Thrifty Food Plan, 1999

Administrative Report

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Abstract

The Thrifty Food Plan (TFP), a fundamental part of the U.S. food guidance system, is now revised. The TFP provides a representative healthful and minimal cost meal plan to demonstrate how a nutritious diet may be achieved utilizing a modest budget or food stamp benefits. This revision incorporates recent developments in nutrition standards and dietary guidance as well as updates reflective of food consumption and food nutrient content information. It is possible to obtain a healthful diet meeting current nutritional standards at a constant real cost equal to the previous Thrifty Food Plan.

Keywords: Thrifty Food Plan, food, food guidance, meal plan, recipes, food policy, nutrition policy, Food Stamp Program, food assistance programs.
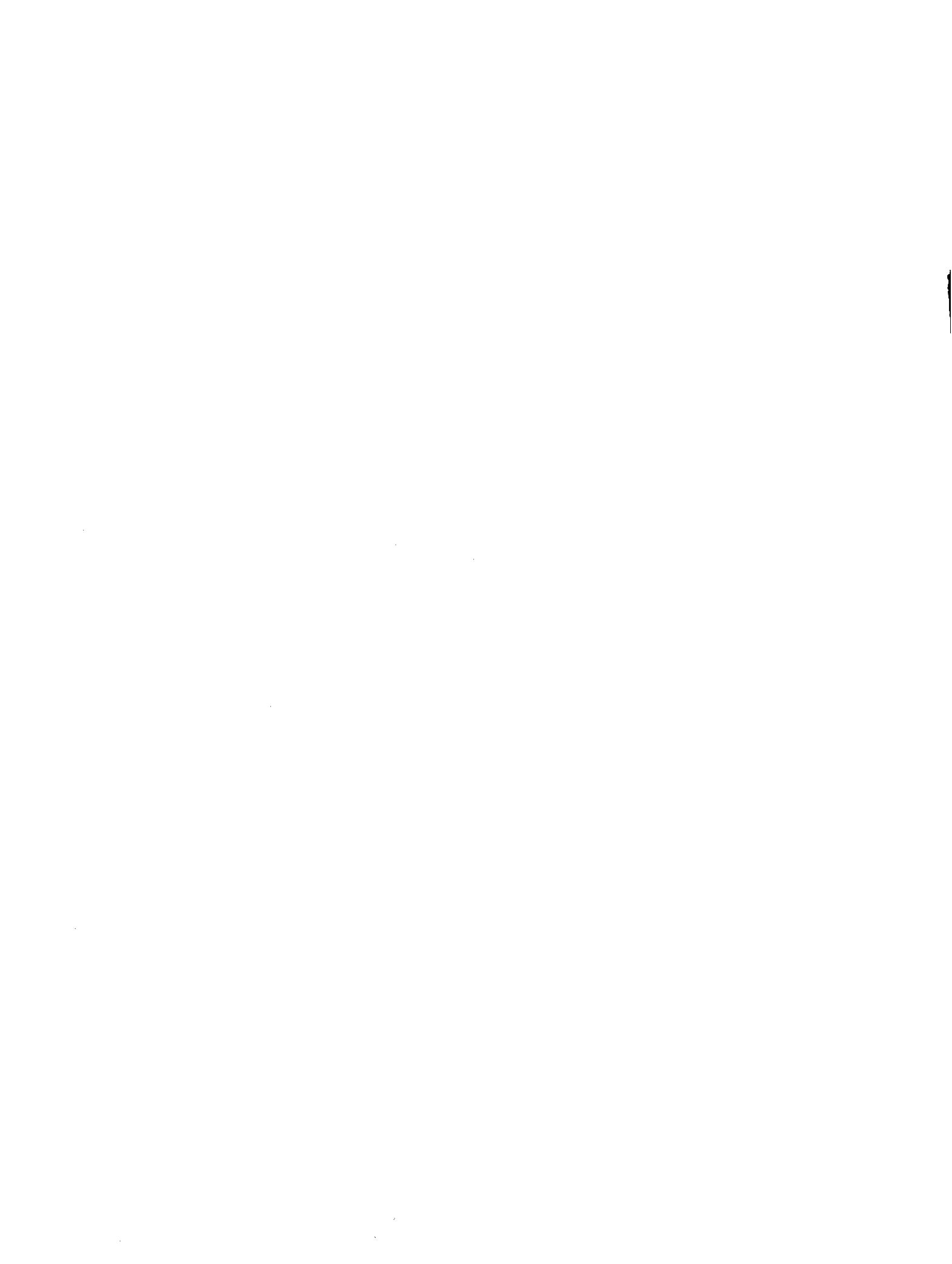
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The Thrifty Food Plan, 1999 Administrative Report

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Foreword

I am delighted to present the new Thrifty Food Plan (TFP) prepared by the Center for Nutrition Policy and Promotion with assistance from the Economic Research Service and the Food and Nutrition Service.

The TFP serves as a national standard for a nutritious diet at a minimal cost and is used as the basis for food stamp allotments. This is the first revision of the plan since 1983, and that plan was based on food consumption data from a 1977-78 survey and 1980 Recommended Dietary Allowances. The new plan incorporates current nutritional standards, including the 1989 Recommended Dietary Allowances, the *1995 Dietary Guidelines for Americans*, and Food Guide Pyramid serving recommendations. The plan is based on data from the 1989-91 Continuing Survey of Food Intakes by Individuals and national average food prices.

The TFP provides food market baskets for 12 age-gender groups at the same cost as the current food stamp allotment. Each TFP market basket identifies the type and quantity of foods that people in specific age-gender groups could consume at home to achieve a healthful diet that meets dietary standards.

The report also offers a sample of menus and recipes, developed under contract by The Pennsylvania State University, that are based on the new TFP market baskets. These menus and recipes were tested and found acceptable by food stamp recipients. The meal plans illustrate one way of preparing nutritious meals and snacks at a minimal cost using the revised TFP. The next challenge is to promote the new TFP among food stamp recipients to help them consume a healthful diet. Currently, they are not eating a diet that meets nutritional standards but nevertheless costs 23 percent more than the TFP. The report shows that food stamp participants could eat a nutritious diet for the cost of the maximum allotment.

I would like to take this opportunity to acknowledge the contribution made by Center staff: P. Peter Basiotis, Shanthy Bowman (now with the USDA Agricultural Research Service), Mark Lino, Myrtle Hogbin, Shirley Gerrior, Carole Davis, and Alyson Escobar for the technical work; Carol Kramer-LeBlanc who, in addition to her leadership role, provided valuable editorial suggestions, and Julia Dinkins who edited and proofed the final drafts of the report.

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The Thrifty Food Plan, 1999
Executive Summary

The Thrifty Food Plan (TFP) has been revised to reflect current dietary recommendations, food consumption patterns, food composition data, and food prices while maintaining the cost at the level of the previous baskets. This revision was undertaken by the U.S. Department of Agriculture (USDA) Center for Nutrition Policy and Promotion (CNPP) with assistance from the USDA Economic Research Service and the USDA Food and Nutrition Service.

The TFP serves as a national standard for a nutritious diet at a minimal cost and is used as the basis for food stamp allotments. The cost of the TFP food or market basket for what is termed "the TFP reference family" (male and female ages 20 to 50, and two children ages 6 to 8 and 9 to 11) was $98.40 per week in June 1999. 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) maintained by CNPP. The TFP market baskets specify the type and quantity of foods that people could consume at home to obtain a nutritious diet at a minimal cost. There are 12 market baskets—one for each of the 12 specific age-gender groups: *Children* ages 1 year, 2 years, 3-5 years, 6-8 years, and 9-11 years, *Males* ages 12-14 years, 15-19 years, 20-50 years, and 51 years and over, and *Females* ages 12-19 years, 20-50 years, and 51 years and over.

TFP Development

Data and Methods

Two main data sources were used to revise the TFP market baskets: USDA's 1989-91 Continuing Survey of Food Intakes by Individuals (CSFII) and the Food Price Database. The CSFII was conducted by the USDA Agricultural Research Service, and the Food Price Database was created by CNPP by merging foods from the CSFII with national food price data. The CSFII is administered to a nationally representative sample of households in the 48 coterminous States. The survey assesses the food and nutrient intake of individuals both at home and away from home. Data on 1-day food intake by individuals in low-income households were used for this revision. "Low income" was defined as before-tax income at or below 130 percent of the U.S. poverty threshold; this is the gross income cut-off for Food Stamp Program eligibility. The sample consisted of about 7,800 individuals ages 1 and over from low-income households. The CSFII contains sampling weights that make the data representative of the U.S. low-income population. All data were weighted in this study.

In the 1989-91 CSFII, people were asked what foods they consumed in a day—at home and away from home. Information on the ingredients, nutrient content, and amount consumed of each of these foods is contained in the data

set. The foods reported as consumed—about 4,800 different foods—were placed into 44 TFP food categories.

The CSFII does not contain information on food prices or expenditures for foods consumed. This information is needed to price a market basket. CNPP developed a method to estimate the price of foods as consumed in the survey and created the Food Price Database using national average food price data from the following sources: the Scantrack system developed by A.C. Nielsen; the retail prices database from the Bureau of Labor Statistics, U.S. Department of Labor; wholesale prices for fresh produce from the Agricultural Marketing Service, USDA; and fish prices from the National Marine Fisheries Service, U.S. Department of Commerce.

To calculate a TFP market basket for each age-gender group, CNPP used a mathematical optimization model. For each of the 12 age-gender groups, the model minimizes deviations from average consumption patterns for the 44 food categories and suggests new consumption patterns that meet required dietary standards and maintain constant cost levels. Each model consists of four sets of data inputs and is subject to three constraints. The model is depicted in figure ES-1. The data inputs relate to each of the 44 food categories and include average consumption (to ensure an acceptable market basket composed of foods that people eat), average food category price, nutrient profile, and the Food Guide Pyramid servings profile. The constraints in the model are dietary standards—including serving specifications of the

Figure ES-1. Thrifty Food Plan Methodology

Inputs

Average Consumption of 44 Food Categories for 12 Age-Gender Groups

Cost per 100 Grams of 44 Food Categories

Nutrient Profile of 44 Food Categories per 100 Grams

Food Guide Pyramid Servings Profile of 44 Food Categories per 100 Grams

Mathematical Optimization Process

Optimization Process Solution Output

Conversion Process (From 44 Food Categories to 25)

TFP Market Baskets for the 12 Age-Gender Groups

Constraints

Dietary Standards for 12 Age-Gender Groups

Food Guide Pyramid Servings Recommendations for 12 Age-Gender Groups

TFP Maximum Cost Allotment for 12 Age-Gender Groups

Food Guide Pyramid—and the TFP cost (for 1989-91 to correspond to the period of the food consumption data).

Dietary Standards

The revised TFP market baskets incorporate updated knowledge of nutritional needs. The 1989 Recommended Dietary Allowances (RDAs), the *1995 Dietary Guidelines for Americans,* the National Research Council's Diet and Health Report, and the serving recommendations of the USDA Food Guide Pyramid form the basis of the TFP market baskets. The TFP market basket for 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 were based on the *1995 Dietary Guidelines for Americans,* which recommend 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 recommend 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,* 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) 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.

Cost Level

The research question addressed in this revision was whether households can still meet updated nutrition standards at the cost of the previous TFP. Accordingly, the cost of the new TFP was constrained by CNPP to equal the average cost of the 1989-91 TFP for each age-gender group. This constant cost was used to ascertain whether, and how, a household could achieve a nutritious diet deviating as little as possible from existing consumption patterns.

TFP Results

Market Baskets

The optimization model yielded a TFP market basket, for each of the 12 age-gender groups, consisting of quantities of each of the 44 food categories. Each market basket met model constraints for dietary standards, Food Guide Pyramid serving recommendations, and cost levels.

In the design of the TFP, CNPP found it necessary to convert foods and quantities consumed into the appropriate, corresponding form and quantity of purchasable foods. After obtaining quantities of food as consumed in the 44 food categories from the model output, CNPP converted the quantities to the equivalent amount of food ingredients that could be purchased and then collapsed into a simplified group of 25 food categories. One of the simplifications was that mixed foods were disaggregated into ingredients and allocated to these categories. A 1-week market basket of 25 food categories was determined for each of the 12 age-gender groups. The 1-week TFP market baskets for each of the age-gender groups are shown in table ES-1. These individual market baskets may be combined to form a household market basket.

TFP Comparisons and Sensitivity Analysis

To understand how actual reported diets would need to change to meet the nutritional standards embodied in the new TFP, we can compare the average TFP market basket (a population-weighted average of the 12 age-gender specific market baskets) with a market basket based on average consumption reported in the 1989-91 CSFII. Compared with average consumption, the new average TFP market basket contains more pounds of fruits (+143 percent), vegetables (+38 percent), grains (+36 percent), and milk products (+29 percent) but contains fewer pounds of other foods (fats, oils, and sweets) (-58 percent) and meat/meat alternates (-8 percent). Having more fruits and vegetables and less of the other foods group in the TFP market basket, compared with average consumption, is not surprising, because the TFP market basket represents a nutritious diet. The Healthy Eating Index, an indicator of overall quality of the American diet, shows that the diet of most Americans, particularly low-income Americans, needs improvement. Compared with the previous average TFP market basket (in pounds), the revised average 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 fewer pounds of grains (-10 percent). These differences from the previous TFP market basket are primarily due to changes in dietary standards.

Sensitivity analysis is a technique that permits an assessment of how sensitive model results are to changes in the constraints. By relaxing the cost constraint systematically, for example, one can identify a cost range over which the model still produces a TFP market basket that meets all other constraints. In other words, sensitivity analysis permits an examination of the cost ranges at which the TFP market baskets could be obtained from the mathematical model, given the model inputs and other constraints.

Table ES-1. 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 food plan cost.
[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.

Table ES-1. Quantities of food for a week,[1] 1999 Thrifty Food Plan market baskets (cont'd)

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
				Pounds per week			
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	7.81
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	.31	.62	1.55	.40	1.44	.42	1.32
	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	.28	.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 food plan cost.

CNPP found that for all 12 age-gender groups, food plan solutions as specified by TFP inputs and other constraints could be obtained in the cost range between 96 and 125 percent of the TFP cost. While the model still "solves" when the cost is reduced 4 percent, the mix of foods in each of the five Food Guide Pyramid food groups varies and shifts to less expensive food items. For example, the amounts of potatoes, rice, and dry beans increase. The 125 percent of the TFP cost figure represents a capped limit so that the TFP cost does not exceed the cost of the Low-Cost Food Plan, the next higher cost USDA food plan.

TFP Menus and Recipes

Development

To help implement the TFP, CNPP contracted to have the shopping list or market basket for a family of four converted into menus and recipes that may be used by food stamp recipients or households with a limited food budget. These menus and recipes were developed under contract with The Pennsylvania State University (PSU) and demonstrate one way of eating nutritious meals and snacks on a minimal-cost budget. The menus and recipes were first evaluated by taste panelists and then evaluated by a small number of food stamp households.

Two weekly menus with recipes for each week were developed. Convenience was considered whenever possible but was a secondary objective. Each weekly menu consists of seven daily menus, with three meals and usually one snack a day. The sample weekly menus met the dietary standards and the cost criterion of the TFP. The nutritive values of the menus and recipes were analyzed by using the Food Intake Analysis System, Version 3.2 (1996), and the number of Food Guide Pyramid servings in the menus and recipes was determined by using the USDA's 1996 Food Guide Pyramid Servings Data Base to ensure that these menus and recipes met the dietary standards.

Once the recipes were developed, they were tested for acceptability in the PSU Food Laboratory. Taste panelists rated the sensory qualities of the recipes, and those with an acceptable score were included in the final menus to be evaluated by food stamp households. Recipe yields and preparation and cooking time were determined for 40 recipes (20 per week).

Foods in the menus and recipes were then purchased by eight four-person food stamp households (four households for each weekly menu) based on the TFP budget. The menus and recipes were prepared and evaluated for acceptability by these households, who were of different races (White and African American), ethnicity (Hispanic and non-Hispanic), household structure (married couple and single parent), and locale (urban and rural Pennsylvania).

Results

Overall, the menus and recipes were well received by the eight households. Interestingly, two of the eight households required additional guidance related to basic cooking skills in preparing the menus and recipes because they lacked knowledge or experience to prepare food items from the recipes. Nonetheless, results of this component of the TFP study confirm that minimal cost, nutritious meal plans based on the revised TFP market baskets are both feasible and acceptable. It should be noted that the foods in the menus and recipes were chosen to be widely available to ensure that the menus and recipes were appropriate for a national population. However, a limitation was the small number of food stamp households, from one region of the country, evaluating the menus and recipes.

The new TFP meal plans for 2 weeks (food lists and menus) are included here. The new meal plans, including recipes, will also appear in Preparing Nutritious Meals at Minimal Cost. Nutrition educators and other "information multipliers" can use the meal plans to develop nutrition education materials for local, culturally diverse, low-income populations.

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 nutrition standards. The menus and recipes developed in the TFP revision will assist people in planning and preparing nutritious meals on a limited budget. This revision of the TFP market baskets is an important step in assisting households to eat more healthfully.

FOOD LIST

Week I: Food for a Family of Four[1]

Fruits and Vegetables

Fresh[2]:

Apples	(6 small) 1 lb 8 oz
Bananas	(11 medium) 2 lb 12 oz
Melon	1 lb
Oranges	(26 small) 5 lb 7 oz
Cabbage	4 oz
Carrots	1 lb 4 oz
Celery	3 oz
Green pepper	3 oz
Lettuce, leaf	4 oz
Onions	2 lb 8 oz
Potatoes	11 lb 14 oz
Zucchini	7 oz

Canned:

Applesauce	2 oz
Peaches	1 lb 10 oz
Pears	13 oz
Green beans	12 oz
Spinach	10 oz
Tomato paste	6 oz
Tomato sauce	1 lb 1 oz
Tomato soup	10.5 oz

Frozen:

Orange juice, concentrate	8 12-oz cans
Green beans	5 oz
Peas	5 oz

Breads, Cereals, and Other Grain Products

Bagels, plain, enriched	(8) 1 lb
Bread crumbs	2 oz
Bread, white, enriched	2.2 lb
English muffins	8
French bread, enriched	8 oz
Hamburger buns, enriched	8
Crackers, snack, low salt	4 oz
Oatmeal, quick, rolled oats	3 oz
Ready-to-eat cereal (flakes)	6 oz
Barley, pearl	4 oz
Flour, enriched	1 lb 8 oz
Macaroni, enriched	1 lb 11 oz
Noodles, yolk-free, enriched	2 lb 3 oz
Rice, enriched	2 lb, 5 oz

Milk and Cheese

Evaporated milk	16 fl oz
Milk, 1% lowfat	2½ gal
Milk, whole	3 qt
Cheddar cheese	8 oz

Meat and Meat Alternates

Beef chuck roast	2.5 lb
Beef, ground, lean	2.4 lb
Chicken, fryer	1.5 lb
Fish	
Breaded portions, frozen	1 lb
Cod, frozen	1 lb
Tuna fish, chunk-style, water-pack	12 oz
Turkey breast	2 lb 4 oz
Turkey, ground	2 lb
Turkey ham (deli)	11 oz
Beans, kidney, canned	1 lb 11 oz
Beans, lima, dry	6 oz
Beans, northern, canned	9 oz
Beans, garbanzo (chickpeas), canned	10 oz
Eggs, large	16

Fats and Oils

Margarine, stick	7 oz
Shortening	2 oz
Salad dressing, mayonnaise-type	1 lb
Vegetable oil	9 fl oz

Sugars and Sweets

Sugar, brown	2 oz
Sugar, granulated	1 lb
Chocolate pudding, instant	3 oz
Lemonade (ready-to-drink)	1 gal

Other Food Items[3]

Baking powder
Baking soda
Beef bouillon cubes
Black pepper, red pepper
Catsup
Chicken bouillon cubes
Chili powder
Cinnamon
Cornstarch
Cumin
Dry mustard
Gelatin, unflavored
Lemon juice, bottled
Onion powder
Oregano
Paprika
Parsley flakes
Salt
Soy sauce
Sweet pickle relish
Vanilla
Vinegar

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[1]Provides food for a family of four. Amounts of food shown are for foods **actually used** during the week.
[2]Substitute other fruits or vegetables in season that contain similar nutrients if they are better buys.
[3]Small amounts used in preparing recipes and other foods in the menus and recipes; purchase as needed.

FOOD LIST

Week II: Food for a Family of Four[1]

Fruits and Vegetables
Fresh[2]:

Apples	(5 small) 1 lb 4 oz
Bananas	(11 medium) 2 lb 12 oz
Grapes	1 lb 8 oz
Melon	1 lb
Oranges	(22 small) 4 lb 12 oz
Carrots	1 lb
Celery	5 oz
Green pepper	4 oz
Lettuce, leaf	9 oz
Onions	1 lb 4 oz
Potatoes	10 lb 8 oz
Tomatoes	6 oz

Canned:

Oranges, mandarin	13 oz
Peaches, canned, light-syrup	1 lb 10 oz
Mushrooms, canned	4 oz
Spaghetti sauce	26 oz
Tomato sauce	8 oz

Frozen:

Orange juice, concentrate	7 12-oz cans
Broccoli	6 oz
French fries	11 oz
Green beans	1 lb 7 oz
Peas	15 oz

Breads, Cereals, and Other Grain Products

Bagels, plain, enriched	(4) 8 oz
Bread crumbs	3 oz
Bread, French	4 oz
Bread, white, enriched	2 lb
Bread, whole-wheat	1 lb
Hamburger buns, enriched	8
Rolls, dinner, enriched	4
Ready-to-eat cereal	
Corn flakes	1 oz
Toasted oats	10 oz
Flour, enriched	1 lb 7 oz
Macaroni, enriched	1 lb 5 oz
Noodles, yolk-free, enriched	1 lb 2 oz
Popcorn, microwave, unpopped	3 oz
Rice, enriched	3 lb 2 oz
Spaghetti, enriched	11 oz

Milk and Cheese

Evaporated milk	4 oz
Milk, 1% lowfat	9 qt
Milk, whole	4 qt
Cheese, cheddar	2 oz
Cheese, cottage	7 oz
Cheese, mozzarella	1 oz

Meat and Meat Alternates

Beef, ground, lean	3 lb 15 oz
Chicken, fryer	1 lb 13 oz
Chicken, thighs	2 lb 12 oz
Fish (flounder, cod), frozen	2 lb
Tuna fish, chunk-style, water-pack	12 oz
Pork, ground	1 lb 7 oz
Turkey, ground	1 lb
Turkey ham	11 oz
Beans, garbanzo (chickpeas), canned	15 oz
Beans, kidney, canned	15 oz
Beans, vegetarian, canned	1 lb 9 oz
Eggs, large	17

Fats and Oils

Margarine, stick	15 oz
Shortening	4 oz
Salad dressing, mayonnaise-type	6 fl oz
Vegetable oil	9 fl oz

Sugars and Sweets

Sugar, brown	1 oz
Sugar, powdered	3 oz
Sugar, granulated	9 oz
Jelly	8 oz
Molasses	1 fl oz
Pancake syrup	2 oz
Chocolate chips, semi-sweet	2 oz
Fruit drink	1 gal
Fudgesicles, ice milk	4

Other Food Items[3]

Baking powder
Baking soda
Black pepper
Catsup
Chicken broth, reduced sodium
Chili powder
Cinnamon
Chocolate drink mix, powdered
Cumin
Dried onion
Garlic powder
Gelatin, unflavored
Italian herb seasoning
Lemon juice, bottled
Oregano
Paprika
Salt
Soy sauce, reduced sodium
Vanilla

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[1]Provides food for a family of four. Amounts of food shown are for foods **actually used** during the week.
[2]Substitute other fruits or vegetables in season that contain similar nutrients if they are better buys.
[3]Small amounts used in preparing recipes and other food items in the Week 1 menus; purchase as needed.

Week I. Menus for a Family of Four

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
BREAKFAST	Orange juice (3 c) Ready-to-eat cereal (3 c flakes) Toasted English muffin (4) 1% lowfat milk (2 c)	Orange juice (3 c) Banana (4) Bagel (4) Margarine (4 tsp) 1% lowfat milk (2 c)	Orange juice (3 c) **Cooked rice cereal Bagel (4) Margarine (4 tsp)	Orange juice (3 c) Scrambled eggs (4) Hash brown potatoes (2 c) 1% lowfat milk (2 c)	Orange juice (3 c) Ready-to-eat cereal (3 c flakes) English muffin (4) Margarine (4 tsp) 1% lowfat milk (2 c)	Orange juice (3 c) *Baked French toast Cinnamon sugar topping (4 tsp) 1% lowfat milk (2 c)	Orange juice (3 c) *Baked potato cakes White toast (4 slices) 1% lowfat milk (2 c)
LUNCH	*Turkey patties Hamburger bun (4) Orange juice (3 c) Coleslaw (2 c) 1% lowfat milk (2 c)	*Crispy chicken **Potato salad **Orange gelatin salad Peaches, canned (1 c) **Rice pudding	**Turkey chili Macaroni (2 c) *Peach-apple crisp 1% lowfat milk (2 c) Orange juice (3 c)	Turkey ham (11 oz, 2 tbsp salad dressing) sandwiches (4) **Baked beans Banana, slices (2 c) **Oatmeal cookies Orange juice (3 c) 1% lowfat milk (2 c)	**Potato soup Snack crackers, low salt (5 each) *Tuna pasta salad Orange slices (2 c) **Oatmeal cookies 1% lowfat milk (2 c)	**Potato soup Snack crackers, low salt (5 each) Apple orange slices (2 apples, 2 oranges) (2 c) **Rice pudding 1% lowfat milk (2 c)	Baked fish (12 oz, 4 tbsp salad dressing) sandwiches (4) *Crispy potatoes **Macaroni salad Melon (1-1/3 c) Orange juice (3 c) 1% lowfat milk (2 c)
DINNER	**Beef-noodle casserole Lima beans (2 c) Banana orange salad (2 bananas, 2 oranges) (2 c) 1% lowfat milk (2 c)	*Turkey stir fry Steamed rice (3 c) White bread (4 slices) *Peach-apple crisp 1% lowfat milk (2 c)	**Baked cod w/cheese *Scalloped potatoes Spinach (1-1/3 c) Margarine (4 tsp) Chocolate pudding (2 c)	*Beef pot roast Noodles (4 c) Peas and carrots (1 c) Orange slices (2 c) Biscuits (8) Margarine (4 tsp) **Rice pudding 1% lowfat milk (2 c)	Beef pot roast (12 oz) Noodles (4 c) Green beans (1-1/3 c) Leaf lettuce (1-1/3 c) Salad dressing (4 tbsp) **Rice pudding 1% lowfat milk (2 c)	*Saucy beef pasta White bread (4) Canned pears (2 c) Orange juice (3 c) 1% lowfat milk (2 c)	*Turkey-cabbage casserole (8 c) Orange slices (2 c) White bread (2 slices) **Chickpea dip 1% lowfat milk (2 c)
SNACK	White bread (4 slices) **Chickpea dip Lemonade (4 c)	Orange juice (3 c)	*Crispy potatoes	Lemonade (4 c)	Biscuits (8) Margarine (4 tsp) Lemonade (4 c)	Lemonade (4 c)	

*Recipes were tested and sensory-evaluated in the food laboratory and by households.

**Recipes were tested and sensory-evaluated in the food laboratory.

Note: Daily menus are designed in no specific sequence. Amounts of foods that a family is expected to use are shown in parentheses for most foods. Amounts of allowed margarine and milk can be combined or divided differently at meals. Recipes are provided for foods shown with asterisks. Serving sizes are shown on the recipes.

Week II. Menus for a Family of Four

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
B R E A K F A S T	Orange juice (3 c) Hash brown potatoes (2 c) Biscuits (8) Margarine (4 tsp) Jelly (8 tbsp)	Orange juice (3 c) Ready-to-eat-cereal (3 c toasted oats) White toast (4 slices) Margarine (8 tsp) 1% lowfat milk (2 c)	Orange juice (3 c) Bananas (1/2 c) Ready-to-eat-cereal (3 c toasted oats) White toast (4 slices) Jelly (8 tbsp) 1% lowfat milk (2 c)	Orange juice (3 c) **Cooked rice cereal White toast (4 slices) Margarine (4 tsp) 1% lowfat milk (2 c)	Orange juice (3 c) Ready-to-eat cereal (3 c toasted oats) White toast (4 slices) Margarine (4 tsp) 1% lowfat milk (2 c)	Orange juice (3 c) Scrambled eggs (2 c) Turkey ham (11 oz) Bagels (4) 1% lowfat milk (2 c)	Orange juice (3 c) Melon (1-1/3 c) Pancakes (12) Pancake syrup (8 tbsp) 1% lowfat milk (2 c)
L U N C H	**Chicken and vegetables **Scalloped potatoes Grapes (12 oz) Whole wheat bread (4 slices) Margarine (4 tsp) *Peach cake 1% lowfat milk (2 c)	*Pizza meat loaf Noodles (4 c) Margarine (8 tsp) Orange slices (2 c) 1% lowfat milk (2 c)	*Tuna macaroni salad White bread (4 slices) Margarine (4 tsp) Apple slices (2 c) 1% lowfat milk (2 c) Cocoa drink mix (2 oz)	Hamburger (12 oz) sandwiches (4) *Ranch beans **Orange gelatin salad Banana slices (1/2 c) 1% lowfat milk (2 c)	*Baked chicken nuggets **Shoestring potatoes Macaroni (5 c) Margarine (4 tsp) **Orange gelatin salad 1% lowfat milk (2 c)	*Chicken noodle soup Biscuits (8) Canned peaches (2 c) Orange juice (3 c) 1% lowfat milk (2 c) Cocoa drink mix (2 oz)	Meatball (12 meatballs) sandwiches (4) Grapes (2 oz) **Sugar cookies 1% lowfat milk (2 c) Orange juice (3 c)
D I N N E R	*Southwestern salad Steamed rice (6 c) Apple orange salad (2 apples, 2 oranges) Margarine (4 tsp) 1% lowfat milk (2 c)	*Spanish baked fish Steamed rice (6 c) Peas (1-1/3 c) Whole wheat bread (4 slices) Margarine (8 tsp) *Peach cake 1% lowfat milk (2 c)	*Stir-fried pork and vegetables with rice Dinner rolls (4) Margarine (4 tsp) Mandarin oranges (2 c) 1% lowfat milk (2 c)	Baked chicken (10 oz) Mash potatoes (6 c) Green beans (1-1/2 c) White bread (4 slices) Margarine (5-1/3 tbsp) Orange slices (2 c) 1% lowfat milk (2 c)	**Baked spicy fish Noodles (4 c) Peas and carrots (10 oz) White bread (4 slices) Margarine (8 tsp) *Chocolate rice pudding 1% lowfat milk (2 c)	*Baked meatballs Spaghetti and sauce (5 c) Leaf lettuce (2 c) Salad dressing (4 tbsp) French bread (4 slices) 1% lowfat milk (2 c)	*Cheese-stuffed potatoes Macaroni (5 c) Peas (1-1/3 c) Margarine (8 tsp) Orange slices (2 c) 1% lowfat milk (2 c)
S N A C K	Popcorn (6 c)	**Shoestring potatoes Fruit drink (4 c)	Popcorn (6 c) Orange juice (3 c)	*Chocolate rice pudding	Baked French fries (11 oz) Fruit drink (4 c)	Ice milk fudgesicle (4)	Popcorn (6 c) Fruit drink (4 c)

*Recipes were tested and sensory-evaluated in the food laboratory and by households.
**Recipes were tested and sensory-evaluated in the food laboratory.
Note: Daily menus are designed in no specific sequence. Amounts of foods that a family is expected to use are shown in parentheses for most foods. **Amounts of allowed margarine and milk can be combined or divided differently at meals.** Recipes are provided for foods shown with asterisks. Serving sizes are shown on the recipes.

The Thrifty Food Plan, 1999 Administrative Report

Introduction

The U.S. Department of Agriculture (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.

This report represents a revision by CNPP of the previous 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. The market baskets are accompanied by newly designed meal plans and menus. This report 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; it also describes the development of meal plans, menus, and recipes. To better illustrate some of the implications of the new TFP market baskets, CNPP compared and contrasted them both with the previous TFP market baskets and with actual reported consumption patterns.

The TFP market baskets are important as a national standard illustrating how a nutritious household diet can be prepared on a limited budget. Currently, the average low-income family of four spends about 23 percent more on total food than the cost of their household TFP market basket (USDA, CNPP, 1998). Moreover, most low-income families do not obtain a healthful diet (Bowman et al., 1998). Therefore, the TFP market baskets are useful as illustrative guides in educational programs and as references for policies aimed at assisting low-income families in efficiently budgeting their food expenditures and bettering their diets.

Background of the Thrifty Food Plan

For over 100 years, the USDA has prepared guides for selecting nutritious diets at different cost levels. In 1894, based on work of W.O. Atwater, the Department published information on the quantity of foods purchasable at a relatively economical price level that met the nutrient standard for the average American male undertaking "moderate muscular work." In this original food plan, nutrient needs, food composition, and the price of foods were factored in—the same criteria still used in the development of food plans (Cofer et al., 1962).

By the 1920's, research had demonstrated the presence of minerals and vitamins in foods and their value to the diet. Basic food plans were developed that were adequate in nutrients, moderate in cost, and satisfying in flavor. These early food plans or diet guides provided consumers with practical and economical advice on healthful eating. In the 1930's, four nutritious food plans were developed at different cost levels for families with varying incomes. These plans were (1) the Restricted Food Plan for Emergency Use, (2) the Minimum-Cost Food Plan, (3) the Moderate-Cost Food Plan, and (4) the Liberal-Cost Food Plan. The two lower cost food plans were used for low-income families affected by the Depression and were replaced in the early 1940's by the Low-Cost Food Plan. The early food plans were revised periodically to reflect changes in dietary guidance, consumption behavior, and food prices (Cofer et al., 1962).

In 1961, the Economy Food Plan was developed as a nutritionally adequate diet designed for short-term or emergency use. This plan, priced at less than the Low-Cost Food Plan, served as the basis for food stamp allotments as stipulated in the 1964 Food Stamp Program Act. In 1975, the Economy Food Plan was replaced by the TFP, which represented a completely new set of market baskets, but at the same minimal cost as the Economy Food Plan market baskets. The TFP became the new basis for food stamp allotments. The TFP represented a minimal cost diet based on up-to-date dietary recommendations, food habits, food composition data, and food price information. A computerized optimization model was used for the first time to determine the market baskets that met dietary standards and cost constraints with the least possible change from actual consumption patterns. The TFP market baskets were next revised in 1983 using data from USDA's 1977-78 Nationwide Food Consumption Survey. This 1999 report represents the most recent revision of the TFP since 1983.

The 1983 TFP market baskets are outdated, because they are based on food composition data, eating patterns, and price information that are now over 20 years old. Since then the Recommended Dietary Allowances (RDAs) and the *Dietary Guidelines for Americans* have been updated, and the USDA Food Guide Pyramid introduced (USDA, 1996). The nutrient composition of foods has changed from the late 1970's, reflecting advances in food science, changing dietary guidance, and evolving consumer demands for foods that are more convenient and healthful. Changing population demographics have resulted in the introduction of many new foods in the marketplace. Finally, relative food prices have changed over time, affecting food choices and consumption patterns. For all these reasons, the TFP was updated.[1]

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[1] See Appendix 1 for an evaluation of the 1983 TFP (Gerrior, 1995).

Data and Methods

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.

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 using in-person interviews and a 24-hour dietary recall method.[2] This study utilized 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 assistance of the child.

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 Food Stamp Program eligibility. 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 contained 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.[3] This was required because while the CSFII has extensive

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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 (Basiotis et al., 1987).

[3] See Appendix 2 for a detailed description of the construction of the Food Price Database (Bowman, 1997). The process involved the necessity of converting from foods in the form consumed to foods in the form purchased and back to the consumed form.

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 household food expenditure information from which food costs were derived. For this study, creation of the Food Price Database involved (1) identifying all foods reported consumed at and away from home in the CSFII and disaggregating them using recipes into their specific ingredients, (2) adjusting ingredient quantities for cooking and waste factors, when appropriate, to convert foods to a purchasable form, (3) pricing the purchasable ingredients 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 elaborate, some foods or food ingredients—for example, milk on cereals or luncheon meats in sandwiches—are in a form that can be readily purchased (and priced). However, other consumed foods have been cooked or other-wise prepared (peeled, shelled, etc.) and must be adjusted to retail form before pricing. For such foods, cooking and waste conversion factors that adjust for the loss or gain in weight due to cooking and preparation were applied to all relevant ingredients.[4] For example, steamed vegetables were converted to raw, unprepared forms, and cooked pasta was converted to its uncooked form. Similarly, cooked eggs were converted to eggs with shells, and peeled bananas were converted to purchasable form with peel. For more explanation, see Appendix 2.

To determine retail prices to calculate the costs of foods, CNPP utilized four sources of data: (1) the A.C. Nielsen Scantrack system, which was used to price most food ingredients; (2) Department of Labor Bureau of Labor Statistics price data for miscellaneous foods; (3) USDA Agricultural Marketing Service price data for fresh produce and meat; and (4) Department of Commerce National Marine Fisheries Service price data for fish. 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 supermarket product label information, 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, first scrambled eggs were

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[4] USDA Agriculture Handbook No. 8 (series) *Composition of Foods* (USDA, 1976-92) 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 Yields: Summarized by Different Stages of Preparation* (USDA, 1975). Food ingredients that are cooked and/or have a waste factor were converted using either or both conversion factors and then priced.

separated into ingredients: egg without shell, milk, table fat, and salt. These ingredients were then adjusted for loss in weight due to cooking (e.g., the loss of moisture in eggs and milk) and for food preparation waste (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.

Methods

Food plan development includes three major steps. First is the selection of a survey sample to use as the basis for the food plan at a particular cost level. Second is the establishment of dietary standards and a cost limit for the food plan. Third is the use of a computerized mathematical model to help develop the food plan. The model utilized should be designed to identify food market baskets representing the smallest change necessary in actual food consumption patterns to meet the dietary standards and the cost limit desired.

An overview of the methodology used to update the TFP market baskets is depicted in figure 1. A revised market basket was calculated for 12 age-gender groups: *Children* ages 1, 2, 3-5, 6-8, and 9-11; *Females* ages 12-19; 20-50, and 51 and older; and *Males* ages 12-14, 15-19, 20-50, and 51 and older. Nutritional needs, similarity to RDA age categories, and comparability to previous food plan age-gender categories 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 presents these 44 food categories and some examples of foods in each. Foods are assigned to food categories based on similarity of nutrient content, food costs, use in meals, and link to the USDA Food Guide Pyramid food groups (see appendix 3 for Food Category Database Documentation).

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 food category consumption, average food category cost per 100 grams, average food category nutrient profile, and average food category Food Guide Pyramid servings profile. The constraints were dietary standards, serving specifications of the Food Guide Pyramid, and constant TFP market basket costs (corresponding to the period of food consumption data).

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 (i.e., shredded wheat)
Breakfast cereal—regular fiber	Corn meal or grits, cream of wheat, and ready-to-eat cereals having less than 3.7% fiber (i.e., 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, and 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 watermelon; 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, Thrifty Food Plan, 1999 (cont'd)

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 than 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 mixtures—lowfat	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, oils, 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.**

Figure 1. Thrifty Food Plan Methodology

Inputs

Average Consumption of 44 Food Categories for 12 Age-Gender Groups

Cost per 100 Grams of 44 Food Categories

Nutrient Profile of 44 Food Categories per 100 Grams

Food Guide Pyramid Servings Profile of 44 Food Categories per 100 Grams

Mathematical Optimization Process

Constraints

Dietary Standards for 12 Age-Gender Groups

Food Guide Pyramid Serving Recommendations for 12 Age-Gender Groups

TFP Maximum Cost Allotment for 12 Age-Gender Groups

Optimization Process Solution Output

Conversion Process (From 44 Food Categories to 25)

TFP Market Baskets for the 12 Age-Gender Groups

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 to 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 Food and Nutrition Board energy recommendations (National Academy of Sciences, 1989b).

Similar to the previous TFP and consistent with research on household discard of edible food (USDA, 1983a, 1983b), 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.

Although the updated TFP begins with average consumption, it deviates from average consumption to satisfy the dietary standards of the plan. This deviation occurs because average consumption of many foods—especially fruits and vegetables—is far below recommended consumption; whereas, consumption of some other foods or food components—fats, added sugars, and sodium—is above. Only a small percentage of Americans consume the recommended number of servings of all five major food groups of the Food Guide Pyramid (Bowman et al., 1998).

Average price of each of the 44 food categories

As described in the data section, the Food Price Database contains estimated food costs for food items consumed per 100 grams of the food. Each of the 4,800 foods reported consumed in 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 the average consumption of all people. 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. Average consumption of all people as opposed to the average consumption of each age-gender group was used to calculate the food item weights because food prices do not vary by age-gender group.

Nutrient profile and Food Guide Pyramid servings profile of each of the 44 food categories

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. Food item weights were again based on the average consumption of all people. The average consumption of all people as opposed to the average consumption of each age-gender group was used because the TFP is for household-wide use.

The Food Guide Pyramid servings profile of each of the 44 food categories was 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 incorporates current knowledge about dietary needs and recommendations. Table 2 shows major differences in dietary standards between the old and the revised plan. The new TFP market basket for each age-gender group meets dietary standards for (1) food energy and 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), (2) total fat and saturated fat, (3) cholesterol, (4) carbohydrate, and (5) serving recommendations of the Food Guide Pyramid. The revised TFP also considered recommendations for sodium, dietary fiber, and caloric sweetener/added sugar.

The 1989 Recommended Energy Allowances (REAs) and the Recommended Dietary Allowances (RDAs) for various age-gender groups are the level of intake of food energy and essential nutrients considered adequate to meet the nutrient needs of practically all healthy Americans in the group (National Academy of Sciences, 1989b). For the revised TFP, the market basket for each age-gender group had to meet the group's 1989 REA and 100 percent or more of its 1989 RDAs for the 15 essential nutrients. Because the age-gender groups used in this study do not correspond exactly with the 1989 REAs and RDAs, CNPP interpolated REAs and RDAs.

Consumption limits for fat and saturated fat in the revised TFP market baskets were based on the *1995 Dietary Guidelines for Americans* (USDA and DHHS, 1995). These Guidelines recommend 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 under age 2, the guidelines for fat do not apply. For children ages 2 to 5, the guidelines recommend 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 (USDA, 1995) because young children need sufficient calories for growth and development. Total and saturated fat consumption was therefore unrestricted for children age 1 and was constrained at consumption levels for children ages 2 to 4.

Table 2. Dietary standards of the previous and revised Thrifty Food Plan market baskets

Constraint	Previous TFP market baskets	Revised TFP market baskets
RDAs for each age-gender group	1980 RDA	1989 RDA
Energy	Midpoint of RDA	Average energy allowance
Protein, vitamin A and vitamin C, thiamin, riboflavin, niacin, vitamin B_{12}, calcium, phosphorus, magnesium, and iron	100% RDA	100% RDA
Vitamin E, folate, and zinc	80% RDA	100% RDA
Vitamin B_6	0.02 gm/gm protein	100% RDA
Dietary Guidelines		
Total fat	35% or less of total calories	30% or less of total calories for adults and children ages 5 and older; at average consumption for children ages 2 to 4; unrestricted for children age 1
Saturated fat	No constraint	Less than 10% of total calories for adults and children ages 5 and older; at average consumption for children ages 2 to 4; unrestricted for children age 1
Other recommendations		
Sodium	1,600 mg/1,000 Kcal	No more than 100% of average consumption; unrestricted for children age 1
Cholesterol	350 mg/day or less	300 mg/day or less; unrestricted for children age 1
Fiber	No constraint	No less than 100% of average consumption
Carbohydrate	No constraint	55% or more of total calories/day
Caloric sweeteners/added sugars	12% of total calories	No more than 100% of average consumption
Food Guide Pyramid servings		
Grains	No constraint	Minimum of 6; maximum of 11 servings/day[1]
Vegetables	No constraint	Minimum of 3; maximum of 5 servings/day[1]
Fruits	No constraint	Minimum of 2; maximum of 4 servings/day[1]
Milk products	No constraint	Minimum of 2; maximum of 3 servings/day[1]
Meat/meat alternates	No constraint	Minimum of 2; maximum of 3 (5 to 7 ounces) servings/day[1]
Fats, oils, and sweets	No constraint	No more than 100% of average consumption

[1]Minimum and maximum servings vary by age-gender group. Maximum servings are specified to ensure that the minimum number of servings from all Pyramid food groups are included in the TFP market basket before the maximum number of servings of any one of the food groups is exceeded. Serving sizes for children through 5 years of age are modified by reducing the serving size by 1/3, except for milk product servings.

The National Research Council's *Diet and Health Report* was the source of dietary standards for cholesterol, carbohydrate, and sodium (National Academy of Sciences, 1989a). This report (a consensus by experts in foods and nutrition, medicine, epidemiology, public health, and related fields) 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 their calories per day from carbohydrate. These recommendations were incorporated in the revision of the TFP market baskets for each age-gender group. Regarding sodium, the *Diet and Health Report* 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.*

The *Dietary Guidelines for Americans* do not recommend a quantitative standard for dietary fiber or caloric sweeteners/added sugars. The Guidelines promote the benefits associated with a diet high in fiber and moderate in sugars. The *Diet and Health Report* contains similar recommendations. 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.

This revision of the TFP market baskets is the first one to incorporate serving recommendations of the Food Guide Pyramid. The Food Guide Pyramid translates recommendations from the *Dietary Guidelines for Americans* into the type and amount of foods people can eat to achieve a healthful diet. More importantly, the Pyramid specifies the number of servings of the major food groups (grains, vegetables, fruits, milk products, and meat/meat alternates) that people of different age-gender groups need to eat for a healthful diet. For this TFP revision, the market basket for each age-gender group had to meet the serving requirements for the five major food groups. In establishing the serving recommendations for the five food groups, CNPP used the serving recommendations from the Food Guide Pyramid for energy intake levels of 1,600, 2,200, and 2,800 calories and interpolated serving recommendations for people with other food energy needs. The REA for children ages 3 and younger is less than 1,600 calories. The recommended number of servings for these children was held at the servings for 1,600 calories, but the serving size was scaled proportionately downward (except for milk products) in accordance with their food energy needs. This approach is consistent with guidance based on the Food Guide Pyramid.

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. In other words, the cost level for the TFP should remain constant. Accordingly, because 1989-91 consumption data underlie this revision of the TFP market baskets, for each age-gender group, CNPP constrained the cost of each group's revised TFP market basket to equal the average real cost of its previous TFP market basket for the 1989-91 period. This constant real cost constraint was used to examine whether and how a person could achieve a nutritious diet.

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 from the previous TFP, which required many dishes to be made from scratch, using individual ingredients and requiring more preparation than using packaged mixes.

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 bound was set slightly above zero for most food categories. The exceptions were for all of the vegetables, fruits (including juices), legumes, and nuts categories, where the range was set not to fall below 90 percent of consumption to ensure these foods were included in each market basket. 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 upper bound for milk-based drinks and desserts (regular and lower fat); fruit drinks, soft drinks, and ades (regular and low calorie); and sugars and sweets was set at average consumption to avoid excessive levels of these food categories in each market basket. The lower and upper bound amounts of the various food categories were based on consultation with nutrition researchers and examination of the consumption distribution of each food category.

Mathematical Model

Since 1975 a computerized quadratic mathematical programming model has been used in the development of the TFP. The model selects the optimal food plan for each age-gender group that meets the dietary standards and cost constraints, with as little change as possible from food consumption. The model for the revised TFP was adapted from the model 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 the food budget shares of each of the foods within a food category as the basis for weighting in this revision of the TFP. This is desirable because budget shares reflect consumer preferences, so the shares weight food categories according to consumer preferences.

Another improvement in the model is that it used 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 consumer behavior than symmetry of response. Nonetheless, this model— like all models—remains an approximation of people's consumption behavior. The important point is that the revised TFP mathematical model provides people with an illustrative market basket to develop into daily food plans and recipes that provide nutritionally adequate, healthful meals at the most economical cost.

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. For example, CNPP combined high-fiber and regular-fiber breakfast cereal categories into one breakfast cereal category, 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. Table 3 lists the 25 food categories of the TFP market baskets and examples of the types of foods they contain.

The new TFP market baskets consist of the quantities of the 25 food categories that, in turn, fall into one of the Food Guide Pyramid food groups (grains, vegetables, fruits, milk products, meat/meat alternates, and other foods). Table 4 lists the quantities of the 25 food categories (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.[5] Revised market baskets are also compared with average reported consumption and the previous market baskets.

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[5] 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 3. Market basket food categories and examples of foods, Thrifty Food Plan, 1999

Food category	Examples of foods
Grains	
Breads, yeast and quick	Rolls, buns, breads, muffins, biscuits, flour or corn tortillas, taco shells, bagels, waffles, pancakes, doughnuts, bread stuffing, bread crumbs, and croutons
Breakfast cereals, cooked and ready to eat	Corn grits, cream of wheat, cream of rice, oats, ralston, wheatena, all ready-to-eat cereals, and bulgur
Rice and pasta	All types of rice, spaghetti, noodles, and macaroni
Flours	Buckwheat flour, corn flour, corn meal, corn starch, oat bran, oat flour, rice flour, rye flour, wheat flours, cake mixes, cornbread mixes, pancake mixes, and tapioca flour
Grain-based snacks and cookies	Corn-based snacks, popcorn, pretzels, cookies, crackers, breakfast tarts, and breakfast bars
Vegetables	
Potato products	Potatoes, potato puffs, French-fried potatoes, potato chips, potato sticks, instant potato soup mixes, and instant mashed potatoes
Dark-green and deep-yellow vegetables	Broccoli, carrots, chard, collards, endive, kale, greens, pumpkin, spinach, sweet potatoes, yam, and carrot juice
Other vegetables	Asparagus, beans, beets, Brussels sprouts, cabbage, cauliflower, celery, sweet corn, cucumber, eggplants, lettuce, mushrooms, okra, onions, green peas, peppers, radishes, tomatoes and tomato products, squash, taro, mixed vegetables, and vegetable soups
Fruits	
Citrus fruits, melons, berries, and juices	Limes, lemons, grapefruits, oranges, and tangelos; melons such as cantaloupe, honeydew, and watermelon; berries such as blackberries, blueberries, cranberries, raspberries, and strawberries; and juices from these fruits
Noncitrus fruits and juices	All noncitrus fruits such as apples, apricots, bananas, cherries, grapes, papayas, peaches, pears, and plums; and their juices
Milk products	
Whole milk, yogurt, and cream	All fluid, evaporated, condensed, and dry whole milk; regular yogurt; all fluid creams; sour creams; cream cheeses; cream soups; and milk substitutes
Lower fat and skim milk and lowfat yogurt	All fluid, evaporated, and dry reduced-fat and skim milks; lowfat and nonfat yogurt; and fluid and dry buttermilk
Cheeses	Natural, processed, and imitation cheeses, cottage cheese, cheese spreads, cheese dips, and cheese soups
Milk drinks and milk desserts	Milk-based drinks such as malted milk, milk shakes, and eggnogs; chocolate or cocoa-based drinks, infant formulas, and meal replacement drinks; nondairy dessert toppings; and desserts such as ice cream, frozen yogurt, fudgesicle, sherberts, puddings, and custards

Continued

Table 3. Market basket food category and examples of foods, Thrifty Food Plan, 1999 (cont'd)

Food category	Examples of foods
Meat/meat alternates	
Beef, pork, veal, lamb, and game	Beef, pork, veal, lamb, game meats, organ meats, meat-based soups, meat-based baby foods, cured meat products, and processed meat products
Chicken, turkey, and game birds	Chicken, turkey, duck, game birds, organ meats, chicken- or turkey-based soups, chicken- or turkey-based rolls, and canned chicken
Fish and fish products	Finfish, shellfish, fish chowders, and reconstructed seafoods
Bacon, sausages, and luncheon meats	Bacon, sausages, salami, frankfurters, bologna, pastrami, corned beef, turkey ham, and luncheon meats
Eggs and egg mixtures	Fresh, frozen, and dried eggs; egg substitutes; meringues; and egg mixtures
Dry beans, lentils, peas, and nuts	Black, lima, mung, pinto, red, white, navy, pink, and kidney beans; cowpeas; chickpeas; lentils; all tree nuts; peanuts; peanut butter; soybeans; soy flour; soy milk; soy protein isolate; and soybean-based meat substitutes
Other foods	
Table fats, oils, and salad dressings	Butter; margarine; vegetable oils such as corn oil, olive oil, palm oil, peanut oil, sunflower oil, safflower oil, and soybean oil; shortenings; butter blends; lard; salad oils; all types of salad dressings; and mayonnaise
Gravies, sauces, condiments, spices and salt	Gravies, soy sauce, barbecue sauce, duck sauce, white sauce, and other sauces; pickles, relishes, mustard, and olives; baking soda, salt, vinegar, and bakers yeast; and all spices.
Fruit drinks, soft drinks, and ades	Fruit juice drinks, fruit juice cocktails, and fruit punches; cola- and pepper-type soft drinks, ginger ale, and root beer; ades, lemonades, limeades, nonalcoholic wines, club soda, cream sodas, and other sodas
Sugars, sweets, and candies	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
Coffee and tea	Instant, ground, and fluid coffees and teas with or without caffeine and with or without sugar or sweeteners

Table 4. 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 food plan cost.
[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.

Table 4. Quantities of food for a week,[1] 1999 Thrifty Food Plan market baskets (cont'd)

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
			Pounds per week				
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	7.81
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	.31	.62	1.55	.40	1.44	.42	1.32
	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	.28	.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 food plan cost.

Thrifty Food Plan Market Baskets by Food Group

Grains account for 8 to 14 percent of the revised TFP market baskets for the various age-gender groups. Grains account for a larger share for males ages 15 to 50 than for the other age-gender groups (table 5).

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. The vegetables and fruits groups combined generally make up a larger share of the TFP market baskets for adults, compared with the two groups' share 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 preschoolers 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) account for 7 to 15 percent of the TFP market baskets for the various groups. These other foods 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.

Table 5. 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.

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 6). 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 and 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. The foods in the grains group are especially nutrient dense because of fortification. These foods provide an important source of food energy, vitamins, minerals, and dietary fiber, particularly in the diets of people with high REAs, such as adolescents and adult males.

Table 6. Percentage distribution of grain categories 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 of food per week	18.22	17.88	20.02	24.66	27.63
Grains					
Total pounds of grains per week	1.47	1.41	2.58	3.15	3.48
		Percent grain pounds per week			
Breads, yeast and quick	10	13	20	45	39
Breakfast cereals, cooked and ready-to-eat	51	63	20	3	9
Rice and pasta	34	16	51	41	37
Flours	3	5	6	10	13
Grain-based snacks and cookies	2	3	3	1	2

	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 of food per week	31.90	30.45	26.48	32.42	34.70	33.30	30.63
Grains							
Total pounds of grains per week	3.46	3.54	3.02	4.12	4.85	4.71	3.40
			Percent grain pounds per week				
Breads, yeast and quick	37	43	32	29	21	29	34
Breakfast cereals, cooked and ready-to-eat	10	5	14	10	1	2	11
Rice and pasta	37	37	41	48	70	61	42
Flours	14	12	10	12	7	7	12
Grain-based snacks and cookies	2	3	3	1	1	1	1

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 (table 7). 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 that of 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.

Table 7. Percentage distribution of vegetable categories 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 of food per week	18.22	17.88	20.02	24.66	27.63
Vegetables					
Total pounds of vegetables per week	2.69	2.53	2.29	4.59	4.94
	Percent vegetable pounds per week				
Potato products	59	61	42	45	63
Dark-green and deep-yellow vegetables	8	6	10	21	10
Other vegetables (corn, cabbage, etc.)	33	33	48	34	27

	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 of food per week	31.90	30.45	26.48	32.42	34.70	33.30	30.63
Vegetables							
Total pounds of vegetables per week	5.11	5.31	4.74	5.82	6.01	6.60	5.56
	Percent vegetable pounds per week						
Potato products	54	54	28	65	49	59	36
Dark-green and deep-yellow vegetables	11	8	14	3	8	6	11
Other vegetables (corn, cabbage, etc.)	35	38	58	32	43	35	53

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 (table 8). 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 make up 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 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 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.

Table 8. Percentage distribution of fruit categories 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 of food per week	18.22	17.88	20.02	24.66	27.63
Fruits					
Total pounds of fruits per week	2.17	2.28	2.40	4.06	4.54
	Percent fruit pounds per week				
Citrus fruits, melons, berries, and juices	32	42	35	62	67
Noncitrus fruits and juices	68	58	65	38	33

	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 of food per week	31.90	30.45	26.48	32.42	34.70	33.30	30.63
Fruits							
Total pounds of fruits per week	4.26	5.16	4.90	5.39	6.41	6.42	7.81
		Percent fruit pounds per week					
Citrus fruits, melons, berries, and juices	77	79	62	73	85	57	83
Noncitrus fruits and juices	23	21	38	27	15	43	17

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 (table 9). The exception is children ages 1 to 5, where the whole milk, yogurt, and cream category exceeds the category of lower fat and skim milk and lowfat yogurt 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 yogurt. Dietary guidance, however, is that children at these ages need to consume whole milk products (American Academy of Pediatrics, 1992), 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. The large share of lower fat milk products in the market baskets guarantees these nutrient contributions are in the food plan and dietary standards are met for total fat and saturated fat.

Table 9. Percentage distribution of milk product categories 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 of food per week	18.22	17.88	20.02	24.66	27.63
Milk products					
Total pounds of milk products per week	7.67	6.81	6.94	7.53	7.23
	Percent milk product pounds per week				
Whole milk, yogurt, and cream	98	95	54	23	36
Lower fat and skim milk and lowfat yogurt	-	-	39	74	56
Cheese	1	1	2	1	2
Milk drinks and milk desserts	1	4	5	2	6

	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 of food per week	31.90	30.45	26.48	32.42	34.70	33.30	30.63
Milk products							
Total pounds of milk products per week	10.74	7.04	6.80	10.63	10.98	7.05	7.22
	Percent milk product pounds per week						
Whole milk, yogurt, and cream	17	26	20	25	19	35	24
Lower fat and skim milk and lowfat yogurt	80	69	76	72	79	60	74
Cheese	1	2	1	1	1	3	1
Milk drinks and milk desserts	2	3	3	2	1	2	1

Meat and Meat Alternates

No food category dominates the meat/meat alternates portion of the revised TFP market baskets for any age-gender group (table 10). 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 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.

Table 10. Percentage distribution of meat/meat alternate categories 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 of food per week	18.22	17.88	20.02	24.66	27.63
Meat/meat alternates					
Total pounds of meat/meat alternates per week	2.88	3.09	3.14	3.77	4.44
	Percent meat pounds per week				
Beef, pork, veal, lamb, and game	16	16	25	32	21
Chicken, turkey, and game birds	25	25	19	10	30
Fish and fish products	5	8	3	14	26
Bacon, sausages, and luncheon meats	2	3	6	3	4
Eggs and egg mixtures	42	28	14	16	10
Dry beans, lentils, peas, and nuts	10	20	33	25	9

	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 of food per week	31.90	30.45	26.48	32.42	34.70	33.30	30.63
Meat/meat alternates							
Total pounds of meat/meat alternates per week	4.99	4.70	4.35	4.76	5.01	5.77	4.92
	Percent meat pounds per week						
Beef, pork, veal, lamb, and game	23	34	35	32	23	25	35
Chicken, turkey, and game birds	52	34	32	37	11	29	16
Fish and fish products	9	10	9	8	24	10	5
Bacon, sausages, and luncheon meats	2	3	3	3	5	4	5
Eggs and egg mixtures	8	10	11	7	6	7	12
Dry beans, lentils, peas, and nuts	6	9	10	13	31	25	27

Other Foods

Fruits 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 (table 11). Two exceptions are 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 0.3 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 baskets for adults.

Table 11. Percentage distribution of other food categories 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 of food per week	18.22	17.88	20.02	24.66	27.63
Other foods					
Total pounds of other foods per week	1.34	1.76	2.67	1.56	3.00
	Percent other food pounds per week				
Table fats, oils, and salad dressings	11	7	8	17	11
Gravies, sauces, condiments, spices, and salt	4	4	4	12	6
Fruit drinks, soft drinks, and ades	63	71	74	44	75
Sugars, sweets, and candies	22	18	14	27	8

	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 of food per week	31.90	30.45	26.48	32.42	34.70	33.30	30.63
Other foods							
Total pounds of other foods per week	3.34	4.70	2.67	1.70	1.44	2.75	1.72
	Percent other food pounds per week						
Table fats, oils, and salad dressings	8	7	12	22	32	17	22
Gravies, sauces, condiments, spices, and salt	5	4	7	9	15	9	13
Fruit drinks, soft drinks, and ades	81	83	73	63	48	69	56
Sugars, sweets, and candies	6	6	8	6	5	5	9

Comparing the New Thrifty Food Plan Market Baskets With Average Consumption and the 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. These average baskets were derived by weighting each age-gender group by its population size and calculating a weighted mean.

Compared with average reported consumption (all 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 12). Having more fruits and vegetables and less of the other foods group in the average TFP market basket compared with average consumption is not surprising, because the TFP market basket represents a nutritious diet. The Healthy Eating Index, an indicator of the diet quality of the average American, shows that the diet of most people, particularly low-income Americans, needs improvement (Bowman et al., 1998).

Table 12. 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.

We can also compare the new and the old TFP average baskets to understand how dietary guidance has changed over time. 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 underestimates in the case of fruits, milk products, and meat/meat alternates and an overestimate in the case of grains because the food groups for the previous TFP basket contained added fats, oils, and sugars rather than breaking them out separately. Hence, a true comparison of the other foods category cannot reasonably 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 reflect changes in relative food prices since the TFP was last updated.

Sensitivity Analysis

Sensitivity analysis is a technique that permits assessing 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, sensitivity analysis involves systematically changing 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 TFP market basket model solution 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 Pyramid serving recommendations). In this sensitivity analysis, incremental changes in the cost constraint of the TFP were made both downward and upward.

CNPP found that the model produced market basket solutions in the cost range between 96 and 125 percent of the TFP cost 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 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 come into 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 from the milk products group.

Cost Update of the Thrifty Food Plan

Providing more money (relaxing the cost constraint) naturally makes it easier to find market basket solutions. The TFP sensitivity analysis 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.

The cost of the revised TFP market baskets will be updated each month for each of the 12 age-gender groups by the same method currently used. 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 TFP market basket food categories. 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. To illustrate the overall idea, the CPI for breakfast cereal is used to update the cost of the TFP category "breakfast cereals, cooked and ready to eat"; the CPI for potatoes is used to update the TFP category "all potato products"; the CPI for cheese and related products is used to update the TFP category "cheese"; and the TFP category "chicken, turkey, and game birds" is updated with the CPI for poultry. To illustrate the use of two CPIs for a TFP category, consider the updating of the TFP cost for "lower fat and skim milk and lowfat yogurt": CNPP uses a weighted average of the CPI for fresh milk other than whole and the CPI for other dairy and related products. 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 TFP market basket cost for each age-gender group.

Translating the Revised Thrifty Food Plan Market Baskets into Sample Meal Plans[6]

Research conducted under contract with The Pennsylvania State University (PSU) led to development of two nutritious, minimal-cost sample weekly meal plans based on the revised TFP market baskets. The meal plans use the revised TFP market basket for a family of four and meet the constant real cost criterion.[7] The recipes were evaluated as acceptable by taste panelists from the PSU Food Research Laboratory and a small number of food stamp participants. Thus, the meal plans illustrate a feasible means of preparing minimal-cost, nutritious meals and snacks using the revised TFP. Daily menus follow a principle of combining greater proportions of less expensive foods such as dry beans and grain products with smaller proportions of moderately priced foods using menus that assist families and individuals to follow the *Dietary Guidelines for Americans* for a healthful diet.

Menu and Recipe Development

Week I and Week II meal plans were designed to reflect current lifestyles as well as to meet stipulated weekly cost of foods, use foods and quantities from the market basket, and meet nutritional standards. When possible, convenience was incorporated in the choice of food form included in the meal plans: for example, canned broth or bouillon instead of preparing soup from stock, a commercial pudding mix rather than preparing pudding from basic ingredients, canned beans instead of dry beans, some deli meats purchased for sandwiches instead of baking a roast or ham, and store-bought bread instead of baking bread for sandwiches and toast. However, menus still require that many food products be prepared from basic ingredients rather than purchased as boxed mixes or ready-to-eat foods because specific quantities of flour and milk must be used in the weekly menus. Foods prepared at home include biscuits and oatmeal cookies.

After taste panelist testing, field testing involved eight four-person food stamp households who shopped, prepared, and consumed food items in the two sample weekly menus and evaluated them for overall acceptability. A total of four households evaluated each weekly menu along with a majority of the recipes. In addition to rating acceptability, the households also evaluated preparation time, ease of use of menus and recipes, clarity of recipe preparation instructions, availability of ingredients and foods, and the availability of necessary preparation and cooking equipment.

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[6] Two weekly menus are found in appendix 4, 40 recipes in appendix 5, and two food lists in appendix 6.

[7] The June 1996 maximum weekly TFP allotment for the four-person reference food stamp household (male and female, 20 to 50 years old and two children, 6 to 8 and 9 to 11 years old) was $92, the target cost for each sample weekly menu. Meal development began in 1996.

Implementing Nutritional Standards and Cost Limits

The same nutritional standards used in the development of the TFP market baskets—1989 RDAs, the *1995 Dietary Guidelines for Americans*, the Food Guide Pyramid serving recommendations, and the National Research Council recommendations for cholesterol and carbohydrate—were used to develop each sample weekly menu. CNPP defined target RDAs and Food Guide Pyramid servings for four-person households by totaling the needs of individual household members.

To allow some flexibility in planning weekly menus, CNPP established ranges for meeting target market basket food quantities, the mandatory total weekly cost limit, and specific dietary standards. These targets were as follows: food quantities of the 25 food categories used in each weekly menu had to be within a 5-percent deviation of the amounts specified in the weekly market basket, except for any one or two food categories, which could deviate up to 10 percent; a cost range from $91 to $93 for each weekly menu. As long as the specified nutritional standards for the households were met, CNPP permitted the quantity limits for the fats; sugars; gravies, sauces, condiments; and seasonings groups to deviate from the quantities in the market basket so that the weekly calorie level could be met.

Combining some of the 25 food categories in the market basket was allowed in order to keep the number of food categories manageable in planning menus. For example, the milk drinks and milk desserts category and the milk and yogurt category (whole, lower fat, and skim) were combined. The nutritive content of the menus was not affected by combining these groups because the foods had similar nutritive values.

The energy (calories) content of each weekly menu could exceed the specified target for the four-person household each week by 5 percent but could not drop below the recommended amount. Daily calories had to be within 5 percent of the recommended number. The percentage of calories from fat had to be within a range of 27 to 30 percent for a week, and the percentage of calories from fat on a given day had to be within a range of 27 to 33 percent for each weekly menu. The percentage of total calories from saturated fat had to be within a range of 9 to 10 percent for a week, and the percentage of calories from saturated fat on a given day had to be within a range of 8 to 12 percent for each weekly menu.

Nutrient and Food Guide Pyramid Analyses of Menus and Recipes

PSU used the Food Intake Analysis System (FIAS, Version 3.2, 1996) to analyze the nutritive values of the daily and weekly menus and recipes.[8] Quantitative

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[8] FIAS is a computerized nutrient analysis system developed by the University of Texas, Houston Health Science Center in collaboration with the USDA, Agricultural Research Service (U Texas, USDA, ARS, 1996).

nutritional standards appropriate for the total diet were applied to the weekly menu but not to individual recipes, foods, or meals. However, recipes were developed based on Dietary Guidelines' principles (e.g., lower fat, saturated fat, and cholesterol; moderate amounts of sodium and sugars, and plenty of whole grains, fruits, and vegetables) whenever possible.

Food Guide Pyramid servings for the daily and weekly menus were determined by using the CNPP 1996 Food Guide Pyramid Servings Data Base (USDA, CNPP, 1996). It provides the number of Food Guide Pyramid servings per 100 grams for more than 4,800 food codes included in the nutrient data base of the 1989-1991 CSFII. In the data base, ingredient components of a food count toward their respective Pyramid food group if they provide at least one-fourth of a serving of a Pyramid food group or subgroup. The number of servings of a food group from a given food code was calculated for the menus and recipes by using the physical weight of household measures specified as a serving in the Food Guide Pyramid. Meat, poultry, and fish servings are based on 1-ounce cooked, lean meat equivalents. According to the Food Guide Pyramid, cooked dry beans and peas count as either a meat or vegetable serving. In the menus, PSU counted dry beans as a meat when used in a main dish (e.g., Turkey Chili) and counted them as a vegetable when used as a side dish (e.g., Baked Beans and Cooked Lima Beans).

Recipe Testing

Testing in the PSU Food Laboratory consisted of standardizing recipes and replicating them at least twice. New recipes or uncommon recipes such as chick pea dip were evaluated by PSU taste panelists. Recipes for commonly used foods, such as cooked noodles, were not rated for acceptability. Each laboratory-tested recipe included the number and size of servings, a list of ingredients and quantities, step-by-step preparation procedures, and preparation and cooking time. Preparation time consisted of assembly of ingredients, pre-preparation (e.g., peeling, chopping, cutting), and actual preparation; cooking time was defined as the total time to bake, roast, braise, or steam the food item. Prior to finalizing the Week I and Week II menus, PSU determined nutrient content and number of Food Guide Pyramid food group servings.

Ingredients that were needed to prepare and test the recipes in the food laboratory were purchased at supermarkets local to PSU. To obtain the prices used in estimating costs for the menus and recipes, PSU purchased food items for quantities as close as possible to amounts specified on the shopping list. Food items chosen at the store were those with the lowest unit price, regardless of brand name. The recipes were followed exactly to reduce any variation in methods and product from one replication to another. Recipe yields (quantities obtained after cooking a food item) were determined by using FIAS software and the 1990 USDA's *Food Buying Guide for Child Nutrition Programs* (USDA, FCS, 1990).

Taste panelists (six for each panel) used a sensory evaluation form to evaluate recipes immediately after preparation in the laboratory (appendix 7-A). Taste panelists rated the overall appearance, smell, first taste, texture, taste after several minutes, and overall eating quality of the recipes being tested. Scores given each recipe over two replications were averaged to obtain the mean score for the recipe. Recipes were defined as acceptable if they had an overall mean score of 7 or higher on a 9-point hedonic scale where 9 represented the most positive score ("like extremely"). Recipes that received an acceptable evaluation score were then tested and evaluated by food stamp households.

Food Stamp Household Evaluation of Menus and Recipes[9]

As PSU researchers completed the development and evaluation of the first week of menus and recipes, the first four food stamp households residing in Pennsylvania began their testing and evaluation. Food stamp households with a family of four were identified, screened, and initially contacted by the local food stamp office. Married couples ages 20 to 50, with two children, ages 6 to 11; and single parents ages 20 to 50, with three children, ages 6 to 11 were included in the sample. These households needed to reflect diversity of ethnicity and race within the limits of a small sample. In addition, all households had to have access to a working phone and refrigerator.

Of the eight total households—four for each week's menus—half were Caucasian, three were African American, and one was Latino. Five households lived in urban areas (including two minority households) and three households lived in rural areas (one household from each group). Six of the eight households contained two adults, while two were single-parent households. Once the screening was complete, the food stamp office provided clearance for the PSU researchers to contact the eligible households.

Researchers interviewed each household by phone, providing background information about the project, eliciting participant expectations, and confirming eligibility, availability, and willingness to participate in the study. Researchers also identified the individual primarily responsible for food shopping and preparation, location of the preferred grocery store, and availability of cooking equipment needed to complete the testing of menus and recipes. It was explained to food preparers that they would be accompanied to stores by researchers to shop for the foods required to prepare a week of menus and that the project would purchase the foods at no cost to the families.

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[9] Forms developed included these: *Sensory Evaluation Rating Form* completed by both the primary food preparer and other family members for each of 12 recipes being evaluated on sensory qualities (appendix 7-2); *Recipe Test Form* for primary food preparer to record information about each of the 12 recipes the households prepared and evaluated (appendix 7-3); *Weekly Menu Form*, each family member used this form to indicate whether he or she liked or disliked the food items on the weekly menu (appendix 7-4); *Primary Weekly Menu Form*, primary food preparers used this form to indicate whether they liked or disliked the food items on the weekly menu (appendix 7-5).

A preliminary in-home interview by PSU researchers with the food stamp households reviewed the project and presented the evaluation instruments, sample weekly menus, food shopping lists, and recipes to be evaluated. The food stamp food preparer was asked to shop for and prepare meals and snacks, consume them with their families, and evaluate them for acceptability. Each participating household received a "start-up kit" consisting of a 9- by 13-inch baking dish, an 8-inch square baking dish, a 3-quart saucepan, and measuring cups and spoons.

Evaluation began by the PSU researcher accompanying the food preparer on the shopping trip. During the week, the PSU researchers interviewed household members in three personal visits to the home along with one telephone call every other day to obtain reactions on the previous day's menus and recipes. After the 1-week period, a final interview was conducted to obtain household members' comments on the overall acceptability of the sample menus and recipes.

Information on usual household food preferences and eating, shopping, and food preparation practices was obtained. The household member primarily responsible for food purchase and preparation evaluated the 12 recipes. Menus and recipes were evaluated daily by the households based on ease of preparation, familiarity, taste, adequacy of amount, and overall acceptability. The primary meal preparer and the other three household members completed sensory evaluations of the food items made from the 12 recipes in one of the two weekly menus. If there were young children, the primary food preparer assisted or completed their evaluation forms. Household members used the same 9-point hedonic scale for rating quality of food products that was used in evaluating the products in the food laboratory. For households, a mean score of 5 or higher was considered an acceptable score because the homes of participants provided a more informal environment than the food laboratory.

Overall, households gave acceptable ratings to the menus and recipes for both weeks, with three of the four food preparers each week rating the meal plan as "good." Average ratings were slightly lower in Week 1 because one recipe (Saucy Beef Spaghetti) was rated unfavorably. It was subsequently replaced with Saucy Beef Pasta (appendix 8). Remarks of the households showed that some of the households were not accustomed to using recipes. Despite this fact, they did not find the food preparation techniques used in preparing food items in the menus unacceptable. At least two of the eight households required additional guidance in preparing the meal plans, such as measuring ingredients and following appropriate cooking techniques, because they lacked basic cooking skills needed to prepare food items from the recipes.

A limitation of the study was the small sample of households recruited from one State to evaluate the weekly menus. PSU researchers indicated that recruitment of and data collection from the households were challenging. Contractors indicated that newly enacted welfare reform legislation, some families relocating, and some families lacking basic food preparation and cooking skills made the data collection labor intensive.

Conclusions and Implications

Results of the TFP study indicate that minimal-cost, nutritious meal plans based on the revised TFP market basket were feasible and acceptable to sample households. The list of foods and quantities specified in the market basket ensure that the menus can be applied broadly to a national population. Because the foods and meal plans were designed to meet nutritional standards, the meal plans show one way of eating a healthful diet on a low-cost budget.

These meal plans replace those that accompanied the previous TFP and are published in *Preparing Nutritious Meals at Minimal Cost* (USDA, 1999). This booklet provides information, for use by educators and other information multipliers, that teaches Americans living on a tight budget how to prepare foods for a healthful diet.

Our data indicate that assisting households to enhance their skills in basic food preparation and meal management will improve the chances of low-income and other families to benefit from these meal plans. These skills as well as efficient and economical food shopping techniques should be enhanced through nutrition and consumer education efforts.

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Appendix 1

Does the 1983 Thrifty Food Plan Provide a Nutritionally Adequate Diet at the Cost Level Currently Used?

Feature Articles

Does the 1983 Thrifty Food Plan Provide a Nutritionally Adequate Diet at the Cost Level Currently Used?

By Shirley Gerrior
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Center for Nutrition Policy and Promotion

This study is an evaluation of USDA's thrifty food plan, revised in 1983. It consists of two components: (1) a review of the nutritional adequacy of the 1983 plan and (2) a partial revision of the 1983 plan adjusted for updated nutrient data and dietary standards at a specified cost level. Data used are from the 1977-78 and 1987-88 Nationwide Food Consumption Surveys and USDA's National Nutrient Data Bank. The review shows that with the exception of magnesium the nutritive value of the 1983 thrifty food plan meets or exceeds dietary standards used in the development of the 1983 plan. The 1983 thrifty food plan fails to meet current recommendations for total fat, saturated fat, and cholesterol for most sex-age groups. The partial revision generates a nutritious diet that meets dietary guidance and 100 percent of the 1989 RDAs for all nutrients except zinc at the current thrifty food plan cost level. This evaluation identifies the limitations of the plan currently used but also shows that a nutritious plan can be developed that meets current dietary recommendations. These findings are useful to USDA researchers and policymakers as they prepare to revise the thrifty food plan.

T he U.S. Department of Agriculture (USDA) has prepared guides for selecting nutritious diets at different levels of cost for 70 years. Early diet guides or plans of the 1920's provided the consumer with practical and economical advice on healthy diets. In 1933, diet plans were developed at four levels of nutritive content and cost—the restricted diet for emergency use, the minimum cost diet, the moderate cost diet, and the liberal cost diet. The two lower cost plans were written for low-income families particularly affected by the Great Depression and the Dust Bowl. Since then, food plans have been revised periodically to reflect up-to-date nutritive information, consumption behavior, and food prices (2). In the early 1960's, the economy food plan was designed to cost 75 to 80 percent of the USDA low-cost plan while providing a nutritionally adequate diet for families who had less money to spend on food (2). This plan was used as a basis of the food stamp allotment until it was replaced by the thrifty food plan (TFP) in 1975. The TFP was

based on the most recent information on food composition, food consumption, food costs, and nutritional requirements available at that time.

The most recent revision of the TFP was published in 1983 (*6*). As do the more costly plans, the TFP specifies the quantities of different types of foods (or food groups) that households may use to provide nutritious meals and snacks for household members (table 1, p. 4). The assortment of foods in the plan is based on food consumption patterns of families with relatively low food costs and allows for a nutritious, palatable, and economical diet. The TFP includes larger proportions of foods that are economical sources of nutrients than do the other plans.

A revision of this plan was scheduled for 1993 using 1987-88 Nationwide Food Consumption Survey (NFCS) data.

This revision would have incorporated changes in nutritional recommendations, food composition, food consumption behavior, and food costs; however, because of nonresponse issues related to the data source, the revision was not completed (*5*). Historically, the NFCS has been a significant data source in the development of USDA food plans by providing two types of information: food used by households during a 7-day period and the costs for these foods; and the food eaten by individuals in the same households during a 3-day period (*12*).

Because of the length of time between usable USDA surveys for food plan development, the Center for Nutrition Policy and Promotion[1] (which develops the TFP) and the Food and Consumer Service[2] (which administers the TFP)

jointly approved an evaluation of the 1983 TFP. This article reports the results of this evaluation, which consisted of a review of the 1983 TFP (TFP-R) and a partial revision of the 1983 TFP (TFP-PR). Three research questions were addressed: (1) Is the 1983 TFP nutritionally adequate in terms of current dietary recommendations (TFP-R)? (2) Can a TFP be developed that meets dietary recommendations at current cost level (TFP-PR)? and (3) What are the implications of these findings?

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[1]The 1983 TFP was developed by the U.S. Department of Agriculture's Human Nutrition Information Service (HNIS), Nutrition Education Division. The Center for Nutrition Policy and Promotion (CNPP) was created December 1, 1994. CNPP is comprised of the former Nutrition Education Division of HNIS and the former Family Economics Research Group of the Agricultural Research Service.

[2]Food and Consumer Service was formerly Food and Nutrition Service.

Definition of Terms

TFP-83. Most recent revision of the thrifty food plan.
TFP-R. Review of the TFP-83.
TFP-PR. Partial revision of the TFP-83.

Features of each term

Term	Methods	Dietary standard	Sex-age groups	Consumption patterns	Foods and nutrient data	Food group names	Pounds of food groups
TFP-83	TFP-83	TFP-83	TFP-83	NFCS[1] 77-78	NFCS 77-78	TFP-83	TFP-83
TFP-R	TFP-83	Updated	TFP-83	NFCS 77-78	NFCS 87-88	TFP-83	TFP-83
TFP-PR	TFP-83	Updated	TFP-83	NFCS 77-88	NFCS 87-88	TFP-83	Recalculated

[1]Nationwide Food Consumption Survey.

Table 1. Thrifty food plan, 1983: Quantities of food for a week[1]

Food group	Children (years)				Males (years)				Females[2] (years)		
	1-2	3-5	6-8	9-11	12-14	15-19	20-50	51+	12-19	20-50	51+
					Pounds[3]						
Vegetables, fruit											
Potatoes (fresh wt)	0.47	0.82	1.04	1.11	1.29	2.22	1.50	1.55	1.27	1.16	0.90
High-nutrient vegetables	0.52	0.67	1.05	1.17	1.65	1.08	1.61	1.52	1.14	1.91	2.28
Other vegetables	0.60	0.70	0.97	1.25	1.35	1.15	1.86	1.33	1.08	2.68	2.03
Mixtures, mostly vegetables; condiments	0.01	0.02	0.05	0.07	0.02	0.06	0.13	0.06	0.07	0.02	0.02
Vitamin-C rich fruit[4]	1.19	1.24	1.32	1.62	1.08	1.17	1.13	1.00	2.02	1.73	1.35
Other fruit[4]	0.97	0.92	1.61	1.86	1.11	1.04	1.20	1.41	1.30	0.93	1.37
Grain products											
Whole-grain/high-fiber breakfast cereals[5]	0.44	0.33	0.17	0.24	0.38	0.27	0.17	0.13	0.30	0.12	0.17
Other breakfast cereals	0.30	0.27	0.19	0.26	0.05	0.12	0.21	0.12	0.39	0.19	0.27
Whole-grain/high-fiber flour, meal, rice, pasta	0.11	0.14	0.12	0.11	0.20	0.22	0.15	0.21	0.16	0.15	0.18
Other flour, meal, rice, pasta	0.88	1.23	1.85	1.73	2.15	2.34	1.81	1.87	1.32	1.81	1.32
Whole-grain/high-fiber bread	0.09	0.10	0.09	0.11	0.15	0.17	0.24	0.21	0.21	0.34	0.29
Other bread	0.38	0.65	1.01	1.27	1.68	1.33	1.85	1.33	1.04	0.59	0.29
Bakery products, not bread	0.06	0.10	0.42	0.58	0.19	0.43	0.56	0.30	0.36	0.12	0.10
Grain mixtures	0.08	0.06	0.07	0.11	0.02	0.13	0.23	0.15	0.31	0.37	0.19
Milk, cheese, cream											
Milk, yogurt (qts)[6]	3.42	3.06	3.39	4.17	3.99	3.91	2.00	1.63	4.36	2.37	2.17
Cheese	0.04	0.05	0.08	0.11	0.11	0.11	0.13	0.12	0.27	0.29	0.32
Cream, mixtures mostly milk	0.15	0.15	0.34	0.30	0.10	0.24	0.41	0.26	0.35	0.03	0.26
Meat and alternates											
Lower cost red meats, variety meats	0.93	0.69	0.70	0.92	1.20	1.49	1.40	1.73	1.75	1.60	1.95
Higher cost red meats, variety meats	0.15	0.11	0.13	0.19	0.18	0.26	0.39	0.54	0.20	0.35	0.55
Poultry	0.35	0.48	0.64	0.70	0.90	0.90	0.96	0.71	0.20	0.95	0.70
Fish, shellfish	0.02	0.02	0.02	0.03	0.03	0.02	0.04	0.04	0.04	0.04	0.04
Bacon, sausage, luncheon meats	0.18	0.32	0.31	0.24	0.26	0.27	0.56	0.49	0.24	0.45	0.45
Eggs (number)	3.00	2.90	1.90	2.50	2.20	3.10	4.10	4.30	4.10	4.40	4.10
Dry beans, peas, lentils (dry wt)[7]	0.27	0.18	0.18	0.24	0.59	0.58	0.45	0.59	0.35	0.41	0.43
Mixtures, mostly meat, poultry, fish, egg, legume	0.05	0.06	0.01	0.01	0.02	0.03	0.13	0.15	0.20	0.13	0.15
Nuts (shelled wt), peanut butter	0.09	0.24	0.13	0.15	0.37	0.14	0.17	0.22	0.09	0.28	0.08
Other foods[8]											
Fats, oils	0.14	0.33	0.58	0.67	0.73	0.93	0.76	0.60	0.22	0.28	0.21
Sugar, sweets	0.10	0.36	0.78	0.87	1.20	0.95	1.01	0.76	0.31	0.21	0.22
Soft drinks, punches, ades (single strength)	0.39	0.57	0.65	0.87	0.87	1.51	1.17	0.32	1.12	0.40	0.38

[1] Quantities are for food as purchased or brought into the household from garden or farm. Food is for preparation of all meals and snacks for a week. About 5 percent of the edible parts of food is assumed to be discarded as plate waste, spoilage, etc.
[2] Pregnant and lactating females usually require added nutrients.
[3] Quantities in pounds except milk, which is in quarts, and eggs, which are by number.
[4] Frozen concentrated juices are included as single-strength juice.
[5] Cereal fortified with iron is recommended.
[6] Quantities of dry and evaporated milk and yogurt included as their fluid whole milk equivalents in terms of calcium content.
[7] Count one pound of canned dry beans—pork and beans, kidney beans, etc.—as 0.33 pound.
[8] Small quantities of coffee, tea, and seasonings are not shown. Their cost is a part of the estimated cost for the food plan.
Source: U.S. Department of Agriculture, Human Nutrition Information Service, 1983, The Thrifty Food Plan, CND(Adm.) No. 365, p. 19.

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Data and Procedures Used in Evaluating the TFP

The development of the 1983 TFP included four major steps: (1) identification of food consumption patterns from USDA consumption data; (2) determination of dietary standards based on scientific information and authoritative recommendations; (3) determination

of cost limits for the plan; and (4) use of a computerized mathematical model to help develop the plan (*1*). This evaluation uses the same methods developed for the 1983 TFP (TFP-83) (*15*) but includes new dietary standards based on current recommendations (*9*) and updated food nutrient composition data for the analysis of food groups (*11*) (see figure).

The dietary standards used in TFP-83 were based on the 1980 Recommended Dietary Allowances (*10*). The TFP-83 provided food energy at the midpoint of the RDA and 100 percent of the RDA (*1,10*) for protein, vitamins, and minerals, with the exception of vitamin B-6, zinc, folate, and vitamin E. The plan used a special ratio of 0.02 mg vitamin B-6 per gram of protein and

Data and procedures used in evaluation of the 1983 thrifty food plan
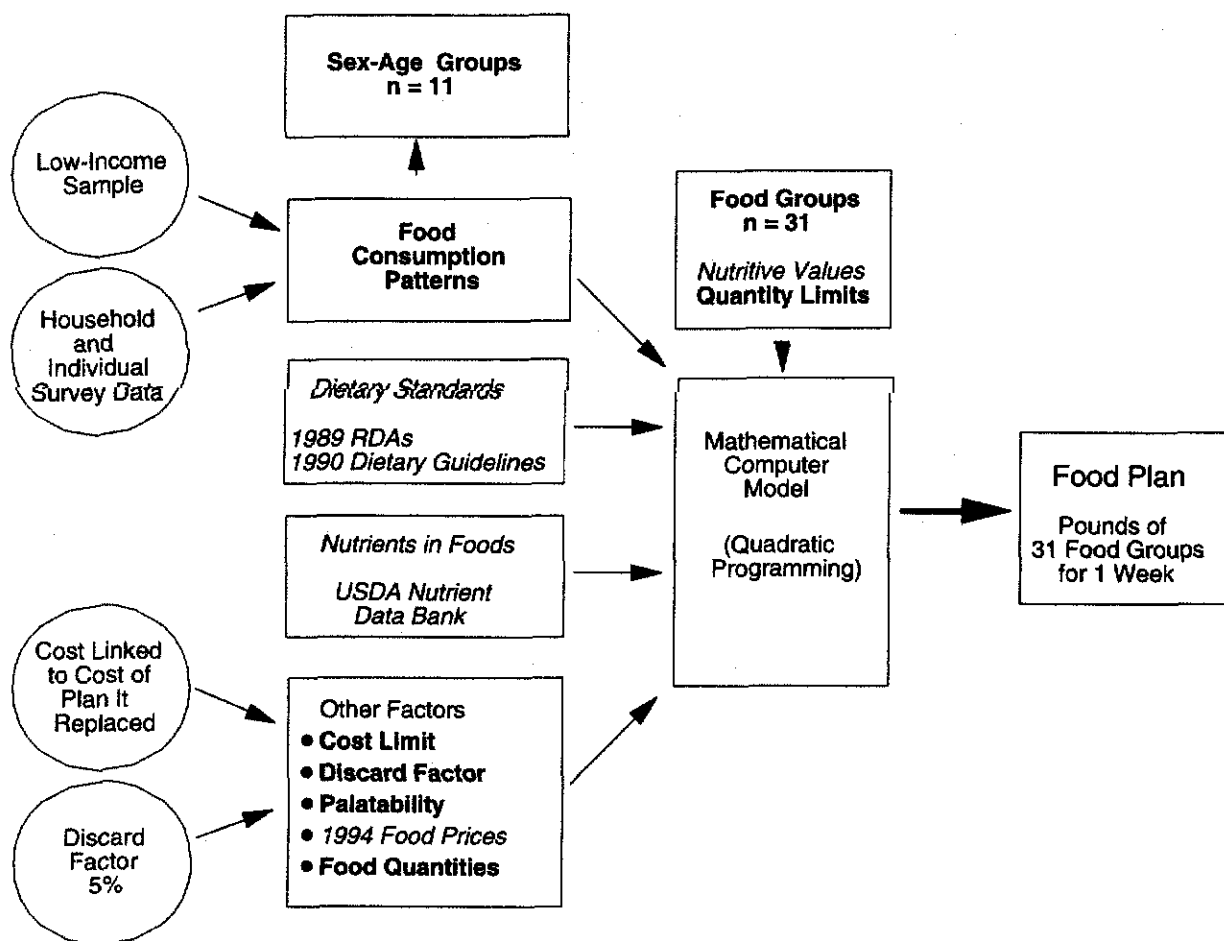
Bold lettering indicates use of data from the 1977-78 Nationwide Food Consumption Survey.
Italics indicates use of data from the 1987-88 Nationwide Food Consumption Survey or other updated information.

80 percent of the RDA for zinc, folate, and vitamin E. Eighty percent of the RDA was used for these three nutrients because when TFP-83 was developed, the U.S. food supply did not provide sufficient zinc to meet RDA levels, and food composition data were insufficient and/or unreliable for folate and vitamin E (*15*). Additionally, limits were placed on total fat, cholesterol, caloric sweeteners, and sodium. These limits were based, in part, on the 1980 *Dietary Guidelines for Americans* as well as on nutritional recommendations made by other authoritative groups (*1*). Because the use of a computerized mathematical model necessitates setting minimum or maximum levels for all food components,

levels of these components were limited to 35 percent of total calories for total fat, 350 mg of cholesterol per day, 12 percent of calories from added caloric sweeteners, and 1,600 mg of sodium per 1,000 kcal (*1*).

In 1989, the RDAs were revised for several vitamins and minerals (*9*). Recommended amounts of vitamin B-6, calcium, magnesium, iron, and zinc changed for some sex-age categories; those of folate and vitamin B-12 were lower for all categories. Additionally, RDAs were established for vitamin K and selenium for the first time. At about the same time, quantitative limits for total fat and saturated fat as a percentage

> **...the TFP specifies the quantities of different types of foods (or food groups) that households may use to provide nutritious meals and snacks for household members.**

Dietary Standards Used in the Evaluation of the 1983 TFP (TFP-R and TFP-PR)

Dietary standards were based on the 1989 Recommended Dietary Allowances (RDAs) (*9*) and the 1990 *Dietary Guidelines for Americans* (*16*). The RDAs and the Dietary Guidelines provide guidance for healthy people to use in choosing a diet that, based on current knowledge and research, will maintain and promote the health of most people. Dietary standards were established for each sex-age category. Energy was set at the average energy allowance for the appropriate sex-age category. Levels of protein, vitamins, and minerals were set at 100 percent of the RDA. Levels for vitamin K and selenium were not included in the dietary standards because food composition data on these nutrients are incomplete or not available. When there was no comparable RDA sex-age category, dietary standards were derived by interpolation of RDA values. Maximum levels (minus discard factor) for total fat, saturated fat, and cholesterol were limited to 30 percent of calories from total fat, 10 percent of calories from saturated fat, and 300 mg of cholesterol per day, respectively (*8,14*). No quantitative recommendations are suggested in the *Dietary Guidelines for Americans* for sugar and sodium. The dietary standards established for these components in TFP-83 were used, and no adjustments were made to the lower and upper limits of the TFP-83 consumption patterns. These "moderate" levels, which were originally defined as levels below those in the average food consumption patterns of most sex-age categories using 1977-78 NFCS data (*15*), were considered approximate for the exploratory nature of this analysis.

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[1]This calculation computes the differences of the RDA nutrient amounts between the different sex-age categories and then reapportions this difference to derive the new RDA amount for the TFP sex-age categories.

of total calories (*16*) and for cholesterol intake were recommended (*8,14*). Dietary standards used to evaluate the TFP-83 were updated to reflect these recommendations.

For TFP-83, data from the Survey of Food Consumption in Low-Income Households, conducted as part of the NFCS 1977-78 (*1*), were used as the basis for classifying approximately 2,400 foods into 1 of 31 food groups (table 2). The average nutritive value or nutrient profile per pound for each of these groups was calculated by weighting the nutritive value of each food in the food group by the average number of pounds reported as used by the survey households. Food composition data for these calculations were from USDA's Nutrient Data Bank (*1,11*).

As part of TFP-R and TFP-PR, the nutritive profile of each food group in TFP-83 was updated using food items reported by low-income households in NFCS 1987-88. Food items that had been reported as used by households in 1977-78 NFCS were matched with similar items from the 1987-88 NFCS household component. Each item was identified by a household code and linked to the most current nutrient values from USDA's Nutrient Data Base specific to that food code. In the event that a household food code used in the 1977-78 NFCS did not appear in the 1987-88 household food code, either a food item similar in nutrient composition was substituted, or if the food item was consumed in negligible amounts, that food code was excluded from the food group.

The majority of the few codes excluded were foods of Puerto Rican origin. Each household code was placed in 1 of the 31 food plan food groups, and the average nutritive value per pound was recalculated for each group to reflect the current data. The nutritive value of each food in the food group was weighted by the average number of pounds reported as used by the NFCS 1977-78 survey households.

The recalculated nutritive profile of several food groups differed in the level of calories and of specific nutrients from the nutritive profile for the same groups in the TFP-83. These differences reflect the changes in food composition data due to technological developments, marketing practices, and improved analytical methods that occurred between the 1977-78 and 1987-88 surveys. For example, technological advances since the late 1970's increased the number of food items in bakery, cereal, fruit juice and drink, and milk product food groups with nutrients added through fortification and enrichment.

Different marketing practices altered the nutrient contributions of many grain, vegetable, and meat mixtures. Sweeteners and fat added to enhance the flavor of these mixtures contributed more calories and fat to the diet from these foods than previously calculated. Also, new or improved analytical methods provided more accurate data on several nutrients or dietary components. For example, the decrease in the level of cholesterol in the plan can be attributed to new analytical methods used to determine the nutrient composition of eggs (*4*). Additionally, since the 1977-78 NFCS, USDA's Nutrient Data Bank has expanded the survey data base to include nutrients previously omitted because of limited data.

With the exception of magnesium, the nutritive value of food in TFP-R exceeded the dietary RDA standards originally specified in TFP-83.

Table 2. Food groups for USDA thrifty food plan[1]

Food group	Food included
Potatoes	White potatoes, dehydrated potatoes, mixtures, mostly potato
High-nutrient vegetables[2]	Asparagus, bean sprouts, broccoli, brussels sprouts, cabbage, carrots, cauliflower, green peppers, leafy greens, okra, pumpkin, sauerkraut, summer and winter squash, sweet potatoes, tomatoes, turnips; tomato and vegetable juices
Other vegetables	All other vegetables including artichokes, beets, celery, corn, cucumbers, eggplant, lettuce, lima beans, mushrooms, onions, parsnips, peas, radishes, rutabagas, snap beans
Mixtures, mostly vegetables; condiments	Catsup, chili sauce, barbecue sauce; tomato and cucumber pickles and relishes; olives; potato chips, sticks; other mixtures, mostly vegetables
Vitamin-C rich fruit	Cantaloupe, grapefruit, honeydew melon, lemons, limes, mangoes, oranges, persimmons, papayas, strawberries, tangelos, tangerines; citrus and citrus-blend juices
Other fruit	All other fruit including apples, apricots, bananas, berries, cherries, dried fruit, grapes, nectarines, peaches, pears, pineapple, plums, watermelon
Whole-grain/high-fiber breakfast cereals	Oatmeal, bran cereal, wheat germ, shredded wheat, granola type, puffed oats, other breakfast cereals made from whole or high-fiber grains
Other breakfast cereals	Farina, ready-to-eat cereal other than those made from whole or high-fiber grains
Whole-grain/high-fiber flour, meal, rice, pasta	Whole wheat, buckwheat, soy, barley, rye, millet, peanut, carob, triticale flours and meal; mixes made from whole-grain/high-fiber flours; whole-ground cornmeal; whole-wheat pasta; popcorn; brown rice; leavenings
Other flour, meal, rice, pasta	White enriched flour, mixes made from white enriched flour, leavenings, degermed cornmeal, white enriched rice, grits, enriched pasta
Whole-grain/high-fiber bread	Whole wheat, pumpernickel, bran, rye, oatmeal, triticale breads, rolls, muffins, pancakes
Other bread	White enriched bread, rolls, muffins, bagels, biscuits, pancakes, waffles; cornbread; tortillas
Bakery products, not bread	Enriched and unenriched cakes, pies, tarts, cobblers, crackers, cookies, pastries, doughnuts, pretzels, corn and wheat snacks
Grain mixtures	Soups, mostly grain; pizza; macaroni salad; egg rolls; Spanish rice; macaroni and cheese; spaghetti with tomato sauce; other pasta mixtures and plate meals
Milk, yogurt	Whole milk, lowfat milk, skim milk, buttermilk, nonfat dry milk, imitation milk and formulas, evaporated milk, yogurt, chocolate milk, cocoa with nonfat dry milk
Cheese	Cheddar, swiss, cottage, other cheeses, imitation cheese, cheese dips, cheese fondue

Food group	Food included
Cream, mixtures mostly milk	Cream, half and half, sour cream, eggnog, nondairy creamers, puddings, ice cream, ice milk, milkshakes, other frozen desserts, sweetened liquid meal supplements, milk-based soups
Lower cost red meats, variety meats[3]	Ground beef and pork, beef chuck roast and steak; fresh and cured pork shoulder and boston butt; beef and lamb stew meat; canned corned beef, roast beef; chipped beef; organ meats such as liver, heart, kidney
Higher cost red meats, variety meats[3]	Most beef and veal steaks and roast; cured ham, boiled ham, spareribs, pork loin roast, pork chops; lamb chops, steaks, roast; variety meats such as brains, tongue, chitterlings
Poultry	Raw and processed chicken, turkey, and other poultry
Fish, shellfish	Raw and processed cod, perch, haddock, sole, and other fish; breaded fish portions and sticks; canned tuna, sardines, and other fish; raw and processed crab, lobster, clams, shrimp, and other shellfish
Bacon, sausage, luncheon meats	Bacon, salt pork, sausage; frankfurters, bologna, salami, liverwurst, other luncheon meats; fatback and other fatty meats; bacon and sausage substitutes
Eggs	Eggs, egg substitutes
Dry beans, peas, lentils	Dry beans of all kinds; dry peas; lentils; soybeans and soya products
Mixtures, mostly meat, poultry, fish, egg, legume	Soups and mixtures, mostly meat, poultry, fish, egg, or legume (plate dinners, entrees such as hamburgers, corned beef hash, chili con carne, chicken and tuna salad, pot pies, fish cakes, egg foo yung, beans and franks, etc.)
Nuts, peanut butter	Peanuts, tree nuts, peanut butter and other nut butters, seeds
Fats, oils	Butter, margarine, hydrogenated vegetable fat, lard, cooking oil, salad dressings
Sugar, sweets	Sugar, granulated, powdered, brown, maple; molasses syrup; honey, jams; jellies; preserves; powdered dessert mixes and prepared desserts; candy; fruit ices; chocolate syrup and topping; sugar substitutes
Seasonings[4]	Salt, seasoning, vinegar, extracts, spices, plain cocoa, baking chocolate
Soft drinks, punches, ades	Soft drinks, regular and diet; fruit ades, punches, drinks, nectars
Coffee, tea[4]	Coffee, tea

[1]Cost, nutrient composition, and use in meals are considered in grouping foods.
[2]Systematically selected for their relatively high nutrient-to-calorie ratios and content per serving of vitamin A, vitamin B-6, ascorbic acid, iron, and magnesium.
[3]Selected by their relative costs per unit of protein.
[4]Quantities of coffee, tea, and seasonings are not shown in quantities of food for a week tables, but their cost is part of the estimated cost of the food plan.

Table 3. Nutritive value[1] of food in the 1983 thrifty food plan (TFP-83) as a percent of 1980 RDAs[2]

Food component	Children (years)				Males (years)				Females (years)		
	1-2	3-5	6-8	9-11	12-14	15-19	20-50	51+	12-19	20-50	51+
	Percentage of Recommended Dietary Allowance (1980)[3]										
Protein	238	204	202	200	202	165	159	155	182	196	186
Vitamin A	214	189	167	159	138	126	143	131	172	189	213
Thiamin	194	181	148	158	149	150	149	156	179	176	162
Riboflavin	237	207	171	175	155	150	144	145	205	176	173
Niacin	290	281	218	224	232	232	235	251	276	306	285
Vitamin B-6[4]	154	114	95[5]	100	101	95[5]	85[5]	82[5]	97[5]	94[5]	96[5]
Vitamin B-12[4]	205	155	128	149	156	176	156	164	209	168	190
Folate[4]	263	156	103	97[5]	90[5]	86[5]	91[5]	84[5]	94[5]	92[5]	89[5]
Vitamin C	143	152	174	201	170	143	151	130	186	176	171
Vitamin E[4]	80[5]	104	123	144	144	123	118	102	80[5]	97[5]	82[5]
Calcium	100	100	120	120	100	103	115	100	100	113	104
Iron	90[5]	115	151	136	116	123	209	194	105	100	171
Magnesium[4]	160	129	112	110	119	100	104	101	115	118	104
Phosphorus	144	148	168	165	153	162	203	197	143	201	188
Zinc	80[5]	80[5]	85[5]	84[5]	80[5]	82[5]	80[5]	80[5]	80[5]	80[5]	80[5]
	Composition of diet										
Food energy (kcal)	1300	1600	2100	2400	2700	2800	2700	2400	2100	2000	1800
Cholesterol[4] (mg)	230	230	220	270	270	330	350	350	250	350	350
Sodium[4] (mg)	1600	1900	2300	2700	3000	3700	4000	3000	3100	3000	2300
	Percentage of energy										
Total fat	32	35	34	34	34	35	35	35	32	35	35
Protein	17	14	12	13	14	13	13	15	16	17	18

[1]Nutritive value of the edible portion of food as purchased, adjusted to allow for losses in cooking for vitamins, except folate. One-half of the drippings and trimmable fat from meat, poultry, and fish was assumed as discard.
[2]Nutritive value per pound of food groups is based on the average quantities of foods used by a special group of about 4,400 low-income households (eligible for the Food Stamp Program) surveyed November 1977–March 1978 as part of the Nationwide Food Consumption Survey 1977-78.
[3]RDA derived for specified sex-age categories by interpolation.
[4]Based on limited food composition data.
[5]Although the plan failed to provide the RDA, it met standards specified for the plan.
Source: *U.S. Department of Agriculture, Human Nutrition Information Service, 1983, The Thrifty Food Plan, CND(Adm.) No. 365, p. 25.*

Is the 1983 TFP Nutritionally Adequate?

To determine the nutritional adequacy of TFP-R, the recalculated nutritive value for each food group was multiplied by the food group quantity specified in TFP-83 (table 1) for each of the 11 sex-age categories. These values were then compared with the revised dietary standards to determine the nutritional adequacy of the consumption pattern of a particular sex-age category.

With the exception of magnesium, the nutritive value of food in TFP-R exceeded the dietary RDA standards originally specified in TFP-83 (tables 3 and 4). Values for zinc, vitamin B-6, and vitamin E, which did not meet 100

Table 4. Nutritive value[1] of food in the 1983 thrifty food plan review (TFP-R) as a percent of 1989 RDAs[2]

Food component	Children (years)				Males (years)				Females (years)		
	1-2	3-5	6-8	9-11	12-14	15-19	20-50	51+	12-19	20-50	51+
Percentage of Recommended Dietary Allowance (1989)[3]											
Protein	375	297	261	245	214	168	149	139	206	186	171
Vitamin A	262	236	210	199	180	160	180	160	213	237	265
Thiamin	223	207	187	197	180	158	155	168	205	177	174
Riboflavin	286	221	200	223	197	167	154	159	247	185	195
Niacin	186	167	149	162	153	130	141	162	159	158	164
Vitamin B-6	164	150	127	142	122	110	108	98	154	135	133
Vitamin B-12	886	593	403	409	357	390	342	351	448	362	412
Folate	547	407	295	294	238	176	179	152	231	195	184
Vitamin C	234	237	226	291	242	224	221	180	281	239	222
Vitamin E	107	118	140	146	137	136	126	106	105	110	96
Calcium	127	125	148	151	121	120	120	113	125	123	124
Iron	147	149	158	169	179	183	217	190	135	121	171
Magnesium	302	239	182	160	146	100	98	90	121	119	102
Phosphorus	156	160	182	183	160	162	183	189	154	182	185
Zinc	91	89	95	103	87	91	85	84	114	107	108
Composition of diet											
Food energy (kcal)	1400	1700	2300	2600	2900	3000	2900	2600	2400	2200	2000
Cholesterol (mg)	210	220	230	270	280	330	340	280	340	340	340
Sodium (mg)	1600	2000	2600	3000	3200	4000	4200	3100	3400	3300	2500
Percentage of energy											
Total fat	33	34	33	34	34	35	36	37	32	35	37
Saturated fat	13	12	12	12	11	12	12	12	13	13	14
Protein	17	14	12	13	13	13	13	14	16	16	17

[1]Nutritive value of the edible portion of food as purchased, adjusted to allow for losses in cooking for vitamins, except folate. One-half of the drippings and trimmable fat from meat, poultry, and fish was assumed as discard.
[2]Nutritive value per pound of food groups is based on the average quantities of foods used by about 4,400 low-income households eligible for the Food Stamp Program surveyed November 1977–March 1978 as part of the Nationwide Food Consumption Survey 1977-78.
[3]RDA derived for specified sex-age categories by interpolation.

percent of the revised dietary standard for some sex-age categories, met a higher percentage of the dietary standard than in TFP-83. For several of the sex-age categories, the TFP-R contained more calories than did the TFP-83. These additional calories reflect the updated food composition data used to recalculate the nutritive values for the food groups used in the TFP-R and TFP-PR. Overall, the improved nutritive value seen in TFP-R, compared with that in TFP-83, reflects the decrease in RDA values between the 1980 and the 1989 editions for several nutrients—particularly, vitamin B-6 and zinc for selected sex-age groups—and more reliable and up-to-date food composition data.

Although the nutritive value of TFP-R was much improved over that of TFP-83 in terms of RDA, the TFP-R contained 100 to 300 more calories than TFP-83, and the levels of total fat and saturated fat for each of the 11 sex-age categories failed to meet current dietary guidance. In addition, fat levels for males 20-50 years of age and males and females 51 years of age and older exceeded the 1983 standard of 35 percent or less of total calories. No standard for saturated fat was established for TFP-83 so a comparison of saturated fat values in TFP-R and TFP-83 was not attempted.

Cholesterol levels for all sex-age groups in TFP-R fell below the TFP-83 standard of 350 mg per day (table 4), with six of the sex-age groups falling below 300 mg per day. TFP-R sodium levels ranged from 1,100 to 1,500 mg per 1,000 kcal for the sex-age groups. Although the standard of 1,600 mg per 1,000 kcal is met, the caloric increase in the TFP-R's nutritive value contributed to an overall increase in sodium for all sex-age categories, except children 1-2 years old.

Can a TFP Be Developed That Meets Dietary Recommendations at Current Cost Level?

For the TFP-PR, a computerized mathematical model was used to generate a practical and acceptable consumption pattern for each of the 11 sex-age categories. This model, which was used in the development of TFP-83 (*1,15*), minimizes the changes that households need to make in consumption patterns to meet the goal of obtaining a nutritious diet at the current cost level. Dietary standards used in TFP-83 (*1,15*) were updated in the model to reflect the 1989 RDAs and to include additional constraints for fat, saturated fat, and

cholesterol. Recalculated nutritive values for the 31 food groups based on the 1987-88 NFCS and USDA's Nutrient Data Bank data were used to update the nutritive value of foods in the consumption patterns of the TFP-83. No other data modifications were made to TFP-83, and average unit costs of each food group were held constant. The model compared the updated nutritive values to the revised dietary standards and made any necessary adjustments in the consumption patterns. Thus, the optimum food plan (quantities of the 31 food groups for a week) that met dietary standard constraints at the current cost was selected for each sex-age category.

The TFP-PR generated by the model illustrates a possible and practical consumption pattern for each of the 11 sex-age groups (table 5). Current dietary standards are met for all nutrients and dietary components except zinc, for five sex-age categories (table 6). Although not a complete revision of TFP-83, TFP-PR represents a link of 1977-78 NFCS consumption data with up-to-date food composition information and food codes from the 1987-88 NFCS. This step is useful in determining the feasibility of generating a new TFP using current dietary recommendations. This plan is not currently used by the U.S. Department of Agriculture but represents the results of exploratory research on food plan development.

Several shifts in food group quantities are apparent when comparing the TFP-PR and TFP-83. In the development of TFP-83, minimum and maximum quantities that could be included in the food plan were predetermined (*15*). Such limits helped to assure that the food plan would be practical as a basis for meal preparation. In TFP-83, the lower and upper limits were based on

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This study shows that the TFP-83 does not meet current nutritional recommendations for several nutrients and dietary components.

Table 5. Thrifty food plan, partial revision (TFP-PR): Quantities of food for a week[1]

Food group[2]	Children (years)				Males (years)				Females[3] (years)		
	1-2	3-5	6-8	9-11	12-14	15-19	20-50	51+	12-19	20-50	51+
					Pounds[4]						
Vegetables, fruit											
Potatoes (fresh wt)	0.47	1.78	1.14	1.18	1.29	2.33	2.09	3.37	1.58	2.24	1.79
High-nutrient vegetables	0.52	1.40	1.08	1.23	1.65	1.08	1.61	3.17	1.78	2.33	3.77
Other vegetables	0.60	0.73	1.02	1.32	1.35	1.15	1.86	2.51	1.54	2.73	2.44
Mixtures, mostly vegetables; condiments	0.01	0.01	0.02	0.02	0.02	0.03	0.02	0.02	0.01	0.02	0.02
Vitamin-C rich fruit[5]	1.20	1.24	1.35	1.72	1.08	1.17	1.13	1.00	2.25	1.73	1.35
Other fruit[5]	0.97	0.92	1.61	1.91	1.11	1.04	1.20	1.41	1.41	0.93	1.37
Grain products											
Whole-grain/high-fiber breakfast cereals[6]	0.44	0.42	0.39	0.41	0.53	0.43	0.23	0.15	0.30	0.12	0.17
Other breakfast cereals	0.26	0.67	0.52	0.63	0.85	0.42	0.37	0.24	0.49	0.19	0.27
Whole-grain/high-fiber flour, meal, rice, pasta	0.11	0.15	0.12	0.09	0.20	0.27	0.19	0.22	0.16	0.15	0.18
Other flour, meal, rice, pasta	0.09	1.37	1.29	1.14	1.95	3.08	2.30	2.20	1.71	1.81	2.03
Whole-grain/high-fiber bread	0.01	0.24	0.12	0.14	0.34	0.17	0.27	0.45	0.24	0.34	0.29
Other bread	0.16	0.24	0.75	0.94	1.30	1.43	2.26	0.46	1.12	1.13	0.29
Bakery products, not bread	0.06	0.06	0.14	0.20	0.19	0.17	0.15	0.13	0.14	0.12	0.10
Grain mixtures	0.02	0.01	0.14	0.21	0.02	0.29	0.30	0.02	0.35	0.41	0.01
Milk, cheese, cream											
Milk, yogurt (qts)[7]	5.21	3.25	3.20	3.45	3.13	4.64	2.55	1.27	3.42	1.68	1.54
Cheese	0.03	0.04	0.08	0.11	0.11	0.11	0.09	0.06	0.07	0.08	0.09
Cream, mixtures mostly milk	0.02	0.02	0.05	0.04	0.04	0.07	0.05	0.03	0.03	0.03	0.03
Meat and alternates											
Lower cost red meats, variety meats	1.08	0.92	0.70	0.92	1.81	1.49	2.23	2.18	1.38	1.60	1.95
Higher cost red meats, variety meats	0.33	0.11	0.30	0.19	0.18	0.26	0.31	0.24	0.20	0.35	0.18
Poultry	0.04	0.06	0.70	0.70	0.90	0.90	0.21	0.08	0.20	0.95	0.46
Fish, shellfish	0.02	0.02	0.21	0.35	0.03	0.02	0.04	0.33	0.04	0.04	0.04
Bacon, sausage, luncheon meats	0.18	0.18	0.24	0.23	0.26	0.27	0.33	0.23	0.24	0.22	0.20
Eggs (number)	1.43	1.43	2.24	2.45	1.91	3.34	4.46	3.70	3.93	5.13	2.29
Dry beans, peas, lentils (dry wt)[8]	0.27	0.29	0.21	0.24	0.71	0.47	0.73	0.88	0.37	0.42	0.42
Mixtures, mostly meat, poultry, fish, egg, legume	0.01	0.01	0.09	0.10	0.02	0.02	0.02	0.02	0.13	0.13	0.01
Nuts (shelled wt), peanut butter	0.04	0.07	0.05	0.01	0.15	0.10	0.34	0.21	0.05	0.16	0.04
Other foods[9]											
Fats, oils	0.13	0.14	0.18	0.21	0.23	0.38	0.39	0.38	0.20	0.28	0.21
Sugar, sweets	0.10	0.17	0.83	0.94	0.38	0.66	0.64	0.29	0.25	0.21	0.22
Soft drinks, punches, ades (single strength)	0.16	0.23	0.65	0.87	0.35	1.51	1.17	0.13	1.12	1.01	0.15

[1]Quantities are for food as purchased or brought into the household from garden or farm. Food is for preparation of all meals and snacks for a week. About 5 percent of the edible parts of food is assumed to be discarded as plate waste, spoilage, etc.
[2]See table 2 for foods in food groups.
[3]Pregnant and lactating females usually require added nutrients.
[4]Quantities in pounds except milk, which is in quarts, and eggs, which are by number.
[5]Frozen concentrated juices are included as single-strength juice.
[6]Cereal fortified with iron is recommended.
[7]Quantities of dry and evaporated milk and yogurt included as their fluid whole milk equivalents in terms of calcium content.
[8]Count one pound of canned dry beans—pork and beans, kidney beans, etc.—as 0.33 pound.
[9]Small quantities of coffee, tea, and seasonings are not shown. Their cost is a part of the estimated cost for the food plan.

Table 6. Nutritive value[1] of food in the partial revision of the thrifty food plan (TFP-PR) as a percent of 1989 RDAs[2]

Food component	Children (years)				Males (years)				Females (years)		
	1-2	3-5	6-8	9-11	12-14	15-19	20-50	51+	12-19	20-50	51+
	Percentage of Recommended Dietary Allowance (1989)[3]										
Protein	377	287	255	221	214	180	166	137	181	174	146
Vitamin A	271	346	230	211	206	167	187	249	241	258	347
Thiamin	189	250	201	200	220	196	184	174	216	187	185
Riboflavin	305	249	211	215	223	197	178	155	221	174	173
Niacin	150	200	174	178	198	159	166	172	167	169	176
Vitamin B-6	151	215	164	169	181	134	127	135	161	143	139
Vitamin B-12	1046	671	464	436	445	429	432	379	362	323	343
Folate	516	532	371	344	329	211	220	194	248	207	198
Vitamin C	229	294	281	323	265	242	234	251	320	277	263
Vitamin E	100	100	106	101	100	101	106	100	100	104	100
Calcium	151	124	130	122	100	133	133	100	100	100	100
Iron	121	192	190	191	239	223	258	216	144	130	190
Magnesium	307	258	184	150	140	106	113	105	117	120	112
Phosphorus	163	162	170	158	149	179	208	189	134	165	163
Zinc	95	97	100	100	99	100	100	88	100	100	95
	Composition of diet										
Food energy (kcal)	1300	1600	1900	2100	2500	3000	2900	2300	2200	2200	1900
Cholesterol (mg)	190	150	200	230	240	300	300	250	250	300	210
Sodium (mg)	1400	1900	2600	3000	3100	3500	3600	2700	3200	3200	2600
	Percentage of energy										
Total fat	38	25	26	26	28	27	30	30	26	30	28
Saturated fat	17	10	10	10	10	10	10	10	10	10	10
Protein	19	15	14	14	15	14	14	15	15	15	15

[1]Nutritive value of the edible portion of food as purchased, adjusted to allow for losses in cooking for vitamins. One-half of the drippings and trimmable fat from meat, poultry, and fish was assumed as discard.
[2]Nutritive value per pound of food groups is based on the average quantities of foods used by about 4,400 low-income households eligible for the Food Stamp Program surveyed November 1977–March 1978 as part of the Nationwide Food Consumption Survey 1977-78.
[3]RDA derived for specified sex-age categories by interpolation.

the 25th and the 90th percentiles on distributions of the food group quantity used per person by survey households. These same cut-offs were used for the TFP-PR. These limits not only assured practical consumption patterns but also restricted the use of foods such as salt and seasonings, soft drinks, punches and ades, and coffee and tea. Shifts in food group quantities that occurred from TFP-83 to TFP-PR were constrained by the minimum and maximum limits set for TFP-83; however, these shifts showed the direction of change needed to meet the dietary standards is towards food groups with nutrient-dense foods. For example, quantities of potatoes, high-nutrient vegetables, other vegetables, breakfast cereals, and pasta products were higher, and quantities of cream and fats and oils were lower in

the consumption patterns for some sex-age categories (tables 1 and 5).

The TFP-PR generated by the model represents a solution at the current cost level of TFP-83. The cost of TFP-83 established at the time of development (prices paid by survey households in the 1977-78 NFCS) has been updated monthly by USDA to reflect current prices paid for food using the Consumer Price Index (CPI) for detailed food expenditure categories. The CPI is based on prices collected each month by the Bureau of Labor Statistics.

Zinc in TFP-R and TFP-PR

In both components of the evaluation, zinc was identified as the nutrient least likely to meet 100 percent of the RDA. USDA applies the RDAs as a standard because they recommend a level of intake of specific nutrients designed to ensure that the needs of most healthy people are met (*9*). Although the zinc levels did not meet 100 percent of the dietary standard for all sex-age groups, the levels in both components of this evaluation were consistent with intakes by Americans. Zinc levels in the TFP-R and in TFP-PR were at least 84 and 88 percent, respectively, of the RDA (tables 4 and 6)—and better, in many cases, than observed consumption levels in American diets (*7,13*). In addition, the dietary changes associated with reducing total fat, saturated fat, and cholesterol are likely to negatively affect the zinc content of the diet (*3*). To ensure adequate amounts of zinc in the revision of the plan, emphasis needs to be placed on incorporating a variety of food items (such as grains, legumes, more fruits and vegetables, and lower fat dairy products) that are higher in zinc but lower in fat than are included in the 1983 TFP.

Summary of Findings and Implications for Research

This study shows that the TFP-83 does not meet current nutritional recommendations for several nutrients and dietary components. Additionally, it identifies several limitations of this plan. These limitations include out-of-date consumption and cost data from 1977-78, dietary standards based on old (1980) RDAs, the exclusion of the limits contained in the most recent (1990) version of the *Dietary Guidelines for Americans* from the dietary standards, and incomplete and out-of-date food composition data. Concern about the quality of data from the 1987-88 NFCS and the absence of an alternative data source to revise the plan have been the major limitations to updating the TFP-83. Linking the food stamp allotment to a plan based on such data may not be defensible or acceptable.

This evaluation is presented as a first step in the revision process of the 1983 TFP. Although exploratory, it is valuable because it shows that a plan (TFP-PR) at the current cost level of TFP-83 can be generated that meets nutritional recommendations for all nutrients except zinc. These findings will be used by USDA to identify the data needs and to determine the steps necessary to revise the 1983 TFP. This process is currently underway by the Center for Nutrition Policy and Promotion (CNPP), the responsible lead for the development of USDA Family Food Plans.

CNPP and several other USDA agencies are developing strategies and a work plan for revision of the 1983 TFP. Discussion is focused on obtaining and incorporating several types of data into the revision process. These include updated survey data on household and individual consumption behaviors and food prices paid by households for food consumed; the most recent RDAs as well as the forthcoming *Dietary Guidelines for Americans* and Food Guide Pyramid serving recommendations; updated food composition data and access to food grouping systems for classification of foods (including mixtures) into appropriate groups; and menu and recipe planning software to assist with the production of educational materials that offer a variety of foods to low-income consumers.

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Appendix 2

A Methodology to Price Foods Consumed: Development of a Food Price Database

A Methodology to Price Foods Consumed: Development of a Food Price Database

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Information on what people eat and how much money they spend on the foods they eat is useful when studying the cost of nutritious diets. USDA's Continuing Survey of Food Intakes by Individuals is a major source of information on food consumed by Americans. However, this survey lacks information about the cost of individual food items that are reported consumed by individuals. A methodology was developed to estimate the prices of foods as consumed in the survey: (1) The foods were disaggregated into their recipe ingredients; (2) the recipe ingredients were converted to a form that could be purchased; (3) the ingredients were priced; and (4) the ingredients were aggregated back to foods—with prices.

he Continuing Survey of Food Intakes by Individuals (CSFII 1989-91), conducted by the U.S. Department of Agriculture (USDA), has information on the kinds and amounts of foods reported consumed by individuals. However, information on the cost of individual food items purchased and brought into homes is not available in this survey. Therefore, it is not possible to estimate how much individuals spend on foods they consume from the survey data alone. This article describes the methodology that was developed to estimate the prices of foods as reported consumed in the survey and the Food Price Database that resulted.

Sources of Data

The process of food price database development involved the identification of foods reported consumed in the CSFII 1989-91 survey and their recipe ingredients, conversion of recipe ingredients to the form in which they can be purchased, pricing of recipe ingredients, and converting the recipe ingredients with prices to foods reported consumed with prices. Various data sources were used in the different steps of developing the database; these are listed on the opposite page.

Identification of foods reported consumed and their recipe ingredients.

- USDA Continuing Survey of Food Intakes by Individuals 1989-91—"Record Type 30" *(4)*. This file lists individual foods reported consumed in the survey. Food intake data were obtained for individuals age 1 year and older.

- USDA Continuing Survey of Food Intakes by Individuals 1989-91—"Survey Recipe File" *(5)*. This file contains recipes for all the foods reported consumed in the survey. Each food is identified by a 7-digit food code. Table 1 gives some of the information from the survey recipe file for chili con carne with beans and potato salad with egg. Only those recipes for the foods reported consumed on the first day of the survey by individuals age 1 year and older were used.

Conversion of recipe ingredients to the forms in which they can be purchased.

- USDA Agriculture Handbook No. 102—"Food Yields Summarized by Different Stages of Preparation" *(2)*. This publication contains the percent yield of foods. For example, it was used to compute the percent of edible portion of a vegetable after it is peeled and percent yield of some cooked foods.

- USDA Agriculture Handbook No. 8 (series)—"Composition of Foods" *(3)*. Information from Handbook No. 8 was used to compute the weight of uncooked foods such as pasta, rice, meat, and vegetables from the respective cooked weights.

Table 1. Recipes for chili con carne with beans and potato salad with egg

Survey food code	Ingredient description	Amount in 100 grams of recipe
Food: Chili con carne with beans		
2711141	Ground beef, cooked	20.92
2711141	Onion, raw	6.76
2711141	Celery, raw	3.69
2711141	Chili powder	.32
2711141	Salt	.34
2711141	Tomatoes, stewed	27.89
2711141	Tomato sauce	13.94
2711141	Kidney beans, canned	26.14
Food: Potato salad with egg		
7160101	Mayonnaise	8.12
7160101	Dry mustard	.24
7160101	Salt	.61
7160101	Onion, chopped	1.48
7160101	Green pepper, chopped	1.30
7160101	Celery, chopped	6.64
7160101	Sweet pickle relish	2.95
7160101	Pimento, canned	1.14
7160101	Potatoes, boiled, diced	66.45
7160101	Eggs, hard cooked, diced	11.07

- USDA Continuing Survey of Food Intakes by Individuals 1989-91—"Survey Food Code Book" *(6)*. The survey food code book has gram weights for different measures such as cups, fluid ounces, slices, and units. This file was mainly used to convert fluid ounces to gram weight equivalents for foods such as milk, fruit juices, juice drinks, and salad dressings. The gram weight of measures for some of the foods are in table 2, p. 28.

Pricing of food ingredients.

- Average retail prices for the food ingredients were assigned by USDA's Economic Research Service (ERS) *(7)*. ERS used the following price sources to compute the food prices: Scantrack® system developed by A.C. Nielsen; Bureau of Labor Statistics (BLS), U.S. Department of Labor; Agricultural Marketing Service (AMS), USDA; and National Marine and Fisheries Service (NMFS), U.S. Department of Commerce.

Table 2. Food codes, their descriptions, measures, and weights

Survey food code	Food code description	Measure	Gram weight equivalent
1111100	Milk, cow's, fluid, whole	1 cup	244
		1 fl oz	30.5
8310100	Blue or roquefort cheese dressing	1 cup	245
		1 tbsp	15.3
8210200	Corn oil	1 cup	218
		1 tbsp	13.6
8310710	Mayonnaise, made with yogurt	1 cup	220
		1 tbsp	13.8
9241031	Soft drink, cola-type	1 fl oz	31
		1 can (12 fl oz)	369
9241061	Ginger ale	1 fl oz	30
		1 can (12 fl oz)	366
9251015	Apple juice drink	1 cup	250
		1 fl oz	31.3
9251061	Fruit drink (includes fruit punches and fruit ades)	1 cup (8 fl oz)	248
		1 fl oz	31.0

BLS collects a representative sample of retail prices in 85 urban areas throughout the Nation. Although the BLS prices are considered the best source of representative prices, they include only a limited number of foods.

The Scantrack® system has information on all scannable products in grocery stores having annual sales of a least $2 million, which account for about 82 percent of all grocery sales. It provides such information as brand names and container sizes. AMS prices were used to compute the prices of fresh fruits and vegetables that were not available in the BLS and the Scantrack® databases. Data from NMFS were used to compute the prices of fresh fish and fish products that were not available in the BLS and the Scantrack® databases *(1)*.

Methodology

Identification of Foods Reported Consumed and Their Recipe Ingredients
Foods reported consumed in the CSFII 1989-91 by individuals age 1 year and older were identified from the Record Type 30. Alcoholic beverages were not included because they are not a part of the Food Guide Pyramid food groups.

Recipes for the foods reported consumed were extracted from the CSFII 1989-91 survey recipe file. The names of the recipe ingredients, their amounts in the recipe, and the yield of the recipe were used to estimate prices of the foods reported consumed. Recipe ingredients were identified through a disaggregation process. Figure 1 shows the disaggregation of chili con carne with beans.

Establishing the "Purchased" Form of Recipe Ingredients
Recipe ingredients that could be purchased in the form used in the recipes were separated from the other ingredients. These were ready for pricing. Most ingredients were in this form. Examples of such foods are milk, yogurt, cheese, butter, cream, breads, muffin, flour, ready-to-serve soups, baby foods, oils, salad dressings, soft drinks, ready-to-eat cereals, cookies, crackers, candies, luncheon meats, sausages, salt, and spices.

A recipe where all ingredients could be directly purchased is given in table 3, p. 30. The dry potato flakes, milk, margarine, and salt in the recipe for mashed potatoes may be purchased in the form required by the recipe. Recipe ingredients such as cooked rice, cooked pasta,

Figure 1. Disaggregation of foods reported consumed to recipe ingredients

```
┌─────────────────────────────┐          ┌─────────────────────────┐
│    Foods as reported        │          │      CSFII 1989-91      │
│        consumed             │          │      Survey Recipe      │
│                             │          │          File           │
│ (e.g.: chili con carne with │          │                         │
│            beans)           │          │                         │
└─────────────────────────────┘          └─────────────────────────┘
                    \                    /
                     \                  /
                    ╭─────────────────────╮
                    │    Disaggregation    │
                    │      Process         │
                    ╰─────────────────────╯
                             │
                    ┌─────────────────────────┐
                    │  Food Recipe Ingredients │
                    │                          │
                    │ (e.g.: Ground beef, cooked│
                    │        canned kidney beans│
                    │        stewed tomatoes   │
                    │        tomato sauce      │
                    │        raw onion         │
                    │        raw celery        │
                    │        salt, chili powder)│
                    └─────────────────────────┘
```
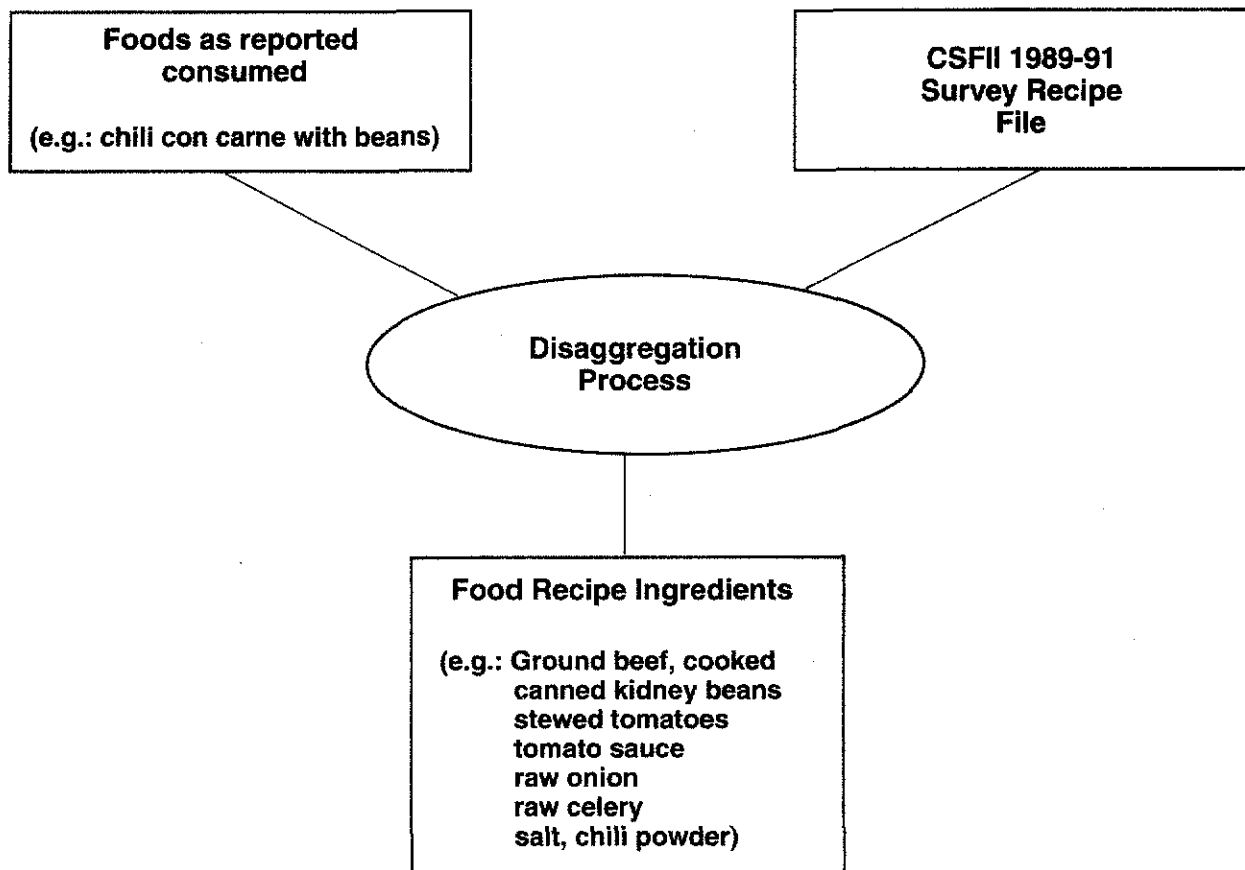
boiled eggs, and steamed vegetables that could not be purchased in the form used in the recipes were converted back to the weight equivalents of the form in which they can be purchased, using conversion factors. A process to decide the need for conversion factors is shown in figure 2, p. 31.

Development of Conversion Factors
Two types of conversion factors were used: to adjust for cooking loss or gain and to adjust for food preparation waste. The first conversion factor adjusted for the loss or gain in weight

due to cooking. For example, steamed vegetables were converted to raw, prepared forms; and cooked rice and cooked pasta were converted to their respective uncooked forms. Some examples of this type of conversion— from cooked to raw forms—are shown in table 4, p. 30. By using a conversion factor, 100 grams of cooked rice was converted to 35.4 grams of uncooked rice by weight and assigned the price of this quantity of uncooked rice. In the same way, 100 grams of toasted white bread was assigned the price of 111 grams of fresh white bread.

The second conversion factor adjusted for waste in food preparation. This factor converted peeled raw potatoes to potatoes with peel and raw eggs to shell eggs. Examples of how the food preparation loss factor is used are given in table 5, p. 30. One-hundred grams of raw banana consumed is equivalent to 154 grams of raw banana with peel, and 100 grams of peeled, seeded, and sliced honeydew is equivalent to 217 grams of fresh whole honeydew. These fruits are priced as banana with peel and whole honeydew, respectively.

Some foods required conversion factors for both cooking weight changes and preparation waste. Foods such as fresh vegetables, eggs, meat cuts with bone and/or skin removed are first prepared to the form required for cooking and then cooked. Examples of foods that need both types of conversion factors are shown in table 6, p. 32.

Pricing of Food Ingredients
National average prices for the food ingredients in "purchased" form for the years 1989, 1990, and 1991 were computed by ERS based upon data from Scantrack®, BLS, AMS, and NMFS *(7)*.

ERS categorized nearly one-half million items from Scantrack® to fit into the CSFII food descriptions. Summary information was entered on a spread-sheet and average prices were computed. ERS made adjustments to the wholesale prices of fresh fruits and vegetables obtained from the AMS to account for losses due to trimming, spoilage and other damage, and to include the marketing spread (difference between wholesale and retail price, including transportation costs) to get retail prices. NMFS has developed a model that uses fish supply data and wholesale value information to estimate retail prices of most frequently consumed fish and shellfish. Prices for less frequently consumed fish were estimated using prices for similar species *(1)*.

The prices received from ERS were in dollar amounts per pound or per fluid ounce. It was necessary to convert pounds and fluid ounces to corresponding gram weights. The CSFII 1989-91 Survey Code Book and Survey Recipe File, together with supermarket product label information, were used to convert fluid ounces to gram weights. All food prices were then converted to prices per 100 grams of food.

Table 3. Example of a recipe where all the ingredients could be purchased

Food ingredient	Amount in 100 grams of recipe	Raw weight equivalent
	Grams	
Food: Mashed potato made from potato flakes and milk		
Dry potato flakes	14.5	14.5
Whole milk	23.2	23.2
Margarine	5.4	5.4
Water	56.4	56.4
Salt	0.5	0.5

Table 4. Examples of foods that gain or lose weight during cooking

Food ingredient	Amount in 100 grams of recipe	Conversion factor	Raw weight equivalent
	Grams		*Grams*
Food: Cooked white rice, fat not added in cooking			
Enriched cooked rice	99.12	0.36	35.40
Salt	0.88	1.00	0.88
Food: White bread, toasted			
Toasted white bread	100.00	1.11	111.0

Table 5. Examples of foods that need adjustment for food preparation waste

Food ingredient	Amount in 100 grams of recipe	Conversion factor	Raw weight equivalent
	Grams		*Grams*
Food: Raw banana			
Raw banana, peeled	100	1.54	154
Food: Honeydew melon			
Honeydew melon, sliced	100	2.17	217

Figure 2. Decision process for establishing conversion factors
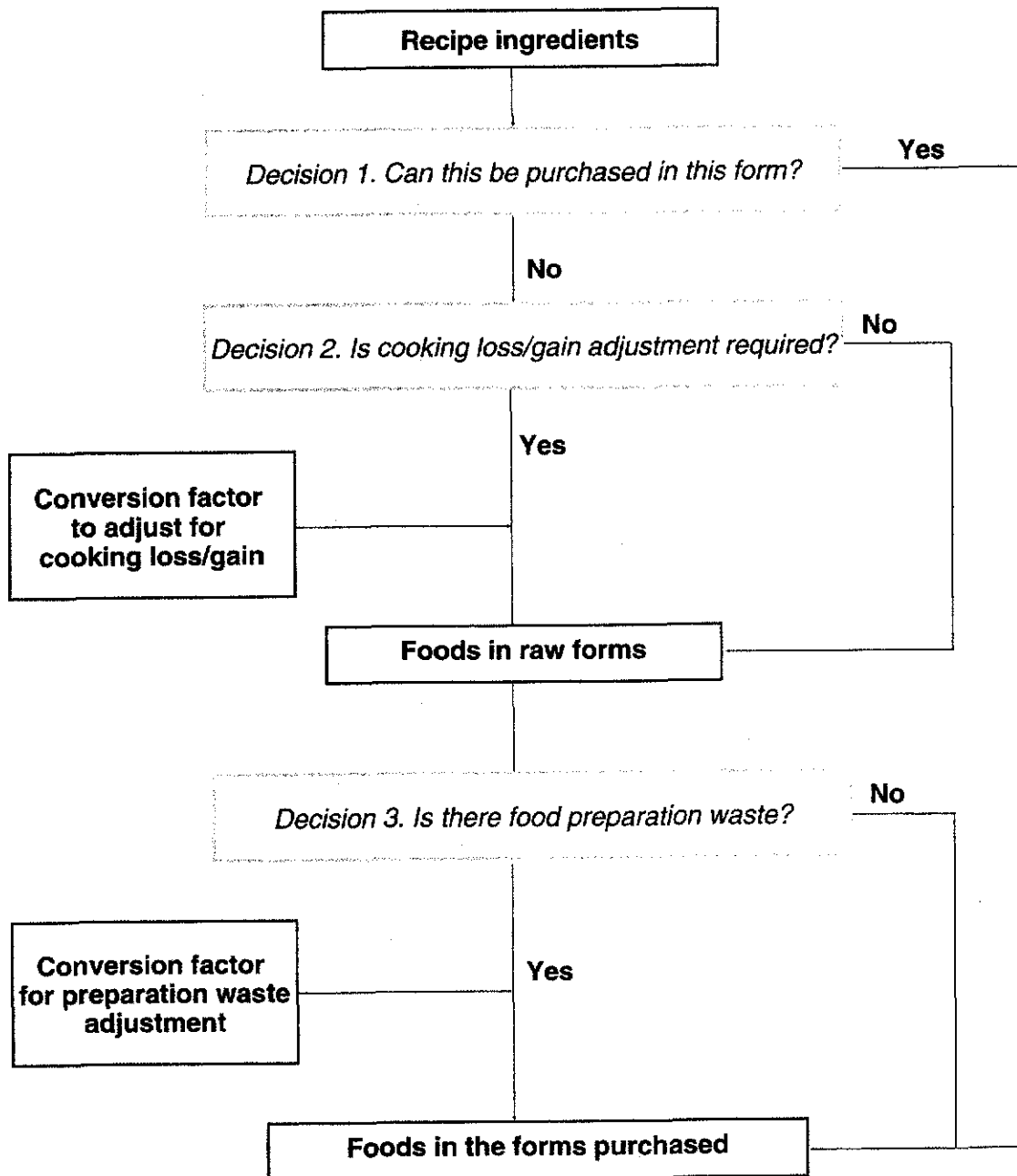
```
                          ┌─────────────────────────────┐
                          │      Recipe ingredients      │
                          └─────────────────────────────┘
                                         │
    ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
    │  Decision 1. Can this be purchased in this form?  │──── Yes ────┐
    └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘             │
                                         │ No                          │
    ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐             │
    │ Decision 2. Is cooking loss/gain adjustment required? │── No ──┐ │
    └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘         │ │
                                      │ Yes                          │ │
┌──────────────────┐                  │                              │ │
│ Conversion factor │                 │                              │ │
│    to adjust for  │─────────────────┤                              │ │
│  cooking loss/gain │                 │                              │ │
└──────────────────┘                  │                              │ │
                          ┌───────────────────────┐                  │ │
                          │    Foods in raw forms   │──────────────────┘ │
                          └───────────────────────┘                    │
                                      │                                │
    ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐             │
    │     Decision 3. Is there food preparation waste?   │── No ──┐     │
    └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘       │     │
                                      │ Yes                        │     │
┌──────────────────────┐             │                            │     │
│  Conversion factor    │            │                            │     │
│ for preparation waste │────────────┤                            │     │
│     adjustment        │            │                            │     │
└──────────────────────┘             │                            │     │
                          ┌─────────────────────────────┐          │     │
                          │  Foods in the forms purchased │──────────┴─────┘
                          └─────────────────────────────┘
```

Table 6. Examples of foods that need two conversion factors

Food ingredient	Preparation waste conversion factor	Cooking gain/loss conversion factor
Cooked snap beans	1.14	1.11
Boiled carrots	1.12	1.03
Baked potato flesh	1.33	1.17
Boiled eggs	1.18	1.03
Roasted boneless chicken	1.49	1.19

In the absence of food expenditure information, the Food Price Database offers a way to price the foods.

Table 7. Creating foods with prices—price of 100 grams of scrambled eggs

Food ingredient	Raw equivalent in 100 gram recipe	Price of 100 gram ingredient	Price of recipe amount
	Grams	*Dollars*	*Dollars*
Raw eggs	87.57	$0.16	$0.140
Milk	31.64	0.06	0.019
Table fat	3.74	0.14	0.005
Salt	0.31	0.06	0

Total price of 100 grams of scrambled eggs = $0.164

Prices were obtained from ERS for about 1,600 foods. There were some foods in the survey for which ERS had no prices. The mean intake of these foods was very small in the survey. In these cases, average prices of similar types of foods that were available from ERS were used.

Estimation of Prices for CSFII 1989-91

The food ingredients were then aggregated back to foods in the form reported consumed in the CSFII. Each food had three prices—one for each year (1989, 1990, and 1991). Prices were computed for 100 grams of recipe. An example of how scrambled eggs is priced from its recipe ingredients is shown in table 7.

The final food price database contains 7-digit food codes for the foods and prices for 100 grams of each food for the years 1989, 1990, and 1991.

Uses of the Food Price Database

This database was developed to revise the current Thrifty Food Plan (TFP). The TFP is the lowest cost food plan developed by USDA and is the nutritional basis of U.S. Food Stamp Program benefits. The Food Stamp Program provides low-income households with the means to purchase low-cost, nutritious diets. In the current TFP, the cost of foods purchased by the low-income population was derived from the Household Survey data collected in

the 1977-78 Nationwide Food Consumption Survey. The CSFII 1989-91 did not collect household food use data. In the absence of food expenditure information, the Food Price Database offers a way to price the foods. The primary use of this database is to study the cost of nutritious diets such as the USDA food plans.

Acknowledgment

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6. U.S. Department of Agriculture, Agricultural Research Service. 1989-1991. Continuing Survey of Food Intakes by Individuals 1989-91 Survey Food Code Book.

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Appendix 3

Food Group Database Documentation

Food Category Database Documentation

Food categories developed for the revised TFP are based mainly on the food category classification used in the 1989-91 CSFII with modifications suitable for TFP models. In addition, criteria used in the previous food plan development and Food Guide Pyramid food groups were considered in categorizing foods. Within major food categories, individual foods, which had similar nutritive values, particularly fat content, were placed together in subcategories. The cost of the foods was also considered in grouping foods.

Foods reported consumed by all individuals 1 year and older in the 1989-91 CSFII are grouped into 44 food categories. Alcoholic beverages are excluded from the food category database. There are 4,830 individual foods in this database. Foods included in each category and criteria used to assign a food to a particular food category are described below.

Grains

Breads, yeast and quick—high fiber; Breads, yeast and quick—regular fiber: includes breads, rolls, muffins, bagels, tortillas, taco shells, pancakes, waffles, biscuits, and cornbread. This group is subdivided into two categories: high fiber and regular fiber. Breads or bread products with 0.8 grams of fiber or more per ounce were placed in the high fiber category and the remaining breads and bread products were placed in the regular fiber category. This cutoff is based on CNPP consensus of what a high fiber bread is and on the Food and Drug Administration's (FDA) definition of a "good source of fiber."

Breakfast cereal—high fiber; Breakfast cereal—regular fiber: includes ready-to-eat cereals, cornmeal, oatmeal, millet, and grits. This group is subdivided into two categories—high fiber and regular fiber. With the exception of oatmeal cereals, which were placed in the high fiber category, cereals with 1.2 grams of fiber or more per ounce were placed in the high fiber category, and the remaining cereals were placed in the regular fiber category. This cutoff is based on CNPP consensus of what a high fiber cereal is and on the FDA's definition of a "good source of fiber."

Rice and pasta: includes all types of rice and pasta products such as macaroni, noodles, and spaghetti.

Cakes, pies, and other sweet bakery products: includes cakes, cookies, pies, pastries, doughnuts, sweet rolls, croissants, graham crackers, breakfast and meal replacement bars, and other sweet products.

Grain-based snacks: includes crackers, popcorn, pretzels, and corn- or wheat-based salty snacks.

Grain mixtures—regular fat; Grain mixtures—lowfat: includes tacos, enchiladas, chimichangas, pizzas, pasta with meat and/or vegetables, egg rolls, lasagna, and rice with meat and/or vegetables. This group is subdivided into

two categories—regular fat and lowfat. Generally, mixtures were placed in the regular or lowfat category based on their CSFII descriptor. However, in some cases, a food code was reviewed individually and included in a particular category based on the fat content of its recipe components. Six percent was chosen as the cut-off value for regular versus lowfat by looking at the fat content of fried or high-fat grain mixtures such as tacos, nachos, burritos, pizza, and pasta with cheese. Pizza without cheese contains 6.25 percent fat; rice dishes with beans, macaroni salads, meatless lasagna, and lo-mein with meat contain 4.5 to 6.0 percent fat. Because pizza is considered a higher fat food, and those foods with a fat content of 4.5 to 6 percent are considered lower fat foods, mixtures with a fat content less than 6.0 percent by weight were placed in the lowfat category, and mixtures with a fat content of 6.0 percent or more by weight were placed in the regular fat category.

Vegetables and Fruits

Potato products—high fat; Potato products—regular fat: includes fresh and processed white potatoes, French fries, hash browns, home fries, potato chips, and potato sticks. These foods are subdivided into two groups—a high fat and a regular fat category. The high fat category includes potato chips, French fried potatoes, hash browns, potato puffs, potato patties, potato pancakes, potato puddings and salads, and mashed potatoes with added fat, egg, and cheese. The regular fat category includes cooked, boiled, baked, scalloped, mashed, and stuffed potatoes, and potato salad, German style.

Green-yellow vegetables—added fat; green-yellow vegetables—no added fat: includes vegetables such as broccoli, chard, collard greens, kale, spinach, carrots, pumpkin, squash, and sweet potatoes; juices from these vegetables are also included. This group is subdivided into two categories based on whether any fat was added during cooking. The survey recipe database was used to determine whether fat was added to the vegetable during cooking. If fat was added, the vegetable was placed in the added fat category, and if no fat was added, the vegetable was placed in the no added fat category.

Other vegetables—added fat; other vegetables—no added fat: includes vegetables such as beans, beets, cabbage, cauliflower, corn, cassava, eggplant, green peas, lettuce, bell peppers, snow peas, tomatoes, turnip, and Brussels sprouts; juices from these vegetables are also included. This group is subdivided into two categories based on whether any fat was added during cooking. The survey recipe database was used to determine if fat was added to the vegetable during cooking. If fat was added, the vegetable was placed in the added fat category, and if no fat was added, the vegetable was placed in the no added fat category.

Mixed vegetables—added fat; Mixed vegetables—no added fat: includes mixed vegetable groups and/or vegetables in combination with other foods. Creamed peas and carrots; carrots in tomato sauce; cucumber salad with creamy dressing; mixed vegetables containing corn, lima beans, and peas;

batter-dipped fried vegetables; and vegetable casseroles with cheese are examples of foods in this category. This group is subdivided into two categories based on whether any fat was added during cooking. The survey recipe database was used to determine if fat was added to the vegetable during cooking. If fat was added, the vegetable was placed in the added fat category, and if no fat was added, the vegetable was placed in the no added fat category.

Citrus fruits, melons, berries, and juices: includes citrus fruits, such as limes, lemons, grapefruits, oranges, tangelos, and tangerines; melons, such as cantaloupe, honeydew, and watermelon; and berries, such as blackberries, blueberries, cranberries, raspberries, and strawberries. Fruit juices from these fruits are included in this food category.

Other noncitrus fruits and juices: includes apples, apricots, bananas, cherries, grapes, papayas, peaches, pears, and plums. Fruit juices made from these fruits are also included in this food category.

Milk Products

Milk and milk-based foods—regular fat: includes all fluid, evaporated, condensed, and dry whole milk (fat content 3 percent or higher by weight) as well as regular yogurt, coffee creams, cream substitutes, whipping creams, sour creams and dips, and neufchatel/cream cheese and dips. For dry milk, the fat content was equivalent to whole milk after reconstitution.

Milk and milk-based foods—lower fat: includes all fluid, evaporated, and dry reduced-fat milk (fat content 2 percent by weight), light milk (fat content 0.5 to 1 percent by weight), and skim (fat-free) milk as well as lowfat or nonfat yogurt (fat content less than 1.55 percent by weight). Tofu yogurt was also included in this category. For dry milk, the fat content was equivalent to reduced fat, light, or skim milk after reconstitution.

Cheese: includes natural, processed, and imitation cheeses; cottage cheese; cheese spreads; cheese dips; and cheese soups. These foods were not subclassified into a regular and a lowfat category because the average amount of cheese reported consumed was too low to be separated into two categories and be used in the mathematical model.

Milk-based drinks and desserts—regular fat; Milk-based drinks and desserts—lower fat: includes milk-based drinks, such as flavored milk, malted milk, eggnogs, cocoa, hot chocolate, infant formulas, meal replacement drinks, soy-based drinks, and milk-based dry mixes; dairy desserts made with ice milk, ice cream, and frozen yogurt; sherbet, puddings, and custard; and tofu frozen desserts. Milk-based drinks with a fat content equivalent to that of whole milk (fat content 3 percent or higher by weight) and dairy desserts having more than 6 percent fat content by weight were placed in the regular fat category.

Milk-based drinks with a fat content equivalent to that of reduced-fat or skim milk (fat content less than 3 percent by weight) and dairy desserts having 6 percent or less fat content by weight were placed in the lower fat category. For dry milk-based drinks, the fat level of whole milk powder was used as the basis for placing the dry mixes into the regular or lower fat category; whole milk powder has a fat content of 26.7 percent, thus milk-based dry drink mixes having less fat than 26.7 percent were placed in the lower fat category.

Meat and Meat Alternates

Red meats—high fat, regular cost; Red meats—high fat, low cost: includes beef; pork; veal; lamb; game meats; and organ meats, such as liver, kidney, brains, tongue, and tripe. Red meats with a fat content of 10 percent or more by weight were considered high fat; this fat cut-off value was selected because it is used by FDA to define regular fat versus lean meat. To determine regular cost versus low cost, CNPP arranged each food in the high-fat red meat category (beef, pork, etc.) in descending order in terms of its average cost per pound. The top 66.66 percent of foods were placed in the regular cost category, and the bottom 33.34 percent of foods, in terms of cost, were placed in the low cost category.

Red meats—lean, regular cost; Red meats—lean, low cost: includes beef, pork, veal, lamb, and game meats. Red meats with a fat content of less than 10 percent by weight were included in this group; this fat cut-off value was selected because it is used by FDA to define regular fat versus lean meat. The standards used for ground beef or hamburger to be considered lean were to have not more than 22.5 percent fat content or to have 25 percent less fat than the reference meat by weight. The 25-percent cut-off value is based on the FDA definition of regular versus reduced-fat meat. To determine regular cost versus low cost, CNPP arranged each food in the lean red meat category (beef, pork, etc.) in descending order in terms of its average cost per pound. The top 66.66 percent of foods were placed in the regular cost category, and the bottom 33.34 percent of foods, in terms of cost, were placed in the low cost category.

Poultry and fish—high fat, regular cost; Poultry and fish—high fat, low cost: includes raw and processed chicken, turkey, duck, Cornish game hen, game birds, and organ meats (such as liver, giblets and gizzards), as well as fish and shellfish. Fish and poultry with a fat content of 10 percent or more by weight were included in this group; this fat cut-off value was selected because it is used by FDA to define regular fat versus lean poultry and fish. To determine regular cost versus low cost, CNPP arranged each food in the high fat poultry and fish category (chicken, tuna, etc.) in descending order in terms of its average cost per pound. The top 66.66 percent of foods were placed in the regular cost category, and the bottom 33.34 percent of foods, in terms of cost, were placed in the low cost category.

Poultry and fish—lean, regular cost; Poultry and fish—lean, low cost: includes raw and processed chicken, as well as fish and shellfish, with less than 10 percent fat content by weight; this fat cut-off value was selected because it is used by FDA to define regular fat versus lean poultry and fish. To determine regular cost versus low cost, CNPP arranged each food in the lean poultry and fish category (chicken, tuna, etc.) in descending order in terms of its average cost per pound. The top 66.66 percent of foods were placed in the regular cost category, and the bottom 33.34 percent of foods, in terms of cost, were placed in the low cost category.

Lunch meats, sausages, and bacon—regular fat; Lunch meats, sausages, and bacon—lowfat: includes sausage, bacon and luncheon meat-type foods, including frankfurters. Foods with the CSFII descriptor "lowfat" or which contain 25 percent less fat by weight than their original form were placed in the lowfat category. The 25 percent cut-off value is based on the FDA definition of regular versus reduced-fat meat. For some foods, fat comparisons were not possible, so a cutoff of a fat content of 20 percent or more by weight was used to classify foods into regular and lowfat products.

Egg and egg mixtures: includes eggs, egg substitutes, eggs with vegetables and/or meat, egg drop soup, and meringues. Foods in this category are not subdivided based on fat content because egg-based products have similar fat contents.

Meat, poultry, and fish mixtures—regular fat; Meat, poultry and fish mixtures—lowfat: includes beef, veal, pork, lamb, chicken, turkey, and fish with vegetables and/or grain products. This group is subdivided into two categories: regular and lowfat. Mixtures were generally placed in the regular or lowfat category based on their CSFII descriptor. However, in some cases a food code was reviewed individually and placed in a particular category based on the fat content of its recipe components. Mixtures with a fat content of 8 percent or more by weight were placed in the regular fat category and those with a fat content of less than 8 percent by weight were placed in the lowfat category. Eight percent was chosen to avoid placing mixtures containing cream or cheese in the lowfat category. This value served as an appropriate cutoff because meat mixtures with vegetables and rice or noodles were placed in the lowfat category, and fried meat mixtures, such as fish cakes and fish and chips, were placed in the regular fat category.

Dry beans, peas, lentils dishes, and mixtures: includes black, white, lima, pinto, red, mung, and kidney beans; lentils; and different types of peas cooked alone or with other foods. Soybean products (such as miso, tofu, and meal) and soybean-based meat substitutes (such as textured protein products and soyburger) were also placed in this food category.

Nuts and seeds: includes all tree nuts, such as almonds, cashews, peanuts, coconut, and walnuts; seeds, such as sunflower, pumpkin, and sesame seeds; and nut butters.

Other Foods

Fats, oils, salad dressings, sauces, and condiments: includes table fats, such as butter, margarine, vegetable oil, and butter blends; fat-free butter replacements; cooking fats, such as lard, shortening, corn oil, olive oil, peanut oil, rapeseed oil, safflower oil, soybean oil and sunflower oil; salad dressings; and condiments, sauces, gravies and seasonings.

Coffee and tea: includes instant, ground, and fluid coffees and teas with or without caffeine and with or without sugar or sweeteners, as well as postum.

Fruits drinks, soft drinks, and ades—regular calorie; Fruit drinks, soft drinks, and ades—low calorie: includes fruit juice drinks, cola- and pepper-type soft drinks, root beer, ginger ale, cream soda, and lemonade. This group is subdivided into regular and low calorie categories. All drinks that are sugar free or are described in the CSFII as low calorie are included in the low calorie category and the other drinks containing sugar are included in the regular calorie category.

Sugars and sweets: includes 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.

Appendix 4

Menus
Week I
Week II

Week I. Menus for a Family of Four

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
B R E A K F A S T	Orange juice (3 c) Ready-to-eat cereal (3 c flakes) Toasted English muffin (4) 1% lowfat milk (2 c)	Orange juice (3 c) Banana (4) Bagel (4) Margarine (4 tsp) 1% lowfat milk (2 c)	Orange juice (3 c) **Cooked rice cereal Bagel (4) Margarine (4 tsp)	Orange juice (3 c) Scrambled eggs (4) Hash brown potatoes (2 c) 1% lowfat milk (2 c)	Orange juice (3 c) Ready-to-eat cereal (3 c flakes) English muffin (4) Margarine (4 tsp) 1% lowfat milk (2 c)	Orange juice (3 c) *Baked French toast Cinnamon sugar topping (4 tsp) 1% lowfat milk (2 c)	Orange juice (3 c) *Baked potato cakes White toast (4 slices) 1% lowfat milk (2 c)
L U N C H	*Turkey patties Hamburger bun (4) Orange juice (3 c) Coleslaw (2 c) 1% lowfat milk (2 c)	*Crispy chicken **Potato salad **Orange gelatin salad Peaches, canned (1 c) **Rice pudding	**Turkey chili Macaroni (2 c) *Peach-apple crisp 1% lowfat milk (2 c) Orange juice (3 c)	Turkey ham (11 oz, 2 tbsp salad dressing) sandwiches (4) **Baked beans Banana, slices (2 c) **Oatmeal cookies Orange juice (3 c) 1% lowfat milk (2 c)	**Potato soup Snack crackers, low salt (5 each) *Tuna pasta salad Orange slices (2 c) **Oatmeal cookies 1% lowfat milk (2 c)	**Potato soup Snack crackers, low salt (5 each) Apple orange slices (2 apples, 2 oranges) (2 c) **Rice pudding 1% lowfat milk (2 c)	Baked fish (12 oz, 4 tbsp salad dressing) sandwiches (4) *Crispy potatoes **Macaroni salad Melon (1-1/3 c) Orange juice (3 c) 1% lowfat milk (2 c)
D I N N E R	**Beef-noodle casserole Lima beans (2 c) Banana orange salad (2 bananas, 2 oranges) (2 c) 1% lowfat milk (2 c)	*Turkey stir fry Steamed rice (3 c) White bread (4 slices) *Peach-apple crisp 1% lowfat milk (2 c)	**Baked cod w/cheese *Scalloped potatoes Spinach (1-1/3 c) Margarine (4 tsp) Chocolate pudding (2 c)	*Beef pot roast Noodles (4 c) Peas and carrots (1 c) Orange slices (2 c) Biscuits (8) Margarine (4 tsp) **Rice pudding 1% lowfat milk (2 c)	Beef pot roast (12 oz) Noodles (4 c) Green beans (1-1/3 c) Leaf lettuce (1-1/3 c) Salad dressing (4 tbsp) **Rice pudding 1% lowfat milk (2 c)	*Saucy beef pasta White bread (4) Canned pears (2 c) Orange juice (3 c) 1% lowfat milk (2 c)	*Turkey-cabbage casserole (8 c) Orange slices (2 c) White bread (2 slices) **Chickpea dip 1% lowfat milk (2 c)
S N A C K	White bread (4 slices) **Chickpea dip Lemonade (4 c)	Orange juice (3 c)	*Crispy potatoes	Lemonade (4 c)	Biscuits (8) Margarine (4 tsp) Lemonade (4 c)	Lemonade (4 c)	

*Recipes were tested and sensory-evaluated in the food laboratory and by households.

**Recipes were tested and sensory-evaluated in the food laboratory.

Note: Daily menus are designed in no specific sequence. Amounts of foods that a family is expected to use are shown in parentheses for most foods. **Amounts of allowed margarine and milk can be combined or divided differently at meals. Recipes are provided for foods shown with asterisks. Serving sizes are shown on the recipes.**

Week II. Menus for a Family of Four

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
B R E A K F A S T	Orange juice (3 c) Hash brown potatoes (2 c) Biscuits (8) Margarine (4 tsp) Jelly (8 tbsp)	Orange juice (3 c) Ready-to-eat-cereal (3 c toasted oats) White toast (4 slices) Margarine (8 tsp) 1% lowfat milk (2 c)	Orange juice (3 c) Bananas (1/2 c) Ready-to-eat-cereal (3 c toasted oats) White toast (4 slices) Jelly (8 tbsp) 1% lowfat milk (2 c)	Orange juice (3 c) **Cooked rice cereal White toast (4 slices) Margarine (4 tsp) 1% lowfat milk (2 c)	Orange juice (3 c) Ready-to-eat cereal (3 c toasted oats) White toast (4 slices) Margarine (4 tsp) 1% lowfat milk (2 c)	Orange juice (3 c) Scrambled eggs (2 c) Turkey ham (11 oz) Bagels (4) 1% lowfat milk (2 c)	Orange juice (3 c) Melon (1-1/3 c) Pancakes (12) Pancake syrup (8 tbsp) 1% lowfat milk (2 c)
L U N C H	**Chicken and vegetables **Scalloped potatoes Grapes (12 oz) Whole wheat bread (4 slices) Margarine (4 tsp) *Peach cake 1% lowfat milk (2 c)	*Pizza meat loaf Noodles (4 c) Margarine (8 tsp) Orange slices (2 c) 1% lowfat milk (2 c)	*Tuna macaroni salad White bread (4 slices) Margarine (4 tsp) Apple slices (2 c) 1% lowfat milk (2 c) Cocoa drink mix (2 oz)	Hamburger (12 oz) sandwiches (4) *Ranch beans **Orange gelatin salad Banana slices (1/2 c) 1% lowfat milk (2 c)	*Baked chicken nuggets **Shoestring potatoes **Macaroni (5 c) Margarine (4 tsp) **Orange gelatin salad 1% lowfat milk (2 c)	*Chicken noodle soup Biscuits (8) Canned peaches (2 c) Orange juice (3 c) 1% lowfat milk (2 c) Cocoa drink mix (2 oz)	Meatball (12 meatballs) sandwiches (4) Grapes (12 oz) **Sugar cookies 1% lowfat milk (2 c) Orange juice (3 c)
D I N N E R	*Southwestern salad Steamed rice (6 c) Apple orange salad (2 apples, 2 oranges) (2 c) Margarine (4 tsp) 1% lowfat milk (2 c)	*Spanish baked fish Steamed rice (6 c) Peas (1-1/3 c) Whole wheat bread (4 slices) Margarine (8 tsp) *Peach cake 1% lowfat milk (2 c)	*Stir-fried pork and vegetables with rice Dinner rolls (4) Margarine (4 tsp) Mandarin oranges (2 c) 1% lowfat milk (2 c)	Baked chicken (10 oz) Mash potatoes (6 c) Green beans (1-1/2 c) White bread (4 slices) Margarine (5-1/3 tbsp) Orange slices (2 c) 1% lowfat milk (2 c)	**Baked spicy fish Noodles (4 c) Peas and carrots (10 oz) White bread (4 slices) Margarine (8 tsp) *Chocolate rice pudding 1% lowfat milk (2 c)	*Baked meatballs Spaghetti and sauce (5 c) Leaf lettuce (2 c) Salad dressing (4 tbsp) French bread (4 slices) 1% lowfat milk (2 c)	*Cheese-stuffed potatoes Macaroni (5 c) Peas (1-1/3 c) Margarine (8 tsp) Orange slices (2 c) 1% lowfat milk (2 c)
S N A C K	Popcorn (6 c)	**Shoestring potatoes Fruit drink (4 c)	Popcorn (6 c) Orange juice (3 c)	*Chocolate rice pudding	Baked French fries (11 oz) Fruit drink (4 c)	Ice milk fudgesicle (4)	Popcorn (6 c) Fruit drink (4 c)

*Recipes were tested and sensory-evaluated in the food laboratory and by households.
**Recipes were tested and sensory-evaluated in the food laboratory.
Note: Daily menus are designed in no specific sequence. Amounts of foods that a family is expected to use are shown in parentheses for most foods. Amounts of allowed margarine and milk can be combined or divided differently at meals. Recipes are provided for foods shown with asterisks. Serving sizes are shown on the recipes.

Appendix 5

Introduction to Recipes
Recipe List
Forty Recipes

Introduction to Recipes

The 40 recipes developed for the two sample weekly menus illustrate how to combine larger amounts of less expensive foods with smaller amounts of moderately priced foods and how to follow the *Dietary Guidelines for Americans*. The recipes are grouped as main dishes: Beef, pork, fish, poultry, or vegetarian; soups; vegetables and dips; salads; breads and hot cereals; and desserts. The ingredients used in the recipes are readily available and are low to moderate in cost.

Some Key Facts About the Recipes:

- The type of flour used is all-purpose.
- The size of the eggs is large.
- The type of rice used is long-grain.
- Many of the recipes are prepared without added salt.
- Lower fat ingredients are often used instead of similar ingredients that are higher in fat: for example, water-packed tuna instead of oil-packed tuna.

Each recipe lists the number of servings, serving size, preparation time, cooking time, and nutrient data per serving. Calories are rounded to the nearest 5, total fat and saturated fat are rounded to the nearest gram, and cholesterol and sodium are rounded to the nearest milligram.

Recipe List

MAIN DISHES

Beef and Pork
*Baked meatballs
*Beef pot roast
**Beef noodle casserole
*Pizza meat loaf
*Saucy beef pasta
*Southwestern salad
*Stir-fried pork and vegetables with rice

Fish
**Baked cod with cheese
**Baked spicy fish
*Spanish baked fish
*Tuna macaroni salad
*Tuna pasta salad

Poultry
*Baked chicken nuggets
**Chicken and vegetables
*Oven crispy chicken
*Turkey-cabbage casserole
**Turkey chili
*Turkey stirfry
*Turkey patties

Vegetarian
*Cheese-stuffed potatoes

SOUPS
*Chicken noodle
**Potato

VEGETABLES AND DIPS
**Baked beans
*Baked crispy potatoes
*Potato cakes
*Ranch beans
*Scalloped potatoes
**Shoestring potatoes
**Chickpea dip

SALADS
**Macaroni
**Orange gelatin
**Potato

BREADS AND HOT CEREALS
*Baked French toast
**Cooked rice cereal

DESSERTS
*Chocolate rice pudding
**Oatmeal cookies
*Peach-apple crisp
*Peach cake
**Rice pudding
**Sugar cookies

*Recipes tested and sensory-evaluated in the PSU food laboratory and by households.
**Recipes tested and sensory-evaluated in the PSU food laboratory.

MAIN DISHES

Beef and Pork

Baked Meatballs

4 Servings, about 3 meatballs each, plus 4 servings for another meal

Onions, minced	¼ cup
Vegetable oil	1 tablespoon
Lean ground beef	2 pounds
Eggs	2
Bread crumbs	¾ cup
Whole milk	½ cup
Salt	⅛ teaspoon
Pepper	½ teaspoon
Onion powder	2 teaspoons
Garlic powder	½ teaspoon

1. Preheat oven 400° F. Grease baking sheet lightly with oil.
2. Add 1 tablespoon oil and onions to small skillet. Cook over medium heat, until tender, about 3 minutes.
3. Mix remaining ingredients together in bowl; add onions. Mix until blended, using a large serving spoon.
4. Shape beef mixture into 1- to 2-inch meatballs; place on baking sheet.
5. Bake until thoroughly cooked, about 10 to 12 minutes.

Note: Serve with spaghetti sauce and in the meatball sandwich.

Preparation time: 15 minutes
Cooking time: 10 to 12 minutes

Per serving:

Calories	345
Total fat	21 grams
Saturated fat	7 grams
Cholesterol	142 milligrams
Sodium	224 milligrams

Beef Pot Roast

4 Servings, about 3 ounces beef each, plus 4 servings for another meal

Onion, chopped	½ cup
Water	2 tablespoons
Beef chuck roast, boneless	2½ pounds
Hot water	2 cups
Beef bouillon	1 cube
Orange juice	2 tablespoons
Ground allspice	¼ teaspoon
Pepper	⅛ teaspoon

1. Simmer onion until tender in 2 tablespoons water in heavy, deep skillet.
2. Add roast to skillet; brown on sides.
3. Combine beef bouillon cube with 2 cups hot water; stir until dissolved.
4. Combine orange juice, allspice, pepper, and beef broth. Pour over meat. Cover and simmer, about 2 hours.

Preparation time: 20 minutes
Cooking time: 2 hours

Per serving:

Calories	220
Total fat	9 grams
Saturated fat	3 grams
Cholesterol	91 milligrams
Sodium	264 milligrams

Beef-Noodle Casserole

4 Servings, about 2 cups each

Lean ground beef	1 pound
Onions, chopped finely	½ cup
Boiling water	3 quarts
Noodles, yolk-free, enriched, uncooked	2¾ cups
Tomato soup, condensed	1 10¾-ounce can
Water	1¼ cups
Pepper	⅛ teaspoon
Bread crumbs	1 cup

1. Brown beef and onions in hot skillet; drain.
2. Place water in large saucepan; bring to rolling boil. Cook noodles in boiling water for 10 minutes; drain and set aside.
3. Combine soup, water, and pepper. Stir into cooked meat. Add cooked noodles to meat mixture. Stir gently to avoid tearing the noodles.
4. Spoon beef-noodle mixture into 9- by 13-inch baking pan. Sprinkle bread crumbs over beef-noodle mixture.
5. Bake, uncovered, at 300° F, about 30 minutes.

Preparation time: 20 minutes
Cooking time: 30 minutes

Per serving:

Calories	595
Total fat	18 grams
Saturated fat	6 grams
Cholesterol	86 milligrams
Sodium	575 milligrams

Pizza Meat Loaf
4 Servings, about ¼ loaf each

Ground turkey	1 pound
Spaghetti sauce	¾ cup
Mozzarella cheese, part-skim	¼ cup
Green peppers, chopped	½ cup
Onion, minced	¼ cup

1. Lightly grease 9-inch pie plate with vegetable oil. Pat turkey into pie plate.

Conventional Method
1. Place turkey in 350° F oven; bake until turkey no longer remains pink, about 17 to 20 minutes.

Microwave Method
1. Cover turkey with waxed paper.
2. Cook on high; rotate plate ¼ turn after 3 minutes.
3. Cook until turkey no longer remains pink, about 5 more minutes. Drain.

TO COMPLETE COOKING

1. Top baked turkey with spaghetti sauce, cheese, and vegetables.
2. Return turkey to either the conventional oven or the microwave oven and heat until cheese is melted, about 1 to 2 minutes.

Preparation time: 15 minutes
Conventional cooking time: 20 minutes
Microwave cooking time: 8 minutes

Per serving:

Calories	255
Total fat	14 grams
Saturated fat	4 grams
Cholesterol	88 milligrams
Sodium	376 milligrams

Saucy Beef Pasta
4 Servings, about 1½ cups each

Water	½ cup
Green beans, frozen	½ 10-ounce package
Onions, minced	½ cup
Lean ground beef	1 pound + 6 ounces
Noodles, yolk-free, enriched, uncooked	6¾ cups
Cold water	2 cups
Beef bouillon	2 cubes
Flour	⅓ cup
Pepper	¼ teaspoon
Dry parsley flakes	1 teaspoon
Garlic powder	½ teaspoon
Onion powder	1 teaspoon

1. Place ½ cup of water in saucepan. Cover and bring to boil. Add green beans, lower heat, and simmer until tender, about 5 minutes. Drain.
2. Place onions and ground beef in skillet. Cook over medium heat; stir occasionally. Cook until beef no longer remains pink, about 5 to 10 minutes. Drain fat off.
3. Cook noodles according to package instructions. Drain.
4. Combine cold water and flour; stir until smooth. Add flour mixture and beef bouillon cubes to ground beef. Cook, stirring frequently until mixture has thickened and bouillon cubes have dissolved, about 4 minutes.
5. Add cooked green beans, cooked noodles, pepper, parsley flakes, garlic powder, and onion powder to ground beef mixture; stir to combine.
6. Place beef mixture in 8- by 12-inch baking pan; cover and bake in 350° F oven until thoroughly heated, about 15 minutes.

Preparation time: 25 minutes
Cooking time: about 35 minutes

Per serving:

Calories	605
Total fat	22 grams
Saturated fat	8 grams
Cholesterol	120 milligrams
Sodium	404 milligrams

Southwestern Salad

4 Servings, about ½ cup beef mixture, ½ cup lettuce and cheese mixture each

Onions, chopped	½ cup
Lean ground beef	1 pound
Chili powder	1 tablespoon
Dry oregano	2 teaspoons
Ground cumin	½ teaspoon
Canned kidney beans, red, drained	1 cup
Canned chickpeas, drained	1 15-ounce can
Tomato, diced	1 medium
Lettuce	2 cups
Cheddar cheese	½ cup

1. Cook ground beef and onions in a large skillet until the beef no longer remains pink. Drain.
2. Stir chili powder, oregano, and cumin into beef mixture; cook for 1 minute.
3. Add beans, chickpeas, and tomatoes. Mix gently to combine.
4. Combine lettuce and cheese in large serving bowl. Portion lettuce and cheese onto 4 plates. Add 1 cup of beef mixture on top of lettuce and cheese.

Preparation time: 15 minutes
Cooking time: 10 to 15 minutes

Note: Garbanzo bean is another name for chickpea.

Per serving:

Calories	485
Total fat	22 grams
Saturated fat	9 grams
Cholesterol	98 milligrams
Sodium	411 milligrams

Stir-Fried Pork and Vegetables With Rice

4 Servings of pork and vegetables, about ½ cup each
4 Servings of cooked rice, about 2 cups each

Chicken broth, reduced sodium	2 cups
Hot water	2 cups
Rice, uncooked	2 cups
Vegetable oil	2 tablespoons
Broccoli cuts, frozen	2 cups
Carrots, cleaned, sliced thinly	1 cup
Onions, minced	¼ cup
Garlic powder	1 teaspoon
Canned mushrooms, drained	½ cup
Ground pork	1 pound + 7 ounces
Soy sauce	4 tablespoons

1. Heat broth and water to a boil in sauce pan; add rice and return to boil. Reduce heat to low and simmer until tender, about 15 minutes.
2. Heat 1 tablespoon of oil in skillet. Add broccoli, carrots, onions, and garlic powder. Cook until crisp-tender, about 5 minutes. Remove from skillet. Add mushrooms. Cook for 1 minute and set aside.
3. Heat second tablespoon of oil in skillet. Add pork; cook until pork no longer remains pink. Drain liquid.
4. Add soy sauce and stir until mixed; add vegetables to pork mixture. Cook until heated, about 1 to 2 minutes.
5. Serve pork mixture over cooked rice.

Preparation time: 20 minutes
Cooking time: 25 to 30 minutes

Note: Sodium level can be reduced from 799 milligrams to 532 milligrams by reducing soy sauce from 4 to 2 tablespoons.

Per serving:

Calories	860
Total fat	33 grams
Saturated fat	10 grams
Cholesterol	108 milligrams
Sodium	799 milligrams

Fish

Baked Cod With Cheese

4 Servings, about 3 ounces each

Cod fillets, fresh or frozen	1 pound
Cheddar cheese, shredded	4 tablespoons

1. Thaw cod according to package directions.
2. Prepare cod according to package directions.
3. After cod is fully cooked, sprinkle cheese on cod. Return cod to oven to melt cheese, about 3 to 5 minutes.

Preparation time: 7 minutes
Cooking time: 15 minutes

Per serving:

Calories	155
Total fat	5 grams
Saturated fat	3 grams
Cholesterol	65 milligrams
Sodium	160 milligrams

Baked Spicy Fish
4 Servings, about 3 ounces each

Cod fillets, fresh or frozen	1 pound
Paprika	¼ teaspoon
Garlic powder	¼ teaspoon
Onion powder	¼ teaspoon
Pepper	⅛ teaspoon
Ground oregano	⅛ teaspoon
Ground thyme	⅛ teaspoon
Lemon juice	1 tablespoon
Margarine, melted	1½ tablespoons

1. Thaw frozen fish according to package directions.
2. Preheat oven to 350° F.
3. Separate fish into four fillets or pieces. Place fish in ungreased 13- by 9- by 2-inch baking pan.
4. Combine paprika, garlic and onion powder, pepper, oregano, and thyme in small bowl. Sprinkle seasoning mixture and lemon juice evenly over fish. Drizzle margarine evenly over fish.
5. Bake until fish flakes easily with a fork, about 20 to 25 minutes.

Preparation time: 15 minutes
Cooking time: 25 minutes

Per serving:

Calories	140
Total fat	5 grams
Saturated fat	1 gram
Cholesterol	51 milligrams
Sodium	123 milligrams

Spanish Baked Fish
4 Servings, about 3 ounces each

Perch fillets, fresh or frozen	1 pound
Tomato sauce	1 cup
Onions, sliced	½ cup
Garlic powder	½ teaspoon
Chili powder	2 teaspoons
Dried oregano flakes	1 teaspoon
Ground cumin	⅛ teaspoon

1. Thaw frozen fish according to package directions.
2. Preheat oven to 350° F. Lightly grease baking dish.
3. Separate fish into four fillets or pieces. Arrange fish in baking dish.

4. Mix remaining ingredients together and pour over fish.
5. Bake until fish flakes easily with fork, about 10 to 20 minutes.

Preparation time: 15 minutes
Cooking time: About 10 to 20 minutes

Per serving:

Calories	135
Total fat	1 gram
Saturated fat	Trace
Cholesterol	104 milligrams
Sodium	448 milligrams

Tuna Macaroni Salad
4 Servings, about 1½ cups each

Elbow macaroni, uncooked	1 cup
Canned tuna, water-pack, drained	2 6-ounce cans
Eggs, hard cooked, finely diced	4
Celery, chopped	¼ cup
Carrots, grated	¾ cup
Salad dressing, mayonnaise-type	½ cup
Onion, minced	2 tablespoons
Pepper	¼ teaspoon

1. Place water in large saucepan and bring to boil. Add macaroni and cook until tender, about 6 to 8 minutes. Drain.
2. Combine macaroni, tuna, eggs, celery, and carrots in a large bowl.
3. Stir together salad dressing, onion, and pepper. Spoon dressing over salad; toss until evenly combined.
4. Chill until ready to serve.

Preparation time: 15 minutes
Cooking time: 8 to 10 minutes

Per serving:

Calories	520
Total fat	30 grams
Saturated fat	5 grams
Cholesterol	237 milligrams
Sodium	509 milligrams

Tuna Pasta Salad
4 Servings, about 1½ cups each

Macaroni, uncooked	2 cups
Tuna, canned, water-pack	2 6½-ounce cans
Zucchini, chopped	½ cup
Carrots, sliced	¼ cup
Onions, diced	⅓ cup
Salad dressing, mayonnaise-type	¼ cup

1. Cook macaroni according to package directions. Drain.
2. Drain tuna.
3. Wash vegetables. Chop zucchini; slice carrots into thin slices; dice onions.
4. Mix macaroni, tuna, and vegetables together in mixing bowl. Stir in salad dressing.
5. Chill until ready to serve.

Preparation time: 25 minutes
Cooking time: 8 minutes

Per serving:

Calories	405
Total fat	13 grams
Saturated fat	2 grams
Cholesterol	25 milligrams
Sodium	360 milligrams

Poultry

Baked Chicken Nuggets
4 Servings, about 3 ounces each

Chicken thighs, boneless, skinless	1½ pounds
Ready-to-eat cereal, cornflakes, crumbs	1 cup
Paprika	1 teaspoon
Italian herb seasoning	½ teaspoon
Garlic powder	¼ teaspoon
Onion powder	¼ teaspoon

1. Remove skin and bone; cut thighs into bite-sized pieces.
2. Place cornflakes in plastic bag and crush by using a rolling pin.
3. Add remaining ingredients to crushed cornflakes. Close bag tightly and shake until blended.
4. Add a few chicken pieces at a time to crumb mixture. Shake to coat evenly.

Conventional Method
1. Preheat oven to 400° F. Lightly grease a cooking sheet.
2. Place chicken pieces on cooking sheet so they are not touching.
3. Bake until golden brown, about 12 to 14 minutes.

Microwave Method:
1. Lightly grease an 8- by 12-inch baking dish.
2. Place chicken pieces on baking dish so they are not touching. Cover with waxed paper and cook on high.
3. Rotate chicken every 2 to 3 minutes. Cook until tender, about 6 to 8 minutes.

Preparation time: 15 minutes
Conventional cooking time: 12 to 14 minutes
Microwave cooking time: 6 to 8 minutes

Note: To remove bone from chicken thighs:
1. Place chicken on cutting board. Remove skin from thighs.
2. Turn chicken thighs over.
3. Cut around bone and remove it.

Per serving:

Calories	175
Total fat	8 grams
Saturated fat	2 grams
Cholesterol	67 milligrams
Sodium	127 milligrams

Chicken and Vegetables
4 Servings, about 1 cup each

Margarine	1½ tablespoons
Garlic powder	1 teaspoon
Onions, chopped	½ cup
Chicken thighs, boneless, skinless	1 pound + 4 ounces
Cut green beans, frozen	10-ounce package
Pepper	¼ teaspoon

1. Melt margarine in heavy skillet. Add garlic and onions; stir until blended. Cook over medium heat, until tender, about 5 minutes. Remove from skillet.
2. Place chicken in the skillet. Cook over medium heat, until chicken is thoroughly done and no longer pink in color, about 12 minutes. Remove chicken from skillet; keep warm.
3. Place frozen green beans, pepper, and cooked onions in same skillet. Cover and cook over medium-low heat until beans are tender, about 5 minutes.
4. Add chicken to vegetable mixture. Continue cooking, stirring occasionally, until heated through, about 3 minutes.

Preparation time: 6 minutes
Cooking time: 25 minutes

Note: To remove bone from chicken thighs:
1. Place chicken on cutting board. Remove skin from thighs.
2. Turn chicken thighs over.
3. Cut around bone and remove it.

Per serving:
Calories	190
Total fat	11 grams
Saturated fat	3 grams
Cholesterol	57 grams
Sodium	109 milligrams

Oven Crispy Chicken
4 Servings, about 4 ounces each

Broiler fryer chicken, cut-up	1½ pounds
Whole milk	¼ cup
Flour	½ cup
Paprika	1 teaspoon
Pepper	½ teaspoon
Ready-to-eat flake cereal, slightly crushed	1 cup
Vegetable oil	4 tablespoons

1. Remove skin and all visible fat from chicken. Place milk in large bowl. Add chicken pieces; turn to coat.
2. Combine flour, paprika, and pepper on a plate.
3. Lift chicken pieces from milk and reserve milk. Coat chicken thoroughly with seasoned flour and place on a wire rack until all pieces have been coated. Redip chicken pieces into reserved milk.
4. Place crushed cereal on plate. Place chicken pieces on crushed cereal. Using 2 forks, turn chicken pieces in crushed cereal to coat.
5. Place chicken on a foil-lined baking tray; drizzle oil over chicken.
6. Bake at 400° F. for 15 minutes. Turn chicken pieces over; continue to bake until chicken is thoroughly cooked and crust is crisp, about 15 more minutes.

Preparation time: 15 minutes
Cooking time: 30 minutes

Per serving:
Calories	350
Total fat	15 grams
Saturated fat	4 grams
Cholesterol	93 milligrams
Sodium	503 milligrams

Turkey-Cabbage Casserole
4 Servings, about 2 cups each

Cabbage, shredded	1 cup
Ground turkey	1 pound
Onions, chopped	½ cup
White rice, uncooked	1 cup
Tomato sauce	2 cups
Garlic powder	½ teaspoon
Ground oregano	½ teaspoon

1. Place shredded cabbage in a lightly greased 2-quart casserole dish.
2. In skillet cook turkey until browned and no longer pink in color. Add chopped onions; stir occasionally and cook 3 minutes. Add uncooked rice to cooked turkey.
3. Place turkey-rice mixture over cabbage in casserole dish.
4. Combine tomato sauce, garlic, and oregano. Pour over cooked turkey.
5. Cover and bake at 350° F, about 1 hour.

Preparation time: 10 minutes
Cooking time: 60 minutes

Per serving:

Calories	380
Total fat	11 grams
Saturated fat	3 grams
Cholesterol	77 milligrams
Sodium	829 milligrams

Turkey Chili
4 Servings, about 1½ cups each

Ground turkey	1 pound
Onion, minced	¾ cup
Margarine	2 tablespoons
Water	3 cups
Garlic powder	½ teaspoon
Chili powder	1 tablespoon
Dry parsley flakes	1 tablespoon
Paprika	1 teaspoon
Dry mustard	2 teaspoons
Canned red kidney beans, drained	1 15½-ounce can
Tomato paste	1 6-ounce can
Pearl barley	½ cup
Cheddar cheese, shredded	¾ cup

1. In large sauce pan, cook turkey and onions in margarine until turkey is browned and no longer pink in color, about 9 minutes. Drain; return turkey and onions to pan.
2. Add remaining ingredients except the cheese to turkey mixture; bring to boil, stirring frequently. Cover, reduce heat, and simmer 30 minutes, stirring occasionally.
3. Uncover and simmer 30 minutes, stirring occasionally.
4. Serve over cooked macaroni.
5. Sprinkle 3 tablespoons of cheese over each serving of chili.

Preparation time: 30 minutes
Cooking time: 70 minutes

Per serving:

Calories	540
Total fat	26 grams
Saturated fat	9 grams
Cholesterol	104 milligrams
Sodium	579 milligrams

Turkey Stirfry
4 Servings, about ½ cup each

Chicken bouillon cube	1
Hot water	½ cup
Soy sauce	2 tablespoons
Cornstarch	1 tablespoon
Vegetable oil	2 tablespoons
Garlic powder	½ teaspoon
Turkey, cubed	1 pound
Carrots, thinly sliced	1¾ cups
Zucchini, sliced	1 cup
Onions, thinly sliced	½ cup
Hot water	¼ cup

1. Combine chicken bouillon cube and hot water to make broth; stir until dissolved.
2. Combine broth, soy sauce, and cornstarch in small bowl. Set aside.
3. Heat oil in skillet over high heat. Add garlic and turkey. Cook, stirring, until turkey is thoroughly cooked and no longer pink in color.
4. Add carrots, zucchini, onion, and water to cooked turkey. Cover and cook, stirring occasionally, until vegetables are tender-crisp, about 5 minutes. Uncover, bring turkey mixture to boil. Cook until almost all liquid has evaporated.
5. Stir in cornstarch mixture. Bring to boil, stirring constantly until thickened.

Note: Serve over steamed rice.

Preparation time: 15 minutes
Cooking time: 10 minutes

Per serving:

Calories	195
Total fat	9 grams
Saturated fat	2 grams
Cholesterol	44 milligrams
Sodium	506 milligrams

Turkey Patties
4 Servings, 1 patty each

Ground turkey	1 pound + 4 ounces
Bread crumbs	1 cup
Egg	1
Green onions, chopped	¼ cup
Prepared mustard	1 tablespoon
Margarine	1½ tablespoons
Chicken broth	½ cup

1. Mix ground turkey, bread crumbs, egg, onions, and mustard in large bowl. Shape into 4 patties, about ½-inch thick.
2. Melt margarine in large skillet over low heat. Add patties and cook, turning once to brown other side. Cook until golden brown outside and white inside, about 10 minutes. Remove from skillet and place onto plate.
3. Add chicken broth to skillet, and boil over high heat until slightly thickened, about 1 to 2 minutes. Pour sauce over patties.
4. Serve on buns.

Preparation time: 15 minutes
Cooking time: 10 minutes

Per serving:

Calories	305
Total fat	18 grams
Saturated fat	5 grams
Cholesterol	149 milligrams
Sodium	636 milligrams

<u>Vegetarian</u>
Cheese-Stuffed Potatoes
4 Servings, two potato halves each

Baking potatoes	4 (8-ounces each)
Lowfat cottage cheese	⅛ cup
Whole milk	2 tablespoons
Onion, minced	2 tablespoons
Paprika	¼ teaspoon

1. Scrub potatoes and remove any blemishes.

To BAKE:
<u>Conventional Method</u>:
1. Preheat oven to 400° F.
2. Place potatoes in oven and bake until tender, about 30 to 40 minutes.

<u>Microwave Method</u>:
1. Pierce potatoes by using fork prongs.
2. Cover potatoes with waxed paper. Heat on high until tender, about 5 to 10 minutes.

To STUFF POTATOES:
1. Slice each potato in half, lengthwise. Using a spoon, scoop out pulp, leaving about ¼-inch thick shells, saving pulp.
2. Blend cheese, milk, and onion. Add potato pulp; mix until light and fluffy.
3. Fill potato halves with mixture. Sprinkle paprika over potatoes.

Note: Return to oven or microwave to reheat, for a few minutes, if desired.

Preparation time: 20 minutes
Conventional cooking time: 30 to 45 minutes
Microwave cooking time: 5 to 10 minutes

Per serving:
Calories	250
Total fat	1 gram
Saturated fat	1 gram
Cholesterol	5 milligrams
Sodium	216 milligrams

SOUPS

Chicken Noodle Soup
4 Servings, about 1½ cups each, plus 4 servings for another meal

Vegetable oil	1 teaspoon
Onion, minced	½ cup
Carrots, diced	½ cup
Celery, sliced	½ cup
Garlic powder	½ teaspoon
Flour	⅛ cup
Dried oregano flakes	¼ teaspoon
Chicken broth, reduced sodium	3 cups
Potatoes, peeled, diced	2 cups
Chicken, cooked, chopped	¼ cup
Whole milk	½ cup
Noodles, yolk-free, enriched, uncooked	1 cup

1. Heat oil over medium heat in large sauce pan. Add minced onions, carrots, celery, and garlic powder. Cook until onions are tender, about 3 to 5 minutes.
2. Sprinkle flour and oregano over vegetables; cook about 1 minute.
3. Stir in chicken broth and potatoes. Cover and cook until tender, about 20 minutes.
4. Add chicken, milk, and noodles. Cover and simmer until noodles are tender, about 10 minutes.

Preparation time: 25 minutes
Cooking time: 35 to 40 minutes

Per serving:

Calories	205
Total fat	4 grams
Saturated fat	1 gram
Cholesterol	8 milligrams
Sodium	107 milligrams

Potato Soup
4 Servings, about 1 cup each, plus 4 servings for another meal

Onion, chopped	¾ cup (1 medium)
Potatoes, peeled, diced	4½ cups
Margarine	1 tablespoon
Flour	3 tablespoons
Whole milk	1 quart

1. Place onions and potatoes in sauce pan. Cover with water and bring to boil. Simmer until soft, about 10 minutes. Drain.
2. Melt margarine in saucepan. Add flour and stir until smooth. Heat to thicken.
3. Add onions and potatoes to milk mixture, and heat to serving temperature.

Preparation time: 25 minutes
Cooking time: 15 minutes

Per serving:

Calories	190
Total fat	6 grams
Saturated fat	3 grams
Cholesterol	17 milligrams
Sodium	325 milligrams

VEGETABLES AND DIPS

Baked Beans
4 Servings, about ¾ cup each

Canned vegetarian beans	3 cups
Catsup	¼ cup
Brown sugar	2 tablespoons

1. In small (1 quart) casserole dish, combine beans, catsup, and brown sugar.
2. Cover and bake at 350° F until bubbly, about 30 minutes.

Preparation time: 5 minutes
Cooking time: 30 minutes

Per serving:

Calories	220
Total fat	1 gram
Saturated fat	Trace
Cholesterol	0
Sodium	937 milligrams

Baked Crispy Potatoes
4 Servings, about ½ cup each, plus 4 servings for snack

Potatoes	4 pounds
Vegetable oil	4 tablespoons
Ground cumin	1 teaspoon
Red pepper	¼ teaspoon

1. Lightly coat a 7- by 12- by 1-inch pan with oil.
2. Wash potatoes; cut in half lengthwise.
3. Place cut sides of potatoes on the oiled pan; rub potatoes in the oil; turn potatoes over so that cut sides are facing up.
4. Mix cumin and red pepper together; sprinkle over potatoes.
5. Bake at 400° F until potatoes are golden brown and tender, about 20 minutes.

Preparation time: 10 minutes
Cooking time: 20 minutes

Per serving:

Calories	170
Total fat	5 grams
Saturated fat	1 gram
Cholesterol	0
Sodium	10 milligrams

Potato Cakes
4 Servings, 1 cake each

New potatoes, cooked, peeled, mashed	2 cups
Egg	1
Flour	1 tablespoon
Whole milk	2 tablespoons
Vegetable oil	¼ cup

1. Mix mashed potatoes, egg, flour, and milk thoroughly.
2. Shape into flat cakes, about ½-inch thick.
3. Heat oil in skillet.
4. Add potato cakes to hot skillet. Cook until golden brown and thoroughly heated.

Preparation time: 10 minutes
Cooking time: 5 minutes

Per serving:

Calories	210
Total fat	15 grams
Saturated fat	3 grams
Cholesterol	54 milligrams
Sodium	222 milligrams

Ranch Beans
4 Servings, about 1 cup each

Green pepper, chopped	¼ cup
Canned vegetarian beans	1¾ cups
Canned kidney beans, red, drained	1¾ cups
Catsup	2 tablespoons
Molasses	2 tablespoons
Dried onion	½ teaspoon

Conventional Method:
1. Place all ingredients in saucepan and heat thoroughly, about 10 minutes.

Microwave Method:
1. Place all ingredients in microwave-safe bowl. Cover with waxed paper. Cook on high; stirring every 2 minutes; cook about 5 minutes.

Preparation time: 5 minutes
Cooking time: 5 to 10 minutes

Per serving:

Calories	240
Total fat	1 gram
Saturated fat	Trace
Cholesterol	0
Sodium	916 milligrams

Scalloped Potatoes
4 Servings, about 1½ cups each

Potatoes	2 pounds
Margarine	2 tablespoons
Onions, sliced	1 cup
Flour	3 tablespoons
Pepper	¼ teaspoon
Whole milk	2 cups

1. Wash potatoes; peel and slice into thin slices.
2. Melt 1 tablespoon of margarine in heavy, deep skillet. Remove skillet from heat; spread half of potato slices in skillet.
3. Cover potatoes with onions. Sprinkle half of flour and pepper over potato mixture.
4. Add remaining potato slices, flour, and pepper. Cut 1 tablespoon of margarine into small pieces and place on top of potato mixture.
5. Pour milk over potato mixture; bring to boil over high heat. Reduce heat to medium low, cover, and cook until potatoes are tender, about 15 minutes.

Preparation time: 20 minutes
Cooking time: 15 minutes

Per serving:

Calories	305
Total fat	10 grams
Saturated fat	4 grams
Cholesterol	17 milligrams
Sodium	139 milligrams

Shoestring Potatoes

4 Servings, about 6 ounces each

Potatoes	1½ pounds
Vegetable oil	3 tablespoons
Salt	¼ teaspoon
Pepper	¼ teaspoon

1. Preheat oven to 450° F.
2. Wash potatoes; cut lengthwise into thin strips.
3. Combine remaining ingredients in plastic bag. Put potatoes in bag; seal; shake to coat potatoes.
4. Arrange potatoes in single layer on baking sheet.
5. Bake until crisp and golden, about 30 minutes.

Preparation time: 15 minutes
Cooking time: 30 minutes

Per Serving:

Calories	255
Total fat	14 grams
Saturated fat	2 grams
Cholesterol	0
Sodium	156 milligrams

Chickpea Dip

4 Servings, about 3 tablespoons each, plus 4 servings for another meal or snack.

Canned chickpeas, drained	1 15½-ounce can
Vegetable oil	2 tablespoons
Lemon juice	1 tablespoon
Onions, chopped	2 tablespoons
Salt	½ teaspoon

1. Mash chickpeas in a small bowl until they are smooth.
2. Add oil and lemon juice; stir to combine.
3. Add chopped onions and salt.
4. Serve on bread or crackers.

Preparation time: 10 minutes

Note: Garbanzo bean is another name for chickpea.

Per serving:

Calories	90
Total fat	4 grams
Saturated fat	Trace
Cholesterol	0
Sodium	148 milligrams

SALADS

Macaroni Salad

4 Servings, 1½ cups each

Elbow macaroni, uncooked	12 ounces
Green pepper, chopped	½ cup
Salad dressing, mayonnaise-type	¼ cup
Pepper	½ teaspoon
Garlic powder	¼ teaspoon

1. Cook macaroni according to package directions. Drain and cool.
2. Combine green pepper, salad dressing, and spices.
3. Add macaroni and toss lightly. Chill.

Preparation time: 15 minutes
Cooking time: 8 to 10 minutes

Per serving:

Calories	430
Total fat	13 grams
Saturated fat	2 grams
Cholesterol	0
Sodium	72 milligrams

Orange Gelatin Salad

4 Servings, ¾ cup each

Gelatin, unflavored	3 ¼-ounce packages
Cold Water	2¼ cups
Orange juice, concentrate	¾ cup

1. Place water in a saucepan; sprinkle gelatin over water. Let stand 2 minutes.
2. Heat gelatin mixture until it dissolves (mixture will be clear), about 3 to 4 minutes.
3. Remove from heat; add orange juice concentrate and mix.
4. Pour into 9- by 9-inch pan and refrigerate until firm, about 2 to 3 hours.
5. Cut into 1-inch squares.

Preparation time: 5 minutes
Cooking time: 3 to 4 minutes

Per serving:

Calories	100
Total fat	Trace
Saturated fat	Trace
Cholesterol	0
Sodium	16 milligrams

Potato Salad

4 Servings, 1½ cups each

Potatoes, washed, peeled	1 pound (4 medium)
Onion, diced	1 cup
Sweet pickle relish	¼ cup
Celery, chopped	½ cup
Salad dressing, mayonnaise-type	½ cup

1. Wash potatoes; place in sauce pan. Cover with water and bring to boil. Simmer until soft, about 15 minutes. Drain and cool.
2. Dice onion and chop celery; combine with pickle relish.
3. Add salad dressing to pickle mixture.
4. Cube potatoes and blend with dressing.
5. Cover and chill several hours.

Preparation time: 25 minutes
Cooking time: 15 minutes

Per serving:

Calories	350
Total fat	24 grams
Saturated fat	3 grams
Cholesterol	0
Sodium	290 milligrams

BREADS AND HOT CEREALS

Baked French Toast
4 Servings, about 2 slices each

White bread	8 slices ½-inch-thick slices
Eggs	5
Whole milk	1½ cups
Sugar	¼ cup
Vanilla	½ teaspoon

1. Lightly grease a 13- by 9- x 2-inch baking pan. Cut each slice of bread into 2 even strips. Arrange bread strips in pan.
2. In large bowl, mix eggs, milk, sugar, and vanilla with an electric mixer on low speed until well-blended, about 5 minutes.
3. Pour egg mixture over bread strips; cover. Chill 4 to 24 hours.
4. Preheat oven to 425° F. Bake until eggs are set and toast is lightly browned, about 30 to 40 minutes.
5. Serve with Cinnamon Sugar Topping.

Preparation time: 15 minutes
Cooking time: 30 to 40 minutes

Per serving:

Calories	460
Total fat	23 grams
Saturated fat	7 grams
Cholesterol	279 milligrams
Sodium	581 milligrams

Cooked Rice Cereal
4 Servings, 1 cup each

White rice, uncooked	1½ cups
1% lowfat milk	2 cups
Sugar	1/4 cup
Ground cinnamon	1 teaspoon

1. Cook rice according to instructions on the package.
2. Combine warm cooked rice, milk, sugar, and cinnamon. Stir and serve.

Preparation time: 10 minutes
Cooking time: 15 minutes

Per serving:

Calories	250
Total fat	2 grams
Saturated fat	1 gram
Cholesterol	5 milligrams
Sodium	66 milligrams

DESSERTS

Chocolate Rice Pudding

4 Servings, about ⅔ cup each, plus 4 servings for another meal

Whole milk	1 quart
White rice, uncooked	⅔ cup
Sugar	½ cup
Semi-sweet chocolate chips	¼ cup
Eggs	2
Evaporated whole milk	½ cup
Sugar	½ cup
Flour	1½ tablespoons
Vanilla	1 teaspoon

1. Place milk, rice, and sugar in large saucepan. Simmer over medium heat; stir continuously.
2. Reduce heat to low; simmer uncovered until rice is tender, about 25 minutes. Check to make sure rice doesn't scorch. Add chocolate and stir until melted.
3. Beat eggs, evaporated milk, sugar, flour, and vanilla in medium bowl until smooth. Gradually beat egg mixture into rice mixture.
4. Stir continuously; cook over medium heat until thickened, about 5 to 7 minutes. Do not allow pudding to boil.
5. Pour pudding into medium bowl. Cover and chill.

Preparation time: 15 minutes
Cooking time: 30 to 35 minutes

Per serving:

Calories	325
Total fat	9 grams
Saturated fat	5 grams
Cholesterol	74 milligrams
Sodium	94 milligrams

Oatmeal Cookies

4 Servings, 2 cookies each, plus 4 servings for another meal or snack

Sugar	¾ cup
Margarine	2 tablespoons
Egg	1
Canned applesauce	¼ cup
1% lowfat milk	2 tablespoons
Flour	1 cup
Baking soda	¼ teaspoon
Ground cinnamon	½ teaspoon
Quick rolled oats	1 cup + 2 tablespoons

1. Preheat oven to 350° F. and lightly grease cookie sheets.
2. In a large bowl, use an electric mixer on medium speed to mix sugar and margarine. Mix until well blended, about 3 minutes.
3. Slowly add egg; mix on medium speed 1 minute. Gradually add applesauce and milk; mix on medium speed, 1 minute. Scrape sides of bowl.
4. In another bowl, combine flour, baking soda, and cinnamon. Slowly add to applesauce mixture; mix on low speed until blended, about 2 minutes. Add oats and blend 30 seconds on low speed. Scrape sides of bowl.
5. Drop by teaspoonfuls onto cookie sheet, about 2 inches apart.
6. Bake until lightly browned, about 13 to 15 minutes. Remove from baking sheet while still warm. Cool on wire rack.

Preparation time: 20 minutes
Cooking time: 13 to 15 minutes each batch

Per serving:

Calories	215
Total fat	4 grams
Saturated fat	1 gram
Cholesterol	27 milligrams
Sodium	84 milligrams

Peach-Apple Crisp

4 Servings, about ½ cup each, plus 4 servings for another meal

Canned sliced peaches, light-syrup pack, drained	20 ounces
Apples, tart, peeled, sliced	2 medium
Vanilla	½ teaspoon
Ground cinnamon	¼ teaspoon
Flour	¾ cup + 3 tablespoons
Brown sugar, packed	¼ cup
Margarine, chilled	3 tablespoons

1. Preheat oven to 350° F. Lightly grease 9- by 9- by 2-inch casserole dish.
2. Combine peaches, apples, vanilla, and cinnamon in a bowl. Toss well and spread evenly in greased casserole dish.
3. Combine flour and sugar in small bowl. Cut in margarine with two knives until the mixture resembles coarse meal.
4. Sprinkle flour mixture evenly over fruit.
5. Bake until lightly browned and bubbly, about 20 minutes.

Preparation time: 20 minutes
Cooking time: 20 minutes

Per serving:

Calories	175
Total fat	5 grams
Saturated fat	1 gram
Cholesterol	0
Sodium	57 milligrams

Peach Cake

8 Servings, about 2- by 2-inch piece each

Canned peaches, light syrup pack, drained and chopped	2¼ cups (29-ounce can)
Sugar	½ cup
Flour	1 cup
Egg	1
Baking soda	1 teaspoon
Vegetable oil	2 tablespoons
Vanilla	1 teaspoon
Brown sugar, firmly packed	2 tablespoons
Whole milk	2 teaspoons

1. Preheat oven to 350° F. Lightly grease 8- by 8-inch pan.
2. Spread peaches in baking pan. Mix remaining ingredients, except brown sugar and milk, together in mixing bowl; spread over top of peaches.
3. Bake until toothpick inserted into cake comes out clean, about 30 to 35 minutes.
4. For topping, combine brown sugar and milk in small bowl. Drizzle mixture on top of cake; return cake to oven, and bake 2 to 3 minutes.
5. Cut into 8 pieces

Preparation time: 20 minutes
Cooking time: 30 to 35 minutes

Per serving:

Calories	205
Total fat	4 grams
Saturated fat	1 gram
Cholesterol	27 milligrams
Sodium	171 milligrams

Rice Pudding

4 Servings, about ¼ cups each, plus 4 servings for another meal or snack

Whole milk	1 cup
Water	1 cup
Rice, uncooked	1 cup
Eggs	2
Evaporated milk	1 cup
Vanilla	1 teaspoon
Sugar	¼ cup
Ground cinnamon	⅛ teaspoon

1. In sauce pan, heat milk and water.
2. Add rice, bring to boil, lower heat to simmer; stir mixture every 10 minutes. Cook uncovered until rice is tender, about 30 minutes.
3. In large bowl, mix eggs, ¾ cup evaporated milk, vanilla, and sugar. Set aside.
4. Add remaining ¼ cup evaporated milk to rice mixture.
5. Spoon 1 cup of rice mixture into egg mixture and stir. Pour egg-rice mixture into remaining rice.
6. Heat pudding until it boils, stirring continuously. Remove from heat, and sprinkle with cinnamon.

Preparation time: 15 minutes
Cooking time: 40 minutes

Per serving:

Calories	190
Total fat	5 grams
Saturated fat	3 grams
Cholesterol	67 milligrams
Sodium	66 milligrams

Sugar Cookies

4 Servings, 3 cookies each, plus 4 servings for another meal or snack

Margarine	⅓ cup
Powdered sugar	⅔ cup
Eggs	2
Vanilla	½ teaspoon
Flour	1 cup
Baking powder	½ teaspoon
Baking soda	⅛ teaspoon

1. Preheat oven to 375° F.
2. Mix margarine and powdered sugar together thoroughly.
3. Add eggs and vanilla. Beat until blended. Add dry ingredients and blend well.
4. Shape dough into 24 one-inch balls and place on ungreased cookie sheets. Crisscross balls by using fork prongs.
5. Bake until lightly brown, about 10 minutes.

Preparation time: 15 minutes
Cooking time: About 10 minutes each batch

Per serving:

Calories	190
Total fat	10 grams
Saturated fat	2 grams
Cholesterol	53 milligrams
Sodium	167 milligrams

Appendix 6

Food Lists
Week I
Week II

FOOD LIST

Week I: Food for a Family of Four[1]

Fruits and Vegetables
Fresh[2]:

Apples	(6 small) 1 lb 8 oz
Bananas	(11 medium) 2 lb 12 oz
Melon	1 lb
Oranges	(26 small) 5 lb 7 oz
Cabbage	4 oz
Carrots	1 lb 4 oz
Celery	3 oz
Green pepper	3 oz
Lettuce, leaf	4 oz
Onions	2 lb 8 oz
Potatoes	11 lb 14 oz
Zucchini	7 oz

Canned:

Applesauce	2 oz
Peaches	1 lb 10 oz
Pears	13 oz
Green beans	12 oz
Spinach	10 oz
Tomato paste	6 oz
Tomato sauce	1 lb 1 oz
Tomato soup	10.5 oz

Frozen:

Orange juice, concentrate	8 12-oz cans
Green beans	5 oz
Peas	5 oz

Breads, Cereals, and Other Grain Products

Bagels, plain, enriched	(8) 1 lb
Bread crumbs	2 oz
Bread, white, enriched	2.2 lb
English muffins	8
French bread, enriched	8 oz
Hamburger buns, enriched	8
Crackers, snack, low salt	4 oz
Oatmeal, quick, rolled oats	3 oz
Ready-to-eat cereal (flakes)	6 oz
Barley, pearl	4 oz
Flour, enriched	1 lb 8 oz
Macaroni, enriched	1 lb 11 oz
Noodles, yolk-free, enriched	2 lb 3 oz
Rice, enriched	2 lb, 5 oz

Milk and Cheese

Evaporated milk	16 fl oz
Milk, 1% lowfat	2½ gal
Milk, whole	3 qt
Cheddar cheese	8 oz

Meat and Meat Alternates

Beef chuck roast	2.5 lb
Beef, ground, lean	2.4 lb
Chicken, fryer	1.5 lb
Fish	
Breaded portions, frozen	1 lb
Cod, frozen	1 lb
Tuna fish, chunk-style, water-pack	12 oz
Turkey breast	2 lb 4 oz
Turkey, ground	2 lb
Turkey ham (deli)	11 oz
Beans, kidney, canned	1 lb 11 oz
Beans, lima, dry	6 oz
Beans, northern, canned	9 oz
Beans, garbanzo (chickpeas), canned	10 oz
Eggs, large	16

Fats and Oils

Margarine, stick	7 oz
Shortening	2 oz
Salad dressing, mayonnaise-type	1 lb
Vegetable oil	9 fl oz

Sugars and Sweets

Sugar, brown	2 oz
Sugar, granulated	1 lb
Chocolate pudding, instant	3 oz
Lemonade (ready-to-drink)	1 gal

Other Food Items[3]

Baking powder
Baking soda
Beef bouillon cubes
Black pepper, red pepper
Catsup
Chicken bouillon cubes
Chili powder
Cinnamon
Cornstarch
Cumin
Dry mustard
Gelatin, unflavored
Lemon juice, bottled
Onion powder
Oregano
Paprika
Parsley flakes
Salt
Soy sauce
Sweet pickle relish
Vanilla
Vinegar

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[1]Provides food for a family of four. Amounts of food shown are for foods **actually used** during the week.
[2]Substitute other fruits or vegetables in season that contain similar nutrients if they are better buys.
[3]Small amounts used in preparing recipes and other foods in the menus and recipes; purchase as needed.

FOOD LIST

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Week II: Food for a Family of Four[1]

Fruits and Vegetables
Fresh[2]:

Apples	(5 small) 1 lb 4 oz
Bananas	(11 medium) 2 lb 12 oz
Grapes	1 lb 8 oz
Melon	1 lb
Oranges	(22 small) 4 lb 12 oz
Carrots	1 lb
Celery	5 oz
Green pepper	4 oz
Lettuce, leaf	9 oz
Onions	1 lb 4 oz
Potatoes	10 lb 8 oz
Tomatoes	6 oz

Canned:

Oranges, mandarin	13 oz
Peaches, canned, light-syrup	1 lb 10 oz
Mushrooms, canned	4 oz
Spaghetti sauce	26 oz
Tomato sauce	8 oz

Frozen:

Orange juice, concentrate	7 12-oz cans
Broccoli	6 oz
French fries	11 oz
Green beans	1 lb 7 oz
Peas	15 oz

Breads, Cereals, and Other Grain Products

Bagels, *plain*, enriched	(4) 8 oz
Bread crumbs	3 oz
Bread, French	4 oz
Bread, white, enriched	2 lb
Bread, whole-wheat	1 lb
Hamburger buns, enriched	8
Rolls, dinner, enriched	4
Ready-to-eat cereal	
Corn flakes	1 oz
Toasted oats	10 oz
Flour, enriched	1 lb 7 oz
Macaroni, enriched	1 lb 5 oz
Noodles, yolk-free, enriched	1 lb 2 oz
Popcorn, microwave, unpopped	3 oz
Rice, enriched	3 lb 2 oz
Spaghetti, enriched	11 oz

Milk and Cheese

Evaporated milk	4 oz
Milk, 1% lowfat	9 qt
Milk, *whole*	4 qt
Cheese, cheddar	2 oz
Cheese, cottage	7 oz
Cheese, mozzarella	1 oz

Meat and Meat Alternates

Beef, ground, lean	3 lb 15 oz
Chicken, fryer	1 lb 13 oz
Chicken, thighs	2 lb 12 oz
Fish (flounder, cod), frozen	2 lb
Tuna fish, chunk-style, water-pack	12 oz
Pork, ground	1 lb 7 oz
Turkey, ground	1 lb
Turkey ham	11 oz
Beans, garbanzo (chickpeas), canned	15 oz
Beans, kidney, canned	15 oz
Beans, vegetarian, canned	1 lb 9 oz
Eggs, large	17

Fats and Oils

Margarine, stick	15 oz
Shortening	4 oz
Salad dressing, mayonnaise-type	6 fl oz
Vegetable oil	9 fl oz

Sugars and Sweets

Sugar, brown	1 oz
Sugar, powdered	3 oz
Sugar, granulated	9 oz
Jelly	8 oz
Molasses	1 fl oz
Pancake syrup	2 oz
Chocolate chips, semi-sweet	2 oz
Fruit drink	1 gal
Fudgesicles, ice milk	4

Other Food Items[3]

Baking powder
Baking soda
Black pepper
Catsup
Chicken broth, reduced sodium
Chili powder
Cinnamon
Chocolate drink mix, powdered
Cumin
Dried onion
Garlic powder
Gelatin, unflavored
Italian herb seasoning
Lemon juice, bottled
Oregano
Paprika
Salt
Soy sauce, reduced sodium
Vanilla

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[1]Provides food for a family of four. Amounts of food shown are for foods **actually used** during the week.
[2]Substitute other fruits or vegetables in season that contain similar nutrients if they are better buys.
[3]Small amounts used in preparing recipes and other food items in the Week 1 menus; purchase as needed.

Appendix 7

Survey Instruments

USDA/CNPP/PSU
Household Sensory Evaluation Form

Each member of the household will complete this form after sampling each recipe. Researcher will review and clarify.

Recipe _____   Date _____

Please tell us how much you like or dislike the food qualities in this recipe listed below using the following scale:

9 - Like extremely
8 - Like very much
7 - Like moderately
6 - Like slightly
5 - Neither like nor dislike

4 - Dislike slightly
3 - Dislike moderately
2 - Dislike very much
1 - Dislike extremely

Characteristic	Score	Why did you give it that score?
Overall appearance	1 2 3 4 5 6 7 8 9	
Smell	1 2 3 4 5 6 7 8 9	
First taste	1 2 3 4 5 6 7 8 9	
Texture	1 2 3 4 5 6 7 8 9	
Taste after a while	1 2 3 4 5 6 7 8 9	
Overall Quality	1 2 3 4 5 6 7 8 9	

Comments?

USDA/ CNPP/ PSU Household Recipe Test Form
Household member primarily responsible for food preparation will complete this form after preparing each recipe. Researcher will review and clarify.

Name of Household _____

Recipe Title _____

Date recipe tested _____   Number of servings prepared _____

The Recipe

1. Were the ingredients easy to find at your store?   Yes _____   No _____

2. Were the directions easy to understand?   Yes _____   No _____

3   Did the directions make sense to you, were they easy to follow?   Yes _____   No _____

4. Were the cooking time and preparation time on the recipe correct?   Yes _____ No _____
    If you had different times what were they?

5. Did you make the recipe exactly as it was written?   Yes _____   No _____
    If no, what changes did you make?

6. What cooking equipment did you use?

7. Was the recipe you prepared acceptable in appearance? Yes _____   No _____
    texture?   Yes _____   No _____
    taste?   Yes _____   No _____
    overall?   Yes _____   No _____

    Comments?

8. Overall, did you think the recipe was
    Excellent _____   Good _____   Fair _____   Poor _____

Overall

1. Did you ever make a recipe like this one before? Yes _____   No _____

2. Would you use this recipe again?   Yes _____   No _____

3. Do you have any suggestions for further modification of this recipe?

_____   _____
Name of person completing this form   Date completed

USDA/ CNPP/ PSU Weekly Menu Form

This form is to be completed in interview style with all household members individually.

Name of Household _____
Week # _____

1. Were the food items in the weekly menu different from the foods you usually eat?

    Yes _____   No _____

    If yes, how were they different?

2. Were any of the foods new to you?   Yes _____   No _____
    If yes, which ones?

3. Which foods did you like?
    Explain

4. Which foods, if any, did you dislike?   Why?

5. If the food on the weekly menu had been all you had to eat, would there have been enough food ?
    Yes _____   No _____
    Explain

6. Did you like or dislike the meal combinations?   Like _____   Dislike _____
    If you disliked them, which ones specifically?

7. Was there enough variety in the weekly menu?   Yes _____   No _____

8. Compared to the foods or dishes you usually eat in a week, were
    there foods or dishes that appeared too often?   Yes _____   No _____
    If yes, which food(s) or dishes?

9. Compared to the foods or dishes you usually eat in a week, were
    there food items or dishes that were missing?   Yes _____   No _____
    If yes, which food(s) or dishes?

10. Were the food items included in the weekly menu acceptable to you overall?

    Yes _____   No _____

    If no, what would you change to make the weekly menu acceptable?

11. Overall, did you think the weekly menu was   Excellent _____ Good _____ Fair _____ Poor _____

Other Comments:

_____   _____
Name of person completing this form   Date completed

USDA/ CNPP/ PSU Weekly Menu Form - Primary

This form is to be completed in interview style with the adult member of the household primarily responsible for food preparation and shopping.

Name of Household _____
Week # _____

1. Were the food items for the week easy to find at your store?   Yes _____   No _____

2. Did you follow the weekly menu exactly as it was written?   Yes _____   No _____
    If no, did you include any foods that were not on the menu?   Yes _____   No _____
            If yes, what were those foods?

    If not, did you omit any foods that were on the menu?   Yes _____   No _____
            If yes, which foods did you omit?

3. Generally, how long did it take you to prepare the meals?   Time _____
    Was this more, less, or about the same amount of time as usual?

4. Was the preparation required different from your usual methods?   Yes _____   No _____
    If yes, how?

5. Did you have all the equipment and utensils required to prepare
    the weekly menu?   Yes _____   No _____
    If no, what item(s) were you missing?

6. Would you have had the cooking items you needed without the
    start up kit from this study?   Yes _____   No _____
    If no, what item(s) would you have needed without receiving that kit?

7. Were the food items in the weekly menu different from the foods
    you usually eat?   Yes _____   No _____
    If yes, how were they different?

8. Were any of the foods new to household members?   Yes _____   No _____
    If yes, which ones?

9. Which foods did the household like?

10. Which foods did the household members dislike?
    Why?

11. If the food on the weekly menu had been all you had to eat, would there have been enough food?
    Yes_____   No _____
    Explain

12. Did the household like or dislike the meal combinations?   Like _____   Dislike _____
    If they disliked them, which ones specifically?

13. Was there enough variety in the weekly menu?   Yes _____   No _____

14. Compared to the foods or dishes you usually eat in a week, were there
    foods or dishes that were missing?   Yes _____   No _____
    If yes, which food(s) or dishes?

15. Compared to the food or dishes you usually eat in a week, were there
    foods or dishes that appeared too often?   Yes _____   No _____
    If yes, which food(s) or dishes?

16. Were the food items included in the weekly menu acceptable
    to you overall?   Yes _____   No _____
    If no, what would you change to make the weekly menu acceptable?

17. Overall, did you think the weekly menu was   Excellent _____ Good _____ Fair _____ Poor _____

Other Comments:

_____   _____
Name of person completing this form   Date completed

Appendix 8

Table: Households' Mean Sensory Evaluation Ratings for Recipes

Households' mean sensory evaluation ratings for recipes[1]

Week I recipes[2]	Household 1	Household 2	Household 3	Household 4	Mean
Baked Crispy Potatoes	6	7	8	8	7
Crispy Chicken	6	8	6	8	7
Baked French Toast	8	4	9	8	7
Peach-Apple Crisp	5	5	9	8	7
Beef Pot Roast	8	8	9	9	8
Potato Cakes	5	5	9	7	7
Saucy Beef Spaghetti[3]	2	4	4	5	4
Scalloped Potatoes	7	7	8	8	8
Tuna Pasta Salad	6	7	5	6	6
Turkey Cabbage Casserole	7	7	6	6	6
Turkey Patties	6	6	8	8	7
Turkey Stir Fry	8	8	9	9	8

Week II recipes[2]	Household 5	Household 6	Household 7	Household 8	Mean
Baked Chicken Nuggets	8	6	7	7	7
Baked Meatballs	7	7	8	8	7
Baked Spanish Fish	7	6	5	6	6
Cheese Stuffed Potatoes	8	5	6	5	6
Chicken Noodle Soup	8	8	8	8	8
Chocolate Rice Pudding	8	6	5	6	6
Peach Cake	7	8	8	5	7
Pizza Meat Loaf	8	7	8	7	7
Stir-fried Pork/Vegetables	8	8	6	7	7
Ranch Beans	8	7	6	6	7
Southwestern Salad	8	8	7	6	7
Tuna Macaroni Salad	9	5	6	6	6

[1]Mean of 4-person households' ratings reported for averaged sensory attributes per recipe.

[2]For recipes, sensory attributes were: overall appearance, aroma, initial taste impression, texture, taste intensity, overall quality; rating scales were: 9 = like extremely, 8 = like very much, 7 = like moderately, 6 = like slightly, 5 = neither like nor dislike, 4 = dislike slightly, 3 = dislike moderately, 2 = dislike very much, 1 = dislike extremely. Rating of 5 was considered acceptable.

[3]Recipe deleted because of unacceptable rating. A recipe for Saucy Beef Pasta was substituted in the menu.