2013

Changes in Food Selection after Implementation of a Nutritional Labeling Program in a Worksite Cafeteria

Brenda Bodenmiller

Wright State University - Main Campus

Follow this and additional works at: https://corescholar.libraries.wright.edu/mph

Part of the Nutrition Commons, and the Public Health Commons

Repository Citation

Changes in Food Selection after Implementation of a Nutritional Labeling Program in a Worksite Cafeteria

Brenda Bodenmiller

Wright State University
Acknowledgments

Thank you to Marietta Orlowski, Sylvia Ellison, Ed Syron, and Christine Broomhall for your support and guidance with assisting me in completing this paper. Thank you to my family, both home and at work for patience and understanding; Miami Valley Hospital’s senior leadership; and John Eckelberry and his team in Nutrition Services for leading the way of health promotion within our hospital.
Table of Contents

Abstract ............................................................................................................................................4

Introduction ......................................................................................................................................5

Review of Literature ................................................................................................................... 5

Purpose ...........................................................................................................................................22

Methods..........................................................................................................................................22

Results ............................................................................................................................................26

Data Analysis ..................................................................................................................................29

Discussion ......................................................................................................................................32

Conclusion .....................................................................................................................................39

References ......................................................................................................................................40

Appendices .....................................................................................................................................49

   Appendix A: Cycle B Menu Examples Weeks 1-4 ...........................................................49
   Appendix B: Examples of Signage ....................................................................................53
   Appendix C: Photo Examples ............................................................................................54
   Appendix D: List of Tier 1 Core Public Health Competencies Met ..............................55
Abstract

This quantitative study examined the individual employee selection changes that occur in cafeteria purchases after the implementation of nutritional information point of purchase campaign in a hospital worksite. The study utilized data received from daily sales. Twelve selected variables were obtained from the labeling campaign. One entrée, soup, side item, and dessert were chosen from each of the nutrition color categories: red, yellow, and green. A comparison of the monthly sales totals for the selected menu items from each category (red, yellow, green) items was completed. Each monthly total was compared for any identifiable trends. The original analysis plan was hampered by a number of factors. Implications of the results and recommendations for future research are discussed.

Keywords: Point of purchase, Nutrition and Health, Ecological
Changes in Food Selection after Implementation of a Nutritional Labeling Program in a Worksite Cafeteria

Cardiovascular disease (CVD) is the leading cause of death. More than 2200 Americans die of CVD each day, an average of 1 death every 39 seconds (American Heart Association [AHA], 2012). Cardiovascular disease includes heart disease and stroke; both conditions involve narrowed or blocked vessels of the heart or circulatory system. The narrowing involves a process called atherosclerosis, which is a buildup of plaque and fatty material inside the lining of the arteries. Atherosclerosis begins early in life and is influenced by non-modifiable and modifiable behavioral risk factors (AHA, 2011). Non-modifiable factors are traits and situations in which there is not any lifestyle control. Examples of non-modifiable risk factors include gender, age and heredity. Modifiable risk factors include behaviors that are associated with an increased risk of disease and include tobacco use, high blood pressure (hypertension), diabetes, high cholesterol, obesity, physical inactivity, obesity and unhealthy diets. Data from the Nurses’ Health Study suggest that women, maintaining a desirable body weight, eating a healthy diet, exercising regularly, not smoking, and consuming a moderate amount of alcohol could account for an 84% reduction in risk for CVD (AHA, 2002).

Review of Literature

Nutritional studies have documented that healthy dietary patterns are associated with a substantially reduced risk of CVD. Knoops, Groot, Fidanza, Kromhout, and Van Staveren, (2006) demonstrated through the HALE population, using different dietary guidelines for preventing chronic diseases had a significantly lower risk of all-cause mortality. Appel et al. (2005) demonstrated through the results of the OmniHeart trial that blood pressure, low-density lipoprotein cholesterol, and estimated coronary heart disease risk were lower on each diet
compared to baseline. Nutrition plays an important role as a modifiable determinant for cardiovascular and non-cardiovascular diseases (AHA, 2006).

In addition to CVD, chronic diseases, including heart disease, cancer, stroke, diabetes, and respiratory diseases, each share major risk factors beyond genetics and social inequalities including tobacco use, unhealthy diet, physical inactivity, and lack of access to preventative care (Halpin, Morales-Suarez-Varela, & Martin-Moreno, 2010).

Obesity and Health

The high prevalence of overweight and obesity across the population is of concern as obesity is a chronic health conditions as well as an independent risk factor for cardiovascular disease and other chronic health conditions (AHA, 2006). Excess body weight adversely affects many CVD risk factors (e.g. increasing low-density lipoprotein LDL cholesterol levels, triglyceride levels, blood pressure, blood pressure BP, and blood glucose levels, and reducing high-density lipoprotein HDL cholesterol levels). Obesity affects other chronic conditions such as osteoarthritis, and in the United States, overweight and obesity contribute to 14% to 20% of all cancer-related mortality (Calle, Roderiquez, Walker-Thurmond, & Thun, 2003). Factors which have contributed to the “obesity epidemic” and body weight are those which affect calorie balance. Calorie balance refers to the relationship between calories consumed from foods and beverages and calories expended in normal body functions (i.e. metabolic processes) and through physical activity (United States Department of Agriculture [USDA], 2010). Obesity is a result of caloric imbalance. “Individuals tend to consume more calories than are expended and consuming more calories than expended leads to weight gain” (Je’quier & Tappy, 1999, p. 453). Excess calories are associated with portion sizes, high calorie density food and sedentary lifestyle or physical inactivity. Bray and Popkin (1998) concluded that dietary fat plays a role in the
development of obesity. Binkley, Eales, and Jekanowski (2000) concluded that increased consumption of fast food is a contributing factor to increased obesity. Therefore, the overall environment in which individuals live, learn, and play affects the type and amount of food consumed and physical activity. Food and eating environments are components that contribute to increasing obesity and chronic diseases. “Major changes in our food system and eating environments have been driven by: 1) technological advances; 2) U.S. food and agricultural policies; and 3) economic, social, and lifestyle changes” (Story, Kaphingst, Robinson-O’Brien, & Glanz, 2008, p. 254). Our society demands and seeks access to food that is convenient and easily accessible but often these lead to unhealthy eating habits. The environment affects nutritional choice. Nutritional choice is influenced by multifactorial factors such as increased portion sizes, high-calorie density foods, easy access to plentiful, inexpensive food, sedentary lifestyle, and commercial and cultural influences that, in aggregate, encourage calorie consumption in excess of calorie utilization (AHA, 2006). Average daily calorie count per individual has increased specifically with availability of added fats and oils, grains, milk and milk products (USDA, 2010). Since the 1970s, the number of fast food restaurants has more than doubled.

**Nutrition and Health**

The importance of proper nutrition and its role in health continues to impact chronic disease. Numerous research studies have demonstrated the role that diet plays in prevention of chronic diseases. Fung, Schulze, Manson, Willet, and Hu (2004) concluded a diet with high intakes of red and processed meats, refined grains, and sweets and desserts may increase stroke risk, whereas a diet higher in fruits and vegetables, fish, and whole grains may protect against stroke. Appel et al. (1997) demonstrated that a diet rich in fruits and vegetables, and low-fat
dietary foods and with reduced saturated and total fat can substantially lower blood pressure. This type of diet, such as the DASH diet has shown for years its use to prevent and treat hypertension. The strongest dietary determinants of elevated cholesterol concentrations are dietary saturated fatty acid and trans fatty acid intake (AHA, 2006). There are multiple dietary factors that increase blood pressure that include: excessive sodium and insufficient potassium intake; overweight and obesity; and excess alcohol consumption (USDA, 2010). Despite the evidence supporting the benefits of a healthy diet on blood pressure, lipids insulin sensitivity, and body weight, the majority of the population does not meet several of the public health targets set forth in the dietary guidelines. It has been estimated that >50% of global deaths can be attributed to diet (AHA, 2006). The need to change dietary habits is clear and must begin with consuming less fat, cholesterol, and sodium to reduce the risk of heart disease while adding more foods that are low in fat and rich in complex carbohydrates, such as fiber to reduce risk of diet related cancer (USDA, 1985, 1990). Research shows that high intake of fruits and vegetables can contribute to good cardiovascular health (AHA, 2006; USDA, 2010). The importance of proper nutrition, Hu and Willett (2002) concluded, “Substantial evidence indicates that diets relying on non- hydrogenated and unsaturated fats, whole grains as the main carbohydrate, an abundance of fruits and vegetables, and adequate omega-3 fatty acids can offer significant protection against cardiovascular disease […] incorporating healthy diets, with exercise, avoidance of smoking, and a healthy body weight may prevent the majority of cardiovascular diseases in western populations” (p. 2575).

Health Enhancing Nutrition Behaviors

Healthy eating results from a combination of behaviors that occur across a lifespan and involves individual choice and environmental influences which affect and promote a healthy
lifestyle. General guidelines for daily health that can enhance eating include increasing intake of whole grains, vegetables and fruits, and reducing intake of sugar-sweetened beverages. Specifically, 6-8 servings of whole grains, 4-5 servings of fruits and vegetables, 2-3 servings of fat-free or low-fat milk, less than 6oz of lean meats, poultry and fish (AHA, 2006; USDA, 2010). The USDA guidelines include calorie intake and expenditure per day by age, gender, and physical activity levels. Actual food group servings will vary based upon age and activity patterns. Carbohydrates, protein and fat are essential nutrients that are included in a diet. The recommended proportions vary according to age. Young children (1-3 years of age) should have 5-20% of their diet from protein and 30-40% from fat. But, adults need 10-35% protein and 20-35% fat. In addition to age, there are recommendations specific to a population such as pregnant women. Pregnant women are encouraged take an iron supplement and consume 8-12 ounces of seafood per week (USDA, 2010). Recommendations also include guidelines for reducing sodium consumption, keeping trans fatty acid consumption as low as possible, and reducing intake of calories from solid fats and added sugars, and limit refined grains. In addition to the dietary recommendations, there are guidelines to facilitate a physically active lifestyle. However, an individual’s choice may be limited by what is available in a person’s environment, including stores, restaurants, schools, and worksites.

Ecological Approaches to Modifying Diet

“An ecological approach is useful to illustrate the various connections between people and their environments” (Story et al., 2008, p. 254). In an ecological model, all behavior is influenced by multilevel environmental factors. Environmental factors exist on intrapersonal, interpersonal, community, organizations and system levels. Intrapersonal influences include constructs such as self-control, self-determination, and competence. An interpersonal (social)
influence includes constructs such as, peers, school, work, and friends. Community influences are constructs that include the community in which one may reside. The community may promote physical activity with bike paths or walking paths. Organizations may include schools, worksites, and faith-based such as churches. System influences may include influences such as public health and policy. The AHA conceptual model for food influences and identifies facilitators and barriers to attaining a healthy diet and lifestyle, Figure 1 (AHA, 2009).

Incorporating a sociological model consists of targeting individual, interpersonal, and organizational elements combined with the interactions within and among them. The Institute of Medicine (IOM) notes interventions implemented at any level within an ecological model can influence individual behavior change. However, existing research also suggests “that concurrent intervention at multiple levels such as individual, family, and community are most likely to sustain change and should be encouraged” (Matson-Koffman, Brownstein, Neiner, and Greaney, 2005, p. 168). Incorporating policy and environmental strategies coupled with promotion of physical activity and good nutrition, and comprehensive policy, environmental and systems-level intervention for patient care can be effective in controlling chronic conditions Matson-Koffman, Grenade, & Anwuri, (2008). Robinson (2008) examined the dietary behaviors, focusing on fruit and vegetable intake, of low-income African Americans. The studies that were most ecological, recommending the integration of environmental and individual targets across a variety of settings, suggesting multiple targets, and including at least two different strategies, with the client as a direct target and at least one other targeting a component of the environment demonstrated the greatest results for increased fruit and vegetable intake (Robinson, 2008). The socio-ecological model provides a useful framework for achieving a better understanding of the multiple factors and barriers that impact dietary behaviors.
**The individual (intrapersonal).**

Numerous individual factors influence eating behaviors. Intrapersonal factors are within the control of the individual. Individual factors that are related to food choices and eating behaviors include biological, demographic factors, and personal cognitions. Biological factors include an individual’s genetic makeup, age, gender, and race. Individuals may have a genetic predisposition to a specific disease, such as cardiovascular disease; or genetic make-up may influence what an individual eats. For example, Hispanics have an inherited chemical sensitivity to bitter tastes, which may cause them to avoid certain foods. Researchers at Temple University in Philadelphia tested 152 predominantly Hispanic children for genetic bitter taste sensitivity. Seventy percent of the children had the genetic trait. Demographic factors include factors such as age, gender, socioeconomic status, race/ethnicity, and disability status. Socioeconomic status influences individual eating habits. The highest rates of obesity in America are found among groups of people with low incomes. Cognitions that impact food choices include individual...
motivations, such as having the desire to want to lose weight or eat healthy, self-efficacy, outcome expectations and behavioral capability (Story et al., 2008). Examples of cognitions include an individual’s knowledge of the healthier choice, and individual food preferences (taste, texture and appearance), individual habits, individual energy and nutrient needs, health concerns, cultural or religious practices, cost and availability. A mother of child-bearing age should consume extra amounts of folate and foods with added folic acid to assist the health of a baby during pregnancy. An athlete will require higher energy requirements during training to meet nutritional needs. Both are examples of how motivation or outcome expectation may affect an individual’s nutritional choice.

**Family and friends (interpersonal).**

The second level of an ecological model for health-enhancing eating includes interactions with family, friends, peers and others in the community. The interactions with family and friends influence food choice by modeling and support. Studies show that children’s food intake is related to their parents’ nutrition knowledge and food intake, and their peers (Gibson, Wardle, & Watts, 1998; Reinaerts, DeNooijer, Candel, & DeVries, 2007). Parenting practices may influence children’s dietary intake. An authoritative feeding style has been positively associated with adolescent intake of fruits and vegetables (Lytle, Varnell, Murray, Story, & Perry, 2003). Birch (1999) found that parental practices such as restricting foods, pressuring children to eat, or using foods as rewards may inadvertently promote behaviors counter to their intentions. Young people tend to associate healthy foods with parents and fast food with pleasure, friendship and socializing (Shepherd et al., 2006), and they expect negative reactions from their peers about eating healthier foods (Cullen et al., 2001).
Behavior is not only influenced by culture and social networks; it is also influenced by the perception of how others within the social networks and culture will perceive the particular behavior. Molaison, Connell, Stuff, Yadrick, and Bogle (2005) concluded that most participants “believed that their peers would not support them in consuming more fruits and vegetables because most of their peers ate junk” (p. 249). “Social gatherings also tend to decrease the variance of consumption; those who normally eat large amounts eat less, while those who normally eat little will eat more” (Clendenen, Herman, & Polivy, 1994, p. 1). Cultural norms will affect what particular food or beverages that are consumed. James (2004) concluded that there was a general perception that eating healthfully meant giving up part of their cultural heritage when trying to conform to the dominant culture. Another example is a vegan, an individual who follows a vegetarian diet that excludes meat, eggs, dairy products and other animal-derived ingredients. Yet, depending upon the community and social interactions it may be difficult to maintain this particular lifestyle. Convenience and fast may be preferred rather than healthy choices. Making a healthier choice could be more difficult if the healthier choice is not strongly valued within society.

**Environments**

Environments consist of micro environment, the home environment, and macro environments which are any physical environments outside of the home where people interact and eat or purchase food, e.g. schools, restaurants, supermarkets and worksites.

Americans have 47.5% of their meals prepared within the home (Guthrie, Lin, & Frazao, 2002). Some factors within the home environment are availability and accessibility of healthy foods, the frequency of family meals, and parental intake and parenting practices (modeling of healthy dietary intake). Grimm, Harnack, and Story (2004) concluded that availability of soft
drinks in the home has also been strongly associated with soft drink consumption among children.

Environments which are located outside the home include social environments such as schools and worksites. These settings within the community play an important role in affecting individuals’ food choices.

**School.**

“School food environments can impact children’s and adolescents dietary intake, because two meals and snacks are eaten at school every day” (Story, Kaphingst, & French, 2006, p. 109). Most schools will offer federally reimbursed meals which meet defined nutrition standards. However, most will offer a la carte offerings in the cafeteria. Federal requirements do very little to limit the sale or set nutrition standards. The number of food establishments in the U.S. has nearly doubled in the past three decades U.S. Food and Drug Administration [FDA], 2006).

Foods eaten away from home tend to be more calorie dense and of poorer nutritional quality than foods prepared at home (Guthrie et al., 2002). Studies have linked frequent eating out to higher calorie intake, weight gain, and obesity (McCrory et al., 1999; Pereira, Kartashov, Ebbeling, Van Horn, & Slattery, 2005). Supermarkets; grocery stores play a major role in food purchasing and availability of healthful products contribute to healthy eating patterns. Environmental strategies are aimed at reducing barriers or increasing opportunities for healthy choices by providing more healthy options, making healthy choices more accessible and by establishing policies that require healthy choices or restrict the number of unhealthy options.

**Worksite.**

Americans currently spend two-thirds of their time at the worksite. Sixty-six percent of Americans are employed thus making the worksite a significant environment (United States
Increased time at work creates opportunities for worksites to provide environmental interventions that play an important role towards improvement of health. Nutritional behaviors can be positively influenced by work site health promotion programs that include healthful modifications of the work site environment. Workplace environments provide opportunities for on-site health promotion programs and may influence dietary intake through availability and variety of healthful food options. In a controlled worksite environmental intervention study in which two strategies were used for promotion of stair use and information in cafeteria, by providing product information for healthier food choices, it was concluded that a relatively modest food and physical activity intervention proved to be effective in improving cholesterol levels (Engbers, Van Poppel, & Van Mechelen 2005). In a review of worksite nutrition and physical activity interventions for controlling employee overweight and obesity, it was found that worksite nutrition and physical activity programs achieve modest improvements in employee weight status (Anderson et al., 2009). “Organizational initiatives are influenced by management support, commitment, and supportive organizational structures to sustain policy efforts over time” (Sorensen, Linnan, & Hunt, 2004, p. S94). Mhurchu, Aston, and Jebb (2010) conducted an extensive review on environmental strategies consisting of changes to worksite nutrition policies and practices such as nutritional labeling, vending policies and menu reformulation, to determine the impact on employee behavior. They found positive changes in fruit and vegetable consumption as a result Mhurchu et al. (2010).

Healthcare environments tend to be complex and have a unique role. They provide a place of employment in a rapidly changing health care environment, and are regarded as experts for providing community education. They support public health initiatives by providing education and access to community screenings. Examples include community education and
support of identification of health risks, tobacco cessation efforts, and healthy nutritional choices. Nurses represent an important component of the hospital workforce and serve as role models when caring for patients. “With increased national attention focused on preventing and reducing obesity, the role of the nurse as behavior models is important to patients, families and community” (Rush, Kee, & Rice, 2005, p. 167). It is also important to provide a positive workplace image. Previous research has revealed that people who are overweight question the validity of advice given by overweight health professional. Therefore, achieving improved health and physical image for a healthcare professional may have indirect benefits for the patients and community.

Therefore, the worksite offers opportunities as an environment to provide interventions that incorporate strategies to influence a healthier nutritional choice. Figure 2 is an example of a conceptual model that demonstrates the various ways to influence a healthy lifestyle in the workplace. In worksite ecological model physical environments, informational messaging, and behavioral social approaches can influence latest choice and behavior which may then influence the outcome of body composition. A worksite can influence behaviors such as food choice, dietary intake and physical activity by providing environmental changes and policies that offer onsite food availability and healthy choices and onsite exercise options. These environmental conditions support access to affordable healthy food and safety for exercise. Informational messages support knowledge; social approaches that support social norms with community and managerial support all influence individual behaviors of food choices, dietary intake and physical activity there by influencing body size and composition.
Macronutrition.

The outer level of an ecological model is the macro-environment. Macro-environments consist of factors operating within the larger society include food marketing, food production, and distribution systems, agriculture policies, and economic price structure. The macro/public policy level factors involve local, state, and federal policies. Although macro level factors are more distal and indirect, they still effect what people eat.

Choice Engineering

Environments can be structured in a way that promotes well-being making it easier to promote a healthier lifestyle. A supportive environment is one that offers convenient access to healthy food choices. “Environmental interventions are advocated at a population level because individual nutrition behavior change strategies are expensive and labor-intensive relative to the number of persons they affect” (Seymour, Yaroch, Serdula, Blanck, & Khan, 2004, p. S108). Worksite and university interventions have a potential for success (Seymour et al., 2004).

Multiple interventions incorporated within an environment offer promise in assisting individuals to make healthier food choices. Specifically, studies have demonstrated how
environmental modifications (labeling, increasing healthy choices, and price reductions) can positively influence dietary intake (Engbers, et al., 2005; Glanz, 1999; Jeffery, French, Raether, & Baxter, 1994). The Institute of Medicine [IOM] (2001) and U.S. Department of Health and Human Services and The Advertising Council (2004) report concluded that environmental strategies (combination of environmental and individual) with a focus on large-scale changes in dietary and physical activity behaviors are promising approaches to improve dietary and physical activity behaviors. Examples of environmental interventions include food availability, access, pricing or information such as point-of-purchase in worksites, universities, grocery stores, and restaurants.

Pricing.

Recent years have seen a significant increase in concerns about health and wellness and a corresponding growth in consumer demand for healthy food products (Glazer, 2008). One way to assist individuals to make healthier food choices is with price structuring. Offering a low price for healthier options is one approach and higher pricing for less healthier options. When low fat snacks were added to vending machines at different pricing levels snack sales increased by 9%-93% respectively based upon the price reduction (French et al., 2001). Another study looked at the feasibility and long term sustainability of the price reduction strategy. Hannan, French, Story, and Fulkerson (2002) found that pricing structure may not have been widely adopted due to the loss of revenue. The study examined whether the purchase pattern in which prices of targeted high fat foods were raised and targeted low fat foods were lowered. The study concluded that a pricing strategy is possible and feasible to maintain revenue. Raising the price on high fat foods serves two purposes; it encourages substitution with a more healthful option, and it helps to balance revenues.
**Default choices.**

Another specific strategy to alter behavioral choice is to alter the default choice. The default choice is the option that is assigned. The default choice works through applying behavior economics. When individuals make choices they tend to favor the default option, rather than taking the time to consider an alternative state. Thaler and Benartzi (2004) found that savings rates increased dramatically when employees are automatically enrolled. Altering choice through altering the default option can be applied in healthy options, offering water as the default beverage in a cafeteria, vegetables or fruit as the default side. One example of a default option is placing low fat salad dressing options on the salad bar and placing packets of regular salad dressing across the room. A study at a Chinese takeout restaurant, patrons were asked if they would prefer a half-serving of rice (without any price discount). Many of them preferred this option, which had always been available, but had not occurred to them when the full-sized entrée was offered as the default (Schwartz, Riis, Elbel, & Ariely, 2012).

**Nutritional labeling.**

The goal of nutritional labeling is to provide accurate food item information to individuals. Food labels can educate consumers about origins of their food, the practices used to produce it, or the nutritional content. An example of labels that inform consumers about nutritional content of foods and beverages is the nutrition information label that appears on the back of food and beverage packages. The label now required by the U.S. FDA was launched in 1994 in expectation that the information would help curb diet-related disease by helping consumers make healthier choices. Providing nutritional information and labeling may serve two purposes, one is that it is a quick way to provide information and awareness, plus offer choice of purchasing a red, yellow or green item. Research by Buscher, Martin, and Crocker
(2001) concluded that customers are influenced to choose healthfully when they are aware of nutrition information about food choices. The type of information that is placed upon on the label is important because of consumer literacy. The information label must be easy to understand and be written to be interpreted quickly due to people’s time and attention span. Previous research has demonstrated that the ability to interpret nutritional information requires not only high literacy but also high numeracy skills (Rothman et al., 2006). Patients demonstrated deficits in understanding nutrition labels. Poor label comprehension was highly correlated with low-level literacy and numeracy skills, but even patients with higher literacy could have trouble interpreting labels (Rothman et al., 2006). One third of U.S. adults have trouble reading and acting on health related information (National Association of Adult Literacy, 2006). Although menu labeling is a public health policy, reading and understanding the label is complex. Using calorie information requires an understanding of one’s total calorie needs and estimation of serving size. Due to comprehension and literacy levels color coded information systems have been introduced.

**Point of purchase.**

Point of purchase interventions are a form of nutritional education. Point of purchase gives visual cues, these cues are easily recognizable visual prompts (symbols) at the site of food selection. Examples may be the symbol of a heart to denote an item is “heart” healthy or a stop light coloring system indication whether an item is acceptable (green), proceed with caution, use selectively (yellow) or an item this is not a healthy choice (red). A large number of decisions are made at the time of purchase. Point of purchase signs or color coding may also include additional labeling.
Point of purchase programs have also been studied in a variety of workplace settings for years. In pilot projects conducted by the National Heart Lung and Blood Institute, point of purchase prompts were shown to influence to sales in the direction of desired change in a cafeteria and at food vending machines. Reed, Powers, Greenwood, Smith, and Underwood (2011) noted a significant mean difference in daily fruit consumption. Buscher et al. (2001) found that it was important to have the nutritional information provided. Studies that utilized more than one strategy demonstrated potential for success. Thorndike, Sonnenberg, Riis, Barraclough, and Levy (2012) implemented a two stage experiment. The first stage introduced nutrition labels that were color coded to help identify the healthfulness of foods and beverages. In the second stage, the locations of foods and beverages were changed in order to increase the visibility of the healthy food and beverage choices. Therefore, interventions aimed at influencing choice may be more successful when multiple interventions are employed. Thorndike et al. (2012) demonstrated that the color coded intervention improved sales of healthy items, with the largest change occurring among beverages. During phase 1, sales of all red items decreased 9.2% and red item beverages decreased by 16.5%. During phase 2, sales of red items further decreased 4.9% and red item beverages decreased 11.4% (Thorndike et al, 2012). In a similar study, Levy, Riis, Sonnenberg, Barraclough, and Thorndike (2012) demonstrated that all the labeling decreased all employees’ red item purchases by 11.2% and increased green item purchases 6.6%. Red item beverages decreased the most 23.8%. Despite baseline differences in healthy food purchases, a simple color-coded labeling and choice architecture intervention improved food and beverage choice among employees from all racial and socioeconomic backgrounds. Engbers et al. (2005) in a systematic review of worksite health promotion programs, found that fruit, vegetable, and fat intake can be positively influenced by
environmental strategies that include point-of-purchase labeling, promotional materials, expanded availability of healthy foods, and targeted food placement.

**Purpose**

Nutritional labeling and point of purchase prompts can alter food choice in a worksite cafeteria. Offering information, assisted with visual cues, may entice an individual in choosing the healthier option at the point of purchase. The purpose of this study was to describe the impact on sales of specific food purchases in a hospital worksite cafeteria after incorporating a point of purchase concept of behavioral economics.

**Methods**

**Setting**

This study of food purchases was conducted at Miami Valley Hospital (MVH) located in Dayton, Ohio in cooperation with Public Health - Dayton and Montgomery County’s Get Up Montgomery County initiative to increase healthy eating and physical activity (http://getupmc.org/). The data do not reflect personally identifiable human subjects data and were therefore exempt from Institutional Review Board purview (United States Department of Health & Human Services, 2004). Montgomery County is ranked 70th of 88 counties for negative health outcomes according to the County Health Rankings (Robert Wood Johnson Foundation and the University of Wisconsin, 2012). One-third (31%) of adults residing in Montgomery County are obese compared with the national average 25%. Montgomery County has an average of 61 hospital days per 1000 Medicare enrollees that are preventable through appropriate diet and exercise. The national average for preventable hospital days is 49 per 1000 Medicare enrollees.
MVH is the largest hospital in the Dayton area and has over 6000 employees. Miami Valley Hospital is one of five hospitals within the Premier Health Partners (PHP) system, the largest health care system serving southwest Ohio. The hospital has six eateries: Rubicon Place, Magnolia Place, Medical Staff Dining Room, Valley Café, Café Express, and Kobricks. The hospital serves over 8000 patient, visitor and employee meals per day. The largest portion of meals served is employee meals. Rubicon Place, the primary eatery focused on in this study, serves 2,780 customers (employees, physicians and visitors) per day. The eatery is located in the basement of the hospital and is open from 6am-10pm and 2am-4am daily.

**Point of Purchase Intervention**

A point of purchase intervention program was implemented in the Rubicon cafeteria on September 19, 2011. For menu Cycle B, a color coded nutritional labeling system was implemented on selected foods. Hot food choices offered on the Chef’s Corner and Specialty Bar, and items at the grill were analyzed and labeled. The labeling system was based upon the MaineHealth “spotlight on Nutrition” program and Virginia’s response to the “Health Criteria for Hospital Cafeteria foods”. The goal of the nutritional labeling system was to model a red, yellow, and green “traffic light” approach. Healthy Criteria Guidelines for nutrition labeling were as follows:
Figure 3. Stop light guidelines used in the nutrition labeling system.

Sample Data

The sample for this study consisted of total food sales for selected items included in the point of decision nutritional labeling campaign over a six month period. The Rubicon cafeteria has three different menu cycles that rotate throughout the year. Cycle B menu was in place September 19, 2011-February 12, 2012. Cycle C menu began February 13, 2012 through May 27, 2012, and Cycle A menu May 28, 2012 through September 26, 2012. This study plan was to focus on the Cycle B menu period September 19, 2011-February 12, 2012. Each menu cycle has different weekly menus (see Appendix 1).

Twelve menu items were selected to be in the study sample. One entrée, soup, side item, and dessert were chosen from each of the nutrition color categories: red, yellow, and green. The sample menu items were chosen based upon their previous popularity (see Figure 4). Monthly sales totals for the selected menu items were requested from nutrition services for the time period August 1, 2011-February 29, 2012. This date range included the end of the menu cycle prior to the point of purchase intervention.
**Data Analysis Plan**

A comparison of the monthly sales totals for the selected menu items from each category (red, yellow, green) was completed. Each monthly total was compared for any identifiable changes in sales. The analysis aimed to identify any trends or significant shifts in consumer behavior in response to the adopted strategies.

**Figure 4.** Sample items used in the study.

In addition to the select red, yellow and green category menu items, salad dressing and fresh vegetable purchase data was also included. At the time of this study, the hospital was participating in a local public health initiative called Get Up Montgomery County. Get Up is a social marketing campaign promoting, among other things, the practice of eating five fruits and vegetables each day. Changes in salad dressing offerings and fresh vegetable frequency cards were additional cafeteria strategies. With the new strategy, the default choice of salad dressing was changed. Fat free dressings were included on the updated salad bar. Regular (full fat) dressings were offered only by individual packets. This was a shift from previous practice when few low fat low calorie dressings were offered in the packets and regular (full fat) dressings options located on the salad bar. Fresh vegetable frequency cards worked like reward cards; after the purchase of six fresh vegetables the seventh vegetable was free.
trends. In addition, a monthly comparison of the number of (full fat) salad dressing packets and fresh vegetable servings was completed. The original analysis plan was hampered by a number of factors that will be discussed in the results section.

Results

Descriptive Data

Table 1 demonstrates the actual number of times the selected green, yellow and red food menu items were offered during menu cycle A and B in 2011 and 2012. Only the white bean chicken chili (red item) and mashed potatoes (green item) were offered frequently enough to provide useful analysis. Chicken noodle soup was offered twice as much in 2011 as 2012 and mashed potatoes were most often offered for both cycles. There were no items in the yellow category that were offered enough for a trend analysis. Within the red items, both white bean chili and fried chicken were offered equally.

Table 1

Food Menu Item Frequency Cycle A and B, 2011

<table>
<thead>
<tr>
<th>Item</th>
<th>Cycle A 2011</th>
<th>Cycle B 2011-2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Items</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Bean Chicken Chili</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>German Chocolate Brownie</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Macaroni and Cheese</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Fried Chicken</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Yellow Items</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tex Mex Potato Soup</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Hot Fudge Brownie Cake</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Au Gratin Potatoes</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Green Items</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken Noodle Soup</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Peach Cobbler</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Mashed Potatoes</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>Beef Lasagna</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
Figure 5 represents the actual number of sales for each of the green variables beginning in August 2011, prior to the implementation of the labeling system through February 2012. The beef lasagna had a range of 74-326 and the mashed potatoes had a range of 2634-3142. There is not any identifiable trend noted for all of the sales of each green variable. Figure 6 demonstrates actual sales total for the selected yellow menu items sold from August 2011 to February 2012. Due to the lack of frequency that each item was offered sales were minimal. Figure 7 represents the total sales of the red variables from August 2011 to February 2012. Fried chicken and white bean chicken chili was both up and down without any identifiable trends. Macaroni and cheese had a very wide range of 234 to 1045.

\[\text{Figure 5. Sales total for select green items, August 2011-February 2012.}\]
Figure 6. Sales total for select yellow items, August 2011-February 2012.

Figure 7. Sales total for select red items, August 2011-February 2012.
Without any identifiable trends from the selected variables as noted in Figure 4 there is lack of any information that is able to be gained from the data that was chosen for the project. Therefore data was obtained using all fresh vegetables (see Figure 8).

![Sales total for select fresh vegetables, August 2011-February 2012.](image)

*Figure 8.* Sales total for select fresh vegetables, August 2011-February 2012.

Eighteen fresh vegetables were offered, fresh green beans was most popular for the months of August 2011, September 2011 and February 2012. Sales rose and fell over the time period. There was no trend established in either direction. This trend analysis again shows that there are not any identifiable trends that are able to be concluded from this data set. There are very wide ranges and sales totals are increased for one month and then decreased the following month.

**Data Analysis**

Analysis of the data became difficult due to several factors. Table 2 represents planned analysis and the problems that were encountered with the data.
Table 2

*Analysis Plan Steps and Associated Problem Encountered*

<table>
<thead>
<tr>
<th>Analysis Plan</th>
<th>Problem Encountered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compare monthly menu items sales totals.</td>
<td>Menu item availability.</td>
</tr>
<tr>
<td>Compare menu items by category color.</td>
<td>Menu item recipe formulation changes.</td>
</tr>
<tr>
<td>Request more data to address problems.</td>
<td>Data format and availability.</td>
</tr>
</tbody>
</table>

**Menu Item Availability**

Items were chosen to include an entrée, soup, dessert, and side item from each food group. Upon obtaining the data it was discovered that all of the items were not offered on the menu cycles with the same frequency; some items being offered more frequently such as mashed potatoes 26/27 and some items not offered every month such as fried pork chop which was deleted from the menu. This made analysis very difficult. Lack of frequency of the selected green, yellow and red menu resulted in a very low number for analysis.

**Menu Item Recipe Formulation Changes**

Another complication that was identified is the recipes for the selected menu items were constantly changing during the menu cycle. From the beginning of the implementation of the labeling program, the goal for the nutrition services department was to increase the number of green and yellow items and decrease the number of red items. This resulted in the recipes being modified to become more nutritious. For example, the white bean chicken chili was a red item when the labeling began (September 2011) but, within two months, the soup was modified and became a yellow item according to the labeling criteria. Though it was discovered that monthly comparison of items or trend analysis would not be accurate, food service surveys and direct reports indicated that the point of decision prompts were increasing awareness and influencing
choices. Therefore, an attempt was made to obtain more data. Additional data was requested for all data for August 2011 through February 2012 and a trend analysis was planned for all red, all yellow and all green items.

**Data Format and Availability**

The availability of data has been cumbersome because it is only available in a format that is designed for accounting purposes. It is pulled from a daily revenue center menu item sales data detail report. This report is for the complete hospital system (Premier Health) and then locations (the hospital and cafeteria) are selected. This report contains every item that is available to purchase from the specific cafeteria location. It is divided into categories, such as beverages, breads/rolls, breakfast items, desserts, entre, grill features, open bar, bakery, snacks, soups, and total vegetables. It lists price and sales quantity. The data was received in a format that is unable to be manipulated or filtered for specific items. The items were not labeled for the point of purchase labeling system. Therefore there was not a way to identify whether each item sold was green, yellow, or red. The items were identified at the point of purchase (in the cafeteria) not on the daily revenue menu item sales detail report. At that point it was decided to pull all vegetables. When the vegetable data were obtained it was found that several items labeled vegetables such as fried mushrooms were in this category. So, for the purposes of the study only fresh vegetables were selected (Figure 8). Once again no identifiable trends were noted.

In conclusion as noted changes in food purchases after a point of purchase intervention were not reportable due to lack of frequency of items chosen, ongoing recipe changes, and access to data. The process of analysis though does lend itself to a plan for future analysis.
Discussion

Cardiovascular disease continues to be the leading cause of death in the United States, and is followed by cancer and stroke. Proper nutrition and diet play an important role in prevention of these three leading causes of death and disability. Healthy eating consists of a combination of behaviors, including the consumption of fruit and vegetables, choosing whole grains and low-fat proteins and the minimization of the intake of sodium. Eating behaviors develop over a lifetime, and are influenced by many environmental factors.

In an ecological model, several levels of environmental factors, such as a system level influence a person’s behavior. The worksite setting is one example of an organizational environment that can have opportunities to provide multilevel interventions to supportive health promotion. In cafeterias, worksites can influence healthy behaviors by offering environmental changes that promote healthier food choice, such as nutritional labeling and point of purchase prompts. Points of purchase interventions give visual cues that are easily recognizable, such as a stop light labeling system.

Food Selection Changes

There were several factors identified that affected the plans for analysis, thereby affecting the ability to describe the results. One specific menu cycle time frame and only a few selected food items, proved inappropriate for proper analysis. Due to the great variety of the food entrees and sides items offered in the menu cycle, the selected foods items were not offered in enough consistency for an analysis. Review of previous studies suggests, a better option would have been to compare sales of all items within the green category and all items within the red category. Using the total items sold for each category would have allowed us to report items as a proportion of total sales, and not look directly at frequency of a few color-coded items. In a
similar point-of-purchase study of college students, Freedman and Connors (2010) did not demonstrate significant difference in sales of any food item between baseline and intervention. However, overall sales of tagged items, as a percentage of total sales within each cereal, soup, and cracker category, increased as a result of the intervention (Freedman & Connors, 2010.).

In addition to problems with the sample selected, a second methodological issue with the evaluation was that recipes continued to be modified during the menu cycle. In the real world of the cafeteria, increasing the number of healthy options in the cafeteria is a good thing. It created difficulty with the evaluation though; items started in one color-coded category and ended the study period in another category. Red item recipes, such as the white bean chili, were modified to become a healthier recipe, and as a result become coded as a yellow item. While this is a very good overall goal for the nutrition services department to offer healthier items; a better solution would be to not alter the food items during the menu cycle or during the study time frame. In a similar study, in which certain entrée items were targeted and designated as a healthy entrée, no recipes were modified from baseline formulations (Sproul, Canter, & Schmidt, 2003).

Promotional information and displays were available during the time period. Approximately 60% of the respondents reported that they had noticed the promotional materials. The majority 79% indicated that the presence of these materials did not influence their meal selections. In another study where the worksite had been undergoing a series of changes to offer healthier items, data had been collected six days prior, and six days post intervention (Schmitz & Fielding, 1986).

A third area that affected the ability to describe changes in food selection involved the availability of useful data for evaluation of the sales. The daily revenue sheets that were used for the trend analysis did not have a way to identify which items had been labeled or categorized.
They were only available in paper PDF format that could not be “filtered” or manipulated to adjust for certain variables. This made the data very cumbersome. All data had to be pulled manually and then placed in a separate spreadsheet.

**Future System Application**

In looking at opportunities for improvement in the evaluation process, it is important to understand how other researchers have documented changes in food choice after implementing a point of purchase labeling system. More recently, since our study was implemented, two additional similar studies have been released that offer possible solutions to limitations that were identified in our study. Other researchers have measured changes by a) measuring the intervention during a period of time, b) using all the data in a particular area or category; not just individual items or variables, c) collecting the data in a different format that has been set up ahead of time so the data collection is an easier process and, d) inclusion of additional cafeteria categories in the labeling program, such as beverages.

**Phases of point of purchase.**

To evaluate changes that may occur from an intervention, it is important to have a pre intervention period and a post intervention period. Offering the implementation of a study in particular period of time allows the opportunity to just measure what may be occurring within that particular time period. Nothing is changed except what is within the intervention. Having both a pre and post intervention measurement supports conclusions that changes can be attributed to the intervention. For example, Reed evaluated the eating behaviors of college students following PowerPoint messaging located between the cookie and fruit selection, the intervention occurred for 9 days. A significant mean difference in daily fruit consumption was found following the slide presentation. Average daily fruit consumption at baseline was 408
Post baseline average daily fruit consumption significantly increased (533; SD=102). The point of decision messaging significantly influenced fruit selection in a single dining room setting. Cookie and fruit consumption was measured 9 days pre and 9 days post intervention (Reed et al., 2011). In a similar study at Massachusetts General Hospital in Boston a 2-phase labeling intervention was implemented. Baseline data was collected for three months then a two phase intervention was implemented for six months. Phase 1 was a labeling intervention of a simple color-coded scheme which provided information about healthy cafeteria items. Phase 2 was an architecture intervention involving food display and placement. The primary outcome was change in sales of red and green items from baseline to phase 1 and from phase 1 to phase 2. The results were able to show the proportion of sales of red and green items between baseline, phase 1 and phase 2 (Thorndike et al., 2012).

**Data selection and measures.**

When deciding to undertake the study, it was known that daily sales sheets listing every item sold were available to use for collection purposes. However, it was later discovered that the sales sheets provided challenges, a) the sheets were not available in an electronic format so that the selected variables would be easily extracted, b) the selected variables were not offered each and every day; and they were not easy to identify on the daily sales sheets. Because data had to be manually reentered into Excel, only select items were chosen for the sample. Several studies have addressed the sampling issues by using a computerized cash register system which categorizes the sales data, a) placing the targeted items into a particular category they are easily identified in a specific sales category, b) sampling every item in the category, and c) through observation.
A computerized system is helpful to address the data set issues. In a more recent study, Thorndike et al. (2012) labeled all items as red, yellow or green on the basis of the United States Department of Agriculture’s 2005 My Pyramid healthy eating recommendations. Before collecting any data, all cafeteria cash registers were programmed to capture the information needed to identify an item as red, yellow, or green. Throughout the study, register data was exported daily. Additionally the cashiers who worked during the study were trained to enter specific names of food and beverages (Thorndike et al., 2012). In another study, the items were placed into categories within a computerized cash-register system and the selected variables identified ahead of time in the cash register system. If unable to manipulate or alter a specific cash register system for categorizing specific food items, existing food categories may be used for the study. For example Freedman and Connors (2010) used specific food categories that were already identifiable in sales; cereal, bread, soup, cracker, canned vegetables, granola/energy bar, and salad dressing. While it may not be possible to “program cash registers” it is important to understand how items are categorized when entered into the register system to evaluate if there are additional opportunities that would assist with identification on the daily sales sheets.

In another study of college students a specific campaign, “Eat Smart” was introduced which provided information on which items were healthful food items and the items were tagged with the “Fuel Your life” logo. All sales of tagged items were compared to sales of the same items during the intervention period. Second tagged items as a percentage of total items sold in each category were calculated, and sales were compared for the two time periods (Freedman and Connors, 2010).

Finally, in lieu of tracking total sales of select or all food items, others have tracked food selection changes at the individual level. In a hospital cafeteria setting, after implementing of a
color-coded labeling system, Levy and colleagues (2012) tracked individual employee purchases. Employee purchases were tracked via employee identification. He concluded despite baseline differences in healthy food purchases, a simple color-coded labeling intervention improved food and beverage choices among employees from all racial and socioeconomic backgrounds (Levy et al., 2012).

**Food categories.**

Understanding how pre-established food categories are set up is another component that is important to define prior to beginning a study. For example when it was realized the frequency of individual food items were too low for comparison, we looked at using a pre-established specific category that was already in the cash register system. As we looked at the category labeled vegetables, we discovered that fried vegetables were included in this category. If using pre-established categories it is important to understand everything that is placed in that category. We therefore used the “fresh” vegetables and manually pulled them from the sales sheets. As mentioned before, another researcher used existing categories of cereal, soup, and crackers and tagged those categories then looked at the percent of tagged items to the overall sales total (Freedman & Connors, 2010).

Another option that may be important to consider would be the inclusion of beverages in the intervention. Beverages were not included in the labeling system, but have been used in other studies. Thorndike et al. (2012) concluded that a color-coded labeling intervention improved sales of healthy items. The largest changes occurred among beverages. The purchase of red beverages decreased 16.5% during phase 1 and further decreased by 11.4% in phase 2. The purchase of green beverages increased 9.6% in phase 1 and 4.0% in phase 2 and, bottled water consumption increased 25.8% overall (Thorndike et al., 2012). Labeling of beverages is an
additional important factor, as the consumption of sugar sweetened beverages has increased over the last few years and the epidemiologic evidence grows for the role between sugary beverages and poor health outcomes, including obesity, diabetes and heart disease (Malik, Popkin, Bray, Despres, & Hu, 2010).

**Public Health Implications**

Worksites can play a very powerful role in the health of a population. A majority of Americans (66%) are employed outside the home, making worksite an important environment to implement change (Bureau of Labor Statistics, 2007). Worksites are viable settings for reaching large numbers of working adults of varying socioeconomic levels and ethnic backgrounds (Pratt et al., 2007). As the cost of health care in the United States continues to increase, chronic disease comprises the majority of health care expenditures, accounting for seventy five percent of the nation’s annual health care costs and affecting greater than one third of working-age Americans (Milani & Lavie, 2009). Interventions that improve worksite health also have public health implications to impact the community and population health. Many national strategic policies include worksites and the importance they play in improving the health of our country. For example the National Prevention Strategy includes seven priorities to improve the health and wellness of the U.S. population.

The importance of evaluating worksite health promotion programs cannot be over looked. Especially, as we become more of a data driven society, we note the importance of evidence based outcomes to substantiate the need and support for particular programs. Accurate data, analysis, and evaluation systems must be planned for; specifically, playing close attention to the data set prior to beginning a study. Accurate studies lead to evidence based practices that can be taken forward to impact public health. For example data is used for programs such as
implementation of flu vaccine at the worksite. Another example is how providers are reimbursed for services; the new Medicare rules dictate how much a provider will be reimbursed, based upon quality indicators such as infection rates and patient satisfaction. Employers are establishing guidelines for their employees’ biometrics and health insurance rates. Programs that help to establish healthy eating practices play a role in educating the employee to healthier options. Therefore, to lead to a valuable conclusion for any program, it is important to have available data that will be able to measure for the relevant outcome.

Conclusion

Overall, while this study was not able to measure changes in the food purchases of the study variables, there are several positive points to mention. While menu items continued to change, there is always a very wide variety of fruits and vegetables that are offered on every menu. In addition, recipes continue to be modified to become healthier items. Finally, the worksite is continuing to modify and offer more green items with every menu. To date the cafeteria offers between 60 and 70% of green choices on its daily menu. In addition, this cafeteria is one of several within the hospital and the Premier Health system. The labeling is being expanded to other eateries and expanded to additional hospitals within the Premier Health system. The focus of this study and interactions with the leadership in nutrition services helped raise the level of awareness and response for helping modify employee healthy behaviors by continually to offer more healthy green food choices.
References


http://www.adcouncil.org/content/download/1410/12408/file/Healthy-Lifestyles_white-paper.pdf

## Appendix A

**Cycle B Menu Examples - Week 1**

### NUTRITION LABEL

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
</tr>
<tr>
<td>Scrambled Eggs, Bacon &amp; Sausage Patties with Hazelnut Oatmeal</td>
<td>Scrambled Eggs, Bacon &amp; Sausage Patties with Hazelnut Oatmeal</td>
<td>Scrambled Eggs, Bacon &amp; Sausage Patties with Hazelnut Oatmeal</td>
<td>Scrambled Eggs, Bacon &amp; Sausage Patties with Hazelnut Oatmeal</td>
<td>Scrambled Eggs, Bacon &amp; Sausage Patties with Hazelnut Oatmeal</td>
<td>Scrambled Eggs, Bacon &amp; Sausage Patties with Hazelnut Oatmeal</td>
<td>Scrambled Eggs, Bacon &amp; Sausage Patties with Hazelnut Oatmeal</td>
</tr>
<tr>
<td><strong>Soup &amp; Salad</strong></td>
<td><strong>Soup &amp; Salad</strong></td>
<td><strong>Soup &amp; Salad</strong></td>
<td><strong>Soup &amp; Salad</strong></td>
<td><strong>Soup &amp; Salad</strong></td>
<td><strong>Soup &amp; Salad</strong></td>
<td><strong>Soup &amp; Salad</strong></td>
</tr>
<tr>
<td>White Bean Chicken Chili Corn Muffins</td>
<td>White Bean Chicken Chili Corn Muffins</td>
<td>White Bean Chicken Chili Corn Muffins</td>
<td>White Bean Chicken Chili Corn Muffins</td>
<td>White Bean Chicken Chili Corn Muffins</td>
<td>White Bean Chicken Chili Corn Muffins</td>
<td>White Bean Chicken Chili Corn Muffins</td>
</tr>
<tr>
<td><strong>Daily Features</strong></td>
<td><strong>Daily Features</strong></td>
<td><strong>Daily Features</strong></td>
<td><strong>Daily Features</strong></td>
<td><strong>Daily Features</strong></td>
<td><strong>Daily Features</strong></td>
<td><strong>Daily Features</strong></td>
</tr>
<tr>
<td>Buttered Chicken Breast with Mushrooms</td>
<td>Buttered Chicken Breast with Mushrooms</td>
<td>Buttered Chicken Breast with Mushrooms</td>
<td>Buttered Chicken Breast with Mushrooms</td>
<td>Buttered Chicken Breast with Mushrooms</td>
<td>Buttered Chicken Breast with Mushrooms</td>
<td>Buttered Chicken Breast with Mushrooms</td>
</tr>
<tr>
<td><strong>Daily Features</strong></td>
<td><strong>Daily Features</strong></td>
<td><strong>Daily Features</strong></td>
<td><strong>Daily Features</strong></td>
<td><strong>Daily Features</strong></td>
<td><strong>Daily Features</strong></td>
<td><strong>Daily Features</strong></td>
</tr>
<tr>
<td>Chef’s Special</td>
<td>Chef’s Special</td>
<td>Chef’s Special</td>
<td>Chef’s Special</td>
<td>Chef’s Special</td>
<td>Chef’s Special</td>
<td>Chef’s Special</td>
</tr>
</tbody>
</table>

**Menus are subject to change.**
<table>
<thead>
<tr>
<th>Day</th>
<th>Feature 1</th>
<th>Feature 2</th>
<th>Feature 3</th>
<th>Feature 4</th>
<th>Feature 5</th>
<th>Feature 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Soups: Chicken Noodle, Corn Chowder, Tomato Soup</td>
<td>Sandwiches: Turkey &amp; Cheese, Grilled Chicken, Ham &amp; Cheese</td>
<td>Salads: Caesar, Greek, Tuna</td>
<td>Pasta Salad: Alfredo, Four Cheese, Primavera</td>
<td>Vegetables: Broccoli, Carrots, Green Beans</td>
<td>Sides: Fries, Baked Potato, Steamed Vegetables</td>
</tr>
</tbody>
</table>
### Appendix A Cont’d

#### Cycle B Menu Examples – Week 3

**Premier Health Partners Nutrition Services**  
**“Rubicon Place” Menu**

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/06/2012</td>
<td>02/07/2012</td>
<td>02/08/2012</td>
<td>02/09/2012</td>
<td>02/10/2012</td>
<td>02/11/2012</td>
<td>02/12/2012</td>
</tr>
<tr>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
<td><strong>Breakfast</strong></td>
</tr>
<tr>
<td>Sense &amp; Leggs</td>
<td>Sense &amp; Leggs</td>
<td>Sense &amp; Leggs</td>
<td>Sense &amp; Leggs</td>
<td>Sense &amp; Leggs</td>
<td>Sense &amp; Leggs</td>
<td>Sense &amp; Leggs</td>
</tr>
<tr>
<td>Bacon &amp; Sausage Links</td>
<td>Bacon &amp; Sausage Links</td>
<td>Bacon &amp; Sausage Links</td>
<td>Bacon &amp; Sausage Links</td>
<td>Bacon &amp; Sausage Links</td>
<td>Bacon &amp; Sausage Links</td>
<td>Bacon &amp; Sausage Links</td>
</tr>
<tr>
<td>Breakfast</td>
<td>Breakfast</td>
<td>Breakfast</td>
<td>Breakfast</td>
<td>Breakfast</td>
<td>Breakfast</td>
<td>Breakfast</td>
</tr>
<tr>
<td>O’Brian Pancakes</td>
<td>O’Brian Pancakes</td>
<td>O’Brian Pancakes</td>
<td>O’Brian Pancakes</td>
<td>O’Brian Pancakes</td>
<td>O’Brian Pancakes</td>
<td>O’Brian Pancakes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Soup &amp; Salad</strong></th>
<th><strong>Soup &amp; Salad</strong></th>
<th><strong>Soup &amp; Salad</strong></th>
<th><strong>Soup &amp; Salad</strong></th>
<th><strong>Soup &amp; Salad</strong></th>
<th><strong>Soup &amp; Salad</strong></th>
<th><strong>Soup &amp; Salad</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey &amp; Stuffing</td>
<td>Turkey &amp; Stuffing</td>
<td>Turkey &amp; Stuffing</td>
<td>Turkey &amp; Stuffing</td>
<td>Turkey &amp; Stuffing</td>
<td>Turkey &amp; Stuffing</td>
<td>Turkey &amp; Stuffing</td>
</tr>
<tr>
<td>Ham &amp; Cheese</td>
<td>Ham &amp; Cheese</td>
<td>Ham &amp; Cheese</td>
<td>Ham &amp; Cheese</td>
<td>Ham &amp; Cheese</td>
<td>Ham &amp; Cheese</td>
<td>Ham &amp; Cheese</td>
</tr>
<tr>
<td>Corn &amp; Muffins</td>
<td>Corn &amp; Muffins</td>
<td>Corn &amp; Muffins</td>
<td>Corn &amp; Muffins</td>
<td>Corn &amp; Muffins</td>
<td>Corn &amp; Muffins</td>
<td>Corn &amp; Muffins</td>
</tr>
</tbody>
</table>

**Daily Features**

- Shrimp Scampi
- Honey Lime Grilled Chicken
- Brown Rice & Edamame
- Whipped Potatoes
- Beef Lasagna
- Spanish Albondigas
- Grilled Green Bean Vegetables
- Apple Granola

**Chef’s Special**

- Smoked Barbecue
- Smoked Sausage
- Beef Lasagna
- Baked Beans
- Baked Sweet Potato Tots
- Southern Fried Chicken

**Sides**

- Chicken Jasmine Rice
- Baked Sweet Potato Tots
- Grilled Italian Chicken
- Grilled Italian Hoagie
- Northern Sausage Sausages
- Curly Fries
# Cycle B Menu Example – Week 4

<table>
<thead>
<tr>
<th>Day</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breakfast</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sausage Links, Bacon &amp; Sausage Patties, Biscuit &amp; Gravy, Omelet, Fresh Melon, Juice, Bread, Oatmeal, Coffee, Tea, Milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Soup &amp; Salad</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomato Soup, Spinach Salad, Black Bean Soup, Winter Salad, Roasted Vegetable Quinoa, Caesar Salad, Greek Salad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Daily Features</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit &amp; Yogurt, Summer Fruit, Apple, Orange Juice, Green Tea, Black Tea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lunch</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkey &amp; Black-eyed Peas, Grilled Chicken &amp; Vegetable Skewers, Shrimp Scampi, Grilled Salmon &amp; Vegetable Skewers, Sushi Rolls, Asian Fusion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Daily Special</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black-Eyed Peas, Grilled Chicken, Shrimp Scampi, Sushi Rolls, Asian Fusion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dessert</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chocolate Mousse, Cheesecake, Apple Pie, Ice Cream, Gelato, Dried Fruit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Premier Health Partners Nutrition Services**

**Rubicon Place** Menu

<table>
<thead>
<tr>
<th>Day</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breakfast</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sausage Links, Bacon &amp; Sausage Patties, Biscuit &amp; Gravy, Omelet, Fresh Melon, Juice, Bread, Oatmeal, Coffee, Tea, Milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Soup &amp; Salad</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomato Soup, Spinach Salad, Black Bean Soup, Winter Salad, Roasted Vegetable Quinoa, Caesar Salad, Greek Salad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Daily Features</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit &amp; Yogurt, Summer Fruit, Apple, Orange Juice, Green Tea, Black Tea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lunch</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkey &amp; Black-eyed Peas, Grilled Chicken &amp; Vegetable Skewers, Shrimp Scampi, Grilled Salmon &amp; Vegetable Skewers, Sushi Rolls, Asian Fusion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Daily Special</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black-Eyed Peas, Grilled Chicken, Shrimp Scampi, Sushi Rolls, Asian Fusion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dessert</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chocolate Mousse, Cheesecake, Apple Pie, Ice Cream, Gelato, Dried Fruit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Chef's Special**

- **Lunch Special**
  - Black-Eyed Peas, Grilled Chicken, Shrimp Scampi, Sushi Rolls, Asian Fusion

---

**Bar Special**

- **Smoothie**
  - Strawberry Smoothie
- **Beverage**
  - Sparkling Water
- **Entree**
  - Grilled Chicken or Beef Stir-fry with Vegetables and Rice
- **Dessert**
  - Ice Cream or Gelato

---

**Specials**

- **Breakfast Special**
  - Sausage Links, Bacon & Sausage Patties, Biscuit & Gravy, Omelet, Fresh Melon, Juice, Bread, Oatmeal, Coffee, Tea, Milk
- **Lunch Special**
  - Turkey & Black-eyed Peas, Grilled Chicken & Vegetable Skewers, Shrimp Scampi, Grilled Salmon & Vegetable Skewers, Sushi Rolls, Asian Fusion
- **Dessert Special**
  - Chocolate Mousse, Cheesecake, Apple Pie, Ice Cream, Gelato, Dried Fruit
Appendix B

Sign Examples

### Breakfast Features
- Scrambled Eggs (1 Scoop/Serving) $0.75
- Bacon (slice) $0.65
- Bavarian Sausage $1.95
- Biscuit $0.65
- Hot Cereal $0.75
- Potato Munchers (10 in an order) $1.95
  (Each) $0.25
- French Toast Sticks (each) $0.60

- GREEN...Choose Often
- YELLOW...Choose Sometimes
- RED...Choose Sparingly

### Daily Features
- Roast Turkey $2.95
- Turkey Hot Shot $3.50
- Grilled Pork Chop $3.50
  in a Tomato Wine Sauce
- Baked Sweet Potato $1.25
- Whipped Potatoes $0.95
  with Turkey Gravy
- Fresh Sugar Snap Peas $1.75
  with Mushrooms
- Fresh Midori Blend $1.75
- Apple Cobbler $1.50

- GREEN...Choose Often
- YELLOW...Choose Sometimes
- RED...Choose Sparingly

### Texas BBQ Bar
- Grilled Chicken Strips
- Pulled Pork
- Pulled Chicken
- Beef Brisket

  Your Choice of
  Sweet BBQ Sauce  Spicy BBQ Sauce
  Traditional BBQ Sauce

  $0.52 per ounce

- Curly Fries $1.50

- GREEN...Choose Often
- YELLOW...Choose Sometimes
- RED...Choose Sparingly

### Healthy Choice Meal Deal
- Grilled Pork Chop
  in a Tomato Wine Sauce
- Whipped Potatoes
- Fresh Sugar Snap Peas
  with Mushrooms
  or
- Fresh Midori Blend

20 oz. Fresh Brewed Ice Tea
  or
  Bottled Water $0.50

  Meal Deal Discount

- GREEN...Choose Often
- YELLOW...Choose Sometimes
- RED...Choose Sparingly
Appendix C

Photo Examples
Appendix D

List of Tier 1 Core Public Health Competencies Met

<table>
<thead>
<tr>
<th>Domain #1: Analytic/Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify the health status of populations and their related determinants of health and illness (e.g., factors contributing to health promotion and disease prevention, the quality, availability and use of health services)</td>
</tr>
<tr>
<td>Describe the characteristics of a population-based health problem (e.g., equity, social determinants, environment)</td>
</tr>
<tr>
<td>Use variables that measure public health conditions</td>
</tr>
<tr>
<td>Use methods and instruments for collecting valid and reliable quantitative and qualitative data</td>
</tr>
<tr>
<td>Identify sources of public health data and information</td>
</tr>
<tr>
<td>Recognize the integrity and comparability of data</td>
</tr>
<tr>
<td>Identify gaps in data sources</td>
</tr>
<tr>
<td>Adhere to ethical principles in the collection, maintenance, use, and dissemination of data and information</td>
</tr>
<tr>
<td>Describe the public health applications of quantitative and qualitative data</td>
</tr>
<tr>
<td>Collect quantitative and qualitative community data (e.g., risks and benefits to the community, health and resource needs)</td>
</tr>
<tr>
<td>Use information technology to collect, store, and retrieve data</td>
</tr>
<tr>
<td>Describe how data are used to address scientific, political, ethical, and social public health issues</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain #2: Policy Development and Program Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gather information relevant to specific public health policy issues</td>
</tr>
<tr>
<td>Describe how policy options can influence public health programs</td>
</tr>
<tr>
<td>Identify mechanisms to monitor and evaluate programs for their effectiveness and quality</td>
</tr>
<tr>
<td>Demonstrate the use of public health informatics practices and procedures (e.g., use of information systems infrastructure to improve health outcomes)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain #3: Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify the health literacy of populations served</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain #4: Cultural Competency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorporate strategies for interacting with persons from diverse backgrounds (e.g., cultural, socioeconomic, educational, racial, gender, age, ethnic, sexual orientation, professional, religious affiliation, mental and physical capabilities)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain #5: Community Dimensions of Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognize community linkages and relationships among multiple factors (or determinants) affecting health (e.g., The Socio-Ecological Model)</td>
</tr>
<tr>
<td>Demonstrate the capacity to work in community-based participatory research efforts</td>
</tr>
<tr>
<td>Identify stakeholders</td>
</tr>
<tr>
<td>Collaborate with community partners to promote the health of the population</td>
</tr>
<tr>
<td>Maintain partnerships with key stakeholders</td>
</tr>
<tr>
<td>Gather input from the community to inform the development of public health policy and programs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain #6: Public Health Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify the basic public health sciences (including, but not limited to biostatistics, epidemiology, environmental health sciences, health services administration, and social and behavioral health sciences)</td>
</tr>
<tr>
<td>Describe the scientific evidence related to a public health issue, concern, or intervention</td>
</tr>
<tr>
<td>Retrieve scientific evidence from a variety of text and electronic sources</td>
</tr>
<tr>
<td>Discuss the limitations of research findings (e.g., limitations of data sources, importance of observations and interrelationships)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain #7: Financial Planning and Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhere to the organization’s policies and procedures</td>
</tr>
<tr>
<td>Operate programs within current and forecasted budget constraints</td>
</tr>
<tr>
<td>Apply basic human relations skills to internal collaborations, motivation of colleagues, and resolution of conflicts</td>
</tr>
</tbody>
</table>
Appendix D Cont’d

<table>
<thead>
<tr>
<th>Domain #8: Leadership and Systems Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorporate ethical standards of practice as the basis of all interactions with organizations, communities, and individuals</td>
</tr>
<tr>
<td>Describe how public health operates within a larger system</td>
</tr>
<tr>
<td>Participate with stakeholders in identifying key public health values and a shared public health vision as guiding principles for community action</td>
</tr>
<tr>
<td>Identify internal and external problems that may affect the delivery of Essential Public Health Services</td>
</tr>
<tr>
<td>Use individual, team and organizational learning opportunities for personal and professional development</td>
</tr>
<tr>
<td>Participate in mentoring and peer review or coaching opportunities</td>
</tr>
<tr>
<td>Participate in the measuring, reporting and continuous improvement of organizational performance</td>
</tr>
<tr>
<td>Describe the impact of changes in the public health system, and larger social, political, economic environment on organizational practices</td>
</tr>
</tbody>
</table>