The Thrifty Food Plan, 1999: Revisions of the Market Baskets

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The Thrifty Food Plan (TFP), a fundamental part of the U.S. food guidance system, is revised. The TFP provides a representative healthful and minimal-cost meal plan to demonstrate how a nutritious diet may be achieved by consumers using a limited budget or food stamp benefits. This revision incorporates recent developments in nutritional standards and dietary guidance as well as updated underlying information about food consumption and nutrient content. It is the first revision to incorporate serving recommendations of the Food Guide Pyramid. Results show it is possible for Americans to obtain a healthful diet that meets current nutritional standards at a constant real cost equal to the previous Thrifty Food Plan.

T he U.S. Department of Agriculture's (USDA) Thrifty Food Plan (TFP) serves as a national standard for a nutritious diet at a minimal cost. It represents a set of market baskets, each applicable to 1 of 12 age-gender groups. Each market basket contains a selection of foods in quantities that reflect current dietary recommendations, actual consumption patterns, food composition data, and food prices. The TFP is one of four official USDA food plans (the others being the Low-Cost Plan, the Moderate-Cost Plan, and the Liberal Plan) and is maintained by the USDA Center for Nutrition Policy and Promotion (CNPP). The TFP is used by the Federal Government to provide food and economic information to consumers preparing food on a limited budget. It also serves as the basis for food stamp allotments.

CNPP recently revised the TFP market baskets to reflect recent changes in dietary guidance as well as to incorporate updated information on food composition, consumption patterns, and food prices. This article provides background information on the updated TFP market baskets and describes the data sources, dietary standards, and methods used to revise the TFP market baskets.[1] The TFP market baskets were last revised in 1983 with data from USDA's 1977-78 Nationwide Food Consumption Survey *(9)*.

Data

Two main data sources were used in revising the TFP market baskets: the USDA 1989-91 Continuing Survey of Food Intakes by Individuals (CSFII) and the Food Price Database. The Food Price Database was created by CNPP, with assistance from the USDA Economic Research Service, by merging food items from the CSFII with national data on food prices.

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[1]For a more detailed description of the revisions to the TFP market baskets, see *The Thrifty Food Plan 1999, Administrative Report (8)*.

1989-91 Continuing Survey of Food Intakes by Individuals

The CSFII provides detailed information on people's reported intake of food at home and away from home, as well as extensive demographic and socioeconomic information. The CSFII is nationally representative of individuals living in households in the 48 coterminous States. Lower income households are oversampled to increase the precision level in analyses of this group. Sampling weights to make the sample representative of the U.S. population were used in this study.

For the 1989-91 CSFII, dietary intakes of individuals were collected over 3 nonconsecutive days. Day-1 data were collected by using in-person interviews and a 24-hour dietary recall.[2] This study used the Day-1 food intake data of individuals ages 1 and older in households with income at or below 130 percent of the U.S. poverty threshold. For children under age 12, the parent or main meal planner furnished the information, often with the child's help.

Individuals with household income at or below 130 percent of the poverty threshold were included in this study because this income level represents the upper threshold for determining eligibility to participate in the Food Stamp Program. The final sample consisted of about 7,800 individuals ages 1 and older from low-income households. These individuals reported consuming about 4,800 different foods.

Information on the ingredients, nutrient content, and amount consumed of each of these foods is recorded in the CSFII data sets.

Food Price Database

The Food Price Database was constructed specifically for this study by merging information from the CSFII on foods consumed with price data from national data sets. This was required because while the CSFII has extensive information on reported food intake, it does not contain information on either food prices or food expenditures. The earlier Nationwide Food Consumption Surveys used in the development of previous food plans did include information on household food expenditures from which food costs were derived. For this study, creation of the Food Price Database involved

(1) identifying all foods that were reported in the CSFII as having been consumed at home and away from home and, by using recipes, disaggregating them into their specific ingredients,

(2) adjusting ingredient quantities for cooking and waste factors, when appropriate, to convert foods to a purchasable form,[3]

(3) pricing the purchasable ingredients by using national retail price databases, and

(4) converting the priced retail ingredients back to the consumed form of the food, with a price now attached.

To determine retail prices to calculate the costs of foods, CNPP used four sources of data: (1) the A.C. Nielsen Scantrack system, which was used to price most food ingredients, (2) Department of Labor price data for miscellaneous foods (Bureau of Labor Statistics), (3) USDA price data for fresh produce and meat (Agricultural Marketing Service), and (4) Department of Commerce price data for fish (National Marine Fisheries Service). The average price of all brands (including national, store, and generic) of a food ingredient was used to price that food ingredient. For example, the average price of all brands of whole milk was used to price whole milk, and the average price of all types of corn flakes was used to price corn flakes. Food ingredients were priced in dollar amounts per 100 grams; the CSFII Survey Code Book and Survey Recipe File, together with label information on supermarket products, were used to convert fluid ounces to gram weights.

All food ingredients were then converted back to the food consumed, and the food was priced per 100 grams. To illustrate, scrambled eggs were first separated into ingredients: egg without shell, milk, table fat, and salt. These ingredients were then adjusted for any loss in weight due to cooking (e.g., the loss of moisture in eggs and milk) and waste due to food preparation (e.g., the shell of the egg). National average prices were used to price each of the ingredients per 100 grams. The food ingredients were then regrouped into the food reported consumed—the scrambled eggs—and this food was priced per 100 grams.

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[2]For the other 2 days, food diaries were kept by participating individuals; however, response rates were lower than the first day's, and subsequent days were not used for this analysis. One-day data have been indicated in prior research to be reliable measures of usual intakes of groups of people *(2)*.

[3]USDA Agriculture Handbook No. 8 (series) *Composition of Foods (6)* contains data on the weight of cooked and uncooked foods. These data permit computation of cooking conversion factors. Waste conversion factors that adjust for waste when food is prepared (e.g., due to peeling, coring, slicing, and dicing) are found in USDA Agriculture Handbook No. 102 *Food Yeilds. Summarized by Different Stages of Preparation (7)*. Food ingredients that are cooked and/or have a waste factor were converted, by using either or both conversion factors, and then priced.

Methods

Figure 1 shows an overview of the methods used to update the TFP market baskets. A revised market basket was calculated for the 12 age-gender groups. Nutritional needs, similarity of RDA age categories, and comparability to previous age-gender categories in the food plan were key factors in the selection of the age-gender groups. Individual TFP market baskets calculated for each age-gender group may be combined to calculate a TFP household market basket.

For TFP-modeling purposes, CNPP assigned each of the 4,800 foods reported in the CSFII into 1 of 44 food categories (table 1). Foods were assigned to food categories based on similarity of nutrient content, food costs, use in meals, and their link to the food groups of the USDA Food Guide Pyramid.

To calculate a TFP market basket for each age-gender group, CNPP estimated a mathematical optimization model for each group. The model selected the optimal food plan for each age-gender group that met the dietary standards and cost constraints with as little change as possible from actual reported food consumption. Each model consisted of four sets of data inputs related to each of the 44 food categories, subject to three constraints. The inputs were average consumption within a food category, average cost per 100 grams of a food category, average nutrient profile of a food category, and average servings profile of food category based on the Food Guide Pyramid. The constraints were dietary standards, serving specifications of the Food Guide Pyramid, and constant costs of TFP market basket (corresponding to the period when the food consumption data were collected).

Model Inputs

Average consumption of each of the 44 food categories

The TFP has historically reflected the consumption patterns and eating habits of the low-income population to ensure acceptable market baskets composed of foods that people actually eat. To accomplish this, CNPP determined and entered into each model the average consumption patterns of each of the 12 age-gender groups for the 44 food categories.

For each age-gender group, to guarantee that consumption patterns provided the 1989 Recommended Energy Allowance (REA), CNPP adjusted quantities of each of the food categories proportionately by an average of 10 percent to meet the specific REA of the age-gender group. The exact percentage was derived by comparing the REA of each age-gender group with

Figure 1. Thrifty Food Plan Methodology
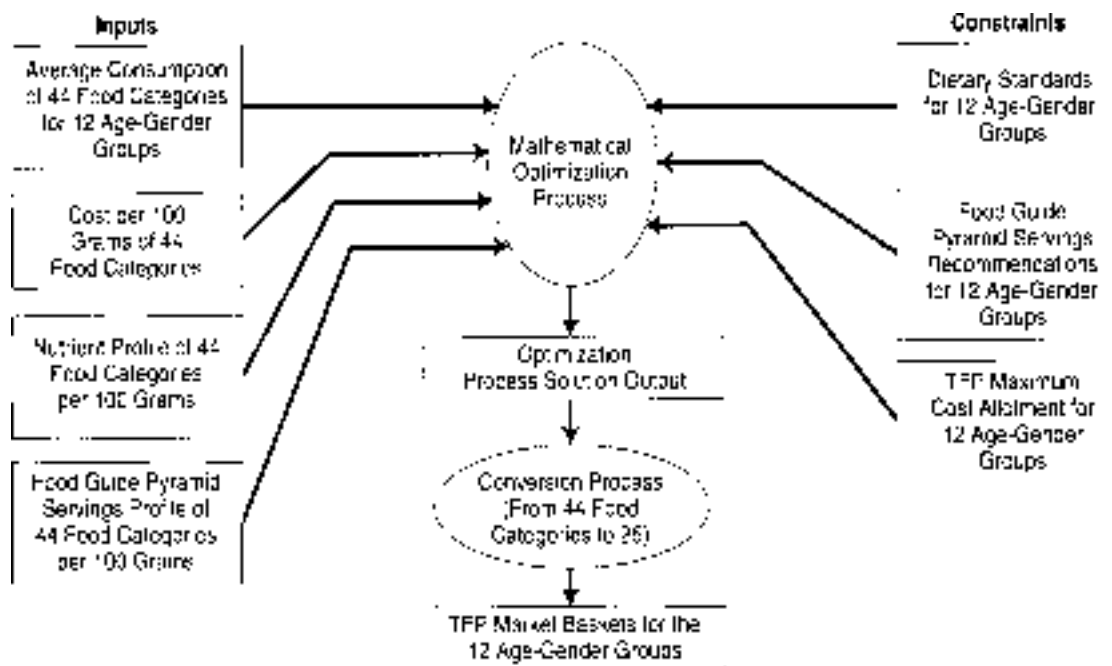
The TFP market basket for each age-gender group meets 100 percent or more of the group's RDAs for 15 essential nutrients.

its reported average energy intake. This correction adjusts for underreporting of consumption by individuals in the survey and ensures that the overall quantity of food in each market basket is consistent with the energy recommendations of the Food and Nutrition Board *(4)*.

Similar to the previous TFP and consistent with research on household discard of edible food *(9,10)*, CNPP also added an allowance of 5 percent to reported intake for each of the 44 food categories in the model to account for food waste. Household discard of edible food could result from preparation, plate waste, or spoilage.

Average price of each of the 44 food categories
Each of the 4,800 foods reported as being consumed, according to the Food Price Database, was assigned to 1 of 44 food categories. The weighted average price per 100 grams of each of these food categories was then determined based on total average consumption. For example, the food category of "noncitrus fruits and juices" includes apples, apricots, bananas, and cherries. The average price per 100 grams of this food category was based on the average price of these individual food items weighted by their consumption share. Apples and bananas received a greater weight proportionately because of more frequent consumption. Total average consumption, compared with average consumption by each age-gender group, was used to calculate food-item weights, because food prices do not vary by age-gender group.

Profiles of each of the 44 food categories: Nutrients and servings of the Food Guide Pyramid
The 1989-91 CSFII Nutrient Database contains information on the nutrient content (including food energy, vitamins, minerals, and other dietary components, such as cholesterol and

dietary fiber) of each of the foods that people reported consuming. Using this database, CNPP calculated the weighted average nutrient content of each of the 44 food categories per 100 grams. For example, the poultry and fish lean, low-cost group consists of foods such as baked chicken, broiled turkey breast, and tuna. The average nutrient profile of this food category was calculated based on the food items in the category and the average consumption of each item. Weights for the food item were again based on total average consumption (by all people). The total average consumption, compared with average consumption by each age-gender group, was used because the TFP is for use by the household.

Serving profiles, based on the Food Guide Pyramid, of each of the 44 food categories were also an input into the model. The average weighted number of servings of grains, vegetables, fruits, milk products, and meat/meat alternates contained in each of the 44 food categories was considered. Many food categories yielded servings for only one Pyramid food group; for example, cheese contributed servings to the milk products group only. Other food categories contributed servings to more than one Pyramid food group; mixed grains may contain servings of grains, vegetables, and meat/meat alternates.

Model Constraints
Dietary standards
The revised TFP market baskets incorporate updated knowledge of nutritional needs. The 1989 Recommended Dietary Allowances (RDA), the *1995 Dietary Guidelines for Americans (11)*, the National Research Council's *Diet and Health Report (5)*, and the serving recommendations of the USDA Food Guide Pyramid form the nutritional basis of the TFP market baskets. The TFP market basket for

Table 1. Food categories and foods in each category, Thrifty Food Plan, 1999

Food category	Examples of foods
Grains	
Breads, yeast and quick—high fiber	Whole wheat, rye, oatmeal, bran, and pumpernickel rolls and breads; corn tortillas and taco shells; and muffins, bagels, waffles, and pancakes made from whole-grain flours or containing bran
Breads, yeast and quick—regular fiber	White rolls and breads; muffins, bagels, waffles, pancakes, and scones not made from whole-grain flours or containing bran; and biscuits, cornbread, and croissants
Breakfast cereal—high fiber	Oatmeal, barley, bulgur, oat bran cereals, and ready-to-eat cereals having 3.7% or more fiber (e.g., shredded wheat)
Breakfast cereal—regular fiber	Corn meal or grits, cream of wheat, and ready-to-eat cereals having less than 3.7% fiber (e.g., corn flakes)
Rice and pasta	All types of rice, spaghetti, noodles, and macaroni
Cakes, pies, and other sweet bakery products	Cakes, cookies, pies, pastries, doughnuts, sweet rolls, croissants with sweet filling, sweet crackers including graham crackers, and breakfast or granola bars
Grain-based snacks	Crackers, popcorn, pretzels, and salty snacks
Grain mixtures—regular fat	Tacos, burritos, enchiladas, pasta and rice with meat, pizzas, and egg rolls having 6% or more fat content
Grain mixtures—lowfat	Rice and pasta with vegetables and/or beans, noodle or rice soups with vegetables and/or meat having less than 6% fat content
Vegetables and fruits	
Potato products—high fat	Potato chips, French-fried potatoes, hash browns, potato puffs, potato patty; and potato salads and mashed potatoes with added fat, eggs, and cheese
Potato products—regular fat	Boiled, baked, scalloped, mashed, and stuffed potatoes; and potato salad, German style
Green-yellow vegetables—added fat Green-yellow vegetables—no added fat	All dark-green and deep-yellow vegetables such as broccoli, chard, collard greens, kale, spinach, carrots, pumpkin, squash, and sweet potato—with or without added fat; and juices from these vegetables
Other vegetables—added fat Other vegetables—no added fat	All other vegetables such as beans, beets, cabbage, cauliflower, corn, cassava, eggplant, green peas, lettuce, bell pepper, snow peas, tomatoes, turnip, and Brussels sprouts that are not dark-green or deep-yellow vegetables—with or without added fat; and juices from these vegetables
Mixed vegetables–added fat Mixed vegetables–no added fat	Mixed vegetables containing corn, lima beans, and peas; vegetable salads; stuffed vegetables; and other mixed vegetable dishes—with or without added fat. Mixed vegetables with added fat include creamed peas and carrots, batter-dipped fried vegetables, cole slaw with dressing, and vegetables in combination with other foods such as cheese and nuts
Citrus fruits, melons, berries, and juices	Limes, lemons, grapefruits, oranges, and tangelos; melons such as cantaloupe, honeydew, and watermelons; berries such as blackberries, blueberries, cranberries, raspberries, and strawberries; and juices from these fruits
Other noncitrus fruits and juices	All other noncitrus fruits such as apples, apricots, bananas, cherries, grapes, papayas, peaches, pears, and plums; and their juices
Milk products	
Milk and milk-based foods—regular fat	All fluid, evaporated, condensed, and dry whole milk; regular yogurt; all fluid creams; cream substitutes; cream cheese; and dips
Milk and milk-based foods—lower fat	All fluid, evaporated, and dry reduced-fat and skim milks; buttermilk; and lowfat or nonfat yogurts
Cheese	Natural, processed, and imitation cheeses, cottage cheese, cheese spreads, cheese dips, and cheese soups

(Continued)

Table 1. Food categories and foods in each category, Thrifty Food Plan, 1999 (continued)

Food category	Examples of foods
Milk-based drinks and desserts—regular fat	Milk-based drinks such as malted milk; hot chocolate; eggnogs, cocoa, infant formulas, and meal-replacement drinks with a fat equivalent to that of whole milk; and dairy desserts such as ice cream, frozen yogurt, ice milk, custard, puddings, and tofu frozen desserts having more than 6% fat
Milk-based drinks and desserts—lower fat	Milk-based drinks made with reduced-fat or skim milk and dairy desserts having 6% or less fat
Meat/meat alternates	
Red meats—high fat, regular cost Red meats—high fat, low cost	Beef, pork, veal, game meats, and organ meats with 10% or more fat
Red meats—lean, regular cost Red meats—lean, low cost	Beef, pork, veal, and game meats with less than 10% fat
Poultry and fish—high fat, regular cost Poultry and fish—high fat, low cost	Chicken, turkey, duck, Cornish hen, game birds, and organ meats, and all fish and shellfish with 10% or more fat
Poultry and fish—lean, regular cost Poultry and fish—lean, low cost	Chicken, turkey, duck, Cornish hen, and game birds, and all fish and shellfish, with less than 10% fat
Lunch meats, sausages, and bacon—regular fat	Sausages, salami, frankfurter, bologna, sliced ham, bacon, and pastrami
Lunch meats, sausages, and bacon—lowfat	Sausages, salami, frankfurter, bologna, sliced ham, bacon, and pastrami having less than 25% fat compared with the regular fat category
Egg and egg mixtures	Fresh, frozen, and dried eggs; egg substitutes; meringues; and egg mixtures
Meat, poultry, and fish mixtures—regular fat	Beef, veal, pork, lamb, chicken, turkey, and fish with grain or vegetables with 8% or more fat
Meat, poultry, and fish mixture—low fat	Beef, veal, pork, lamb, chicken, turkey, and fish with grain or vegetables with less than 8% fat
Dry beans, peas, lentil dishes, and mixtures	Black, red, pinto, lima, white, mung, and kidney beans; all types of peas with or without other foods; soybean products such as miso, tofu, and soybean-based meat substitutes
Nuts and seeds	Nuts, peanut butter and other nut butters, nut mixtures, carob, and seeds such as sesame and pumpkin
Other foods	
Fats, oil, salad dressings, sauces, and condiments	Butter; margarine; vegetable oils such as corn oil, olive oil, and sunflower oil; butter blends; salad oils; lard; shortenings; all salad dressings; mayonnaise; pickles; relishes; salsa; soy sauce; catsup; tomato paste; and gravies and sauces
Coffee and tea	Instant, ground, and fluid coffees and teas with or without caffeine and with or without sugar or sweeteners
Fruit drinks, soft drinks, and ades—regular calorie	Fruit drinks; cola- and pepper-type soft drinks; ginger ale; root beer; and fruit punches, ades, lemonades, limeades, and other sodas containing sugar
Fruit drinks, soft drinks, and ades—low calorie	Sugar-free or low-sugar drinks such as cola- and pepper-type soft drinks, ginger ale, root beer, fruit-flavored drinks, fruit punches, ades, lemonades, and other sodas
Sugars and sweets	All types of sugars, sweeteners, and syrups such as honey, jams, jellies, marmalades, preserves, icings, gelatin desserts, marshmallow, fudge, all types of candies and chocolates, and chewing gum

Note: For more complete definitions of regular fat and lowfat, regular cost and low cost, and other terms for a particular food category, see Appendix 3 of the administrative report *(8)*.

each age-gender group meets 100 percent or more of the group's RDAs for 15 essential nutrients—protein, vitamin A, vitamin E, vitamin C, thiamin, riboflavin, niacin, vitamin B_6, folate, vitamin B_{12}, calcium, phosphorus, magnesium, iron, and zinc. The RDA levels for each of these 15 nutrients represent an amount sufficient to meet the needs of all healthy people in the group.

Recommendations for fat and saturated fat consumption for the revised TFP market baskets are based on the *1995 Dietary Guidelines for Americans (11)*, which recommended that adults and children ages 5 and older consume no more than 30 percent of total food energy (calories) per day from total fat and less than 10 percent of calories per day from saturated fat. For children ages 2 to 5, the Dietary Guidelines recommended reducing intake of total and saturated fat gradually to no more than 30 percent (total fat) and less than 10 percent (saturated fat) of total calories per day by the time the child is about 5 years old. Recommendations for cholesterol and carbohydrate were based on the National Research Council's *Diet and Health Report (5)*, which recommends that people ages 2 and over limit their daily intake of cholesterol to 300 milligrams or less and that all people consume 55 percent or more of calories per day from carbohydrate.

This revision of the TFP market baskets is the first one to incorporate serving recommendations of the Food Guide Pyramid. The Pyramid specifies the number of servings of the five major food groups (grains, vegetables, fruits, milk products, and meat/meat alternates) that people of different age-gender groups need to eat to have a healthful diet. For this TFP revision, the market basket for each age-gender

group had to meet the recommended servings of each of the five major food groups.

The *Dietary Guidelines for Americans (11)* do not recommend a quantitative standard for dietary fiber or caloric sweeteners/added sugars. Because of the lack of precise numeric guidelines, CNPP constrained the revised TFP market basket for each age-gender group to provide no less than average consumption of dietary fiber and no more than average consumption of sweeteners/added sugars. The actual TFP market basket for each age-gender group, however, contains more fiber and less sweeteners/sugars than average consumption because of the influence of other dietary standards. Regarding sodium, the *Diet and Health Report (5)* recommends that people ages 2 and over limit their daily intake to 2,400 milligrams or less. This is difficult to achieve in practice because so many grain products contain sodium, and grains are a recommended part of a healthful diet. The sodium standard in the model, therefore, was fixed at no more than average consumption for each age-gender group. For children age 1, no restriction was set on sodium, in accordance with the *Diet and Health Report (5)*.

A food item or ingredient that makes up at least one-fourth of a Food Guide Pyramid serving was counted in calculating Pyramid servings. A food item or ingredient that was less than one-fourth of a Food Guide Pyramid serving was not counted, therefore creating an underestimate of Pyramid food group consumption. Because of this limitation of the data, CNPP adjusted the Pyramid serving recommendations downward by 10 percent to compensate for food components in a food item (e.g., raisins in raisin bread) that were not counted toward a serving of a particular food group.

Cost and other constraints

A primary constraint satisfied by the new TFP market baskets was that they should cost no more than the previous TFP baskets in real terms. Accordingly, because 1989-91 consumption data underlie this revision of the TFP market baskets, CNPP constrained the cost of each age-gender group's revised TFP market basket to equal the average real cost of its previous TFP market basket for the 1989-91 period.

In addition, efforts were made to consider ease of food preparation and convenience in the development of these TFP market baskets. Foods such as breads, ready-to-eat cereals, canned soups, processed vegetables, chicken parts, frozen orange juice, boxed mashed potatoes, and macaroni and cheese are included in the new TFP market baskets. This is an improvement over the previous TFP that required many dishes to be made from scratch, using individual ingredients and requiring more preparation than what is required when packaged mixes are used.

The TFP market basket for each age-gender group also was constrained to fall within a range of average consumption for each of the 44 food categories. This was done for technical reasons and to ensure that no food category was eliminated from any market basket. The lower bounds were set slightly above zero for most food categories. The upper bounds were set at six times consumption for most food categories, to keep any particular food category from increasing to an unreasonable level. The lower- and upper-bound amounts of the various food categories were based on consultation with nutrition researchers and examination of how consumption of each food category was distributed.

> The new TFP market baskets consist of the quantities of the 25 food categories that, in turn, fall into one of the food groups of the Food Guide Pyramid . . . .

Mathematical Model

Since 1975 a computerized programming model with a quadratic mathematical function has been used to develop the TFP. The model selects for each age-gender group the optimal food plan that meets dietary standards and cost constraints, with as little change as possible from actual food consumption. The model for the revised TFP was adapted, from the one used in the 1983 TFP, to accommodate the 44 food categories, additional dietary constraints, and serving specifications of the Food Guide Pyramid. Also, the mathematical model was upgraded to reduce the limitations of the previous model. CNPP used shares of the food group of the total food budget as the weights in the model for this revised TFP. Weighting in this manner is desirable because budget shares reflect consumer preferences; thus, the food categories are weighted according to these preferences. Another improvement in the model is the use of logarithms of quantities rather than actual quantities. Hence the model is more resistant to decreases than to increases in consumption of any food category, a more realistic portrayal of consumer behavior.

Thrifty Food Plan Market Baskets

The optimization model yielded 12 TFP market baskets, one for each age-gender group. Each basket contained designated quantities of each of 44 food categories. Initially in "as consumed" form, the 44 food categories were then simplified into 25 food categories in an "as purchased" form. The consolidation of categories, wherein similar foods were grouped, expedited the development of menus and recipes. (See the companion article in this issue, pp. 65-75.) For example,

CNPP combined high-fiber and regular-fiber categories of breakfast cereals into one category of breakfast cereals, high-fat and regular-fat potato products to form one category of potato products, and lean and high-fat red meat into one category of red meats. The dietary standards were still maintained when the 44 food categories were collapsed into 25 food categories.

The new TFP market baskets consist of the quantities of the 25 food categories that, in turn, fall into one of the food groups of the Food Guide Pyramid (grains, vegetables, fruits, milk products, meat/meat alternates, and other foods). Table 2 lists the quantities of the 25 food categories (including coffee and tea) (in pounds per week) in the TFP market baskets for each of the 12 age-gender groups. The following subsections discuss the revised TFP market baskets in terms of general food groups and food categories.[4] Revised market baskets are also compared with average reported consumption and the previous market baskets.

Thrifty Food Plan Market Baskets by Food Group

The following bullets highlight key findings of the total pounds of food per week overall and by food group (in percentage form) in the TFP market baskets for the various age-gender groups (table 3):

- *Grains*, accounting for 8 to 14 percent of the revised TFP market baskets for the various age-gender groups, represented a larger share for males ages 15 to 50 than for the other age-gender groups.

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[4]Components of the TFP market baskets are discussed in terms of weight; therefore, fluids such as milk and soft drinks are weighted more prominently than dry foods, and juice concentrates are weighted less prominently than reconstituted forms.

Table 2. Quantities of food for a week,[1] 1999 Thrifty Food Plan market baskets, by age-gender group

Food category	Children (years)				
	1	2	3-5	6-8	9-11
Total pounds	18.22	17.88	20.02	24.66	27.63
	Pounds per week				
Grains					
Breads, yeast and quick	.14	.18	.51	1.42	1.33
Breakfast cereals, cooked and ready to eat	.76	.90	.52	.08	.32
Rice and pasta	.50	.22	1.31	1.28	1.30
Flours	.05	.07	.15	.33	.45
Grain-based snacks and cookies	.02	.04	.09	.04	.08
	1.47	1.41	2.58	3.15	3.48
Vegetables					
Potato products	1.58	1.55	.98	2.06	3.10
Dark-green and deep-yellow vegetables	.21	.15	.22	.97	.49
Other vegetables	.90	.83	1.09	1.56	1.35
	2.69	2.53	2.29	4.59	4.94
Fruits					
Citrus fruits, melons, berries, and juices	.70	.95	.84	2.51	3.04
Noncitrus fruits and juices	1.47	1.33	1.56	1.55	1.50
	2.17	2.28	2.40	4.06	4.54
Milk products					
Whole milk, yogurt, and cream	7.51[2]	6.46	3.72	1.71	2.63
Lower fat and skim milk and lowfat yogurt	-	-	2.71	5.59	4.06
Cheese	.07	.06	.16	.09	.14
Milk drinks and milk desserts	.09	.29	.35	.14	.40
	7.67	6.81	6.94	7.53	7.23
Meat/meat alternates					
Beef, pork, veal, lamb, and game	.45	.50	.80	1.19	.95
Chicken, turkey, and game birds	.72	.76	.62	1.15	1.29
Fish and fish products	.15	.25	.08	.52	1.14
Bacon, sausages, and luncheon meats	.06	.10	.20	.11	.18
Eggs and egg mixtures	1.21	.85	.45	.62	.46
Dry beans, lentils, peas, and nuts	.29	.63	.99	.95	.42
	2.88	3.09	3.14	3.77	4.44
Other foods					
Table fats, oils, and salad dressings	.15	.13	.21	.26	.34
Gravies, sauces, condiments, spices, and salt	.06	.07	.12	.18	.18
Fruit drinks, soft drinks, and ades	.84	1.24	1.97	.70	2.23
Sugars, sweets, and candies	.29	.32	.37	.42	.25
	1.34	1.76	2.67	1.56	3.00

[1]Food as purchased includes uncooked grain products; raw, canned, and frozen vegetables; fruit juice concentrates; dry beans and legumes; and meat with bones. Coffee and tea are included in the food plan but are not shown because of the small quantities. However, their cost is included in the estimated cost of the food plan.
[2]For children ages 1 and 2 years, the model yielded quantities of whole milk, yogurt, and cream, and lower fat and skim milk and lowfat yogurt. Dietary guidance, however, is that children at these ages primarily consume whole-milk products, so quantities of lower fat and skim milk and lowfat yogurt for these children were allocated to the whole milk, yogurt, and cream category.

(Continued)

Table 2. Quantities of food for a week,[1] 1999 Thrifty Food Plan market baskets, by age-gender group (continued)

Food category	Females 12-19	Males 12-14	Males 15-19	Females 20-50	Males 20-50	Females 51+	Males 51+
Total pounds	31.90	32.42	34.70	30.45	33.30	26.48	30.63
Grains							
Breads, yeast and quick	1.32	1.20	1.02	1.52	1.36	.97	1.14
Breakfast cereals, cooked and ready to eat	.33	.42	.05	.18	.09	.42	.36
Rice and pasta	1.28	1.95	3.41	1.31	2.86	1.24	1.45
Flours	.47	.50	.34	.44	.35	.30	.41
Grain-based snacks and cookies	.06	.05	.03	.09	.05	.09	.04
	3.46	4.12	4.85	3.54	4.71	3.02	3.40
Vegetables							
Potato products	2.74	3.76	2.95	2.85	3.95	1.33	2.02
Dark-green and deep-yellow vegetables	.56	.17	.47	.45	.37	.65	.62
Other vegetables	1.81	1.89	2.59	2.01	2.28	2.76	2.92
	5.11	5.82	6.01	5.31	6.60	4.74	5.56
Fruits							
Citrus fruits, melons, berries, and juices	3.27	3.96	5.42	4.08	3.67	3.03	6.47
Noncitrus fruits and juices	.99	1.43	.99	1.08	2.75	1.87	1.34
	4.26	5.39	6.41	5.16	6.42	4.90	7.80
Milk products							
Whole milk, yogurt, and cream	1.84	2.68	2.05	1.80	2.47	1.39	1.75
Lower fat and skim milk and lowfat yogurt	8.59	7.66	8.75	4.87	4.24	5.14	5.28
Cheese	.12	.09	.11	.17	.20	.10	.09
Milk drinks and milk desserts	.19	.20	.07	.20	.14	.17	.10
	10.74	10.63	10.98	7.04	7.05	6.80	7.22
Meat/meat alternates							
Beef, pork, veal, lamb, and game	1.14	1.53	1.14	1.58	1.42	1.54	1.73
Chicken, turkey, and game birds	2.59	1.78	.56	1.64	1.72	1.39	.80
Fish and fish products	.45	.36	1.18	.47	.58	.40	.25
Bacon, sausages, and luncheon meats	.12	.12	.26	.16	.23	.14	.25
Eggs and egg mixtures	.38	.35	.32	.45	.38	.46	.57
Dry beans, lentils, peas, and nuts	4.99	4.76	5.01	4.70	5.77	4.35	4.92
Other foods							
Table fats, oils, and salad dressings	.28	.37	.46	.35	.48	.31	.37
Gravies, sauces, condiments, spices, and salt	.17	.16	.22	.19	.26	.18	.22
Fruit drinks, soft drinks, and ades	2.70	1.06	.69	3.88	1.87	1.96	.98
Sugars, sweets, and candies	.19	.11	.07	.27	.14	.22	.15
	3.34	1.70	1.44	4.70	2.75	2.67	1.72

[1]Food as purchased includes uncooked grain products; raw, canned, and frozen vegetables; fruit juice concentrates; dry beans and legumes; and meat with bones. Coffee and tea are included in the food plan but are not shown because of the small quantities. However, their cost is included in the estimated cost of the food plan.

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- *Vegetables* account for 11 to 19 percent of the revised TFP market baskets for children and adolescents ages 1 to 19, and 17 to 21 percent for females and males ages 20 and older.

- *Fruits* make up 12 to 18 percent of the revised TFP market baskets for children and adolescents ages 1 to 19, 17 to 19 percent for females ages 20 and older, and 19 to 25 percent for males ages 20 and older. The fruits group constitutes the largest single share of pounds in the TFP basket for males ages 51 and older. Generally, the vegetables and fruits groups combined make up a larger share of the TFP market baskets for adults than they do of the market baskets for children.

- *Milk products* account for the largest share of food by weight in the revised TFP market baskets for children and most adults: 21 to 42 percent. For children and adolescents ages 1 to 19, the milk products group accounts for 26 to 42 percent of total pounds of their TFP market baskets, with pre-schoolers having the largest share of milk products. The share of milk products declines for children after age 1 until ages 9 to 11; it then increases after this age. Milk products account for 24 to 26 percent of the TFP market baskets for females ages 20 and older and 21 to 24 percent for males ages 20 and older.

- *Meat/meat alternates* account for 14 to 17 percent of the revised TFP market baskets for the various age-gender groups.

- *Other foods* (fats, oils, and sweets), accounting for 4 to 15 percent of the TFP market baskets for the various groups, make up a particularly large share of the revised TFP market

basket for females ages 20 to 50. For these women, foods such as fruit drinks, soft drinks, and ades provide inexpensive sources of calories, after all other dietary standards are met.

Thrifty Food Plan Market Baskets by Food Categories

Grains
Breakfast cereals account for over half of the grains in the revised TFP market baskets for children ages 1 and 2 (table 2). Rice and pasta and breads (yeast and quick) are the main grain products in the TFP market baskets for older children and adolescents. Rice and pasta account for a particularly large share of grain products (70 percent) for males ages 15 to 19. For adults ages 20 and older, rice and pasta as well as breads (yeast and quick) continue to be the main grain products in their TFP market baskets, with rice and pasta accounting for a larger share for adult males, compared with the share for adult females. Foods in the grains group are especially nutrient dense because of fortification.

Vegetables
Two food categories—potato products and other vegetables (cabbage, corn, etc.)—account for most of the vegetables portion of the revised TFP market baskets for children ages 1 to 19. For many children and adolescents, potato products make up over half the vegetables portion of their TFP baskets. Potatoes are relatively inexpensive sources of copper, potassium, vitamin B_6, vitamin C, and dietary fiber. Dark-green and deep-yellow vegetables, relatively expensive sources of nutrients, make up a smaller portion of children's and adolescents' TFP market baskets. The vegetables portion of the TFP market basket for adults is similar to the vegetable portion for children and adolescents—high in potato products and other vegetables.

Compared with other vegetables, potato products account for a larger share of the vegetables component of the TFP baskets for adults ages 20 to 50. For adults ages 51 and older, the reverse holds.

Fruits
Noncitrus fruits and juices account for over half—58 to 68 percent—of the fruits portion of the revised TFP market baskets for children ages 1 to 5. Citrus fruits, melons, berries, and juices account for most of the fruits component of the TFP market baskets for all other age-gender groups. For males ages 15 to 19, citrus fruits, melons, berries, and juices account for up to 85 percent of the fruits component of their TFP market basket. For females ages 20 to 50, citrus fruits, melons, berries, and juices make up to 79 percent of the fruits component of their TFP market basket. These fruits then decline to 62 percent for females ages 51 and older. A reverse trend is true for adult males: citrus fruits, melons, berries, and juices compose 57 percent of the fruits component of the TFP market basket for males ages 20 to 50 but increase to 83 percent for males ages 51 and older. The large share of citrus fruits, melons, berries, and juices in most of the market baskets ensures an adequate daily source of vitamin C, folate, and potassium.

Milk Products
The category of lower fat and skim milk and lowfat yogurt accounts for over half the milk products portion of the revised TFP market baskets for most children and adolescents. The exception is the market basket for children ages 1 to 5, where the whole milk, yogurt, and cream category exceeds the lower fat and skim milk and lowfat yogurt category as a share of the milk products component of their TFP baskets. For children ages 1 and 2, the model yielded quantities of lower fat and skim milk and lowfat

Table 3. Percentage distribution of food groups in the Thrifty Food Plan market baskets, by age-gender group, 1999

	Children (ages)				
	1 yr	2 yrs	3-5 yrs	6-8 yrs	9-11 yrs
Total pounds per week	18.22	17.88	20.02	24.66	27.63
	Percent total pounds per week				
Grains	8	8	13	13	13
Vegetables	15	14	11	19	18
Fruits	12	13	12	16	16
Milk products	42	38	35	31	26
Meat/meat alternates	16	17	16	15	16
Other foods[1]	7	10	13	6	11

	Females (ages)			Males (ages)			
	12-19 yrs	20-50 yrs	51+ yrs	12-14 yrs	15-19 yrs	20-50 yrs	51+ yrs
Total pounds per week	31.90	30.45	26.48	32.42	34.70	33.30	30.63
	Percent total pounds per week						
Grains	11	12	11	13	14	14	11
Vegetables	16	17	18	18	17	21	18
Fruits	13	17	19	17	18	19	25
Milk products	34	24	26	32	33	21	24
Meat/meat alternates	16	15	16	15	14	17	16
Other foods[1]	10	15	10	5	4	8	6

[1]Fats, oils, and sweets.

yogurt. Dietary guidance, however, is that children at these ages need to consume whole-milk products *(1)*, so quantities of lower fat and skim milk and lowfat yogurt for these children were allocated to the whole-milk, yogurt, and cream category. For females ages 12 to 19, lower fat and skim milk and lowfat yogurt makes up 80 percent of the milk products portion of their TFP basket. For adults, lower fat and skim milk and lowfat yogurt makes up over half of the milk products component of their TFP market baskets, with a larger share for older adults than for adults ages 20 to 50.

Cheese contributes very little (1 to 3 percent) to the milk products component of the TFP market baskets for all age-gender groups. Milk products constitute a large share of the overall TFP market baskets for all age-gender groups, because these products provide high-quality protein and are good sources of vitamin A, vitamin D, vitamin B_{12}, riboflavin, calcium, phosphorus, magnesium, potassium, and zinc.

Meat and Meat Alternates
No food category dominates the meat/meat alternates portion of the revised TFP market baskets for any age-gender group. Eggs and egg mixtures and poultry (chicken, turkey, and game birds) are the main foods in the meat/meat alternates component of the TFP market baskets for children ages 1 to 2. Red meat (beef, pork, veal, lamb, and game) and another category—legumes (dry beans, lentils, and peas) and nuts—are the main foods in the meat/

meat alternates component of the TFP baskets for children ages 3 to 8. Poultry and fish and fish products are the main foods in the meat/meat alternates component of the TFP basket for children ages 9 to 11.

Poultry makes up 52 percent of the meat/meat alternates component of the TFP market basket for females ages 12 to 19, compared with 37 percent for males ages 12 to 14 and 11 percent for males ages 15 to 19. Red meat accounts for about one-third of the meat/meat alternates component of the TFP basket for males ages 12 to 14, and legumes and nuts account for about one-third of this component for males ages 15 to 19. Red meat and poultry make up most of the meat/meat alternates component of the TFP market baskets for females ages 20 and older. These two food

Table 4. Average Thrifty Food Plan market basket versus average consumption and average previous market basket[1]

	Average Thrifty Food Plan market basket	Average consumption		Average previous Thrifty Food Plan market basket	
	Pounds	Pounds	Difference in average basket vs. average consumption	Pounds	Difference in revised vs. previous basket
Grains	3.43	2.52	+36%	3.83	-10%
Vegetables	5.73	4.15	+38%	5.75	0%
Fruits	5.00	2.06	+143%	2.63	+90%
Milk products	7.58	5.86	+29%	6.37	+19%
Meat/meat alternates	3.80	4.15	-8%	3.41	+11%
Other foods (fats, oils, and sweets)	2.89	6.77	-58%	1.60*	-
Total	28.43	25.51		23.59	

[1]Figures are a weighted average for all age-gender groups in terms of pounds of food per week.
*Do not contain added fats, oils, and sugars; these items are included in the food groups to which they apply.
-Does not apply.

categories and legumes and nuts are the main foods in the meat/meat alternates component of the TFP baskets for males ages 20 and over. Meat, poultry, and fish supply protein, B-vitamins, iron, and zinc. In general, the greater presence of these foods in the TFP market baskets for females and children reflects the higher RDA for iron for females and children, compared with that for males.

Other Foods
Fruit drinks, soft drinks, and ades make up most of the other foods component—which is relatively small to begin with—of the revised TFP market baskets for many of the age-gender groups. Two exceptions are the market baskets for children ages 6 to 8 and males ages 15 to 19: fruit drinks, soft drinks, and ades account for less than half of the other foods component of their TFP market baskets. For children ages 6 to 8, sugars, sweets, and candies make up 27 percent (about 0.4 pounds per week) of the other foods component, and for males ages 15 to 19, table fats, oils, and Salad dressings

account for 32 percent (about 0.5 pounds per week) of the other foods component of their TFP market basket. Sugars, sweets, and candies account for 5 to 9 percent of the other foods component of the TFP market baskets for adults.

A Comparison of the New Thrifty Food Plan Market Baskets With Average Consumption and Previous Market Baskets
To understand how actual reported diets would need to change to meet the nutritional standards of the new TFP, we can compare the average TFP market basket with average consumption. Results could also be shown for each age-gender group, but for simplicity, CNPP computed an average revised TFP market basket based on all age-gender groups and compared it with a market basket based on actual average consumption. CNPP derived these average baskets by weighting each age-gender group by its population size and calculating a weighted mean.

Compared with average reported consumption (in pounds), the average new TFP market basket contains more fruits (+143 percent), vegetables (+38 percent), grains (+36 percent), and milk products (+29 percent) but less other foods (fats, oils, and sweets) (-58 percent) and meat/meat alternates (-8 percent) (table 4). Having more fruits and vegetables and less of the other food groups in the average TFP market basket, compared with average consumption, is not surprising: the TFP market basket represents a nutritious diet. The Healthy Eating Index, an indicator of the quality of the average American's diet, shows that most people's diet, particularly low-income Americans, needs improvement *(3)*.

We can also compare the new and the old TFP average baskets to understand how dietary guidance has changed over time. Doing so, we find that compared with the previous average TFP market basket (in pounds), the new TFP market basket contains more fruits (+90 percent), milk products (+19 percent), and meat/meat alternates (+11 percent), about the same amount

of vegetables, and less grains (-10 percent). These percentage changes from the previous average TFP market basket are likely to be underestimates of fruits, milk products, and meat/meat alternates and an overestimate of grains because the food groups of the previous TFP basket contained added fats, oil, and sugars. The revised TFP basket has added fats, oils, and sweets in a separate category. Hence a true comparison of the other foods category cannot be made between the two TFP baskets. It is also important to consider that larger quantities of most food groups in the revised TFP, compared with the previous one, partly reflects changes in dietary recommendations since the TFP was last updated.

Sensitivity Analysis

Sensitivity analysis permits assessment of how sensitive model results are to changes in the constraints imposed on the solution. To understand how sensitive the results are to changes in market basket costs, we use sensitivity analysis to change systematically the cost limit within the range of the original cost while holding all other inputs and constraints constant. CNPP conducted sensitivity analysis of the revised TFP market baskets for each of the 12 age-gender groups to understand whether a model solution of the TFP market baskets could still be obtained if costs were lowered and what its food group composition would be, given the same inputs (average consumption, cost of food, and nutrient profile/Pyramid servings of food categories) and other constraints (dietary standards and serving recommendations of the Pyramid). With this sensitivity analysis, CNPP made incremental downward and upward changes in the cost constraint of the TFP.

Using this approach, CNPP found that the model produced market-basket solutions between 96 and 125 percent

of the cost of the TFP for the market baskets. At a cost level below 96 percent of the TFP allotment, a market basket that met the dietary standards could not be constructed for at least one of the age-gender groups. In the 96- to 125-percent cost range, dietary standards and serving recommendations of the Food Guide Pyramid can be met. However, the mix and desirability of foods from the various food groups differ. For the TFP market baskets at the bottom end of the cost range, more rice and pasta and less breakfast cereals enter the solution from the grains group, more potatoes and less green and yellow vegetables from the vegetables group, and more citrus fruits and less other fruits from the fruits group. In addition, more dry beans, lentils, peas, and nuts and less fish and poultry are included from the meat/meat alternates group, and more lower fat and skim milk and lowfat yogurt and less milk drinks and milk desserts enter the model solution from the milk products group.

Providing more money (relaxing the cost constraint) naturally makes it easier to find market-basket solutions. Sensitivity analysis of the TFP was capped at 125 percent so that its cost would not exceed the cost of the Low-Cost Food Plan, the next highest cost USDA food plan.

Cost Update of the Thrifty Food Plan

CNPP will use the current method to update the cost of the revised TFP market baskets each month for each of the 12 age-gender groups. This method was approved by an expert interagency panel of economists and uses the monthly Consumer Price Indexes (CPIs) for specific food categories to update prices for the food categories of the TFP market basket. Each of the 25 food categories of the TFP has a corresponding CPI or a set

of corresponding CPIs that are applied to update the appropriate TFP-food-category cost for the market basket of each age-gender group. For TFP food categories with more than one corresponding CPI, CNPP uses a weighted average of the appropriate CPIs. The weights are based on expenditure patterns. After the CPIs are applied to each food category, the costs of the food categories are summed to determine the total cost of the TFP market basket for each age-gender group.

Conclusions

The TFP represents a minimal cost, nutritious diet. The revised TFP market baskets successfully incorporate recent dietary guidance and nutrient recommendations while maintaining constant real-cost levels. The market baskets serve as a valuable framework for providing advice to low-income households regarding economical, nutritious food selection. This is especially important because the average low-income family of four currently spends about 23 percent more on food than the cost of their TFP market basket and, even so, their diets do not meet nutritional standards. This latest revision of the TFP market baskets is an important step in helping households to eat more healthfully.

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