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Per Capita Food Supply Trends: Progress Toward Dietary Guidelines

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Federal dietary guidance outlined in the 2000 edition of *Dietary Guidelines for Americans* and depicted in the Food Guide Pyramid is intended to help consumers choose diets that improve health, reduce their risk for diet-related chronic disease, and meet their nutritional needs (fig. 1). 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—grains (bread, cereals, rice, and pasta), vegetables, fruit, dairy (milk, yogurt, and cheese), and meat (red meat, poultry, fish, dry beans, eggs, and nuts). The Pyramid also suggests that consumers use fats, oils, and sweets sparingly. *The Dietary Guidelines* recommend that Americans limit total fat intake to no more than 30 percent of calories, saturated fat intake to less than 10 percent of calories, and dietary cholesterol to less than the Daily Value of 300 milligrams a day listed on the Nutrition Facts Label.

Information about consumers' eating patterns, if different from these recommendations, helps consumers make dietary adjustments and helps policymakers and nutrition educators target educational

messages effectively. For example, analyses of food supply data, adjusted for spoilage and waste, by USDA's Economic Research Service (ERS) suggest that the average American diet is heavily weighted to added fats and sugars found at the tip of the Pyramid and falls short of recommendations for fruits and dairy products. And many consumers need to change the mix of foods in the meat, vegetable, and grain groups to meet recommendations for dietary variety and selected food components, such as fiber, total fat, saturated fat, and cholesterol.

Food Supply Data Adjusted for Spoilage and Waste

Two primary data sets are available to measure compliance with the new *Dietary Guidelines*—USDA's Continuing Survey of Food Intakes by Individuals (CSFII) and the U.S. Food Supply Series. Both data sets provide Pyramid servings data for analyzing how American diets stack up compared to Pyramid recommendations.

The CSFII records what people say they have eaten over a specific time period and collects demographic information about respondents, such as household size, income, race, age, and sex. The demographic information is particularly valuable because it can be used

Figure 1
Dietary Guidelines for Americans

AIM FOR FITNESS...

- ▲ Aim for a healthy weight.
- ▲ Be physically active each day.

BUILD A HEALTHY BASE...

- Let the Pyramid guide your food choices.
- Choose a variety of grains daily, especially whole grains.
- Choose a variety of fruits and vegetables daily.
- Keep food safe to eat.

CHOOSE SENSIBLY...

- Choose a diet that is low in saturated fat and cholesterol and moderate in total fat.
- Choose beverages and foods to moderate your intake of sugars.
- Choose and prepare foods with less salt.
- If you drink alcoholic beverages, do so in moderation.

The *Dietary Guidelines* are issued by the U.S. Department of Agriculture (USDA) and the U.S. Department of Health and Human Services (DHHS) and are updated every 5 years to reflect new scientific findings and changes in food consumption and physical activity levels of the population. The *Dietary Guidelines for Americans* released in April 2000 is the fifth edition.

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to identify the type of persons most likely to meet dietary recommendations on the basis of social and demographic characteristics and can help researchers assess dietary status among population subgroups. The 1994-96 CSFII Pyramid Servings Data provide national probability estimates for the U.S. population based on food intakes reported by 14,256 individuals 2 years of age and older on 2 nonconsecutive days.

Numerous studies suggest that food intake surveys, like the CSFII, which collect food consumption data through recollections of foods eaten or food diaries over short periods, are subject to underreporting of consumption when measured in terms of energy intake. Underreporting of consumption is a particular concern of researchers studying the underlying causes of the steep rise in the prevalence of obesity in recent years in the United States.

Food supply data are collected directly from producers and distributors using techniques that vary by commodity. Food supply data are not collected from individual consumers, which allows examination of food consumption changes independent of consumer survey data. If waste and other losses in the system are relatively constant from year to year, food supply data also provide an independent measure of changes in food consumption patterns over time.

ERS calculates annually the amount of food available for human consumption in the United States. For most commodity categories, this available food supply is measured as the sum of annual production, beginning inventories, and imports minus exports, industrial nonfood uses, farm uses (seed and feed), and end-of-year inventories. Per capita consumption is calculated by dividing the available food supply by the total U.S. population as of July 1 each year.

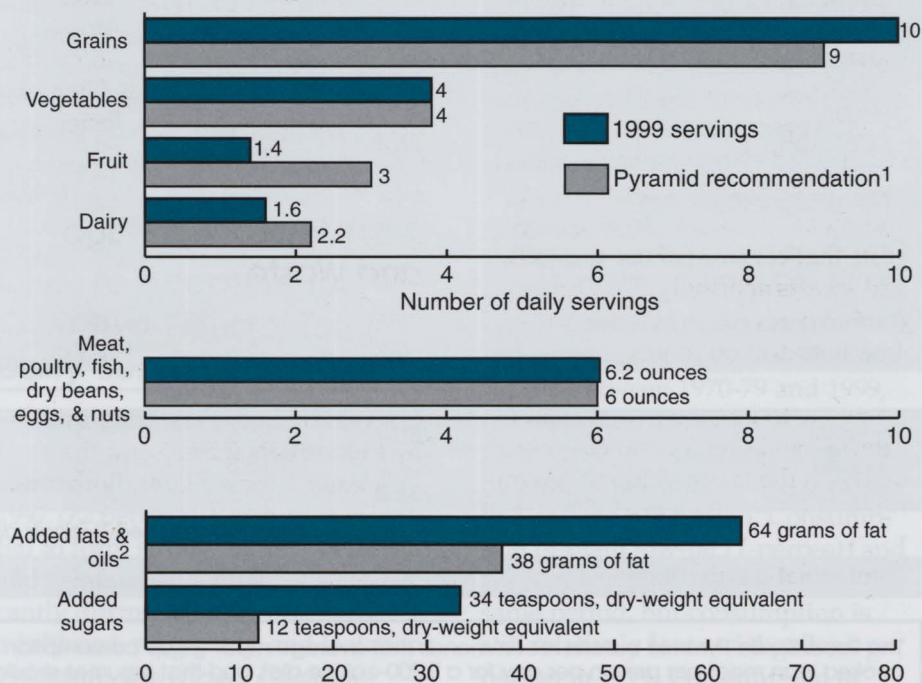
Since food supplies are measured on an aggregate level as they move through marketing channels for domestic consumption, the data typically overstate the amount of food that people actually ingest by capturing substantial quantities of nonedible food parts (like peach pits) and food lost through spoilage and waste in the home and marketing systems.

ERS has developed new methods to adjust the food supply data for losses and express the data in terms of servings recommended by the Food Guide Pyramid. Researchers can gain a more complete understanding of U.S. dietary patterns by comparing food supply servings at the national level with estimates generated at the individual level by food intake surveys. Loss-adjusted

servings calculated from the food supply data can be compared with the servings recommended by the Food Guide Pyramid to gauge America's progress in following the new *Dietary Guidelines* (fig. 2).

The Pyramid shows a range of servings for each major food group. The number of servings varies depending on a person's age, sex, and physiological status. Everyone should have at least the lowest number of servings in the food group ranges. Preschool children, 2-3 years of age, should eat smaller servings (two-thirds of the adult servings, except milk) of the lowest calorie level. ERS uses the recommended Pyramid servings for a sample diet of 2,200 calories in this article. This calorie level approximates the daily Recommended

Figure 2
1999 Food Supply Servings Compared With Food Guide Pyramid Serving Recommendations



¹Pyramid recommendation based on a sample diet of 2,200 calories.

²The 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 1997 and an upper limit on total fat consumption of 73 grams for a 2,200-calorie diet.

Source: USDA's Economic Research Service.

Energy Allowance (REA) of 2,247 calories for the United States, derived from a 1998 population-weighted average of REA's for different cohorts of the U.S. population.

Red Meat Dominates the Meat Group

In 1999, total meat consumption (red meat, poultry, fish, and shellfish) amounted to 201 pounds (boneless, trimmed-weight equiva-

lent, unadjusted for waste and cooking losses) per person, 24 pounds above the 1970's annual average (table 1). Each American consumed an average of 12 pounds less red meat (mostly less beef), 33 pounds more poultry, and 3 pounds more fish and shellfish, compared with average annual consumption in the 1970's.

The Dietary Guidelines and the Food Guide Pyramid recommend two to three servings (totaling the equivalent of 5 to 7 ounces of

cooked lean meat) of fish, shellfish, lean poultry, other lean meats, eggs, beans, or nuts daily. *The Dietary Guidelines* suggest choosing beans often, trimming fat from meat, skinning poultry, and limiting intake of organ meats, egg yolks, and high-fat processed meats, such as bacon, sausages, and cold cuts, to keep saturated fat intake and blood cholesterol in check. *The Dietary Guidelines* also advise eating moderate amounts of foods high in unsaturated fats—some fish, such as

Table 1
Americans Are Eating Less Red Meat, Fewer Eggs, and More Poultry and Fish

Item	Per capita annual averages				Change, 1970-79 to 1999	1999 food supply, Pyramid-based servings per capita per day ¹
	1970-79	1980-89	1990-99	1999		
	Pounds, edible weight ²				Percent	Ounces of cooked meat equivalents
Total meat, poultry, and fish	177.2	182.2	191.1	201.3	13	5.2
Red meat	129.5	121.8	113.7	117.7	-9	3.0
Beef	80.9	71.7	63.9	65.8	-19	1.8
Pork	45.0	47.7	48.1	50.5	12	1.2
Lamb and mutton	1.5	1.0	.9	.9	-40	—
Veal	2.0	1.3	.8	.6	-70	—
Poultry	35.2	46.2	62.6	68.3	94	1.7
Chicken	28.4	36.3	48.5	54.2	91	1.3
Turkey	6.8	9.9	14.1	14.1	107	.4
Fish and shellfish	12.5	14.2	14.8	15.2	18	.5
Dry beans, peas, and lentils (legumes) ³	7.0	6.6	8.1	8.4	20	.2
Peanuts and peanut butter	5.8	6.1	6.0	6.1	5	.1
Tree nuts and coconuts	2.3	2.6	2.7	2.7	21	.1
	Number					
Eggs	285.4	256.6	238.7	254.6	-11	.6
In-shell	251.6	218.3	178.6	181.1	-28	.4
Processed	33.8	38.3	60.1	73.5	118	.2
	Ounces of cooked meat equivalents daily ¹					
Total meat group supply ^{1,3}	5.7	5.7	5.9	6.2	9	6.2

The Food Guide Pyramid bulletin recommends that average meat group consumption should total the equivalent of 6 ounces of cooked lean meat per person per day for a 2,200-calorie diet, and that legumes should be selected often as choices from the meat group.

— = Less than 0.05. Note: Totals may not add due to rounding.

¹Adjusted for waste and cooking losses. According to the Food Guide Bulletin, consumers should count meat, poultry, and fish in total ounces. Other foods in this group—1 egg, 1/2 cup dry beans, 2 tablespoons of peanut butter, and 1/3 cup of nuts—are counted as the equivalent of 1 ounce of cooked lean meat.

²Aggregate data, unadjusted for waste and cooking losses.

³Includes all legumes consumed, including those that may have been selected as vegetable group servings.

Source: USDA's Economic Research Service.

salmon, tuna, and mackerel, and many kinds of nuts—taking care to avoid excess calories. The 2000 edition of the *Dietary Guidelines* states: "Get most of your calories from plant foods (grains, fruits, vegetables). If you eat foods high in saturated fat for a special occasion, return to foods that are low in saturated fat the next day."

For a 2,200-calorie diet, the recommended amount from the meat group is 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 this group—1 egg, 1/2 cup of dry beans, 1/2 cup of tofu, a 2-1/2-ounce soyburger, 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 6.2 ounces of cooked meat (lean and fat portion) per person per day in 1999—a modest 9-percent increase from the 1970's. Because food supply estimates for meat and poultry include both lean and fat, the estimates likely overstate lean meat consumption and are not directly comparable with the Food Guide Pyramid recommendation.

Legumes (dry beans, peas, or lentils) count either as servings in the meat or the vegetable group. As a vegetable, 1/2 cup of cooked, dry beans counts as one serving. As a meat substitute, one cup of cooked, dry beans counts as one serving (equivalent to 2 ounces of cooked lean meat). The 2000 edition of the *Dietary Guidelines* advises consumers to choose legumes often as vegetable servings and as protein sources from the meat group. Previous dietary assessment research has implied that "often" equals about one-seventh of total vegetable servings, or about four 1/2-cup servings a week for a 2,200-calorie diet. For

this analysis, we also defined "often" as equal to one-seventh of total meat group servings, or about three 1-cup servings a week for a 2,200-calorie diet. Thus, average consumption of cooked legumes should total 5 cups per week. However, total legume servings in 1999—less than 3/4 cup of cooked legumes weekly a person—fell far short of this level.

Although poultry meat consumption nearly doubled since the 1970's, red meat accounted for 49 percent of total meat-group servings per capita per day in 1999, nearly double the 27-percent poultry share. The remaining 24 percent broke down as follows: fish and shellfish, 7 percent; eggs, 10 percent; dry beans, peas, and lentils, 4 percent; peanuts and peanut butter, 2 percent; and tree nuts and coconuts, 1 percent. (The food supply series does not estimate consumption of soy products—soyburgers, tofu—other than soybean oil.) The data suggest that, on average, Americans consume large quantities of foods that, relative to others in the meat group, are naturally high in saturated fat, and cholesterol. Many consumers may need to adjust the mix of foods they eat in this group.

Cheese Accounts for Over Two-Fifths of Total Dairy Servings

Dairy products accounted for nearly three-quarters of the calcium available in the U.S. food supply in 1997 (72 percent). Calcium is essential to form strong bones and teeth, and requirements increase significantly during adolescence, early adulthood, pregnancy, and lactation. Therefore, the *Dietary Guidelines* base milk serving recommendations on age and physiology rather than energy requirements alone among the food groups. 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. All others should have two daily servings.

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 1.6 daily servings of dairy products in 1999, about three-quarters of the 2.2 servings target, which is essentially unchanged since 1970 (table 2).

A modest increase in consumption, equal to about one-half cup of milk per person daily, would bring per capita servings up to Pyramid recommendations. Because many dairy foods are naturally high in fat, consumers may need to weigh their increased consumption of dairy products against overall fat intake. In 1999, for example, more than half the dairy servings provided by the food supply came from two dairy products naturally high in fat—cheese and whole milk.

Sharp changes over time in consumption patterns for fluid milk and cheese also suggest that many consumers may be substituting one high-fat dairy food for another, with little net reduction in total dairy-fat intake. Between 1970-79 and 1999, for example, Americans reduced their average annual consumption of plain whole milk by three-fifths to 8 gallons per person. Consumption of plain low-fat (1-percent) and skim milk nearly tripled during this same period, but consumption is still relatively low at 6.4 gallons per person in 1999. Consumption of plain reduced-fat (2-percent) milk increased 60 percent to 7.5 gallons per person in 1999.

Even as Americans used less whole milk, they boosted their

Table 2
Americans Are Drinking Less Milk and Eating More Cheese and Yogurt

Item	Per capita annual averages				Change, 1970-79 to 1999	1999 food supply, Pyramid-based servings per capita per day ¹
	1970-79	1980-89	1990-99	1999		
	<i>Gallons²</i>				<i>Percent</i>	<i>Number</i>
Beverage milk	29.8	26.5	24.6	23.6	-21	.70
Plain	28.1	24.9	23.1	22.0	-22	.66
Whole	20.9	13.9	8.8	8.0	-62	.24
2-percent fat	4.7	7.7	8.5	7.5	60	.23
1-percent fat	1.0	1.8	2.5	2.6	160	.08
Skim	1.4	1.5	3.4	3.8	171	.12
Flavored	1.2	1.1	1.2	1.4	15	.04
Buttermilk	.6	.5	.3	.3	-50	.01
	<i>Half-pints²</i>					
Yogurt	3.2	6.5	8.5	9.1	184	.03
	<i>Pounds²</i>					
Total cheese (excluding cream cheese) ³	18.6	24.3	27.8	30.2	76	.68
Cheese other than cottage-types ^{3,4}	13.7	20.2	24.9	27.5	107	.67
Natural cheese	9.3	15.3	20.1	22.9	146	.54
Cheddar	6.3	9.0	9.3	10.1	60	.20
Mozzarella	2.0	4.5	8.0	9.2	360	.18
Cheese content of processed cheese products ⁵	4.3	5.0	4.8	4.6	6	.13
Cottage cheese	4.9	4.1	2.9	2.7	-45	.01
Frozen dairy products ⁶	27.8	27.4	29.1	29.3	5	.09
Ice cream	17.7	17.7	16.1	16.8	-5	.06
Low-fat ice cream	7.6	7.2	7.6	7.9	4	.03
Sherbet	1.5	1.3	1.3	1.3	-9	.00
Frozen yogurt	na	na	2.9	2.1	na	.01
Condensed and evaporated milks	9.4	7.5	7.5	6.6	-30	.04
Dry milks	4.1	2.4	3.1	3.6	-12	.10
	<i>Number of daily servings¹</i>					
Total dairy group supply ¹	1.6	1.6	1.6	1.6	4	1.64

The Food Guide Pyramid bulletin suggests three servings—the equivalent of three 8-ounce glasses of milk per day—for teenagers, young adults up to 24 years of age, and pregnant and lactating women. Two daily servings of dairy foods are recommended for children and most other adults. In this study, average servings were compared with 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).

na = Not available. Note: Totals may not add due to rounding. Percentages computed from unrounded data.

¹Adjusted for losses and waste. One cup of milk or yogurt, 1-1/2 ounces of natural cheese, 2 ounces of processed cheese, 2 cups of cottage cheese, 1-1/2-cups of ice cream, 1/2 cup of canned evaporated milk, or 1/4 cup of dry milk or buttermilk count as one serving.

²Aggregate data, unadjusted for losses and waste.

³Cream cheese is counted in added fats.

⁴Excludes full-skim American, cottage, pot, and baker's cheese.

⁵Processed cheese is made by pasteurizing, emulsifying, and blending natural cheese.

⁶Includes items not shown separately, such as mellorine (from 1970-90).

Source: USDA's Economic Research Service.

cheese consumption. Total and saturated fats per serving in many cheeses are as high or higher than whole milk. When butter and fluid cream products (including sour cream) are included, total per capita consumption of milkfat increased slightly between 1970-79 and 1999.

(Cream products and butter are classified as added fats rather than as part of the dairy group in our tables.) Average annual per capita consumption of fluid cream products rose by more than 80 percent between 1970 and 1999 to 18 half-pints per person.

People Eat Fewer Fruits Than Recommended

The food supply provided 1.4 servings per person per day of fresh and processed fruit and fruit juices in 1999, less than half the 3 fruit servings a day recommended by the

Table 3
Three Fruits—Oranges, Apples, and Bananas—Contributed One Half of Total Daily Fruit Servings in 1999

Item	Per capita annual averages							Change, 1970-74 to 1999	1999 food supply, Pyramid-based servings per day ¹
	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	1999		
	Pounds, fresh-weight equivalent ²							Percent	Number
Total fruit ³	240.0	257.5	266.0	275.3	277.1	290.9	297.9	24	1.40
Fresh fruit	97.6	101.2	107.6	118.6	120.7	129.6	132.5	36	.73
Processed fruit	142.3	156.3	158.4	156.7	156.4	161.3	165.3	16	.68
Citrus, melons, and berries ³	141.5	151.6	148.2	143.8	142.0	156.3	157.2	11	.62
Fresh citrus ⁴	27.9	26.6	24.7	23.7	23.1	24.8	20.7	-26	.09
Oranges	15.0	13.8	13.0	12.8	12.2	12.5	8.6	-43	.04
Grapefruits	8.4	8.2	7.0	6.3	5.7	6.0	5.9	-30	.02
Melons ⁴	20.0	19.1	20.5	24.7	24.8	28.6	30.5	52	.15
Watermelon	12.6	12.0	12.1	13.3	14.1	15.7	15.8	26	.08
Cantaloupe	6.5	5.8	6.8	9.1	8.7	10.6	11.9	84	.06
Berries ⁴	3.5	3.5	4.0	5.1	6.1	6.8	7.1	103	.07
Fresh and frozen strawberries	2.9	3.0	3.5	4.3	4.8	5.5	5.8	100	.06
Kiwifruit	na	na	na	.2	.5	.5	.6	na	.01
Juices ⁴	90.1	102.4	99.0	90.3	88.0	96.1	98.9	10	.30
Orange juice	73.6	85.8	83.3	77.1	73.8	80.3	83.6	14	.27
Other fruit ⁴	98.5	105.9	117.8	131.5	135.1	134.6	140.7	43	.78
Fresh bananas	18.0	19.5	21.6	24.7	26.3	28.6	31.4	74	.15
Fresh apples	16.3	17.6	18.0	19.4	19.2	18.9	18.8	16	.10
Apple juice	5.9	8.2	14.7	18.5	20.2	20.5	21.8	272	.08
Fresh grapes	2.8	3.4	5.1	7.3	7.3	7.6	8.2	197	.08
Canned applesauce	5.5	5.1	5.0	5.3	5.4	5.0	5.1	-7	.03
Canned peaches	6.4	5.8	4.4	4.1	4.0	3.6	3.7	-43	.04
Raisins	5.8	6.8	8.0	9.1	8.1	7.7	7.2	22	.04
Fresh peaches and nectarines	4.8	5.6	6.3	6.0	5.9	5.1	5.3	10	.03
Canned pears	3.7	4.2	4.0	3.6	3.6	3.2	3.5	-7	.03
	Servings per capita per day ¹								
Total fruit ¹	1.06	1.12	1.17	1.27	1.30	1.36	1.40	28	1.40

The Food Guide Pyramid bulletin recommends three servings of fruit a day for a 2,200-calorie diet.

na = Not available. Note: Percentages computed from unrounded data.

¹Inedible portions removed and adjustments made for spoilage and waste. One medium apple, banana, or orange; 1/2 cup of chopped, cooked, or canned fruit; 1/4 cup of dried fruit; or 3/4 cup of fruit juice count as one serving.

²Inedible portions, spoilage, and waste included.

³Totals may not add due to rounding.

⁴Includes food item(s) not shown separately.

Source: USDA's Economic Research Service.

Food Guide Pyramid for a 2,200-calorie diet (table 3). This shortfall is particularly troublesome given scientific evidence linking frequent consumption of fruits and vegetables with substantially reduced risk of many chronic diseases, including certain cancers.

When measured in Pyramid servings, average fruit consumption has inched up 0.3 serving a day since the early 1970's—the equivalent of a third of a medium banana or apple or 1.75 ounces of fruit juice.

Consistent with recommendations, total fruit servings were fairly evenly divided between two fruit subgroups—citrus, melons, and berries (0.62 serving) and other fruit (0.78 serving). However, the data suggest that many consumers do not incorporate adequate variety into their daily diet. Six foods, out of more than 60 fruit products included in the food supply data, accounted for more than half (55 percent) of total fruit servings in 1999—orange juice (19 percent), bananas (11 percent), fresh apples (7 percent), apple juice (6 percent), watermelon (6 percent), and fresh grapes (6 percent).

Eating a wide variety of fruits and vegetables is important because different fruits and vegetables are rich in different nutrients. For example, a fresh orange has 27 times the fiber content of orange juice, and many less frequently consumed fruits (blueberries and cranberries) and vegetables (kale and beets) are excellent sources of protective phytochemicals. Some fruits and vegetables—orange vegetables like carrots and sweet potatoes; dark-green leafy vegetables like spinach; orange fruits like cantaloupe and apricots; and tomatoes—are excellent sources of carotenoids, including those which form vitamin A. Others (citrus, kiwi, strawberries, cantaloupe, broccoli, peppers, tomatoes, cabbage, potatoes, romaine lettuce, and spinach) are excellent sources of vitamin C. Still others (cooked dry

beans, oranges, dark-green leafy vegetables, and green peas) are good sources of folate. Potatoes, cooked greens, winter squash, bananas, dried fruits, orange juice, and cooked dry beans are excellent sources of potassium.

Potatoes Dominate Among Vegetables

Our vegetable consumption tells the same story—consumers tend to eat a limited variety of vegetables. While food supply servings met the overall recommendation, consumption was concentrated in a small number of foods. The food supply provided a daily average of four servings of fresh, frozen, canned, and dehydrated vegetables (including dry beans, peas, and lentils) in 1999, equal to the minimum four daily servings recommended for a 2,200-calorie diet (table 4). Per capita servings grew 28 percent, or nearly a whole (0.87) vegetable serving, between the early 1970's and 1999.

Five foods—iceberg lettuce, frozen potatoes, fresh potatoes, potato chips, and canned tomatoes—accounted for 52 percent of total vegetable servings in 1999. Legumes made up 6 percent of total consumption. Another 16 percent of total vegetable servings came from dehydrated potatoes (mainly instant potatoes), fresh tomatoes, fresh carrots, and fresh onions. No other single food, out of more than 70 vegetable foods in the food supply data, accounted for more than 3 percent of total vegetable consumption, or 0.1 serving. (Note: fresh, frozen, or canned vegetables are counted as three different foods.)

Dietary guidance suggests that consumers divide their total vegetable servings into three subgroups—dark green leafy and deep yellow vegetables; starchy vegetables, including potatoes, dry beans, peas, and lentils; and other vegetables. Thus, for a 2,200-calorie diet with a minimum serving recom-

mendation of 4 servings daily, consumption would be expected to be evenly divided at 1.3 servings from each subgroup. Within these groups, dark-green leafy vegetables and dry beans, peas, and lentils should account for 0.6 servings or about three-sevenths of total subgroup consumption, and deep yellow and other starchy vegetables should account for 0.8 servings or four-sevenths of their subgroups.

Average vegetable consumption tilted to starchy vegetables, especially white potatoes, in 1999, however. Frozen potatoes (mostly french fries) and potato chips together accounted for 43 percent of starchy vegetables servings and 17 percent of total vegetable servings. Consumption of dark-green leafy vegetables and deep yellow vegetables combined totaled 0.4 serving per capita per day, well below the 1.3 daily servings suggested for a 2,200-calorie diet. Likewise, average consumption of dry beans, peas, and lentils was woefully low.

Refined Grain Servings Are Higher than Recommended

The food supply provided 10 servings of flour and other commodities in the bread, cereals, rice, and pasta group in 1999, suggesting that many consumers met the 9-serving Pyramid recommendation for a 2,200-calorie diet (table 5). Total daily servings were nearly 50 percent higher than in the early 1970's. Increased consumption of white and whole wheat flour accounted for half of the increase. A threefold increase in corn products (used for some snack foods and Mexican-style foods like tortillas) and rice and a 54-percent increase in durum flour (used for pasta) consumption accounted for additional grain group servings.

The actual number of per capita daily servings from the grains group

Table 4

Iceberg Lettuce, Frozen Potatoes (Mainly French Fries), and Potato Chips Constituted More Than A Third of Total Daily Vegetable Servings in 1999

Item	Per capita annual averages							Change, 1970-74 to 1999	1999 food supply, Pyramid-based serving per capita per day ¹
	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	1999		
	Pounds, fresh-weight equivalent ²							Percent	Number
Total vegetables	335.5	340.1	339.0	364.3	399.0	418.0	421.2	26	4.00
Fresh vegetables	148.1	145.7	148.7	162.7	173.6	185.9	192.1	30	2.13
Processed vegetables	187.3	194.4	190.3	201.5	225.4	232.1	229.1	22	1.86
Canned	102.1	100.0	98.8	99.1	112.7	108.6	105.7	4	.62
Frozen	47.3	56.9	56.5	65.5	72.9	82.4	82.5	74	.59
Dehydrated (includes dry beans)	21.3	21.3	17.8	19.4	22.7	25.0	24.6	15	.42
Potato chips	16.6	16.1	17.2	17.6	17.1	16.2	16.3	-2	.23
Dark green leafy vegetables	4.0	4.5	5.5	10.2	12.4	15.8	17.1	328	.15
Escarole, romaine, and leaf lettuces	.6	.5	.4	3.3	4.9	6.6	6.5	1,063	.07
Broccoli	1.7	2.3	3.5	5.3	5.8	7.4	8.2	386	.06
Spinach	1.8	1.7	1.6	1.5	1.6	1.8	1.8	2	.02
Deep yellow vegetables	15.2	14.5	14.5	14.8	17.8	21.7	22.0	45	.23
Carrots	10.2	9.4	9.7	10.4	13.5	17.3	17.6	73	.20
Sweet potatoes	5.0	5.1	4.8	4.5	4.3	4.3	4.0	-21	.03
Dry beans, peas, and lentils (legumes) ³	7.2	6.7	6.2	6.9	7.8	8.2	8.6	19	.24
Other starchy vegetables	152.7	153.6	146.7	154.2	164.6	174.9	173.1	13	1.38
Total potatoes	118.9	121.3	117.4	124.7	133.1	142.2	139.8	18	1.24
Fresh potatoes	55.5	49.5	48.4	48.5	49.3	49.4	49.2	-11	.38
Frozen potatoes	31.7	40.4	39.7	45.9	51.6	59.4	59.5	88	.46
Corn	27.8	26.9	24.6	25.2	27.2	29.0	29.7	7	.11
Peas	5.1	4.7	4.3	3.9	3.9	3.5	3.5	-31	.03
Other vegetables	156.3	160.7	166.1	178.2	196.5	196.7	197.5	26	2.00
Iceberg lettuce	22.8	24.8	24.6	25.4	25.9	23.2	25.3	11	.60
Canned tomatoes	63.0	62.7	62.5	64.5	76.0	74.4	72.8	15	.26
Fresh tomatoes	12.0	12.4	13.1	16.0	15.9	17.5	17.8	48	.13
Fresh onions	10.6	11.0	11.9	14.0	16.3	18.5	18.6	76	.10
Cabbage	11.1	10.7	10.3	10.4	10.3	9.9	9.3	-16	.06
Bell peppers	2.4	2.7	3.1	4.2	5.6	6.7	6.7	179	.07
Celery	7.3	7.1	7.2	6.9	7.2	6.3	6.2	-16	.07
Cucumbers	8.5	9.4	9.5	10.2	9.7	10.9	11.1	31	.06
	Servings per capita per day ^{2,3}								
Total vegetables ^{1,3}	3.12	3.19	3.17	3.40	3.66	3.80	4.00	28	4.00
Cruciferous vegetables ⁴	.12	.13	.14	.16	.16	.15	.14	18	.14

The Food Guide Pyramid bulletin recommends four servings of vegetables a day for a 2,200-calorie diet.

Note: Totals may not add due to rounding. Percentages computed from unrounded data.

¹Excludes inedible portions and adjusts for spoilage and waste. One cup of raw leafy greens, 1/2 cup of other vegetables—cooked or chopped raw—or 3/4 cup of vegetable juice count as one serving.

²Includes inedible portions, spoilage, and waste.

³Includes all legumes consumed, including those that may have been selected as meat group servings.

⁴Cruciferous vegetables (members of the cabbage family) are not mentioned per se in the *Dietary Guidelines for Americans*. However, the Committee on Diet, Nutrition, and Cancer of the National Research Council advised the public in 1982 to eat more carotene-rich (dark green and deep yellow) vegetables and cruciferous vegetables (cabbage, broccoli, cauliflower, and Brussels sprouts) to lower the risk of certain cancers.

Source: USDA's Economic Research Service.

was probably higher than indicated because the food supply series fails to count many grain foods, particularly whole grain items. For example, the series excludes wheat foods not manufactured directly from wheat flour or bulgur, such as wheat bran, wheat germ, wheat berries, and products manufactured directly from these items, such as Wheaties, Shredded Wheat, Puffed Wheat, and All-Bran breakfast cereals and Triscuit crackers. Similarly, it excludes whole grain foods made directly from field corn and corn bran, such as corn tortilla snack chips and some breakfast cereals, and popcorn. In addition, the food

supply series excludes many whole grains that Americans rarely eat, such as amaranth, buckwheat, millet, kamut, quinoa, spelt, and triticale, as well as flours milled from these grains.

The U.S. Census of Manufactures series provides some information about whole grain foods, which the food supply series does not have. Using the most recent census data, ERS researchers estimate that the inclusion of wheat germ, wheat bran, popcorn, and whole field corn used in snack foods and some tortillas would add more than 18 pounds of grain foods per person to the official 1999 per capita food sup-

ply series (unadjusted for loss and waste), or roughly one serving per capita per day. Unpopped popcorn sold in consumer-size packages and popcorn used in manufactured products like Cracker Jack and Poppycock totaled more than 8 pounds per capita in 1997, or 0.43 serving a person a day. If bulk sales of popcorn to movie theater chains and the like, which are unmeasured but undoubtedly substantial, also were included, the contribution of popcorn to total grain intake would likely be more than a two-thirds serving a person a day.

While the food supply data suggest that average total grain con-

Table 5
Per Capita Grain Consumption Has Jumped by Nearly 50 Percent Since the Early 1970's¹

Item	Per capita annual averages							Change, 1970-74 to 1999	1999 food supply, Pyramid-based serving per capita per day ²
	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	1999		
	Pounds ³							Percent	Number
Total flour and cereal products ²	135.1	141.2	147.0	167.9	186.8	198.6	201.9	49	9.97
Total wheat flour	111.0	116.1	117.3	128.3	139.9	146.9	148.4	34	7.69
White and whole wheat flour	103.9	109.0	110.8	119.1	127.2	134.5	137.5	32	7.39
Durum wheat flour ⁴	7.1	7.1	6.5	9.2	12.7	12.4	10.9	54	.30
Rye flour	1.2	.8	.7	.6	.6	.6	.5	-54	.02
Rice (milled)	7.2	7.4	10.1	12.6	16.7	18.7	19.4	170	.51
Total corn products	10.2	11.8	14.1	20.4	22.6	27.0	28.4	178	1.53
Corn flour and meal	6.3	6.5	8.2	13.0	15.3	17.1	17.7	180	.96
Hominy and grits	2.0	3.0	2.9	3.3	3.0	5.0	5.9	201	.25
Corn starch	2.0	2.4	3.1	4.1	4.2	4.9	4.8	147	.32
Oat products	4.7	4.1	3.8	5.0	6.3	4.9	4.5	-5	.20
Barley products	.9	1.0	1.0	.9	.7	.7	.7	-18	.02
	Servings per capita per day ³								
Total flour and cereal products ²	6.78	7.10	7.36	8.35	9.26	9.77	9.97	47	9.97

The Food Guide Pyramid recommends nine servings of grain products a day for a 2,200-calorie diet.

Note: Totals may not add due to rounding.

¹Excludes quantities used in alcoholic beverages and fuel. Excludes popcorn and some other whole grain foods.

²Adjusted for spoilage and waste. Servings are calculated based on a grain equivalent. The amount of flour in 1 slice of bread; 1 ounce of ready-to-eat cereal; or 1/2 cup of cooked cereal, rice, or pasta count as one serving.

³Unadjusted for spoilage and waste.

⁴Includes flour equivalent of imported pasta products.

Source: USDA's Economic Research Service.

sumption 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. Cakes, cookies, pastries, and pies—all high in fat and sugar—accounted for 13 percent of average total grain consumption in the 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII). Grain-based snack foods (crackers, popcorn, pretzels, and corn chips) accounted for another 4 percent. Actual consumption of grain-based sweets and snacks may be higher, as people tend to underreport snack and binge eating.

Whole wheat flour accounted for less than 2 percent of total wheat flour provided by the food supply in 1992, the latest year for which data are available. This shortfall in whole grain servings is confirmed by data from the 1994-96 CSFII, which indicate that average consumption of foods made from whole grains stood at about one serving per person per day, well below the minimum three servings recommended.

Consumption of Added Fats Skyrockets

After adjusting for losses and the nonfat portion of composite prod-

ucts like margarine, the per capita food supply provided 64 grams of added fats and oils in 1999, a 32-percent increase from the 49 grams available for consumption in the early 1970's (table 6).

Fats are added in cooking and at the table and in many processed food products, including baked goods, french fries, and snack foods. Added fat in processed foods may not be visible to consumers, who are typically not aware of the fat content. These added fats are consumed in addition to those that occur naturally in red meats, poultry, fish, nuts, eggs, and dairy products.

Although a healthful diet requires some dietary fat, excessive fat intake

Table 6
Average Consumption of Salad and Cooking Oils Increased by Three-Quarters Between 1970-74 and 1999

Item	Per capita annual averages							Change, 1970-74 to 1999	1999 food supply, added fats per capita per day ¹
	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	1999		
	Pounds, product weight ²							Percent	Grams
Salad and cooking oils	16.8	19.5	22.3	24.9	26.4	27.8	29.4	75	28.9
Shortening	17.2	17.6	19.0	21.9	23.3	21.7	21.6	26	17.3
Margarine	11.0	11.4	10.8	10.6	10.7	8.7	8.1	-26	6.3
Lard (direct use) ³	3.6	2.5	2.1	1.5	1.4	1.9	2.0	-45	1.2
Edible beef tallow (direct use) ³	na	.4	1.4	1.2	1.8	3.0	3.7	na	2.3
Other edible fats and oils ⁴	2.2	1.9	1.6	1.4	1.5	1.4	1.6	-27	1.9
Dairy fats	na	na	na	na	na	na	na	na	5.8
Butter	5.0	4.4	4.6	4.6	4.5	4.5	4.8	-4	3.7
Cream cheese	.6	.8	1.1	1.4	2.0	2.2	2.4	266	0
	Half pints ²								
Heavy cream	1.0	1.1	1.5	2.1	2.5	3.5	3.9	276	.7
Light cream	.7	.6	.5	.8	.7	.9	1.2	76	.1
Sour cream	2.3	3.1	3.7	4.5	5.0	5.6	5.8	147	.5
Half and half	4.9	4.5	4.7	5.8	5.8	6.2	6.6	34	.2
	Grams per capita per day ¹								
Total added fats ¹	48.5	50.6	54.3	58.9	61.9	61.6	63.8	32	63.8

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. In 1999, added fats alone accounted for 87 percent of this suggested upper limit.

na = Not applicable or not available. Note: Totals may not add due to rounding.

¹Adjusted for losses and waste. Fat content of butter and margarine calculated at 80 percent. One gram of fat equals 9 calories.

²Aggregate data, unadjusted for losses and waste.

³Excludes use in margarine and shortening.

⁴Specialty fats used mainly in confections and nondairy creamers.

Source: USDA's Economic Research Service.

is associated with increased blood cholesterol, heart disease, and some cancers. The *Dietary Guidelines* recommend that people limit 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.

The food supply data suggest that most consumers do not meet this recommendation. In 1999, added fats alone accounted for 87 percent of the recommended upper daily limit for total fat intake—or about 26 percent of total calories for a 2,200-calorie diet. Per capita consumption of salad and cooking oils, which is up by three-quarters since the early 1970's, accounted for

nearly half (45 percent) of added fats in 1999. These oils, which are largely unsaturated, are used mainly in mayonnaise and salad dressings. Animal fats—including lard, edible beef tallow, butter, and other dairy fats—which are major sources of saturated fats, accounted for 15 percent of added fats in 1999. Shortening and margarine, which are major sources of trans fatty acids, accounted for more than a third (37 percent) of added fats in 1999. Trans fatty acids and saturated fat raise blood cholesterol and increase risk of heart disease.

According to food supply nutrient data for 1997, added fats accounted for 52 percent of the total fat provided by the food supply. Assuming

that added fats continue to account for about 52 percent of the total fat provided by the food supply, Americans must, on average, consume two-fifths less added fat to bring total fat (added fat and naturally-occurring fat) consumption close to the recommended upper limit of 30 percent of calories.

Added Sugars Consumption Is Nearly Triple Dietary Targets

Although our body cannot distinguish between naturally occurring and added sugars, dietary guides focus on added sugars because foods high in added sugars often

Table 7
Average Consumption of Added Sugars Increased 29 Percent From 1980-84 to 1999

Item	Per capita annual averages							Change, 1970-74 to 1999	1999 food supply, added sugars per capita per day ¹
	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	1999		
	Pounds, dry-weight equivalent ²							Percent	Teaspoons
Total caloric sweeteners	123.6	123.8	122.4	130.6	141.6	153.6	158.4	29	34.1
Refined cane and beet sugar	100.5	91.5	74.7	62.0	64.4	66.7	67.9	-9	14.6
Corn sweeteners	21.7	30.9	46.4	67.3	75.8	85.6	89.1	92	19.2
High fructose corn syrup	1.5	9.4	27.4	47.1	52.8	62.0	66.2	142	14.2
Glucose	15.7	17.5	15.6	16.5	19.1	19.7	19.3	24	4.2
Dextrose	4.6	3.9	3.4	3.6	3.9	3.8	3.6	6	.8
Edible syrups	.5	.4	.4	.4	.4	.4	.4	0	.1
Honey	.9	1.0	.9	1.0	1.0	1.0	1.1	29	.2
	Teaspoons per capita per day								
Total caloric sweeteners supply									
Not adjusted for loss and waste ²	42.1	42.2	41.7	44.5	48.2	52.0	54.0	29	54.0
Adjusted for loss and waste	26.4	26.6	26.4	28.1	30.5	32.8	34.1	29	34.1

The Food Guide Pyramid bulletin recommends that people limit their consumption of added sugars to no more than 12 teaspoons daily for a 2,200-calorie diet. In 1999, average consumption of added sugars was nearly 3 times this suggested upper limit.

Note: Totals may not add due to rounding

¹Adjusted for loss and waste.

²Aggregate data, unadjusted for loss and waste. One teaspoon of sugar equals 15 calories.

Source: USDA's Economic Research Service.

supply calories but few nutrients, the so-called empty calories. High intake of sugary snack foods and desserts—colas, candy, cookies—and reduced intake of nutrient-rich foods—fruits, vegetables, grains—cuts needed nutrients.

To maintain nutritious diets and healthy weights, the Food Guide Pyramid advises consumers to limit added sugars to 12 teaspoons a day for a 2,200-calorie diet. After adjusting for losses, the food supply provided 34 teaspoons of added sugars (refined cane and beet sugar, corn sweeteners, edible syrups, and honey) per person per day in 1999—about the amount in 3-3/4 regular 12-ounce colas (table 7). Average

annual consumption of caloric sweeteners grew by 29 percent between 1980-84 and 1999.

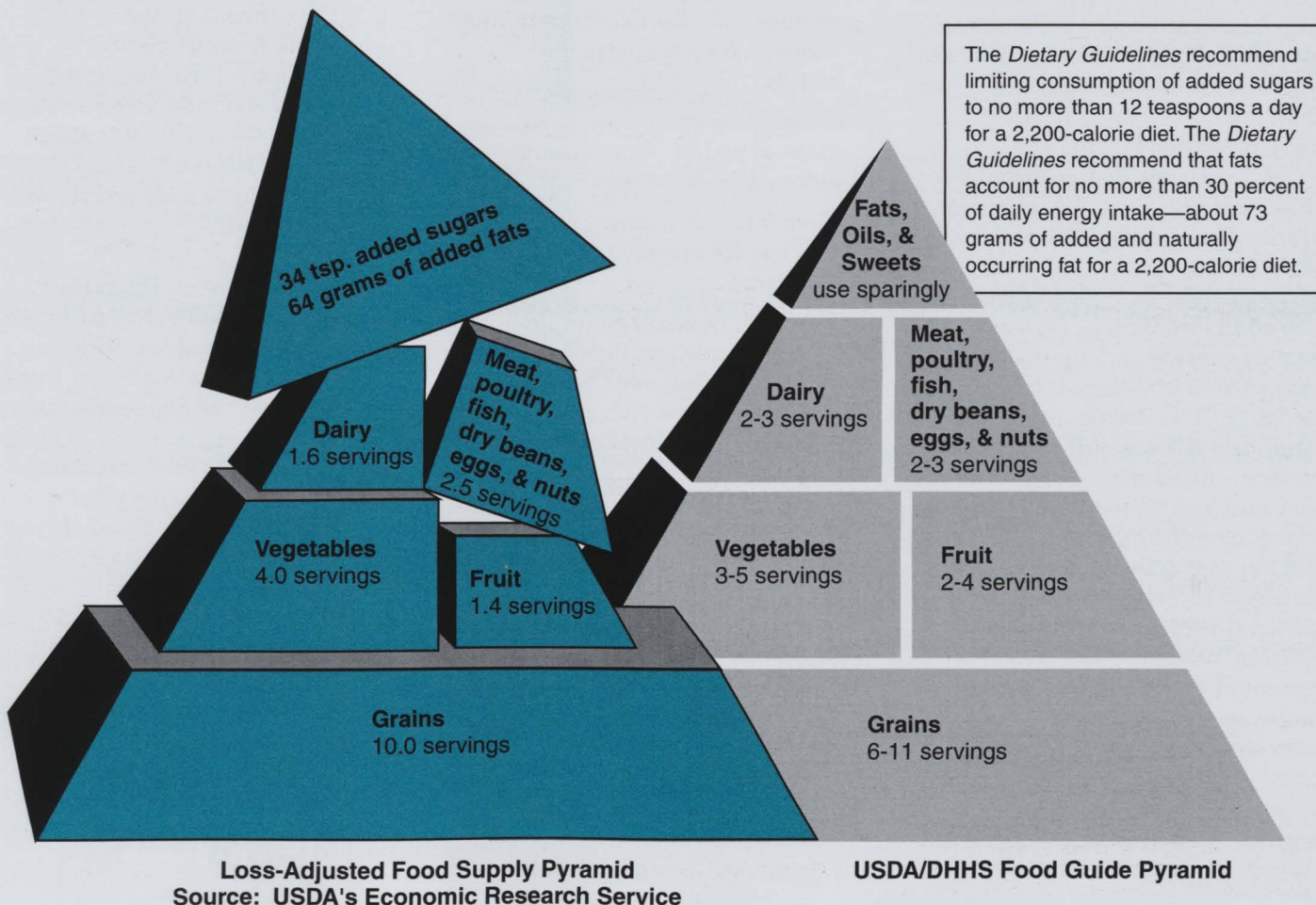
The ability of consumers to moderate their consumption of added sugars is complicated by the fact that caloric sweeteners are likely to be “hidden” in prepared foods. Although the food label mandated by the 1990 Nutrition Labeling and Education Act requires manufacturers to disclose the total sugar content of food, the label does not distinguish total sugars from added sugars, which may sometimes make it difficult for consumers to determine how much added sugar they actually consume. A coalition of leading health experts and organiza-

tions, concerned about the climbing rates of obesity and the rising level of added sugars consumption in the United States, has asked the U.S. Food and Drug Administration to require that food labels state the amount of sugar added to soft drinks, ice cream, and other foods.

Topsy-Turvy American Diet Fuels Rise in Obesity and Related Chronic Diseases

The average American has an unbalanced diet when compared with the recommended servings from the Food Guide Pyramid.

Figure 3
The Unbalanced American Diet



Instead of resembling a well-built pyramid, consumption based on loss-adjusted food supply data reflects a precariously built or tumbling pyramid, top heavy with added sugars and added fats (fig. 3). The midsection of the pyramid sags from underconsumption of fruits, dark green leafy and deep yellow vegetables, dry beans, fish, nuts, and lowfat dairy products. The base of the pyramid—the grain group—is somewhat larger than that recommended by the Food Guide Pyramid but is weakened by heavy consumption of refined grain foods (often loaded with fat and sugars) and woefully low consumption of fiber- and nutrient-rich whole grains (thought to decrease the risk of heart disease, diabetes, and some cancers).

Americans' weight gain over the last 20 years is no mystery. An unbalanced, increasingly high-calorie American diet largely explains why Americans continue to put on pounds. Initial results from the 1999 National Health and Nutrition Examination Survey (NHANES), using measured heights and weights, indicate that an estimated 61 percent of U.S. adults are either overweight or obese, compared with 56 percent in 1994 and 46 percent in the late 1970's. In 1999, 26 percent of U.S. adults were obese (at least 30 pounds overweight), up from 23 percent in 1988-94 and 15 percent in the late 1970's. Obesity puts one at significant risk for serious health problems like diabetes, hypertension, and heart disease. Loss-adjusted food supply data suggest that average daily calorie intake increased about 15 percent between 1984 and 1994, and remained stable between 1994 and 1997. Nearly 90 percent of that 15-percent increase in average calorie intake stemmed from higher consumption of refined grains (42 percent), added sugars (23 percent), and added fats (23 percent).

Obesity prevention requires changes in individual behavioral patterns as well as eliminating environmental barriers to healthful food choices and active lifestyles—both exceedingly difficult to achieve. In the January-February 2000 issue of *Public Health Reports*, nutrition professor Marion Nestle and nutrition activist Michael Jacobson recommend major governmental and societal changes to reduce the prevalence of obesity. Their paper, "Halting the Obesity Epidemic: A Public Health Approach," urges legislators, researchers, educators, businesses, urban planners, transportation experts, and nonprofit groups to fight obesity in a more creative way and to take immediate action. Specific recommendations include:

- Mounting large-scale mass-media campaigns to promote healthier diets and physical activity.
- Requiring chain restaurants to provide information about calorie content on menus or menu boards.
- Designating more downtown areas as pedestrian malls and automobile-free zones.
- Having health-insurance companies pay for effective weight-loss programs.
- Changing government policies and corporate practices, including a ban in schools on the sale of soft drinks, candy bars, and other foods high in calories, fat, and sugar.

Nestle and Jacobson conclude: "Ending the obesity epidemic will require much greater knowledge of effective diet and activity strategies than is currently available. The research focus must extend beyond genetic, metabolic, and drug development studies to encompass—and emphasize—population-based behavioral interventions, policy development, and program evaluation."

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