behaviors and participation by employee departments?

CHAPTER II

REVIEW OF LITERATURE

Individuals working full-time consume the majority of their calories while at work (Kahn-Marshall & Gallant, 2012). Worksite health promotion programs have become increasingly popular in the US and other countries in an attempt to improve employee health (Katz et al., 2005). This literature review focuses on strategies used in successful worksite health promotion programs with an emphasis on hospitals. Attempts to reduce sugar-sweetened beverage consumption are discussed, as well as the publication of nutrition facts for food items, promotion of healthy cafeteria options, and availability of nutrition and health education for employees. The health and cost benefits of worksite health programs are also examined. Finally, the elements of both the Healthier Hospitals Initiative and WorkHealthy Hospitals are presented in detail.

2.1 Centers for Disease Control and Prevention (CDC) Recommendations for Hospital Employee Wellness Programs

Hospitals are often at the center of a community, employing a large proportion of a town's population. The substantial purchasing power of a hospital allows for healthy modifications to be made to benefit hospital employees, patients and visitors.

A health-promoting environment is essential for a healthcare facility because hospitals typically serve several hundred thousand to one million meals annually and also have the potential to improve health care and reduce absenteeism and lost productivity costs as a result of poor employee health (Wiseman, Boothe, Reynolds, & Belay, 2010). Positive actions taken by a hospital or healthcare system within a community can also have progressive effects on other groups of people and worksites in the area. The Social Ecological Model (CDC, 2013) is centered on the idea that social setting and the person's physical environment significantly influence individual health behaviors. Using this model, the CDC's Division of Nutrition, Physical Activity, and Obesity published recommendations to equip hospitals with the appropriate tools to promote a "culture of health" (Wiseman et al., 2010).

The CDC recommends creating a culture of health within a hospital using a number of strategies. First and foremost, hospitals are responsible for determining the amounts of certain foods and beverages to be offered at the facility in addition to creating an overall definition of "healthy" for their specific site. National hospital initiatives recommend that hospitals promote healthy, sustainable food items wherever food is offered at the hospital (Wiseman et al., 2010). The Healthier Hospitals Initiative (2012) promotes local, sustainable purchasing in the Healthier Food Challenge area. Through appropriate access, pricing, product promotion and menu labeling, hospitals can support environmental change and directly address America's obesity and chronic disease crises.

To measure the effectiveness of these initiatives, hospital and public health practitioners should design toolkits to measure employee, community and/or environmental health based on their accepted definition or through other established health criteria (Wiseman et al., 2010). Measurements of employee satisfaction, behavior and clinical costs should be gathered (Wiseman

et al., 2010). This data should be publicly available in order to promote new hospital health policies within the facility and serve as a quality indicator to the community (Wiseman et al., 2010). Returns on investment, marketing diversity, and a positive reputation may also be favorable consequences of strong data collection.

2.2 Successful Worksite Health Promotion Programs

Here, successful employee health promotion programs performed throughout the United States are discussed with special emphasis on programs that include the interventions that are used at SMC.

2.2.1 Reducing Sugar-Sweetened Beverages

Frequent consumption of sugar-sweetened beverages is one of the major contributors to obesity in America today (Illinois Public Health Institute, 2012), accounting for about 10% of total calories consumed (Bleich, Wang, Wang, & Gortmaker, 2009). Increasing evidence also shows that excessive intake of sugar-sweetened beverages can contribute to Type 2 diabetes, heart disease, and metabolic syndrome (Malik, Popkin, Bray, Despres, & Hu, 2010). Examples of sugar-sweetened beverages include carbonated soft drinks, fruit drinks (not 100% fruit juice), prepackaged iced teas and coffees, energy drinks, sports drinks, and sweetened milks (Illinois Public Health Institute, 2012). With limited availability to sources outside the workplace, full-time employees are forced to consume beverages supplied by the workplace (Illinois Public Health Institute, 2012). Motivating employees to consume healthier beverages while at work can be a big first step in improving health.

For the most part, people are not taking the time to read the nutrition facts label on their beverages and, therefore, do not realize how many calories they are consuming with sugar-

sweetened beverages (CDC, 2011). Additionally, when people are trying to lose weight, they usually focus on food intake and do not think to cut calories among their beverage choices (CDC, 2011). In an attempt to persuade consumers away from purchasing sugar-sweetened beverages, the CDC (2011) recommends making healthy beverages the "easy choice" through marketing and points of purchase reminders.

The Boston Public Health Commission (2011) created easy-to-understand resources to aid the average American in choosing healthy beverages. The traffic light "Rethink Your Drink" posters and educational materials (Boston Public Health Commission, 2011) make the healthy choice easy by categorizing beverages into healthful, or green, somewhat healthful, or yellow, and unhealthful, or red. The "go on green" slogan urges consumers to drink plenty of "green" beverages like water, seltzer water, or skim or 1% milk. "Yellow" beverages should be consumed on occasion and include diet soda, 100% juice, and low-calorie, low-sugar drinks. "Red" drinks should be consumed "rarely, if at all" (Boston Public Health Commission, 2011) and include the sugar-sweetened beverages mentioned previously (Illinois Public Health Institute, 2012). It is recommended that these traffic light posters can be displayed in worksite cafeterias and the colors could possibly be placed on the respective beverages choices to make people think about what they are purchasing (Illinois Public Health Institute, 2012).

A longitudinal follow-up study (Thorndike, Riis, Sonnenberg, & Levy, 2014) at Massachusetts General Hospital used traffic-light labels on cafeteria food and beverage items and choice architecture to influence purchases. Positive criteria for food items were fruit or vegetables, whole grain, and lean protein/low-fat dairy (Thorndike et al., 2014). Negative criteria were saturated fat and total calories. If the food item had more positive criteria than negative, it was labeled green. If the item was equally positive and negative, it was labeled yellow. Red items

had more negative criteria than positive. Beverage items were labeled according to Boston Public Health Commission Standards (Boston Public Health Commission, 2011). Choice architecture was implemented by making green items more visible or at eye level while making red items less visible in the cafeteria. Sales data from cafeteria cash registers were recorded to track all food and beverage purchases over a 24-month period. Purchases by all cafeteria customers revealed a 10% decrease in red beverage sales and an 8% increase in green beverage sales after 24 months of intervention with the traffic light posters in the hospital cafeteria. A cohort of 2,285 hospital employees who frequently purchased cafeteria items (at least three times every three months) exhibited similar trends including a marked 39% decrease in red beverage purchases after 24 months (Thorndike et al., 2014). This study showed that interventions in the food environment such as traffic light posters and choice architecture can significantly impact food and beverage purchases.

A study by Arsenault, Singleton, & Funderburk (2014) used surveys to determine the use of the "Go-for-Green" nutrition labeling system in military dining facilities in New Mexico and Texas. Green labels were placed on nutrient dense "high-performance foods" (Arsenault, et al., 2014) while amber labels were placed on foods higher in calories and lower in nutritive value, and red labels were placed on fat- and energy-dense "low-performance" foods. Beverages were not included in the labeling system. A total of 299 soldiers submitted surveys ranking how often they noticed colored labels. Those who responded "sometimes" or "always" to using the Go-for-Green system were categorized as users and compared against nonusers. Results showed that about half of participating soldiers used the labeling system. Users also exhibited lower fat intake, higher multivitamin and nutritional supplement use, and followed special diets more than nonusers. Red, yellow (amber), and green food labeling can therefore influence purchases in worksite cafeterias and improve the dietary behaviors of employees.

The cafeteria at Brigham and Women's Hospital in Boston attempted to reduce sugary soft drink consumption through price manipulation with and without combined educational materials (Block, Chandra, McManus, & Willett, 2010). Cash register sales data were collected to complete the analyses. At baseline, all soft drinks (diet or regular) were the same price. Regular soda represented 11% of total beverage sales, while diet soda represented 10% of total beverage sales. The first month of intervention increased the price of regular soda by 35% ($0.45), causing a significant decrease (26%) in sales of regular soda and a 20% increase in diet soda purchases. The second month of intervention involved price manipulation in addition to educational posters hung in the cafeteria reading "Lose up to 15-25 pounds in one year and decrease your risk of diabetes by 1/2. Just skip one regular soda per day. For zero calories, try diet soda or water" (Block et al., 2010). This resulted in a 36% decrease in regular soda purchases and a 14% increase in diet soda purchases. This educational intervention alone without the price manipulation yielded no significant change in sales. This study revealed that a point-of-purchase intervention is an easy way to manipulate beverage consumption among hospital cafeteria employees and visitors.

Davy et al. (2014) observed conditions that promote sugar-sweetened beverage (SSB) consumption among overweight employees both on an individual basis and at work. Twenty-eight worksites (1,482 employees total) in Virginia invited their employees to complete baseline questionnaires regarding demographic factors, education level, and income in addition to a Beverage Intake Questionnaire. SSB consumption included sugar-sweetened juice, sodas, tea, coffee with cream and/or sugar, mixed alcoholic beverages, protein meal replacement drinks, and energy drinks. Overweight (BMI 25.0-29.9 kg/m^2) and obese (BMI $\geq$ 30 kg/m^2) employees were included in the study. The health of the work environment was assessed using the Checklist of Health Promotion Environment at Worksites (CHEW) and recorded the number of vending

machines, regular soda slots, water coolers and water fountains at the facility. Multiple regression analyses revealed that older employees, female employees, and employees with higher education and higher household income consumed fewer SSBs on average. Greater BMI at baseline as well as an increased number of water coolers and vending machines at work was positively associated with SSB consumption. Frequent breaks taken at work also increased the frequency of SSB intake among employees. This study showed that the workplace environment can influence employee SSB consumption and that policies to reduce vending machines and increase water availability might increase water intake and decrease SSB intake.

Excessive sugar-sweetened beverage consumption is a major contributor to obesity and associated chronic diseases. Many worksites have attempted to reduce SSB intake and ultimately improve the health of their employees using choice architecture, price manipulation, and education. Traffic light labeling systems have proven successful in point-of-purchase interventions of SSB intake while other educational posters around the point of purchase have successfully reduced SSB intake as well. Implementing worksite policies to reduce SSB availability and increase healthier beverages can positively influence employees' beverage choices at work.

2.2.2 Providing Nutrition Labels

In today's fast-paced world, most people do not take the time to think about the foods they are consuming, especially while in a busy work environment (Kahn-Marshall & Gallant, 2012). Providing visible calorie and nutrient information for food items might catch consumers' attention and cause them to think twice about their food and beverage purchases (Kahn-Marshall & Gallant, 2012). A study done in Philadelphia hospital cafeterias (Lowe et al., 2010) showed that providing nutrition labels containing calorie content and macronutrients on all cafeteria items

for five months led to significant decreases in employee intakes of fats, sweets, and total calories from baseline.

Another study done in the Netherlands at 17 Dutch worksites (Steenhuis et al., 2004) showed that labeling of calories and fat content on foods can significantly alter purchases. A total of 1,013 employees from 17 worksites completed a baseline food frequency questionnaire and a post-questionnaire related to fruit, vegetable, and total fat intake. Six months of nutrient labeling intervention took place between pre- and post-questionnaires. Sales data on milk, butter, cheese, meat and dessert purchases were collected. Results showed no significant increase in fruit and vegetable intake, but the addition of food labels containing calorie and fat content significantly decreased dessert purchases and total fat consumption after six months (Steenhuis et al., 2004). This study exhibited beneficial effects of even a minimal amount of nutrition information on food labels to influence food purchases at work.

Roberto, Larsen, Agnew, Baik, & Brownell (2010) studied the amount of calories ordered by individuals dining in a restaurant under one of three conditions: no nutrition information provided for food items, calorie counts for each food item, and calorie counts plus a disclaimer in the top right-hand corner of the menu stating "The recommended daily caloric intake for an average adult is 2,000 calories." A total of 273 participants were divided into the three groups, ordered dinner, and were surveyed about post-dinner calories consumed. Participants in the combined group of both calorie label conditions consumed 14% fewer calories than those in the no calorie information group (Roberto et al., 2010). Participants in the group without total calorie recommendation information also consumed significantly more post-dinner calories compared to the calorie recommendation group. This study showed that simply stating caloric density of food items influences purchases.

Two Canadian hospitals initiated labeling programs including nutritional content of menu items to observe their influence on food purchases (Vanderlee & Hammond, 2014). The intervention cafeteria included calories, sodium, saturated fat and total fat content of a wide variety of foods on large menu boards. The control cafeteria included minimal nutrition information on paper posters on surrounding walls. A total of 1,003 cafeteria patrons from both sites were surveyed regarding how often they looked at the posted nutrition information and how influential the information was on their cafeteria purchases. A 43.3% increase in noticing labels was seen in the intervention hospital compared to control. Patrons at the intervention hospital reported being more influenced by the labeling compared to control (a 15.9% difference). Among those influenced by labels, 35.5% and 30.6% reported choosing items with less sodium and total calories, respectively. Staff members were also significantly more likely to be influenced by the labels compared to patients and visitors (Vanderlee & Hammond, 2014).

A study by Lassen et al. (2014) measured the effect of healthy food labeling on employee dietary intake and edible plate waste at lunchtime in two Danish hospital cafeterias. The control cafeteria included 135 employees. Another 135 employees were included in the intervention cafeteria, where healthy food items were labeled with a Nordic Keyhole symbol implemented by the Danish Veterinary and Food Administration. Ready-made meals had to be within a set calorie range, a maximum of 30% of calories from fat, a minimum of 25g fruit and vegetables per 100g, a maximum of 1-1.25g salt per 100g, a maximum of 3g refined sugars per 100g, and a minimum of 15-25% wholegrains. Employees' plates were photographed before and after lunch consumption. Edible plate waste and total energy and nutrient intake were estimated. After six months, employees of the intervention hospital consumed 16.8% less calories from fat, 54% more fruits and vegetables, 32% less sodium, and 16% fewer calories compared to baseline. Intervention cafeteria participants consumed significantly less total energy, fat calories, sodium,

and refined sugars as well as significantly more fruit and vegetables and whole grains compared to the control cafeteria after six months.

A study on a college campus by Chu, Frongillo, Jones, & Kaye (2009) examined changes in entrée selection at a campus dining center before, during, and after intervention with point-of-purchase nutrition facts labels. Total calories, fat, protein, and carbohydrate content were analyzed using Food Processor software for all entrees served on campus. Total energy and macronutrient content were included on the nutrition facts labels in the food-service facilities. The trial lasted a total of 41 days: 14 days of pretreatment analysis of average calorie content of entrees sold per day without nutrition facts provided, 14 days of treatment with nutrition facts labels next to the entrees on the menu, and 13 days of posttreatment with the labels unavailable once again. The results showed an average decrease in sold entrée calories of 12.4 from the last day of pretreatment to the first day of treatment with the nutrition labels, with a steady decline in calories purchased throughout the treatment period. Once posttreatment began and labels were removed, the energy content of entrees sold increased an average of 1.5 calories per day. The dining center also observed no significant change in revenue between pretreatment, treatment, and posttreatment. This study showed that posting nutrition information of food items in dining centers results in an immediate decrease in the calorie content of purchased entrees. Removing the nutrition information also caused patrons to revert back to the higher calorie options.

These studies show that worksite cafeterias are ideal point-of-purchase settings for introducing environmental interventions such as nutrient labeling. Interventions with nutrition facts labels are, therefore, an appropriate starting place for initiating change in employee dietary behaviors. Labels can be displayed as complete nutrition facts panels or a logo to identify a healthy item that meets specific nutrition criteria. Successful labelling programs have the

potential to reduce daily energy and sodium consumption, and increase fruit, vegetable, and whole grain intake as seen by these studies.

2.2.3 Offering Healthier Cafeteria Options

Every organization or workplace is entitled to its own definition of "healthy" or "healthful" eating. The Eat Smart Move More…North Carolina initiative (2007) observed that most healthy eating initiatives target consumption of less total fat, saturated fat, cholesterol, and sodium, and promote greater consumption of fruits and vegetables. For example, the National Cancer Institute & Produce for Better Health Foundation's 5 A Day Program (2001) promote consumption of food or beverage products that contain at least one serving of fruit or vegetable per portion, less than 30% calories from fat and less than 10% saturated fat, and contain a maximum of 100 mg cholesterol and 480 mg sodium per portion. The American Heart Association Food Certification Program (2014) uses these guidelines and also adds the requirement that any certified food product should also contain a minimum of 10% Daily Value of either protein, fiber, calcium, vitamin A, vitamin C, or iron.

The Healthier Hospitals Initiative (2012) recommends "balanced menus" in hospital cafeterias in order to model healthy eating. One way to do this is by reducing meat purchases (i.e. beef, pork, and poultry) by 20% from baseline within three years (Healthier Hospitals Initiative, 2012). Reducing meat purchases and availability not only improves the health of consumers, but also greatly reduces purchasing costs as well as fossil fuel release (Healthier Hospitals Initiative, 2012). Four major hospitals in San Francisco reported an average decrease of 28% in meat purchases leading to hospital savings of over $1 million after one year through initiation of balanced menus in their cafeterias (Lagasse & Neff, 2010). Hospital A increased vegetarian options, which were widely accepted by consumers and led to a 59.5% reduction in beef

purchases and reductions in every other meat category. Hospital B cut beef purchases by 7.5% and pork by 16.1% while increasing fish options and increasing vegetarian protein purchases by 17%. Hospital C focused on vegetarian proteins and poultry options, eventually leading to a 36.7% drop in beef purchases. Hospital D experienced a significant drop in pounds of beef and poultry purchased after one year of program implementation. This study showed that balanced menus create a healthier work environment, saves the hospital money, as well as reduces green house gas emissions.

North Carolina Prevention Partners (2012) makes recommendations for creating a healthy food environment in the workplace through its program called WorkHealthy America. Key components for the creation of this healthy environment include providing easy access to healthy foods, using lower prices as incentives for purchasing healthier items, and using marketing and strategic placement of healthier options to encourage healthy behaviors. Lowe et al. (2010) found that the introduction of healthier food options in two hospital cafeterias in Philadelphia can change employees' environment and positively impact dietary behaviors. Ten low-energy-density foods including low-fat cheese, low-fat mayonnaise, whole wheat bread, reduced-fat personal pizzas and low-fat frozen yogurt were introduced to the cafeteria menu. Ninety-six employees who frequently purchased cafeteria items (at least twice per week) took part in four dietary recalls over 6 months of low-energy-density food intervention. Cash register data linked to employee ID cards were also collected to track purchases. After six months, employees showed a mean decrease in total energy intake by about 70 kilocalories per month and a general downward trend in intake of energy from fat. Participants also reported increased consciousness and restriction of food intake during and immediately following the six-month study period, leading to lower total energy intake and weight loss in many individuals (Lowe et al., 2010).

In line with the Healthier Hospitals Initiative "balanced menus" challenge (Healthier Hospitals Initiative, 2012), Sodexo North America introduced "Meatless Mondays" to 245 of their food service sites in 2011 (Johns Hopkins Center for a Livable Future, 2012). About half of these sites were corporate centers, while the other half represented health care facilities. Success surveys were submitted by each sites' general manager or food service director after a year of program implementation. The majority (76%) of sites reported the program "easy" or "very easy" to implement. Food service directors noticed a 49% increase in vegetable purchases and a 30% decrease in meat purchases with implementation of Meatless Monday. Over half (51%) of the facilities experienced no change in total sales over the year, while 19% experienced an increase in sales. The health care facilities reported a 40% perceived positive response from customers and 65% of participating centers planned to continue promoting Meatless Monday at their facility. This study showed that dedicating one day per week to healthful eating can significantly change consumer behaviors and can even benefit the facility financially.

One study by Perlmutter, Canter, & Gregoire (1997) observed changes in sales data and overall acceptability of popular worksite cafeteria entrees after fat and sodium modification. Seven hot entrees in the cafeteria were manipulated to contain less than 30% total calories from fat and less than 1,000 mgs sodium. The cafeteria at the Kansas Farm Bureau served about 200 people per day and all employees eating in the cafeteria were invited to rate the unmodified entrees in areas of taste, texture, seasoning, etc. during the first phase on the study. Sales data for these food items were also collected. In phase 2, sales data were collected after fat and sodium modification and employees were asked to rate the modified food items using the same scale. The study found relatively equal acceptability of the unmodified and modified entrees with significant increases in sales data when the items were marketed as healthful. Employees were more willing to tolerate flavor profile changes when the modified entrees were marketed as the

healthier option. This study showed that manipulating the nutritional content of established cafeteria food items in addition to marketing the healthier option can lead to improved employee dietary intake at work.

A Better Choice is a food policy initiated in Queensland, Australia that increases the availability and promotes healthy foods and beverages in healthcare facilities while decreasing the availability and promotion of energy-dense, low-nutrient foods and beverages. A study by Miller, Lee, Obersky, & Edwards (2013) examined the implementation of the A Better Choice program at 278 Queensland Health Facilities. All facility managers were encouraged to implement the policy in all sectors of food and drink supply within the facility. The goal of A Better Choice is to increase healthier food and beverages to 80% of the displayed options, while lowering the availability of "red" items, or items to limit, to 20% of displayed options. Only "green," or the best choices, should be promoted or marketed. Red items should also not be offered in vending machines, on tea or coffee trollies, at meetings, or at fundraising events. Of the 278 facilities who participated, 78.4% reported implementation of over half of the A Better Choice requirements in their facility. Almost a quarter (24.6%) of the participating facilities implemented 100% of the policy guidelines. This study showed that changes in the healthy food policy of a healthcare facility can be very successful in improving employee dietary behaviors.

French et al. (2010b) observed intake of vending machine items between four transit authority garages in Minneapolis, Minnesota with or without price and availability manipulation of healthy items. Two intervention garages increased the availability of healthy vending machine options by 50% and lowered the price of these items by at least 10% over an 18-month period. Two control garages did not change their vending machines items at all. Healthy items had to meet specific nutrition criteria for calories and macronutrient distribution. Examples were diet

soda instead of regular soda, turkey lean pockets instead of pepperoni hot pockets, and Nutrigrain bars instead of candy bars. After 18 months of implementation, 55% of vending machine sales at the two intervention garages were healthy items compared to 19% of sales at the control garages. The intervention garages reduced the price of healthy items by 31% compared to unhealthy items, which was an important incentive for employee vending machine purchases. This study revealed that manipulating the food environment at work in the form of vending machine options and prices can lead to better dietary choices and attitudes by employees.

Offering healthier cafeteria options at work can improve employee dietary behaviors as evidenced by these studies. The Healthier Hospitals Initiative, WorkHealthy Hospitals, and A Better Choice all have recommendations for creating a healthy food environment in the workplace. Marketing and promotion of healthy items, including special healthy occasions like Meatless Monday, can increase employee participation and enthusiasm about healthful eating. Eventually, policy changes can lead to long-term employee wellness success by keeping the food environment consistently at a healthy level.

2.2.4 Nutrition and Health Education for Employees

The U.S. Department of Health and Human Services supports the integration of an employee wellness program in American worksites (U.S. Department of Health and Human Services, 2013). *Healthy People 2020 Objective ECBP-8.6* (U.S. HHS, 2013) states that an increased proportion of worksites with 750 or more employees should have employee wellness programs with emphasis on health education as part of the organizational structure (Kahn-Marshall & Gallant, 2012). An employee wellness program called Steps to A Healthier Austin introduced nutrition education, cooking demonstrations, individualized diet counseling, and a company fitness center to a local transit company named Capital Metro in an attempt to improve

dietary behaviors and reduce absenteeism costs related to poor health (Davis et al., 2009). Over 300 employees were enrolled in the program in 2007 with increased participation each year since the launch in 2003. The number of workouts in the fitness center and personal training sessions increased by 9,039 and 1,787, respectively, between 2006 and 2007. In 2007, an average weight loss of 10 pounds per person was achieved by employees. Capital Metro experienced a total decrease in health care costs by 4% and a decrease in rates of absenteeism by 2.4% between 2003 and 2006. Participating employees claimed to possess improved dietary behaviors, increased knowledge of chronic disease reduction and increased physical activity as a result of Steps to a Healthier Austin (Davis et al., 2009).

Another metropolitan transit authority in Minneapolis used a new fitness facility, healthy vending machine options, and group behavioral programs to improve employee dietary behaviors (French et al., 2010a). Group programs included walking competitions, fruit and vegetable intake challenges, and individualized fitness classes and personal training sessions. Dietary changes were measured using BMI, dietary intake and physical activity according to follow-up interviews, and ease of access to fruits, vegetables, and other healthier food items at work. Employees receiving nutrition education and group behavior intervention experienced a 25% increase in fruit and vegetable intake compared to a control garage as well as a 31% decrease in fast food meals and an average decrease of 407 kcals consumed per day. Employees in the intervention garage reported an 18.6% and a 17.5% increase in information regarding healthy eating and weight control at work, respectively, compared to a control garage (French et al., 2010a).

Steenhuis et al. (2004) used nutrition education programs in an attempt to decrease fat intake and increase fruit and vegetable intake by employees of Dutch worksite cafeterias. Seventeen worksites were assigned to one of four conditions: an educational program, a food

supply plus educational program, a labeling program plus education program, and a control program with no intervention. The educational program provided handouts, posters, take-home manuals, and table tents about healthy nutrition. In the labeling program, low-fat foods were labeled. The availability of low-fat products, fruit, and vegetables was increased in the food supply program. Participants received pre- and post-food frequency questionnaires and six months of intervention. Those in the labeling plus education program consumed more total fat than the food supply plus education program, but the labeling plus education program participants consumed more fruit than the food supply plus education program. The labeling plus education program participants consumed significantly fewer desserts compared to both the education alone and control groups. Multi-factorial educational programs, therefore, positively influence employee dietary behaviors at work and are more effective than education alone.

Studies observing the effect of nutrition education in employee wellness programs reveal that multi-component programs are the most effective. The addition of cooking demonstrations, gym memberships, a food labeling system, healthier food choices at work, or group fitness activities to an individualized or group health education program can lead to better dietary behaviors in employees. Changing the environment at work as well as educating employees on the importance of health can lead to increased physical activity, better intake of fruits and vegetables, and lower kilocalorie consumption by employees.

2.3 Pledged Initiatives by SMC

Stillwater Medical Center has already taken steps towards implementing SMC Wellness at Work by pledging to two national healthcare employee health initiatives: The Healthier Hospitals Initiative in December 2013 and WorkHealthy Hospitals in February 2014. The components of these programs are described here.

2.3.1 Healthier Hospitals Initiative

The Healthier Hospitals Initiative (HHI) is a program dedicated to improving the health and environmental consciousness of health care facilities across the United States (Healthier Hospitals Initiative, 2012). It was formed in April 2012 when 12 of the largest healthcare systems in the country joined with Health Care Without Harm (HCWH), the Center for Health Design (CHD), and Practice Greenhealth to implement a program that would encourage and guide hospitals to be healthier and more environmentally friendly (Healthier Hospitals Initiative, 2012). Any facility that is committed to reducing costs and improving the health of patients, workers, and the community is encouraged to take the pledge, especially because membership is free. HHI also provides free online services to help facilities begin, including data collection help, community networks, hospital-to-hospital mentoring programs, interactive webinars, "how-to guides" for each Challenge Area, case studies, success stories, and leadership insight (Healthier Hospitals Initiative, 2012). The data is all self-reported by the participating hospital, but HHI offers measurable objectives and appropriate metrics for each action in the HCWH "how-to guides." The data is collected through the Institute for Healthcare Improvement's (IHI) extranet, with the exception of data from the Lean Energy Challenge Area being collected through ENERGY STAR's Portfolio Manager.

HHI follows the Center for Medicare and Medicaid Services' (CMS) Triple Aim: Better Health, Better Care, and Lower Costs (Healthier Hospitals Initiative, 2012). HHI implements this by offering "Challenge Areas" for hospitals to improve on. Facilities that pledge can commit to any of six Challenge areas including Engaged Leadership, Healthier Food, Leaner Energy, Less Waste, Safer Chemicals, and Smarter Purchasing. Once a facility commits to a Challenge Area, the facility needs to meet the Baseline Requirements or produce an action plan. This usually

includes eliminating mercury-containing chemicals or signing an environmentally friendly purchasing plan. Next, the facility commits to Level 1, Level 2, or Level 3 within the Challenge Area. The levels become increasingly complex and are based on the facility's capabilities and resources. The facility can choose to complete any Level at any time, but it is the goal of HHI for the facility to achieve all Levels within three years of pledging to the initiative.

The first Challenge Area available to health care facilities is Engaged Leadership. Four categories, Strategic Priority, Operational Focus, Systematic Communication, and Stakeholder Engagement exist within this area, and each has a number of leadership activities to choose from. Level 1 for Engaged Leadership involves implementing three of these leadership activities in the facility. Level 2 involves implementing six leadership activities, and Level 3 involves ten.

The Leaner Energy Challenge Area is important because hospitals use more than 8% of the nation's energy and experienced a 56% increase in energy costs between 2003 and 2008 (Healthier Hospitals Initiative, 2012). Level 1 of the Leaner Energy Challenge Area involves reducing greenhouse gases by decreasing weather-adjusted energy intensity from metered energy use by 3% from baseline. Level 2 involves reducing this number by 5%, and Level 3 involves reducing by 10%. If the facility is already an ENERGY STAR (ES) rated facility (>75), their goal for Level 3 is to maintain their ES status.

The Less Waste Challenge Area is critical because hospitals produce 11,000 tons of waste each day, an average of 26 pounds per staffed bed (Healthier Hospitals Initiative, 2012). The Levels for this Challenge Area involve committing to three goals: regulated medical waste reduction, recycling, or construction and demolition diversion. Level 1 is achieved when the facility commits to one of these goals, Level 2 commits to two, and Level 3 commits to all three.

The Safer Chemicals Challenge Area is important because more chemicals are used in health care than in any other sector (Healthier Hospitals Initiative, 2012). Again, the Levels involve committing to one, two, or three of the following goals: green cleaning, reduction of di(2-ethylhexyl)phthalate (DEHP) or polyvinyl chloride (PVC) plastics, and healthy interiors.

The Smarter Purchasing Challenge Area should be implemented because health care represents 17% of the nation' marketplace (Healthier Hospitals Initiative, 2012). Levels involve committing to one, two, or three of the following: surgical kit review, single use device reprocessing, or electronic products environmental assessment tool (EPEAT) purchasing.

Finally, the Healthier Food Challenge Area is the topic of interest at SMC. The goal of this Challenge Area is to purchase more environmentally sustainable foods and serve healthier meals to patients, employees, visitors, and communities. This is essential because the US spends billions of dollars to treat diet-related chronic illnesses and hospitals have a purchasing power that allows for local, sustainable foods (Healthier Hospitals Initiative, 2012). Also, hospitals are viewed as places of healing, so the food items they offer should be reflective of a healthy lifestyle (Healthier Hospitals Initiative, 2012).

The Baseline goal for this Challenge Area is for the facility to sign the Healthy Food in Health Care Pledge, or to formally adopt a sustainable food policy. Health Care Without Harm offers the ability for a healthcare facility to sign the pledge online, mak a personal commitment to provide "local, nutritious and sustainable food" (Health Care Without Harm, 2005). Not only do hospitals pledge to offer healthful items, they also vow to communicate with vendors and the public about the importance of nutritious eating and the purposes of their actions (Health Care Without Harm, 2005).

Once the baseline requirements are met, the Healthier Food Challenge Area invites participating hospitals to conquer three Challenge categories. The Balanced Menu Challenge strives to decrease the amount of meat purchased by the hospital by 20% within three years from baseline. Meat is defined as beef, pork and poultry (Sayre et al., 2012). Americans consume more than twice the global average for meat consumption, and hospitals are notorious for serving a number of meat products from large distributors (Sayre et al., 2012). Reducing hospital meat purchases decreases food costs, improves health of consumers and reduces the large climate footprint as a result of meat production (Healthier Hospitals Initiative, 2012). Hospitals who attempt the Balanced Menu Challenge are encouraged to educate employees and customers on the benefits of reducing processed meats and increasing plant-based proteins, as well as purchasing sustainable meat, poultry or seafood with the savings from reducing meat purchases (Sayre et al., 2012). Tracking progress, celebrating success and sharing findings with the public also contribute to hospital success in this Challenge (Sayre et al., 2012).

Healthy Beverages is the second Challenge of the Healthier Foods Challenge Area. Sugar-sweetened beverages (SSBs) are known to be major contributors to obesity and chronic disease, so introducing healthy beverages and decreasing SSBs in the workplace can potentially improve employee health and reduce health care costs (Sayre et al., 2012). Healthy beverages are defined as water; 100% fruit juice; 100% vegetable juice; low-fat milk; unsweetened, non-dairy milk alternatives; and unsweetened teas and coffees (Sayre et al., 2012). All beverages should be organic when possible, and tap water and/or reusable beverage containers should be encouraged (Sayre et al., 2012). To achieve this Challenge, healthcare facilities should increase the percentage of healthy beverage purchases by 20% of total beverage purchases annually over baseline year, or increase the percentage of healthy beverage purchases to 80% of total beverage purchases throughout the hospital, including patients, retail, vending, and catering, within three

years (Healthier Hospitals Initiative, 2012). Hospitals are encouraged to promote healthy beverage consumption through education, marketing, reduced access to SSBs, point-of-purchase information and reminders, inexpensive pricing and social support (Sayre et al., 2012).

The final Challenge of the Healthier Food Challenge Area is Local/Sustainable Food, which aims to increase the percentage of local and/or sustainable food purchases by 20% annually over baseline year, or achieve local and/or sustainable food purchases of 15% of total food purchases within three years (Healthier Hospitals Initiative, 2012). Hospitals have the purchasing power to achieve this Challenge (Healthier Hospitals Initiative, 2012). By introducing local and sustainable food items, hospitals can improve the health of their employees and the communities they serve, as well as reduce food costs and serve as a model for healthy, sustainable growth (Sayre et al., 2012).

2.3.2 WorkHealthy Hospitals

WorkHealthy Hospitals is a healthcare employee wellness initiative created by Prevention Partners in collaboration with the Oklahoma Hospital Association (OHA) as a branch of WorkHealthy America (North Carolina Prevention Partners, 2013). The goals of the program are to create a culture of wellness within the hospital, a healthy food environment, a physically active workplace, and tobacco-free places and people (North Carolina Prevention Partners, 2013). WorkHealthy Hospitals developed effective interventions based on the Socio-Ecologic Model, focusing on organizational practices as opposed to individual behaviors (North Carolina Prevention Partners, 2013). To begin the initiative, hospitals complete initial assessments evaluating current workplace policies, benefits and environments related to each of the four modules. Individualized feedback is offered in order to direct hospitals toward improvement and maintenance of employee health (North Carolina Prevention Partners, 2013).

The WorkHealthy America website provides tools and instructions for each module (North Carolina Prevention Partners, 2012). A preliminary online assessment for each of the four modules is completed by the assessment team assembled by the participating hospital. The assessment team usually consists of a representative from each of the following departments: Human Resources/Wellness, Nursing, Respiratory, Food Service, Administration, and Operations. A preliminary grade of A, B, C, D, or F is assigned to the hospital in each area based on the organization's answers to assessment questions. The Nutrition module contains thirty-two assessment questions related to employee food polices and practices including access, pricing, and marketing, employee breastfeeding polices, nutrition program descriptions, nutrition criteria including the hospital's definition of "health," and employee health insurance benefits and incentives related to nutrition and weight management (North Carolina Prevention Partners, 2013).

After the assessment is completed, "action plans" (North Carolina Prevention Partners, 2013) are provided to the hospital in order to improve employee programs. Data is submitted to OHA for documentation on policy implementation and/or environmental change. Examples of data are changes in employee health behaviors and outcomes, healthcare costs, and employee productivity (Berdanier, 2014). Employee health behaviors, health status and risk factors can be measured using Health Risk Assessments, biometric screenings, and surveys about program participation, interest in wellness activities, and self-reported health (Berdanier, 2014). Healthcare costs can be measured using healthcare claims data, behavioral health claims data, and pharmacy claims data. Employee productivity is measured using short- and long-term disability claims, workers compensation claims, absenteeism because of illness or injury, and "presenteesim," or productivity at work (Berdanier, 2014).

Module reassessment online can be completed at any time after the healthcare facility feels they have improved significantly. A new grade is awarded and the hospital can continue to improve or move on to another challenge area. Based on the submitted data, the participating hospital's grades and progress are made publicly available through the Prevention Partners website. For example, if the hospital scores outstanding in the nutrition department, the hospital receives a gold apple on the online WorkHealthy America participation map and is recognized at an excellence award ceremony (North Carolina Prevention Partners, 2012). Red and blue apples are awarded for active participation and for simply completing the assessment, respectively.

2.4 Summary

The research presented in this literature review shows that modification of the food environment at the workplace can influence employee dietary behaviors. The use of the traffic light labeling system and the Rethink Your Drink posters provided by the Boston Public Health Commission (2011) can change both energy-dense food and sugar-sweetened beverage purchases. In the present study, Rethink Your Drink informational posters were hung in the cafeteria and snack bar alongside red, yellow, and green traffic light symbols posted on the respective beverage. Providing nutrition facts labels on food items causes consumers to consider their health before purchasing a food item and possibly chose a healthier option instead. In the present study, nutrition facts labels were provided for all breakfast items and printed on to cold packaged items in the cafeteria and snack bar. Changing the food environment by providing healthier dining options can lead to improved dietary intake by employees. This study provided healthier cafeteria options through Try It Tuesdays once per month. Long-term successful employee wellness programs incorporate nutrition education into the curriculum so that

employees can practice better dietary behaviors outside the workplace. In this study, nutrition education was provided through short informational videos posted to the employee blog over the course of six months. The use of these effective employee wellness practices over a six-month period provided the groundwork for improved dietary behaviors in Stillwater Medical Center employees.

CHAPTER III

METHODOLOGY

The purpose of the study was to evaluate dietary behaviors of SMC employees and their perceptions of SMC Wellness at Work before and after implementation of the program. An online survey system, SurveyMonkey, was used to evaluate employee behaviors based on their voluntary answers to nutrition-related questions. A pre-survey (see Appendix A) was administered as a baseline evaluation of employee behaviors and influences on behaviors. Six months of intervention following survey administration included promotion of healthier food items in the hospital cafeteria and snack bar, availability of nutrition information on selected food items, healthy beverage promotion and short nutrition and health seminars. A post-survey (see Appendix A) was administered to assess changes in employee behaviors and perceptions, as well as participation in interventions and perceptions and the effectiveness of the interventions. The Oklahoma State University Institutional Review Board approved the research as exempt on February 11, 2014. The letter of approval from Oklahoma State University is shown in Appendix B.

3.1 Participants

Stillwater Medical Center employs approximately 900 staff. All staff members were invited to voluntarily and anonymously participate in the study through a hospital-wide e-mail (see Appendix C). Demographic information of the staff members such as gender, race and age were not collected to ensure anonymity. All staff members were invited to participate in the study assuming all employees have access to and have utilized the hospital cafeteria and snack bar. Inviting the entire staff maximized the sample size for the study serving as a good representation of the target population. Moreover, it did not require additional resources or effort to survey the entire hospital employee population through the free survey website and complete employee listserv.

3.2 Program Promotion at SMC

SMC Wellness at Work is an internal employee wellness program created by the wellness team at Stillwater Medical Center in an effort to improve employee health. The wellness team consists of SMC employees from various departments including the Vice President of Support Services, ICU nurses, dietitians, and health and fitness supervisors, among others. Team participation is completely voluntary with the purpose of assisting in wellness program development and implementation (i.e. offering healthy food ideas, suggesting methods to encourage employee health, helping with health demonstrations, etc.). In an effort to establish obtainable goals related to employee wellness and acquire reliable recommendations for achieving them, SMC pledged to the Healthier Hospitals Initiative as well as WorkHealthy Hospitals.

So far, SMC has committed to the Healthier Foods Challenge Area within the Healthier Hospitals Initiative. They signed the Healthy Food in Health Care Pledge as a baseline requirement, and started at Level 1, the Balanced Menus Challenge in December 2013. The SMC wellness team proposed Meatless Mondays for nutrition intervention, but decided to put a more positive spin on the event, hence the creation of Try It Tuesdays. The next Challenge for SMC was Healthy Beverages, which had a goal of increasing healthy beverages to 80% of total beverage purchases throughout the hospital (Healthier Hospitals Initiative, 2012). This Challenge was initiated in July 2014 through hanging traffic-light Rethink Your Drink posters in the SMC cafeteria and snack bar.

More recently, SMC signed on to WorkHealthy Hospitals, which provides more evidence-based tools, incentives and licensure for becoming a healthy hospital. At this point in time SMC plans to improve on the Nutrition component of the initiative, though improvements will be made in other areas as well. SMC has paid the licensure fee, becoming a fully engaged hospital in the initiative. SMC has already implemented many of the components of a healthy food environment, but the WorkHealthy Hospitals provided tailored recommendations for improvement. Posting of nutrition information of foods and beverages at the point of selection, nutrition counseling, and measurement of the impact of wellness initiatives are recommendations that were completed through this study.

3.3 Materials & Methods

A survey reflecting the previously stated research objectives was used as the evaluation tool and administered online through SurveyMonkey.com on two separate occasions: February 2014 and August 2014. The majority of SMC employees have experience with SurveyMonkey and the program is considered easy to use, which is why this method was chosen over other

programs. Printed surveys and oral interviews were decided against because of the large predicted participation rate for the e-mailed survey.

The Information Systems Coordinator at SMC prepared the pre-survey by converting the approved questions into a clickable online survey. The link to the survey was copied into an e-mail, which was sent to employees. Three days before survey administration, the Director of Nutrition Services sent a preliminary notification e-mail to all employees to expect a request for participation in a survey within a few days. On February 20, 2014, the Director of Nutrition Services sent an e-mail hospital-wide including an introduction to the study and an invitation for participation (see Appendix C), the approved consent form (see Appendix D), and the link to the pre-survey.

The pre-survey contained 12 multiple-choice questions related to dietary practices and influences (see Appendix A). The first three questions asked the participant about the influence of nutrition information on their food choices. The next two questions (questions 4 and 5) asked about water and soda consumption while at work. Questions 6-10 asked the participant to rate how influential cost, nutritive value, personal taste preference, presentation, and convenience are on food choices, respectively. Questions 11 and 12 asked how often the participant purchased hamburgers and items from the salad bar in the cafeteria. Each employee's answers were recorded within the SurveyMonkey database and categorized into groups based on the employee's department (Inpatient Nursing, Pharmacy, Information Technology, Nutrition, Patient Access Services, Imaging, Laboratory, Administration/Program Improvement/Marketing/Human Resources, Cimarron Medical Services/Home Health, Clinics, Surgery Center West, and Central Business Office). Departments with five or fewer respondents (Materials/Purchasing,

Environmental Services, Rehabilitation Internal, Respiratory/Electrocardiography, Physician, and Health Information Systems) were grouped into an "Other" department for analysis.

After pre-survey administration, six months of wellness intervention occurred at SMC. In order to introduce healthier options in the hospital cafeteria and snack bar, the wellness team created "Try It Tuesdays." It was decided that the previously developed "Meatless Mondays" carried a negative connotation, so healthy, but not necessarily vegetarian, options were offered on at least one Tuesday of every month. Try It Tuesday was promoted through flyers posted around the hospital, on the SMC blog, and distributed to employee mailboxes (see Appendix E). Recipes and nutrition information for the healthy options offered that day were printed on flyers for customers in the cafeteria to take home (see Appendix E). The healthy Try It Tuesday options were marked with the SMC Wellness at Work logo in the cafeteria and snack bar (see Appendix F) for easy identification, and nutrition information for the items was also posted in the cafeteria (see Appendix G).

Healthy beverage choices were promoted as the second wellness intervention. Rethink Your Drink posters provided by the Boston Public Health Commission (Boston Public Health Commission, 2011) were posted throughout the cafeteria and snack bar starting in July 2014 (see Appendix H). Green "go" signs were posted on healthy beverages such as low-fat milk and water. Yellow "slow down" signs were posted on drinks to be consumed in moderation such as diet soda and 100% fruit juice. Red "stop" signs were posted on drinks that should rarely be consumed, if at all, such as regular soda and other sugar-sweetened beverages.

As a third intervention, the SMC wellness team created short (3-5 minute) informational presentations related to diet and health. Topics included appropriate portion sizes, the benefits of whole grains, and the healthy way to follow a gluten-free diet. These seminars were recorded

between April and June 2014 and posted on the SMC blog for easy employee access in August 2014.

Nutrition facts labels for all cafeteria breakfast items and all cold packaged items sold in the cafeteria and snack bar became available to employees and visitors starting in early August 2014 as the final wellness intervention. All items prepared in-house by cafeteria staff followed standardized recipes. The breakfast labels were available in hard copies kept in a binder by the cafeteria's cash register. When ready-made products from the vendor were served (i.e. frozen breakfast potatoes), nutrition information was provided by US Foods (see Appendix G). Printed nutrition facts labels were placed on the cold packaged items after they were prepared by cafeteria staff (i.e. club sandwiches, yogurt parfaits, chef salads, etc.). All nutrient analyses were conducted using ESHA Food Processor software (see Appendix G).

The post-survey was administered on August 25, 2014 after six months of intervention (see Appendix A). The same administration methods were used through SurveyMonkey as stated previously for the pre-survey. The post-survey contained 23 questions; the same questions from the pre-survey were restated (questions 1-12) and the remaining questions asked the individual about his/her participation in interventions and the level of influence the interventions had on his/her food and beverage choices. Data were collected as stated previously and differences from pre-survey answers were evaluated. The final question of the post-survey asked for comments or suggestions for employee wellness program improvement. The responses to this question were summarized and categorized based on similar comments.

3.4 Statistical Analysis

The first hypothesis of this study was that SMC employees as a whole would possess improved dietary behaviors after six months of program intervention. A "score" was assigned to each answer for questions that asked how often the employee performed dietary behaviors (i.e. "On average, how often do you purchase items from the salad bar in the cafeteria?" Never=0, Once per week=1, Twice per week=2, 3 times per week=3, 4+ times per week=4, etc.). Mean scores for each question and a total diet score on the pre- and post-surveys were calculated. A higher diet score indicated the individuals' healthier behaviors, while a low score indicated less healthy behavior. T-tests were used to compare the dietary behavior (diet) scores from the pre-test to the scores from the post-test.

The second hypothesis was that there would be changes in dietary influences after six months of intervention. A chi square test was used to compare dietary influences pre- and post-intervention.

The third hypothesis of this study was that costs for "Try-it-Tuesdays" would have the greatest influence on employee participation. This was determined by frequencies and confidence intervals for the questions about the influences on "Try-it-Tuesdays" in the post-surveys.

The final hypotheses of this study were that nursing and nutrition department employees would have better dietary scores and participate in Try-it-Tuesdays compared to other departments. A "score" was assigned to each answer for questions that asked how often the employee participated in Try-it-Tuesdays (i.e., Never=0, 1-2 times=1, 3-4 times=3, 5+times=4). ANOVA was used to compare departments based on dietary behaviors and Try-it-Tuesday

participation scores from the post-survey. The LSD post hoc test was used to identify which departments were different using a significance value of $p<0.5$.

CHAPTER IV

FINDINGS

About 900 Stillwater Medical Center employees were invited to participate in both the pre- and post-surveys. A total of 277 employees completed the pre-survey in February 2014, representing about a 30% response rate. A total of 164 employees completed the post-survey in August 2014, representing about an 18% response rate. One hundred and twenty-seven, or 80.9%, of the post-survey completers claimed to have completed the pre-survey.

The components making up the total diet score and their frequency of consumption are presented in Table 1. The majority of employees (63.0% in the pre-survey, 61.0% in the post-survey) never purchased bottled water while at work. Almost half (49.5%) of pre-survey employees never consumed soda while at work, while the majority (51.8%) of post-survey employees never consumed soda at work. The highest proportion of employees purchased salad bar items once per week (30.5% for the pre-survey, 36.6% for post-survey). The majority of employees (75.1% for pre-survey, 77.3% for post-survey) never consumed hamburgers in the cafeteria. Consumption of bottled water, soda, salad bar, and hamburgers at work did not significantly differ after six months of intervention.

Table 2 shows total diet scores by department. The pre-survey mean diet score for all departments was 13.5 ± 2.6. Imaging had the highest mean pre-survey diet score of 15.4 ± 2.8. Imaging had significantly different diet scores from Inpatient Nursing, Information Technology, Nutrition, Lab, Cimarron Medical Services/Home Health, Clinics, Surgery Center West, Central Business Office, and Other departments. The Lab department diet score was significantly lower than Inpatient Nursing, Administration/Patient Improvement/Marketing/Human Resources, and Clinics in addition to Imaging.

The post-survey mean diet score for all departments was 13.6 ± 2.3. Pre- and post-diet scores did not significantly differ after six months of intervention. Patient Access Services had the highest mean post-survey diet score of 15.0 ± 1.7. Patient Access Services had significantly higher diet scores than Inpatient Nursing, Cimarron Medical Services/Home Health, Surgery Center West, Central Business Office, and Other departments. Imaging had significant different diet scores from the Central Business Office. The Central Business Office was also significantly lower than Inpatient Nursing, Pharmacy, Information Technology, Patient Access Services, Imaging, Administration/Patient Improvement/Marketing/Human Resources, Clinics, and Other departments.

Table 3 presents influences on cafeteria and snack bar purchases. The majority of employees claimed cost, nutritive value, presentation, and convenience to be somewhat influential for both the pre- and post-surveys. The majority of employees (81.4% for pre-survey, 86.5% for post-survey) claimed personal taste preference to be very influential on their cafeteria and snack bar purchases. The high p-values in Table 3 show that influences did not significantly change after six months of intervention.

Tables 4 and 5 refer to employee use of nutrition facts labels and their level of influence on food and beverage consumption in the cafeteria and snack bar. For both the pre-survey and post-survey, 41.5% of employees claimed to look at nutrition facts labels on the food they ate most of the time (see Table 4). The highest proportion of employees (54.2% for pre-survey, 48.8% for post-survey) claimed that nutrition facts labels influenced what they ate sometimes (see Table 4). Nutrition information was somewhat influential for 33.7% of employees in the pre-survey and 44.7% of employees in the post-survey (see Table 5). Responses were not significantly different between pre- and post-surveys. Table 6 shows that 73.8% of employees ate in the cafeteria or purchased food from the snack bar at least twice per week on average.

Table 7 presents the influence of two of the four interventions. The majority of employees (59.6%) did not find the Rethink Your Drink posters influential on their beverage purchases. The majority of employees (63.4%) did not view the HealthPro videos on the SMC blog. Of the 59 employees who viewed the videos, 69.5% found them somewhat influential on their food choices.

Tables 8 and 9 show frequency of Try It Tuesday purchases and level of participation by department, respectively. The majority of employees (67.9%) purchased the Try It Tuesday option at least once over the course of six months (see Table 8). About one quarter (28.4%) purchased it three or more times in six months. Patient Access Services had the highest Try It Tuesday participation rate (score of 2.73 ± 0.65), which was significantly higher than the participation of Total Health, Clinics, Surgery Center West, Central Business Office, and Other departments. Surgery Center West participated in Try It Tuesdays the least, which was significantly different from Pharmacy, Information Technology, and Patient Access Services. In addition to Surgery Center West, Pharmacy participated significantly more than Inpatient

Nursing, Central Business Office, and Other departments. Information Technology also participated significantly more than Central Business Office in addition to Surgery Center West.

Table 10 shows the factors that influenced Try It Tuesday purchases. Personal taste preference had the biggest influence on Try It Tuesday purchases (score of 2.23).

Table 11 presents comments and suggestions for program improvement divided into categories. The most common request (n=10) was for nutrition facts to be provided for all cafeteria and snack bar items.

Table 1 Frequencies of purchase of water, soda, salad bar and hamburger from the cafeteria, snack bar or vending machines

Item	Pre-intervention score n (%)					Post-intervention score n (%)				
	Never	1 per day	2 per day	3 per day	4+ per day	Never	1 per day	2 per day	3 per day	4+ per day
Water	174 (63.0)	50 (18.1)	23 (8.3)	9 (3.3)	20 (7.2)	100 (61.0)	32 (19.5)	14 (8.5)	9 (5.5)	9 (5.5)
Soda	136 (49.5)	95 (34.5)	26 (9.5)	12 (4.4)	6 (2.2)	85 (51.8)	62 (37.8)	9 (5.5)	4 (2.4)	4 (2.4)
Item	Never	1 time per week	2 times per week	3 times per week	4+ times per week	Never	1 time per week	2 times per week	3 times per week	4+ times per week
Salad bar	47 (17.1)	84 (30.5)	47 (17.1)	54 (19.6)	43 (15.6)	24 (14.6)	60 (36.6)	33 (20.1)	26 (15.9)	21 (12.8)
Hamburger	205 (75.1)	53 (19.4)	10 (3.7)	4 (1.5)	1 (0.4)	126 (77.3)	32 (19.6)	4 (2.5)	1 (0.6)	0 (0.0)

Table 2 Differences in total diet scores by department

Department	Pre-intervention		Post-intervention	
	n	mean ± SD[1]	n	mean ± SD[1]
Administration/Program Improvement/Marketing/Human Resources	17	14.0 ± 2.0[a,b,c]	13	14.0 ± 1.7[a,b]
Central Business Office	19	12.7 ± 1.7[c,d]	11	11.7 ± 2.5[c]
Cimarron Medical Services/Home Health	12	12.9 ± 1.8[b,c,d]	6	12.7 ± 0.8[b,c]
Clinics	51	13.7 ± 2.4[b,c]	24	14.0 ± 2.0[a,b]
Imaging	9	15.4 ± 2.8[a]	8	14.1 ± 2.3[a,b]
Information Technology	8	12.9 ± 2.0[b,c,d]	6	14.8 ± 2.0[a,b]
Inpatient Nursing	81	13.7 ± 2.4[b,c]	38	13.4 ± 2.0[b]
Laboratory	11	12.0 ± 2.6[d]	10	13.5 ± 1.5[a,b,c]
Nutrition	10	13.2 ± 2.9[b,c,d]	3	14.3 ± 2.1[a,b,c]
Patient Access Services	16	14.3 ± 1.5[a,b,c,d]	11	15.0 ± 1.7[a]
Pharmacy	9	14.0 ± 1.6[a,b,c,d]	7	12.4 ± 1.0[a,b]
Surgery Center West	10	12.3 ± 2.4[c,d]	3	13.7 ± 2.9[a,b,c]
Other	19	13.5 ± 1.9[b,c,d]	17	13.4 ± 2.7[b]

[1]A higher diet score indicates healthier dietary habits at work, while a lower diet score indicates less healthy habits. Frequency of bottled water purchases in the cafeteria, snack bar or vending machines was scored as never=0, one bottle per day=1, two bottles per day=2, three bottles per day=3, and four or more bottles per day=4. Frequency of soda consumption at work was scored as never=4, one soda per day=3, two sodas per day=2, three sodas per day=1, and four or more sodas per day=0. Frequency of salad bar purchases in the cafeteria was scored as never=0, once per week=1, twice per week=2, three times per week=3, and four or more times per week=4. Frequency of hamburger purchases in the cafeteria was scored as never=4, once per week=3, twice per week=2, three times per week=1, and four or more times per week=0.

[a,b,c,d] Departments in a column with the same letter are not significantly different.

Table 3 Influences on food choices in the cafeteria and snack bar

Influence	Pre-intervention n(%)			Post-intervention n(%)			p-value
	Not influential	Somewhat influential	Very influential	Not influential	Somewhat influential	Very influential	
Cost	48 (17.3)	129 (46.9)	98 (35.6)	23 (14.2)	82 (50.6)	57 (35.2)	.618
Nutritive value	16 (5.8)	151 (54.9)	108 (39.3)	8 (4.9)	92 (56.4)	63 (38.7)	.901
Personal taste preference	1 (0.4)	50 (18.2)	223 (81.4)	1 (0.6)	21 (12.9)	141 (86.5)	.322
Presentation	20 (7.3)	144 (52.6)	110 (40.1)	9 (5.6)	87 (53.7)	66 (40.7)	.779
Convenience	15 (5.5)	157 (57.1)	103 (37.5)	3 (1.8)	254 (58.0)	166 (37.9)	.183

Table 4 Frequency of food label use and influence on food choice

	Pre-intervention n(%)				Post-intervention n(%)			
	Never	Sometimes	Most of the time	Always	Never	Sometimes	Most of the time	Always
How often do you look at nutrition facts on the foods you eat?	11 (4.0)	111 (40.1)	115 (41.5)	40 (14.4)	3 (1.8)	62 (37.8)	68 (41.5)	31 (18.9)
How often does the information on food labels influence what you eat?	20 (7.2)	150 (54.2)	93 (33.6)	14 (5.1)	9 (5.5)	80 (48.8)	61 (37.2)	14 (8.5)

Table 5 Influence of nutrition information on food choice in the cafeteria

	Pre-intervention n(%)				Post-intervention n(%)			
	Info not available	Not influential	Somewhat influential	Very influential	Info not available	Not influential	Somewhat influential	Very influential
In the past week, how often has nutrition information affected your decision on what you ate in the cafeteria?	45 (16.9)	62 (23.2)	90 (33.7)	70 (26.2)	18 (11.3)	34 (21.4)	71 (44.7)	36 (22.6)

Table 6 Frequency of cafeteria or snack bar purchases

	Never n (%)	Once per week n (%)	Twice per week n (%)	3 times per week n (%)	4+ times per week n (%)
On average, how often do you eat in the cafeteria or snack bar?	12 (7.3)	31 (18.9)	23 (14.0)	37 (22.6)	61 (37.2)

Table 7 Influence of Rethink Your Drink posters and HealthPro videos on beverage and food purchases, respectively

	Not influential n (%)	Somewhat influential n (%)	Very influential n (%)
How influential were the "Rethink Your Drink" and stoplight signs on your beverage choice?	96 (59.6)	49 (30.4)	16 (9.9)

	I did not view the videos n (%)	Not influential n (%)	Somewhat influential n (%)	Very influential n (%)
How influential were the HealthPro videos on the SMC blog been on your food choices over the past several months?	102 (63.4)	11 (6.8)	41 (25.5)	7 (4.3)

Table 8 Frequency of Try It Tuesday purchases

	Never n (%)	1-2 times n (%)	3-4 times n (%)	5+ times n (%)
How often did you purchase the "Try It Tuesday" option in the last several months?	52 (32.1)	64 (39.5)	38 (23.5)	8 (4.9)

Table 9 Try It Tuesday participation by department

Department	n	mean ± SD[1]
Administration/Program Improvement/Marketing/Human Resources	13	2.23 ± 0.73[a,b,c,d]
Central Business Office	11	1.64 ± 0.81[d]
Cimarron Medical Services/Home Health	5	2.20 ± 0.84[a,b,c,d]
Clinics	24	2.00 ± 0.78[b,c,d]
Imaging	8	2.13 ± 1.13[a,b,c,d]
Information Technology	6	2.50 ± 0.84[a,b,c]
Inpatient Nursing	38	1.76 ± 0.88[c,d]
Laboratory	10	2.20 ± 0.92[a,b,c,d]
Nutrition	3	2.33 ± 0.58[a,b,c,d]
Patient Access Services	11	2.73 ± 0.65[a]
Pharmacy	7	2.57 ± 0.98[a,b]
Surgery Center West	3	1.00 ± 0.00[d]
Total Health	6	1.67 ± 0.82[c,d]
Other	17	1.82 ± 0.81[c,d]

[1]A higher score indicates more frequent participation. Frequency was scored as never=0, one to two times=1, three to four times=2, four or more times=3.

[a,b,c,d] Departments in a column with the same letter are not significantly different.

Table 10 Try It Tuesday influences

Influence	Not influential n (%)	Somewhat influential n (%)	Very influential n (%)	Mean score[1] (95% CI)
Cost	79 (49.7)	59 (37.1)	21 (13.2)	1.64 (1.52, 1.75)[a]
Nutritive value	61 (37.9)	61 (37.9)	39 (24.2)	1.86 (1.74, 1.98)[a,c]
Personal taste preference	42 (26.4)	39 (24.5)	78 (49.1)	2.23 (2.09, 2.36)[b]
Presentation	54 (34.0)	66 (41.5)	39 (24.5)	1.91 (1.79, 2.02)[c]
Convenience	60 (37.3)	58 (36.0)	43 (26.7)	1.89 (1.77, 2.02)[c]

[1] A higher mean score indicates higher influence. Mean score was calculated using not influential=1, somewhat influential=2, and very influential=3.
[a.b.c] Mean scores in a column with the same letter are not significantly different.

Table 11 Comments and suggestions for program improvement

Subject	Frequency
Positive comments/no suggestions	14
Nutritional facts for all cafeteria and snack bar items	10
More menu variety	4
Poor taste of healthier items	4
Prices too high	4
Cafeteria runs out of food too quickly	3
Tap water vs. bottled water	3
Requests for more Try It Tuesdays	3
More late evening/night healthy choices	2
Better vending machine options	2
More gluten-free/dairy-free/vegetarian options	2
Poor everyday options (i.e. fried foods, burgers)	2
Successful Rethink Your Drink program	2
Other	4

CHAPTER V

DISCUSSION

This study's first hypothesis was that SMC employees would possess improved dietary behaviors after six months of intervention. A t-test comparing pre- and post-diet scores revealed no significant changes in dietary behaviors after six months of intervention. Several studies reviewed previously (see Chapter II) observed improved employee dietary behaviors after worksite interventions. Lowe et al. (2010) and Steenhuis et al. (2004) both had intervention periods similar to this study, but focused solely on calorie and macronutrient content labeling, leading to decreased intake of fat, sweets, and total calories by employees. Lassen et al. (2014) also had a six-month intervention in a hospital cafeteria with a healthy logo on foods that met certain nutrition criteria, leading to fewer fat calories, total calories, sodium, and refined sugar consumption compared to a control cafeteria. Though these studies had similar intervention periods, the labels were available for the entire five or six months compared to only about one month of label implementation at Stillwater Medical Center. If the labels at SMC were available for a longer period of time, employees might have experienced improved dietary behaviors.

Similar to the methods of this study, several other studies used employee questionnaires to measure dietary changes by employees. For example, Perlmutter et al. (1997) decreased the fat

and sodium content of popular cafeteria entrees, which were found to be equally acceptable by employees and even more popular if the entrees were marketed as the healthier option. The highly accepted Meatless Monday program at Sodexo facilities (Johns Hopkins Center for a Livable Future, 2012) also followed HHI Balanced Menu guidelines and used employee surveys to measure likeability and collect suggestions for future meals. The program showed long-term success in improving overall dietary intake by employees. Offering more frequent Try it Tuesdays at SMC and long-term evaluation could improve the program, leading to increased participation and eventual improvement of employee dietary behaviors. The study by Arsenault et al. (2014) asked military personnel about their purchases of "high-performance foods" and "low-performance foods." The wording and marketing involved in this program was the most effective in catering to physically-fit military personnel who might be most concerned about their "performance" in the field. Proper wording that resonates with healthcare professionals could market healthier items better at SMC and lead to improved dietary behaviors.

Many studies observed an increase in healthy food consumption and a decrease in unhealthy food consumption by collecting cafeteria sales data. Thorndike et al. (2014) saw an increase in "green" beverage sales and a decrease in "red" beverage sales after 24 months of choice architecture intervention. Lowe et al. (2010) compared sales of common food items and their healthier counterparts (i.e. whole wheat bread and reduced fat cheese, mayonnaise, pizza, and frozen yogurt) and estimated a decrease in total calories consumed by employees after introduction of the healthier counterparts. Collecting cash register sales data at SMC might have yielded different results for dietary behaviors compared to individual questionnaires.

Dietary behaviors by SMC employees could have been improved with implementation of a more extensive nutrition and health education component. Davis et al. (2009) saw improved

employee dietary behaviors outside of the workplace and more physical activity after opening a worksite fitness facility and offering cooking demonstrations and individualized diet counseling on a regular basis. French et al. (2010a) used nutrition education in addition to group activities and challenges to improve self-reported health behaviors by employees. Steenhuis et al. (2004) used a multi-component program with food labeling, nutrition education in the form of take-home materials and table tents, and increased availability to healthier foods at work to initiate change. A more individualized approach to nutrition education instead of short educational videos could have resonated more with the employees of SMC. The multi-component approach that our study took (i.e. nutrition education in addition to labeling and offering healthier options) had been shown in other studies to be an effective means of promoting significant dietary changes by employees.

The second hypothesis of this study was that there would be changes in dietary influences (i.e. cost, nutritive value, personal taste preference, presentation, convenience) after six months of intervention. It was anticipated that employees would be more influenced by nutritive value by the end of the six-month intervention stage because of the nutrition education component and the addition of nutrition facts labels to common food items in the cafeteria and snack bar. The biggest influence on dietary choices, however, was personal taste preference both pre- and post-intervention. A chi-square test revealed no change in dietary influence pre- and post-intervention. This might be a reflection of an ineffective nutrition education procedure and the short duration of nutrition labeling.

The third hypothesis of this study was that the cost of Try it Tuesday options would be the greatest influence on employee participation. Table 10 shows that personal taste preference was the biggest influence on Try it Tuesday purchases by employees. This is in agreement with a

study by Glanz and colleagues (1998) who concluded that taste was the biggest influence on American adults' food choices, followed by cost, nutrition, convenience, and weight control. Even though Try it Tuesday options were lower in price than other entrée options, employees chose their food based on personal taste preference more than cost.

The final hypotheses of this study were that Inpatient Nursing and Nutrition department employees would have better dietary scores and participate in more Try-it-Tuesdays compared to other departments. These hypotheses were made based on the assumption that women, especially women in nutrition and nursing departments are more likely to be diet-conscious compared to men. Nursing and nutrition departments tend to employ more women than men. According to a survey study by Fagerli and Wandel (1999), women were more willing to increase vegetable consumption, reduce meat consumption, and switch to lower fat dairy products compared to men. In the study by Beardsworth and colleagues (2002), women were more likely to favor meals marketed as the "healthier" option and to make changes consistent with national dietary guidelines. Table 2 reveals that Imaging possessed the highest pre-intervention mean diet score, while Patient Access Services possessed the highest post-intervention mean diet score. Table 9 shows that Patient Access Services also participated in Try It Tuesdays more than the other departments, which might be an underlying reason for their high diet scores. Inpatient Nursing had one of the lowest Try It Tuesday participation rates, despite the high number of responses to the post-survey. This may be a reflection of their relatively low diet scores and poor dietary habits. Imaging and Patient Access Services contain a large proportion of women, which could explain why they had the highest diet scores.

5.1 Limitations

Limitations of this study are largely related to the design and study population. The entire employee population was invited to participate in both the pre-survey and post-survey, which produced a mixture of independent and dependent samples. Because of the anonymity of the survey responses, we were unable to identify the subjects who completed both surveys, so an independent sample was assumed. If one cohort of the entire population answered the pre- and post-surveys, it would have been possible to test a purely dependent sample and produced valid results. In addition, a much larger number of Inpatient Nursing employees participated in the surveys compared to other departments. This caused Inpatient Nursing diet scores to be significantly different from other departments due to the large sample size.

The interventions could have been more organized and planned out in order to yield more promising results. Nutrition information on cafeteria and snack bar items was not available on the employee intranet due to technical difficulties, so package labels were made, prolonging the initiation date to early August 2014. The Rethink Your Drink traffic light symbols were not posted until July 2014, giving employees only about one month to change their sugar-sweetened beverage consumption. Editing of the nutrition education videos only allowed for one of the three recorded sessions to be posted to the employee blog before the post-survey was administered. Overall, the Try it Tuesday component was successful and could have been offered more frequently if fewer interventions were carried out. In a future study, offering a greater number of healthier options in the cafeteria and snack bar might be the most effective means of improving employee dietary behaviors.

5.2 Implications for Practitioners and Future Research

For practitioners working to improve employee dietary behaviors, multi-component programs seem to be very effective. Intervention should last at least six months with all components running for the entire period. Employee surveys for feedback purposes should be administered throughout the implementation period, especially for long-term success of the program. As far as reducing sugar-sweetened beverage consumption, the stoplight model introduced by the Boston Public Health Commission (2011) seems to be an effective, easily accessible, and inexpensive means of initiating change. Catchy educational posters about sugar-sweetened beverages and weight gain like the ones presented by Block et al. (2010) could also prompt consumers to rethink their beverage choices. Nutrition facts labels and healthy food logos are very effective at reducing calorie consumption by employees. Manipulating the food environment by offering a greater number of healthier options and reducing the fat and sodium content of existing items can improve dietary intake. Worksite wellness initiatives such as WorkHealthy Hospitals and the Healthier Hospitals Initiative provide facilities with data collection tools as proof for changes in food policies and the food environment. Documentation of policy implementation and food orders can serve as factors contributing to dietary behavior change by employees. As far as nutrition education, individualized programs seem to be most effective.

Future research in the area of employee wellness is vastly needed. Scientific evidence of policy and environmental changes in the worksite is especially lacking. Program characteristics that differ between small and large business also needs to be established. Facilities should conduct cost-effectiveness analyses by measuring health care costs, absenteeism, and returns on investment (ROIs) as a result of the employee wellness program. This effectiveness analysis

should be conducted at long-term follow up, or at least three years after program implementation. The level of management support, resources, funding, and underlying determinants of employee program participation and/or behavior change should be taken into consideration when evaluating program effectiveness and future success. When using self-monitoring tools such as employee surveys, it would be beneficial to also collect sales data for comparison. Establishing a steady baseline period before program implementation would allow for measureable changes, especially when compared to a control worksite. The effects of both calorie modifications of all worksite cafeteria items as well as the provision of appealing and und understandable nutrition facts labels should be evaluated. Price modifications for healthy and unhealthy foods should be considered as well. Finally, as seen by Glanz et al. (1998), nutritional content is not as influential on food and beverage choices as taste and cost. With this in mind, future nutrition education programs should attempt to promote healthy diets as tasty and inexpensive.

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APPENDICES

Appendix A

Surveys

Pre-Survey

1. How often do you look at nutrition facts on the foods you eat?
    a. Never
    b. Sometimes
    c. Most of the time
    d. Always
2. How often does the information on food labels influence what you eat?
    a. Never
    b. Sometimes
    c. Most of the time
    d. Always
3. In the past week, how often has nutrition information affected your decision on what you ate in the cafeteria?
    a. Nutrition info was not available to me
    b. Nutrition info was not influential
    c. Nutrition info was somewhat influential
    d. Nutrition info was very influential
4. How often do you drink bottled water from the cafeteria, snack bar, or vending machines at the hospital during the day?
    a. Never
    b. 1 bottle/day
    c. 2 bottles/day
    d. 3 bottles/day
    e. 4+ bottles/day
5. How often do you drink soda at work?
    a. Never
    b. 1 soda/day
    c. 2 sodas/day
    d. 3 sodas/day
    e. 4+ sodas/day
6. How influential is **cost** on your food choices in the cafeteria and snack bar?
    a. Not influential
    b. Somewhat influential
    c. Very influential
7. How influential is **nutritive value** on your food choices?
    a. Not influential
    b. Somewhat influential
    c. Very influential
8. How influential is **personal taste preference** on your food choices?
    a. Not influential
    b. Somewhat influential
    c. Very influential

9. How influential is **presentation** on your food choices?
    a. Not influential
    b. Somewhat influential
    c. Very influential
10. How influential is **convenience** on your food choices?
    a. Not influential
    b. Somewhat influential
    c. Very influential
11. On average, how often do you purchase items from the salad bar in the cafeteria?
    a. Never
    b. Once per week
    c. Twice per week
    d. 3 times per week
    e. 4+ times per week
12. On average, how often do you consume hamburgers from the cafeteria?
    a. Never
    b. Once per week
    c. Twice per week
    d. 3 times per week
    e. 4+ times per week

Post-Survey

1. Did you complete the Pre-Survey in February?
    a. Yes
    b. No
2. How often do you look at nutrition facts labels on the foods you eat?
    a. Never
    b. Sometimes
    c. Most of the time
    d. Always
3. How often does the information on nutrition facts labels influence what you eat?
    a. Never
    b. Sometimes
    c. Most of the time
    d. Always
4. On average, how often do you eat in the cafeteria or snack bar?
    a. Never
    b. Once per week
    c. Twice per week
    d. 3 times per week
    e. 4+ times per week

5. In the past week, how often have posted nutrition information or nutrition facts labels affected your decision on what you ate *in the cafeteria or snack bar?*
    a. Nutrition info was not available to me
    b. Nutrition info was not influential
    c. Nutrition info was somewhat influential
    d. Nutrition info was very influential
6. How often do you drink bottled water from the cafeteria, snack bar, or vending machines at the hospital during the day?
    a. Never
    b. 1 bottle/day
    c. 2 bottles/day
    d. 3 bottles/day
    e. 4+ bottles/day
7. How often do you drink soda at work?
    a. Never
    b. 1 soda/day
    c. 2 sodas/day
    d. 3 sodas/day
    e. 4+ sodas/day
8. How influential is **cost** on your food choices in the cafeteria and snack bar?
    a. Not influential
    b. Somewhat influential
    c. Very influential
9. How influential is **nutritive value** on your food choices?
    a. Not influential
    b. Somewhat influential
    c. Very influential
10. How influential is **personal taste preference** on your food choices?
    a. Not influential
    b. Somewhat influential
    c. Very influential
11. How influential is **presentation** on your food choices?
    a. Not influential
    b. Somewhat influential
    c. Very influential
12. How influential is **convenience** on your food choices?
    a. Not influential
    b. Somewhat influential
    c. Very influential
13. On average, how often do you purchase items from the salad bar in the cafeteria?
    a. Never
    b. Once per week
    c. Twice per week
    d. 3 times per week
    e. 4+ times per week
14. On average, how often do you consume hamburgers from the cafeteria?
    a. Never
    b. Once per week
    c. Twice per week
    d. 3 times per week
    e. 4+ times per week

15. How influential were the "Rethink Your Drink" and stoplight signs on your beverage choices?
    a. Not influential
    b. Somewhat influential
    c. Very influential
16. How influential have the HealthPro videos on the SMC blog been on your food choices over the past several months?
    a. I did not view the videos
    b. Not influential
    c. Somewhat influential
    d. Very influential
17. How often did you purchase the "Try-It Tuesday" option in the last several months?
    a. Never
    b. 1-2 times
    c. 3-4 times
    d. 5+ times
18. How influential was **cost** on your "Try-It Tuesday" purchases?
    a. Not influential
    b. Somewhat influential
    c. Very influential
19. How influential was **nutritive value** on your "Try-It Tuesday" purchases?
    a. Not influential
    b. Somewhat influential
    c. Very influential
20. How influential was **personal taste preference** on your "Try-It Tuesday" purchases?
    a. Not influential
    b. Somewhat influential
    c. Very influential
21. How influential was **presentation** on your "Try-It Tuesday" purchases?
    a. Not influential
    b. Somewhat influential
    c. Very influential
22. How influential was **convenience** on your "Try-It Tuesday" purchases?
    a. Not influential
    b. Somewhat influential
    c. Very influential
23. Please provide any comments or suggestions below that can be used to improve the SMC Wellness at Work program:

Appendix B

IRB Approval Letter

Oklahoma State University Institutional Review Board

Date:	Tuesday, February 11, 2014
IRB Application No	HE149
Proposal Title:	Promoting the Healthier Hospitals Initiative: An Evaluation on Participation Rates, Health Education, and Behavior of Stillwater Medical Center Employees
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 2/10/2017

Principal Investigator(s):

Brenna Bowman
920 S Murphy Apt 6208
Stillwater, OK 74074

Gail Gates
301 HES
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1.Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms
2.Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3.Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4.Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Cordell North (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,

Shelia Kennison, Chair
Institutional Review Board

Appendix C

E-mail invitations to hospital employees for survey participation

Pre-survey e-mail sent 2/20/14:

Hello Everyone,

As you may know, SMC has recently pledged to the nationally recognized Healthier Hospitals Initiative (HHI) to further promote Wellness at SMC. One of our first tasks is to promote healthier food and beverage options in the cafeteria, snack bar and vending machines throughout the hospital through our HEALTHPRO SMC WELLNESS @ WORK program and committee. We have already begun work in these areas with great success and positive feedback. In order to really get this program up and running, we have recruited a graduate student from the Department of Nutritional Sciences at OSU. Brenna Bowman will be completing her thesis on employee perceptions of healthier eating at SMC. She is a member of our HEALTHPRO team assisting with fun, new ideas and providing staff education. She is also assisting our nutrition services dept developing recipes and providing nutrition information to our patrons.

*We would greatly appreciate your help with this project. Completing a short **5 minute pre-survey** (scroll down past the Consent Form) and a 5 minute post-survey a few months from now will do a world of good for measuring the success of HHI at SMC and being in a published article! The surveys are completely anonymous, so we appreciate your honesty. Please support SMC's efforts to be a healthier hospital!*

Thank you,
Michelle Axtell
Brenna Bowman

Post-survey e-mail sent 8/25/14:

Hello Everyone,

As you may know, SMC has been working on its "wellness culture". We pledged to the nationally recognized Healthier Hospitals Initiative (HHI) and joined Oklahoma Hospital Association Work Healthy Hospitals group to further promote Wellness at SMC. One of our first tasks was to promote healthier food and beverage options in the cafeteria, snack bar and vending machines throughout the hospital through our HEALTHPRO SMC WELLNESS @ WORK program and committee. Brenna Bowman, a graduate student from the Department of Nutritional Sciences at OSU, has been helping us these past 6 months. Brenna Bowman will be completing her thesis on employee perceptions of healthier eating at SMC. She is a member of our HEALTHPRO team assisting with fun, new ideas and providing staff education. She is also assisting our nutrition services dept developing recipes and providing nutrition information to our patrons.
*Most of you may recall taking a pre-survey back in February. We would greatly appreciate your help taking a short **5-minute post-survey (scroll down past the Consent Form).***
Completing this post-survey will do a world of good for measuring the success of HHI at SMC and being in a published article! The surveys are completely anonymous, so we appreciate your honesty. Please support SMC's efforts to be a healthier hospital!

Thank you,
Michelle Axtell
Brenna Bowman

Appendix D

Consent form

PARTICIPANT INFORMATION
OKLAHOMA STATE UNIVERSITY

Title: Promoting the Healthier Hospitals Initiative: An Evaluation on Participation Rates, Health Education and Behavior of Stillwater Medical Center Employees

Investigator(s): Brenna Bowman, BS, Master of Science Student, Oklahoma State University
Michelle Axtell, Director of Nutrition Services, Stillwater Medical Center

Purpose: The purpose of the research study is to evaluate employee perceptions and behaviors on health and food choices. You must be 18 years or older to participate.

What to Expect: This research study is administered online. Participation in this research will involve completion of two surveys. The first survey will ask general nutrition knowledge and behavior questions. The second survey will be administered after 5 months and ask the same knowledge and behavior questions in addition to a few feedback questions on the specific interventions. You may skip any questions that you do not wish to answer. You will be expected to complete each survey once. They should each take you 5-10 minutes to complete.

Risks: There are no risks associated with this project, which are expected to be greater than those ordinarily encountered in daily life.

Benefits: There are no direct benefits to you. However, the results of this study will be used to improve implementation of the Healthier Hospitals Initiative (HHI) at SMC.

Compensation: There will be no compensation for participation.

Your Rights and Confidentiality: Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time.

Confidentiality: The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify you. Research records will be stored on a password-protected computer in a locked office and only researchers and individuals responsible for research oversight will have access to the records. Data will be destroyed one year after the study has been completed.

Contacts: You may contact any of the researchers at the following addresses and phone numbers, should you desire to discuss your participation in the study and/or request information about the results of the study:

Brenna Bowman, BS, 101 Human Sciences, Dept. of Nutritional Sciences, Oklahoma State University, Stillwater, OK 74078, (520)444-8812.

Michelle Axtell, 1323 W 6th Ave, Nutrition Services, Stillwater Medical Center, Stillwater, OK 74074, (405)372-1480.

Gail Gates, Ph.D., 314 Human Sciences, Dept. of Nutritional Sciences, Oklahoma State University, Stillwater, OK 74078, (405)744-3845.

2·11·14
2·10·17
HE·14·9

Appendix E

Try It Tuesday flyers

Introducing...

"Try-It Tuesdays!"

In the cafeteria and snack bar

Take part in purchasing healthy options in the cafeteria and snack bar on specific Tuesdays of every month!

We vow to provide lower-calorie, higher-nutrient foods in the cafeteria and snack bar this year. Participate by purchasing "Try-It Tuesday" options every month on the road to a healthier SMC! Look for flyers on what we'll be serving next!

Look for our *HealthPro SMC Wellness at Work* logo on healthier food items!

Ask for nutrition information at the cash register!

Introducing...

Try-It Tuesdays!

In the cafeteria and snack bar

Kickoff

Tuesday, February 25th

Love Your Heart

feed it good food

See What's Cookin'

Citrus Salmon

170 calories | 18g protein | 10g fat per 3 oz serving

Why it's heart healthy:

- **Omega-3's**
- **Low sodium**
- **Vitamins C and other antioxidants**
- **Carotenoids**

HEALTHPRO

SMC WELLNESS AT WORK

Couscous & Quinoa Salad with Cranberries and Pecans

210 calories | 5g protein | 6g fat per ½ cup serving

Why it's heart healthy:

- **Very high fiber in quinoa and couscous**
- **Very high antioxidants in cranberries**
- **Cholesterol-lowering phytosterols in pecans**

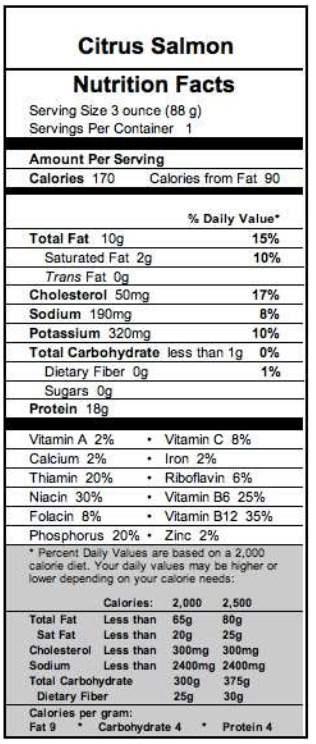
Citrus Salmon Recipe

Ingredients (prepares one 3 oz fillet)

- 3oz Salmon fillet, raw
- 1 chopped green onion
- ¼ whole orange, sliced
- 1 Tbsp red wine vinegar
- 1/8 tsp ground black pepper
- 1 pinch of salt

Instructions (prepared one 3 oz fillet)

1. Preheat oven to 400°F.
2. Lay fish on a greased sheet pan.
3. Sprinkle vinegar on fish. Squeeze some orange juice on fish for extra citrus flavor. Arrange orange slices on top. Sprinkle with chopped green onion, salt and black pepper.
4. Bake fish in oven for 8-10 minutes.
5. Cook until done or to a minimum internal temperature of 145°F for 15 seconds.



Citrus Salmon

Nutrition Facts

Serving Size 3 ounce (88 g)
Servings Per Container 1

Amount Per Serving	
Calories 170	Calories from Fat 90
	% Daily Value*
Total Fat 10g	**15%**
Saturated Fat 2g	**10%**
Trans Fat 0g	
Cholesterol 50mg	**17%**
Sodium 190mg	**8%**
Potassium 320mg	**10%**
Total Carbohydrate less than 1g	**0%**
Dietary Fiber 0g	**1%**
Sugars 0g	
Protein 18g	

Vitamin A 2%	• Vitamin C 8%
Calcium 2%	• Iron 2%
Thiamin 20%	• Riboflavin 6%
Niacin 30%	• Vitamin B6 25%
Folacin 8%	• Vitamin B12 35%
Phosphorus 20%	• Zinc 2%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2400mg	2400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

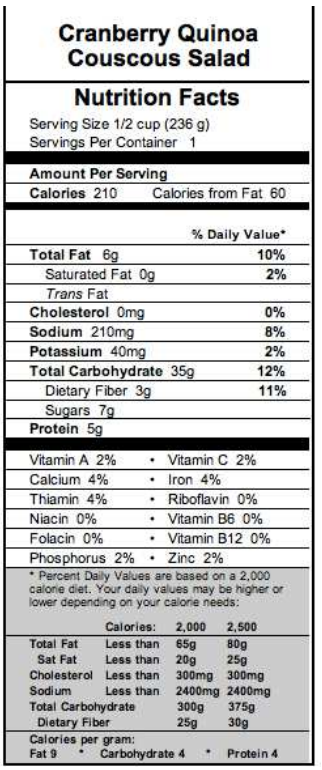
Cranberry Quinoa Couscous Salad Recipe

Ingredients (prepares 1 cup salad)

- 1 cup water
- 1/8 tsp salt
- ¾ cup uncooked quinoa couscous blend
- ¼ cup chopped arugula
- 2 Tbsp dried cranberries
- 2 Tbsp toasted pecans
- 2 Tbsp Fat-free raspberry vinaigrette
- 1-2 Tbsp feta cheese

Instructions (prepares 1 cup salad)

1. Bring salted water to a boil.
2. Add couscous blend and return to boil. Cover. Reduce heat to low and simmer for 10-14 minutes, stirring occasionally until tender. Drain.
3. While still warm, toss couscous blend with cranberries, toasted pecans, and dressing. Season to taste.
4. Refrigerate and sprinkle with feta prior to serving.



Cranberry Quinoa Couscous Salad

Nutrition Facts

Serving Size 1/2 cup (236 g)
Servings Per Container 1

Amount Per Serving	
Calories 210	Calories from Fat 60
	% Daily Value*
Total Fat 6g	**10%**
Saturated Fat 0g	**2%**
Trans Fat	
Cholesterol 0mg	**0%**
Sodium 210mg	**8%**
Potassium 40mg	**2%**
Total Carbohydrate 35g	**12%**
Dietary Fiber 3g	**11%**
Sugars 7g	
Protein 5g	

Vitamin A 2%	• Vitamin C 2%
Calcium 4%	• Iron 4%
Thiamin 4%	• Riboflavin 0%
Niacin 0%	• Vitamin B6 0%
Folacin 0%	• Vitamin B12 0%
Phosphorus 2%	• Zinc 2%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2400mg	2400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Appendix F

SMC Wellness at Work Logo

Appendix G

Food labels

Food processor label:

Lime Cilantro Pork Tacos

Nutrition Facts

Serving Size (294g)
Servings Per Container

Amount Per Serving

Calories 320	Calories from Fat 60
	% Daily Value*
Total Fat 7g	**11%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 75mg	**25%**
Sodium 340mg	**14%**
Total Carbohydrate 36g	**12%**
Dietary Fiber 3g	**12%**
Sugars 3g	
Protein 27g	

Vitamin A 4%	• Vitamin C 25%
Calcium 2%	• Iron 8%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

U.S. Foods label:

Citrus Salmon

Nutrition Facts

Serving Size 3 ounce (88 g)
Servings Per Container 1

Amount Per Serving

Calories 170	Calories from Fat 90
	% Daily Value*
Total Fat 10g	**15%**
Saturated Fat 2g	**10%**
Trans Fat 0g	
Cholesterol 50mg	**17%**
Sodium 190mg	**8%**
Potassium 320mg	**10%**
Total Carbohydrate less than 1g	**0%**
Dietary Fiber 0g	**1%**
Sugars 0g	
Protein 18g	

Vitamin A 2%	• Vitamin C 8%
Calcium 2%	• Iron 2%
Thiamin 20%	• Riboflavin 6%
Niacin 30%	• Vitamin B6 25%
Folacin 8%	• Vitamin B12 35%
Phosphorus 20%	• Zinc 2%

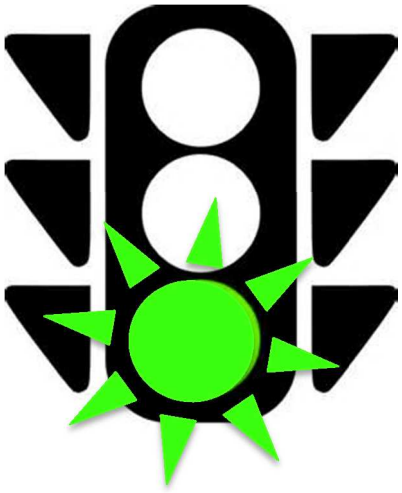
* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2400mg	2400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

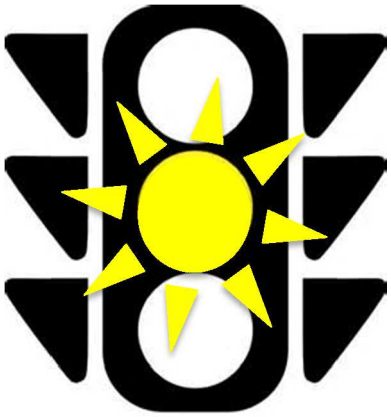
Appendix H

Rethink Your Drink Posters



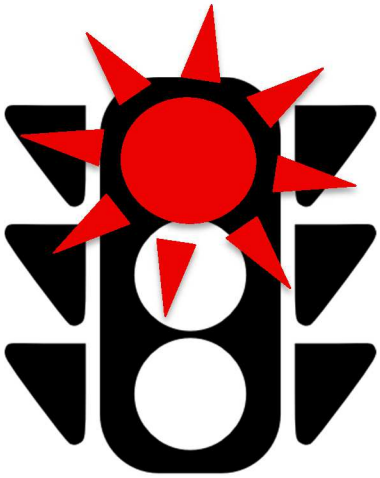
GREEN – Drink Plenty
Hydrating
Nutrient-dense

Examples:
Water
Seltzer water
Skim or 1% milk



YELLOW – Drink Occasionally
Empty calories
Low nutritional value

Examples:
Diet soda
Low-calorie, low-sugar drinks
100% juice



RED – Drink Rarely, If At All
Sweetened with sugar
Empty calories

Examples:
Regular soda
Energy/sport drinks
Fruit drinks

VITA

Brenna Marie Bowman

Candidate for the Degree of

Master of Science

Thesis: EVALUATING STILLWATER MEDICAL CENTER WELLNESS AT WORK

Major Field: Nutritional Sciences

Biographical:

Education:

Completed the requirements for the Master of Science in Nutritional Sciences at Oklahoma State University, Stillwater, Oklahoma in May, 2015.

Completed the requirements for the Bachelor of Science in Nutritional Sciences at the University of Arizona, Tucson, AZ in 2013.

Experience:

Graduate Teaching Assistant - Patricia Kain Knaub Center for Student Success, January – August 2014
Graduate Teaching Assistant - HS 1112 Human Sciences Freshman Experience, August – December 2014

Professional Memberships:

Academy of Nutrition and Dietetics
Oklahoma Academy of Nutrition and Dietetics
American Society for Parenteral and Enteral Nutrition