The following paper is being offered by the Provider Unit of the Continuing Education Committee of the American Association of Diabetes Educators. AADE has been approved as a provider of continuing education in nursing by the Central Regional Accrediting Committee of the American Nurses' Association and the California Board of Nursing under BRN #05096. Application for CE credit has also been made to the American Dietetic Association. Upon successful completion of a posttest (70% correct) and submission of the required processing fee ($10), participants will be awarded 1.0 Contact Hour of CE credit.

OBJECTIVES FOR ALTERNATIVES TO THE EXCHANGE SYSTEM FOR TEACHING MEAL PLANNING TO PERSONS WITH DIABETES

Upon completion of this paper, the reader will be able to:

1. *outline the steps of the nutrition education process;*
2. *define the stages of education;*
3. *outline the information to be taught with each stage of the nutrition intervention process;*
4. *list and define other meal-planning approaches for persons with diabetes;*
5. *explain an indication for use with each of the meal-planning approaches discussed;*
6. *summarize the meal-planning approaches that would be recommended for persons with diabetes trying to lose weight;*
7. *describe those meal-planning approaches that could be used for persons with limited education;*
8. *differentiate a minimum of two meal-planning approaches that could be used for persons with IDDM and for those with NIDDM.*

Alternatives to the Exchange System for Teaching Meal Planning to Persons With Diabetes

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Although the most well known, exchange lists are not the only meal-planning approach for persons with diabetes. This paper outlines the steps in the nutrition education process, including initial and continued education stages, and presents six alternative approaches for individualizing meal planning. These include the High Carbohydrate-High Fiber Exchange System, Calorie/Fat Counting, Total Available Glucose, the Point System, Month of Meals, and Individualized Sample Menus. The approaches are rated according to emphasis on weight loss, glucose control, and ease of learning and according to type of diabetes. A complete resource guide is provided.

How to successfully promote change in personal eating and life-style habits to meet the current nutritional recommendations continues to be one of the greatest challenges for diabetes educators in working with persons who have diabetes. Use of the most popular system for meal planning, exchange lists, was described in Part I of this series. The purpose of this paper is to describe alternative meal-planning approaches. Certainly, providing information about additional alternatives to meal planning is not going to dramatically reduce the challenge. Changing eating behavior requires much more than altering the type of meal plan. Using a variety of tools and adding flexibility in meal planning, however, more closely parallels the present-day view of promoting diabetes self-management and activating persons with diabetes.

Nutrition Education Process

It is important to differentiate between content and process in diabetes nutrition education. We must consider not only the information we will provide about diabetes and nutrition but also how this information can most effectively be presented. The purpose of education is to assist persons with diabetes to acquire and maintain the knowledge, skills, attitudes, behaviors, and commitment needed to successfully meet the challenges of having and treating diabetes independently on a daily basis. This is not accomplished by one teaching session but rather by a process of staged teaching over a longer period of time. A logical sequence for the education process of nutrition management involves several steps, including rapport development, assessment or infor-

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mation gathering, goal setting, intervention, follow-up, and maintaining change. Because the focus of this paper is on nutrition intervention, in-depth information will not be provided on the other steps of the nutrition education process. For further reading about these other important steps, see references 1 through 4.

Nutrition Intervention

Intervention refers to the activities that enable, facilitate, or support the nutrition care plan. Most of these activities fall in the areas of education and counseling. They include:

- Providing information
- Explaining concepts related to diabetes and nutrition
- Assisting in development of self-care skills
- Encouraging development of positive attitudes toward the role of self-care
- Allowing persons with diabetes to take responsibility for their own care

Effective nutrition intervention requires the diabetes educator to function in the roles of information provider and counselor. As a counselor, we can help the person with diabetes to understand what having diabetes means personally and support the patient in an effort to cope responsibly with the disease. Often, in our role as counselors, we think our responsibility is to motivate the person with diabetes. It is a false premise that we can motivate others. Our role is to serve as a guide to help persons with diabetes discover how they are motivated and to help them use their motivation so that *they* can bring about positive changes in eating behavior. The role of information provider is more in keeping with the traditional information-centered approach to diabetes care. The role of counselor is in keeping with the more client-centered trends in health care. Both are part of an essential balance that expands the role of the diabetes educator and contributes to quality health care.

Nutrition intervention, specifically, refers to:

1. Providing basic information about nutrition and nutrient requirements, discussing the diabetes nutrition management guidelines, and introducing other survival skill information that may be important specific to the type of diabetes
2. Selecting an appropriate meal-planning approach for achieving individually determined goals and providing continuity of care

These two components are often referred to as the initial and continued education stages of the nutrition intervention process.

Initial Education

The specific information that should be taught in the initial education stage when providing basic information about nutrition is:

- What are calories?
- What are nutrients?
- What is the definition of carbohydrate, protein, and fat?
- What are food sources of each of these nutrients?
- What is the caloric contribution of each of these nutrients?

The diabetes nutrition guidelines that should be discussed with the person with diabetes include:

- Reaching and staying at a reasonable weight
- Eating less total fat
- Eating more complex carbohydrate and high-fiber foods
- Eating less sugar
- Using less salt
- Avoiding skipping meals
- Increasing daily activity

Survival skill information for persons with insulin-dependent diabetes mellitus (IDDM) who require insulin and for persons with non-insulin-dependent diabetes mellitus (NIDDM) who are being treated with insulin would include discussing sick-day management and treatment of hypoglycemia. Persons with NIDDM, specifically those in the obese population, will need more attention focused on food and eating awareness during this initial education stage. The connection between portion size and calories, and the fat and calorie content of foods should be emphasized. Tools such as food-behavioral records can be used to increase awareness of total food consumption and stimuli that promote overeating.

Information about basic nutrition and diabetes nutrition guidelines can be taught using any of several published materials, including *Guide to Good Eating*, available from the National Dairy Council; *Healthy Food Choices*, available from the American Dietetic Association or the American Diabetes Association; or *Dietary Guidelines for Americans*, available from the Consumer Information Center. For additional materials and more complete ordering information, consult the resource list (see sidebar).

The terminology *no concentrated sweets* is commonly used in the hospital setting as a diet prescription or ordered as an approach for teaching a simplified diet. The primary problem with using this terminology is that it misinforms people (both persons with diabetes and health care professionals) that the primary nutrition goal should be avoidance of simple sugars. In fact, the primary issue with most persons with diabetes is not that they have diets too high in concentrated sweets but rather diets too high in fat. This diet is often used as an attempt to provide a simplified form of education to persons with diabetes. A more acceptable strategy would be to use and teach the diabetes nutrition guidelines that are much broader in focus and to use the terminology *healthy food choices* as a more appropriate diet order.

Continued Education

One of the components of this stage of nutrition education is selecting a meal-planning approach. Before addressing the question of when to use a meal plan, we should define the term *meal plan*. A meal plan is not a diet but rather a guide to good eating and making healthy food choices. When the diabetes educator provides a person with diabetes information on basic nutrition and diabetes nutrition guidelines, the result is an approach to selecting foods. The person with diabetes can use this information to make food choices that can affect blood glucose and lipid levels and promote weight control. However, the person with diabetes does not receive specific information on portion sizes or the amounts of food to eat daily.

Many persons with diabetes will need a more structured meal plan that defines the specific types and amounts of food and the frequency of eating. Examples of when a person may need a more structured meal plan include:

- Frequent meal skipping or irregular pattern of eating (eg,

skips lunch or eats only one meal a day; eats meals at inconsistent times from day to day)
- Highly variable caloric intake from meal to meal or day to day
- Not aware of portion sizes of foods
- Inappropriate food choices after being provided with guidelines for good eating
- Unsuccessful with previous weight loss attempts
- No improvement in blood glucose levels after making changes in eating
- Interested in more specific information about calories and/or specific nutrients

Also, to provide continuity of care, many more issues relating to nutrition need to be discussed besides basic nutrition and guidelines for diabetes nutrition management. It is during the continued education stage that the diabetes educator will reassess progress, make adjustments with the meal plan, provide supplementary information, and give reinforcement and support. Persons with diabetes often have more specific questions about issues such as fat, fiber, and use of sugar. In addition, supplementary information should be discussed regarding topics such as sick-day eating, alcohol consumption, eating out, fast foods, nonnutritive sweeteners, snacking, low-calorie eating suggestions, handling special occasions, food labeling, supermarket shopping, adjustment to exercise, and individualizing insulin dose based on glycemic response of specific foods. This information can be provided through a variety of formats: written materials, videotapes, group classes, a newsletter or, for some of the topics discussed above, through the use of a tour (eg, supermarket), demonstration (eg, snacking), or actual experience (eg, eating out).

Meal-Planning Approaches

There are several meal-planning approaches other than the universal system of exchange lists for meal planning that can be used to provide more structure and give further definition to the specific types and amounts of food to be eaten. For purposes of simplification, the meal-planning approaches to be discussed can be placed into the following subcategories based on their similarities:

Exchanges	High Carbohydrate-High Fiber Exchange Lists (HCF)
Counting	Calorie
	Total Available Glucose (TAG)
	Point System
Menus	Month of Meals
	Individualized Sample Menus

To be effective in helping persons with diabetes make changes in their eating habits, the diabetes educator must be able to individualize the meal plan. An individualized meal plan means more than making adjustments for food preferences and distributing the calories based on usual eating patterns. Selecting an appropriate meal-planning approach, based on the person's learning needs and abilities, nutritional needs, and consideration for personal needs and life-style issues, is the key to individualizing the meal plan.

Each of six meal-planning approaches will be further discussed by providing information on definition, perceived advantages and disadvantages with each approach, and intended use.

Resource Materials for Diabetes Nutrition Education

Basic Nutrition and Diabetes Nutrition Guidelines

- *Guide to Good Eating*
  To obtain, contact the National Dairy Council, 6300 North River Road, Rosemont, IL 60018-4233. Tel: 708/696-1020, ext 220.
- *Healthy Food Choices*
  Copies are available from the American Diabetes Association, Inc, Diabetes Information Service Center, 1600 Duke Street, Alexandria, VA 22314. Tel: 800/ADA-DISC.
- *Dietary Guidelines for Americans,* 1990 edition
  Single copies are available free from the Consumer Information Center, Department 514-x, Pueblo, CO 81009. For information about the printing of bulk orders, contact the Superintendent of Documents, US Government Printing Office, Washington, DC 20401. Tel: 202/275-3325.
- Seven mini-pamphlets related to the *Dietary Guidelines* include:
  Maintain Desirable Weight
  Eat a Variety of Foods
  Avoid Too Much Fat, Saturated Fat and Cholesterol
  Eat Foods With Adequate Starch and Fiber
  Avoid Too Much Sugar
  Avoid Too Much Sodium
  If You Drink Alcoholic Beverages, Do So in Moderation
  To order, contact R. Woods, Consumer Information Center-Z, PO Box 100, Pueblo, CO 81002.
- Nutrition Information Series
  A series of information sheets covering the following topics:
  1. Becoming aware of what you eat
  2. Losing weight
  3. Portion sizes
  4. Eat a variety of health foods
  5. Sweetening your food
  6. Meal and snack times

  Available from the American Dietetic Association, 216 West Jackson Blvd, Suite 800, Chicago, IL 60606-6995. Call 800/877-1600, ext 5000 to request a publications catalog.

Exchange Approach

For more information about *HCF Exchanges: A Sensible Plan for Healthy Eating* (1984), write to HCF Diabetes Foundation, Inc, PO Box 22124, Lexington, KY 40502.

Counting Approach

- Barbara Kraus, *Calories and Carbohydrates,* 10th ed. New York: New American Library, 1990.
- *Health Counts: Fat and Calorie Counting Made Easy* (1987). Kaiser Permanente Department of Health Education and Promotion, 3600 North Interstate Avenue, Portland, OR 97227.
- Corinne Netzer. *Complete Book of Food Counts.* New York: Dell Publishing, 1988.

Total Available Glucose (TAG) Approach

For more information, write General Clinical Research Center, Medical University of South Carolina, 171 Ashley Avenue, Charleston, SC 29401.

Point System Approach

For more information, write Diet Teach Programs, Inc, PO Box 1832, Sun City, AZ 85372.

Month of Meals Approach

Copies of *Month of Meals* and *Month of Meals 2* are available from the American Diabetes Association, Inc, Diabetes Information Center, 1600 Duke Street, Alexandria, VA 22314. Tel: 800/ADA-DISC.

High Carbohydrate-High Fiber (HCF) This meal-planning approach was developed by Dr James W. Anderson and his colleagues at the University of Kentucky in 1974. The recommended nutrient distribution for this type of meal plan is 55% carbohydrate, 18% protein, and 27% fat, with an average of 55 to 60 g/day of dietary fiber.[5] This approach also uses the food exchange concept, but the foods are further divided into eight food exchange groups, and specific dietary information is provided. The food groups with their dietary fiber amounts are milk (0 g), garden vegetables (2 g), beans (8 g), cereals (2 g), starches (3 g), fruits (3 g), meat (0 g), and fat (0 g).

Because the HCF approach requires change from a traditional American diet to a more vegetarian type of diet, individual preferences and eating habits are often difficult to satisfy. With an increase in fiber, persons with diabetes who are accustomed to more refined foods often complain of gastric distress, usually in the form of flatulence, bloating, and diarrhea. These symptoms subside once the intestinal tract adjusts to the increased fiber. Additionally, those persons on higher caloric levels—1800 calories and more—frequently mention an inability to consume the quantity of food prescribed. Because 55% to 60% of the total calories are derived from high carbohydrate, high-fiber, reduced-fat foods, a large quantity of food is required. (This aspect of the HCF plan is an *advantage* to persons on calorie-restricted diets who desire an increased quantity of food.) Another possible disadvantage to consider with the HCF approach, even if it may be the most clinically appropriate for the person you are working with, is its complexity. Because it involves use of food exchanges, the person must be able to grasp this concept and be willing to follow this type of structured meal-planning approach.

The HCF meal-planning approach has primarily been used for persons with NIDDM to lower postprandial glucose responses. Persons with elevated cholesterol and/or triglyceride levels also have an additional benefit because of the diet's emphasis on foods low in fat and high in fiber, especially water-soluble fiber. Therefore, this approach would be most suited for overweight persons with NIDDM who have elevated lipid levels.

Calorie/Fat Counting Calorie counting was initially used in weight loss programs to promote gradual decreases in body weight. This approach emphasized specific caloric composition of foods to enable the person with diabetes to control calories and achieve weight loss. A baseline calorie level is designed for weight loss of 1 to 2 lb/week agreed upon by the person with diabetes and the diabetes educator. The person with diabetes is provided with calorie lists or reference books to use in making food choices, and a record form is provided for the person to record daily food and calorie intakes.

Although calorie counting is an effective meal-planning approach for some persons with diabetes, some limitations do exist. This method is based on caloric density of food and does not take into account the food's glycemic effect, or nutrient or fiber content. For this approach to be maximally effective, persons with diabetes must complete food diaries and calorie calculations that require daily documentation and can thus be cumbersome for some persons. Although the initial instruction time is less than with some other meal-planning approaches, continued education and support from the diabetes educator are essential to ensure accurate calorie-counting techniques, as well as desirable nutrient composition and distribution.

Because this approach considers total caloric intake without emphasis on macronutrients (carbohydrate, protein, and fat) and because fat is usually the culprit in diets of high caloric intake, calorie counting is often combined with fat counting as an effective meal-planning approach for the overweight NIDDM patient. In addition to recording total calories consumed, the person uses a resource book to look up the fat calories in foods with a goal of restricting fat to 30% or less per day. A resource tool that can be used to teach the combined approach of calorie/fat counting is *Health Counts*. For more information about this tool, see item 2 under Counting Approaches in the resource list (sidebar).

Calorie/Fat counting is most appropriate for the overweight person with NIDDM who has been unsuccessful with previous weight loss attempts, desires more flexibility and a broader range of food choices, and wants greater accuracy and specificity in caloric content of foods. It is not the option of choice for a person with diabetes using insulin who needs to also be concerned with matching timing of meals to insulin schedule.

Total Available Glucose (TAG) This meal-planning approach was developed by Mary Joan Oexmann, MS, RD, at the General Clinical Research Center at the Medical University of South Carolina in Charleston in 1983. The purpose of the total available glucose (TAG) approach is to provide optimal control of blood glucose levels by directly relating insulin to the amount of glucose derived from the foods consumed. The amount of glucose derived from foods is equal to the sum of the portions of carbohydrate, protein, and fat that are available as glucose. The TAG values for any food are calculated by determining the sum of 100% of the grams of carbohydrate, 58% of the grams of protein, and 10% of the grams of fat. To simplify TAG for use with persons with diabetes and to promote a nutrient distribution of at least 45% carbohydrate, 20% protein, and 35% fat, all foods are placed into the categories of starch, sugar, meat, milk, and fat. The percentage of calories recommended from each category are 50%, 20%, 19%, 10%, and 2%, respectively. When the dietary prescription has been determined, the person with diabetes is provided with an individualized meal plan showing the total number of TAG units available for each meal. Food tables are provided for selecting foods of appropriate portion size to satisfy the TAG requirements.

TAG offers flexibility and promotes decision making in diabetes self-management by using the glucose-insulin (GI) ratio. This ratio is calculated by dividing the total available glucose from food eaten in 24 hours by the total units of insulin taken in a 24-hour period. For example, if the TAG in a 24-hour period is 262 g and the total insulin intake is 50 units, the GI ratio would be 5.24. In other words, 1 unit of insulin covers 5.24 TAG. Once the GI ratio for a set meal is known, a person with diabetes can accommodate changes in meal patterns and activity and still achieve good control of blood glucose by increasing or decreasing the amount of insulin given.[6]

The major disadvantage with this approach is that it is a complicated system to learn and requires a fairly high level of cognitive maturity. In addition, it is a time-consuming system to use on a daily basis.

For persons who are interested in tight control of blood glucose levels but who desire autonomy rather than a prescriptive nonparticipatory approach to controlling their diabetes, the TAG system may be a useful approach. For those persons on an intensive insulin management regimen or insulin pump therapy, this approach might be especially helpful. It seems to be ideally suited to the intelligent, motivated person with IDDM. This approach was described in more detail than carbohydrate counting, a similar approach, because it also takes into account the glucose derived from protein and fat and may therefore be more accurate.

Point System The point system, used predominantly in the Midwest, was developed by Virginia Stuckey, RD, and Rollin T. Woodyatt, MD, in 1944 at Rush Medical Center and the University of Illinois. This structured alternative is a simplified method of counting calories and the amount of specific nutrients. For example, points have been developed to count grams of carbohydrate, protein, fat, fiber, calories, and various vitamins and minerals.

In the point system, 1 point equals 75 calories. For example, a slice of bread is 1 point, a small piece of fruit is approximately ½ point, and a 1200-calorie diet equals 16 points. A calorie point level is agreed upon between the person with diabetes and the diabetes educator. If consistency in the meal pattern is important, specific attention is given to points consumed at each meal or snack. A reference book that lists foods by food groups and identifies the points for a particular serving size is provided.

Although minimal teaching time is needed to use the point system, the person with diabetes is required to look up point values of foods and is encouraged to keep food records, precluding its use for some persons with diabetes.

The concept of the point system is fairly simple to teach and may allow for easier comprehension. Because it is easily understood, this alternative may be beneficial for the younger IDDM population, persons with limited educational background, and for persons desiring a structured approach, particularly newly diagnosed persons with diabetes.

Month of Meals *Month of Meals* is a book that does the meal planning for the person with diabetes. It contains a set of 28 complete and interchangeable menus for breakfast, lunch, dinner, and snacks to provide a balanced, healthy diet. The menus have been designed to provide 1500 calories per day. The calorie level can be adjusted up or down, depending on the caloric needs of the client. The menus provide 45% to 50% of calories from carbohydrate, 20% from protein, and 25% to 30% from fat. In 1991, a second series entitled *Month of Meals 2* was developed by the American Diabetes Association as a companion piece to *Month of Meals*. It includes an additional 28 days' worth of breakfasts, lunches, and dinners, plus tips on dining out at ethnic and fast-food restaurants. Quick-to-fix and ethnic recipes are also included.

Month of Meals reviews diabetes nutrition guidelines as well as the six food lists based on *The Exchange Lists for Meal Planning*. There is a section on how to use the book and how to adjust the calorie level of the meal plan. Snack suggestions are divided into three categories: 60-calorie snacks, 125-calorie snacks, and 170-calorie snacks. Also, recipes for various menu items are included.

The diabetes educator can use these books for the person with diabetes who desires menus with specific food choices and appropriate amounts. Generally, this material could be used for persons who do not understand the concept of food exchanges or choices.

Individualized Sample Menus The term *individualized sample menu* is defined as a method of meal planning whereby the diabetes educator works with the person with diabetes to prepare menus that specify the foods and appropriate quantities that can be eaten over a period of days. The written menus reflect whatever restrictions are called for in the nutrition prescription. There are no rules that govern this approach; its main purpose is to help simplify meal planning for those patients who have either little experience or little interest in meal planning and who have fairly routine eating habits. The menus can be very specific or involve some choices.

This approach is frequently used by many diabetes educators. However, it is difficult to assess the effectiveness of individualized menu planning and to compare it with other meal-planning approaches because it is individualized and not standardized, and a great deal of variation exists from menu to menu.

Individualized sample menus can be used in a variety of ways. Examples include:

- Preparing sample menus to reinforce comprehension of a meal plan based on the food exchange lists
- Preparing a 1- or 2-week cycle of menus for an elderly person with a low literacy level to reinforce the importance of nutrition in normalizing blood glucose levels through controlled and/or regulated eating
- Providing dietary guidelines specific to diabetes and reinforcing them with menus, prepared by the person with diabetes and the diabetes educator, individualized to food preferences, schedule, and life-style for the self-directed learner who does not need the structure of a meal plan

The most effective resources for this approach are a blank piece of paper, a pencil, a creative diabetes educator, and the input of the person with diabetes.

It is also important when providing continuity of care that progress or success with the meal-planning approach is reassessed. Persons with diabetes often need to have adjustments made in the original nutrition education plan. For example, changes occur in personal relationships, career changes are made, work schedules change, and insulin/medication adjustments need to be made. All of these changes will affect the nutrition education plan. Also, sometimes a change is needed just to increase a new level of interest and motivation. A combination of different meal-planning approaches and teaching strategies may need to be used over a period of time to enable the person with diabetes to make permanent changes in their eating and life-style behaviors.

Table 1 summarizes the meal-planning approaches that have been discussed with regard to their degree of emphasis on weight loss, glucose control, ease of learning, and difficulty in adherence. Table 2 provides recommendations on

Table 1. Rating the Meal-Planning Approaches

Approaches	Potential for Weight Loss	Emphasis on Glucose Control	Easy to Learn	Easy to Follow
HCF	Moderate	Moderate	No	No
Calorie\Fat Count	High	Low	Yes	Somewhat
TAG	Low	High	No	No
Point System	Moderate	Moderate	Somewhat	Somewhat
Month of Meals	Moderate	Moderate	Yes	Yes
Individualized Menus	Moderate	Moderate	Yes	Yes

Note: This table represents the author's judgment and experience with meal-planning approaches; readers are encouraged to modify information to be used from this table based on their experiences.

Table 2. Selection of Meal-Planning Approaches According to Type of Diabetes

Approach	IDDM	Nonobese NIDDM	Obese NIDDM
HCF		X	X
Calorie/Fat Count			X
TAG	X		
Point System	X	X	X
Month of Meals		X	X
Individualized Menus		X	X

Note: This table was developed with primary consideration given to the clinical characteristics of each type of diabetes. Emphasis certainly also needs to be given to the person's individual preferences, learning needs, and life-style. The decision regarding the use of a meal-planning approach, or which type of meal-planning approach to select should be modified with these considerations in mind.

which meal-planning approaches are best suited to each type of diabetes.

Summary

There is no right or wrong method of meal planning. Many approaches are available to be individualized for use with persons who have diabetes. Nutrition education should be comprehensive and needs to incorporate the steps of assessment, goal setting, intervention, and follow-up. Just providing nutrition information without incorporating the teaching process, regardless of the quality of the education material, is a setup for dietary noncompliance. In addition, when providing nutrition education, the educator should be flexible and creative. Boredom can set in with any regimen and also lead to noncompliance. It is the responsibility of the diabetes educator to promote continuity of learning by introducing new ideas and concepts and altering the learning environment.

As educators, we also need to remember that we can't force our values and knowledge on persons with diabetes and assume that they will make changes in their eating behaviors because we think they should. Rather, we need to try and diminish the distance between "where they are" and "what we know." We can help them to discover new choices and make them aware of new possibilities. Taking the time to listen to persons with diabetes and hear what they are telling us and providing them with new possibilities will promote more permanent behavior changes than giving them a standardized or structured tool for meal planning.

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