Discussion

As mentioned earlier in this report, the ERS food supply data is only one component of the Federal Government's efforts to monitor nutrition. USDA's Continuing Survey of Food Intakes by Individuals (CSFII) is the Government's main source of data on individual food intakes. Comparing the similarities and differences between the food supply and CSFII servings estimates may lead to improved understanding of both data series and therefore the populations' food and nutrient intake. Such information, may, for example, improve the food supply data by (1) helping to refine estimates of food loss and other factors used to generate the food supply servings, (2) highlighting data gaps for certain food sub-groups, including dark-green and deep yellow vegetables, and (3) identifying food groups for which underreporting of energy intake by CSFII respondents may impact intake estimates.

Comparing CSFII Servings Estimates

Comparing servings estimates generated from the 1996 CSFII with food supply data for the same year yields conflicting results about the number of servings consumed from each food group (table 11). The largest differences were observed for the grains and meat groups and added sugars while smaller differences were observed for the vegetable, fruit, and dairy groups. However, the consumption of various subsets of foods—dark-green leafy vegetables, white potatoes, dry beans, peas, and lentils, and citrus, melons, and berries—within most of these groups was similar. Within the meat group, red meat, poultry, and fish accounted for a similar share of total servings for both data sets. Data for fats and oils were not comparable because of methodological differences.

A portion of the gap between the food supply and CSFII servings estimates is attributed to methodological differences such as the choice of serving weights for some foods—especially grain products—and the extent to which ingredient use of foods—especially dairy products—was measured. For the meat, poultry, fish, dry beans, eggs, and nuts group, for example, most of the difference between the two servings estimates can likely be explained by the way in which meat servings were estimated. The food supply servings estimates for meat, poultry, and fish include both the lean and fat portions (poultry skin, trimmable fat). The CSFII servings estimates, however, include the lean meat only, with the fat portion counted as discretionary fat (USDA, ARS, March 1997).

Some of the differences in dairy servings between the two data sets may be explained because the CSFII servings data omitted small quantities of dairy products used as ingredients in other products, and classified some dairy products in other food groups. In the CSFII servings data, for example, milk ingredients (including nonfat dry milk solids) used in home or commercially prepared grain products were counted in the grains group, while dairy products used in processed meats and meat analogs were not measured due to data limitations.

Differences between the two servings estimates for added sugars are more difficult to explain. The CSFII servings data for added sugars omit sweeteners used in cream substitutes, soy-based imitation milk, processed meats such as cured ham and luncheon meats, meat analogs, and processed cheeses because recipes for these foods were not available when the CSFII data files were developed (USDA, ARS, March 1997). However, since total consumption of these foods is small, this methodological difference is not sufficient to explain the large gap between the added sugar servings reported in the two data sets.

Caloric Intake

Differences in daily energy intake reported by the two data sets may also explain some of the gap between the food supply and CSFII servings estimates for some foods. For example, the mean intake of 1,969 calories reported for individuals aged 2 and older in the CSFII servings data is two-thirds of the 2,666 daily calories imputed from the food supply data after adjusting the data for waste, cooking, and the discard of nonedible portions (see Appendix 2 for calories implied by the adjusted food supply data). Given the differences in caloric intake reported in the two data series, one would expect that average food supply servings, at least for some food groups, would be higher than those reported for the lower levels of average caloric intake reported in the CSFII servings data. The number of Food Guide Pyramid servings that are right for any one person varies depending on age, sex, and physiological status.

Although the food supply servings estimates imply a total caloric intake substantially higher than the 2,247

Table 11--Food supply servings compared with intake data from the Continuing Survey of Food Intakes by Individuals (CSFII), 1996[1]

Food group	Food supply	CSFII
	Servings	
Bread, cereals, rice, and pasta group	9.7	6.8
Whole-grain products	--	1.0
Nonwhole grain products	--	5.8
Vegetable group	3.8	3.4
Dark green leafy	0.1	.2
Deep yellow	.2	.2
Dry beans, peas, and lentils	.2	.2
Starchy vegetables	1.4	1.3
White potatoes	1.0	1.1
Other starchy	.4	.2
Tomatoes	.4	.5
Other vegetables	1.5	1.0
Fruit group	1.3	1.5
Citrus fruits, melons, berries	.6	.7
Other fruits	.7	.8
Milk, yogurt, cheese	1.7	1.5
Milk	.9	1.0
Yogurt	*	*
Cheese	.6	.5
	Ounces	
Meat, poultry, fish, dry beans, eggs and nuts group	5.6	4.5
Meat	2.9	1.9
Poultry	1.6	1.0
Fish	.4	.4
Organ meat	--	--
Frankfurters and luncheon meat	--	.7
Eggs	.5	.3
Soybean products	--	*
Nuts and seeds	.2	.1
	Fat grams	
Fats and oils—		
Total fat	--	--
Discretionary fat	--	55.7
Added fats and oils	60.2	--
	Teaspoons	
Added sugars	32.0	20.1

-- = not available.
* = less than 0.1 servings.
[1]Differences in methodology may affect comparability of the servings estimates.
Sources: USDA, Economic Research Service; USDA, ARS, 1998.

calories estimated as the Recommended Energy Allowance for the population, the data suggest that most consumers could meet the Food Guide Pyramid serving recommendations for a 2,200-calorie diet while maintaining energy intake close to suggested levels. Reducing average added fat and sugar consumption to target levels, for example, would reduce total energy intake to about 2,150. While a portion of this reduction would be offset by increased servings from other food groups, were these increased servings to come mostly from lowfat choices within each group, as suggested by *The Food Guide Pyramid* bulletin, the data suggest that the calorie goal could be achieved.

The higher total caloric intake implied by the food supply servings estimates, however, does not explain why differences in servings estimates between the two data sets are larger for some food groups than for others. One possible explanation may be that underreporting by food-intake survey respondents is greater for some foods or food groups—added sugars for example—than for other food groups for which food supply and CSFII servings estimates are similar. For example, if the excess added sugar servings estimated from the food supply data represent consumption of less nutrient-dense foods such as candy bars or soft drinks, this could support previously reported research that suggests that food-intake survey respondents are less likely to report intake of such foods accurately compared with foods like fruits and vegetables perceived as more "healthy" or nutrient-dense.

Other Methodological Issues Related to the Food Supply Estimates

In calculating food supply servings for certain food groups, like grains and added sugars, in which many of the commodities are consumed indirectly as ingredients in processed food products, there was a concern that the servings estimates may be overstated due to the use of some of these commodities in food products that are exported. Examples of such foods may include flour, fats, and sweeteners used in cookies, crackers, and other baked goods and added sweeteners used in candy, confectionary products, and regular soft drinks.

Export Use

Many exported foods are excluded from the food supply consumption series and are not counted in the servings estimates reported here (Putnam and Allshouse, 1997). These foods include red meat, poultry, and fish; milk, cheese, and most other dairy products; fresh and processed fruits and vegetables (including potatoes for french fries and potato chips and tomato products); and durum flour used in macaroni and other pasta products.

Consumption of many other foods, however, is estimated at the primary or semi-processed level (flour mills, sugar beet processors, oilseed crushers) before the commodities are released into the marketing system for additional processing. Since ingredient use of these foods at additional manufacturing stages is not measured, it is not possible to determine what share of these products eventually end up in the export market and should thus be excluded from the food supply servings estimates measuring domestic consumption.

Although a precise measure of export ingredient use was not available, trade data were examined in an attempt to determine the impact that these exports may have on the food supply servings estimates. Trade data were examined for food categories most likely to account for exported ingredients—all grain products, jams and jellies, confectionary products (including chocolate and chewing gum), carbonated soft drinks, sweetened waters, other nonalcoholic beverages including fruit drinks, and ready-to-eat puddings (USDA, ERS, unpublished, 1997). These data were examined for approximate sugar and grain content.

Carbonated soft drinks and other nonalcoholic beverages excluding fruit juice were assumed to contain 1 teaspoon of sweetener per fluid ounce based on added sugar contents for fruit ades and colas listed in *The Food Guide Pyramid* bulletin. To estimate an extreme level of sweetener use, grain products were assumed to contain 50-percent sweetener. Using this method, the total impact on food supply servings estimates was judged to be small. For example, the total sweetener content of the food exports reported in the trade categories listed above was estimated to be less than 2 teaspoons per person per day. Grain use in exported foods was estimated at less than half of a grain serving by ERS commodity experts. However, these estimates lack precision and additional research is needed to completely understand the effect of unmeasured food exports on food supply consumption and servings estimates. In addition, fat ingredient use in exported foods was not measured.

Food Loss

The food supply servings estimates reported in this study are in part determined by the assumptions used to estimate the amount of available food supplies lost to human consumption because of waste, cooking, and other discard. However, such losses, particularly food discard at the consumer level, are by nature difficult to measure. Previous studies of food loss have reported consumer waste rates ranging from 7 to 35 percent (Gallo, 1980). Differences in the way that waste is defined, differences in study methodology, and differences in characteristics of sample households partially explain the wide range of these estimates.

A recent ERS study reported that 27 percent of available food supplies are lost at the retail, consumer, and foodservice levels (Kantor and others, 1997). However, most existing studies of food waste date from the 1970's or before, and the more recent ERS estimates rely largely on coefficients generated from these older studies. The U.S. marketing system has dramatically changed since these coefficients were originally estimated, suggesting that actual waste rates, and hence the servings estimates on which they depend, may differ from those reported here.

These same data limitations also meant that the loss estimates were held constant across the entire time series of data. However, loss rates may have changed dramatically over time for some food groups. For example, there is evidence that the waste portion of added fats and oils has increased during the past two decades with the growth in consumption of food away-from-home. Foodservice establishments that deep-fry foods can generate significant amounts of waste grease known as "restaurant grease." Many of these used frying fats are disposed of by restaurants and processed by renderers for use in animal feeds, pet foods, and industrial operations. While ERS is working with industry groups, including the prepared-foods and fast-food industries, to improve the added fats and oils data, the old coefficients used to measure losses of added fats and oils in this paper may not accurately reflect current consumption and marketing patterns.

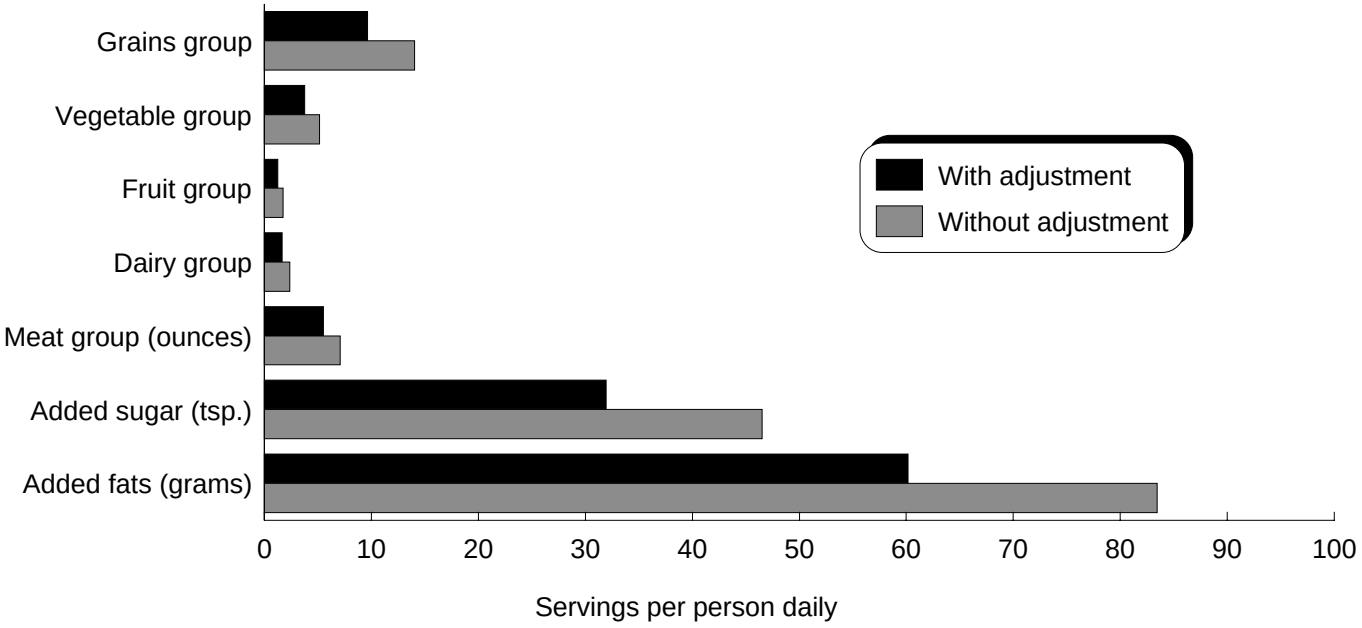
Due to the uncertainties associated with these waste estimates, a sensitivity analysis was conducted to evaluate the impact of the selected waste factors on the food supply servings estimates. For the three groups where the food supply servings estimates differed the most from the CSFII servings data—bread, cereals, rice, and pasta; meat, poultry, fish, dry beans, eggs, and nuts; and added sugars—it was also determined how much the loss factors would have to change in order to reconcile the differences between the two servings estimates.

To close the gap between the food supply and CSFII servings estimates for these food groups, an additional 2.9 servings of grain products, 12 teaspoons of caloric sweeteners, and about three-quarters of an ounce of meat or meat equivalents per person would have to be lost from the food supply each day. This is the flour equivalent of about three slices of bread, the caloric sweetener in one 16-ounce regular soft drink, or about one egg or one slice of luncheon meat per person daily. Total grain group losses would have to grow to 50-percent of edible food supplies. A total of 20 percent of the edible meat and meat alternates (boneless weight equivalent) provided by the food supply would have to be thrown away or otherwise lost to human use for food supply servings to approach the CSFII servings estimates, however, some of this "loss" is likely to be fat trim not counted in the CSFII estimates. Total caloric sweetener losses would need to increase to nearly 55 percent of available food supplies for food supply servings to decline to the 20 teaspoons reported in the 1996 CSFII.

To further test the validity of the waste and other loss factors used in this study, food supply servings were calculated without adjusting the data for retail, household, or institutional losses. Adding these losses back to the food supply consumption series moves the servings estimates for several food groups—meats, vegetables, and dairy products—from below to above Food Guide Pyramid serving recommendations for a 2,200-calorie diet (fig. 14). However, average fruit servings remain well-below minimum recommended intake at 1.8 servings. Total energy intake implied by the servings estimates increases by nearly 40 percent to about 3,700 calories.

Figure 14

Food supply servings measured with and without loss adjustment*



*Losses include retail, household, and institutional losses of edible food portions.
Source: U.S. Department of Agriculture, Economic Research Service.