AN ABSTRACT OF THE THESIS OF

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The objective of this evaluation was to determine whether the Meals Made Easy for Diabetes curriculum, using the Idaho Plate Method, positively affected participants' fruit, vegetable, and fat intake and their confidence to make appropriate food choices in potentially challenging situations.

Adults with a self-reported diagnosis of diabetes (n=132) supplied information on demographic characteristics and answered questions about eating behavior and confidence surrounding potentially challenging food situations both at baseline and after the four-part intervention. The questionnaires included a 7-item fruit and vegetable screener to estimate daily servings of fruits and vegetables, a brief fat screener to estimate percentage of energy from fat, and five questions designed to assess confidence in making appropriate food choices.

Change scores for daily servings of fruits and vegetables, percentage of energy from fat, and confidence were calculated by subtracting pre-test scores from post-test scores. The Wilcoxon Signed Rank Test determined whether participants significantly changed their intake of fruits, vegetables, percentage of energy from fat,

or their confidence surrounding dietary behavior issues from the pre-test questionnaire to the post-test questionnaire. Spearman's rho was used to determine whether changes in confidence scores were related to changes in eating behavior.

A significant increase of +0.5 daily vegetable servings was reported from baseline to the end of the intervention. Combined fruit and vegetable servings and fruit servings were in the direction of an improvement, but were not statistically significant. Fat as a percentage of caloric intake did not decrease significantly during the intervention. Average confidence scores and scores on each of the individual confidence questions significantly increased from baseline to the end of the intervention, but changes in confidence were not demonstrated to be associated with changes in eating behavior.

The intervention appeared to more effectively change participants' confidence in their ability to make appropriate food choices than specific dietary behaviors. The increase in vegetable intake and the trend toward improved fruit and vegetable and fat intake suggest that individuals with diabetes were receptive to the meal planning and nutrition education curriculum.

Meals Made Easy for Diabetes:
Evaluation of a Diabetes Meal Planning and Nutrition Education Curriculum

by
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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Jeri R. Greenberg

Jeri R. Greenberg, Author

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TABLE OF CONTENTS

Page

INTRODUCTION.....1

Evaluation Questions and Hypotheses 7

LITERATURE REVIEW 9

Diabetes Statistics 9

Dietary Treatment for Diabetes 11

Behavioral Theory 13

Disease Diagnosis and Eating Behavior 16

Dietary Assessment Methods and Instruments 17

Educational Interventions for Diabetes 22

Plate Method 26

MATERIALS AND METHODS 29

Subjects 29

Study Design 30

Assessment: Questionnaire 1 31

Intervention 37

Assessment: Questionnaire 2 39

Assessment: Instructor Checksheet 40

Statistical Analysis 41

RESULTS 43

Demographics 43

Eating Behavior 46

Confidence 53

Program Satisfaction and Participation 59

TABLE OF CONTENTS (Continued)

Page

DISCUSSION 63

Eating Behavior 63

Confidence 67

Frequency of Use of Plate Method 68

Association of Change in Overall Confidence with Change in Eating Behavior 69

LIMITATIONS 71

CONCLUSIONS 76

Summary 76

Recommendations for Future Research 77

REFERENCES 80

APPENDICES 88

Appendix A. Informed Consent Form 89

Appendix B. Questionnaire 1 90

Appendix C. Action Plan 98

Appendix D. Questionnaire 2 99

Appendix E. Instructor Checksheet 107

LIST OF FIGURES

Figure Page

1. Correlation between change in overall confidence score and change in total fruit and vegetable servings 58

2. Correlation between change in overall confidence score and change in total vegetable servings 58

3. Correlation between change in overall confidence score and change in percent of calories from fat 59

LIST OF TABLES

Table Page

1. Distribution of subjects throughout Oregon 30
2. Demographic characteristics of 132 participants with diabetes 44
3. Self-reported daily fruit and vegetable servings from the fruit and vegetable screener 47
4. Comparison of number of self-reported servings of fruits and vegetables reported by participants before and after intervention 48
5. Comparison of the proportion of participants who reported eating 5 or more servings of fruits and vegetables per day before and after intervention 49
6. Comparison of number of self-reported servings of fruit before and after intervention 49
7. Comparison of the proportion of participants who reported eating 2 or more servings of fruit per day before and after intervention 50
8. Comparison of number of self-reported servings of vegetables before and after intervention 50
9. Comparison of the proportion of participants who reported eating 3 or more servings of vegetables per day before and after intervention 51
10. Comparison of self-reported percentage of energy from fat before and after intervention....52
11. Comparison of the proportion of participants who reported consuming between 20% and 35% of total calories as fat before and after intervention 52
12. Self-reported daily servings of selected food items from the fat screener 53
13. Comparison of overall confidence score reported by participants before and after intervention 54
14. Comparison of individual confidence measures reported by participants before and after intervention 55
15. Comparison of frequency with which participants ate breakfast, lunch, and dinner 56
16. Comparison of frequency with which participants used Plate Method at breakfast, lunch, and dinner 57

LIST OF TABLES (Continued)

Table Page

17. Associations between change overall confidence score and change in servings of fruits and vegetables or percent of calories from fat for each participant 57

18. Participant satisfaction 60

19. Additional comments from participants 61

20. Responses from instructors 62

Meals Made Easy for Diabetes: Evaluation of a Diabetes Meal Planning and Nutrition Education Curriculum

INTRODUCTION

In 2002, 13.3 million individuals in the United States reported that they had been diagnosed with diabetes (1). The prevalence of diagnosed diabetes increased in all age groups between 1980 and 2002. Throughout that time period, individuals aged 65 to 74 years had the highest prevalence of diabetes, followed by individuals aged 75 or older. In 2002, the prevalence of diagnosed diabetes among individuals aged 65 to 74 years (16.85 per 100 population) was about 13 times that of individuals less than 45 years of age (1.23 per 100 population) (1).

The prevalence of diabetes in Oregon echoes the trends seen in national data. While Oregon's heart disease death rate has declined and cancer death rate has remained steady, the diabetes death rate has more than doubled over the past 20 years (2). In 2000, diabetes was the seventh leading cause of death among Oregonians (2) and the sixth leading cause of death nationally (3). In 2003, the Diabetes Surveillance System of the Centers for Disease Control and Prevention estimated that over 6% of Oregon's adult population had been diagnosed with diabetes (1). Over 156,000 Oregonians have been diagnosed with diabetes and another 68,000 may have the disease but have not yet been diagnosed (2).

An increase in type 2 diabetes accounts for the rise in diabetes diagnoses. Type 2 diabetes, also known as noninsulin-dependent diabetes mellitus or adult-onset diabetes, is much more prevalent than type 1 diabetes (insulin-dependent diabetes mellitus or juvenile-onset diabetes). Type 2 diabetes most often develops in adults over 40 years, but is now seen in obese children as well. Whereas with type 1

diabetes the person produces no insulin at all, with type 2 diabetes, the fat cells resist insulin. Obesity, weight gain, and lack of physical activity increase the risk of developing type 2 diabetes. It is estimated that 85% of type 2 diabetes is associated with obesity (2). People with diabetes are two to four times more likely than people without diabetes to die from heart disease and stroke (3). Diabetics are also at risk of suffering from the complications of diabetes, which include blindness, kidney disease, nervous system disease, dental disease, stroke, and lower extremity amputations (3).

The cost of diabetes is staggering. In 2002, the total cost of diabetes in the United States was $132 billion (3). Of the total cost, $92 billion was spent on medical care and services and $40 billion was dedicated to indirect costs such as short-term and permanent disability and premature death (3). In 2000, diabetes cost $30 million in direct medical costs for over 3,090 hospitalizations in Oregon with a primary diagnosis of diabetes (2). The previous year, Oregonians were burdened with $380 million in charges for 36,000 hospitalizations with any mention of diabetes (2).

Much of the burden of the increasing prevalence of type 2 diabetes could be eliminated or reduced by diabetes self-management. A healthy diet and regular physical activity are the cornerstones of diabetes self-management. The risk of complications of diabetes can be decreased when blood glucose levels are maintained within a normal range. For many individuals with type 2 diabetes, control of blood glucose levels can be achieved through a healthy diet, weight management, and regular physical activity. The majority of individuals with diabetes, however, are dependent upon either insulin or oral medication for diabetes control. In 2002, approximately 80% of diabetic adults in the United States were using oral medication, insulin, or both (49.7%, 18.4%, and 11.6%, respectively) (1).

Nutrition intervention can be highly successful to maintain near-normal blood glucose among individuals with type 2 diabetes. To maintain near-normal blood

glucose, it is recommended that the diet provide the same amount of carbohydrate each day and that the carbohydrate be delivered evenly throughout the day (4). Eating too much carbohydrate at once can raise blood glucose too high, stressing the insulin-producing cells of the pancreas. Eating too little carbohydrate can lead to hypoglycemia, an abnormally low blood glucose concentration. It is the amount of carbohydrate consumed, not the source, that individuals with diabetes must consider (5, 6).

Individuals with type 2 diabetes should also watch their fat intake. Of primary concern is limiting intake of saturated fats and cholesterol. Saturated fat is the principal dietary determinant of low-density lipoprotein cholesterol (also known as "bad cholesterol") and individuals with diabetes appear to be especially sensitive to dietary cholesterol (6). Saturated fat and cholesterol intake should be limited to achieve a lipid and lipoprotein profile that reduces the risk of macrovascular disease. Monounsaturated fat and polyunsaturated fat intake, although not linked to disease risk, should be kept in check to avoid increased energy intake and weight gain (6),

Meals Made Easy for Diabetes, a nutrition education curriculum developed by a Registered Dietitian in Oregon and administered by the Oregon Diabetes Prevention and Control Program (ODPCP) of the Department of Human Services, Health Services, addressed the dietary component of diabetes self-management. The lessons and recipes included in the program were designed to teach individuals with diabetes, as well as their family members and caregivers, how to make daily food choices that better control blood sugar fluctuations and reduce the complications of diabetes. Meal planning and food preparation skills were targeted for improvement with the ultimate goal of achieving blood glucose control and reducing the burden of diabetes.

Meals Made Easy for Diabetes taught participants healthy meal planning using the Plate Method. Originally developed in 1970 in Sweden, the Plate Method began as a simplified meal planning approach for diabetic clients. In 1980, Swedish nutritionists designed a booklet (*Food for People with Diabetes and Heart Disease: Good Food for Everyone*) to help their clients select healthful foods more easily and use visual estimations of portions. Shortly thereafter, the plate model was accepted by the Swedish Food and Administration Board as the official meal planning method for people with diabetes and/or atherosclerotic heart disease. A decade later, the British Diabetes Association endorsed the Swedish plate model as an appropriate meal planning approach and much of Europe now uses a similar approach (7).

Dietitians in the Idaho Diabetes Care and Education practice group of the Idaho Dietetic Association adapted the Swedish plate model to better fit American foods and the 1994 American Dietetic Association and the American Diabetes Association Nutrition Recommendations for People with Diabetes. The resulting adaptation is known as the Idaho Plate Method or simply, the Plate Method. The Plate Method is a visual method of promoting healthful eating through the use of charts, graphs, food models and pictures. The centerpiece of the model is the nine-inch dinner plate, which serves as a pie chart to show the proportions of the plate that should be covered by foods from different food groups. Foods are neither weighed nor measured with measuring cups. Instead, portion sizes are taught via the dinner plate and by having patients learn to visualize serving sizes relative to their hands and commonplace objects. For example, a tablespoon approximates the size of an average thumb and a tennis ball resembles a medium piece of fruit (8). Plate sections include one-quarter plate starch (about 15 grams carbohydrate), one-quarter plate meat, fish, or poultry (about 3 ounces or the size of a deck of cards), and one-half plate low-carbohydrate vegetables (10-15 grams carbohydrate). Additionally, the

meal should be completed with of an 8-ounce glass of milk (12 grams carbohydrate) and a small piece of fruit (15 grams carbohydrate). Foods in the starch category include bread, rice, cereal, tortillas, and vegetables high in carbohydrate, such as potatoes, legumes, corn, and winter squash. Low-carbohydrate vegetables include, but are not limited to, broccoli, green beans, carrots, mushrooms, tomatoes, cauliflower, spinach, and peppers. Following this plan at breakfast, lunch, and dinner provides 40-50 grams of carbohydrate per meal, 480-600 calories from carbohydrate per day, and about 1200 calories per day, if the servings are about a half-inch deep (7). If the individual needs additional calories, snacks may be added during the afternoon and at bedtime. Snacks can be chosen from the starch, fruit, or milk group, with about 15 grams of carbohydrate allowed per snack. Daily meat intake for most adults is limited to two quarter plate servings of lean cuts (5-7 ounces, about the size of two decks of playing cards). Individuals are instructed to limit their intake of fats and sugar.

Individuals with diabetes following the Plate Method can benefit in several ways. They may experience weight loss, although weight loss is not a specified goal of the Plate Method. They may also adopt a more nutritionally sound diet that includes more fiber and less fat and cholesterol. Individuals with diabetes may also experience improved glycemic control because carbohydrate intake is evenly distributed throughout the day. A 68-year-old male who had been diagnosed with type 2 diabetes 10 years prior to trying the Idaho Plate Method found success through simplified meal planning. He was referred to a dietitian after having gained 22 pounds in two years and upon finding his HbA_{1c} level to be 9.2% (normal range 4-8% (9)). His doctor had been considering insulin therapy, unless the man could better manage his blood glucose levels. After seven months on the Plate Method and

a modest walking routine, the man had lost 17 pounds, his HbA_{1c} was 7.6% and insulin was deemed unnecessary (7).

The Idaho Plate Method is a simplified meal planning approach that is best suited to individuals with diabetes who may never be able to, or need to, move on to more complex meal planning approaches, such as carbohydrate counting. The Plate Method is useful for diabetics who are attempting to manage their blood glucose through diet, exercise, and medications; however, because of its somewhat loose control over carbohydrate intake, the Plate Method is not appropriate for diabetics receiving intensive insulin therapy. Specific groups that may find the Plate Method to be a valuable tool in diabetes management include individuals recently diagnosed with diabetes, individuals with low literacy skills, individuals with cognitive difficulties, individuals who have had difficulties using more structured meal planning approaches, individuals who need to lose weight, and elderly individuals (7). The Plate Method is suitable as an instructional tool for adult learners in individual counseling or a group setting (10). Positive features of the Plate Method include its ability to translate general dietary advice into specific visual recommendations and its adaptability to patients' personal food preferences and cultural differences. Meal components can be selected to match an individual's preferences, thereby providing personal tailoring that is essential to acceptance (10).

Research is needed to determine whether the Plate Method produces positive changes in participants' eating behavior. Although used by dietitians in Europe and parts of the United States and Canada, the Plate Method has not been evaluated for its usefulness as a tool to alter eating behavior.

The purpose of this evaluation was to determine whether the Meals Made Easy for Diabetes curriculum, using the Idaho Plate Method, positively affected

participants' fruit, vegetable, and fat intake and their confidence to make appropriate food choices.

Evaluation Questions and Hypotheses

Primary Evaluation Questions

1. Do participants with diabetes report eating more servings of fruits and vegetables after Meals Made Easy for Diabetes than before?

   Hypothesis 1. Participants with diabetes will report consuming a greater number of daily servings of fruits and vegetables after the program than before.

   Hypothesis 2. Participants with diabetes will report consuming a greater number of daily servings of fruits after the program than before.

   Hypothesis 3. Participants with diabetes will report consuming a greater number of daily servings of vegetables after the program than before.

2. Do participants with diabetes report eating a lower percentage of energy as dietary fat after Meals Made Easy for Diabetes than before?

   Hypothesis. Participants with diabetes will report consuming a lower percentage of energy as dietary fat after the program than before.

3. Does participation in Meals Made Easy for Diabetes increase participants with diabetes' confidence in their ability to plan and consume healthy, balanced meals?

   Hypothesis. Participants with diabetes will have greater confidence that they can plan and consume healthy, balanced meals after the program than before.

Secondary Evaluation Questions

1. Which meal will participants with diabetes report eating most regularly?

   Hypothesis. Participants with diabetes will report eating dinner more frequently than either breakfast or lunch.

2. During which meal will participants with diabetes be most likely to use the Plate Method?

   Hypothesis. Participants with diabetes will report using the Plate Method more frequently at dinner than at breakfast or lunch.

3. Is change in overall confidence associated with change in dietary behavior among participants with diabetes?

   Hypothesis. An increase in overall confidence will be associated with an increase in daily servings of fruits and vegetables and a decrease in the percentage of energy from fat.

LITERATURE REVIEW

Diabetes Statistics

Diabetes mellitus is a group of diseases characterized by high concentrations of blood glucose resulting from defects in insulin production or insulin resistance, or both. In the United States, diabetes is a major public health concern. In 2002, 13.3 million individuals in the United States reported that they had been diagnosed with diabetes (1). The prevalence of diabetes has been steadily on the rise over the last two decades. From 1980 to 2002, there was a 130% increase in the number of individuals in the United States who reported that they had been diagnosed with diabetes (1). In 2002, individuals aged 65 to 74 years had the highest prevalence of diabetes (16.85 per 100 population) compared to other age groups. There were 14.18 reported cases per 100 population among individuals aged 75 years and older and 9.34 reported cases per 100 population among individuals ages 45 to 64 years. The prevalence of diabetes (1.23 per 100 population) was lowest among individuals younger than 45 years of age (1).

Diabetes is a public health problem across the United States. The Diabetes Surveillance System of the Centers for Disease Control estimated the state-specific prevalence of diagnosed diabetes among adults and grouped the results into four categories: less than 4%, 4-4.9%, 5-5.9%, and 6% or greater. In 2003, there were no states with less than 4% of the adult population diagnosed with diabetes. Only one state, Colorado, was estimated to have 4-4.9% of its adult population diagnosed with diabetes. Oregon was one of 36 states estimated to have 6% or more of its adult population diagnosed with diabetes (1).

The annual number of new cases of diagnosed diabetes among adults aged 18 to 79 years increased 47% from 1997 to 2002. In 2002, 1.29 million adults in the United States were newly diagnosed with diabetes (1). In 2002, individuals aged 45 to 64 years had the highest incidence of diabetes (12.7 cases per 1000 population) compared to individuals aged 65 to 79 years or individuals aged 18 to 44 years (11.8 and 2.8 cases per 1000 population, respectively) (1). The incidence of diabetes increased more dramatically among whites and Hispanics (+37% and +36%, respectively) than among blacks (+17%) between 1997 and 2002 (1).

The mean age at diagnosis of diabetes among individuals aged 18 to 79 years was 46.6 years in 2002 (1). No major changes in mean age at diagnosis were detected between 1997 and 2002.

Individuals diagnosed with diabetes experience a host of other problems. In 2003, adults who had been diagnosed with diabetes were polled regarding their health problems and perceived quality of life. One-third (33.6%) reported that they suffered from poor mental health, 53.9% reported that they suffered from poor physical health, and 32.6% reported that they were unable to perform their usual activities (1).

The problem has become so pervasive that there are national and state-based diabetes programs in place to help prevent new cases of diabetes and to help those with diabetes manage their disease. The Centers for Disease Control and Prevention (CDC) began a diabetes division in 1977, which was renamed in 1989 as the Division of Diabetes Translation (DDT). The mission of the DDT is to eliminate the preventable burden of diabetes through leadership, research, programs, and policies that translate science into practice. The DDT translates information from clinical trials into clinical and public health practices (11). The state of Oregon has received funding from the Centers for Disease Control and Prevention since 1994 for the

Oregon Diabetes Prevention and Control Program (ODPCP) (12). The ODPCP shares CDC's goal to reduce the burden of diabetes and collaborates with partners in both the public and private sectors to improve Oregon's health care infrastructure and build community-based interventions.

Dietary Treatment for Diabetes

Medical nutrition therapy is essential in the management of diabetes. The goals of medical nutrition therapy for diabetes are as follows: to attain and maintain optimal metabolic outcomes including blood glucose levels in the normal range to prevent or reduce the risk for complications of diabetes, lipid and lipoprotein profile that reduces the risk for macrovascular disease, and blood pressure levels that reduce the risk for vascular disease; prevent and treat the chronic complications of diabetes; improve health through healthy food choices and physical activity; and address individual nutritional needs with consideration given to personal and cultural preferences while respecting the person's wishes and willingness to change (4, 6).

The nutrition issues surrounding diabetes are complex. Despite the complexity of nutritional therapy for diabetes, recommendations have been published for the treatment and prevention of diabetes and related complications (4, 6). The American Diabetes Association recommends that foods containing carbohydrate from whole grains, fruits, vegetables, and low-fat milk be included in a healthy diet and that the total amount of carbohydrate in meals or snacks more significantly affects postprandial blood glucose than the source or type of carbohydrate. In addition, sucrose, which does not increase blood glucose levels to a greater extent than starch, should be eaten in the context of a healthy diet. Carbohydrate and monounsaturated fat should provide 60-70% of energy intake; however, the need for

weight loss and the lipid profile should be considered when establishing the content on monounsaturated fat in the diet. Individuals who would benefit from weight loss or those with a high lipid profile should consume less monounsaturated fat than individuals with a healthy body weight and an optimal lipid profile.

The recommended number of servings of fruits and vegetables has recently increased due to the association between fruits and vegetables and reduced disease risk. The 2000 Dietary Guidelines for Americans recommended that at least five servings of fruits and vegetables be eaten each day (at least two servings of fruits daily and at least three servings of vegetables daily) (13). The new 2005 Dietary Guidelines for Americans recommend that 5-13 servings (2½ -6½ cups per day depending on calorie needs) of fruits and vegetables be eaten daily due to a reduced risk of stroke, some forms of cancer, and type 2 diabetes (14). Vegetables, more than fruit, appear to be associated with a reduced risk of type 2 diabetes. The protective effect of fruits and vegetables has been ascribed to their high fiber content (15) and dietary fiber has been shown to lower postprandial blood glucose (16). In addition, the Dietary Guidelines point out that increased consumption of fruits and vegetables may be a useful component of interventions designed to achieve and maintain weight loss. Much of the burden of type 2 diabetes is associated with overweight and obesity; therefore, achieving and maintaining optimal body weight may help prevent diabetes and help those diagnosed with diabetes manage their disease.

Dietary fats play an important role in nutritional therapy for diabetes. It was recommended that less than 10% of energy intake be derived from saturated fat and that dietary cholesterol intake be less than 300 mg/day (4, 6). The evidence is undeniable that saturated fat and cholesterol pose health risks and it is now recommended that intake of saturated fat and cholesterol be “as little as possible”

(17). If a person with diabetes needs to lower his/her low-density lipoprotein cholesterol, then energy derived from saturated fat can be replaced with either carbohydrate or monounsaturated fat. Polyunsaturated fat intake should be approximately 10% of energy intake (4, 6). Low-fat and fat-free versions of foods and beverages using fat replacers may reduce dietary fat intake (including saturated fat and cholesterol); however, use of foods and beverages containing fat replacers does not necessarily ensure a reduction in total fat intake or body weight (4, 6). Recommended total fat intake for persons with diabetes does not differ from recommendations made for the general public. Total fat intake of 20-35% of calories is recommended for adults (17, 18).

The role of protein in the diets of diabetics has received less attention than either carbohydrates or fats. Ingested protein does not appear to increase plasma glucose concentrations or slow the absorption of carbohydrate ingested simultaneously (6). Recommended protein intake for persons with diabetes (15-20% of total daily energy) does not differ from recommendations made for the general public (6). The new Acceptable Macronutrient Distribution Range (AMDR) for protein is 10-35% of calories (17), but the American Diabetes Association has not changed its recommendation for protein intake to reflect this new acceptable range.

Behavioral Theory

Programs aimed to improve diabetes self-management must first understand when and how behavior change occurs. It has been suggested that research guided by the principles of a behavioral theory improves the effectiveness of nutrition education and is better equipped to explain the emergent results (19). Several behavioral theories, including Social Cognitive Theory and the Transtheoretical

Model, have been developed to explain how health outcomes might be linked to various personal and environmental factors.

Self-efficacy, a central construct in both Social Cognitive Theory and the Transtheoretical Model, is defined as the situation-specific confidence an individual has that he/she can cope with high-risk situations without relapsing into unhealthy behavior (20). Self-efficacy is perhaps the most important prerequisite for behavior change because it determines how much effort an individual decides to invest in accomplishing a given task and what level of performance is attained (20). Self-efficacy is developed through observational and participatory learning. First, an individual must repeatedly succeed at incremental steps associated with a larger task. Then the individual increases his/her belief that he/she can accomplish the task itself, which, in turn, promotes behavioral change (20). Self-efficacy has been found to be an important mediating variable that can influence dietary behavior and diabetes management skills among individuals with diabetes (21, 22).

The Social Cognitive Theory explains human behavior in terms of the behavior itself, personal factors, and environmental influences (20). Social Cognitive Theory proposes that an individual will only attempt activities that he/she feels are manageable and will avoid activities that seem unmanageable (23). Social Cognitive Theory has been used to explain a variety of health behaviors including the adoption of healthy food choices, reduction of alcohol use, and smoking cessation (20-22).

The Transtheoretical Model claims that individuals are at different stages of motivational readiness for adopting healthy behaviors and focuses on enhancing motivation in those who are not motivated to change and maintaining behavior in those who are motivated (24). The Transtheoretical Model provides the stages of change, a temporal construct, as well as constructs to explain how behavior change occurs. Five stages of change describe when individuals change: 1)

precontemplation – the individual has no intention to take action within the next six months 2) contemplation – the individual intends to take action within the next six months 3) preparation – the individual intends to take action within the next 30 days 4) action – the individual has changed behavior for less than six months 5) maintenance – the individual has changed behavior for more than six months. For behavior change to occur, individuals must implement processes of change and effect changes in intermediate outcome measures, including self-efficacy and decisional balance (the balance between the costs and benefits of changing).

The Transtheoretical Model initially gained attention with success in smoking cessation interventions (25). More recently, the model has been used to design effective interventions to promote increased fruit and vegetable consumption (26-28) and has been validated to associate healthy eating with stages of change among a population of individuals with diabetes (29). Ma et al (26) found that, according to 1,545 completed surveys from young adults, self-efficacy increased progressively along the stages of change. Individuals in the action and maintenance stages had higher self-efficacy for fruit and vegetable consumption than those in the preaction stages and fruit and vegetable servings tended to increase as self-efficacy increased. Horacek et al (27) reported that self-efficacy, perceived benefits, and weight satisfaction predicted stage of change for fruit and vegetable consumption among a random sample of 1,438 young adults. Among 1,253 adults aged 60 and older, stage of change was found to be associated with fruit and vegetable intake and self-efficacy, with intake increasing linearly from precontemplation to maintenance (30). In a study conducted among 226 adult cardiac patients, reported fruit and vegetable intake increased from 2.6 daily servings among precontemplators to 5.1 daily servings among individuals in the maintenance stage. Percentage of calories from fat decreased linearly from 38.8% for those in the precontemplation stage to 30.9% for

those in the maintenance stage (28). Vallis and associates (29) found that, among individuals with type 1 and type 2 diabetes, those in the action and maintenance stages had the lowest percentage of calories from fat and the highest number of daily servings of vegetables.

Disease Diagnosis and Eating Behavior

Individuals who have recently been diagnosed with a disease can be motivated to make dietary changes. A study among 260 women with newly diagnosed breast cancer found that fruit and vegetable consumption improved, although nonsignificantly, after diagnosis (31). Among women who reported an increase, fruit intake increased by one-quarter serving per day and vegetable intake increased by one-third serving per day. Although total energy intake decreased significantly among these women, there was a significant increase of 1% in percentage of calories from fat. Another study was conducted among over 3,000 women who had been treated for breast cancer to determine how fruit, vegetable, fiber, and fat intake changed from before diagnosis to after diagnosis. The study found reported post-diagnosis intake of fruits and vegetables to be higher among 58% and 60% of the women, respectively (32). The same study found that 80% of the women reported decreasing their fat intake after diagnosis and that the longer the time since diagnosis, the more likely women chose low-fat foods and reduced added fats. In an attempt to determine changes in fat intake among 144 patients newly diagnosed with type 2 diabetes, van de Laar and associates used a 104-item food frequency questionnaire at diagnosis, eight weeks following diagnosis, and again at four years after diagnosis (33). At diagnosis, fat comprised 40.9% of total caloric

intake. Fat as a percentage of energy intake decreased by eight weeks post-diagnosis and the improvement was sustained at four years.

Not all individuals who have recently been diagnosed with a disease enact healthy dietary changes. In a study conducted among 978 patients diagnosed with breast or prostate cancer, the majority (55%) reported that they consumed less than five servings of fruits and vegetables daily (34). Patients with prostate cancer reported consuming significantly fewer servings of fruits and vegetables than patients with breast cancer. In addition, 69% of the patients reported adherence to a low-fat diet, with significantly more breast cancer patients than prostate cancer patients adhering to a low-fat diet. Among 1,480 adults with a self-reported diagnosis of type 2 diabetes, 62% of the respondents consumed less than five daily servings of fruits and vegetables and nearly two-thirds consumed over 30% of their energy as fat (35).

Clearly, many individuals diagnosed with cancer and diabetes practice healthy dietary behaviors, but there are also those who do not. Interventions are needed to increase fruit and vegetable consumption and decrease fat consumption among those diagnosed with disease. In a meta-analysis of 25 intervention studies, Ammerman and associates reported that interventions tend to be more successful among populations at higher risk for disease and among those diagnosed with a disease; however, interventions conducted among higher-risk populations are often more intense than interventions with lower-risk populations (36).

Dietary Assessment Methods and Instruments

Estimating an individual's usual dietary intake is difficult but collecting information about dietary intake provides important information that is useful in improving health. There are a variety of ways to gain information on dietary intake

and the various types of dietary assessment tools provide different kinds of information, have different functions, vary in the method of administration, and vary in complexity. Each method has its strengths and weaknesses and considerations such as research design, characteristics of study participants, and available resources determine which method should be used. Methods for assessing dietary intake include, but are not limited to, food records, 24-hour recalls, and food frequency questionnaires.

Food records require an individual to record all foods and beverages consumed over several days. The individual must accurately record details about the foods and beverages consumed such as preparation method and portion size. The amount consumed may be weighed, measured with household utensils, or estimated using food models or pictures. Because foods are recorded and measured at the time of consumption and do not rely on memory, food records can provide detailed, quantitatively accurate information on foods and beverages consumed during the recording period. Food records also yield data more representative of usual intake because they are based on intake from multiple days.

There are also several limitations of food records. Food records, because of the tedium of recording all foods and beverages consumed, potentially introduce bias. Individuals might change the amount of a food or beverage they consume during the recording period simply because the act of recording increases awareness of one's dietary behavior. Additionally, individuals might choose to consume prepared foods with food labels rather than measure and record every ingredient in a home-cooked dish. Food records may significantly underreport energy and nutrient intakes (37, 38). Food records require a great deal of cooperation and the burden can result in a low response rate when used in large surveys. Individuals must also be literate to keep food records.

The 24-hour recall requires that a trained interviewer ask the respondent to recall all foods and beverages consumed during the previous 24-hour period. The interviewer records the responses and helps the respondent estimate portion sizes of the foods consumed. There are many strengths of the 24-hour recall including: ease of administration, the short time to administer (less than 30 minutes), detailed information can be gained on types of foods consumed, low respondent burden, and multiple recalls can be used to estimate usual intake for an individual. The 24-hour recall is also inexpensive and does not alter an individual's usual diet.

Several limitations of the 24-hour recall should be noted. First, the recall relies on memory and respondents may forget food and beverage items consumed. Omissions of sauces, beverages, and dressings may lead to low estimates of energy intake. Respondents whose actual food intake is low have been found to overestimate their intake and respondents whose actual food intake is high have been found to underestimate their intake (39). Underreporting can be minimized when the multiple-pass 24-hour recall method is used. Using this method, the interviewer and respondent first make a quick list of foods and beverages consumed in the previous 24-hour period. They then review the list on the second pass to gather information about the meal, time, and place where foods were consumed. Foods forgotten during the quick pass are recorded during the third pass. Additional food details are collected during the fourth pass and the list is reviewed during the fifth pass (39). A final, and important, limitation of the recall is that one recall cannot be considered representative of an individual's usual intake; however, by collecting multiple 24-hour recalls on nonconsecutive days, it is possible to estimate usual intake.

Food frequency questionnaires assess usual dietary patterns and some may be used to estimate energy and/or nutrient intake by determining how frequently an

individual consumed a limited number of foods that are notable sources of the nutrients of interest. Respondents indicate how many times per day, week, month, or year they consumed the foods and beverages. Food frequency questionnaires can be nonquantitative, semiquantitative, or quantitative. Nonquantitative food frequency questionnaires ask how frequently the respondent consumed foods and beverages, but do not ask for portion sizes. Instead, standard portion sizes are assumed. Semiquantitative food frequency questionnaires specify a portion size for each food item on the questionnaire and the respondent is asked how often he/she consumed that portion. Quantitative food frequency questionnaires ask the respondent to describe the size of his or her portion relative to a standard serving.

Food frequency questionnaires have several strengths. First, they can be completed by the respondent and require a modest amount of the respondent's time. Food frequency questionnaires may also be more representative of usual intake than a few days from a food record. They are also appropriate for estimating mean intakes of energy and nutrients for groups and for ranking individuals as having low, average, or high consumption of energy and certain nutrients (40, 41). Food frequency questionnaires are the most practical and economical method for collection of dietary data in large epidemiological studies and are appropriate for assessing diet-disease risk (42).

Food frequency questionnaires are not without limitations. Longer questionnaires, though more comprehensive, can be time-consuming to complete and rely upon the respondent's ability to recall and describe his or her diet. Respondents may be more likely to remember having consumed the individual foods listed on the questionnaire than foods grouped into categories such as "other fruits". In addition, the ability to access information about specific foods is lost when foods are grouped into categories. In general, food frequency questionnaires collect less

detail regarding foods consumed, preparation methods, and portion size, than other dietary measurement tools (42).

While longer food frequency questionnaires may consist of up to 150 individual food items or food groups, short questionnaires known as screeners have been designed to assess intake of individual nutrients or food components (43-46). Compared to full-length food frequency questionnaires, screeners have the advantage of requiring very little time to complete. Screeners, however, are less comprehensive than long questionnaires. Estimated servings of fruits and vegetables (44, 47, 48) and percentage of calories from fat (48) have been lower from screeners than from longer questionnaires and screener estimates were not considered reliable compared to estimates from multiple 24-hour recalls (44). Warneke and associates compared the ability of the 7-item screener and a 31-item food frequency questionnaire to measure fruit, juice, and vegetable intake in a population of 146 African-Americans. The 31-item screener estimates exceeded the 7-item screener estimates by 29%. Correlations with 24-hour recall estimates were high for the 7-item screener ($r = 0.72$) and moderate to low for the 31-item screener ($r = 0.28$) (44). Thompson et al, in a study of 874 adults, compared the performance of the 7-item screener to a 16-item screener and then compared the results of both with two 24-hour recalls and a food frequency questionnaire. In this case, the 7-item screener was less representative of actual intake than the longer screener. The authors found that both screeners significantly underestimated median servings per day relative to estimated true intake, but that the 16-item screener more closely approximated true intake than the 7-item screener (43). Snyder and associates compared the fat screener to a much more detailed Diet History Questionnaire and found that, although participants underestimated their fat intake on the screener compared to the longer

questionnaire, correlations between the two instruments were highly significant ($r=0.54$, $p<.0001$) (48).

Educational Interventions for Diabetes

Diabetes self-management is complex and requires that individuals with diabetes have the knowledge to manage their disease. For successful management, individuals with diabetes need adequate education and social support. Successful self-management can lead to enhanced self-efficacy and improvement in some aspects of physical and psychological well-being. A chronic disease self-management course completed by 185 adults with various chronic diseases including diabetes, osteoporosis, and endometriosis successfully decreased reported fatigue, depressed moods, and health distress and increased reported self-efficacy, cognitive symptom management, and communication with physicians (49).

Community gathering places, such as community centers, libraries, private facilities, and faith institutions are important sites for diabetes self-management education interventions; however, interventions are also conducted in traditional clinical settings, worksites, and in the home (50, 51). Community-based diabetes self-management interventions offer many benefits. Interventions delivered in a community setting can be adapted to be culturally sensitive. Culturally sensitive interventions incorporate familiar music, clothing, and language in printed material, video, and presentations and are often administered by staff from the same cultural background. In a review of eight diabetes self-management programs in community-based settings Jack and associates noted that the interventions reviewed all had positive effects on glycemic control and that six of the interventions targeted minority groups (52). A community-based diabetes and hypertension preventive program

developed in collaboration with the community, public health nurses, and diabetes educators in a Chinese community in Hawaii found that 95% of 75 participants with type 2 diabetes maintained their blood glucose in the normal range (53). The surveys and educational programs were carried out in Chinese and the program was taught during the community association's regular weekly meetings.

Community settings consider the family, workplace, and community in addition to the individual. It has been postulated that communities that show social support, trust, and cohesion help individuals achieve their goals (52). The social environment should be considered when designing interventions aimed to change behavior. Glasgow and associates found that the two strongest general psychosocial barriers to diabetes self-management were low self-efficacy and a lack of social and family support (54). The Black Churches United for Better Health Project is a noteworthy example of a successful community-based intervention that focused on social support and cultural sensitivity. The intervention targeted rural African-American adults and was carried out in 49 rural churches, reaching 2,519 church attendees. At the two-year follow-up, the intervention group consumed 0.85 servings more of fruits and vegetables than the control group. Among those who attended church regularly, the increase in fruit and vegetable consumption (+1.3 daily servings) was even more impressive (55). The authors concluded that the institutional support and social networks of the church provided an effective way to achieve dietary change.

Community-based interventions have also successfully reached disadvantaged populations that may encounter barriers to accessing traditional clinical support (56, 57). Diabetes educators have identified a lack of adequate insurance coverage and personal resources for diabetes education as a barrier to effective diabetes education and follow-up. Over half (52%) of the diabetes educators polled reported that an inability to afford follow-up care prevented their

patients from continuing diabetes education (58). Older individuals, minority groups, and those with language difficulties often experience barriers to access and utilization of diabetes education (59). Interventions delivered in a community setting can help alleviate some of the financial and cultural strain for individuals needing diabetes education. As mentioned, some community-based interventions are delivered in churches and community association meetings. When this is the case, potential concerns such as cost of attendance, transportation to and from the program site, and time for the program itself are eliminated. Project Dulce, a community-based, culturally appropriate diabetes education project targeting underinsured, primarily Latino patients with type 1 and type 2 diabetes, compared 153 patients aged 18 to 80 years in a nurse case management and peer education group to a diabetic control group (60). After one year, the intervention group had significant improvements in glycosylated hemoglobin, total cholesterol, low-density lipoprotein cholesterol, diastolic blood pressure, and diabetes knowledge. No Significant changes were observed in the control group.

Interventions conducted in community settings have documented improvements in blood glucose control and blood lipid profiles (53, 61-63), reductions in caloric intake, percent of calories from fat, and body weight (62) and increased fruit and vegetable consumption (55, 64, 65). A 40-hour curriculum that instructed participants to exercise at least 30 minutes per day and to adopt a diet high in unrefined plant foods and low in fat, animal protein, sugar, and salt successfully improved total cholesterol, LDL cholesterol, and triglycerides in a sample of 242 adults at risk for coronary disease (63). Food records collected before and after the intervention revealed that total fat intake declined from 39% and 38% of total calories to 19% and 21% of total calories for men and women, respectively. Saturated fat and cholesterol intake also decreased from the start to the end of the program.

An intervention designed to improve diet and exercise behaviors and increase blood glucose self-monitoring among older adults with type 2 diabetes found a greater reduction in caloric intake and percentage of calories from fat among subjects in the intervention group than those in the control group. Greater weight reductions and increased frequency of blood glucose self-monitoring were also seen in the intervention group compared to the control group (62). Increased fruit and vegetable consumption has been documented among women served by the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (65) and rural African-Americans in the Black Churches United for Better Health Project (55), studies which were both part of the National Cancer Institute's 5-A-Day for Better Health Program. Buller and associates also documented increased fruit and vegetable consumption among 905 lower socioeconomic, multicultural labor and trades employees following an 18-month workplace intervention designed to increase fruit and vegetable intake (64). From baseline, reported daily servings of fruits and vegetables increased 0.77 servings and 0.46 servings according to 24-hour recalls and a food frequency questionnaire, respectively.

The goal of nutrition intervention in diabetes is to achieve and maintain blood glucose levels in the normal range. Several approaches have been developed to help individuals with diabetes control their blood sugar including exchange systems, carbohydrate counting, estimating total available glucose available in foods (Total Available Glucose), and Healthy Food Choices. The exchange system for meal planning, carbohydrate counting, and Total Available Glucose have been shown to effectively help individuals with diabetes manage their blood glucose (66, 67); however, with the exception of Healthy Food Choices, these meal planning approaches can be too complex for some individuals to follow (66). Although there is no right or wrong method of meal planning, when selecting a meal planning method,

the ability and interest level of the individual with diabetes to participate in his or her meal planning and the flexibility of the meal plan should be considered (68).

Plate Method

Studies of the Plate Method as a tool for meal planning have not been documented. There is some evidence, however, that simplified meal planning approaches for healthy eating in diabetes are in demand (69). Ziemer and associates found that a simplified meal planning approach using Healthy Food Choices was as effective as an exchange-based meal plan among 648 individuals aged 17 years and older with type 2 diabetes (70). Improvements in glycemic control as well as high-density lipoprotein cholesterol and triglycerides were significant but similar between the two groups. Over a six-month period, glycosylated hemoglobin decreased from 9.7% to 7.8% in the Healthy Food Choices group and from 9.6% to 7.7% in the exchange-based group.

Although its effectiveness in changing eating behavior has not been studied, the Plate Method has been demonstrated to be easily accepted and understood. In May 2000, the University of Idaho Cooperative Extension Service piloted Healthy Eating with Diabetes, an eight-hour curriculum developed around the Plate Method. The program took place in a variety of settings including a classroom, supermarket, and kitchen, and included numerous hands-on activities. Extension educators taught the classes and covered the signs and symptoms of diabetes, the Idaho Plate Method, a supermarket tour, and meal preparation. Approximately 70 adults completed the class instruction (71). Most of the participants either had diabetes or had a family member who was diabetic. Program participants were asked to complete a questionnaire at the start of the first class and again after the end of the

program to better understand how Healthy Eating with Diabetes may have changed eating habits and confidence in meal planning. Compared to participants' responses before attending the classes, 75% of participants felt they had made dietary changes that improved their blood glucose levels, 100% were more conscious of trying to eat a lower fat diet, 100% were more confident about planning meals, and 100% were more confident about buying groceries. Additionally, 87% reported that they thought they had increased their intake of fruits and vegetables, 63% were using the Idaho Plate Method at mealtimes, and 100% would recommend the program to others (72).

In 2001, ODPCP, in collaboration with the Oregon State University Extension Service, implemented an education program using the Idaho Plate Method to provide nutrition and meal planning resources to Oregonians with diabetes and to caregivers of persons with diabetes. Educational materials were developed by a Registered Dietitian and classes were taught by either Registered Dietitians or Certified Diabetes Educators. The class consisted of four sessions and incorporated lessons on portion size, the importance of carbohydrate in controlling blood glucose, the Plate Method of meal planning, a supermarket tour, and a cooking class explaining healthy recipe alterations. Class participants from 13 sites within eight Oregon counties were encouraged to complete a pre-test, post-test, and six-month follow-up questionnaire evaluating participants' impressions about the program. At the beginning of the program, 37% indicated that planning meals and 43% that avoiding or limiting foods they enjoy had been a hassle for them over the previous four weeks. Furthermore, almost 60% indicated that they were not confident in being able to prepare healthy meals for someone with diabetes (73). At the end of the program, only 14% reported that planning meals and 30% that avoiding or limiting foods they enjoy was a hassle. At the end of the class, 22% reported that they were still not confident in being able to prepare healthy meals for someone with diabetes (73). Participants were satisfied

with the Idaho Plate Method class, commenting that they would recommend the class to a friend and that they appreciated the simplicity of the material. The evaluation, however, did not attempt to assess participants' eating behavior before or after the class.

MATERIALS AND METHODS

Subjects

The purpose of this evaluation was to determine whether Meals Made Easy for Diabetes, a diabetes meal planning and nutrition education curriculum, positively affected the eating behavior of individuals with diabetes and their confidence to make appropriate food choices. Adults (aged 18 and older) diagnosed with diabetes were the target population for this program; however, class participation was not limited to individuals with diabetes and non-diabetic family members and/or caregivers were allowed to attend classes and participate in the evaluation. Recruiters were asked to target their recruitment efforts at the elderly, individuals with low income or low literacy skills, Hispanics, and those interested in diabetes meal planning. Each site used different recruitment methods including posting fliers in clinics, printing ads in local newspapers, public service announcements on radio stations, and personal recruitment by health care providers or case managers.

All participants signed an informed consent form (Appendix A) before participating in the Meals Made Easy for Diabetes evaluation. A total of 188 adults at 16 class sites across 11 Oregon counties attended the Meals Made Easy classes from November 2003 through July 2004 (29 additional people attended one or more classes but did not sign an informed consent form and were not included in the evaluation) (Table 1). Inclusion in the program required that individuals be at least 18 years of age, sign an informed consent form, and complete pre-test and post-test questionnaires; however, only participants who reported that they had been diagnosed with diabetes were included in data analysis. The Institutional Review

Board of Oregon State University and the pre-Institutional Review Board of the Office of Disease Prevention and Epidemiology at the Oregon Department of Human Services, Health Services approved the evaluation. Table 1 summarizes the distribution of subjects throughout the state.

Table 1. Distribution of subjects throughout Oregon.

County	**Class Site**	**Number of Participants**
Clackamas	Milwaukie	13
Benton	Corvallis	21
Linn	Lebanon	12
Tillamook	Tillamook	2
Josephine/Jackson	Central Point	8
Lincoln	Newport	7
Lincoln	Lincoln City	7
Clatsop	Seaside	8
Klamath	Klamath Falls	21
Curry	Brookings	19
Coos	Coquille	25
Coos	Bandon	20
Curry	Gold Beach	12
Tillamook	Tillamook	8
Benton	Philomath	5
	Total	**188**

Study Design

The evaluation of this meal planning and nutrition education curriculum utilized pre-test and post-test questionnaires to determine whether participants' eating behavior or confidence to make appropriate food choices changed from the beginning to the end of participation in the Meals Made Easy for Diabetes program.

Assessment: Questionnaire 1

The pre-test questionnaire, Questionnaire 1, (Appendix B) was administered at the start of the first class session. Participants answered questions by selecting the appropriate answer and placing a mark in the corresponding box or circling the appropriate answer. Questionnaire 1 included four sections: demographics, diabetes, eating behavior, and confidence. Questions in the demographics, diabetes, and confidence sections were initially developed in a pilot evaluation of the Idaho Plate Method implemented in 2001 by ODPCP in collaboration with the Oregon State University Extension Service (73). The pilot evaluation did not attempt to assess eating behavior among the participants; however, it did assess confidence gained through the program and program satisfaction in order to gain a better understanding of whether the Idaho Plate Method was a useful educational program for Oregonians in a community setting and whether it helped individuals with healthy diabetes meal planning.

Demographics

Demographic questions included information about age, sex, race, education level, and whether the participant had been diagnosed with diabetes, cared for an individual with diabetes, or lived with an individual with diabetes. Participants were also asked about their past experience with nutrition education or meal planning.

Diabetes

The diabetes section applied only to those participants who had been diagnosed with diabetes. Questions included age at diagnosis, who shopped for most of the food in the home, and who cooked most of the food in the home.

Eating Behavior

The eating behavior section included a 7-item fruit and vegetable screener (45) and a fat screener (46), both from the National Cancer Institute of the National Institutes of Health. The 7-item fruit and vegetable screener has been validated and has been found to be a useful tool in assessing fruit and vegetable intake (44). Although the 7-item screener tends to underestimate true fruit and vegetable intake compared to longer screeners and full-length food frequency questionnaires, the short screener has the advantage of taking less time and effort for participants to complete. In the interest of manageable total questionnaire length for participant burden, the 7-item screener was included to assess fruit and vegetable consumption in the Meals Made Easy for Diabetes evaluation.

The fruit and vegetable screener asked how often the participant ate or drank the following five foods in the past month: 100% orange juice or grapefruit juice; other 100% fruit juices; green salad; French fries or fried potatoes; and baked, boiled, or mashed potatoes. The frequency response categories were as follows: Never, 1-3 times per month, 1-2 times per week, 3-4 times per week, 5-6 times per week, 1 time per day, 2 times per day, 3 times per day, 4 times per day, and 5 or more times per day. The screener also asked how many servings of the following the participant ate

in the past month: vegetables, not counting salad or potatoes; fruit, not counting juices. The serving response categories were as follows: Never, 1-3 per month, 1-2 per week, 3-4 per week, 5-6 per week, 1 per day, 2 per day, 3 per day, 4 per day, and 5 or more per day.

The 7-item fruit and vegetable screener was scored following the protocol provided by the National Cancer Institute (45). Scoring was accomplished by first converting each frequency or serving response category for each food item to the midpoint of that range (example: 1-2 times per week = 1.5 times per week), then converting monthly and weekly values to times per day each food item was reportedly consumed. Scoring for the 7-item fruit and vegetable screener assumed one serving was eaten per eating event so that the number of times the respondent reported having eaten a food item equaled the servings per day of that food item. The screener provided an estimation of a respondent's total vegetable servings per day, total fruit servings per day, and the combined total fruit and vegetable servings per day. Three of the seven items on the screener asked about fruit intake. Total fruit servings were calculated only if all three fruit items were answered. Similarly, all four items inquiring about vegetable intake must have been answered for total vegetable servings to be calculated. Total fruit and vegetable servings were calculated by adding total fruit servings and total vegetable servings; therefore, when one food item on the screener was unanswered, total fruit and vegetable servings were not calculated. Change scores (the change in the variable of interest for each participant from baseline to the end of the program) for fruit servings, vegetable servings, and combined fruit and vegetable servings were calculated for each participant by subtracting serving values at baseline from values at the end of the program.

The fat screener was designed in 1996 by the Risk Factor Monitoring and Methods Branch of the National Institutes of Health (46) to estimate an individual's

usual dietary intake of percentage of energy from fat. The fat screener has been validated as a reasonable means to gain information about percentage of energy from fat in a person's diet (48, 74). The 15 foods asked about on the instrument were selected because they were the most important predictors of variability in percentage of energy from fat among adults in USDA's 1989-91 Continuing Survey of Food Intakes by Individuals (75). The 15-food items included in the fat screener follow: Cold cereal; skim milk; eggs, fried or scrambled in margarine, butter, or oil; sausage or bacon, regular-fat; margarine or butter on bread, rolls, or pancakes; orange juice or grapefruit juice; fruit (not juices); beef or pork hot dogs, regular-fat; cheese or cheese spread, regular-fat; French fries, home fries, or hash brown potatoes; margarine or butter on vegetables; mayonnaise, regular-fat; salad dressings, regular-fat; rice; and margarine, butter, or oil on rice or pasta. The frequency response categories were as follows: Never, less than once per month, 1-3 times per month, 1-2 times per week, 3-4 times per week, 5-6 times per week, 1 time per day, and 2 or more times per day.

The fat screener was scored following the published protocol (46) by first converting the monthly or weekly frequency response for each food item to the midpoint of that frequency range, then converting monthly and weekly values to times per day each food item was eaten. Second, the amount of fat added to foods that was regular fat, not reduced-fat, was estimated by asking how often margarine added to foods was reduced-fat margarine. The response categories were as follows: didn't use margarine; almost never; about ¼ of the time; about ½ of the time; about ¾ of the time; and almost always or always. Third, standard regression coefficients were applied to each food item to determine the estimated percent of calories from fat. Frequencies for all 15-food items must have been provided in order for a percentage of energy from fat to be calculated. When one or more items were unanswered, percentage of energy from fat was not calculated. A change score for percent of

energy from fat was calculated for each participant by subtracting percent of calories from fat at baseline from percent of calories from fat at the end of the program.

During data entry, when a participant selected two frequencies for which a particular food item was eaten on either the fruit and vegetable screener or the fat screener, the less frequent answer was chosen. For example, if a participant circled both "1-3 times per month" and "3-4 times per week" for how often he/she drank 100% orange juice or grapefruit juice, then "1-3 times per month" would have been entered into the database.

Confidence

The confidence section included five questions designed to assess how confident the participant was that he/she could make healthy eating decisions in potentially challenging situations. Confidence questions were drawn from 14 questions tested in Oregon's 2001 pilot evaluation (73) and found to be the most important potential barriers to maintaining healthy eating habits. The confidence questions assessed whether program participation increased confidence in meal planning ability with a five-point Likert-type scale (1=I know I cannot to 5=I know I can). For example, participants were asked to rate their response to the question, "How sure do you feel that you can choose the appropriate foods to eat when you are hungry?"

Testing the intermediate outcome, confidence, was important because it may be easier to detect changes in confidence than detecting changes in eating behavior. Confidence, or self-efficacy, is an individual's perception of his/her own ability to perform a specific task in a given situation and may be a mediating variable between the acquisition of knowledge and behavior change based on the knowledge (21).

There are two important domains that must be addressed in order to accomplish behavior change among diabetes patients: 1) knowledge about diabetes self-management and 2) helping the person with diabetes cope with the psychological challenges that surround the diagnosis and living with diabetes (76, 77). Although the goal of diabetes management is effective self-management and the American Diabetes Association has published guidelines that, if followed, lead to effective self-management of the disease, reports of patient response rates to these care guidelines vary. For example, only 52.0% of individuals with diabetes report self-monitoring blood glucose at least once per day (1, 77). Educational interventions have the greatest impact on knowledge levels and less impact on behavioral outcomes (77). Closing the gap between knowledge and action is critical to effective diabetes self-management and self-efficacy is the link between knowing what to do and actually doing it (23). Self-efficacy is developed by a history of being able to perform a task, but can also be influenced by observing others accomplish the task and by verbal persuasion.

Scoring for the confidence section included looking at each confidence question separately as well as calculating an average confidence score for each participant. If only one of the five confidence questions was unanswered, then the average of the remaining four scores was calculated. If two or more confidence questions were unanswered, then an average confidence score was not calculated. Change scores for each individual confidence question and the overall confidence score were calculated for each participant by subtracting the baseline confidence score from the ending confidence score. Some participants circled an end label instead of a number, for example, “I know I can” instead of “5”. When this occurred, it was assumed that the participant meant his/her score to be 5 or 1 when he/she circled “I know I can” or “I know I cannot”, respectively.

Participants returned the completed questionnaires to the instructor, who then mailed the class questionnaires to ODPCP. For confidentiality, the research analyst at ODPCP coded the questionnaires, removed and destroyed the cover page that included the participant's name, and forwarded the questionnaires to the graduate student for data entry and analysis.

Intervention

The Meals Made Easy for Diabetes curriculum was administered in 11 Oregon counties to adults who had been diagnosed with diabetes, lived with someone who had diabetes, cared for someone with diabetes, or were interested in learning more about meal planning for diabetes. Certified Diabetes Educators and Registered Dietitians taught the classes. The desired outcomes of Meals Made Easy were as follows: participants would understand how food choices and serving sizes impact blood glucose; participants would be able to plan meals using the Plate Method and Nutrition Facts food labels; participants would learn how to buy healthy foods for Plate Method meals; and participants would be able to evaluate recipes and make healthy recipe substitutions for Plate Method meals.

In order to achieve the goals just described, four two-hour class sessions were designed by Carol Walsh, RD, CDE. The first class session titled, *What You Eat Makes a Difference*, taught participants how food choices and serving sizes impact blood glucose. Additionally, participants were shown the Plate Method as a simplified method for planning balanced meals and the Diabetes Food Guide Pyramid (78). *Planning Healthy Meals*, the second class session, provided participants with practice in planning meals using the Plate Method. Participants were also shown how to use Nutrition Facts labels to assist in meal and snack planning. *Shopping Smart*, the third

class, took participants on a supermarket tour to teach them how to buy healthy foods using Nutrition Facts labels and to reinforce their knowledge of Food Guide Pyramid serving sizes. The fourth class, *In the Kitchen*, taught participants techniques for evaluating recipes and making healthy recipe alterations when needed.

Each class session was carefully described and detailed for the instructor to insure uniformity of classes. PowerPoint presentations were created for classes 1, 2, and 4. For each class, the instructor was provided with an outline of the purpose, lesson theme, learning objectives, leader preparation, materials needed, and estimated teaching time for each class component.

Participants were encouraged during each class to complete a personal Action Plan (Appendix C). The Action Plan asked the participant to declare a goal related to eating behavior and describe exactly what would be done, when it would be done, and how many times it would happen. The Action Plan also included a log so that the participant could keep track of his/her progress toward the goal. The class sessions were designed to be interactive. The instructor was encouraged to foster a social environment conducive to sharing knowledge and skills by participatory nutrition education and food preparation activities. The instructor allowed time for open discussion so that self-efficacy could be further enhanced by the social support of others in the classroom.

The Meals Made Easy for Diabetes program was not intended to provide individualized meal plans for participants; therefore, individual goals for calories, carbohydrate, fat and sodium were not provided. The Diabetes Food Guide Pyramid (78) was introduced in the class and was intended to supplement, rather than replace, individualized meal planning instruction from qualified health care professionals. Regardless of individual dietary needs, participants were encouraged to increase their consumption of fruits and vegetables and to decrease their

consumption of dietary fat. Although the curriculum explained that fruits and starchy vegetables need to be portioned throughout the day because they are major sources of carbohydrate and impact blood glucose, it also emphasized that fruits and vegetables are necessary for a balanced diet and are usually low in calories. Many individuals with diabetes are overweight and could help manage their disease through weight loss. Substituting low calorie fruit and vegetables for higher calorie foods in the diet and reducing fat intake, which is calorically dense, could help people lose weight and maintain weight loss, thereby aiding diabetes management.

Assessment: Questionnaire 2

The post-test questionnaire, Questionnaire 2, (Appendix D) was administered at the end of the fourth and final class session. Again, participants were asked to answer questions by selecting the appropriate answer and placing a mark in the corresponding box or circling the appropriate answer. There were three sections included in Questionnaire 2: eating behavior, confidence, and satisfaction. The eating behavior section included the same fruit and vegetable screener and fat screener used in Questionnaire 1, but also asked about consumption of regular meals and use of the Plate Method at meals. The confidence section appeared exactly as it did in the pre-test questionnaire. Missing values and doubly answered questions were handled in the same manner as described under Questionnaire 1. A satisfaction section asked participants which Meals Made Easy for Diabetes classes they attended as well as their level of satisfaction with a variety of class components. Participants were not disqualified from the study based on the number of classes they reported having attended. Participants were also given the opportunity to include additional comments about their experience with the class in an open-ended manner.

Participants returned the completed post-test questionnaires to the instructor, who then mailed the class questionnaires to ODPCP. For confidentiality, the research analyst at ODPCP coded the questionnaires, removed and destroyed the cover page that included the participant's name, and forwarded the questionnaires to the graduate student for data entry and analysis.

Assessment: Instructor Checksheet

In an effort to assess participant involvement during the Meals Made Easy classes and to gain feedback on the curriculum from the instructors, the Instructor Checksheet was created (Appendix E). Each instructor was asked to complete a brief set of questions following each of the four class sessions. They were asked how many people attended class, whether they were able to cover all the scheduled material during class, to estimate the proportion of participants who had completed a personal Action Plan, and the proportion of participants who were actively involved in the class. Additionally, instructors were offered an opportunity to comment on their experience with the curriculum for each class session. Instructors were asked to mail their completed Instructor Checksheet to ODPCP with the post-test questionnaires after their last class.

Responses to the four questions on the Instructor Checksheets were compiled into basic frequencies. A sample of the open-ended feedback that instructors provided was included. The Instructor Checksheets were not used to answer the evaluation questions; however, they were useful in gaining a better picture of how effectively the curriculum worked from the classroom perspective of the instructor. The Instructor Checksheets were returned to ODPCP.

Statistical Analysis

Data analysis was conducted using SPSS (Statistical Package for the Social Sciences) for Windows, version 11.5. Statistical advice and assistance selecting proper statistical tests was provided by statisticians, research analysts, and epidemiologists at the Oregon Department of Human Services, Health Services. Descriptive statistics, such as frequency distributions, means, standard deviations, and medians were performed on variables before answering evaluation questions. A p-value less than 0.05 was considered significant.

Primary evaluation questions 1, 2, and 3 were answered using the Wilcoxon Signed Rank Test. A nonparametric test was required to answer the research questions after the Kolmogrov-Smirnov test showed that the variables for dietary change and change in confidence were not normally distributed. The Wilcoxon Signed Rank Test determined whether participants significantly changed their intake of fruits, vegetables, percentage of energy from fat, or their confidence surrounding dietary behavior issues from the pre-test questionnaire to the post-test questionnaire. In addition, primary evaluation questions 1 and 2 employed the McNemar Test to determine if a significantly different proportion of the study population met or exceeded the following dietary recommendations at the post-test compared to the pre-test: to eat at least five servings daily of fruits and vegetables, at least two servings daily of fruit, at least three servings daily of vegetables, and less than 35% of calories as fat.

Spearman's rho, a nonparametric test for correlations, was used to determine whether changes in confidence scores were related to changes in eating behavior. Secondary evaluation question 3 used Spearman's rho to determine whether there

was an association between changes in overall confidence and changes in total fruit and vegetable intake or percentage of energy from fat for each participant.

During data analysis, extreme values for dietary behavior were defined and labeled as missing values. This occurred in only a few cases. After calculating percentage of energy from fat, any value of 50% or greater was treated as a missing value. This decision was based on the knowledge that even an extremely high fat diet in the general population likely would not exceed 50% (79). It was assumed that when the reported percent of calories from fat was 50% or higher, the participant did not understand how to correctly complete the fat screener. A total of three cases from the pre-test questionnaire and one case from the post-test questionnaire were eliminated from the analysis of percentage of energy from fat. There was no need to establish a cut-off point on the low end for percentage of energy from fat because every participant reported a percentage of energy from fat that met or exceeded the AMDR. There were no participants who reported consuming less than 20% of their calories from fat.

RESULTS

Demographics

The sample (n=132) included adults 18 years of age and older who had been diagnosed with diabetes and was selected from within the larger group of 188 class participants on the basis of positive self-reported diabetes diagnosis. Individuals with diabetes comprised 72.9% of the total Meals Made Easy for Diabetes class and were selected for analysis because they were the target population for the intervention. Another 15.5% of class participants lived with someone who had diabetes and 3.3% helped someone who had diabetes. The results presented in this paper represent only the responses of the 132 participants with diabetes. Table 2 provides a summary of the participants' demographic characteristics.

Table 2. Demographic characteristics of 132 participants with diabetes.

Characteristic[1]	n[2]	Percentage (%)
Age (years)		
18-44	9	6.9
45-64	44	33.6
65-74	46	35.1
75+	32	24.4
Gender		
Male	34	25.8
Female	98	74.2
Race		
White	124	96.9
Other/multiracial	4	3.1
Education level		
Less than high school graduate	26	20.0
High school graduate	49	37.7
Some college	32	24.6
College graduate	23	17.7
Last received education about nutrition and meal planning		
Within past 6 months	36	27.9
Within past year	15	11.6
Over a year ago	35	27.1
Never received education	43	33.3
Age when diagnosed with diabetes (years)		
18-34	8	6.2
35-44	12	9.2
45-54	21	16.2
55-64	43	33.1
65+	46	35.4
Person who chooses and buys food in home		
Self	107	81.7
Spouse	18	13.7
Another family member, roommate or housemate	3	2.3
Hired caregiver	1	0.8
Other	2	1.5
Person who cooks food in home		
Self	106	80.3
Spouse	19	14.4
Another family member, roommate or housemate	3	2.3
Other	4	3.0

[1] See Appendix A.
[2] Numbers may not add up 132 due to lack of participant response.

The median age for the sample was 67 years and the range from 22 to 97 years. Only 6.9% of the sample was under 45 years of age. The median age at diagnosis in this group was 60 years and the youngest age at diagnosis was 22 years.

The sample was primarily female (74.2%) and overwhelmingly white (96.9%). Other races included: American Indian or Alaskan native (0.8%), Asian or Pacific Islander (0.8%), and other or multiracial (1.6%). The study sample was more predominately white than the general population of Oregon. Data from the 2000 Oregon census (80) indicate that the population of Oregon is predominately white (86.6%), followed by Hispanic (8.0%), Asian (3.0%), Black or African American (1.6%), American Indian or Alaskan Native (1.3%), and Native Hawaiian or other Pacific Islander (0.2%). Only 1.6% of the sample in this study reported being Hispanic or Latino from any race.

Over half (57.7%) of the sample had not attended college. Twenty percent had less than a high school education and 37.7% had graduated from high school. One-fourth (24.6%) of the participants had attended some college and 17.7% had graduated from college. The education level of the sample was comparable to the Oregon population of adults with diabetes according to the 2003 Oregon Behavioral Risk Factor Surveillance System Survey (81). The survey found that 17% of Oregon adults with diabetes had less than a high school education, 34% had graduated from high school or earned a GED, 27% had attended some college or technical school, and 22% had four or more years of college.

One-third (33.3%) of the sample reported that they had never received education about nutrition or meal planning from a doctor, diabetes educator, or other health care professional, while 27.9% reported having received education within the

past six months. Another 38.7% reported that they had received nutrition or meal planning education at least six months prior to completing the questionnaire.

The majority of the participants reported that they were in control of their own food choices and food preparation. Eighty-two percent (81.7%) of the participants reported that they chose and purchased most of the food in their home and 80.3% reported being responsible for most of the food cooked in the home.

Eating Behavior

Table 3 provides an overview of the results from the 7-item fruit and vegetable screener. For most of the food items, the mean number of servings was larger than the median number of servings. This was the result of many very low and zero reported intakes for the individual food items. Additionally, the range was large for the individual food items, oftentimes ranging from zero servings up to five servings per day. The median, rather than the mean was used to discuss dietary behavior change because food choice data were not normally distributed. Median servings of green salad and baked, boiled, or mashed potatoes appeared to be somewhat higher at the end of the program than at baseline, while servings of fried potatoes, other vegetable servings, and the three fruit items remained the same.

Table 3. Self-reported daily fruit and vegetable servings from the fruit and vegetable screener (n=132).

Fruit and Vegetable Screener: Fruit and Vegetable Intake							
Food Item	n	Baseline			Ending		
		Mean ± SD	Median	Range	Mean ± SD	Median	Range
100% orange juice or grapefruit juice	68	0.18 ± 0.29	0.07	0-1.00	0.17 ± 0.30	0.07	0-1.00
Other 100% fruit juice	70	0.21 ± 0.45	0.03	0-3.00	0.29 ± 0.76	0.00	0-5.00
Fruit servings (not including juices)	72	1.28 ± 1.11	1.00	0-5.00	1.56 ± 1.21	1.00	0-5.00
Green salad	73	0.62 ± 0.64	0.50	0-3.00	0.76 ± 0.55	0.79	0.07-3.00
Fried potatoes	73	0.15 ± 0.59	0.07	0-5.00	0.07 ± 0.11	0.07	0-0.50
Baked, boiled, mashed potatoes	74	0.23 ± 0.48	0.14	0-4.00	0.21 ± 0.20	0.21	0-1.00
Vegetable servings (not including potatoes or green salad)	73	1.42 ± 1.10	1.00	0-5.00	1.61 ± 1.24	1.00	0.21-5.00
Total fruit servings[1]	66	1.68 ± 1.26	1.28	0.13-7.07	1.90 ± 1.36	1.75	0.07-5.50
Total vegetable servings[2]	72	2.44 ± 1.57	2.10	0.27-9.07	2.68 ± 1.36	2.57	0.50-6.07

[1]Total fruit servings=100% orange juice or grapefruit juice + other 100% juice + fruit servings.
[2]Total vegetable servings=green salad + fried potatoes + baked, boiled, mashed potatoes + vegetable servings.

Primary Evaluation Question 1: Did participants with diabetes report eating more servings of fruits and vegetables after Meals Made Easy for Diabetes than before?

Tables 4 through 9 provide results from the 7-item fruit and vegetable screener to answer primary evaluation question 1. Total combined fruit and vegetable consumption for the participants before and after Meals Made Easy for Diabetes is shown in Table 4. Although consumption did not increase significantly, results were in the direction of an increase. The median change in number of daily servings of fruits and vegetables from beginning to end of program participation was

+0.7 servings. Additionally, 60.6% of participants increased their servings per day of fruits and vegetables during the Meals Made Easy for Diabetes program. The hypothesis that total fruit and vegetable servings per day would increase during Meals Made Easy for Diabetes was not supported by the data.

Table 4. Comparison of number of self-reported servings of fruits and vegetables reported by participants before and after intervention[1].

Fruit and Vegetable Screener: Servings of Fruits and Vegetables				
	n	Mean ± SD	Median	Range
Baseline	66	4.2 ± 2.3	3.7	0.7 - 11.1
Ending	66	4.6 ± 2.4	4.4	1.3 - 10.6
Change	66	0.4 ± 2.6	0.7	-9.0 - 5.7

[1] The Wilcoxon Signed Rank Test was used to test for differences between baseline and ending number of servings. *$p<0.05$, **$p<0.01$.

The Dietary Guidelines for Americans (2000) state that at least five servings of fruits and vegetables should be eaten daily for optimal health and reduced disease risk (13). Before the program, 33.3% of participants reported consuming five or more servings of fruits and vegetables daily (Table 5). After the program, 39.4% of participants reported eating five or more servings of fruits and vegetables daily. Although this higher proportion (18.3%) of participants who met or exceeded the nutrition recommendation was not statistically significant, it was encouraging.

Table 5. Comparison of the proportion of participants who reported eating 5 or more servings of fruits and vegetables per day before and after intervention[1].

Fruit and Vegetable Screener: Fruit and Vegetable Intake			
	n	Met or exceeded recommendation (%)	Did not meet recommendation (%)
Baseline	66	33.3	66.7
After intervention	66	39.4	60.6

[1] The McNemar Test was used to test for differences before and after the intervention. *p<0.05, **p<0.01.

The trend toward an increase in total fruit and vegetable servings was evident for both fruit servings and vegetable servings. Table 6 shows that median daily fruit servings did not increase significantly, although the data were in the direction of an increase during program participation. Median daily fruit servings was below the recommended two or more servings per day both at the start and at the end of the program; however, at the beginning of the program, 39.4% of participants reported meeting or exceeding the recommendation, while at the end of the program 48.5% of participants reported meeting or exceeding the recommendation (Table 7). From the start to the end of the program, 53.0% of participants reported eating greater numbers of daily servings of fruit. The data did not support the hypothesis that total daily fruit servings would increase during program participation.

Table 6. Comparison of number of self-reported servings of fruit before and after intervention[1].

Fruit and Vegetable Screener: Servings of Fruits				
	n	Mean ± SD	Median	Range
Baseline	66	1.7 ± 1.3	1.3	0.1-7.1
Ending	66	1.9 ± 1.4	1.7	0.1-5.5
Change	66	0.2 ± 1.3	0.5	-5.0 - 3.9

[1] The Wilcoxon Signed Rank Test was used to test for differences between baseline and ending number of servings. *p<0.05, **p<0.01.

Table 7. Comparison of the proportion of participants who reported eating 2 or more servings of fruit per day before and after intervention[1].

Fruit and Vegetable Screener: Fruit Intake			
	n	Met or exceeded recommendation (%)	Did not meet recommendation (%)
Baseline	66	39.4	60.6
After intervention	66	48.5	51.5

[1] The McNemar Test was used to test for differences before and after the intervention. *p<0.05, **p<0.01.

Daily vegetable servings increased significantly from the start to the end of Meals Made Easy for Diabetes (p=0.04) (Table 8). Intake of vegetables increased 0.5 servings from 2.1 to 2.6 daily servings over the course of the program. Nearly two-thirds (61.1%) of participants reported eating a greater number of vegetable servings per day after than before the program. Although a significantly greater proportion of program participants did not meet or exceed the recommendation to consume three or more vegetable servings daily following program participation, results were in the direction of an improvement. Table 9 shows that 31.9% met or exceeded the vegetable recommendation at the start of the program, compared to 37.5% at the end of the program. The data support the hypothesis that total daily vegetable servings would increase during participation in Meals Made Easy for Diabetes.

Table 8. Comparison of number of self-reported servings of vegetables before and after intervention[1].

Fruit and Vegetable Screener: Servings of Vegetables				
	n	Mean ± SD	Median	Range
Baseline	72	2.4 ± 1.6	2.1	0.3-9.1
Ending	72	2.7 ± 1.4	2.6*	0.5-6.1
Change	72	0.3 ± 1.5	0.5	-4.5 – 5.3

[1] Differences between baseline and ending number of servings were detected with the Wilcoxon Signed Rank Test. *p<0.05, **p<0.01.

Table 9. Comparison of the proportion of participants who reported eating 3 or more servings of vegetables per day before and after intervention[1].

Fruit and Vegetable Screener: Vegetable Intake			
	n	Met or exceeded recommendation (%)	Did not meet recommendation (%)
Baseline	72	31.9	68.1
After intervention	72	37.5	62.5

[1] The McNemar Test was used to test for differences before and after the intervention. *p<0.05, **p<0.01.

Primary Evaluation Question 2: Did participants with diabetes report eating a lower percentage of energy as dietary fat after Meals Made Easy for Diabetes than before?

Tables 10 and 11 provide results from the fat screener in answer to primary evaluation question 2. Table 12 shows the results for selected food items from the fat screener. Mean percent of calories from fat did not significantly decrease from the start to the end of Meals Made Easy for Diabetes, but the results were in the direction of a decrease (Table 10). The current AMDR states that calories from fat should comprise 20-35% of total caloric intake (17). Both the mean and median percent of calories from fat were within the current AMDR recommendation before and after Meals Made Easy for Diabetes. There were no participants who reported consuming less than 20% of total calories from fat on either the pre-test questionnaire or post-test questionnaire; however, several participants reported consuming more than 35% of calories as fat on the pre-test questionnaire (n=15) and on the post-test questionnaire (n=11). The proportion of participants who met the recommendation did not increase significantly, but the results were in the direction of an improvement. The data did not support the hypothesis that percentage of energy from fat would decrease during participation in Meals Made Easy for Diabetes.

At the start of the program, 62.5% of participants met the recommendation to consume 35% or less of calories as fat, while 72.5% met the recommendation at the end of the program (Table 11). Over half (57.5%) of participants reported a decrease in the percent of calories they consumed from fat during program participation.

Table 10. Comparison of self-reported percentage of energy from fat before and after intervention[1].

Fat Screener: Percent of Calories from Fat				
	n	Mean ± SD	Median	Range
Baseline	40	34.1 ± 5.7	33.3	25.0-48.0
Ending	40	32.6 ± 4.6	32.4	23.0-45.0
Change	40	-1.5 ± 5.1	-0.9	-15.2 – 7.3

[1] The Wilcoxon Signed Rank Test was used to test for differences between baseline and ending number of servings. *p<0.05, **p<0.01.

Table 11. Comparison of the proportion of participants who reported consuming between 20% and 35% of total calories as fat before and after intervention[1].

Fat Screener: Percent of Calories from Fat Intake			
	n	Met recommendation (%)	Did not meet recommendation (%)
Baseline	40	62.5	37.5
After intervention	40	72.5	27.5

[1] The McNemar Test was used to test for differences before and after the intervention. *p<0.05, **p<0.01.

Table 12. Self-reported daily servings of selected food items from the fat screener (n=132).

Fat Screener: Servings of Selected Food Items							
Food Item	n	Baseline			Ending		
		Mean ± SD	Median	Range	Mean ± SD	Median	Range
Eggs, fried or scrambled in margarine, butter, oil	70	0.24 ± 0.27	0.21	0-1.00	0.23 ± 0.31	0.21	0-2.00
Sausage/bacon, regular-fat	69	0.12 ± 0.18	0.07	0-1.00	0.10 ± 0.14	0.07	0-0.78
Margarine/butter on bread, rolls, pancakes	66	0.64 ± 0.65	0.50	0-2.00	0.44 ± 0.55	0.21	0-2.00
Beef or pork hot dogs, regular-fat	67	0.21 ± 0.43	0.02	0-2.00	0.11 ± 0.22	0.02	0-1.00
Cheese/cheese spread, regular-fat	69	0.42 ± 0.47	0.21	0-2.00	0.31 ± 0.38	0.21	0-2.00
French fries, home fries, hash browns	71	0.08 ± 0.17	0.02	0-1.00	0.04 ± 0.08	0.02	0-0.50
Margarine/butter on vegetables	68	0.45 ± 0.58	0.21	0-2.00	0.27 ± 0.35	0.21	0-2.00
Mayonnaise, regular-fat	67	0.29 ± 0.46	0.07	0-2.00	0.19 ± 0.34	0.07	0-2.00
Salad dressings, regular-fat	64	0.26 ± 0.41	0.07	0-2.00	0.28 ± 0.44	0.07	0-2.00
Margarine/butter/oil on rice or pasta	70	0.13 ± 0.20	0.02	0-0.78	0.08 ± 0.18	0.00	0-1.00

Confidence

Primary Evaluation Question 3: Did participation in Meals Made Easy for Diabetes increase participants with diabetes' confidence in their ability to plan and consume healthy, balanced meals?

Tables 13 and 14 show the effect that Meals Made Easy for Diabetes had on the confidence that participants with diabetes had in their ability to plan and consume healthy, balanced meals. Five questions were asked on the pre-test and post-test questionnaires in an effort to gain insight into how confident the participant felt that

he/she could adhere to healthy eating behaviors in potentially challenging situations. Table 13 shows the average of the five confidence questions. There was a significant increase in average confidence score from 3.4 to 4.0 ($p<0.01$) during participation in Meals Made Easy for Diabetes. From the start to the end of the program, 71.6% of participants reported an increase in their overall confidence. The data support the hypothesis that overall confidence would increase during program participation.

Table 13. Comparison of overall confidence score reported by participants before and after intervention[1].

Overall Confidence Score				
	n	Mean[2] ± SD	Median	Range
Baseline overall confidence	67	3.4 ± 0.9	3.4	1-5
Ending overall confidence	67	4.0 ± 0.6	4.0**	2-5
Change	67	0.7 ± 0.8	0.6	-0.6 - 3.4

[1] Differences between baseline and ending number of servings were detected with the Wilcoxon Signed Rank Test. *$p<0.05$, **$p<0.01$.
[2] A 5-point rating scale was used: 1=I know I cannot, 5=I know I can. Overall confidence scores were the average of scores for the five questions.

The results for each individual confidence question are shown in Table 14. The mean confidence score significantly increased for each of the five questions ($p<0.01$). The hypothesis that confidence on a variety of individual measures would increase during participation in Meals Made Easy for Diabetes was supported by the data.

Following participation in Meals Made Easy for Diabetes, 53.0% of subjects felt more confident that they could follow a healthy diet when preparing or sharing food with non-diabetics, 57.4% felt more confident that they could choose appropriate foods to eat when they were hungry, and 55.1% felt that they were better able to

adhere to their healthy eating plan when they felt depressed, bored, or tense. Nearly half (45.6%) of the participants reported that they felt more confident after the program that they could eat smaller dinner portions and 48.5% felt that they could add less fat to food than a recipe called for.

Table 14. Comparison of individual confidence measures reported by participants before and after intervention[1].

Confidence Scores for Individual Confidence Questions								
Confidence Question	n	Baseline			End			Mean change in confidence from baseline ± SD
		Mean[2] ± SD	Median	Range	Mean ± SD	Median	Range	
Sharing food with others	66	3.4 ± 1.1	3	1-5	4.1 ± 1.0	4**	2-5	0.7 ± 1.1
When hungry	68	3.2 ± 1.1	3	1-5	3.9 ± 0.9	4**	2-5	0.8 ± 1.2
When emotional	69	3.0 ± 1.2	3	1-5	3.7 ± 1.1	4**	1-5	0.7 ± 1.2
Eat smaller dinner portions	68	3.7 ± 1.1	4	1-5	4.2 ± 0.9	4**	1-5	0.5 ± 1.2
Add less fat to recipes	68	3.6 ± 1.2	4	1-5	4.3 ± 0.9	5**	1-5	0.7 ± 1.1

[1] Differences between baseline and ending number of servings were detected with the Wilcoxon Signed Rank Test. *$p<0.05$, **$p<0.01$.
[2] A 5-point rating scale was used: 1=I know I cannot, 5=I know I can.

<u>Secondary Evaluation Question 1: Which meal did participants with diabetes report eating most regularly?</u>

Table 15 shows the results for secondary evaluation question 1. After program participation, all participants reported that they ate breakfast, lunch, and dinner at least once a week. Nearly 80% of participants reported that they ate

breakfast and lunch every day. A greater proportion (93.2%) reported having eaten dinner daily, than either breakfast or lunch. The data support the hypothesis that dinner would be the meal eaten most regularly among participants.

Table 15. Comparison of frequency with which participants ate breakfast, lunch, and dinner[1].

Frequency of Meals Eaten			
	n	Ate meal at least once a week (%)	Ate meal daily (%)
Breakfast	74	100	79.7
Lunch	74	100	78.4
Dinner	74	100	93.2

[1]Data from Questionnaire 2.

Secondary Evaluation Question 2: During which meal were participants with diabetes most likely to use the Plate Method?

Table 16 shows the results for secondary evaluation question 2. The majority of participants reported that they used the Plate Method at least once a week after program participation. Participants employed the Plate Method less often at breakfast (67.1%) than at lunch or dinner (83.3% and 87.5%, respectively). Fewer participants reported having used the Plate Method during meal preparation on a daily basis: 38.9% of participants used the Plate Method to plan dinner every night of the week, while under one-third of participants reported having used the Plate Method daily for breakfast or lunch preparation. The hypothesis that dinner would be the meal during which participants would most frequently employ the Plate Method was supported by the data.

Table 16. Comparison of frequency with which participants used Plate Method at breakfast, lunch, and dinner[1].

Frequency of Plate Method Used by Meal			
	n	Used Plate Method at least once a week (%)	Used Plate Method daily (%)
Breakfast	73	67.1	30.1
Lunch	72	83.3	27.8
Dinner	72	87.5	38.9

[1]Data from Questionnaire 2.

Secondary Evaluation Question 3: Was change in overall confidence associated with change in dietary behavior among participants with diabetes?

Spearman's rho was used to determine whether change in overall confidence scores was associated with change in servings of fruits and vegetables or percent of calories from fat for each participant. There appeared to be no association between changes in overall confidence scores and changes in eating behavior (Table 17); however, the correlation between change in overall confidence score and change in total vegetable servings approached significance. The data did not support the hypothesis that change in overall confidence was associated with change in dietary behavior. Figures 1 through 3 graphically depict each of the correlations.

Table 17. Associations between change overall confidence score and change in servings of fruits and vegetables or percent of calories from fat for each participant.

Correlation Between Change in Overall Confidence Score and Change in Eating Behaviors			
Eating Behavior	n	Spearman's rho	Significance (2-tailed)
Change in fruit and vegetable servings	60	.140	.287
Change in vegetable servings	65	.219	.080
Change in percent of calories from fat	40	-.094	.564

Figure 1. Correlation between change in overall confidence score and change in total fruit and vegetable servings.

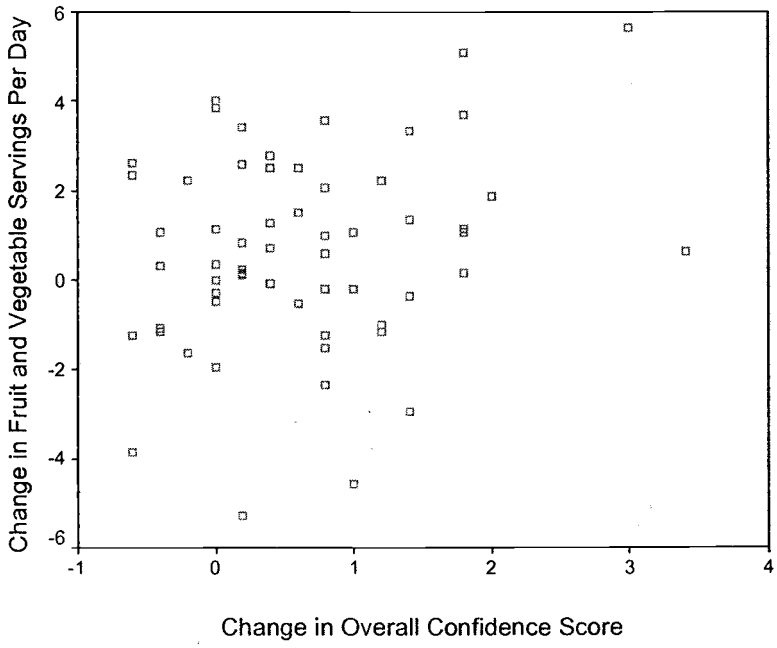


Figure 2. Correlation between change in overall confidence score and change in total vegetable servings.

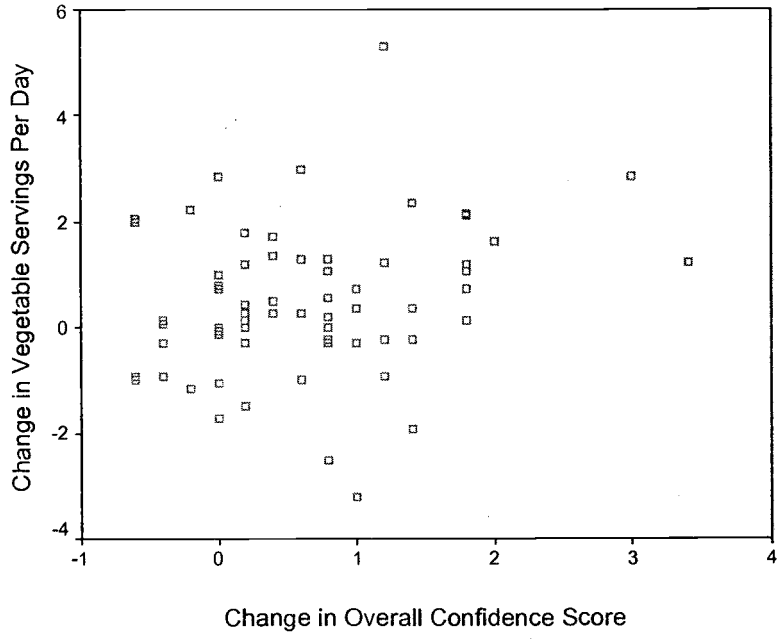
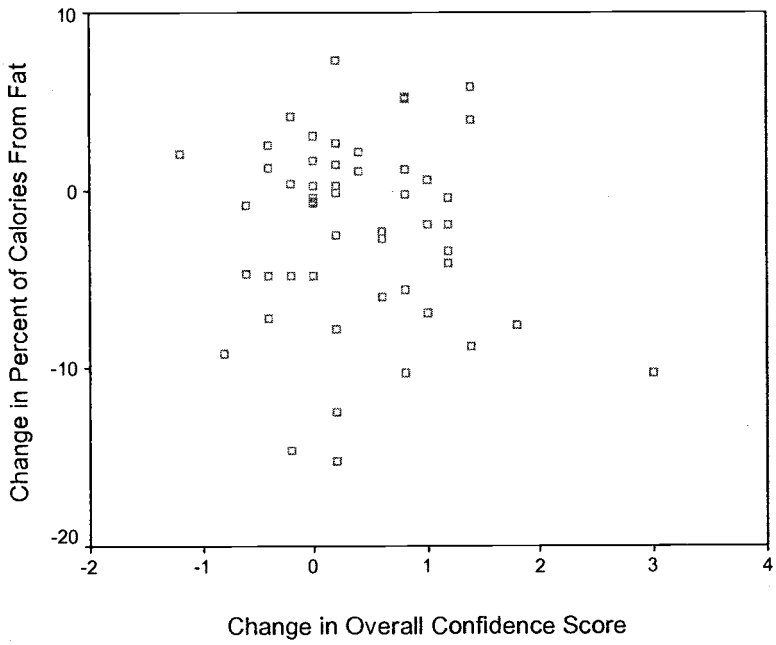


Figure 3. Correlation between change in overall confidence score and change in percent of calories from fat.



Program Satisfaction and Participation

Satisfaction with the Meals Made Easy for Diabetes program was very high. Participants were asked to rate their satisfaction with a variety of class components. Table 18 displays the results of participants' satisfaction with the program.

Table 18. Participant satisfaction[1].

Participants' Program Satisfaction			
Program Component	n	Very Satisfied[2] (%)	Somewhat Satisfied or Very Satisfied[3] (%)
Meals Made Easy program in general	70	92.9	100
Location of class	70	88.6	100
Amount of material covered	71	90.1	100
Visual aids	71	91.5	97.1
Time available for questions/discussion	71	93.0	98.6
Meal planning skills learned	70	82.9	100
Supermarket tour activity	64	76.6	96.9
Plate Method activity	73	86.3	100
Cooking activity	70	85.7	100

[1] Satisfaction rated on scale where 1=not at all satisfied, 2=somewhat dissatisfied, 3=neither satisfied or not satisfied, 4=somewhat satisfied, 5=very satisfied.
[2] Received rating of 5=very satisfied.
[3] Received rating of 5=very satisfied or 4=somewhat satisfied.

Participants were given an opportunity to provide written comments about the Meals Made Easy for Diabetes program. Over 40 participants commented on the classes. Several participants shared favorable impressions of class instructors and the atmosphere of the classes. Table 19 shares some of the comments provided by participants.

Table 19. Additional comments from participants[1].

This class has helped me deal with my blood glucose. It has been lower! Thank you. I've been reading labels since I found out that I'm diabetic.
I enjoyed learning about how I can prepare food in so many different, and tasteful, ways.
I wish we could have more daytime classes like this. Very well presented and I learned a lot.
Very helpful! Too bad there were only four classes.
The hands-on classes were just great. It really helped to know what to do.
The instructor was very well informed, easy to relate to and helpful. There was humor as well as information, which added to the enjoyment of the class.
The plate method was new to me and I found it very helpful.
The instructor covered lots of info for things I wouldn't even think about. I picked up practical, everyday, useful applications on controlling my eating habits (portion control). The "Plate Method" worked wonders for myself and my husband. The cooking sessions were a real treat—so good!
The nine-inch plate with divisions was such a supreme help and revelation!
Offer another series of this class. I have some ask if there will be another class.
Learned much about diet and diabetics, how to read food labels, and understand how I react to different foods. Can now devise and plan diet. Helped me lose weight. 35 pounds in four months.
The teacher was very interesting and lively and made people feel relaxed. I give her an A+.
I was very pleased with the classes and the instructor and her willingness to answer questions. Also the input from those attending. Thank you.
Writing things down made me more aware of what I eat.
Teaching staff made classes interesting, informative, and fun.

[1] Quotes from participants.

Class instructors were asked to complete a brief checksheet after each class session (Appendix E). The results of eight returned checksheets (response rate=50.0%) indicate that instructors were generally able to cover all scheduled curriculum topics (Table 20). When they were unable to cover all the scheduled class material, they reported that the personal Action Plan was omitted from the schedule. Three instructors commented that they needed more time during Class 2 to complete the Nutrition Facts label activity. For each of the classes, three instructors reported that less than one-third of the participants in their class had completed a personal Action Plan. Half of the instructors reported that over two-thirds of class participants

had completed an Action Plan at Class 1. At Classes 2, 3, and 4, only two instructors reported that over two-thirds of class participants had completed an Action Plan. Active class participation was high. For Classes 1, 3, and 4, all eight instructors reported that over two-thirds of class participants were actively engaged in the class material.

Table 20. Responses from instructors (n=8)[1].

Instructor Feedback				
	Class 1	Class 2	Class 3	Class 4
Cover all scheduled topics?				
Yes	6	5	7	8
No	2	3	1	0
Proportion of participants who completed an Action Plan				
<1/3	3	3	3	3
1/3 to 2/3	0	2	3	3
>2/3	4	2	2	2
Proportion of participants who actively took part in class				
<1/3	0	0	0	0
1/3 to 2/3	0	1	0	0
>2/3	8	7	8	8

[1] Numbers may not add up to eight due to instructor non-response.
[2] Data are number of instructors out of the eight total.

DISCUSSION

The literature indicates that it is extremely important for individuals diagnosed with diabetes to eat a healthy, balanced diet that keeps their blood glucose at a nearly normal concentration (4, 6). Many educational interventions have been developed with the goal of increasing diabetes self-management (22, 57, 59, 61, 62). Meals Made Easy for Diabetes was designed to improve the nutrition and meal planning aspect of diabetes self-management. This evaluation attempted to establish whether Meals Made Easy for Diabetes was effective among a population of adults with diabetes at 1) increasing confidence in planning and consuming healthy meals 2) increasing fruit and vegetable intake and decreasing percentage of energy from fat.

Eating Behavior

Participants in the intervention increased their intake of vegetables from 2.1 to 2.6 daily servings from the beginning to the end of Meals Made Easy for Diabetes. They did not significantly increase daily servings of fruits or fruits and vegetables combined, but these data were in the direction of positive change. Median combined fruit and vegetable consumption did not meet the 2000 Dietary Guidelines for Americans recommendation to eat at least five servings of fruits and vegetables daily either before or after the intervention. The finding that there was a significant increase in vegetable servings but not fruit servings could be due to there simply being more food items on the 7-item fruit and vegetable screener that were summed to calculate total vegetable servings. Four of the seven food items on the screener were vegetable items and only three were fruit items. The small number of total

questions and the small number of fruit items asked about on the screener may not have allowed a difference in fruit servings to be detected. If this was the case, then it might explain the lack of an increase in fruit servings as well as the lack of an increase in combined fruit and vegetable intake following the intervention.

Our reported baseline 4.2 servings of fruits and vegetables corresponded with baseline servings of fruits and vegetables reported in studies of healthy adults. Using the 7-item screener, Hunt et al found baseline servings of fruits and vegetables was 3.5 servings per day among 1,096 female community health center employees (47). Thompson et al, using the 7-item screener, found daily fruit and vegetable servings among over 800 healthy males and females ages 50 to 69 years of age was 3.7 and 4.2 servings, respectively (43). A year earlier, another research team used the 7-item screener and found that healthy adult males and females from the 5-A-Day For Better Health study centers consumed 3.1 and 3.8 servings of fruits and vegetables per day, respectively (82).

In a review of 22 intervention studies among healthy and disease-diagnosed adults, adolescents, and children, Ammerman et al found that there was a significant increase in fruit and vegetable servings in 17 of the studies and that the average increase in fruit and vegetable intake was 0.6 servings (36). Several studies used the 7-item fruit and vegetable screener and found significant increases in daily servings of fruits and vegetables that ranged from +0.5 to +0.9 servings (55, 64, 65, 83). Our median change of +0.5 daily servings of fruits and vegetables was not statistically significant. Both our sample size (n=132) and the length of our intervention (four two-hour classes) may explain why our results were not as strong as other studies. Buller and associates reported a significant increase of +0.46 daily servings of fruits and vegetables after conducting an 18-month intervention among 905 participants (64). Havas and associates reported an increase of +0.56 daily servings of fruits and

vegetables after carrying out a two-year, multifaceted intervention among over 1,400 subjects (65). Similarly, Campbell and associates found an increase of +0.85 daily servings of fruits and vegetables following an intervention lasting 20 months and including over 2,500 participants (55). Marcus and associates conducted a brief educational intervention to increase fruit and vegetable consumption that involved only telephone communication and follow-up mailings and found a significant increase of 0.63 daily servings of fruits and vegetables; however, this study included 861 subjects in the intervention group (83). It is clear that our intervention boasted neither the large sample size nor the duration of the interventions just described.

In our evaluation, the proportion of participants who reported eating five or more servings of fruits and vegetables per day was in the direction of an improvement from 33.3% to 39.4%. Although not statistically significant, this finding suggests that the program may have positively impacted several participants. Dietary data from the Third National Health and Nutrition Examination Survey (NHANES III) indicate that among a national sample of 1,480 adults with a self-reported diagnosis of type 2 diabetes, 38% ate at least five servings of fruits and vegetables per day (35). The national data for individuals with diabetes were based on 24-hour recalls and it has been reported that the 7-item screener overestimates fruit and vegetable intake compared to recalls (44). It is possible that our sample may have begun the intervention with a lower intake than was actually reported.

There was a trend toward a decrease in the percentage of energy participants consumed as fat. The median percentage of energy from fat was 33.3% before the intervention and 32.4% after the intervention. This was a very modest reduction compared to an average decrease of 7.3% of calories from fat reported in a review of 49 interventions (36).

The percentage of energy from fat both at baseline and after the intervention in our evaluation were similar to cross-sectional national survey findings. The results from the 1995 Continuing Survey of Food Intakes for Individuals (CSFII), reported that males and females aged 19 to 50 years consumed 33.1% and 32.8% of calories as fat, respectively (79). Data from NHANES III from 1988-1994 show that for all ages of the nation's population, the daily mean percentage of energy from fat was 32.7% (84). The fact that our participants' percentage of energy from fat both before and after Meals Made Easy for Diabetes was in line with national survey findings implies that our subjects initially were typical in fat intake and that the intervention had little effect on participants' fat intake.

Ten percent more of our participants (72.5% and 62.5% of the total, respectively) met the recommendation to consume 20-35% of their daily energy as fat after the intervention than before. Data from NHANES III indicate that 42% of survey respondents with type 2 diabetes reported consuming 30-40% of their daily energy as fat and 26% reported intakes of >40% of their daily energy as fat (35). The NHANES III data on fat intake were based on one 24-hour recall from 1,480 respondents aged 17 years and older. The fat screener used in our study has been shown to underestimate percentage of energy from fat compared to a more detailed questionnaire (48). It is difficult to compare the reported percentage of energy from fat in our study to national survey findings because of the difference in data collection methods.

There is controversy over whether a low-fat versus moderate-fat diet is best for adults with diabetes; however, there is generally agreement that, in addition to increased consumption of fruits and vegetables, saturated fat and cholesterol intake should be decreased (4, 6). Whereas previous dietary recommendations stated that saturated fat intake should comprise less than ten percent of daily energy intake, the

current AMDR recommends that saturated fat intake be as low as possible (17). Unfortunately for this evaluation, saturated fat intake was not measured. The fat screener was designed to estimate percentage of energy consumed as total fat and does not allow for estimations of saturated fat, monounsaturated fat, polyunsaturated fat, or cholesterol.

Confidence

Confidence, or self-efficacy, increased significantly from baseline to the end of Meals Made Easy for Diabetes. Overall confidence increased from 3.4 to 4.0 from the start to end of program participation. Confidence also increased for each of the five individual confidence questions. After the program, participants felt more confident that they could plan and consume a healthy, balanced diet when sharing food with other people; when they were hungry; when they were feeling bored, emotional, or stressed; eat smaller dinner portions; and add less fat when cooking than called for by a recipe.

The reported increase in confidence following program participation was expected. It has been suggested that self-efficacy among adults with diabetes is increased when education includes the following factors: involving people with diabetes in their own care, guiding them in actively learning about diabetes, exploring their feelings about having diabetes, and teaching them the necessary skills to change their behavior and control their own health outcomes (77). Meals Made Easy for Diabetes was designed to actively engage participants in learning about diabetes, discussing their feelings and frustrations about the disease, and helping them gain knowledge about healthy and realistic meal planning. It has also been suggested that self-efficacy is enhanced when the self-care regimen is simplified (85). The Plate

Method is a simplified meal planning approach and Meals Made Easy for Diabetes strived to make meal planning simple for participants. Instructors emphasized simplicity and endorsed enjoyment of food using moderation. Participants did not find any complicated mathematics or conversions in Meals Made Easy for Diabetes. It was, possible, therefore, for nearly any interested person to attend class and come away with a better understanding of appropriate meal planning for diabetes.

Changes in self-efficacy may be easier to detect than specific dietary behavior changes. Self-efficacy is considered an intermediate outcome measure and, as such, is necessary for behavior change to occur (21, 22, 26, 77). Social Cognitive Theory, the Transtheoretical Model, and the Health Belief Model suggest that before increasing fruit and vegetable intake and decreasing percentage of energy from fat, participants need to have 1) the knowledge that the dietary changes would benefit diabetes self-management and knowledge of specific ways to accommodate dietary changes and 2) the confidence to enact dietary changes. The goal, of course, is effective diabetes self-management, but increased self-efficacy is a critical step on the way to accomplishing changes in behavior. Self-efficacy has been studied in relation to changes in fruit and vegetable intake and has been found to be an important mediating variable among low-income women (65), young adults (26) and older adults (27).

Frequency of Use of Plate Method

Participants reported that they both ate dinner and applied the concept of plate division at dinner more frequently than either breakfast or lunch by the end of the intervention. Although dinner was reportedly eaten daily by 93.2% of the participants, the Plate Method was reportedly used at dinner on a daily basis by only

38.9% of the participants. It was encouraging to see that 87.5% of participants reported that they used the Plate Method at dinner at least once per week. Daily use of the Plate Method at breakfast and lunch was 30.1% and 27.8%, respectively.

Effective use of the Plate Method in diabetes meal planning requires that it be used more frequently than once each week. It is difficult to know why participants failed to use the Plate Method more frequently. One possibility was that participants needed more time to practice using the Plate Method for it to become habitual at mealtimes. It is also possible that participants did not understand the Plate Method clearly enough to make use of it at home or that they did not know how to overcome potential barriers, such as fitting their food combinations into the plate divisions.

Association of Change in Overall Confidence with Change in Eating Behavior

No association was found between changes in overall confidence and changes in eating behavior. Change in overall confidence approached an association with change in vegetable intake, but the relationship was not significant. Perhaps small sample size (n=65) prevented an association from being detected. Sample sizes for the associations between changes in overall confidence and changes in total fruit and vegetable intake and changes in percentage of energy from fat were smaller yet and the associations were further from emergence. It is also important to consider that the nature of the intervention may have influenced confidence to make dietary behavior changes more than it influenced dietary practice. The intervention was short in duration and required only that participants attended one class session each week for four weeks. Perhaps an intervention that involves a greater time commitment from participants and appears in many facets of participants' lives would

be able to detect an association between overall confidence and changes in eating behavior.

Other studies have found self-efficacy to be associated with healthful behaviors (86, 87) and glycemic control (76). In a study among 118 inner-city African American women with type 2 diabetes, Skelly and associates found that self-efficacy explained diet, exercise, and self-monitoring of blood glucose (86). Self-efficacy predicted insulin-related self-care practices in a sample of 142 adults managing their diabetes through intensive insulin therapy (87). Anderson and associates reported that self-efficacy and attitudes toward diabetes increased and glycosylated hemoglobin levels decreased following a six-week intervention among patients with diabetes (76). The concept of self-efficacy appears in many theoretical frameworks, including Social Cognitive Theory and the Transtheoretical Model, and has repeatedly been found to be a mediating variable to behavior change (20).

LIMITATIONS

Several limitations of this evaluation should be noted. A major limitation of this evaluation was that all outcome measures were self-reported by participants. Although it would have been ideal to obtain blood samples from each participant and measure serum retinol as an indicator of vitamin A and carotenoid intake or to measure glycosylated hemoglobin as an indicator of blood glucose control, the necessary funding was not available. It would also have been helpful to collect multiple 24-hour diet recalls from each participant as an estimate of true fruit and vegetable and fat intake. These measures were not taken so, consequently, this evaluation was based on self-reporting. Some participants may have responded to the questions in a way that they believed the instructors would have wanted. Other participants had difficulty completing the questionnaires due to low literacy skills or a lack of familiarity with standardized forms. For example, several participants did not understand how to correctly answer the questions asked in the confidence section. The confidence questions asked participants to rate their confidence on a five-point Likert-type scale by circling a number from 1 to 5. The scale was labeled at either end: 1=I know I cannot to 5=I know I can. Several participants circled an end label rather than a number. Although the questionnaires were explained to the participants before being handed out, it was clear that special instruction should have been provided for completing the confidence section.

The fruit and vegetable screener and fat screener were chosen for the evaluation because they were brief and burdened participants as little as possible; however, there was a drawback to the short screeners. Scoring for the screeners assumed that one eating incident was equivalent to one serving. In other words, if a participant reported that she drank 100% orange juice or grapefruit juice one time per

day, it was assumed that she drank one serving at a sitting, and therefore drank one serving of juice per day. The screeners were scored in accordance with NCI's published scoring procedures, but it is obvious that the assumption that one eating occasion equaled one serving was not always met. For example, a participant who regularly filled a 12-ounce glass with 100% orange juice could have answered that she drank 100% orange juice or grapefruit juice one time per day. That would have been scored as one serving per day of juice when, in fact, she actually drank two servings of juice in the 12-ounce glass.

The screeners posed two other issues. First, the fruit and vegetable screener and the fat screener were developed as separate instruments to be used independently. For this reason, fried potatoes and 100% juices appeared on both screeners. This appeared not to have been a problem for most of the participants; however, at one class site, a participant asked the instructor why she needed to answer the same question that she had already answered. The repetition of food items may have caused confusion for some participants or may have over-emphasized consumption of these specific foods. Second, although the screeners were short, they were too long for some participants to fill out completely. This was especially true of the fat screener, which asked about 15 food items and frequency of reduced-fat margarine usage. When even one item on the screener was unanswered, a total score could not be calculated. Of a total of 132 participants, only 66 provided enough information to calculate total fruit and vegetables servings and only 40 completed the entire fat screener. A considerable amount of data was lost when compiling answers for the individual food items into a roll-up score for total daily fruit and vegetable servings and percent of energy from fat.

The fat screener was designed to estimate percentage of energy consumed from fat; however, current dietary advice for people with diabetes specifies that

saturated fat and cholesterol, not total fat, should be limited. There has not been consensus among diabetes nutrition experts how much total fat is optimal in the diet for people with diabetes. For this reason, it would have been helpful to be able to estimate percentage of energy from saturated fat and cholesterol.

Another limitation of this evaluation was the notion that participants learned what constitutes a serving from each food group during the program. The same screeners were included in Questionnaires 1 and 2. Five of the items in the fruit and vegetable screener and all of the items in the fat screener asked about *frequency* of consumption. There were, however, two items in the fruit and vegetable screener that asked how many *servings* were consumed. A participant may have answered these two questions very differently on Questionnaire 2 than he/she did on Questionnaire 1 after having had instruction about serving sizes. For example, a participant may have reported on Questionnaire 1 that he ate 1-2 servings per week of vegetables and then learned that really what he ate was 5-6 servings per week. He may not have changed his eating behavior in the least, but the knowledge that he misreported his servings on the first questionnaire and the correct reporting of his servings on the second questionnaire would incorrectly reflect an increase in his vegetable intake. This issue of misreporting could also have occurred in the opposite direction. For example, a participant could have initially over-reported her fruit intake on Questionnaire 1 before learning what actually constitutes a fruit serving. This was a serious limitation of the evaluation and must be considered whenever an intervention includes nutrition education and utilizes the same evaluation instruments before and after the intervention.

A further limitation of this evaluation was the small and non-random sample. Data from a non-random sample cannot be assumed to represent the target population because it is not known how volunteers may have differed from the target

population in terms of demographic characteristics and motivation to adopt healthy meal planning behaviors.

Small sample size also helps to explain why the ranges and standard deviations surrounding eating behaviors were very large. When looking at individual foods, this will often be true. Some people reported that they never ate cheese, while others reported that they ate cheese daily. As mentioned, the sample size dropped substantially when considering total daily fruit and vegetable servings and percent of energy from fat and a high drop-out rate tends to bias the final sample toward those who were most amenable to the intervention.

Further limiting the evaluation was the fact that there was no consideration given to the number of class sessions participants attended. It would have been preferable to exclude participants who attended less than three class sessions, however, this did not occur for two reasons. First, self-reported attendance and instructor-reported attendance frequently did not correspond. Furthermore, at several class sites, the instructors did not record attendance, so attendance was based solely on self-report. Second, because the sample size was already small, an effort was made to include as many participants as possible in the sample.

In addition to being small in size, the sample was not representative of the population of Oregonians with diabetes. Not only did the sample consist of volunteers, it was also predominately composed of white females. The results of the evaluation do not describe how males or people from non-white racial backgrounds respond to Meals Made Easy for Diabetes.

Consistency between the class sites was a potential limitation. The program was taught by different instructors at 16 sites in 11 Oregon counties. The curriculum was descriptive and PowerPoint presentations developed for the instructors to use; however, there was undoubtedly some variation between instructors and between

class sites. Data from individual class sites was not analyzed separately; therefore, it is not known how much variation existed between the sites. The Instructor Checksheets revealed that not all of the instructors were able to cover all scheduled class material. During the second class session, at least three instructors were unable to complete the Nutrition Facts label activity. The instructors were also comfortable with varying levels of participant involvement and open discussion during class.

This evaluation was further limited by a lack of follow-up. The evaluation was unable to address whether positive changes observed during the intervention were maintained beyond the last Meals Made Easy class.

Finally, the evaluation was limited by the fact that it took place in a community-based setting. Community-based studies pose difficulties getting high attendance, regular attendance, and follow-up.

CONCLUSIONS

Summary

Several studies have documented the efficacy of diabetes education interventions aimed at increasing diabetes self-management; however, this was the first study to evaluate the efficacy of the Plate Method as a tool for nutrition education and meal planning for individuals with diabetes. The Plate Method, the focal point of the Meals Made Easy for Diabetes curriculum, deserves more attention as a tool for meal planning in diabetes. The Plate Method, unlike several other meal planning strategies for individuals with diabetes, is simple and can be easily grasped by those who might struggle with more complicated methods of meal planning.

This study included 132 adults 18 years of age and older who reported that they had been diagnosed with diabetes. Participants were recruited to participate in Meals Made Easy for Diabetes through local print ads, public service announcements, fliers, and contact with health care providers and case managers. The median age of the sample was 67 years and the median age at diagnosis was 60 years. The sample was primarily female (74%) and overwhelmingly white (97%). The majority of the sample reported that they were responsible for choosing and purchasing their own food (82%) and cooking their own food (80%).

Meals Made Easy for Diabetes, using the Plate Method, increased participants' vegetable consumption and their confidence that they could make appropriate food choices in potentially challenging situations. The daily number of vegetable servings that participants reported consuming increased by +0.5 servings from the beginning to the end of the program. There was also a trend toward

improvement in the number of daily total fruit and vegetable servings and daily fruit servings that participants reported eating after the program. Overall confidence and confidence on each of the five individual confidence questions increased significantly from the beginning to the end of the program; however, change in overall confidence was not demonstrated to be associated with change in eating behavior.

The results of this evaluation could be especially helpful to diabetes educators and public health administrators. This study is the first to examine the effects that the Plate Method, through Meals Made Easy for Diabetes, has on participants' eating behavior and their confidence in their ability to make healthful dietary changes. Our data suggest that this intervention was more effective in increasing readiness to change than in effecting dietary change itself.

Recommendations for Future Research

Future studies would benefit from recruiting and retaining a larger sample. The sample in this evaluation (n=132) decreased substantially during data analysis for two reasons. First, a participant had to have completed both Questionnaires 1 and 2 in order for his/her change score to be calculated. Many participants attended the first class session but were absent when Questionnaire 2 was completed in the fourth class session. Second, scoring for the fruit and vegetable screener and fat screener required that there be no missing answers. When even one food item was unanswered, a total score was not calculated. Future studies should attempt to draw and retain the largest sample possible by emphasizing to participants the importance of attending all classes and completing both questionnaires completely.

The sample in future studies should also be more representative of different races. The incidence of diagnosed diabetes was higher among blacks and Hispanics

(10.8 and 10.1 per 1000 population) compared to whites (6.3 per 1000 population) in 2002 (1). Between 1997 and 2002, the incidence of diagnosed diabetes increased almost as alarmingly among Hispanics (+36%) as among whites (+37%) (1). Meals Made Easy for Diabetes is currently being translated into Spanish and it will be interesting to see how the translated material may impact Hispanic groups.

In the future, researchers should include additional outcome measures of dietary change. Multiple 24-hour dietary recalls could be collected and used as an estimate of true intake. Outcome measures that are not self-reported, such as glycosylated hemoglobin, would help concretely support or refute self-reported dietary behavior.

Future studies should use the newly revised fat screener scoring algorithm released by NCI in July 2004 (88). The new scoring algorithm accounts for gender, portion size, and is based on data from adults ages 18 and older, whereas the scoring algorithm used in this study was based on data from adults 50 to 69 years of age.

Additionally, it would be beneficial for future studies to find ways to estimate saturated fat and cholesterol intake. The MEDFICTS Dietary Assessment Questionnaire is recommended by the National Cholesterol Education Program to assess an individual's intake of total fat, saturated fat, and cholesterol from meats, eggs, dairy, fried foods, in baked goods, convenience foods, table fats, and snacks (89). Although, based on the results of this evaluation, the MEDFICTS screener may require too much time and effort for participants to complete, MEDFICTS has been shown to produce good estimates of total fat, saturated fat, and cholesterol intake compared to food records (90).

Finally, it would be recommended that future research ensure better tracking of participant attendance. As mentioned, tracking of participant attendance was a

limitation in this study. Consequently, participants were not excluded from data analysis on the basis of poor class attendance. It would be preferable to accurately know how many class sessions each participant attended and include in data analysis only those who attended three or four of the class sessions.

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APPENDICES

Appendix A. Informed Consent Form

Informed Consent
Meals Made Easy Study

The Department of Human Services, Health Services, Diabetes Prevention and Control Program is conducting a study of how the Meals Made Easy for Diabetes Program helps people with diabetes make changes to the way they eat. We are asking you to participate in this study so that we can learn more about how this program helps you. If you decide to participate in the study, you will be asked to fill out three different questionnaires so we can understand changes over time. The first questionnaire will be filled out now, before you begin the class. The second will be filled out at the end of the last class. The third will be mailed to you six months after the class ends. If you decide to join in this study, here are some things you should know:

- Participation in this study is completely voluntary.
- Your name will not be used in any reports about this study and no information will be attributed to you.
- You may choose to stop participating at any time, for any reason.
- You may have a copy of the report we write about this study, at your request.
- Any questions you have about this study will be answered now, or you can call the Diabetes Prevention and Control Program at any time and ask for Angela Kemple or Jamie Klein at (503) 731-4273.
- We will need your address to send you the questionnaire at six months. Your address will be destroyed after the study is over. The only mail you will receive from us will be about the study.
- Your signature below indicates that you understand the above and agree to participate.

Please print

Name	
Address	
City, state, zip code	
Telephone # or cell phone #	
Email	

Participant Signature

_____

Witness (class instructor)_____

Date _____

Your Name _____

_____

_____

Meals Made Easy Questionnaire 1

Oregon Department of Human Services
Diabetes Prevention and Control Program
October 2003

Please answer each of the following questions by filling in the blanks with the correct answers or by choosing the single best answer.

Section 1 – About You

Q1. What is your age? ___ years old

Q2. Are you: ☐1 Male ☐2 Female

Q3. Are you Hispanic or Latino? ☐1 Yes ☐2 No

Q4. How would you describe your race? (Check only one)

- ☐1 American Indian or Alaskan Native
- ☐2 Asian or Pacific Islander
- ☐3 Black or African American
- ☐4 White
- ☐5 Another race or multiracial

Q5. What was the highest year of education that you completed? (circle one)

K 1 2 3 4 5 6 7 8	9 10 11 12	13 14 15 16	17+
Grade School	High School	College or Technical School	Graduate or Professional School

Q6. Which one of the following applies to you? (check one box)

- ☐1 I have diabetes
- ☐2 I live with someone who has diabetes
- ☐3 I help someone who has diabetes, but do not live with him or her
- ☐4 Other (specify)_____

Q7. Have you ever received education about nutrition or meal planning by attending a series of classes, meetings, or one-on-one training with your doctor, a diabetes educator, or other health care professional (check one box)

- ☐1 Yes, within the last 6 months
- ☐2 Yes, within the last year
- ☐3 Yes, within the last 2 years
- ☐4 Yes, within the last 5 years
- ☐5 No, I have not had a class
- ☐6 Don't know

These next questions are for people with diabetes. If you do not have diabetes, please go to section 3 and continue to answer the questions.

Section 2 – Diabetes

Q1. How old were you when you were first told you have diabetes? ___ years old

Q2. Who usually chooses or buys most of the food in your home? (check one box)

- ☐1 You
- ☐2 Your spouse
- ☐3 Another family member (other than your spouse)
- ☐4 Your roommate or housemate
- ☐5 A hired caregiver
- ☐6 Other (specify)_____

Q3. Who usually cooks most of the food eaten in your home? (check one box)

- ☐1 You
- ☐2 Your spouse
- ☐3 Another family member (other than your spouse)
- ☐4 Your roommate or housemate
- ☐5 A hired caregiver
- ☐6 Other (specify)_____

Section 3 – Eating Behavior

The next questions give a way to think about how many servings of fruits and vegetables you usually eat. Please fill out the following questions by putting an "X" in the box showing how often you ate or drank each of these items of food in the past month.

Q1. 100% Orange juice or grapefruit juice

Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q2. Other 100% fruit juices, not counting fruit drinks or soda

Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q3. Green salad (with or without other vegetables)

Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q4. French fries or fried potatoes

Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q5. Baked, boiled or mashed potatoes

Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

THE NEXT QUESTIONS ASK ABOUT HOW MANY SERVINGS OF THESE FOODS YOU ATE IN THE PAST MONTH.

Q6. About how many servings of vegetables did you eat NOT counting salad or potatoes?

Never	1-3 servings per month	1-2 servings per week	3-4 servings per week	5-6 servings per week	1 serving per day	2 servings per day	3 servings per day	4 servings per day	5 or more servings per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q7. About how many servings of fruit did you eat NOT counting juices?

Never	1-3 servings per month	1-2 servings per week	3-4 servings per week	5-6 servings per week	1 serving per day	2 servings per day	3 servings per day	4 servings per day	5 or more servings per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q8. Think about your eating habits over the last month. About how often did you eat or drink each of the following foods? Remember breakfast, lunch, dinner, snacks, and eating out. Circle **one answer** for each line.

TYPE OF FOOD	Never	Less than Once Per Month	1-3 Times Per Month	1-2 Times Per week	3-4 Times Per Week	5-6 Times Per Week	1 Time Per Day	2 or More Times Per Day
Cold Cereal	1	2	3	4	5	6	7	8
Skim milk, on cereal or to drink	1	2	3	4	5	6	7	8
Eggs, fried or scrambled in margarine, butter, or oil	1	2	3	4	5	6	7	8
Sausage or bacon, regular-fat	1	2	3	4	5	6	7	8
Margarine or butter on bread, rolls, pancakes	1	2	3	4	5	6	7	8
Orange juice or grapefruit juice	1	2	3	4	5	6	7	8
Fruit (not juices)	1	2	3	4	5	6	7	8
Beef or pork hot dogs, regular fat	1	2	3	4	5	6	7	8
Cheese or cheese spread, regular fat	1	2	3	4	5	6	7	8
French fries, home fries, or hash brown potatoes	1	2	3	4	5	6	7	8
Margarine or butter on vegetables, including potatoes	1	2	3	4	5	6	7	8
Mayonnaise, regular fat	1	2	3	4	5	6	7	8
Salad dressings, regular fat	1	2	3	4	5	6	7	8
Rice	1	2	3	4	5	6	7	8
Margarine, butter, oil on rice or pasta	1	2	3	4	5	6	7	8

Q9. Over the last month, when you prepared foods with margarine or ate margarine, how often did you use a reduced-fat margarine?

DID NOT USE MARGARINE	Almost never	About ¼ of the time	About ½ of the time	About ¾ of the time	Almost always or always
☐	☐	☐	☐	☐	☐

Q10. Overall, when you think about the foods you ate over the last month, would you say your diet was high, medium, or low in fat?

High	Medium	Low
☐	☐	☐

Section 4 – Confidence

We would like to know how confident you are in doing certain activities. For each of the following questions, please **CIRCLE** the number that corresponds to your confidence that you can do these tasks regularly.

Q1. How sure are you that you can follow your diet when you have to prepare or share food with other people who do not have diabetes?

I know I can not	1	2	3	4	5	I know I can

Q2. How sure do you feel that you can choose the appropriate foods to eat when you are hungry (for example, snacks)?

I know I can not	1	2	3	4	5	I know I can

Q3. How sure are you that you can stick to your healthful eating plan when you feel depressed, bored, or tense?

I know I can not	1	2	3	4	5	I know I can

Q4. How sure are you that you can eat smaller portions at dinner?

I know I can not	1	2	3	4	5	I know I can

Q5. How sure are you that you can add less fat than the recipe calls for?

I know I can not	1	2	3	4	5	I know I can

Thank-you. Please return to your instructor.

Appendix C. Action Plan

Action Plan Worksheet: Week 1

Setting goals for yourself and then taking action to meet them is a way to move from just wanting something to actually making it happen. Think of something from today that you could turn into an Action Plan for this week. Here are a few suggestions to get you started:

Use the Plate Method to plan dinner
Eat fewer foods from the tip of pyramid
Measure portions at meals
Eat vegetables at meals

In the section below, write your goal in the form of an Action Plan. Use the Daily Action Plan Log to track your progress.

Your Action Plan should include:
1. **What** you are going to do,
2. **How** much you are going to do,
3. **When** you are going to do it, and
4. **How many** days a week you are going to do it.

An example: This week, I will eat (what) 2 servings of either fruits or vegetables (how much) at each meal (breakfast, lunch and dinner) (when) at least three days (how many) this next week.

This week I will:
What I will do:
How much will I do:
When will I do it:
How many times I will do it:

My Daily Action Plan Log

	Completed Action (Yes/No)	Comments
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		

Bring this with you to class next week.

Appendix D. Questionnaire 2

Your Name _____

_____

_____

Meals Made Easy Questionnaire 2

Oregon Department of Human Services
Diabetes Prevention and Control Program
October 2003

Section 1 – Eating Behavior

The next questions give a way to think about how many servings of fruits and vegetables you usually eat. Please fill out the following questions by putting an "X" in the box showing how often you ate or drank each of these items of food in the past month.

Q1. 100% Orange juice or grapefruit juice

Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q2. Other 100% fruit juices, not counting fruit drinks or soda

Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q3. Green salad (with or without other vegetables)

Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q4. French fries or fried potatoes

Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q5. Baked, boiled or mashed potatoes

Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

THE NEXT QUESTIONS ASK ABOUT HOW MANY SERVINGS OF THESE FOODS YOU ATE IN THE PAST MONTH.

Q6. About how many servings of vegetables did you eat NOT counting salad or potatoes?

Never	1-3 servings per month	1-2 servings per week	3-4 servings per week	5-6 servings per week	1 serving per day	2 servings per day	3 servings per day	4 servings per day	5 or more servings per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q7. About how many servings of fruit did you eat NOT counting juices?

Never	1-3 servings per month	1-2 servings per week	3-4 servings per week	5-6 servings per week	1 serving per day	2 servings per day	3 servings per day	4 servings per day	5 or more servings per day
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q8. Think about your eating habits over the last month. About how often did you eat or drink each of the following foods? Remember breakfast, lunch, dinner, snacks, and eating out. Circle **one answer** for each line.

TYPE OF FOOD	Never	Less than Once Per Month	1-3 Times Per Month	1-2 Times Per week	3-4 Times Per Week	5-6 Times Per Week	1 Time Per Day	2 or More Times Per Day
Cold Cereal	1	2	3	4	5	6	7	8
Skim milk, on cereal or to drink	1	2	3	4	5	6	7	8
Eggs, fried or scrambled in margarine, butter, or oil	1	2	3	4	5	6	7	8
Sausage or bacon, regular-fat	1	2	3	4	5	6	7	8
Margarine or butter on bread, rolls, pancakes	1	2	3	4	5	6	7	8
Orange juice or grapefruit juice	1	2	3	4	5	6	7	8
Fruit (not juices)	1	2	3	4	5	6	7	8
Beef or pork hot dogs, regular fat	1	2	3	4	5	6	7	8
Cheese or cheese spread, regular fat	1	2	3	4	5	6	7	8
French fries, home fries, or hash brown potatoes	1	2	3	4	5	6	7	8
Margarine or butter on vegetables, including potatoes	1	2	3	4	5	6	7	8
Mayonnaise, regular fat	1	2	3	4	5	6	7	8
Salad dressings, regular fat	1	2	3	4	5	6	7	8
Rice	1	2	3	4	5	6	7	8
Margarine, butter, oil on rice or pasta	1	2	3	4	5	6	7	8

Q9. Over the last month, when you prepared foods with margarine or ate margarine, how often did you use a reduced-fat margarine?

DID NOT USE MARGARINE	Almost never	About ¼ of the time	About ½ of the time	About ¾ of the time	Almost always or always
☐	☐	☐	☐	☐	☐

Q10. Overall, when you think about the foods you ate over the last month, would you say your diet was high, medium, or low in fat?

High	Medium	Low
☐	☐	☐

Q11. In the past 7 days, on how many days did you eat breakfast, lunch, and dinner? (circle one answer for each line)

	Never							**Daily**
Breakfast	0	1	2	3	4	5	6	7
Lunch	0	1	2	3	4	5	6	7
Dinner	0	1	2	3	4	5	6	7

Q12. In the past 7 days, on how many days did you use the Plate Method when preparing breakfast, lunch, and dinner? (circle one answer for each line)

	Never							**Daily**
Breakfast	0	1	2	3	4	5	6	7
Lunch	0	1	2	3	4	5	6	7
Dinner	0	1	2	3	4	5	6	7

Section 2 – Confidence

We would like to know how confident you are in doing certain activities. For each of the following questions, please **CIRCLE** the number that corresponds to your confidence that you can do these tasks regularly.

Q1. How sure are you that you can follow your diet when you have to prepare or share food with other people who do not have diabetes?

I know I can not	1	2	3	4	5	I know I can

Q2. How sure do you feel that you can choose the appropriate foods to eat when you are hungry (for example, snacks)?

I know I can not	1	2	3	4	5	I know I can

Q3. How sure are you that you can stick to your healthful eating plan when you feel depressed, bored, or tense?

I know I can not	1	2	3	4	5	I know I can

Q4. How sure are you that you can eat smaller portions at dinner?

I know I can not	1	2	3	4	5	I know I can

Q5. How sure are you that you can add less fat than the recipe calls for?

I know I can not	1	2	3	4	5	I know I can

Section 3 – Satisfaction

Q1. Please mark which classes you attended during the 4-week program? (Check all that apply)

- ☐1 Class 1—What You Eat Makes A Difference
- ☐2 Class 2—Planning Healthy Meals
- ☐3 Class 3—Shopping Smart
- ☐4 Class 4—In the Kitchen

Q2. Please circle one number for each item below to indicate how satisfied you were with:

	Not at all satisfied	**Somewhat dissatisfied**	**Neither satisfied or not satisfied**	**Somewhat Satisfied**	**Very satisfied**
a) The "Meals Made Easy" class in general.	1	2	3	4	5
b) The place where the class was held.	1	2	3	4	5
c) The amount of material covered.	1	2	3	4	5
d) The visual aids.	1	2	3	4	5
e) The time available for questions and discussions.	1	2	3	4	5
f) The meal planning skills you learned.	1	2	3	4	5

	Not at all satisfied	Somewhat dissatisfied	Neither satisfied or not satisfied	Somewhat Satisfied	Very satisfied
g) The following activities:					
The supermarket tour	1	2	3	4	5
The plate method	1	2	3	4	5
The cooking session	1	2	3	4	5

Q3. Do you have any additional comments about the class or your experience? (write in answer below)

Thank-you. Please return to your instructor.

Meals Made Easy Instructor Checksheet

(Please return to Oregon Diabetes Program with post-test questionnaires)

County: _____

Instructor: _____

Class 1

Date of class: _____

Number attending: _____

Did you cover all scheduled curriculum topics?
☐ Yes ☐ No

What proportion of participants completed an Action Plan?
☐ <1/3 ☐ 1/3 to 2/3 ☐ >2/3

What proportion of participants actively took part in the class?
☐ <1/3 ☐ 1/3 to 2/3 ☐ >2/3

Briefly describe your experience with the curriculum:

_____

_____

_____

_____

_____

Class 2

Date of class: _____

Number attending: _____

Did you cover all scheduled curriculum topics?
☐ Yes ☐ No

What proportion of participants completed an Action Plan?
☐ <1/3 ☐ 1/3 to 2/3 ☐ >2/3

What proportion of participants actively took part in the class?
☐ <1/3 ☐ 1/3 to 2/3 ☐ >2/3

Briefly describe your experience with the curriculum:

_____

_____

_____

_____

_____

Class 3

Date of class: _____

Number attending: _____

Did you cover all scheduled curriculum topics?
☐ Yes ☐ No

What proportion of participants completed an Action Plan?
☐ <1/3 ☐ 1/3 to 2/3 ☐ >2/3

What proportion of participants actively took part in the class?
☐ <1/3 ☐ 1/3 to 2/3 ☐ >2/3

Briefly describe your experience with the curriculum:

_____

_____

_____

_____

_____

Class 4

Date of class: _____

Number attending: _____

Did you cover all scheduled curriculum topics?
☐ Yes ☐ No

What proportion of participants completed an Action Plan?
☐ <1/3 ☐ 1/3 to 2/3 ☐ >2/3

What proportion of participants actively took part in the class?
☐ <1/3 ☐ 1/3 to 2/3 ☐ >2/3

Briefly describe your experience with the curriculum:

_____

_____

_____

_____

_____