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Americans Consuming More Grains and Vegetables, Less Saturated Fat

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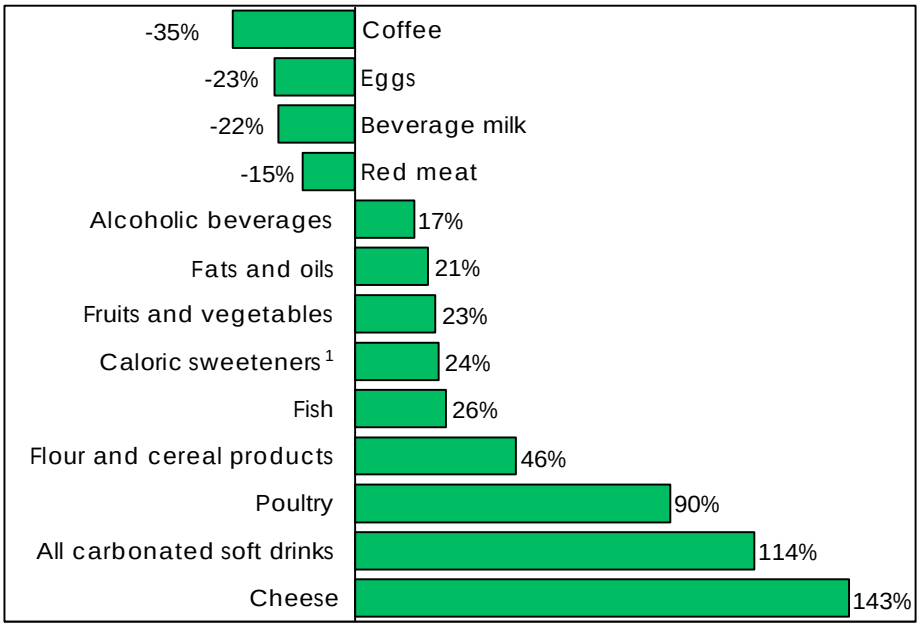
In 1996, each American consumed an average of 77 pounds more of commercially grown vegetables than in 1970, 62 pounds more grain products, 54 pounds more fruits, 31 pounds more poultry, 10 gallons more milk lower in fat than whole milk, 20 pounds less red meat, 73 fewer eggs, and 17 gallons less whole milk (fig. 1). In 1994 (the latest year for which nutrient data are available), meat, poultry, and fish contributed nearly a third less saturated fat to the per capita food supply than in 1970, and beverage milk contributed a half less saturated fat. Similarly, eggs' contribution to total dietary cholesterol declined by a fourth between 1970 and 1994, and beverage milk's contribution declined by a half.

A variety of factors are responsible for the changes in U.S. consumption patterns in the last 25 years, including changes in consumer preferences, relative prices, increases in real (adjusted for inflation) disposable income, and more food assistance for the poor. New products, particularly more convenient ones, also contribute to shifts in consumption, along with more imports, growth in the away-from-home food market, expanded advertising programs, and changes in food-enrichment standards and fortification policy. Sociodemographic trends also driving changes in food choices include smaller households, more two-earner households, more single-parent households, an aging population, and increased ethnic diversity. An expanded scientific base relating diet and health, new *Dietary Guidelines for Americans* designed to help people make food choices that promote health and prevent disease, improved nutrition labeling, and burgeoning consumer interest in nutrition also influence marketing and consumption trends.

Consistent with dietary and health recommendations, Americans now consume two-fifths more grain products and a fifth more fruits and vegetables per capita than they did in 1970, eat leaner meat, and drink lower fat milk. Many people have traded the typical high-fat eggs-and-

Figure 1
The U.S. Per Capita Food Supply Changed Markedly Between 1970 and 1996



Note: [1]Includes caloric sweeteners used in soft drinks.

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bacon breakfast of 1970 for more convenient ready-to-eat breakfast cereals, most of which are fortified with selected vitamins and minerals. Moreover, a steady increase in the proportion of refined flour that is enriched (from 65 percent in 1970 to more than 90 percent today), changes in flour-enrichment standards in 1974 and 1983, along with big increases in grain product consumption since 1984, have boosted per capita supplies of four nutrients lost in the milling process and approximately replaced by manufacturers—iron, niacin, thiamin, and riboflavin.

The typical supermarket fresh-produce department carries more than two-and-a-half times as many items today as in the mid-1970's. Increases in domestic production, rising imports, and improved storage facilities afford year-round availability of many fresh foods. Thanks to genetic research, today's carrots and squashes deliver twice as much beta carotene (a nutrient that the body converts to vitamin A) as they did in 1970 and today's grapes are much sweeter than years ago (and consumption has tripled since 1970).

But contrary to recommendations, Americans are consuming record-high amounts of caloric sweeteners and some high-fat dairy products, and near record amounts of added fats—including salad and cooking oils and baking and frying fats. Moreover, a hefty increase in grain consumption reflects higher consumption of mostly refined, rather than high-fiber, whole-grain products—less than 2 percent of the 148 pounds of wheat flour consumed per capita in 1996 was whole wheat flour. (Most nutrients lost during processing, including fiber, vitamins, minerals, and phytochemicals, are not restored to refined flour.) Potatoes used for fat-laden products like frozen french fries (eaten mostly in fast-food eateries), potato chips, and shoestrings accounted for 11 percent of total U.S. per capita fruit and vegetable supplies (fresh-weight basis) in 1995, compared with 8 percent in 1970.

Evidence from various sources suggests that the average American now consumes more food, more snacks, bigger portions, and more calories than in 1970. A 15-percent increase during 1970-94 in the level of food energy (calories) in the U.S. per capita food supply reflects higher levels of all three energy-yielding nutrients: carbohydrates, fat, and protein. More calories, along with reductions in average physical activity (or energy expenditure), are behind an increase in obesity among adults, adolescents, and children in America. In fact, one-third of adults was overweight in the early 1990's, compared with one-quarter in the late 1970's.

USDA's Economic Research Service (ERS) and Center for Nutrition Policy and Promotion (CNPP) estimate per capita food and nutrient supplies, based on food disappearance data (see box). These data are used as a proxy to estimate human consumption, even though the data may overstate what is actually eaten because they represent food supplies available in the market and do not account for waste.

Per Capita Meat Supply Larger and Leaner

Now more than ever, we are a Nation of meat eaters—but we are eating leaner meat. In 1996, total meat consumption (red meat, poultry, and fish) amounted to 191 pounds (boneless, trimmed-weight equivalent) per person, 2 pounds below 1994's record high and 14 pounds above the 1970 level (table 1). Each American consumed an average of 20 pounds less red meat than in 1970, 31 pounds more poultry, and 3 pounds more fish and shellfish.

Nutritional concern about fat and cholesterol has encouraged the production of leaner animals, the closer trimming of outside fat on retail cuts of meat, and the marketing of a host of lower fat ground and processed meat products—significantly lowering the meat, poultry, and fish group's contribution to total fat and saturated fat in the food supply. Despite record-high per capita consumption of total meat in 1994, the proportion of fat in the U.S. food supply contributed by meat, poultry, and fish declined from 35 percent in 1970 to 25 percent in 1994. Similarly, the proportion of saturated fat contributed by meat, poultry, and fish fell from 37 percent in 1970 to 26 percent in 1994.

Red meat (beef, pork, lamb, and veal) accounted for 58 percent of the total meat supply in 1996, compared with 74 percent in 1970. By 1996, chicken and turkey accounted for 34 percent of the total meat consumed, up from 19 percent in 1970. Fish and shellfish accounted for 8 percent of total meat consumption in 1996 and 7 percent in 1970.

Prices explain much of the decline in per capita consumption of red meat, particularly beef. Retail prices for chicken have remained well below those for beef. In 1996, consumers paid an average of $1.51 per pound for broilers, compared with $2.80 a pound for beef, and $2.21 for pork.

Prices do not entirely explain beef's market share loss to poultry. The poultry industry has enjoyed great success, partly by catering to consumers. Poultry has benefited from health-related concerns about beef. The industry has provided scores of new brand-name, value-added products processed for consumers' convenience—as well as a host of products for foodservice operators.

Consumer demand for more convenience—including eating out

Table 1
Americans Are Consuming More Grains, Vegetables, and Fruits Per Person

Item	Unit	1970	1975	1980	1985	1990	1995	1996
Total meat[1]	pounds	177.3	170.9	179.6	185.4	183.6	192.5	191.0
Beef	"	79.6	83.0	72.1	74.8	64.0	64.0	64.2
Chicken	"	27.4	26.4	32.7	36.4	42.5	48.8	49.8
Pork	"	48.0	38.7	52.1	47.7	46.4	49.0	46.0
Fish	"	11.7	12.1	12.4	15.0	15.0	14.9	14.7
Turkey	"	6.4	6.5	8.1	9.1	13.8	14.1	14.6
Eggs	number	309	276	271	255	234	235	236
Shell	"	276	245	236	217	186	174	174
Processed	"	33	31	35	38	48	61	62
Beverage milk[2]	gallons	31.3	29.5	27.6	26.7	25.7	24.3	24.3
Plain	"	29.6	27.8	25.9	25.0	24.2	22.8	22.8
Whole	"	24.8	20.3	16.5	13.9	10.2	8.4	8.4
Reduced fat (2%)	"	3.2	4.7	6.3	7.9	9.1	8.2	8.0
Light (1% and 0.5%)	"	.2	1.5	1.8	1.7	2.3	2.5	2.6
Fat-free (skim)	"	1.3	1.3	1.3	1.5	2.6	3.7	3.9
Yogurt	½ pint	1.5	3.6	4.6	7.3	7.4	9.4	8.9
Fluid cream[3]	"	9.8	10.0	10.5	13.5	14.3	15.8	16.4
Cheese[4]	pounds	11.4	14.3	17.5	22.5	24.6	27.3	27.7
Frozen dairy desserts	"	28.5	28.6	26.4	27.9	28.4	29.4	28.7
Added fats and oils[5]	"	52.6	52.6	57.2	64.3	62.8	66.8	64.9
Salad and cooking oils	"	15.4	17.9	21.2	23.6	24.8	26.8	26.0
Shortening	"	17.3	17.0	18.2	22.9	22.2	22.5	22.2
Table spreads	"	16.2	15.7	15.8	15.7	15.3	13.7	13.4
Lard and beef tallow	"	4.6	3.2	3.7	3.7	2.5	4.9	4.5
Fruits[6, 7]	"	229	246	258	264	267	280	283
Fresh	"	101	102	105	111	116	125	129
Citrus	"	29	29	26	22	21	24	25
Noncitrus	"	72	73	79	89	95	100	104
Processing	"	128	144	153	153	151	155	154

Continued—

more often and using more prepared / processed foods at home—has brought substantial increases in the use of ground beef (which can be prepared quickly). Ground beef accounted for 42 percent of the beef (boneless, trimmed-weight equivalent) consumed in 1996, compared with 37 percent in 1985 and 28 percent in 1970. Purchases of roasts (which take longer to prepare) were down sharply. In 1996, about 40 percent of all U.S. beef was served through foodservice establishments, and three-quarters of these servings were hamburgers or cheeseburgers, according to the American Meat Institute.

Supermarkets continue to make their retail beef cuts leaner, with less external fat. In 1985, most retail trim specifications called for a half-inch or more of outside fat on retail cuts of beef. By 1994, less than 1 percent of retailers had fat-trim specifications exceeding a quarter inch and 21 percent had eighth-inch-or-less-fat trim specifications.

Retailers also keep cutting fat from ground beef, which is required by Federal regulations to have at least 70 percent lean meat (no more than 30 percent fat by weight). The amount of fat in ground and processed beef dropped from 28 percent to 22 percent between 1975 and 1987, with most of the decline occurring during 1986-87. This trend has continued. Several recent studies show that more than a fourth of all ground beef sold at retail is at least 86 percent lean and a tenth or more is at least 91 percent lean.

The average fat content of foodservice ground beef remains higher than that for retail ground beef, but has nonetheless declined over time as well. In 1997, the North American Meat Processors Association revised

Table 1
Americans Are Consuming More Grains, Vegetables, and Fruits Per Person—*Continued*

Item	*Unit*	1970	1975	1980	1985	1990	1995	1996
Vegetables[6]	*pounds*	335	337	336	358	386	405	412
Fresh	"	153	147	149	156	166	176	179
Potatoes	"	62	53	51	46	46	51	49
Processing	"	182	190	187	202	220	228	234
Tomatoes for canning	"	62	62	64	63	75	76	74
Potatoes for freezing	"	28	37	35	45	50	55	60
Flour and cereals[8]	"	136	139	145	156	182	192	198
Wheat flour	"	111	115	117	125	136	142	148
Corn products	"	11	11	13	17	22	23	23
Rice	"	7	8	9	9	16	20	19
Caloric sweeteners[9]	"	122	118	123	129	137	150	152
Refined sugar	"	102	89	84	63	64	66	66
Corn sweeteners	"	19	27	38	65	71	83	84
High-fructose corn syrup (HFCS)	"	1	5	19	45	50	58	59
Carbonated soft drinks	*gallons*	24.3	28.2	35.1	35.7	46.3	51.6	51.9
Regular (nondiet)	"	22.2	25.0	29.9	28.7	35.6	39.8	40.2
Diet	"	2.1	3.2	5.1	7.1	10.7	11.8	11.7
Coffee	"	34	33	27	28	27	20	22
Bottled water	"	NA	NA	2.4	4.5	8.0	11.6	12.4
Beer[10]	"	28.1	31.0	33.7	32.3	32.2	29.8	29.8
Fruit juice	"	6	6.6	7.2	7.7	7.3	8.7	8.7
Fruit drinks and ades	"	NA	NA	NA	NA	6.3	7.8	7.4

Notes: Data are per person per year. NA = Not available. Totals may not add due to rounding. [1]Boneless weight. Includes lamb, mutton, and veal. [2]Includes flavored milk and buttermilk. [3]Heavy cream, light cream, half and half, sour cream, and eggnog. [4]Excludes full-skim American, cottage, pot, and baker's cheese. [5]Total fat content. Individual items shown on a product-weight basis. [6]Farm weight. [7]Includes fruit juice. [8]Includes oat, barley, and rye products. [9]Dry weight. Includes honey, molasses, refiner's syrups, and caloric sweeteners added to commercially prepared foods and beverages. [10]Per capita estimates use resident population ages 18 years and over.

and updated its 1988 *Meat Buyers Guide* to foodservice meat buyers and cut the upper limit for fat content of ground beef, unless otherwise specified, by 3 percentage points to 22 percent. (The purchaser may, however, specify a different fat content provided it does not exceed 30 percent.)

The next decade will undoubtedly bring more changes. Technological advances will mean a host of new products in the meat case. With little increase in overall consumption of meat products expected in the next decade, the beef, pork, poultry, and fish industries will try to capture a larger share of a stagnant market by offering more prepared products.

Long-Term Decline in Egg Consumption Levels Off

Egg consumption has two components: shell eggs and egg products. Shell eggs are those eggs purchased in cartons in the grocery store. Egg products are eggs that have been processed and sold primarily to food manufacturers and foodservice operators in liquid or dried form. These pasteurized eggs reach consumers as ingredients in foodservice menu items and processed foods—such as pasta, candy, baked goods, and cake mixes—or directly as liquid eggs in some grocery stores. These grocery store liquid egg products usually are made from egg whites and are used by consumers as a nonfat, no-cholesterol alternative to shell eggs.

Between 1970 and 1989, total annual consumption of shell eggs and egg products steadily declined about 4 eggs per person per year, from 309 eggs to 237. During the 1990's, total egg consumption has leveled off, fluctuating between 234 and 238 eggs per person per year. Per capita consumption was 236 eggs in 1996 and has been projected

to be 240 eggs in 1997. The record high for U.S. per capita consumption was 403 eggs in 1945.

A decline in per capita egg consumption over the last few decades reflects two very different and somewhat counterbalancing trends: a dominating, nearly constant decline in consumption of shell eggs, and a partially offsetting growth in consumption of egg products during the 1980's and 1990's.

Shell-egg consumption dropped from 276 eggs per capita per year in 1970 to 174 in 1995 and 1996. The average annual rate of decline in per capita shell-egg consumption was 4 eggs per year in the 1970's and 5 eggs per year in the 1980's. In the 1990's, the rate of decline in per capita consumption of shell eggs has slowed to 2-1/2 eggs per year and is expected to slow even more. 1996 saw a leveling off of the decline, as shell-egg consumption held steady at 174.

Much of the decline in shell-egg consumption since 1970 was due to changing lifestyles (for example, less time for breakfast preparation in the morning as large numbers of women joined the paid labor force) and the perceived ill effects of cholesterol intake associated with egg consumption. Total cholesterol in the U.S. per capita food supply declined 13 percent between 1970 and 1994, from 470 milligrams per person per day to 410 milligrams (table 2). Eggs contributed 39 percent of the total cholesterol in the food supply in 1970 and 34 percent in 1994.

Declining wholesale and retail egg prices may have spurred egg use in recent years. The average retail price for a dozen large, Grade A eggs declined from $1.01 in 1990 to $.86 in 1994. Changing consumer attitudes toward eggs may also be responsible. New test results show eggs to contain less cholesterol than previously documented, leading the American Heart Association to increase its maximum recommended consumption from three eggs per week to four.

Consumption of egg products has grown consistently since 1983, reaching the equivalent of 62 eggs per person by 1996. The growth period followed more than two decades of relatively constant consumption, remaining between the equivalent of 28 and 36 eggs per person from 1960 to 1983. Egg product consumption will continue to increase as consumers opt for more prepared foods and as any perception of potentially negative dietary attributes of processed eggs is lessened.

Table 2

The Per Capita Food Supply Provides Insufficient Levels of Calcium and Folate[1]

Nutrient	*Unit*	1970	1994	Percent change
Food energy	*calories*	3,300	3,800	15
Carbohydrates	*grams*	386	491	27
Protein	"	95	110	16
Total fat	"	154	159	3
Saturated fatty acids	"	54	52	-4
Monounsaturated fatty acids	"	63	65	2
Polyunsaturated fatty acids	"	26	31	19
Cholesterol	*milligrams*	470	410	-13
Vitamin A	*micrograms retinol equivalent*	1,500	1,520	1
Carotenes	"	510	660	29
Vitamin E	*milligrams alpha-tocopherol equivalent*	13.7	16.9	23
Vitamin C	*milligrams*	107	124	16
Thiamin	"	2.0	2.7	35
Riboflavin	"	2.3	2.6	13
Niacin	"	22	29	32
Vitamin B-6	"	2.0	2.3	15
Folate	*micrograms*	279	331	19
Vitamin B-12	"	9.5	8.1	-15
Calcium	*milligrams*	890	960	8
Phosphorus	"	1,460	1,680	15
Magnesium	"	320	380	16
Iron	"	15.4	21.2	38
Zinc	"	12.2	13.2	1
Copper	"	1.6	1.9	19
Potassium	"	3,510	3,780	8

Notes: [1]The level of calcium in the 1994 food supply was insufficient to meet the 1997 Dietary Reference Intake (DRI) values for calcium, which would require a population-weighted-average of 1,040 milligrams (not counting losses or waste) per person in 1994. The level of folate in the 1994 food supply was insufficient to support the Public Health Service's 1992 recommendation that all women of childbearing age consume 400 micrograms of folate, or folic acid, a day. However, implementation by January 1, 1998, of a new FDA folate-fortification policy for all enriched grain foods should provide ample folate in the 1998 food supply.

Higher Use of Cheese Foils Efforts To Cut Average Milkfat Consumption

In 1996, Americans drank an average of 22 percent less milk and ate nearly 2-1/2 times as much cheese (excluding cottage types) as in 1970. Annual per capita consumption of milkfat from fluid milk products (beverage milk and yogurt) has declined by half since 1970 due to lower beverage milk consumption and a trend toward lower fat milks. Americans cut their average consumption of fluid whole milk by two-thirds between 1970 and 1996, and nearly tripled their use of lower fat milks. But because of the growing yen for cheese and fluid cream products, the Nation failed to cut the overall use of milkfat. (Annual average consumption of milkfat from some other dairy products—butter, frozen dairy products, condensed milk, evaporated milk, dry milk, and cottage-type cheeses—also declined between 1970 and 1996 due to lower consumption of these products and increasing preference for lower fat versions.)

Annual per capita consumption of fluid milk declined from 31 gallons in 1970 to 24 gallons in 1996. Consumption of carbonated soft drinks, fruit drinks and ades, and flavored teas may be displacing beverage milk in the diet. Big increases in eating away from home, especially at fast-food places, and in consumption of salty snack foods favored soft drink consumption.

The beverage milk trend is toward lower fat milk. While whole milk represented 81 percent of all beverage milk (plain, flavored, and buttermilk) in 1970, its share dropped to 36 percent in 1996. Yet, whole milk continues to rank number one in popularity. In 1996, plain whole milk accounted for 37 percent of all plain beverage milk, 2-percent reduced fat milk for 35 percent, and light (0.5-percent and 1-percent) and fat-free (skim) milks combined for 28 percent. In terms of average consumption, light and fat-free milks increased 25 percent in 1991-96, 2-percent milk declined 12 percent, and whole milk declined 15 percent.

Total beverage milk contributed 50 percent less fat to the average American's diet in 1996 than in 1970. In contrast, rising consumption of fluid cream products meant that they contributed nearly two times as much milkfat to the average diet in 1996 as in 1970. (Per capita consumption of fluid cream products—half-and-half, light cream, heavy cream, eggnog, sour cream, and dips—jumped from 9.8 half pints in 1970 to 16.4 half pints in 1996.)

On balance, however, annual per capita consumption of milkfat from all fluid milk and cream products declined by 36 percent in 1970-96, from 9.1 pounds per person to 5.8 pounds. Of that 5.8 pounds, whole milk contributed 2.4 pounds; lower fat milks, 1.8 pounds; and fluid cream products, 1.5 pounds. Skim milk added 0.05 pound of fat to the average diet in 1996, and yogurt (most of which is reduced fat or fat-free) added 0.09 pound of fat.

These changes are consistent with increased public concern about consuming cholesterol and animal fats. However, the decline in per capita consumption of fluid milk between 1970 and 1996 also may be attributed to declining numbers of U.S. teenage males and children ages 5-12 years, an increasing incidence of lactose intolerance among Americans due to the growing ethnic diversity and aging of the population, and increasing preference for soft drinks, including diet soft drinks.

Price is also behind the shift to lower fat milks. Skim milk traditionally has been cheaper than whole milk. This has not always been the case for 1-percent and 2-percent milks. However, since 1980, the retail prices for a half gallon of 1-percent and 2-percent milks have averaged a few cents below that for whole milk.

Over time, this has eased the way for consumers to accept and prefer the lower fat milk. Evidence of such acceptance is McDonald's switch from whole milk to 2-percent in 1986 and from 2-percent milk to 1-percent in 1991. Starbucks and other coffee chains and foodservice operators now provide whole milk and fat-free milk in addition to half-and-half, cream, and coffee whiteners.

Advertising has influenced the shift to lower fat milks. A major print advertising program that features celebrities, models, and sports stars wearing "milk mustaches" has improved the overall image of milk, especially light and skim milks. Preliminary research indicated that major contributing factors to a decline in total milk consumption were concern about fat and a belief that lower fat milks contain fewer nutrients than whole milk. Follow-up research showed that more people now know that lower fat milks are as high or higher in calcium, vitamins, and nutrients (except fat) as whole milk.

A sixfold increase in per capita consumption of yogurt since 1970—to 9 half-pint servings per person in 1996—partially offset the decline in beverage milks.

Average consumption of cheese (excluding full-skim American and cottage, pot, and baker's cheeses) increased 140 percent between 1970 and 1996, from 11 pounds per person to 28 pounds. Lifestyles that emphasize convenience foods were probably major forces behind the higher consumption. In fact, two-thirds of our cheese now comes in commercially manufactured and prepared foods (including foodservice), such as pizza, tacos, nachos, salad bars, fast-food sandwiches, bagel spreads, sauces for baked

potatoes and other vegetables, and packaged snack foods. Advertising and new products—such as reduced-fat cheeses and resealable bags of shredded cheeses, including cheese blends tailored for use in Italian and Mexican recipes—also had an effect.

From 1970 to 1996, consumption of Cheddar cheese, America's favorite cheese, increased 59 percent to 9.2 pounds per capita. Consumption of Italian cheeses more than quintupled during the same period, to 10.8 pounds per person in 1996. For example, per capita consumption of mozzarella—the main pizza cheese—in 1996 was 8.5 pounds, more than 7 times higher than in 1970, making it America's second-favorite cheese. Cream cheese (including Neufchatel) overtook Swiss in the 1980's to become America's third favorite cheese, at 2.2 pounds consumed per person in 1996. Annual per capita consumption of total cottage cheese declined by half during 1970-96, to 2.6 pounds. The decline was in whole-milk cottage cheese; consumption of lower fat cottage cheese quadrupled during the same period to 1.2 pounds per person in 1996. Despite a flurry of lower fat cheese introductions in the 1990's, these products still accounted for about a fifth of supermarket cheese sales for the 52 weeks ending July 12, 1997 (at 21 percent, that is down 1 percentage point from a year earlier), according to the International Dairy Foods Association. Lower fat cheeses make up a much smaller proportion of the total cheese used by food manufacturers and foodservice operators.

How Food Consumption Is Measured

USDA's Economic Research Service annually calculates the amount of food available for consumption in the United States. The U.S. food supply series measures national consumption of several hundred basic commodities. It is the only continuous source of data on food and nutrient availability in the country.

The food supply series is based on records of commodity flows from production to end uses. Therefore, the total available supply is the sum of production, beginning inventories, and imports. These three components are either directly measurable or are estimated by Government agencies using sampling and statistical methods.

The food available for human use reflects what is left from available supply after deducting exports, industrial uses, farm inputs, and end-of-year inventories. Human food use is not directly measured or statistically estimated. Instead, it is a residual component after subtracting out other uses from the available total supply.

The availability of food for human use represents disappearance of food into the marketing system, and it is often referred to as food disappearance. Food disappearance measures food supplies for consumption through all outlets—at home and away from home. Per capita food use, or consumption, is calculated by dividing the total annual food disappearance by the total U.S. population.

Food disappearance is often used as a proxy to estimate human consumption. Used this way, the data usually provide an upper bound on the amount of food available for consumption. In general, food disappearance data indicate trends in consumption over time rather than absolute levels of food eaten. Food disappearance estimates can overstate actual consumption because they include amounts that may be discarded during processing or marketing, lost in spoilage, or thrown away at home. For example, the food estimates may overstate fats and oils, since large amounts are used for frying by fast food restaurants and are later discarded.

USDA's Center for Nutrition Policy and Promotion uses data on the amount of food available for consumption and information on the nutrient composition of foods from USDA's Agricultural Research Service to calculate the nutrients available in the food supply. As with the food supply estimates, the resulting nutrient estimates do not account for losses during processing, marketing, or home use. For example, vegetables generally lose nutrients, particularly water-soluble ones like vitamin C and thiamin, when cooked in water.

Nutrients not included in these values are those from vitamin and mineral supplements, alcoholic beverages (or the grains and sugar used to make alcoholic beverages), baking powder, yeast, and certain vitamins and minerals used for functional or flavoring agents in foods. Nutrients added through enrichment of flour and cereal products and through fortification of other foods are included in the nutrient values.

Use of Added Fats Began To Decline, But Remains Near Record-High Level

Americans' overriding nutrition concern in the mid-1990's with cutting dietary fat is apparent in the recent per capita food supply data, which shows a modest decline since 1993 in the use of added fats and oils. However, average use of added fats and oils in 1996 remained more than a fifth above the 1970 level. Added fats and oils include fats and oils used directly by consumers, such as butter on bread, as well as shortenings and oils used in commercially prepared cookies, pastries, and fried foods. Excluded is all fat naturally present in foods, such as in milk and meat.

Annual per capita consumption of added fats and oils declined at least 8 percent between 1993 and 1996,

from a record-high 70 pounds (fat-content basis) per person to 65 pounds. This 8-percent decrease reflects the following declines in per capita use (product-weight basis): 9 percent for butter, 18 percent for margarine and spreads, 12 percent for shortening, 10 percent for salad and cooking oils, and 18 percent for specialty fats used mainly in confectionery products and nondairy creamers. The only increase in per capita consumption among added fats during 1993-96 was for lard (up 35 percent). Lard and edible beef tallow are used mainly for baking and frying in the commercially prepared foods and foodservice sectors; supermarket sales of lard, which accounted for only 6 percent of total lard consumption in 1996, have declined since 1993. Per capita consumption of edible beef tallow in 1996 was the same as in 1993—2.2 pounds per person.

The decline in annual per capita consumption of added fats and oils between 1993 and 1996 will be slightly higher than 8 percent when ERS adjusts the data to reflect the trend toward lower fat margarine-type spreads. The food supply database currently puts the fat content of all margarine and spreads at 80 percent, based on the standards of identity for margarine and butter. However, ERS research estimates the average fat content for margarine and spreads at just under 65 percent in 1996, down significantly from 1993.

In 1970, the fats and oils group (composed of all added fats and oils) contributed the most fat to the food supply (43 percent), followed by the meat, poultry, and fish group (35 percent). By 1994, the fats and oils group's contribution to total fat had jumped 9 percentage points to 52 percent, probably due to the greatly expanded consumption of fried foods in foodservice outlets, the huge increase in consumption of high-fat snack foods, and the increased use of salad dressings. (The average woman aged 19 to 50 gets more fat from salad dressing than from any other food, according to recent USDA food intake surveys.)

In contrast, by 1994, the meat, poultry, and fish group's contribution to total fat had dropped 10 percentage points to 25 percent, reflecting changes in fat-trimming practices at processor and retail levels, improvements in animal husbandry, and increasing substitution of poultry and fish for red meats. Dairy products' contribution to total fat declined from 12.6 to 12.3 percent between 1970 and 1994, even as total fat from dairy products increased from 19 to 20 grams per person per day. A decline in fat accompanying a decline in beverage milk consumption and a shift from whole milk to lower fat milks was offset by an increase in fat associated with big hikes in cheese and cream products use.

Average Consumption of Fruits and Vegetables Rises

As Americans increasingly embrace national health authorities' recommendation of consuming five fruits and vegetables a day, their array of choices continues to widen. Fresh-cut fruits and vegetables, prepackaged salads, locally grown items, and exotic produce—as well as hundreds of new varieties and processed products—have been introduced or expanded in the last decade.

Supermarket produce departments carry over 400 produce items today, up from 250 in the late 1980's and 150 in the mid-1970's. Also, the number of ethnic, gourmet, and natural foodstores—which highlight fresh produce—continues to rise.

Consumers increasingly have more access to fresh local produce as well. The number of farmers' markets reported to State agriculture departments has grown substantially throughout the United States over the last several decades, numbering around 1,755 in the end of 1993 and eclipsing 2,400 in mid-1996. Some analysts say that the total number of farmers' markets, including those not reported, is more than double that figure.

While the overall market for fruits and vegetables has expanded in the last 15 years, the mix has changed. Shifts have taken place among traditional produce items and between fresh and processed forms. Traditional varieties have lost market share to specialty varieties, and exotic produce has gained favor. For example, per capita consumption of iceberg lettuce fell by 5.4 pounds (or 19 percent) between 1989 and 1996, while per capita consumption of romaine and leaf lettuces increased 2.8 pounds (or 78 percent) during the same period. In addition, many specialty lettuces not yet tracked in USDA's food supply database-such as radicchio, frisée, arugula, and red oak—gained in popularity in the last several years because of inclusion in fresh-cut salad mixes and in upscale restaurant menus.

Total per capita use of 80 commercially produced fruits and vegetables (for which ERS has U.S. production data) rose 23 percent, from 564 pounds in 1970 to 696 pounds in 1996. Four-fifths of this increase occurred since 1982, the year in which an expert scientific panel convened by the U.S. National Academy of Sciences published its landmark report *Diet, Nutrition, and Cancer*. The report emphasized the importance of including fruits (especially citrus fruits), vegetables (especially carotene-rich and cruciferous, or cabbage family, vegetables), and whole-grain cereal products in the daily diet, noting that these dietary guidelines were consistent with good nutritional practices and likely to reduce the risk of cancer.

The rate of increase in per capita consumption of processed fruits and vegetables, including potatoes, between 1970 and 1996 outpaced that for fresh produce—24 percent versus 21 percent. The trend is reversed and more pronounced, however, if potatoes are excluded. In that case, the rise in per capita use of processed fruits and vegetables other than potatoes during the same period was only 18 percent, compared with a 34-percent rise for fresh items. These divergent trends reflect two important points. Potatoes constitute a significant portion of total estimated fruit and vegetable consumption—21 percent in 1996, down from 22 percent in 1970. Second, in contrast to a pronounced trend toward fresh produce for most fruits and vegetables, Americans are increasingly choosing fat-laden french fries (bought mainly at fast-food eateries) and eschewing nutrient-dense fresh potatoes.

Grain Consumption Up From 1970's, But Far Below Early 1900's Highs

Per capita use of flour and cereal products reached 198 pounds in 1996 from an annual average of 145 pounds in 1980 and 136 pounds in 1970 (table 1). The expansion in supplies reflects ample grain stocks, strong consumer demand for variety breads and other instore bakery items, and increasing fast-food sales of products made with buns, doughs, and tortillas. The increase is far below the 300 pounds consumed per person in 1909 (the earliest year for which data are available).

USDA's nationwide food consumption surveys confirm the food supply data, also indicating Americans are eating more grain products. Consumption of grain mixtures—such as lasagna and pizza—increased 115 percent between 1977 and 1994. Snack foods—such as crackers, popcorn, pretzels, and corn chips—soared 200 percent, and ready-to-eat cereals were up 60 percent. One of the biggest changes within the grain mixture group was the explosion in consumption of ethnic foods, especially Mexican foods. Mexican foods were consumed four times more often in 1994 than in the late 1970's.

Yet Americans are still eating a serving or less a day of whole grain foods, far below the minimum three per day the American Dietetic Association (ADA) recommends. If a bread does not have whole wheat, oats, or some other whole grain as the first ingredient, much of its vitamin- and mineral-rich germ and bran have been milled away, along with most of its fiber. Enriched flour, from which most breads are made, is not a whole grain. The processor has added back three of the B vitamins and the iron that were lost when the flour was refined. Some companies that make "light" breads also add highly processed fiber to boost the fiber content and cut the calories. But nothing replaces the lost vitamin E, B-6, magnesium, manganese, zinc, potassium, copper, pantothenic acid, and phytochemicals.

Beginning January 1, 1998, all enriched grain foods, including pasta, bread, rolls, flour, cakes, and cookies will be fortified with folate (the B-vitamin folic acid), which is also lost during milling. That should reduce the risk of neural tube birth defects like spina bifida. It may also protect adults from heart disease and reduce the chances of cervical cancer in women. Folic acid is found naturally in legumes; liver; many vegetables, especially green leafy ones like spinach; citrus fruits and juices; whole-grain products; and eggs.

Most ready-to-eat breakfast cereals are fortified with folate. Fortified ready-to-eat cereals usually contain at least 25 percent of the U.S. Recommended Daily Allowance (RDA) for folate (since cereals vary, check the label on the package for the percentage of the U.S. RDA).

Average Consumption of Caloric Sweeteners Hits Record High

Americans have become conspicuous consumers of sugar and sweet-tasting foods and beverages. Per capita consumption of caloric sweeteners (dry-weight basis)—mainly sucrose (table sugar made from cane and beets) and corn sweeteners (notably high-fructose corn syrup, or HFCS)—increased 32 pounds, or 27 percent, between 1982 and 1996. In 1996, each American consumed a record average 152 pounds of caloric sweeteners. That amounted to more than two-fifths of a pound—or 47 teaspoonfuls—of added sugars per person per day in 1996. USDA's Food Guide suggests that people on a 1,600-calorie diet limit their intake of added sugars to 6 teaspoons per day. The daily suggested limit increases to 12 teaspoons for those consuming 2,200 calories a day, and to 18 teaspoons for those consuming 2,800 calories.

A striking change in the availability of specific types of sugar occurred in the past two decades. Sucrose's share of total caloric sweetener use dropped from 83 percent in 1970 to 44 percent in 1996, while corn sweeteners increased from 16 percent to 55 percent. All other caloric sweeteners—including honey, maple syrup, and molasses—combined to maintain a 1-percent share.

In 1996, Americans consumed 73 percent more caloric sweeteners per capita than in 1909. In 1909, two-thirds of the sugar produced went directly into the home, which meant control was in the hands of the person who bought it. The balance was used mostly by industry. In contrast,

more than three-quarters of the refined and processed sugars produced today goes to food and beverage industries, and less than a quarter is being brought home.

Sugar—including sucrose, corn sweeteners, honey, and molasses—is, in a sense, the number-one food additive. It turns up in some unlikely places, such as pizza, bread, hot dogs, boxed rice mixes, soup, crackers, spaghetti sauce, lunch meat, canned vegetables, fruit drinks, flavored yogurt, ketchup, salad dressing, mayonnaise, and some peanut butter.

The steep rise in caloric sweetener consumption since the mid-1980's coincides with a 43-percent increase in annual per capita consumption of regular (nondiet) carbonated soft drinks, from 28 gallons per person in 1986 to 40 gallons in 1996 (that is 14.1 ounces per person per day, an amount that contains nearly 11 teaspoonfuls of sugar). Carbonated soft drinks provided more than a fifth (22 percent) of the refined and processed sugars in the 1994 American diet.

Availability of Calories and Most Nutrients Also Increased

The U.S. per capita food supply contained more calories in 1994 than in 1970, due to higher levels of carbohydrates, protein, and fat (table 2). Despite the higher level of fat, saturated fatty acids decreased due to the increased availability of leaner red meat and the substitution of poultry and fish for red meat. Cholesterol also declined during 1970-94, due largely to a 23-percent decline in egg consumption and, to a lesser extent, a drop in consumption of organ meats, such as liver, and a switch to lower fat dairy products. Per capita levels of most vitamins and all minerals increased from 1970 to 1994.

The level of food energy available in the food supply increased from 3,300 calories per person in 1970 to 3,800 in 1994. This 15-percent increase reflects higher levels of all three energy-yielding nutrients: carbohydrates, fat, and protein. The proportion of calories from carbohydrates increased from 47 to 51 percent, while the share from fat decreased from 42 to 38 percent. Protein has consistently accounted for about 11 percent of calories.

Vitamins are organic substances essential in small amounts for adequate health, growth, reproduction, and maintenance. B-12 is the only vitamin whose per capita level dropped between 1970 and 1994. The 15-percent decrease was due to lower consumption of organ meats, notably liver, and egg yolks. While the 1994 value for vitamin B-12 was lower than earlier levels, it still exceeded the recommended allowances for a healthful diet by a generous margin.

The levels of vitamins A and C were higher in 1994 than in 1970 due to increased availability of vegetables and fruits. While the increase in vitamin A is slight (1 percent), a shift in vitamin sources occurred between 1970 and 1994 from organ meats and egg yolks to dark-green and deep-yellow vegetables. This shift increased vitamin A contributions from these vegetables from 20 to 28 percent between 1970 and 1994. The level of carotene increased by 29 percent because of the development of new varieties of deep-yellow vegetables, notably carrots and squashes, that contain more carotene than previous varieties.

Historically, the nutrient levels in the food supply were deemed to provide sufficient food energy, macronutrients, and micronutrients to meet the nutritional needs of most Americans. In fact, nutrient levels in the food supply need to exceed recommended allowances for a healthy diet, because estimates are for the amount available before adjusting for trimming, cooking, and other losses. In addition, per capita values are averages for the population and do not account for the higher nutritional needs of some people.

However, a significant expansion of the research base and an increased understanding of nutrient requirements and food constituents in the 1990's have prompted increases in recommended intakes for some nutrients—notably calcium and folate—to levels greater than those provided in the 1994 per capita food supply. The RDA's, first developed by the Food and Nutrition Board in 1941 and periodically updated, are being replaced by new recommendations, called Dietary Reference Intakes (DRI's). The DRI's also are being developed by the Food and Nutrition Board, which is now part of the Institute of Medicine (IOM), National Academy of Sciences. Unlike the RDA's, which were initially established to protect against diseases like rickets caused by nutrient deficiencies, the DRI's aim to optimize health by also minimizing the risk of major chronic diseases, such as osteoporosis. The first in a series of IOM reports on DRI's, published in 1997, reviews five bone-related nutrients: calcium, phosphorus, magnesium, vitamin D, and fluoride.

Adequate intake of folate—one answer to having healthier babies and a healthier heart—is a public health concern; folate is currently under review by the IOM. The 1994 food supply provided 331 micrograms of folate per person per day, an amount that exceeds the 1989 RDA's for all individuals except pregnant women. Since 1989, however, strong scientific research has shown that folate, or folic acid, reduces the risk of neural tube birth defects such as spina bifida, when consumed in adequate amounts by women before and during early

pregnancy. Mounting scientific evidence also suggests that folate may reduce the risk of heart disease by lowering levels of homocysteine in the blood. The U.S. Public Health Service recommended in 1992 that all women of childbearing age consume 400 micrograms of folic acid daily. Current folate levels in the per capita food supply fall short of this recommendation. However, with implementation by January 1, 1998, of a new FDA folate-fortification policy for all enriched grain foods, the 1998 food supply should provide enough folate to meet the needs of women of childbearing age and others as defined by FDA and the upcoming IOM recommendations.

The new IOM recommendations for vitamin D are twice as high for adults ages 51 through 70 years and three times higher for adults above 70 years than for younger people or previous recommendations. The amount of vitamin D in the food supply is not estimated because data on the vitamin D content of foods are provisional and limited to selected foods. Since the main dietary source of vitamin D is fortified milk products for which consumption is low, food supply levels of vitamin D are likely insufficient to meet the new recommendations for the U.S. population for vitamin D.

Calcium intakes recommended by the IOM are increased to at least 1,000 milligrams a day (about the amount in three servings of milk or other dairy foods) for all Americans over 8 years of age. Even higher calcium intakes are recommended for adults over 50 years (1,200 milligrams per day, or about 4 servings) and for teens 9 through 18 years (1,300 milligrams per day, about 4 servings). The 1994 per capita food supply provided an average 960 milligrams of calcium per person per day; the new IOM recommendations would have required a population-weighted-average 1,040 milligrams (not counting waste or losses) per person per day in 1994. However, ERS estimates the amount of loss for dairy products—the main source of calcium (73 percent) in the 1994 U.S. diet—including spilled milk, discarded moldy cheese, and the like—at a third of the available supply, indicating that current dietary calcium supplies are well below those needed to meet the new IOM recommendations. As the IOM establishes DRI's for other nutrients, other nutrient shortfalls in the food supply may become apparent.

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