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Wellness Program Effect on the Health Parameters of Female Employees  
Aged 25 to 60 years of Age Targeting Physical Activity and Nutrition Therapy

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A thesis

presented to

the faculty of the Department of Family and Consumer Sciences

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Master of Science in Clinical Nutrition

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by

Adrienne Poag

May 2007

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Keywords: physical activity, fruit and vegetable consumption, nutrition education, health risk factors, healthy women

## ABSTRACT

### Wellness Program Effect on the Health Parameters of Female Employees Aged 25 to 60 years of Age Targeting Physical Activity and Nutrition Therapy

by

Adrienne Poag

The purpose of the study was to determine if the health parameters of female employees would improve, as measured in the posttest data, following the completion of a 12-week employee wellness program. The participants included 17 female employees from the Carter County Health Department located in Elizabethton, Tennessee. The principle investigator assessed the changes in the pretests and posttests and analyzed the data using SPSS. The results showed on average an increase in fruit and vegetable consumption and in the number of days exercised per week as well as improved diastolic blood pressure and triglyceride levels. The employees who experienced weight loss, consumed at least four servings of fruit and vegetables per day, and exercised at least 30 minutes five or more days per week had the greatest improvement in health parameters.

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## CHAPTER1

### INTRODUCTION

#### Background

In 2003, chronic diseases such as cancer, cardiovascular disease (CVD), stroke, and diabetes accounted for 78% of all deaths in the United States (1). Of these deaths, 70% to 90% were estimated to be caused by lifestyle choices such as poor nutrition, sedentary lifestyle, and tobacco use and thus were largely preventable (1). Within the United States, 23% of adults smoked, 77% failed to consume healthy diets, and 78% were at elevated health risk because of decreased physical activity. Overall, only 23% of the population ate five servings of fruits and vegetables per day (1). Therefore, disease prevention and health promotion became increasingly important (2). Interventions were needed that incorporated effective behavior change principles and that were delivered inexpensively to large populations (3). Since people aged 15 to 65 were found to spend most of their time at work, the worksite was the most appropriate place to implement health promotion (2). Advantages to worksite health promotion included the following: they were convenient and accessible, employees were able to support one another in making health and behavior changes, and they were less expensive than fitness facilities and equipment (4). Chang estimated that 53% of employees could have improved their health through participation in health and fitness plans (2).

#### Problem to be Addressed

The purpose of this study was to determine if increasing physical activity, fruit and vegetable consumption, and nutrition education would improve the health parameters



of healthy female employees aged 25-60 who participated in a 12-week employee wellness program. Health parameters were considered to be weight, blood pressure, fasting blood glucose, total cholesterol, HDL, LDL, and triglycerides.

### Hypothesis

Increasing physical activity, fruit and vegetable consumption, and nutrition education through a 12-week employee wellness program will improve the health parameters of healthy female employees aged 25-60 as measured by pretest and posttest questionnaires.

### Null Hypothesis

Increasing physical activity, fruit and vegetable consumption, and nutrition education through a 12-week wellness program will not improve the health parameters of healthy female employees aged 25-60 as measured by pretest and posttest questionnaires.

### Assumptions

- Participants were honest in recording their nutritional intake and physical activity
- Participants understood fruit and vegetable serving sizes

### Limitations

- Self-reported nutrition data and physical activity
- Study was conducted on a volunteer basis

- No attempt was made to control confounding factors such as medications taken by subjects
- Small sample size
- The study used a convenience sample
- There was no control group

### Definition of Terms

**Physical activity**- moderate intensity activity for 30 minutes most days or preferably every day in addition to usual daily activity (5).

**Fruit and vegetable consumption**- consuming 2 cups of fruit and 2.5 cups of vegetables per day as recommended for reference 2000 calorie intake (5).

**Nutrition education**- promoting dietary guidance that links scientific research to the nutrition needs of consumers to help improve the health and well-being of Americans (5).

**Health risk factors**- health conditions or habits that increase the chance of developing a disease or having it worsen. Risk factors may include obesity, elevated blood pressure, triglycerides, cholesterol (total cholesterol, HDL, LDL), and blood glucose (6).

**Healthy women**- women with increased life expectancy and improvement of quality of life through the elimination of health disparities (7).

## CHAPTER 2

### REVIEW OF LITERATURE

#### Nutrition Education

Obesity rates have continued to rise in the United States. In 2006, it was estimated that 49% of Caucasians were overweight or obese (body mass index or BMI >30) (8). The risk of becoming overweight increased by 60% to 110% for women who had at least one live birth (8). Improving nutrition knowledge was an important tool for stimulating dietary behavior that promoted weight loss and improved health parameters. Although the relationship between knowledge and behavior remained debatable, studies reported that greater nutrition knowledge was correlated with weight loss following nutrition education interventions (8). Klohe-Lehman et al. conducted eight weekly weight loss classes emphasizing diet, physical activity, and behavior modification. The study showed that participants with a weight loss of greater than 2.27kg had greater knowledge of nutrition (8).

According to a study in 2005 by Sartorelli et al., the burden of chronic diseases, especially Type 2 diabetes and cardiovascular disease, rapidly increased world-wide (9). Reduction in the prevalence of chronic disease was viewed as essential to controlling health care costs and improving overall health parameters. The largest reductions in chronic disease prevalence in the United States were noted to be achieved when individuals adopted and maintained lifestyles that included a healthy diet and physical activity (10). The SwedishAmerican Health System study using the CHIP (Coronary Health Improvement Project) assessed the clinical impact of lifestyle change education

on chronic disease risk factors (1,11). The study excluded subjects with major illnesses (congestive heart failure, coronary artery disease, CVD, renal failure, transplantation) and involved a control group and an intervention group. Subjects in the intervention group met four times each week for two hours for a total of four weeks. A professional spoke weekly to the group regarding modern medicine, atherosclerosis, coronary risk factors, obesity, dietary fiber, dietary fat, diabetes, hypertension, cholesterol, exercise, osteoporosis, cancer, lifestyle and health, the optimal diet, behavioral change, and self-worth (1,11). Participants were encouraged to adopt the following practices: plant based diet; decrease intake of fat, animal protein, sugar, and salt; increase intake of fiber, antioxidants, and micronutrients; and decrease dietary cholesterol (1,11). They were also encouraged to exercise at least 30 minutes per day. Data screenings regarding the encouraged health practices were conducted at baseline and again at six weeks. A dietary questionnaire was used to assess dietary intake, and blood work was completed in a pretest/posttest format. A favorable change was indicated for blood pressure, total cholesterol, LDL, and fruit and vegetable consumption for only the intervention group (1,11). There was also a 38% reduction in diabetes prevalence and a significant reduction in fasting blood glucose by the intervention group (1,11).

Another study involved the Health Belief Model (HBM). It included eight one-hour weekly education sessions (4). A registered dietitian provided instruction to promote knowledge and beliefs conducive to improving or maintaining positive dietary practices for the prevention of CVD and cancer. The dietary information and recommendations used in this study were consistent with Dietary Guidelines for Americans; the National Heart, Lung, and Blood Institute (NHLBI); and the US

Department of Health and Human Services National Cholesterol Education Program guidelines (4). The results indicated a significant increase in nutrition knowledge related to CVD and cancer for the intervention group. Following the intervention, energy intake among the subjects decreased by 840 calories/day; total fat decreased by 45 grams/day; saturated fat and cholesterol decreased by 18 milligrams/day and 158 milligrams/ day for the treatment group. However, only half of the treatment group reported an increase in fruit and vegetable intake after the intervention (4).

The Working Health Project study (WHP) provided similar results (12). WHP was based on employees being active participants in the design and implementation of the intervention activities (12). Nutrition self-help intervention for fat reduction was offered at 92% of the worksites, and a self-help walking program intervention was offered at 25% of the worksites for over two and one-half years (12). The measured outcomes included self-reported participation in amount of regular physical exercise and self-reported nutritional intake using a food frequency questionnaire. Motivation was also assessed for readiness to change physical activity and dietary intake using the Stages of Behavior Change Model. The intervention group yielded greater changes in exercise, increased fruit and vegetable consumption, and increased fiber intake compared to the control group. Overall, the subjects in the intervention group experienced more readiness to change regarding increased exercise, decreased fat intake, and increased fiber intake (12).

As in the Working Health Project study, the Next Step Trial Study also promoted decreased fat and increased fiber intake (13). This study included 28 worksites randomized to a two-year nutrition intervention including classes, mailed self-help

materials, and personalized dietary feedback. The control group received no intervention. Nutrition outcomes were assessed using food frequency questionnaires. The outcomes included measuring percent energy from fat and fiber density at one year and measuring servings of fruit and vegetables at two years (13). The results at the end of the first year showed a modest but statistically significant intervention effect for fat (-.9%), fiber (+.5g/1000 calories), and fruit and vegetable consumption (+.2 servings) (13). At two years, because of significant positive changes in the control group, intervention effects were only significant for fiber. Intervention effects were also greater in younger, active employees and in those who attended classes (13).

In contrast to the Next Step Trial Study and the Working Health Project study, the New Zealand study used only one intervention worksite that included 132 subjects and one control worksite with 121 subjects (14). Nutrition intervention included nutrition displays and monthly 30-minute workshops for six months (14). Outcome measures at 6 and 12 months included self-reported dietary and lifestyle behaviors, nutrition knowledge, body mass index, waist circumference, and blood pressure. As seen in previous studies, the intervention group reduced fat intake, increased vegetable intake and physical activity, improved nutrition knowledge, and reduced systolic blood pressure compared to the control group (14).

Similar to the Next Step Trial Study and the Working Health Project study, the Seattle Five-A-Day Study used 28 worksites randomized to intervention and control (15). The intervention group received posters, brochures, table tents, paycheck inserts, flyers, newsletters, food demonstrations, message cards, tip sheets, and self-help manuals (15). The nutrition intervention changed on a monthly basis, following the Stages of Behavior

Change Model. The worksites averaged 16 meetings over 12 months with an average attendance of 78% (15). Fruit and vegetable intake was assessed at baseline and at two years, and interim assessments were conducted at 3, 8, and 12 months. Following the trend of previous studies, 33% of the intervention group increased daily servings of fruit and vegetable intake by at least 1.5 servings, compared to 27% of the control group. The change in worksite-wide fruit and vegetable consumption at the two-year follow up was .3 servings (15).

Based on the behavior-change principle discussed in the Seattle Five-A-Day Study, the Worksite Internet Nutrition program (WIN) was established (3). The WIN program was based on a 12-week nutrition intervention program using only email. A self-reported assessment of dietary fat, fiber, and fruit and vegetable intake was obtained in the initial email. Each outgoing email contained interesting health facts with links for further information, health notes containing more scientific information, tips and ideas, and goals for the next week (3). At 12 weeks, there was a mean change in self-reported frequency of consumption of dietary fat of  $-.39$  times per day and an increase of  $.73$  servings of fruits and vegetables per day (3).

Each study revealed a need for more emphasis on fruit and vegetable consumption because people were usually more comfortable with restricting food than adding food to their diet. They also demonstrated a common belief that decreasing fat and calorie intake was the most efficient way to lose weight. In order for change in nutrition behavior to occur, perceived benefits of behavior must out-weigh the perceived costs (perceived taste, lack of convenience/time, high cost, confusing advertising and diet recommendations, and lack of knowledge of actual food intake) (4).

## Fruit and Vegetable Consumption

Cardiovascular disease (CVD) and cancer continued to be the leading causes of death in the United States in 2004 (16). In 1991, the National Cancer Institute and the Produce for Better Health Foundation established the national Five-A-Day for Better Health Program that recommended consuming at least five servings of fruits and vegetables every day to reduce the risks of these diseases (16, 17). However, the Dietary Guidelines for Americans had recently increased the daily recommendations of fruits and vegetables. Based on a 2000 calorie diet, it was suggested to consume at least two cups of fruit and two and one-half cups of vegetables every day (5). Fruit and vegetable intakes beyond four servings per day were associated with a slight decrease in risk for CVD. Further reduction in risk appeared to occur in those who consumed eight or more servings per day (18). A prospective cohort study indicated that for each increase of one serving of fruit or vegetable per day there was a 4% lower risk for CVD (18). Several nutrients found in fruits and vegetables such as dietary fiber, potassium, and antioxidants had been associated with reduced risk for CVD (18). Green leafy vegetables as well as vitamin C rich fruits were most strongly associated with a greater reduction in risk for CVD (16, 18). Eating at least five servings of fruits and vegetables per day resulted in a 28% decrease in the risk for CVD as compared to those eating fewer than 1.5 servings per day (16).

An important component in determining fruit and vegetable intake was knowledge of the number of servings required for good health (19). Most people had a general awareness that vegetables were healthy, but they underestimated the number of servings they should eat and overestimated the serving size (19). The Dixon et al. study



showed that participants had a general understanding that fruit and vegetables were healthy, but an increase in consumption did not immediately come to mind when asked about the beneficial dietary changes that they could make (19). Pleasure-seeking taste rather than nutrition knowledge appeared to be a significant factor in controlling eating behavior. People tended to refer to sensory rather than nutritional attributes of foods when explaining their eating habits (19). Another reason for decreased vegetable intake included the perception of lack of taste as well as lack of preparation and serving knowledge for vegetables (19). Time, convenience, and availability were also noted as barriers to eating a more healthy diet. Equipping consumers with the skills to prepare quick, flavorful meals and providing appealing, healthy recipes were viewed as assisting in promoting healthful eating (19).

### Physical Activity

Obesity has reached epidemic proportions in the United States, and the incidence rate has continued to rise (20). Seven percent of women ages 20 to 34 were obese in 1960 compared to 26% in 2000 (20). It was also estimated that 65% of adults were overweight or obese, a relative increase of 61% from 1991-2000, and thus the risk for CVD, diabetes, and certain cancers increased (21).

Exercise was a reliable predictor of successful weight management (22). Public health guidelines recommended 30 minutes or more of daily moderate intensity physical activity, but the Institute of Medicine and the American College of Sports Medicine suggested that 60 minutes or more of daily physical activity may be required for long-term weight management (22). Jackicie et al. reported that women who exercised more

than 150 minutes per week achieved greater amounts of weight loss, with the magnitude of weight loss being 8% to 11% (23). Although exercise was an important element of weight management, weight management behaviors were absent from the daily lives of most people (20).

Sedentary lifestyles have become more prevalent during the past several decades; this has been reflected by the large percentage of homes with television sets and VCRs and the increased time spent watching television, thus contributing to the obesity epidemic in the United States (24). Hu et al. suggested that 30% of obesity cases and 43% of Type 2 diabetes cases may potentially be prevented by following an active lifestyle including less than 10 hours per week of watching television and 30 minutes or more of daily brisk walking (24). Substantial health benefits may be gained by even light to moderate activity such as performing household chores and by engaging in simple activities such as walking (24).

Worksites provided access to 65% of the population 16 years of age and older, making them ideal settings for implementing strategies for reducing the incidence of overweight and obesity (21). Adults were noted to spend large amounts of time at their worksites, thus providing ample opportunities for health promotion, such as nutrition and physical activity interventions (21). Worksites also allowed access to employees in a controlled environment through existing means of communication and social support systems (21).

Literature supported an emphasis on interventions combining instruction in healthier eating and a structured approach to increase physical activity in the worksite setting (21). In a year-long study combining a dietary and exercise routine, sedentary,

overweight women lost weight and improved cardiorespiratory fitness (22). The study also indicated that the duration of exercise (at least 150 minutes per week of walking) was more important than vigorous versus moderate intensity activity in achieving weight loss goals (22). The following strategies could have been used to help promote changes in behavior for weight management: emphasizing the positive outcomes of improved weight management behaviors, decreasing the negative attitudes for exercise, and increasing the confidence to select healthy food choices (20).

## CHAPTER 3

### DESIGN AND METHODOLOGY

#### Participants

Thirty-two females ranging from 25 to 60 years of age employed by the Carter County Health Department in Elizabethton Tennessee were asked to participate in a 12-week employee wellness program. This sample was selected for this study because 91% of Carter County Health Department employees were female. The youngest female employee was 25 years of age and the oldest was 58 years of age. Because the subjects were asked to volunteer at their place of employment, this was a convenience sample. Twenty-one subjects agreed to participate in the study, while only 17 completed the entire 12-week wellness program. Four participants dropped out within the first two weeks of the study for unknown reasons. As an incentive for participation, the subjects received one day off from work with pay if they completed the 12-week study.

#### Instrumentation

The principle investigator collaborated with the Carter County Health Department health educator to develop the pre and posttest instrument for the study. The pre and posttests used in this study were based on pre and posttest evaluations used by the health educator in previous employee wellness programs conducted at the Carter County Health Department. The health educator contributed information to be included in the pre and posttest that was useful in the previous employee wellness programs; however, the content of the pre and posttest were ultimately decided upon and created by the Northeast

Tennessee Regional Health Office. The health parameters to be analyzed for each employee wellness program were also determined by the Northeast Tennessee Regional Health Office. A panel of judges, which included registered dietitians, reviewed the instrument and suggested revisions. Data were collected by the principle investigator for eating habits, exercise habits, water intake, cooking habits, cigarette smoking, use of medications, medical history, weight status, blood pressure, and lab values prior to the 12- week wellness program using the approved pretest (Appendix A). Data were also collected for the same study components by the principle investigator at the end of the 12- week wellness program using the approved posttest (Appendix B). The posttest additionally asked participants what they thought was most helpful about the 12-week wellness program and what recommendations they had for the program.

### Procedures

Since 2005, the Carter County Health Department has conducted three employee wellness programs each year, with each program lasting 12 weeks, to help improve the health parameters of employees. The Northeast Tennessee Regional Health Office determined which health parameters were to be analyzed for each wellness program. The Northeast Tennessee Regional Health Office reviewed and approved the guidelines for employee wellness programs prior to the beginning of each program. The principle investigator and the health educator created the guidelines for the study based on past wellness programs conducted at the Carter County Health Department. The health educator sent the guidelines for the study to the Northeast Tennessee Regional Health Office for approval three weeks prior to the start of the study. The dates of each

employee wellness program were also determined by the Northeast Tennessee Regional Health Office. The study was conducted from August 28, 2006, to November 19, 2006.

The study consisted of 17 female employees. Each was asked to perform at least 30 minutes of any physical activity at least five days per week, eat five servings of fruits and vegetables at least four days per week, and attend at least three out of five 15-20-minute nutrition education sessions during working hours over the course of 12 weeks. Each participant was required to have lab work conducted (total cholesterol, LDL, HDL, triglycerides, blood glucose) and body weight and blood pressure measured at the beginning and at the end of the wellness program.

The principle investigator weighed each participant at the beginning and at the end of the 12-week wellness program at the Carter County Health Department. The principle investigator kept a record of each participant's weight using employee identification numbers. The nursing supervisor, a registered nurse employed at the Carter County Health Department, recorded blood pressure for each participant in a record log. Each participant also kept a record of her dietary intake and physical activity. The laboratory studies were conducted for all 17 participants by a laboratory technician from Sycamore Shoals Hospital at the Carter County Health Department one week following the end of the 12-week employee wellness program. A pretest and a posttest regarding physical activity, body weight, lab values, blood pressure, water intake, cooking habits, cigarette smoking, use of medications, medical history, and fruit and vegetable consumption were completed by each participant prior to and following the 12-week wellness program. The principle investigator collected a copy of each participant's laboratory data completed by Sycamore Shoals Hospital.

The principle investigator, a registered dietitian, presented all five nutrition education sessions to the participants. The nutrition education sessions were scheduled on different days throughout the 12-week program to allow for any differences in employee work schedules or absences. The nutrition education sessions were conducted in the nutrition education center at the Carter County Health Department during employees' lunch break. Each nutrition education session lasted approximately 20 minutes; the topics included smart food shopping, the importance of water, distinguishing good fats and bad fats, healthy weight management, and emotional hunger versus physical hunger (Appendix C). The lesson plans for each nutrition education topic are located in Appendix D. The nutrition education topics were chosen by the principle investigator and the health educator based on state mandated nutrition topics. The principle investigator developed and used Power Point handouts for each nutrition education session. Participants' understanding of the material was determined by their responses and questions to the information presented. The principle investigator also sent healthy Five-A-Day recipes to each participant via worksite email throughout the 12 weeks to further promote increasing fruit and vegetable consumption (Appendix E).

Participants were provided copies of the guidelines for the wellness program and information about the research at least two weeks prior to the start of the program. If an employee agreed to volunteer in the wellness program, an informed consent was obtained at that time. An informed consent had to be obtained before the start of the wellness program. The Institutional Review Board of East Tennessee State University (IRB) approved all elements of the study.

Confidentiality was maintained by using employee identification numbers. Employees were not aware of other subjects' specific identification numbers. Only the principle investigator and co-investigator/chair of the research committee had access to the employee identification numbers and names.

Anonymity was assured by allowing the participants to keep a written record of their own progress throughout the 12-week wellness program. The principle investigator received each participant's record at the end of the 12-week wellness program.

Each participant's record, as well as each pretest and posttest, were stored in a designated binder in a locked cabinet at the Carter County Health Department with access available only to the principle investigator. The data will be stored for 10 years in the office of the principle investigator in the locked file cabinet.

#### Data Analysis Procedures

Pretests and posttests with questions regarding amount of physical activity, weight loss/gain, increase/decrease in blood pressure, increase/decrease in lab values, fruit and vegetable consumption, cooking habits, water intake, cigarette smoking, use of medications, and medical history were analyzed by the principle investigator for all 17 female participants to determine the effectiveness of the employee wellness program on the established health parameters. Data for each variable were collected and organized using the SPSS program. Means were aggregated for the pretest and posttest for each variable.



## CHAPTER 4

### RESULTS

#### The Sample

Participants in the 12-week wellness program were from the Tri-Cities region in Northeast Tennessee. Participants were enrolled in the study on a volunteer basis. No data were collected on level of education or socioeconomic status. Twenty-one participants completed the pretest and 17 completed the posttest. Participants who did not complete the 12-week wellness program were asked not to complete a posttest; therefore, 17 subjects were included in the study. The mean age for participants was 41.

#### Data Analysis

The pretest included seven subjective questions, and the posttest included nine subjective questions. Both tests included demographic information as well as laboratory data. After all pretests and posttests were collected, the principle investigator calculated the average number of servings of fruit and vegetables consumed per day, the average number of days exercised per week, and the average number of minutes exercised each day for each participant. The results were tabulated based on the changes found in the posttest compared to the pretest for each participant, as shown in Table 1.

**Table 1.** Average Fruit and Vegetable Consumption, Time Exercised per Week, and Minutes Exercised per Day for Each Participant

Employee Number	Fruit & Vegetable Servings/Day		# of Time Exercised/Week		Post Average Minutes/Day of Exercise
	Pre	Post	Pre	Post	
60296	1.5	4.8	5	7	30
60480	2.5	3.7	1.5	4.1	56
60W57	5	3.9	5	4.4	32
60F67	2.5	2.7	3.5	4.3	29
60J44	2.5	3.5	5	5.3	28
60R48	5	1.6	3.5	4.3	30
60Q44	2.5	3	3.5	3.7	47
60L60	3.5	3.5	5	5.3	43
60N77	3.5	2.8	3.5	4.7	32
60W44	3.5	3.5	5	4.3	29
60L55	2.5	2.3	5	5.3	33
60N78	3.5	1.1	3.5	4.3	33
60P03	2.5	3.3	3.5	4.1	40
60N75	2.5	3.5	5	5	33
60H71	1.5	5	5	7	60
60P86	2.5	3.4	3.5	5.8	45
60B90	3.5	1.9	5	4.8	34
<b>Total Mean</b>	2.970588	3.147059	4.17647	4.923529	37.29412

Fruit and Vegetable Servings/Day

The question asked participants how many servings of fruits and vegetables they consumed per day. The results showed an increase of 0.18 servings per day, indicating a small yet positive improvement.

Days Exercised/Week

The question addressed the amount of exercise each participant performed each week. The results showed that the number of days exercised per week increased by less than one day, which revealed a slight improvement.

### Average Number of Minutes Exercised/Day of Exercise

It was recommended to exercise at least 30 minutes each day; however, it was stated that exercising 60 minutes or more may have produced greater amounts of weight loss. The average number of minutes exercised each day was calculated for only the posttest results to determine the level of exercise of the subjects. The participants were not asked the number of minutes that they exercised each day in the pretest.

The principle investigator also calculated the average amount of water consumed each day, the average number of cooking habits used, the average number of medications used, the average medical history reported, and the average number of participants who smoked cigarettes. The results for water consumption and cooking habits were tabulated based on the changes found in the posttest compared to the pretest for each participant, shown in Tables 2 and 3.

<b>Daily Water Consumption (in cups)</b>	<b>OUTCOME</b>			
	<b># of Participants</b>		<b>% of Participants</b>	
	<b>PRE</b>	<b>POST</b>	<b>PRE</b>	<b>POST</b>
Greater than 7 cups	5 out of 17	4 out of 17	29%	24%
5-6 cups	3 out of 17	5 out of 17	18%	29%
3-4 cups	3 out of 17	2 out of 17	18%	12%
2-3 cups	3 out of 17	2 out of 17	18%	12%
1-2 cups	2 out of 17	2 out of 17	12%	12%

<b>Table 3. Participant Outcomes for Cooking Habits Used</b>				
	<b>OUTCOME</b>			
<b>Cooking Habits</b>	<b># of Participants</b>		<b>% of Participants</b>	
	<b>PRE</b>	<b>POST</b>	<b>PRE</b>	<b>POST</b>
Baking	15 out of 17	17 out of 17	88%	100%
Broiling	5 out of 17	5 out of 17	29%	29%
Grilling	16 out of 17	16 out of 17	94%	94%
Frying	6 out of 17	4 out of 17	35%	24%
Boiling	2 out of 17	1 out of 17	12%	6%
Steaming	10 out of 17	7 out of 17	59%	41%
Buttering	3 out of 17	2 out of 17	18%	12%

### Water Intake

It was recommended that participants drink at least eight glasses of water per day. Both the pre and posttest showed that participants consumed an average of four glasses of water each day, which indicated no improvement. The posttest results indicated that only 24% of participants consumed greater than seven glasses of water per day.

### Cooking Habits

This question asked participants how they prepared their foods by giving the following choices: baked, broiled, grilled, fried, boiled, steamed, or buttered. The question did not ask participants what type of butter or how much butter they used in cooking. Participants were encouraged to select all answers that applied to their cooking habits. Compared to the pretest, the posttest results showed that 94% to 100% of participants were baking and grilling their food. Although the number of participants who steamed their food decreased from 59% to 41%, the number of participants who fried their food decreased from 35% to 24%, and the number of participants who buttered their food decreased from 18% to 12%, indicating a positive change towards improving health parameters.

### Cigarette Smoking

Cigarette smoking was a health risk factor for heart disease, cancer, and stroke. Three participants reported smoking everyday, which was consistent in the pre and posttest; however, the participants were not asked how many cigarettes they smoked each day or if they increased or decreased the number of cigarettes that they smoked over the course of the 12-week study.

### Use of Medications

Participants were asked whether they were taking any medications, and if so, to list those medications. The most common medication taken by participants was for controlling blood pressure; 29% of participants were taking blood pressure medication, which may have resulted in lower blood pressure readings. There was no change in medication use between the pre and posttest.

The results for the average reported medical history were tabulated based on the response to question 7 in the pre and posttest, shown in Table 4.

Table 4. Participant Outcomes for Reported Medical History		
	OUTCOME	
Medical History	# of Participants	% of Participants
Diabetes	1 out of 17	6%
Heart Disease	0	0
High Blood Pressure	4 out of 17	24%
High Cholesterol	6 out of 17	35%
No medical history	7 out of 17	41%

### Medical History

The question regarding medical history was asked to determine if participants had any pre-disposed health conditions that would have affected the results of the study

regarding lab work, physical activity, and fruit and vegetable consumption. Participants were asked to answer yes or no to having a medical history of diabetes, heart disease, high blood pressure, and high cholesterol. They were encouraged to include any other medical history not listed. A medical history of high blood pressure and cholesterol combined was noted for 59% of participants. Seven participants reported having no medical history.

#### What Was Most Helpful

Participants were encouraged to answer this question; however, it was not required. Participants who answered this question reported that increasing physical activity and being more aware of increasing fruit and vegetable consumption were the most helpful factors of the 12-week employee wellness program.

#### What Changes Would You Make

Participants were encouraged to answer this question; however, it was not required. Only two participants answered this question. The two participants stated that measuring body fat would have been a beneficial factor in determining the success of improving health parameters.

#### Laboratory Values

Lab work was completed prior to and following the 12-week wellness program to assess certain variables of health parameters. Analysis was done by SPSS using calculated means, and results were based on the changes found in the posttest compared to the pretest for each variable, as illustrated in Table 5.

<b>VARIABLE</b>	<b>PRE</b>	<b>POST</b>
Diastolic BP (mm/Hg)	80.94	77.35
Triglycerides (mm/dl)	148.18	132.59
Weight (pounds)	181.24	181.35
Systolic BP (mm/Hg)	121.56	123.18
Cholesterol (mg/dl)	190.71	197.24
LDL (mg/dl)	122.88	127.00
FBG (mg/dl)	87.71	94.65
HDL (mg/dl)	50.24	48.24

A decrease in the mean statistic for diastolic blood pressure and triglyceride levels in the posttest indicated a slight improvement in health parameters as compared to the pretest. The posttest results indicated no improvement in health parameters for weight, systolic blood pressure, cholesterol, LDL, and fasting blood glucose. HDL showed a slight decrease which was not viewed as a positive change.

The results for the variables including body weight, blood pressure, cholesterol, HDL, LDL, triglycerides, and FBG were diverse as shown in Table 6.

<b>VARIABLE</b>	<b>OUTCOME</b>	
	<b># of Participants</b>	<b>% of Participants</b>
Weight Loss (<10 lbs)	6 out of 17	35 %
Decreased Blood Pressure	12 out of 17	71%
Decreased Total Cholesterol	7 out of 17	41%
Increased HDL	6 out of 17	35%
Decreased LDL	7 out of 17	41%
Decreased Triglycerides	8 out of 17	47%
Decreased FBG	1 out of 17	6%

### Laboratory Variables

#### Diastolic Blood Pressure

Diastolic blood pressure decreased by 3.59mm/Hg, showing a good improvement.

### Triglycerides

On average, triglyceride levels dropped by 15.59mg/dl. This indicated a meaningful improvement in risk of heart disease and obesity and overall health parameters.

### Weight

Weight increased slightly by less than one pound on average, although a decrease was desirable to reduce the incidence of heart disease, obesity, diabetes, and hypertension.

### Systolic Blood Pressure

The results showed an increase in systolic blood pressure of 1.62mm/Hg, indicating no improvement.

### Cholesterol

Cholesterol levels increased by 6.53mg/dl. Even though the average levels in the pre and post evaluations were both within normal limits, a decrease was desirable to reduce the risk of heart disease.

### Low Density Lipoprotein (LDL)

The average in both the pretest and posttest were within normal limits; however, the results indicated an increase of 4.12mg/dl.

### Fasting Blood Glucose (FBG)

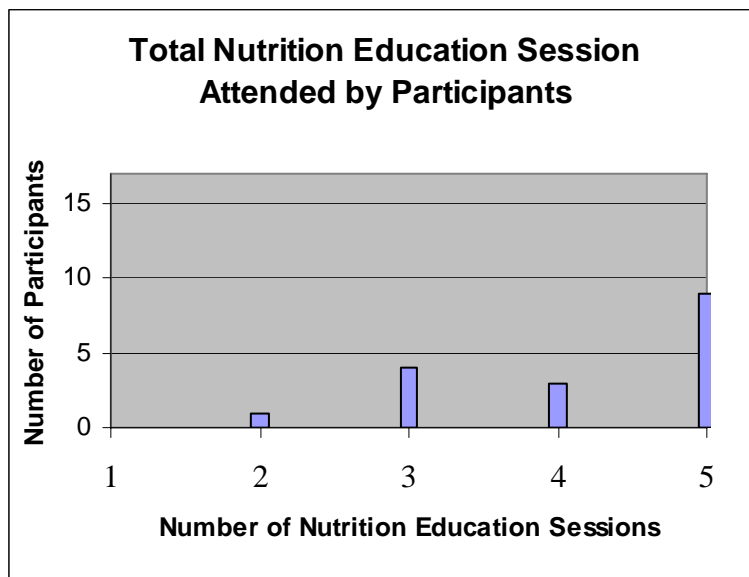
Even though FBG levels were within normal limits in the pretest and the posttest, the results showed an increase of 6.14mg/dl.



## High Density Lipoprotein (HDL)

Both pretest and posttest revealed HDL was within normal limits; however, results showed a decrease of 2mg/dl, which was not a favorable change.

Each participant was also encouraged to attend five nutrition education sessions on topics including smart food shopping, the importance of drinking water, distinguishing “good” fats from “bad” fats, healthy weight management, and recognizing emotional hunger versus physical hunger. The number of nutrition education sessions participants attended is illustrated in Figure 1.



**Figure 1.** Total number of nutrition education sessions attended by each participant

Fifty-three percent of subjects attended all five nutrition education sessions. The minimum number of nutrition education sessions attended was two out of five classes. Nutrition education session attendance seemed to be affected by employee illness and by some employees working in different counties on the scheduled days to receive nutrition education.

Overall, two participants showed great improvement in health parameters. One participant lost seven pounds, decreased blood pressure by 4mm/Hg, decreased cholesterol by 45mg/dl, decreased LDL by 17mg/dl, and decreased triglycerides by 86mg/dl. The second participant lost four pounds, decreased blood pressure by 28mm/Hg, decreased cholesterol by 54mg/dl, increased HDL by 2mg/dl, decreased LDL by 45mg/dl, and decreased triglycerides by 69mg/dl. The two participants each consumed at least four to five servings of fruits and vegetables each day, exercised more than five days each week, and attended all five nutrition education sessions. The two participants showing the greatest improvement in health parameters exercised 33 minutes and 61 minutes each day respectively. Age and beginning body weight did not appear to be factors in their success.

## CHAPTER 5

### DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

#### Discussion

After analysis of the data collected from the pretests and posttests, it was noted that few participants in the employee wellness program showed improvement in their health parameters, thus they did not decrease their risk of obesity and chronic diseases. Not all participants showed improvement nor had improvement in all variables studied. In contrast to past research studies, this study did not use a control group to compare the results of the intervention. Although this study indicated slight improvement in health parameters, there may have been a greater improvement in health parameters if compared to a control group.

Some participants did not increase the number of times that they exercised per week and did not increase their consumption of fruit and vegetables per day. Even though participants were aware that exercising at least five days per week for at least 30 minutes each day was a beneficial factor for promoting weight loss, 53% of participants exercised only three to four days per week; however, the average number of minutes exercised per day was 37.29. Participants' age and weight did not seem to reflect the amount of exercise performed. However, participants may have incorrectly estimated the amount of exercise they performed each week on the pretest, and this may have led to varying results in physical activity on the posttest.

Participants were encouraged to consume five servings of fruits and vegetables at least four days a week to promote decreased fat intake, increased fiber intake, and weight

loss. At least four servings of fruits and vegetables were consumed each day by 76% of participants. A comparison of the data from both tests showed a slight increase in fruit and vegetable consumption by 0.18 servings per day. The results of this study fell short from meeting the results of past research studies which indicated increased fruit and vegetable consumption from 0.2 servings to 1.5 servings. As with physical activity, some participants may have incorrectly estimated the amount of fruit and vegetables they consumed daily on the pretest, which would have yielded varying results when compared to the posttest.

On average, participants attended more than four out of five nutrition education sessions over the course of 12 weeks. However, the literature supported providing more frequent nutrition education to participants to help increase nutrition knowledge and promote healthy lifestyle changes (1,4,8,9,11,12,13,14,15).

The results regarding physical activity, fruit and vegetable consumption, and lab values may have been affected by several different factors. Physical activity and fruit and vegetable consumption may have slightly increased because of participants paying closer attention to how much they exercised as well as to how many servings of fruits and vegetables they were consuming on a daily basis. Increased physical activity may have caused participants to feel as if they could have consumed more food; therefore, the posttest showed an increase in weight, total cholesterol, LDL, HDL, and FBG.

Triglyceride levels may have decreased because of participants becoming more conscious of their dietary habits, thus decreasing intake of high fat foods.

The results may also have been affected by the time of year the study was conducted. Physical activity may have been greater if the study was performed in spring or summer instead

of autumn. Subjects may have exercised more outside because of warmer weather. There may have been a greater increase in fruit and vegetable consumption as well because of more fruits and vegetables being in season during spring and summer.

### Conclusions

The employees participating in the 12-week wellness program were somewhat successful in improving their health parameters. Employees who achieved greater weight loss and improved health parameters consumed more fruits and vegetables and exercised at least five days per week for at least 30 minutes. Therefore, the hypothesis was partially accepted. Integrating the wellness program at a worksite offers numerous opportunities to promote healthier nutrition and physical activity habits, thus decreasing the risk of obesity and other chronic diseases.

### Recommendations

The number of participants in this study was limited. It would be beneficial in future studies to compare the results of employee wellness programs offered in health departments throughout the Northeast Tennessee region. Future studies may also want to compare the results of employee wellness programs conducted during different seasons. It would also be valuable to incorporate a control group for comparison of intervention results.

Future studies may want to further address the challenges of effectively promoting the adoption of healthful food behavior, especially those that require the addition of new food behavior, such as increasing fruit and vegetables (4). It would be

helpful to include more qualitative questions in the pre and posttest such as specific barriers for weight loss, increased physical activity, and increased fruit and vegetable consumption; therefore, stages of behavior change would need to be incorporated into the study. A food frequency questionnaire would need to be completed by participants prior to and following the 12-week wellness program to report changes in dietary intake of fruits and vegetables to increase reliability. Demonstrations could also be offered to show how to prepare fruits and vegetables in different yet tasteful ways and how to incorporate fruits and vegetables into meals and snacks.

Weight loss was a major indicator in determining decreased incidence of many chronic diseases such as CVD. In this study, only 35% of participants had actually lost weight; however, it was possible that participants had lost inches and gained muscle mass through increasing physical activity. It would have been valuable to assess percentage of body fat loss in addition to weight loss in determining the success of the program.

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8. What do you think was most helpful about the 12 week wellness program?

9. What changes would you suggest be made to the 12 week wellness program?

## APPENDIX C

### Nutrition Education Handouts

#### **Smart Food Shopping**

We're going to take an aisle-by-aisle tour of the grocery store to help you the next time you do your shopping. First, when shopping, keep in mind these general shopping tips:

- Your best bet is to concentrate your shopping time around the periphery of the store — the produce, meat, dairy and bakery sections. But don't stop there. You'll find nutritious foods like beans, whole grains and cereal in the middle aisles.
- Read labels carefully and look for foods that are minimally processed. Choose 100% fruit juice over a fruit juice blend; plain frozen vegetables over those with butter sauces; fresh poultry or meat over those already seasoned; whole fresh potatoes over prepared French fries or scalloped potatoes.
- Dairy products are an exception to the minimally processed rule. It's better to buy versions where naturally occurring fat has been removed, such as fat-free milk or low-fat cheese.

Let's take a virtual tour of a typical store and find some tips for shopping wisely.

#### **In the Produce Aisle**

- Color counts — bring home an entire rainbow of colorful fruits and vegetables.
- Save time by purchasing refrigerated jars of mango citrus salad, grapefruit, tropical salad, pears and other fruit. Or select pre-cut fruit like pineapple, watermelons or honeydew melons.
- Other time-savers include freshly cut vegetables like baby carrots, celery and bagged salads.
- Buy small. Smaller sized fruits are often sweeter and more tender than larger, more mature pieces.
- Choose dark green salad items like romaine lettuce, leaf lettuce, spinach, curly endive or radicchio. A little iceberg's OK for crunch.

#### **In the Cereal Aisle**

- Think whole grains! You can find whole grain in hot as well as cold cereal. Examples of whole-grain hot cereal include Wheatena, oatmeal and oat bran. Some whole-grain cold cereals include Wheaties, shredded wheat, Frosted Mini-Wheats and Grape Nuts. Read Nutrition Facts labels to find cereals that contain at least 5 grams of fiber per serving. Check front labels for claims such as "whole grain" or "rich in whole grain."
- Cereals such as grits, cream of wheat and cream of rice are highly refined and offer little fiber.

## **Bread, Waffles, Crackers, Tortillas**

- Look for the word "whole" as the first ingredient on the ingredient list.
- Don't count on terms like "multigrain," "12-" and "cracked wheat" — they can be deceiving. They're mostly refined flour with a touch of whole-grain flour.
- Some examples of whole-grain crackers include Rye Krisp and Triscuits.

## **Pasta, Rice and Other Grains**

- Regular or quick-cooking brown rice makes a delicious side dish. The quick-cooking type retains all the health benefits of regular.
- Whole-wheat pasta takes some getting used to with its nutty texture. Try to substitute it for plain every other time or make your pasta half and half.
- Whole-wheat couscous is available in health-conscious stores. Use it (or regular) in salads and as a rice substitute.
- Barley can be used in soups and stews and also works in hearty salads, pilafs and casseroles. It's considered a whole grain.
- Most rice and pasta mixes are too high in fat and sodium to be considered healthful. You may be able to experiment with the preparation to reduce the amount of either or both.

## Why Water is Important

### **TIPS FOR DRINKING MORE WATER**

Drink a glass of water as soon as you get up each day.

Every morning, fill a 64-ounce to 96-ounce container with water for the day.

When you drink all the water in the container, you have met your daily water need of 8 to 12 cups.

Drink water with meals and snacks.

Add slices of lemon, lime or orange to water for a hint of flavor.

Start your meal with soup occasionally.

Enjoy water breaks instead of coffee or tea breaks.

Take water bottles\* with you to work and when running errands.

Keep a cup of water on your desk to sip on as you work at the computer.

When passing a water fountain, stop and take a drink.

Instead of a soft drink, or soda, reach for bottled water in the convenience store, as well as from the vending machine.

At social gatherings substitute sparkling water for alcoholic drinks, or alternate them.

Pack bottled water in your carry-on luggage when traveling by plane. Drink 1 cup of fluid for every hour of your flight.

Drink water before, every 15 minutes during, and after physical activity.

Weigh before and after exercise. The difference is almost all water. Replace each pound lost with 2 cups of water.

\*Every time you drink, bacteria from your mouth contaminate water in the bottle. Keep your water bottle clean or replace it often. Wash it in hot, soapy water or run it through a dishwasher. If you use a bottle repeatedly, make sure it is designed for reuse.

### **OTHER SMART BEVERAGE CHOICES**

Select other drinks that have a lot of calcium, vitamin A or vitamin C. This includes milk, fortified soymilk, vegetable and fruit juices. Make healthful drink choices based on the food labeling "5-20" guide. This means that a beverage is a very good choice if it contains 20% or more Daily Value for calcium, vitamin A or vitamin C in one serving. On the other hand, 5% or less Daily Value per serving means that it is a poor choice.

#### **Milk:**

Choose skim or 1% milk for the same amount of calcium but less fat and fewer calories than whole milk.

For a sweet and fun treat, choose flavored low-fat milk—chocolate, strawberry, or other flavors.



Drink milk with meals, including fast-food meals and school lunches.  
Make a quick Cool Smoothie in the blender. Combine low-fat milk or yogurt with juice and/or cut-up fruits.  
Fortified soymilk is a healthy alternative to cow or goat milk.

### **Fruit and Vegetable Juices:**

Choose 100% vegetable juice over fruit juice, which is a concentrated source of sugar and calories.

Read the Nutrition Facts label and select fruit juices and fruit drinks that contain the highest % Daily Value (DV) for vitamin C.

Mix two different vegetable or fruit juices for an easy snack drink.

Make a Juice Float for an easy and delicious thirst quencher. Just combine several fruit juices and frozen-fruit yogurt.

Freeze boxes or cans of juice, then tuck them in lunch boxes or backpacks for later.

Select juice or water when buying a beverage from a vending machine.

The calories in fruit juice or juice drinks add up, so drink no more than 12 ounces daily or dilute them in water. A better choice is cut-up fruits, which contain extra fiber in addition to the other nutrients.

### **LIMIT CAFFEINE AND ALCOHOL**

Limit beverages that contain caffeine and alcohol, as well as too much sugar and calories. Examples are sweet tasting liquids such as: soft drinks; tea sweetened with sugar; sports drinks; fruit juices and fruit drinks. Water and sports drinks are better choices than beverages containing caffeine, alcohol, or carbonation.

**Drink Less Soft Drinks, or Sodas:** Enjoy soft drinks, or sodas, in moderation. Avoid substituting them for water or calcium-rich milk. Although soft drinks are mostly water, they contain large amounts of sugar or sugar substitute and no nutrients. An average 12-ounce soft drink contains 150 calories, 9 teaspoons of sugar, and no nutritional value. Avoid diet sodas, which may promote weight gain in some people.

Follow these tips to reduce soda consumption:

If you drink sodas, cut down to one a day, preferably 12 ounces or less.

Replace sodas with water if you like to sip while you read, watch TV, or work on the computer.

Drink sodas as a snack, not as a meal beverage. Enjoy water, milk or juice with your meals.

Pour one glass of soda, rather than drink from a large bottle.

Order the regular-size drink at a fast-food restaurant instead of the large, jumbo, or super-size cup.

Soft drinks, coffee, and tea contain caffeine, which is a mild stimulant and can act as a diuretic. This promotes fluid loss through urination and contributes to dehydration. Although caffeine has a diuretic effect, this effect may be temporary and does not lead to cumulative total body water deficits.

**Drink Alcohol in Moderation:** Alcoholic beverages do not count toward your daily fluid intake. They supply calories and few nutrients, while having a diuretic effect on the body. Consumption of alcoholic beverages should be limited and preferably accompanied with food. The Dietary Guidelines for Americans, 2005 recommends that adults who choose to drink alcoholic beverages should do so sensibly and in moderation. The definition of moderation for women is up to one drink on any single day, and for men it is up to two drinks per day. Drink sizes include: 12 fluid ounces of regular beer, 5 fluid ounces of wine, or 1.5 fluid ounces of 80-proof distilled spirits. Each drink contains the same amount of alcohol.

## **AVOID DEHYDRATION**

Lack of water can lead to dehydration, a condition when the body does not have enough water to carry on normal functions. Dehydration is a health risk, especially for the very young and the very old. A 20% loss of water is life-threatening. Mild dehydration over time has been linked with increased cancer risk, reduced salivary gland function, kidney stones, and even fatal heart attacks.

Thirst is the first symptom of dehydration. Fluids should be consumed before you feel thirsty.

### **Symptoms of Dehydration Include:**

- Excessive thirst
- Fatigue
- Muscle weakness
- Headache
- Dizziness
- Dry mouth, lips and skin
- No urination or a small amount of dark yellow urine\*
- Lightheadedness
- Increased body temperature
- Nausea
- Constipation
- Labored breathing

\*If you are properly hydrated, urine should be clear to pale yellow. You should urinate every 2 to 3 hours.

## Distinguishing Good Fats and Bad Fats

### Fat is Necessary in the Body

- Most often fat receives a bad reputation, but it is necessary to maintain a healthy lifestyle
- Fatty acids are necessary for some body functions
- One of three macronutrients- Carbohydrates, protein, and fat

### What Does Fat Do for the Body?

- Increase hormone production
- Fatty acids provide- shiny hair, healthy skin tone, aids joints and arthritis control by providing lubrication
- Good fats can help lower cholesterol levels

### Good Fats

- Polyunsaturated fats- nuts, seeds, vegetables
- Corn oil
- Monounsaturated fats
- Vegetable and nut oils- peanut, olive, canola

### Bad Fats

- Saturated fats: tropical oils, meat sources
- Beef
- Hydrogenated fats: plant oils, processed fats
- Coconut oils
- Margarine

### How to Choose the Right Foods

- Read labels
- Substitute good fats for bad fats
- Cook with vegetable oils and water
- Avoid too much sugar
- Increase fiber and whole grains
- Be cautious of fat- free- filled with excessive carbohydrates and sugars, convert into fat when stored by the body

## Healthy Weight Management

### What is weight management?

- Maintaining body weight at a desirable level
- Controlling portion size at meal time
- Adopting a healthy lifestyle- Exercise, avoid fad diet
- Control your environment- food and restaurant choices, friends or groups that encourage you
- Be positive!!

### 6 Strategies for Successful Weight Loss

- Make a commitment- healthy weight management requires a lifelong commitment
- Draw support from others- family, friends, spouse
- Set realistic goals- 1-2 pounds/week
- Learn to enjoy healthier foods- fruits, vegetables, whole grains; use spices and seasonings
- Get active, Stay active- an added 30 minute walk 4 days a week can double your rate of weight loss
- Change your lifestyle- daily routines and behaviors; assess personal challenges

### Exercise is One Key to Weight Management

- Diets cause a loss of both fat and muscle
- Our metabolic rate decreases as we age
- Exercise helps expend more calories than we consume
- Goal is to burn calories and gain muscle
- Each pound of muscle gained results in an extra 350 calories burned a week

### Healthy Meal Planning

- Develop an ideal eating plan based on the food pyramid- limit salt and sugar intake; reduce saturated fat and cholesterol; combine foods from each group at every meal
- Serving size- the body requires a balance of certain nutrients: protein, fiber, carbohydrates; serving sizes are smaller than we realize

### Popular Weight Control Methods

- Diet pills- may decrease appetite but can have serious side effects
- Special foods- may lack protein, fiber, and other important nutrients
- Meal replacements- liquid drinks and packaged foods
- Low- calorie or liquid diets

### The Relationship Between Moods and Foods

- Mood can trigger overeating- stress, anxiety, boredom, anger, sadness
- Emotional eaters- eat excess unhealthy foods i.e. starches, sweets, salty, fatty
- Physiologic connection- body feels a reward due to the release of trace amounts of mood and satisfaction elevating opiates

- Psychological connection- mental distraction; comfort foods

#### How to Cope with Mood Eating

- Learn to recognize true hunger- is it physical or mental?
- Find comfort elsewhere- friends, family, take a walk
- Keep healthy snacks- fresh fruit, vegetables, pretzels
- Exercise
- Know what triggers your mood eating- keep a food diary

#### How to Keep Weight Off

- Develop self-control
- Eat fewer calories
- Do not skip meals
- Keep a food journal
- Eat food high in fiber
- Remember to be realistic
- Be happy and confident with yourself

#### Weight Control Resources

- American Dietetic Association- [www.eatright.org](http://www.eatright.org)
- Food and Nutrition Information Center- [www.nal.usda.gov/fnic](http://www.nal.usda.gov/fnic)
- Nutrition.gov
- Shape Up America- [www.shapeup.org](http://www.shapeup.org)
- Weight-Control Information Network- [win@info.niddk.gov](mailto:win@info.niddk.gov) (email)

## Tune In: Physical Hunger vs. Emotional Hunger

### What Are the Triggers for Eating?

- Situational
- Emotional
- Physiological

### Situational

- Food is present and triggers eating- celebrations, holidays, social, easy to access foods in home or away

### Food and Emotion Connection

- Comfort and food connection has early beginnings
- Infant feeding accompanied by security of being held and cuddled- nurturing, important for infant to meet emotional needs

### Food as a Substitute

- Food as a reward
- Food to make you feel better if hurt (physically or emotionally)
- Food to “lift your spirit”

### Emotional Eating

- Food as comfort or mask for feelings, or
- Eating in response to feelings instead of hunger
- TUNE IN: Learn to tell the difference between emotional hunger and physical hunger

### Emotional Triggers

- Loneliness/Boredom
- Unresolved anger- depression
- Fatigue
- Grief
- Disappointment
- Insecurity/fear
- Hopelessness/depression
- Guilt

### Traits of Emotional Hunger

- Sudden onset of hunger
- Cravings for a certain food
- Your mouth craves the taste, your mind whirls with thoughts about the particular food
- Is urgent- you need to eat NOW
- Is paired with an upsetting emotion
- Involves automatic, absent-minded eating

- Does not stop eating in response to fullness
- Feels guilty about eating

#### Coping with Emotional Eating

- Sort out your feelings- face your feelings, allow yourself to “feel” emotions

#### Physiological

- Eat when hungry
- True hunger at regular mealtime
- Important to listen to your body’s signals- learn to recognize the difference between true physiological hunger and other triggers that prompt an eating response

#### Recognize Satiety

- Stop eating when full
- It takes about 20 minutes for the satiety signal to reach the brain to tell you that you are full- eat slowly, take small bites, chew well
- No more clean plate club
- Starving children of the world will not be fed by you eating too much

## APPENDIX D

### Nutrition Education Lesson Plans

#### **Smart Food Shopping**

##### **Goals:**

- Employees will increase their knowledge of eating a balanced diet.
- Employees will be introduced to healthier food shopping techniques.

##### **Materials:**

- Smart Food Shopping handout

##### **Instructional Techniques:**

##### **Introduction:**

- Gather necessary materials
- Introduce topic
- Explain that eating a balanced diet refers to the intake of appropriate types and adequate amounts of foods and beverages to supply nutrition and energy for the maintenance of body cells, tissues, and organs, and to support normal growth and development.
- Explain that to achieve a balanced diet, you must consume a variety of foods from each of the food groups.

##### **General Shopping Tips**

- It is best to concentrate your shopping time around the periphery of the store, focusing on produce, meat, dairy and bakery sections first.
- Read food labels carefully to avoid highly processed foods.
- Choose 100% fruit juice over a fruit juice blend or fruit drink. Fruit drinks contain more sugar and are usually only 10% real fruit juice.
- Choose plain frozen vegetables over those with sauces to decrease fat intake. Frozen vegetables are also lower in sodium than canned vegetables. Fresh vegetables are always best.
- Choose whole fresh potatoes over prepared French fries or packaged potatoes to decrease fat and sodium intake. Packaged foods contain more sodium.
- Choose fat-free milk and low-fat cheese. Fat-free milk and low-fat cheese have the same amount of calcium as whole milk but with less fat.

##### **Produce**

- Purchase a rainbow of colorful fruits and vegetables to maximize your vitamin and mineral intake.



- Save time by purchasing pre-cut fruit such as pineapple, watermelon, or apples. Other time savers include freshly cut vegetables such as baby carrots, celery, and bagged salads.
- Buy small. Smaller sized fruits are often sweeter and more tender.
- Choose dark green salads such as romaine lettuce, leaf lettuce, spinach, endive, or radicchio. Dark green leafy vegetables are good sources of many vitamins and minerals your body needs to stay healthy, like vitamin A, vitamin C, and calcium. They are also great sources of fiber. The darker the leaves, the more nutrients the vegetable usually has.

### **Cereal**

- Think whole grains. Whole grains are low in fat and because they are from plants, they have no cholesterol. They are high in fiber, plant protein, vitamins, minerals, phytonutrients, and antioxidants. You can find whole grains in hot and cold cereal such as oatmeal, oatbran, shredded wheat, or grape nuts. Read nutrition labels to find cereals that contain at least 5 grams of fiber per serving.
- Cereals such as grits, cream of wheat, and cream of rice are highly refined and offer little fiber.

### **Bread, Waffles, Crackers, Tortillas**

- Look for whole wheat as the first ingredient listed.
- Terms like multigrain and cracked wheat can be deceiving. They are mostly refined flour with very little whole grain.
- Whole wheat crackers include Rye Krisp and Triscuits.

### **Pasta, Rice, and Other Grains**

- Regular or quick-cooking brown rice makes a good side dish. The quick-cooking rice retains all of the health benefits of regular rice.
- Try to substitute plain pasta for whole wheat pasta.
- Whole wheat couscous is available in health food stores. Use it in salads or as a rice substitute.
- Barley is also considered a whole grain. It can be used in soups and stews and also in salads and casseroles.
- Most rice and pasta mixes are too high in fat and sodium to be considered healthful.

### **Ask if there are any questions**

## Why Water is Important

### Goals:

- Employees will increase their knowledge of the signs and symptoms of dehydration.
- Employees will be introduced to ways to increase their water consumption.

### Materials:

- Why Water is Important handout

### Instructional Techniques:

#### Introduction:

- Gather necessary materials
- Introduce topic

#### Tips for Drinking More Water

- Ask, “What are some ways that you increase your intake of water”.
- Drink at least 8 cups of water each day.
- Add slices of lemon/lime to water for flavor.
- Keep water on your desk to sip during the day.

#### Other Smart Beverage Choices

- Select other drinks that have a lot of calcium, vitamin A or vitamin C.
- A beverage is a good choice if it contains 20% or more Daily Value for calcium, vitamin A or vitamin C in one serving.
- A beverage is a poor choice if it contains 5% or less Daily Value per serving.
- Make a smoothie using low fat milk or yogurt with juice and/or cut up fruit to increase your fluid intake.
- Choose 100% vegetable juice over fruit juice.
- The calories in fruit juice or juice drinks add up, so do not drink more than 12 ounces per day, or you can dilute juice with water. Eating fresh fruit is better than choice than drinking juice because it contains more fiber in addition to other nutrients.

#### Caffeine

- Although soft drinks are mostly water, they contain large amounts of sugar or sugar substitute and no nutrients. An average 12 ounce soft drink contains 150 calories, 9 teaspoons of sugar, and no nutritional value.
- Soft drinks, tea, and coffee contain caffeine, which is a mild stimulant and can act as a diuretic. This promotes fluid loss through urination and contributes to dehydration.

- Follow these tips to decrease your soda consumption: drink one 12 ounce soda per day or less; drink soda as a snack and not with meals; pour one glass of soda rather than drink from a bottle; order regular sized drinks at fast-food restaurants instead of large or super-size.

### **Alcohol**

- Alcoholic beverages do not contribute to your total daily fluid intake. They supply calories and very few nutrients, while having a diuretic effect on the body.
- It is recommended that adults who drink should do so in moderation. This means one drink per day for women and up to two drinks per day for men. Drink sizes include 12 fluid ounces of beer and 5 fluid ounces of wine.

### **Dehydration**

- Lack of water can lead to dehydration, which occurs when the body does not have enough water to carry on normal functions. Dehydration is a health risk, especially for the very young and very old. Mild dehydration has been linked with increased cancer risk, kidney stones, and fatal heart attacks.
- Thirst is the first symptom of dehydration. Fluids should be consumed before you feel thirsty.
- Symptoms of dehydration include: excessive thirst, fatigue, muscle weakness, headache, dizziness, dry mouth and lips, no urination, lightheadedness, nausea, constipation.
- If you are properly hydrated, urine should be clear to pale yellow. You should urinate every 2-3 hours.

### **Ask if there are any questions**

## **Distinguishing Good Fats and Bad Fats**

### **Goals:**

- Employees will increase their knowledge of good and bad fats.
- Employees will understand the importance of fat in the body.

### **Materials:**

- Distinguishing Good Fats and Bad Fats handout

### **Instructional Techniques:**

#### **Introduction:**

- Gather necessary materials
- Introduce topic

#### **Why is Fat Necessary in the Body?**

- Ask, “Why is fat needed in the body?”
- Fat is one of three macronutrients (carbohydrate, protein, fat).
- Macronutrients are nutrients that provide calories or energy. Nutrients are substances needed for growth, metabolism, and for other body functions.
- 20% - 35% of calories should come from fat, with less than 7% of calories from saturated fat.

#### **What Does Fat Do for the Body?**

- Ask, “What function does fat provide to our bodies?”
- Normal growth and development
- Energy (fat is the most concentrated source of energy)
- Absorbing certain vitamins ( like vitamins A, D, E, K, and carotenoids)
- Providing cushioning for the organs
- Maintaining cell membranes
- Fatty acids provide shiny hair and healthy skin tone
- Good fats can help lower cholesterol

#### **Types of Fats**

- There are three main types of fat, saturated fat, unsaturated fat, and trans fat.
- Fat is found in meat, poultry, nuts, milk products, butters and margarines, oils, lard, fish, grain products and salad dressings.

#### **Good Fats**

- Polyunsaturated fats and monounsaturated fats do not contribute to blood cholesterol.

- Polyunsaturated fats include safflower, sesame and sunflower seeds, corn and soybeans, many nuts and seeds, and their oils.
- Monounsaturated fats include canola, olive and peanut oils, and avocados.

### **Bad Fats**

- Saturated fat is the main dietary cause of high blood cholesterol.
- Saturated fat is found mostly in foods from animals. It is also found in tropical oils and cocoa butter.
- Encourage to avoid hydrogenated fats such as margarine and shortening to help decrease blood cholesterol.

### **How to Choose the Right Foods**

- Read food labels.
- Substitute good fats for bad fats.
- Cook with vegetable oils and water.
- Be cautious of fat free foods. They are filled with excessive carbohydrates and sugars, which are converted into fat when stored in the body.

**Ask if there are any questions**

# Healthy Weight Management

## Goals:

- Employees will increase their knowledge of healthy ways to lose weight

## Materials:

- Healthy Weight Management handout

## Instructional Techniques:

### Introduction:

- Gather necessary materials
- Introduce topic

### What is Weight Management?

- Maintaining your body weight at a desirable level
- Controlling portion sizes at meal time
- Adopting a healthy lifestyle by exercising, avoiding fad diets
- Controlling your environment. Encourage employees to surround themselves with friends or family who are supportive.
- Be positive.

### What are 6 Strategies for Successful Weight Loss?

- Ask, “What do you do to lose weight?”
- Make a commitment.
- Draw support from family and friends.
- Set realistic goals for weight loss; weight loss of 1-2 pounds/week is recommended.
- Learn to enjoy healthier foods.
- Get active, Stay active by walking 30 minutes at least 4 days/week.

### Exercise is one key to weight management

- Fad diets cause a loss of both fat and lean muscle.
- In order to lose weight, we need to exercise to expend more calories than we consume.
- Each pound of muscle gained results in an extra 350 calories burned each week.

### Healthy Meal Planning

- Develop an ideal eating plan based on the food guide pyramid, limiting salt sugar intake; reducing saturated fat and cholesterol; combining foods from each food group at every meal.

- The body requires a balance of certain nutrients: protein, fiber, carbohydrates. Serving sizes are smaller than we realize. Discuss adequate serving sizes for each food group.

### **Popular Weight Control Methods**

- Ask if anyone has ever used any weight control methods.
- Diet pills may decrease appetite but can have serious side effects.
- Special foods may lack protein, fiber, and other important nutrients.

### **Relationship Between Moods and Foods**

- Mood can trigger overeating caused by stress, boredom, anger, sadness.
- Emotional eaters eat excess unhealthy foods such as starches, sweets, and salty and fatty foods.
- Food can provide a physiologic connection. The body feels a reward due to the release of trace amounts of mood and satisfaction elevating opiates.
- Food can also provide a psychological connection by creating a mental distraction from other life events. For example, people eat “comfort food” when they are depressed, sad, angry.

### **How to Cope with Mood Eating**

- Learn to recognize true hunger, is it physical or mental? Ask employees why they eat.
- Find comfort elsewhere. Take a walk to distract yourself from food.
- Keep healthy snacks on hand such as fresh fruit, vegetables, pretzels.
- Exercise
- Know what triggers your mood eating by keeping a food diary.

### **How to Keep Weight Off**

- Develop self-control.
- Eat fewer calories.
- Do not skip meals.
- Keep a food journal.
- Eat foods high in fiber to promote satiety.
- Remember to be realistic.
- Be happy and confident with yourself.

### **Weight Control Resources**

- Provide websites for employees to refer to for additional information
- [www.eatright.org](http://www.eatright.org)
- [www.nal.usda.gov/fnic](http://www.nal.usda.gov/fnic)
- Nutrition.gov
- [www.shapeup.org](http://www.shapeup.org)
- [win@infor.niddk.gov\(email\)](mailto:win@infor.niddk.gov)

## **Tune In: Physical Hunger vs. Emotional Hunger**

### **Goals:**

- Employees will be introduced to the difference between physical hunger and emotional hunger.
- Employees will increase their knowledge of the characteristics of emotional and physical hunger.

### **Materials:**

- Tune In: Physical Hunger vs. Emotional Hunger handout

### **Instructional Techniques:**

#### **Introduction:**

- Gather necessary materials
- Introduce topic

#### **What are the triggers for eating?**

- Situational- food is present and triggers eating such as at holidays, birthdays
- Emotional
- Physiological

#### **Food and Emotion Connection**

- Comfort and food connection has early beginnings
- Infant feeding is accompanied by security of being held and cuddled

#### **Food as a Substitute**

- Using food as a reward
- Eating food to make you feel better if physically or emotionally hurt
- Eating food to lift your spirit

#### **Emotional Eating**

- Ask, “What is emotional eating?”
- Using food as a comfort or to mask feelings or eating in response to feelings instead of hunger

#### **Emotional Triggers**

- Ask, “What do you think are emotional triggers for eating?”
- Loneliness/boredom
- Depression
- Fatigue
- Grief



- Disappointment
- Insecurity/fear
- Guilt

### **Traits of Emotional Hunger**

- Ask, “What are the traits of emotional hunger?”
- Sudden onset of hunger
- Cravings for a certain food
- You need to eat NOW
- Paired with upsetting emotion
- Involves automatic, absent-minded eating
- Eating does not stop in response to fullness
- Feeling guilty about eating

### **Physiological Eating**

- Ask, “What is physiological eating?”
- Eat when hungry
- True hunger at regular mealtimes
- It is important to listen to your body. Learn to recognize the difference between true physiological hunger and other triggers that prompt an eating response.

### **Recognize Satiety**

- Stop eating when you are full
- It takes 20 minutes for the satiety signal to reach the brain to tell you that you are full, so eat slowly, take small bites, and chew well.

**Ask if there any questions.**

## APPENDIX E

### Nutrition Education Recipes

#### **WHY FRUITS & VEGETABLES?**

Fruits and vegetables fight to protect your health!

A growing body of research shows that fruits and vegetables are critical to good health. In fact, fruits and vegetables should be at the base of your healthful diet.

Fruits and veggies are packed with essential vitamins, minerals, fiber, and disease-fighting phytochemicals. Eating plenty of fruits and vegetables every day can reduce your risk of heart disease, high blood pressure, type 2 diabetes, and certain cancers.

Here's a tasty recipe to help you add more fruits and veggies to your diet!

#### Get to Know Your Greens Salad

Preparation Time: 30 minutes

Serves 4

5 A Day Servings: 1

#### Ingredients:

- 1 8-oz can citrus salad in its own juice
- 1 8-oz can apricot halves in its own juice
- 1 teaspoon olive oil
- 4 teaspoons raspberry or white wine vinegar
- ¼ teaspoon salt
- ¼ teaspoon black pepper
- 2 cups bite-sized pieces of endive
- 1 cup bite-sized pieces of arugula or spinach
- 1 cup bite-sized pieces of watercress

#### Directions:

Drain citrus salad and apricots and reserve liquid in a small bowl. Slice apricot halves lengthwise into four slices each. Set fruit aside. Whisk together canning liquid, olive oil, vinegar, salt and pepper. Combine greens in a large salad bowl. Add fruit and dressing and toss. Serve immediately.

#### Nutrition Information Per Serving:

Calories 86; Fat 1g; Saturated Fat 0g; Cholesterol 0mg; Sodium 156mg; Fiber 2g.

\*This is an official 5 A Day Recipe.

## **FRUITS AND VEGGIES AND WEIGHT MANAGEMENT**

Increasing your intake of fruits and vegetables can help you manage your weight...but only if you replace high-calorie foods with fruits and vegetables.

Because they're low in calories and high in fiber, fruits and vegetables can help you control your weight. By eating **more fruits and vegetables** and fewer high-calorie foods, you'll find it much easier to manage your weight.

Replace mayonnaise-based tuna salad with this crunchy salad to increase your fruit and veggie intake while decreasing your calories!

### **Crunchy Tuna Salad**

Preparation Time: 30-60 minutes

Serves 4

5 A Day Servings: 1.5

#### **Ingredients:**

¼ cup bulgur wheat

½ cup boiling water

½ cup plain low fat yogurt

1 Tablespoon lemon juice

2 Tablespoons thinly sliced green onion

1 medium tomato, seeded and diced

2 cups spinach or other dark lettuce greens

1 Tablespoon chopped fresh mint OR 2 teaspoons dried mint, crushed

1 Tablespoon Dijon mustard

1 7-oz can water-packed tuna, drained

1 cup diced zucchini or cucumber

#### **Directions:**

In a medium bowl, combine bulgur and water. Let stand 30 minutes, drain well. Stir yogurt, mint, lemon juice, mustard, and green onion into bulgur. Add tuna, tomato and zucchini or cucumber. Stir gently to break up tuna and coat with yogurt mixture. To serve, line small plates with lettuce leaves and top with tuna mixture.

#### **Nutrition Information Per Serving:**

Calories 132; Fat 2g; Saturated Fat 0.5g; Carbohydrate 28g; Protein 16g; Cholesterol 31mg; Sodium 149mg; Fiber 2g.

\*This is an official 5 A Day Recipe.

### **German Sausage and Red Cabbage**

Serves: 4 (Serving size-1 ¼ cups)

Preparation Time: 30 minutes

#### Ingredients:

- One 12-oz package low-fat kielbasa sausage, cut into ½-inch pieces
- 1 cup chopped onion
- 1 cup apple juice
- 2 Tablespoons balsamic or cider vinegar
- ¼ teaspoon salt
- 2 cups chopped apple (Granny Smith or other firm variety)
- 6 cups sliced red cabbage
- 1 cup water
- 1 ½ Tablespoons brown sugar

#### Directions:

Heat a large nonstick skillet over medium-high heat. Add sausage; sauté 4 minutes. Remove from pan. Add apple, onion, and cabbage to the pan, and cook, stirring frequently, for 5 minutes or until onion becomes slightly translucent. Add the sausage, juice, water, vinegar, sugar, and salt; bring to a boil. Reduce heat and simmer for 10-15 minutes.

#### Nutrition Information Per Serving:

Calories 188; Fat 5.8g; Protein 8.5g; Carbohydrates 28mg; Saturated Fat 1.6g; Sodium 426mg; Fiber 4g

### **Roasted Alive Veggie Kabobs**

Serves: 8

Preparation Time: 1 hour

#### Ingredients:

- 2 medium zucchini/green squash
- 2 large red bell peppers
- 2 Tablespoons dry Ranch salad dressing mix
- 8 wooden skewers
- 2 medium yellow squash
- ½ cup light Italian salad dressing
- 16 cherry tomatoes
- 1 cup pizza sauce

#### Directions:

Preheat oven to 400 F. Wash and cut squash into circles (8 pieces per squash). Cut peppers into quarters and remove seeds. Cut each pepper quarter in half. Combine Italian dressing and 1 Tablespoon of dry Ranch salad dressing mix in a large bowl. Add vegetables and stir well so vegetables are fully coated with salad dressing mixture. On each skewer, place a piece of zucchini, red pepper, and yellow squash. Repeat so each skewer has six pieces of vegetables. Bake 30-40 minutes. Remove from oven and cool for 5 minutes. Warm pizza sauce. Place one cherry tomato at each end of the skewers.

Sprinkle kabobs with remaining dry Ranch salad dressing mix. Serve kabobs with pizza dipping sauce.

**Nutrition Information Per Serving:**

Calories 67; Fat 2g; Protein 3g; Carbohydrates 11g; Saturated Fat 2g; Cholesterol 0mg; Sodium 373mg; Fiber 3g

**Slow and Simple Crock Pot Chili**

Serves: 6      Preparation Time: 4 hours, 20 minutes

**Ingredients:**

- 1 pound lean ground beef
- ¾ cup chopped green pepper
- 1 Tablespoon chili powder
- 1 teaspoon ground cumin
- 1 15-oz can kidney beans OR 2 cups cooked kidney beans
- 6 Tablespoons shredded reduced-fat cheddar cheese
- 1 cup chopped onion
- ¼ cup water
- 1 teaspoon sugar
- 1 garlic clove, minced
- 1 can Mexican-style no salt added tomatoes

**Directions:**

Cook the ground beef in a large nonstick skillet over medium-high heat until brown, stirring to crumble. Add chopped onion, green pepper, water, chili powder, sugar, cumin, salt, and garlic, and cook for 7 minutes or until onion is tender. Place meat mixture in an electric slow cooker (Crock Pot®), and stir in beans and tomatoes. Cover with lid, and cook on low-heat setting for 4 hours. Spoon into bowls, sprinkle with cheese.

**Nutrition Information Per Serving:**

Calories 243; Fat 5.6g; Protein 26g; Carbohydrate 23g; Saturated Fat 2g; Cholesterol 49mg; Sodium 414mg; Fiber 3.1g

**Black and Blue Cobbler**

Preparation time: 3 hours (uses slow cooker)

Serves 6

5 A Day servings: 1

**Ingredients:**

- 1 cup flour
- ½ cup sugar substitute (such as Splenda®)
- 1 teaspoon baking powder
- ¼ teaspoon salt
- ¼ teaspoon cinnamon

¼ teaspoon nutmeg  
½ cup egg substitute  
2 Tablespoons fat free milk  
2 Tablespoons vegetable oil  
2 cups blueberries (thawed if frozen)  
2 cups blackberries (thawed if frozen)  
¾ cup water  
¾ cup sugar  
1 teaspoon orange peel, grated

**Directions:**

Combine flour, sugar substitute, baking powder, salt, cinnamon, and nutmeg. Combine eggs, milk, and oil. Stir into dry ingredients until moistened. Spread batter evenly into bottom of slow cooker. In a saucepan, combine berries, water, orange peel, and sugar. Bring to a boil. Remove from heat and pour over batter. Cover and cook on HIGH for 2-3 hours. Let cobbler rest for 30 minutes before serving. Serve with nonfat frozen yogurt, if desired.

**Nutrition Information Per Serving:**

Calories 200; Fat 5g; Saturated Fat 1g; Cholesterol 0mg; Sodium 125mg; Fiber 5g.

**Broccoli Soup**

Makes 4 servings. (1 cup each)

**Ingredients:**

1 1/2 cups chopped broccoli (or 10-ounce pkg. frozen broccoli)  
1/4 cup diced celery  
1/4 cup chopped onion  
1 cup low sodium chicken broth  
2 cups nonfat milk  
2 Tbsp. cornstarch  
1/4 tsp. salt  
Dash pepper  
Dash ground thyme  
1/4 cup grated Swiss cheese

Place vegetables and broth in saucepan. Bring to boil, reduce heat, cover, and cook until vegetables are tender (about 8 minutes). Mix milk, cornstarch, salt, pepper, and thyme; add to cooked vegetables. Cook, stirring constantly, until soup is lightly thickened and mixture just begins to boil. Remove from heat. Add cheese and stir until melted. This is an official 5 A Day recipe.

Nutritional Analysis Per Serving: calories 115, cholesterol 10mg, sodium 255mg, fat 3g, calories from fat 24%.

### **Pasta Primavera**

Makes 2 servings.

#### Ingredients:

1 cup Broccoli florets  
1 cup Carrots, sliced  
1 cup Zucchini, sliced  
1 cup Macaroni or rotini  
1 Tbsp. Flour (for Sauce)  
1 Tbsp. Margarine (for Sauce)  
1 cup Skim milk (for Sauce)  
1/4 tsp. Dried basil (for Sauce)  
1/8 tsp. Black pepper (for Sauce)  
2 Tbsp. Parmesan cheese (for Sauce)

Steam vegetables until tender-crisp, and cook macaroni according to package directions. In a small saucepan, melt margarine, blend in flour. Gradually stir in milk and seasoning. (Do not add cheese at this time.) Cook over medium heat, stirring constantly, until sauce thickens. Remove from heat and blend in cheese. Pour over hot vegetables. Add macaroni and mix together.

Nutritional analysis per serving: calories 433, fat 9g, calories from fat 19%, cholesterol 7mg, fiber 6g, sodium 281 mg.

VITA

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