

A New Food Guide For North American Vegetarians

VIRGINIA MESSINA, MPH, RD; VESANTO MELINA, MS, RD; ANN REED MANGELS, PhD, RD, FADA

Abstract

This companion paper to the *Position of the American Dietetic Association and Dietitians of Canada: Vegetarian Diets*, presents a new food guide for vegetarians. Two graphic formats are presented, a rainbow and a pyramid. The guide will assist vegetarians in choosing diets that meet recent recommendations established by the Institute of Medicine for nutrients including protein, iron, zinc, calcium, vitamin D, riboflavin, vitamin B-12, vitamin A, omega-3 fatty acids, and iodine. The guide can be adapted for different types of vegetarian diets and includes a wide variety of foods commonly used by vegetarians. The guide is based on the following food groups: Grains; Vegetables; Fruits; Legumes; nuts, and other protein-rich foods; Fats; and Calcium-rich foods. The Calcium-rich foods food group is planned to offer expanded choices for calcium sources and includes foods from each of the other food groups. Specific guidelines are given for meeting requirements for vitamins B-12 and D. Modifications are provided to meet needs of different stages of the life cycle. This vegetarian food guide has a number of advantages including the promotion of variety and moderation within the context of vegetarian diets, a focus on foods commonly consumed by vegetarians, and a foundation in current nutritional science.

(Can J Diet Prac Res 2003; 64:82-86)

Résumé

Cet article, qui porte sur un nouveau guide alimentaire pour les végétariens, accompagne l'exposé de position de l'American Dietetic Association et des Diététistes du Canada. Le guide se présente sous deux formes graphiques: un arc-en-ciel et une pyramide. Il aidera les végétariens à choisir une alimentation qui satisfait aux recommandations récentes établies par l'Institute of Medicine pour les nutriments, notamment les protéines, le fer, le zinc, le calcium, la vitamine D, la riboflavine, la vitamine B₁₂, la vitamine A, les acides gras oméga-3 et l'iode. Le guide peut être adapté à divers types de régimes végétariens et comprend une grande variété d'aliments couramment utilisés par les végétariens. Il est basé sur les groupes d'aliments suivants : céréales; légumes; fruits; légumineuses, noix et autres aliments riches en protéines; matières grasses; aliments riches en calcium. Ce dernier groupe offre des choix multiples de sources de calcium et comprend des aliments de chacun des autres groupes. Des directives particulières permettent de satisfaire les besoins en vitamines B₁₂ et D et les besoins à différentes étapes du cycle de vie. Le guide alimentaire végétarien offre de multiples avantages, entre autres ceux de promouvoir la variété et la modération dans le contexte d'une alimentation végétarienne, d'insister sur les aliments couramment consommés par les végétariens et de présenter les bases scientifiques actuelles de la nutrition.

(Rev can prat rech diétét 2003; 64:82-86)

The first North American food guide was published by the U.S. Department of Agriculture in 1916. It was not until the 1940s however, when wartime shortages, indications of malnutrition among citizens, and the release of the first recommended dietary allowances focused greater attention on nutrient requirements, that food guides became a familiar meal-planning tool in the United States (1). The Canadian government released its first food guide at this time, in 1942 (2). Up until 1992, when the USDA's food guide pyramid (3) and Canada's Food Guide to Healthy Eating (CFGHE) (2) with its rainbow design were introduced, the emphasis of food guides was largely placed on meeting nutrient needs.

The 1992 guides were the first to consider the harmful effects of overnutrition. They were also the first guides to visually emphasize the importance of plant foods in the diet. However, they did not include sufficient guidelines for planning vegetarian diets. USDA publications noted that vegetarians needed special guidance in planning healthful diets, implying that USDA's food guide was not appropriate for vegetarians (4).

Over the past several decades, a number of meal-planning

tools have been developed specifically for vegetarians (5,6). The majority of these have used the pyramid format or the rainbow design and many have been revised versions of the USDA's food guide pyramid and CFGHE. However, because vegetarian diets differ in many ways from non-vegetarian diets, the USDA food guide pyramid and CFGHE are not necessarily the most useful starting point when considering guidelines for vegetarians. It is particularly difficult to manipulate these tools when attempting to provide adequate and practical guidelines for vegans (vegans are vegetarians who exclude all animal products).

In designing a new food guide for vegetarians, we aimed to achieve the following goals:

- To establish a guide that would meet the needs of people following different types of vegetarian diets.
- To help vegetarians choose diets that would meet the most recent recommendations established by the Institute of Medicine.
- To include guidelines that focus on specific nutrients of particular interest in vegetarian diets, as discussed in the

Table 1
Tips for meal planning

1. Choose a variety of foods.
2. The number of servings in each group is for minimum daily intakes. Choose more foods from any of the groups to meet energy needs.
3. A serving from the calcium-rich food group provides approximately 10% of adult daily requirements. Choose 8 or more servings per day. These also count towards servings from the other food groups in the guide. For example, 1/2 cup (125 mL) of fortified fruit juice counts as a calcium-rich food and also counts towards servings from the fruit group.
4. Include 2 servings every day of foods that supply n-3 fats. Foods rich in n-3 fat are found in the legumes/nuts group and in the fats group. A serving is 1 teaspoon (5 mL) of flaxseed oil, 3 teaspoons (15 mL) of canola or soybean oil, 1 tablespoon (15 mL) of ground flaxseed, or 1/4 cup (60 mL) walnuts. For the best balance of fats in your diet, olive and canola oils are the best choices for cooking.
5. Servings of nuts and seeds may be used in place of servings from the fats group.
6. Be sure to get adequate vitamin D from daily sun exposure or through fortified foods or supplements. Cow's milk and some brands of soymilk and breakfast cereals are fortified with vitamin D.
7. Include at least 3 good food sources of vitamin B-12 in your diet every day. These include 1 Tbsp (15 mL) of *Red Star* Vegetarian Support Formula nutritional yeast, 1 cup (250 mL) fortified soymilk, 1/2 cup (125 mL) cow's milk, 3/4 cup (185 mL) yogurt, 1 large egg, 1 ounce (28 g) of fortified breakfast cereal, 1-1/2 oz (42 g) of fortified meat analog. If you don't eat these foods regularly (at least 3 servings per day), take a daily vitamin B-12 supplement of 5 to 10 µg or a weekly B-12 supplement of 2,000 µg.
8. If you include sweets or alcohol in your diet, consume these foods in moderation. Get most of your daily calories from the foods in the Vegetarian Food Guide.

ADA and Dietitians of Canada's joint position on vegetarian diets in this issue of the *Journal* (7,8).

- To include a wide variety of foods that are consumed by vegetarians.
- To increase awareness about the availability of calcium from nondairy foods.

In addition, we strived to meet the challenge spelled out in the 1981 issue of the *Journal of Nutrition Education* by then FDA nutritionist Jean Pennington for an "instrument which converts the professional's scientific knowledge of food composition and nutrient requirements for health into a practical plan for food selection by those without training in nutrition" (9).

Challenges in designing such a guide exist regardless of dietary pattern. Individual food preferences, habits, and choices within food groups will all impact diet quality. While no food guide is completely reliable, a food guide can maximize the chances that consumers will choose healthful diets. The inclusion of 8 Tips for Meal Planning (see Table 1) provides additional help to vegetarians in planning healthful diets.

FOOD GROUPS

The food guide principle that has been in use in North America since 1916 is based on an approach that classifies foods into groups based on similar nutrient content. We have adhered to this principle, with some modification. In the vegetarian food guide, calcium needs are met through choices from several food groups.

In keeping with familiar and widely used approaches to food guide presentation in North America, we have designed our guide in the forms of both a pyramid and a rainbow; the latter is the graphic used in Canada. Both guides utilize the same food groupings, specify the same number of servings, and can be used interchangeably (Figures 1 and 2).

Foods are grouped as follows:

Grains: At the base of the pyramid and in the widest arc of the rainbow, these foods form the foundation of the diet. Grains provide energy, complex carbohydrate, fibre, iron, and B-vitamins. Whole grains are an important source of zinc and other minerals. Vegetarians should choose whole grains often, but enriched refined grains can play a role in vegetarian diets and may be especially valuable for children.

Vegetables and fruits: Vegetables have been grouped separately from fruits to encourage vegetarians to choose a variety of both types of food rather than to focus on one or the other for most choices. A higher number of servings of vegetables is specified due to the greater nutrient density and phytochemical content of vegetables compared to fruits.

Legumes, nuts, and other protein-rich foods: This group includes foods that are good sources of protein, B vitamins, and many trace minerals. It includes all legumes, including soy products such as soymilk and tofu, as well as nuts, seeds, nut and seed butters, eggs, and meat analogs. In a departure from most existing food guides, we have placed dairy foods in this group as well. This groups dairy products with other foods that offer similar amounts of protein per serving. It makes dairy an available but optional choice for vegetarians, while ensuring that protein needs will be met whether or not dairy foods are included in the diet. Categorizing dairy foods with other protein sources also meets the goal of emphasizing the availability of calcium from all of the food groups. Most of the foods in this group provide iron, which is well absorbed when a source of vitamin C is consumed with the meal (10). Dairy foods are the exception here, and those vegetarians who consume frequent servings of dairy foods should be advised to ensure that they are including adequate sources of iron in their meals.

Fats: Vegetarians and others who do not eat fish, require small amounts of plant sources of n-3 fats. In addition, research suggests that moderate intake of certain healthful plant fats may reduce risk for cardiovascular disease (11), improve nutrient

intake (12), and may even aid in weight control (12). Ideally, most of the fat in vegetarian diets should come from fat-rich whole plant foods such as nuts, seeds, and avocado. To ensure an optimal fat intake and to support a practical approach to meal planning, we have specified a minimum of two servings of fats per day. Table 1 indicates that nuts or seeds can be used in place of these fats and also directs vegetarians towards choosing the most healthful fats in their diet.

Calcium-rich foods: Adults should choose a minimum of eight servings of calcium-rich foods daily. Each serving also counts towards choices from one of the other food groups in the guide. For example, one cup of certain cooked leafy green vegetables counts as a serving from the calcium-rich foods group and as two servings from the vegetable group. Placement of the calcium food group adjacent to each of the other food groups allows this concept to be presented in a clear visual way. It also emphasizes the fact that calcium needs are met by choosing a variety of foods from across the food groups.

Diets based on the minimum specified servings from each of the food groups provide approximately 1,400 to 1,500 calories per day, which may be an inadequate energy intake for many vegetarians. Because the numbers of servings in the food guide are minimum recommendations, consumers can meet higher energy needs by choosing more servings from any of the food groups. Regardless of energy needs, most food choices should come from these groups, with only moderate servings of sweets and alcohol at most.

EXPANDED CHOICES FOR MEETING CALCIUM NEEDS

Survey data suggest that vegans account for as much as 40% of the actual vegetarian population (13). Actual vegetarians are those who never eat meat, in contrast to self-described vegetarians, many of whom actually eat some type of animal flesh regularly. Therefore, any guide aimed at vegetarians must consider the needs of vegans. Studies also indicate that a substantial percentage of vegan women as well as some lacto-ovo-vegetarian women (lacto-ovo-vegetarians are those vegetarians that use dairy products and eggs), have calcium intakes that are too low, which suggests that calcium deserves special attention in vegetarian food guides (14). With few exceptions, vegetarian food guides have not provided appropriate guidelines for vegans. A number of guides have included an optional dairy group which presents the risk that consumers will choose diets that are deficient in both calcium and protein. Other guides have included a dairy group that also includes fortified soymilk. However, not all vegans choose to consume soymilk daily. Those who do may not wish to consume the two to three recommended servings. For many families, the expense of soymilk compared to cow's milk makes it an unrealistic choice as the primary source of calcium in the diet.

This food guide illustrates acceptable choices in addition to dairy foods and fortified soymilk for meeting calcium needs. It incorporates the principles of variety and moderation and encourages consumers to consider more plant foods as sources of

Figure 1
Vegetarian food guide pyramid

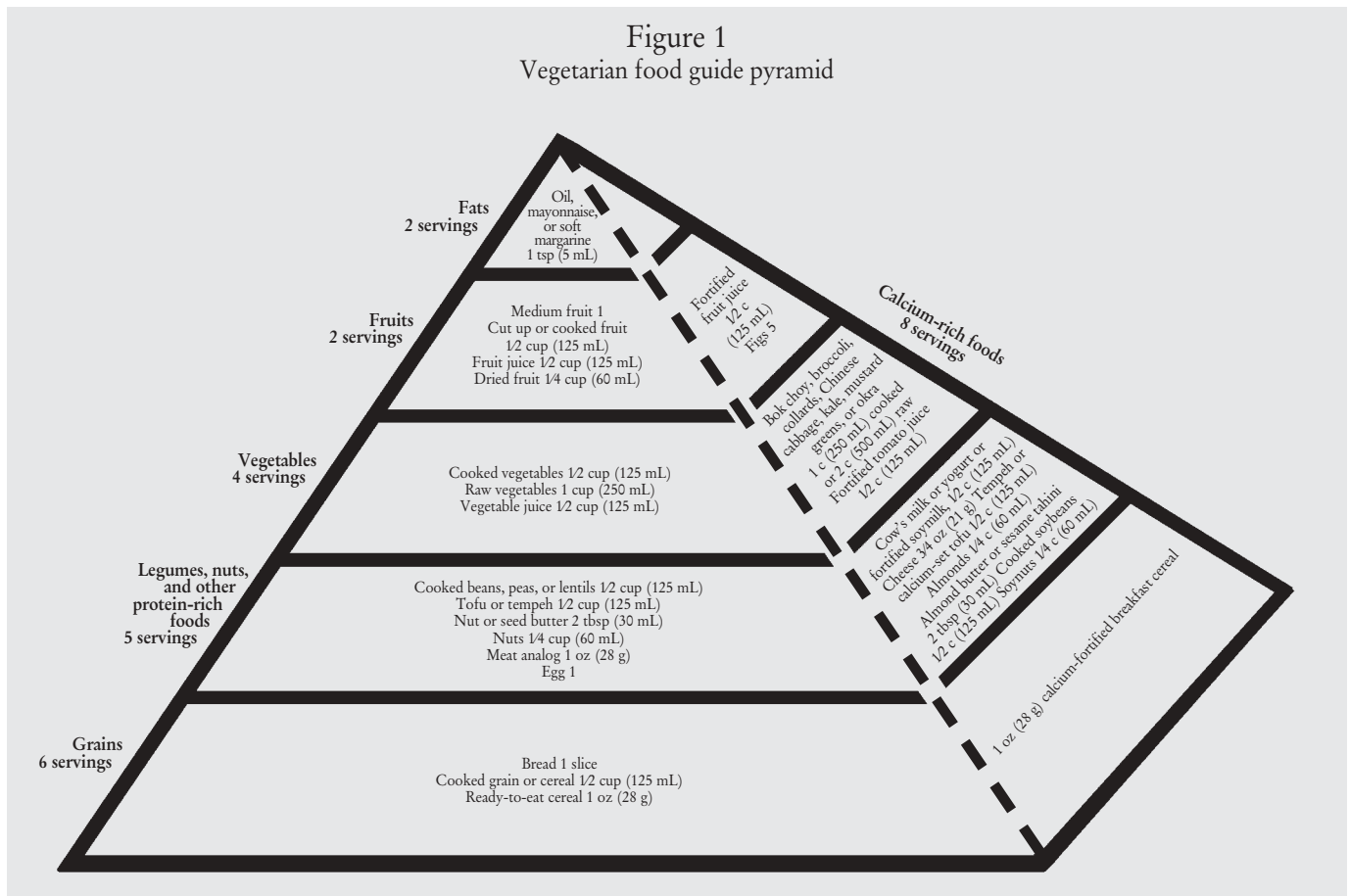
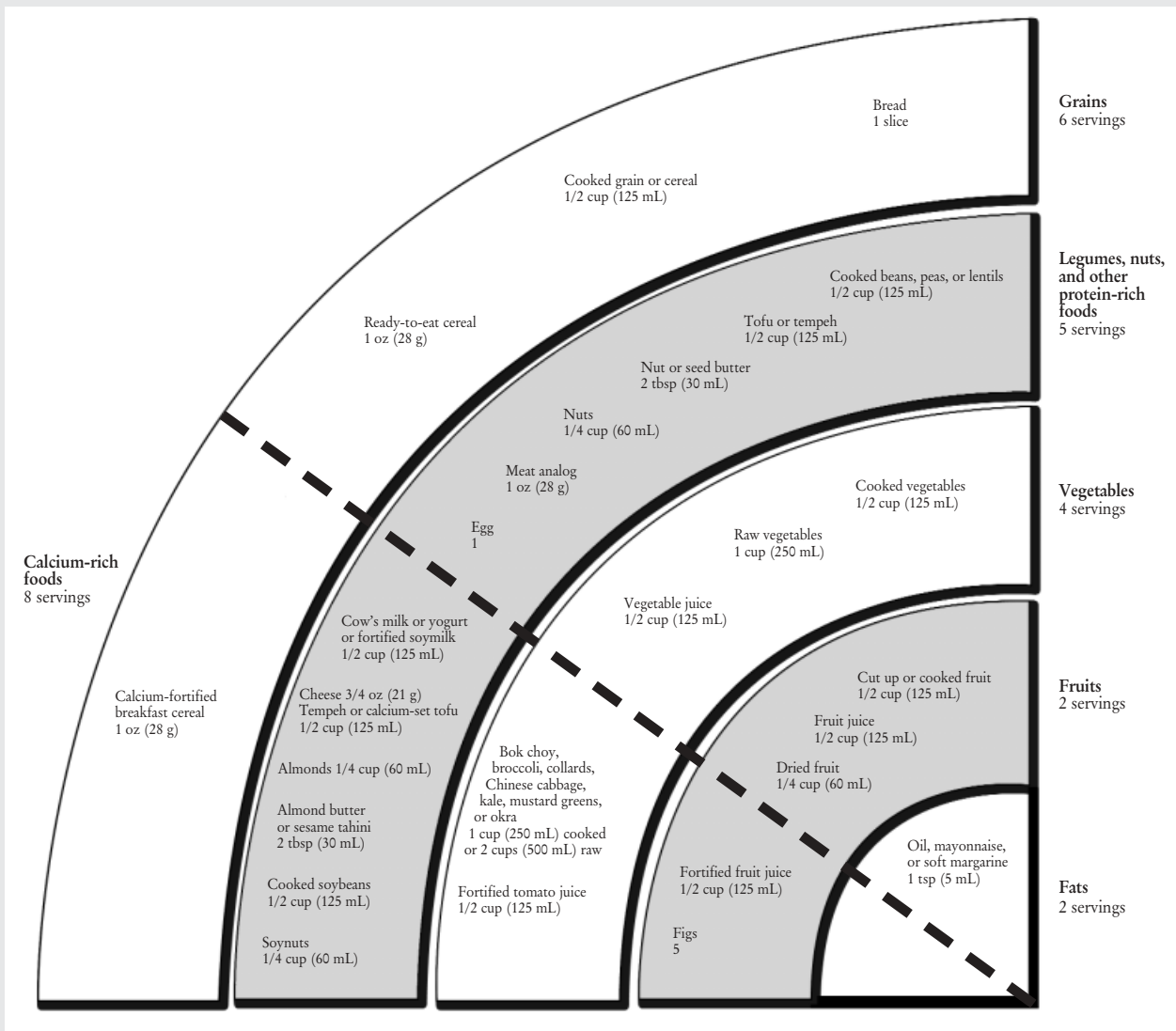


Figure 2
Vegetarian food guide rainbow



nutrients. This is in keeping with government recommendations. Although this food guide does not emphasize the value of one calcium source over another, there may be an advantage to including more plant sources of calcium in diets, since research suggests that other compounds in plant foods, such as isoflavones in soyfoods (15) and potassium (16) and vitamin K (17) in fruits and vegetables, may favourably impact bone health.

By including foods that provide approximately 10-15% (100-150 mg) per serving of the adult AI for calcium, we have allowed consumers to meet calcium needs using a variety of foods in realistic serving sizes. While the serving size of one-half cup for milk differs from many other food guides, it is consistent with common servings on many food labels such as puddings or for use with breakfast cereal.

It should be noted that this approach of emphasizing the variety of calcium-rich foods in different food groups is not specific to the needs of vegetarians but could be adopted for

those who consume non-vegetarian diets as well. The advantages of this approach are relevant for all consumers regardless of diet choices.

SPECIAL CONSIDERATIONS FOR VEGETARIANS

Unsupplemented vegan diets do not provide vitamin B-12. Dairy products and eggs supply vitamin B-12; however depending on food choices, some lacto-ovo-vegetarians may have inadequate intakes as well. The Institute of Medicine has recommended that all people over the age of 50, regardless of type of diet, take vitamin B-12 in the form found in supplements and fortified foods for optimal absorption (18). Vitamin B-12 is well-absorbed from fortified nondairy milks, and from breakfast cereals, as well as from supplements. Because vitamin B-12 absorption is inversely related to dosage, we have recommended a daily supplement of at least 5 µg or a weekly supplement of 2,000 µg.

In addition to regular supplementation with vitamin B-12,

Table 2

Modifications to the Vegetarian Food Guide (Figures 1 and 2) for children, adolescents, and pregnant and lactating women

Life cycle	Food Group ^a		
	B-12-rich foods (svgs)	Beans/nuts/seeds/egg (svgs)	Calcium-rich foods (svgs)
Child ^b	2	5	6
Adolescent ^c	2	6	10
Adolescent ^d	3	6	10
Pregnancy	4	7	8
Lactation	4	8	8

^aThe number of servings in each group is the minimum amount needed. The minimum number of servings from other groups is not different from the Vegetarian Food Guide (Table 1, Figure 1). Additional foods can be chosen from any of the groups in the Vegetarian Food Guide to meet energy needs.

^b4-8 yrs

^c9-13 yrs

^d14-18 yrs

vegans require a dietary source of vitamin D when sun exposure is insufficient. This occurs at northern latitudes and in certain other situations. Many fortified nondairy milks and breakfast cereals provide vitamin D, although the form used to fortify cereals is often not vegan. Vegetarians may also choose vitamin D supplements.

Table 1 provides specific guidelines for meeting needs for vitamins B-12 and D. The vegetarian food guide is based on nutrient needs of adults. It can be modified to meet needs of different stages of the life cycle. Table 2 shows modifications in food group servings for different age groups.

SUMMARY

In summary, this vegetarian food guide has a number of advantages over previous guides designed for this population:

- It is based on current nutritional science. This guide aims to provide sufficient nutrient intake based on the most recent DRIs and addresses concerns like balance of fats in diets.
- It provides information about how to meet calcium needs that are appropriate to a wide range of individuals, including those who follow lacto-ovo-vegetarian diets and vegan diets.
- It promotes the concepts of variety and moderation. Many other guides for both vegetarians and non-vegetarians direct consumers only to dairy foods to meet calcium needs, while this guide emphasizes the wide variety of foods that can meet calcium requirements.
- It focuses on foods that are commonly consumed by vegetarians.

References

1. Hertzler AA, Anderson HL. Food guides in the United States. *J Am Diet Assoc.* 1974;64:19-28.
2. Health Canada, Office of Nutrition Policy and Promotion. Canada's Food Guides From 1942 to 1992. Available at http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/food_guide_history_int_e.html. Accessed February 21, 2003.
3. US Department of Agriculture, Human Nutrition Information Service. The Food Guide Pyramid. Home and Garden Bulletin. No. 252. Washington, DC. August 1992.
4. Welsh SO, Davis C, Shaw A. USDA's Food Guide: Background and Development. Hyattsville, MD: United States Department of Agriculture, Human Nutrition Information Service; 1993. Publication Number 1514.
5. Mutch PB. Food guides for the vegetarian. *Am J Clin Nutr.* 1988;48:913-919.
6. Messina MJ, Messina VL. *The Dietitian's Guide to Vegetarian Diets: Issues and Applications.* Gaithersburg, MD. Aspen Publishers; 1996.
7. Position of the American Dietetic Association and Dietitians of Canada: Vegetarian Diets. *J Am Diet Assoc.* 2003;103;6:748-765.
8. Position of the American Dietetic Association and Dietitians of Canada: Vegetarian Diets. *Can J Diet Prac Res.* 2003;64:62-81.
9. Pennington JT. Considerations for a new food guide. *J Nutr Educ.* 1981;13:53-55.
10. Sandstrom B. Micronutrient interactions: effects on absorption and bioavailability. *Br J Nutr.* 2001;85 Suppl 2:S181-185.
11. Kris-Etherton PM. AHA Science Advisory. Monounsaturated fatty acids and risk of cardiovascular disease. American Heart Association. Nutrition Committee. *Circulation.* 1999;100:1253-1258.
12. McManus K, Antinoro L, Sacks F. A randomized controlled trial of a moderate-fat, low-energy diet compared with a low-fat, low-energy diet for weight loss in overweight adults. *Int J Obes Relat Metab Disord.* 2001;25:1503-1511.
13. Vegetarian Resource Group. How many vegetarians are there? Available at <http://www.vrg.org/nutshell/poll2000.htm>. Accessed June 18, 2002.
14. Janelle KC, Barr SI. Nutrient intakes and eating behavior scores of vegetarian and nonvegetarian women. *J Am Diet Assoc.* 1995;95:180-189.
15. Arjmandi BH, Smith BJ. Soy isoflavones' osteoprotective role in postmenopausal women: mechanism of action. *J Nutr Biochem.* 2002;13:130-137.
16. Lemann J, Jr., Pleuss JA, Gray RW. Potassium causes calcium retention in healthy adults. *J Nutr.* 1993;123:1623-1636.
17. Booth SL, Broe KE, Gagnon DR, Tucker KL, Hannan MT, McLean RR, Dawson-Hughes B, Wilson PWF, Cupples LA, Kiel DP. Vitamin K intake and bone mineral density in women and men. *Am J Clin Nutr.* 2003;77:512-516.
18. Food and Nutrition Board, Institute of Medicine. *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B₆, Folate, Vitamin B₁₂, Pantothenic Acid, Biotin, and Choline.* Washington, DC: National Academy Press; 1998.