

Chapter 4

A Comparison of the U.S. Food Supply With the Food Guide Pyramid Recommendations

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Information on the extent to which eating patterns differ from dietary recommendations is a key tool for policymakers and nutrition educators in the effective targeting of educational messages. This chapter uses aggregate food supply data, adjusts for losses, and converts the remaining supply into daily per capita Food Guide Pyramid servings. These are then compared with Pyramid servings recommendations for the U.S. population. Annual 1992-96 growth rates in per capita servings are compared with those needed to meet Food Guide Pyramid servings recommendations by 2005.

Introduction

Federal dietary guidance outlined in the *Dietary Guidelines for Americans* and presented in the *Food Guide Pyramid* are intended to help consumers choose diets that improve health, reduce their risk for diet-related chronic disease, and meet their nutritional needs (USDA/DHHS, 1995; USDA, CNPP, 1995). Information on the extent to which eating patterns differ from these recommendations is useful for consumers in making dietary adjustments, and is a key tool for policymakers and nutrition educators in the effective targeting of educational messages.

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Federal efforts to monitor the dietary and nutritional status of the population under the congressionally mandated *Ten-Year Comprehensive Plan for National Nutrition Monitoring and Related Research Program* have been recently enhanced by the development of new methods for assessing dietary health in terms of (Food Guide) Pyramid serving recommendations. To date, these efforts have used food intake data from USDA's Continuing Survey of Food Intakes by Individuals (CSFII), a key component of the Nutrition Monitoring Program (Krebs-Smith and others, 1995, 1996, 1997; Cleveland and others, 1995, 1997; Munoz and others, 1997; Bowman and others, 1998; USDA, CNPP, 1995).

Numerous studies, however, have suggested that food intake surveys such as the CSFII, which collect food consumption data through recall or food records over a short period of time, are subject to underreporting of consumption when measured in terms of energy intake (Bingham, 1994; Black and others, 1993; Mertz and others, 1991, Schoeller, 1990, Riddick, 1996). Dietary assessments based on these data probably reflect a lower limit on actual food intake. Consequently, these assessments may also tend to understate the number of servings actually consumed by individuals, at least for some food groups. In addition, the CSFII measures food consumption using methodologies that differ by survey period, making it difficult to separate methodological effects from true consumption changes.

Food supply and utilization data, compiled and published annually by USDA's Economic Research Service (ERS), measure the flow of raw and semiprocessed agricultural commodities through the U.S. marketing system and are another key component of the Nutrition Monitoring Program. The series complements the CSFII with continuous consumption data back to 1909 and is typically used to measure changes in food consumption over time and determine the approximate nutrient content of the food supply. This aggregate approach has the benefit of capturing all food components, no matter how small, including small quantities used as ingredients in other food products. Also, because the food supply series is commodity-based, servings estimates developed from this data set can be readily converted back to the farm level, easing the translation of dietary recommendations into production and supply goals for the agricultural sector (see chapter 20). However, because the series measures food supplies on an aggregate level as they move through marketing channels

for domestic consumption, it typically overstates the amount of food actually ingested by humans by capturing substantial quantities of nonedible food parts and food lost to human use through spoilage and other losses in the home and marketing system.

ERS has developed new methods to adjust the food supply data for these losses and express the data in terms of daily per capita Pyramid-based servings (Kantor, 1998). This will allow researchers to gain a more complete understanding of U.S. dietary patterns by comparing food supply servings measured at the national level, with the estimates generated at the individual level by food intake surveys (USDA, ARS, 1998). Also, because the servings estimates are continuous since 1970, policymakers can assess changes in food consumption relative to major nutrition or policy initiatives.

This chapter summarizes these methods and reports per capita Pyramid servings for the U.S. population for 1970-96. Food supply servings estimates are then compared with servings data from the 1996 CSFII (USDA, ARS, 1998). Finally, the likelihood that the food supply will provide the recommended diet by 2005 is assessed by comparing recent growth in food supply servings (1992-96) with growth rates needed to meet Pyramid recommendations by that time.

Federal Dietary Guidance

Growing scientific evidence about the relationship between diet and health has increased the need for information about the quality and composition of the American diet. Chronic diseases for which diet is a risk factor—including coronary heart disease, cancer, stroke, and diabetes—account for nearly two-thirds of all deaths in the United States each year (Frazão, 1995; see also chapter 1). Healthy diets—which are abundant in grains, vegetables, and fruits, and low in fat, saturated fat, and cholesterol—combined with moderate and regular physical activity can reduce the risk for these diseases.

ERS estimates that improved diets could prevent \$43 billion (in 1995 dollars) in medical costs and lost productivity resulting from disability, and \$28 billion in the value of premature deaths each year (see chapter 1).

The *Dietary Guidelines for Americans* summarizes the most current scientific evidence on diet and health into recommendations for

healthy Americans 2 and older, and serves as the basis for Federal nutrition and education programs (USDA/DHHS, 1995; see also chapter 2). The *Food Guide Pyramid* helps consumers put the *Dietary Guidelines* into practice by recommending the type and quantity of foods to eat from five major food groups—bread, cereals, rice, and pasta; vegetables; fruits; milk, yogurt, and cheese; and meat, poultry, fish, dry beans, eggs, and nuts (USDA, ARS, 1996). It also recommends that consumers use fats, oils, and sweets sparingly. For each food group, specific serving sizes are defined—for example, a slice of bread, a medium piece of fruit—which may differ considerably from the serving size listed on nutrition labels. The number of Pyramid servings that are right for any one person varies depending on age, sex, and physiology (table 1).

Translating the Food Supply Data Into Food Servings

The ERS food supply and utilization series measures the national supply of more than 250 foods using records of commodity flows from production to end uses (Putnam and Allshouse, 1997). The amount of food available for domestic consumption is estimated through the development of supply and utilization data sets for raw and semiprocessed agricultural commodities—wheat, corn, red meat, and fluid milk, for example—from which final food products are made. Human food use is not directly measured or statistically estimated. Rather, the amount of food available for human consumption is calculated as the difference between available commodity supplies (the sum of production, beginning inventories, and imports) and non-food use (exports, ending stocks, seed, feed, and industrial consumption). These components are either directly measurable or estimated by government agencies using sampling and statistical techniques.

Aggregate food supply estimates were converted into Pyramid servings using a multistage process. Each commodity was assigned to one of the Pyramid's five major food groups or to one of two additional groups for added fats and oils and added sweeteners. The data were then converted from pounds and ounces into grams to ease comparison with serving weights identified for different foods in USDA's *Nutrient Data Base for Standard Reference (NDB)*, Release 11 (USDA, ARS, 1997a).

Table 1—Food Guide Pyramid serving recommendations vary with calorie intake

Daily caloric intake ¹	Bread, cereals, rice/pasta	Vegetables	Fruit	Dairy ²	Meat ³	Total fats ⁴	Added sugars ⁵
	-----Servings-----				Oz.	Grams	Tsp.
1,600 calories: Many sedentary women, and some older adults	6	3	2	2-3	5	53	6
2,200 calories: Most children, teenage girls, active women, and many sedentary men	9	4	3	2-3	6	73	12
2,800 calories: Teenage boys, many active men, and some very active women	11	5	4	2-3	7	93	18

¹ Sample diets for a day at three calorie levels.

² Includes milk, yogurt, and cheese. Three servings are appropriate for teenagers and young adults to age 24 and for pregnant and breastfeeding women. Two servings are recommended for all others.

³ Includes fish, dry beans, eggs, and nuts.

⁴ The *Dietary Guidelines* recommend that consumers choose a diet that provides no more than 30 percent of total calories from fat. The upper limit on the grams of fat in a consumer's diet will depend on calorie intake. For example, for a person consuming 2,200 calories per day, the upper limit on total daily fat intake is 660 calories. Seventy-three grams of fat contribute about 660 calories (73 grams x 9 calories per gram of fat = 660 calories).

⁵ To avoid getting too many calories from sugar, *The Food Guide Pyramid* suggests that consumers try to limit added sugars to the daily quantities listed.

Source: USDA, CNPP. *The Food Guide Pyramid*, Home and Garden Bulletin Number 252, Oct. 1996.

Next, the data were adjusted for spoilage and other losses by subtracting estimated losses from the consumption weight reported in the food supply data set. Loss was estimated at several different stages in the marketing system (retail, household, institutions) and averaged 27 percent of total available food supplies (Kantor, 1998; Kantor and others, 1997). Cooking losses for selected commodities and the nonedible portions of all foods—seeds, pits, and inedible peels—were also removed from the data set (USDA, ARS, 1975). However,

the limited ability of researchers to measure such losses accurately suggests that actual loss rates, and hence the servings estimates on which they depend, may differ from the amounts reported here.

Estimation of Serving Weights

For each food supply commodity, a Pyramid serving weight was defined, based on serving sizes identified in the *Food Guide Pyramid* and weights identified in USDA's NDB. For example, the *Food Guide Pyramid* defines one medium apple as a serving of fruit and the Nutrient Data Base indicates that a medium apple with skin weighs 138 grams.

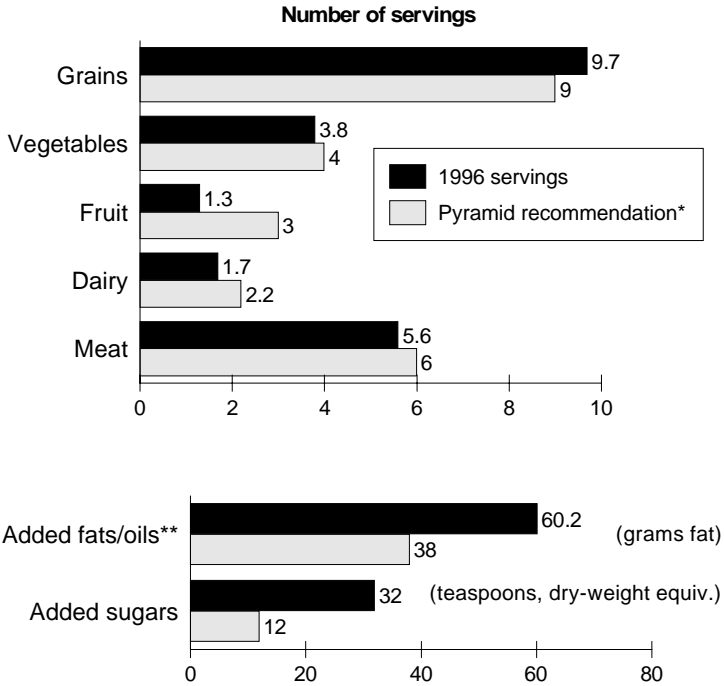
Once Pyramid serving weights were defined for each commodity, daily per capita consumption—adjusted for loss and nonedible parts—was divided by the assigned Pyramid serving weight to calculate the number of per capita Pyramid servings for the commodity (Kantor, 1998). Per capita servings for individual commodities were then aggregated to determine total daily servings for each Pyramid food group and compared with recommended servings. This study used the recommended servings for a sample diet of 2,200 calories (table 1), since this approximates the daily Recommended Energy Allowance (REA) of 2,247 calories for the United States, derived from a 1995 population-weighted average of REA's for different cohorts of the U.S. population.

Gaps Between Per Capita Servings And Recommendations

The food supply data suggest that the average American diet is heavily weighted toward the added fats and sweeteners at the tip of the Pyramid while falling short of recommendations for fruits, vegetables, dairy products, and lean meats and meat alternates (fig. 1). At the same time, the mix of foods provided by the meat, poultry, fish, dry beans, eggs, and nuts group and the bread, cereals, rice, and pasta group may need to change for most consumers to meet recommendations for dietary variety and selected food components such as fiber, total fat, saturated fat, and cholesterol.

Figure 1

1996 food supply servings compared with Food Guide Pyramid serving recommendations



*Pyramid recommendation based on a sample diet of 2,200 calories.

**The Food Guide Pyramid does not make a recommendation for added fats and oils. This recommendation is implied by the 52-percent share of total fats accounted for by added fats and oils in the food supply in 1994 and an upper limit on total fat consumption of 73 grams for a 2,200-calorie diet.

Source: USDA, Economic Research Service.

A comparison of food supply servings between 1970 and 1996 with Pyramid recommendations also suggests that many people have had mixed success in moving toward healthier diets (table 2).

While the average number of servings for several food groups—grains, vegetables, and fruits—has moved closer to recommendations since 1970, the grains, meats, and vegetable groups are the only food groups where total servings are within 10 percent of the recommended intake for a 2,200-calorie diet. While fruit consumption has increased nearly 20 percent between 1970 and 1996, this translates to an increase of about one-fifth of a serving.

Table 2—Average food supply servings for 1970-96 compared with Food Guide Pyramid serving recommendations

Food group	Food supply servings				Recom- mendation ¹
	1970-75	1980-85	1990-95	1996	
Grains	6.8	7.5	9.2	9.7	9
Vegetables	3.1	3.2	3.6	3.8	4
Fruits	1.1	1.2	1.3	1.3	3
Milk, yogurt, cheese	1.6	1.5	1.6	1.7	2.2 ²
Meat, poultry, fish, dry beans, eggs, and nuts (oz.)	5.4	5.5	5.6	5.6	6
Added fats and oils (grams)	49	55	62	60	38 ³
Added sugars (tsps.)	27	26	31	32	12

¹ Recommendation based on a 2,200-calorie diet, which is close to the 2,247 calories recommended as an average caloric intake for the population in 1995. Recommended servings for other years may differ.

² Based on a weighted average of 3 servings of milk, yogurt, and cheese for teenagers and young adults to age 24 and 2 servings for all others.

³ According to food supply data for 1994, added fats and oils accounted for 52 percent of the total fat provided by the food supply in that year. The recommendation shown here assumes that added fats and oils account for 52 percent of total fat intake for a daily upper limit of 38 grams of added fats and oils ($73 \times .52 = 38$).

Source: USDA, Economic Research Service.

Whole Grain Servings Fall Short Of Recommendations

In 1996, the food supply provided 9.7 servings of flour and other commodities that make up the bread, cereals, rice, and pasta group, suggesting that many consumers met the 9-serving Pyramid recommendation for a 2,200-calorie diet (table 3). Total daily servings were more than 40 percent higher than in the early 1970's. Almost half of the increase was accounted for by higher consumption of white and whole-wheat flour. A two-fold increase in durum flour (used for pasta) and corn products (used for snack chips and Mexican-style foods such as tortillas) and a three-fold increase in rice consumption accounted for the remainder of the additional grain group servings.

Table 3—1996 food supply servings for the bread, cereals, rice, and pasta group

Item	Servings
Total	9.7
White and wheat flour	7.2
Durum flour (for pasta)	0.4
Rice	0.5
Corn products	1.3
Oat products	0.3
Rye flour and barley products	*
Recommendation	9.0

* = less than 0.1

Source: USDA, Economic Research Service.

While the food supply data suggest that average total grain consumption meets Pyramid recommendations, many consumers may need to change the types of foods consumed from this group to meet dietary recommendations for fiber, fat, cholesterol, and added sugars. In 1992, for example, the latest year for which data are available, whole-wheat flour accounted for less than 2 percent of total wheat flour provided by the food supply (Putnam and Allshouse, 1997; U.S. Department of Commerce, 1995). This shortfall in whole-grain servings is confirmed by food intake data, which indicate that average consumption of foods made from whole grains was well below suggested levels (several servings daily) at about 1 serving per person per day (USDA, ARS, 1998).

Little Variety in Daily Vegetable Servings

The food supply provided a daily average of 3.8 servings of fresh, frozen, and canned vegetables, and dry beans, peas, and lentils in 1996, close to the 4 daily servings recommended for a 2,200-calorie diet (table 4). Per capita servings grew about 20 percent, or just over half a vegetable serving, between 1970 and 1996. Half a daily vegetable serving is about a quarter cup of cooked vegetables, one-quarter of a baked potato, or 5 french fries.

While food supply servings were close to recommendations, consumption was concentrated in a small number of foods, suggesting

Table 4—1996 food supply servings for the vegetable group

Item	Servings
Total vegetables	3.8
Dark green leafy vegetables	0.1
Deep yellow vegetables	0.2
Dry beans, peas, and lentils	0.2
Other starchy vegetables	1.4
Other vegetables	1.9
Recommendation	4.0

Source: USDA, Economic Research Service.

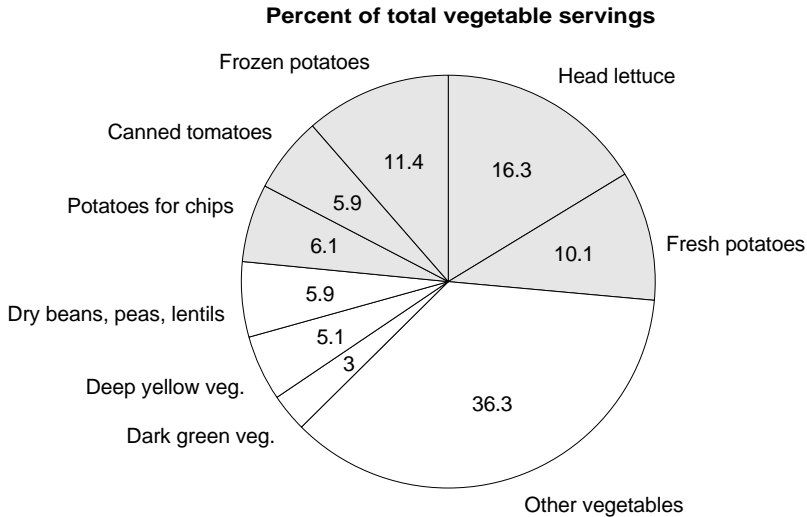
that many consumers may be incorporating too little variety in their daily vegetable choices.

Dietary guidance suggests that consumers divide their total vegetable servings into three vegetable subgroups—dark green leafy and deep yellow vegetables; starchy vegetables, including potatoes, dry beans, peas, and lentils; and other vegetables (Cronin and others, 1987). However, the food supply servings estimates suggest that most consumers fail to meet these subgroup recommendations. Per capita servings of dark green leafy vegetables, deep yellow vegetables, and dry beans, peas, and lentils were well below recommended levels, while a larger share of servings came from other starchy vegetables, particularly potatoes for freezing. Potatoes for freezing, most of which are used for french fries, accounted for one-third of other starchy vegetable consumption and 11 percent of total vegetable servings (fig. 2).

Variety was also limited within the subgroups. For example, although the food supply data report consumption of more than 80 different vegetables, 5 single commodities (head lettuce (mostly iceberg), potatoes for freezing, fresh potatoes, potatoes for chips and shoestrings, and tomatoes for canning) accounted for half of total 1996 vegetable servings (fig. 2). Dry beans, peas, and lentils combined made up 6 percent of total consumption. Another 15 percent of total vegetable servings came from potatoes for dehydration (used mainly for instant potato products), fresh tomatoes, fresh garlic, and fresh carrots. No other single commodity accounted for more than 3 percent of total vegetable consumption or 0.1 serving.

Figure 2

Share of vegetable servings, 1996



Fruit Consumption Is Less Than Recommended

The food supply provided 1.3 servings per person per day of fresh and processed fruit and fruit juices in 1996, less than half the 3 daily fruit servings recommended by the Food Guide Pyramid for a 2,200-calorie diet (table 5). When measured in Pyramid servings, average fruit consumption has remained relatively unchanged over the past two decades, with average servings increasing by about one-fifth of a

Table 5—1996 food supply servings for the fruit group

Item	Servings
Total fruit	1.3
Citrus, melons, and berries	0.6
Fresh citrus	0.1
Melons, berries, kiwi	0.2
Citrus juice	0.3
Other fruit	0.7
Recommendation	3.0

Source: USDA, Economic Research Service.

serving—the equivalent of a quarter of a medium banana or apple per person daily or one and a half ounces of fruit juice—between 1970 and 1996.

Consistent with recommendations, total fruit servings were almost evenly divided between two fruit subgroups—citrus, melons, and berries, including kiwifruit; and other fruit. However, with close to half of total fruit servings coming from five foods—orange juice (18 percent), bananas (9.8 percent), fresh apples (7.9 percent), watermelon (6.5 percent), and apple juice (5.8 percent)—out of the more than 60 fruit products included in the food supply data, the data suggest that many consumers are not incorporating adequate variety into their daily fruit choices.

Cheese Accounts for More Than a Third Of Total Dairy Servings

Dairy products—including milk, yogurt, and cheese—accounted for almost three-quarters of the calcium available in the U.S. food supply in 1994 (see chapter 7 for more on the nutrient content of the food supply). Calcium is essential for the formation of bones and teeth, and requirements thus increase significantly during adolescence, early adulthood, pregnancy, and lactation. As a result, the milk, yogurt, and cheese group is the only food group for which recommended servings are based on age and physiology rather than energy requirements. Three daily servings—the equivalent of three 8-ounce glasses of milk per day—are suggested for teenagers, young adults up to 24 years of age, and pregnant and lactating women. Two daily servings are recommended for all others.

In this study, food supply servings were measured against a daily recommended intake of 2.2 servings. This target was based on a weighted average of recommended servings for different age groups of the U.S. population (excluding the higher needs of pregnant and lactating women). The food supply provided about 1.7 daily servings of dairy products in 1996, about three-quarters of the 2.2 servings target, and essentially unchanged since 1970 (table 6).

A modest increase in consumption, equal to about a half cup of milk per person daily, would bring per capita servings up to Pyramid recommendations. However, because many dairy foods are naturally high in fat and saturated fat, consumers may need to balance any

Table 6—1996 food supply servings for the milk, yogurt, and cheese group

Item	Servings
Total milk, yogurt, and cheese	1.7
Fluid milk	0.8
Cheese	0.6
Yogurt	*
Frozen dairy	0.1
Other	0.1
Recommendation	2.2

* less than 0.1 serving.

Source: USDA, Economic Research Service.

increased dairy consumption with overall fat intake. In 1996, for example, more than half the dairy servings provided by the food supply came from two dairy products that are naturally high in fat—cheese (natural and processed) and whole milk (including dry and condensed).

Sharp changes over time in consumption patterns for fluid milk and cheese also suggest that many consumers may simply be substituting one high-fat dairy food for another, with little net reduction in total dairy fat intake (fig. 3). Between 1970 and 1996, for example, Americans reduced their per capita daily servings of whole milk by one-third to just over one-fourth cup. Servings of lowfat and nonfat milk (1-percent and skim) nearly doubled during this same period, but consumption is still relatively low, at one-fifth cup per person per day. Servings of reduced-fat (2-percent) milk increased by about 25 percent to just over one-fourth cup. However, during the same period, declining whole milk consumption was accompanied by a sharp increase in per capita servings of cheese, most of which is nearly as high (or higher than) whole milk in total and saturated fat per serving. This is consistent with food supply nutrient data that show that total fat and saturated fat provided by dairy products remained constant between 1970 and 1994 (USDA, CNPP, 1997; see also chapter 7).

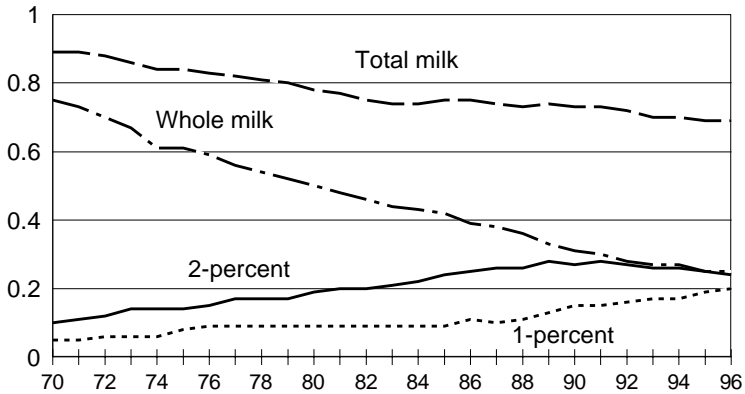
Red Meat Dominates Meat Group Consumption

For a 2,200-calorie diet, the *Food Guide Pyramid* recommends the equivalent of 6 ounces of cooked lean meat per person per day. Meat, poultry, and fish are counted in total ounces. Other foods in

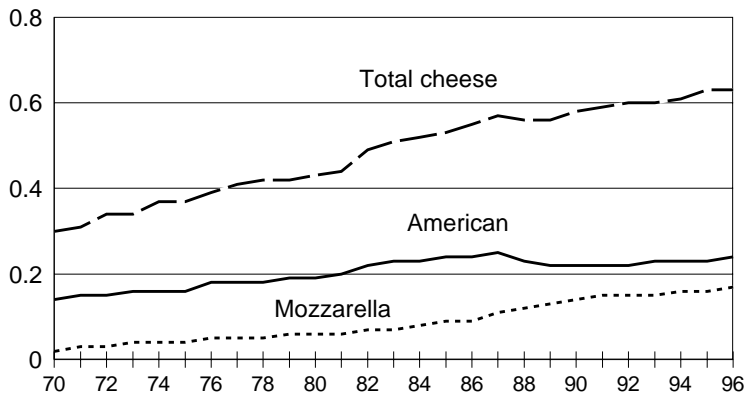
Figure 3

Average daily food supply servings of selected dairy products, 1970-96

Servings per person daily, fluid milk



Servings per person daily, cheese



Source: USDA, Economic Research Service.

this group—1 egg, 2 tablespoons of peanut butter, or 1/3 cup of nuts—are counted as the equivalent of 1 ounce of cooked lean meat.

After adjusting for waste and cooking losses, the food supply provided the equivalent of 5.6 ounces of cooked meat (lean and fat portion) per person per day in 1996—a modest 4-percent increase from the early 1970's, and close to the recommended 6 ounces of cooked lean meat (table 7). Because the food supply estimates for meat and poul-

Table 7—1996 food supply servings for the meat, poultry, fish, eggs, dry beans, and nuts group¹

Item	Ounces
Total meat group	5.6
Meat, poultry, and fish	4.9
Red meat	2.9
Poultry	1.6
Fish and seafood	0.4
Eggs	0.5
Peanuts and peanut butter	0.1
Tree nuts	0.1
Recommendation	6.0

¹ Dry beans, peas, and lentils counted in the vegetable group.
Source: USDA, Economic Research Service.

try include both the lean and fat portion of these products, they likely overstate lean meat consumption, and are not directly comparable with the *Food Guide Pyramid* recommendation. However, the data do suggest that, on average, Americans consume larger quantities of foods that, relative to others in the meat group, are naturally high in fat, saturated fat, and cholesterol. Thus, many consumers may need to adjust the types of foods consumed from this group.

Despite a nearly 60-percent increase in poultry meat (chicken and turkey) consumption since 1980, red meat (beef, veal, pork, and lamb) accounted for 52 percent of total meat equivalents in 1996, nearly double the 27-percent poultry share. Fish and shellfish accounted for 8 percent of consumption, while about 10 percent of meat group consumption came from eggs. Another 2 percent of meat group consumption came from peanut butter.

Added Fats and Oils Account for Over Four-Fifths of Recommended Upper Limit for Total Fat Consumption

Fats and oils are added in cooking and at the table and in many processed food products, including baked goods, french fries, snack foods, and peanut butter. Much of the added fat in processed foods is “invisible” to the consumer, who is typically not aware of their fat

Table 8—1996 food supply fat grams from added fats and oils

Item	Servings (grams)
Total fat grams from added fats and oils	60.2
Salad and cooking oils	25.6
Shortening	17.8
Margarine	7.1
Lard	1.4
Edible tallow	1.4
Other edible fats	1.6
Dairy fats	5.3
Butter	3.3
Heavy cream	0.5
Light cream	0.1
Sour cream	0.5
Half and half	0.3
Cream and neufchatel cheese	0.6
Recommendation	38.0

Source: USDA, Economic Research Service.

content. These added fats are consumed in addition to those that occur naturally in meats, fish, nuts, eggs, and dairy products.

After adjusting for losses and the nonfat portion of composite products like margarine, the food supply provided 60 grams of fat from added fats and oil products in 1996, a 22-percent increase from the 49 grams provided by the food supply in the early 1970's (table 2).

Over 70 percent of the added fat in 1996 came from salad and cooking oils and shortening (table 8). Animal fats—including lard, edible tallow, butter, and other dairy fats—accounted for 13.5 percent of total servings. Lard and edible tallow, together with vegetable shortening, are used largely for deep-fat frying by fast-food restaurants and other food establishments.

Although some dietary fat is essential for good health, excessive fat intake is associated with increased blood cholesterol, heart disease, and some cancers. The Dietary Guidelines recommend that people limit their total fat consumption to no more than 30 percent of daily energy intake—about 73 grams of added and naturally occurring fat

for a 2,200-calorie diet (USDA/DHHS, 1995). In 1996, added fats and oils alone accounted for 82 percent of this suggested upper limit.

According to food supply nutrient data for 1990-94, added fats accounted for 52 percent of the total fat provided by the food supply (Putnam and Allshouse, 1997). Although some of this fat was not actually consumed due to loss and spoilage, the data suggest that consumption of both added and naturally occurring fats needs to be reduced in order to meet dietary recommendations. Assuming that added fats continue to account for 52 percent of daily fat consumption, consumption of added fats and oils would have to decline by more than one-third to 38 grams to bring average total fat consumption per person to the 30 percent of calories recommended as an upper limit by the *Dietary Guidelines*.

Added Sugar Consumption Exceeds Dietary Targets

Although the human body cannot distinguish between naturally occurring and added sugars, dietary guidance focuses on added sugars because foods high in added sugars often supply calories but few nutrients. To the extent that consumers substitute the calories from less nutrient-dense sugary snacks like sweetened soft drinks and candy for nutrient-rich foods like fruits, vegetables, and whole grains, dietary intake of the fiber, vitamins, minerals, and other nutrients found in these foods may be reduced. To maintain nutritious diets and healthy weights, the *Food Guide Pyramid* suggests that consumers limit their added sugars to 12 teaspoons for a 2,200-calorie diet (USDA, CNPP, 1996).

After adjusting for losses, the food supply provided 32 teaspoons, or one-quarter pound per person per day of added sugars and other caloric sweeteners (refined cane and beet sugar, corn sweeteners, and edible syrups) in 1996—or the amount of sweetener in about three and a half regular 12-ounce colas (table 9). Average daily consumption was nearly triple the 12 teaspoons suggested as an upper limit for a 2,200-calorie diet by the *Food Guide Pyramid* (USDA, CNPP, 1996). Consumption grew by 23 percent between 1970 and 1996, led by a sharp rise in the use of high-fructose corn syrup and other corn sweeteners (see chapter 7).

The ability of consumers to moderate their consumption of added sugars and sweeteners is complicated by the fact that many added

Table 9—1996 food supply servings for caloric sweeteners

Item	Servings (tsp.)
Total caloric sweeteners	32
Cane and beet sugar	14
High-fructose corn syrup	13
Glucose	4
Dextrose	0.8
Edible syrups	0.1
Honey	0.2
Recommendation	12.0

Source: USDA, Economic Research Service.

sweeteners are likely to be “hidden” in prepared foods. Although the new food label mandated by the Nutrition Labeling and Education Act (FDA, 1997) requires manufacturers to disclose the total sugar content of food, the label does not distinguish total from added sugars, which may sometimes make it difficult for consumers to determine how much added sugar they are actually consuming.

Food Supply Data Compared With the CSFII

ERS food supply data are only one component of the Federal Government’s nutrition monitoring program. Comparing food supply servings estimates with the CSFII servings data can help researchers refine estimates of food loss and other factors used to generate these data and to address data gaps for subgroups like dark green leafy and deep yellow vegetables. Such a comparison may also help to pinpoint the extent to which underreporting of energy intake by CSFII respondents differs across food groups. This knowledge may lead to further improvements in data collection methods for both data sets and improved accuracy in estimating the population’s dietary status.

A comparison of the food supply servings estimates with those generated from the 1996 CSFII shows notable differences in two major food groups—bread, cereals, rice, and pasta; and meat, poultry, fish, dry beans, eggs, and nuts—and smaller differences in the vegetable, fruit, and dairy groups (table 10). A large gap also exists between the food supply and CSFII servings estimates for added sugars.

Table 10—Comparing food supply servings with CSFII servings estimates¹

Food group	1996 food supply servings	1996 CSFII servings
Bread, cereals, rice, and pasta	9.7	6.8
Vegetables	3.8	3.4
Fruit	1.3	1.5
Milk, yogurt, and cheese	1.7	1.5
Meat, poultry, fish, dry beans, eggs, and nuts (oz.)	5.6	4.5
Added fats and oils (grams) ²	60.2	--
Added sugars (tsp.)	32	20.1

¹ Differences in methodology may affect comparability of the servings estimates.

² Added fats and oils were not measured separately in the CSFII servings estimates.

Sources: USDA, Economic Research Service; USDA, ARS, 1998.

A portion of the gap between the food supply and CSFII servings estimates can be attributed to methodological differences (Kantor, 1998). For meat, poultry, and fish, for example, the food supply estimates include both the lean and fat portions while the CSFII estimates include lean meat only. However, these methodological differences are not sufficient to explain all of the variation in the servings estimates from the two data sets, and additional research is needed to gain a more complete understanding of actual intakes of these foods.

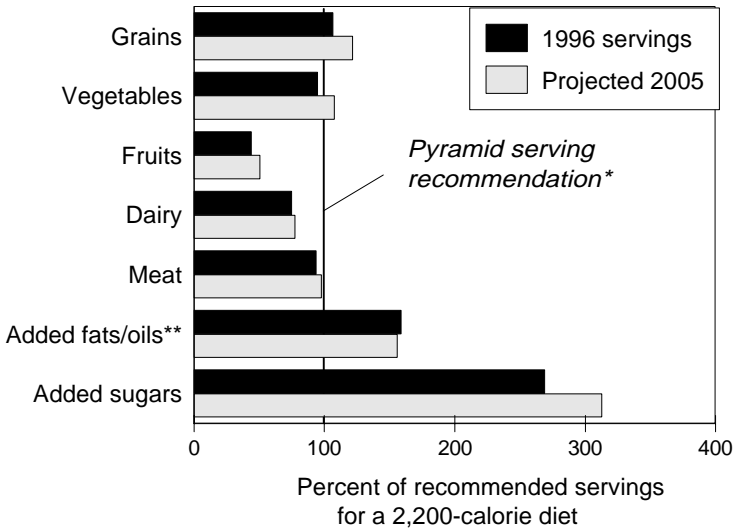
Is the Food Supply Likely to Meet Pyramid Recommendations in 2005?

Using annual per capita 1992-96 growth rates in food supply servings to project food supply servings through 2005 and assuming that recommendations remain at the same level (for a 2,200-calorie diet), our projections indicate that by 2005, most diets will continue to fall short of recommended servings of fruits, dairy products, and some vegetable subgroups, while consumption of added sugars and added fats and oils will continue to exceed suggested limits (fig. 4).

For those food groups where consumption is currently below dietary targets—fruits, vegetables, dairy products, and meats—the largest gap between projected servings in 2005 and recommendations will be in the fruit group. At 1992-96 growth rates, per capita servings will

Figure 4

Projected per capita food supply servings in 2005 compared with 1996



*Pyramid recommendations based on a sample diet of 2,200 calories.

**The Food Guide Pyramid does not make a recommendation for added fats and oils. This recommendation is implied by the 52-percent share of total fats accounted for by added fats and oils in the food supply in 1994 and an upper limit on total fat consumption of 73 grams for a 2,200-calorie diet.

Source: USDA/ERS.

increase only slightly to 1.5 servings in 2005. A 9-percent average annual increase in per capita fruit servings—more than five times the 1992-96 growth rate—would be needed for average fruit consumption to reach the target of three daily servings.

Per capita daily vegetable servings will slightly exceed the recommendation in 2005, climbing to 4.3 servings by the end of the projection period. However, if the current composition of vegetable consumption were to continue, vegetable servings would remain well below recommended levels for some vegetable subgroups. For example, at 1992-96 growth rates, average servings of dark green leafy vegetables, deep yellow vegetables, and dry beans, peas, and lentils would be 30 percent, 41 percent, and 42 percent of recommended levels in 2005. To reach Pyramid targets by the end of the projection period, daily servings of these three subgroups would have

to grow at 6, 3, and 18 times the annual per capita rate observed during 1992-96.

While the *Food Guide Pyramid* makes separate servings recommendations for fruits and vegetables, the 5-A-Day for Better Health program and the U.S. Department of Health and Human Services' Healthy People 2000 set a combined minimum consumption goal of five daily servings of fruits and vegetables (see chapter 6). This consumption target was met in 1996 with 5.1 combined per capita servings of fruits and vegetables. At 1992-96 growth rates of 1.4 percent annually, total fruit and vegetable consumption would grow to 5.8 servings by 2005, 17 percent above the 5-servings target. However, our analysis suggests that consumption would need to grow at more than twice that rate to reach the 7-servings daily target associated with a 2,200-calorie diet used in this study. Were current growth rates to continue, the seven-serving target would not be reached until 2018.

At 1992-96 annual growth rates, average dairy consumption will also fall short of dietary targets in 2005, remaining virtually unchanged at 1.7 servings per capita. Per capita dairy servings would need to grow 8 times the 1992-96 pace for the 2.2-serving target to be met by 2005.

Aggregate consumption from the meat, poultry, fish, dry beans, eggs, and nuts group was close to dietary targets in 1996, and at 1992-96 growth rates will nearly meet the minimum target for a 2,200-calorie diet by 2005 at 5.9 ounces of cooked-meat equivalents.

Consumption of grain products will continue to exceed minimum Pyramid serving recommendations for the bread, cereals, rice, and pasta group through 2005. At 1992-96 growth rates, grain product consumption will reach nearly 11 servings per person daily by 2005, about a 1.5-serving increase over the 1996 estimate.

Consumption of both added fats and oils and added sugars will continue to exceed recommended upper limits in 2005. Although fat grams from added fats and oils will continue to trend downward following the 1992-96 decline, average consumption will remain well above suggested upper limits (38 grams) in 2005, at 59 grams per person per day. At 1992-96 growth rates, the gap between average consumption of added sugars and upper consumption limits suggested by dietary guidance would widen in 2005 with average consumption reaching 38 teaspoons per person daily, 3 times recommended levels. However, the magnitude of this increase, which would result in an additional 96 calories per per-

son daily from added sugars alone, suggests that this trend may flatten over time.

Conclusions

This study details new methods for expressing time series food supply data in terms of Food Guide Pyramid servings. Aggregate annual food supply data for the United States were adjusted for food spoilage, nonedible food parts, and other losses and converted into daily per capita servings, which could be assessed against Pyramid serving recommendations.

Information on the extent to which diets meet Federal dietary recommendations is key to Federal efforts to monitor the dietary and nutritional status of the population. The results of this analysis provide Federal policy officials and nutrition educators with new insights about the progress our Nation is making in achieving healthier diets. Also, because the food supply series is commodity-based, servings estimates presented here can be readily converted back to the farm level, allowing researchers, for the first time, to directly link dietary recommendations to the U.S. food production and marketing system (see chapter 20).

The analysis suggests that despite positive dietary changes that have occurred over the past two decades—including increased consumption of fruits, vegetables, and grain products—many Americans are falling short of suggested consumption targets for most of the Pyramid's five major food groups, while consuming excess calories of fats, oils, and sweeteners depicted at the tip of the Pyramid.

A continuation of recent (1992-96) growth rates in per capita servings through 2005 suggests that, on average, diets will fall short of Pyramid serving recommendations for fruits, some vegetable subgroups (dark green leafy vegetables, deep yellow vegetables, and dry beans, peas, and lentils), and dairy products, while servings of added sugars and added fats and oils will far exceed recommended upper consumption limits.

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