

U.S. Per Capita Food Supply Trends

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The American diet has changed considerably over the last two decades. Beef consumption, for example, fell 26 percent between 1977 and 1997, while chicken consumption rose 75 percent, turkey 101 percent, and fish and shellfish 15 percent (table 1). Fresh fruits and vegetables reached record levels in 1997, with fresh mangoes one of the biggest gainers, increasing 881 percent between 1977 and 1997.

A variety of factors are responsible for the changes in U.S. consumption patterns in the last 20-plus years, including changes in 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 increases in nutrient-enrichment standards and food fortification. 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.

USDA's Economic Research Service (ERS) publishes per capita consumption statistics annually. ERS estimates are based on food disappearance data (see box, "How Food Consumption Is Measured"). 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.

Record-High Meat Consumption in 1998

In 1997, total meat consumption (red meat, poultry, and fish) amounted to 190 pounds (boneless, trimmed-weight equivalent) per person, 13 pounds above the 1970 level (fig. 1a). Each American consumed an average of 21 pounds less red meat (mostly less beef) than in 1970, 31 pounds more poultry, and 3 pounds more fish and shellfish. 1998's total per capita meat consumption is expected to be a record 195 pounds.

Red meat—beef, pork, lamb, and veal—accounted for 58 percent of

the total meat supply in 1997, on a boneless, trimmed-weight basis, compared with 70 percent in 1980 and 74 percent in 1970. By 1997, chicken and turkey accounted for 34 percent of the total meat consumed, up from 23 percent in 1980 and 19 percent in 1970. Fish and shellfish accounted for 8 percent of total meat consumption in 1997 and 7 percent in 1980 and 1970.

Per capita consumption of beef reached an all-time high of 89 pounds (boneless, trimmed-weight equivalent) in 1976 when beef supplies were at record levels because of liquidation of the Nation's beef herd (fig. 1b). It dropped significantly in the late 1970's, remained flat in the early 1980's, and then, from a 1980's high of 75 pounds per capita in 1985, declined steadily to 61.5 pounds in 1993. In 1994-98, increasing supplies of beef and declining beef prices spurred a 2- to 3.5-pound increase in annual per capita consumption of beef. Consumer concerns about cholesterol and saturated fat, inconsistent quality, and lack of convenience in preparation are behind the negative trend in beef demand.

Beginning around 1960, in response to concerns about fat and cholesterol, beef producers began shifting production from the very fat English breeds like Hereford and

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Angus to the bigger, rangier, less fat, faster growing exotic breeds. This shift led to increasing inconsistency in the quality of beef—a less tender, less juicy, less succulent product. By 1995, one of four steaks was too tough to chew, according to the 1995 National Beef Quality Audit. In addition, the mass entry of women into the paid labor force has drastically reduced consumption of beef roasts and other beef cuts requiring lengthy cooking times.

Beef has lagged behind poultry and pork in marketing value-added, convenience items. In January 1999, the beef industry launched a new advertising campaign that uses the familiar “Beef, It’s What’s for Dinner” tagline and aims to inform consumers and beef industry channels about a new trend—beef dishes that are fully cooked and ready to microwave and serve in 10 minutes. Such dishes include traditional beef favorites like pot roast, meat loaf, and beef ribs. In addition, the beef industry funded new genetic research in 1998, findings from which may foster the marketing of beef products that are juicier and more consistent in quality, and that carry brand names.

In contrast, per capita consumption of chicken, which remained flat in the early 1970’s, steadily increased from 26 pounds (boneless-weight equivalent) in 1975 to 50 pounds a year in 1997 and 51 pounds in 1998. Similarly, per capita consumption of turkey climbed from 6.5 pounds in 1975 to 14 pounds a year in 1997 and 1998. The poultry industry has enjoyed great success, partly by catering to consumers. 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. Poultry has also benefited from health-related concerns about beef.

Year-to-year fluctuations in pork consumption are often quite large,

but consumption has been fairly stable in the long run. In fact, annual per capita pork consumption averaged 47.6 pounds per person in 1970-74 and 47.8 pounds per person in 1994-98. The 1990’s quantity, however, contained much more lean and much less fat. Through improved breeding and husbandry practices and greater trimming of outside fat on retail cuts, the pork industry has lowered the fat content of retail pork by more than 30 percent since the 1970’s. The industry has capitalized on this accomplishment by portraying pork as a light and nutritious alternative to chicken with its “Pork: The Other White Meat” advertising campaign, which debuted in 1987. Research indicates that consumers now are less likely to perceive pork negatively in terms

of fat, calories, and cholesterol than before the advertising began. The campaign focused on the industry’s leaner cuts and lower fat products.

U.S. per capita seafood consumption for 1997 is estimated at 14.5 pounds, down from a record high of 16.1 pounds in 1987. Despite the 10-percent decline from the 1987 level, average consumption in 1997 was still 24 percent above 1970. Between 1970 and 1997, increased consumption of fresh and frozen fish and shellfish accounted for all of the growth, rising 42 percent, while canned products held steady, and consumption of cured items fell. Average seafood consumption increased 24 percent from 1970 to 1997, even though seafood prices outpaced those of other protein sources during those years.

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 supplies 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 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.

Consumer Price Indexes (CPI's) for fish, red meat, and poultry climbed 466 percent, 297 percent, and 194 percent, from 1970 to 1997.

Nutritional concern about fat and cholesterol has encouraged the production of leaner animals, the closer trimming of outside fat on retail cuts of meat, the marketing of lower fat ground meat and processed meat products, and consumer substitution of poultry for red meat—significantly lowering the meat, poultry, and fish group's contribution to total fat and saturated fat in the

food supply. Despite near 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 (the latest year for which nutrient data are available). Similarly, the proportion of saturated fat contributed fell from 37 percent to 26 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.

Egg Consumption in 1997 Reached Highest Level Since 1988

Between 1970 and 1989, total annual consumption of shell eggs and egg products steadily declined

Table 1
Consumption Statistics Show 20 Years of Change

Item	Unit	Per capita consumption		Percent change, 1977-97 ¹
		1977	1997	
Some gainers...				
Bottled water	gal	1.3	13.1	925
Mangoes	lb	.1	1.5	881
High fructose corn syrup ²	lb	9.6	62.4	550
Limes	lb	.2	1.2	398
Fresh broccoli	lb	1.1	4.1	273
Garlic	lb	.6	2.1	250
Mozarella cheese	lb	2.5	8.4	239
Heavy cream	½ pt	1.0	3.6	232
Skim milk	gal	1.3	4.0	189
Cream cheese	lb	.8	2.3	187
Diet carbonated soft drinks	gal	4.3	11.6	170
Rice	lb	7.5	19.5	160
Bell peppers	lb	2.8	7.2	157
Fresh mushrooms	lb	.9	2.2	151
Corn flour and meal	lb	6.6	16.4	149
Apple juice	gal	.7	1.6	142
Honeydew melons	lb	1.1	2.6	136
Fresh carrots	lb	5.3	12.5	136
Parmesan cheese	lb	.3	.6	136
Grape juice	gal	4.3	5.9	134
Fresh asparagus	lb	.3	.7	133
Fresh grapes	lb	3.5	8.0	127
Fresh strawberries	lb	1.9	4.2	119
Yogurt, excluding frozen	½ pt	4.3	9.5	119
Provolone cheese	lb	.3	.8	118
Ricotta cheese	lb	.4	.9	118
Low-fat cottage cheese	lb	.6	1.3	105
Cantaloup	lb	5.8	11.7	102
Turkey ³	lb	6.9	13.9	101
Frozen broccoli	lb	1.2	2.3	92
Papayas	lb	.3	.5	91
Sour cream	½ pt	3.1	5.6	81

Continued—

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 238 eggs in 1997 and is forecast to be 242 eggs in 1998. The record high for U.S. per capita egg consumption was 403 eggs in 1945.

The 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 in 1970 to 173 in 1997. The average annual rate of decline in per capita shell-egg consumption was four eggs per year in the 1970's and five 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 two and a half eggs per year and is expected to slow even more.

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 the cholesterol intake associated with egg consumption.

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 \$0.86 in 1994. In 1997, it rose to

Table 1
Consumption Statistics Show 20 Years of Change—Continued

Item	Unit	Per capita consumption		Percent change, 1977-97 ¹
		1977	1997	
Fresh cucumbers	lb	3.5	6.3	80
Corn starch	lb	2.3	4.1	78
Chicken ³	lb	29.0	50.9	75
Fresh pineapple	lb	1.4	2.4	75
Durum wheat flour	lb	7.5	12.5	67
1% and 0.5% milk	gal	1.6	2.6	65
Fresh onions	lb	11.1	17.9	61
Oat products	lb	4.1	6.5	60
Ready-to-eat cereals	lb	9.4	14.3	53
Fresh tomatoes	lb	12.4	18.9	52
Salad and cooking oils	lb	19.1	28.7	50
Fresh spinach	lb	.4	.6	50
Some losers...				
Veal ³	lb	2.6	.9	-68
Canned asparagus	lb	.5	.2	-60
Whole milk	gal	19.5	8.5	-58
Canned beets	lb	2.0	.9	-55
Canned green peas	lb	3.0	1.5	-50
Canned sauerkraut	lb	2.2	1.1	-50
Total cottage cheese	lb	4.7	2.7	-43
Distilled spirits	gal	2.0	1.2	-37
Dehydrated onions	lb	1.3	.9	-31
Cane and beet sugar	lb	94.2	66.5	-29
Canned corn	lb	14.1	10.0	-29
Beef ³	lb	86.3	63.8	-26
Lamb ³	lb	1.1	.8	-26
Margarine	lb	11.6	8.6	-25
Canned fruit	lb	21.9	18.0	-18
Beverage milk	gal	29.0	24.0	-17
Celery	lb	7.0	6.0	-14
Eggs	no	267.0	238.1	-11

Notes: ¹Percent computed from unrounded data. ²Dry weight basis. ³Boneless, trimmed weight. Source: Judith Jones Putnam and Jane E. Allshouse, *Food Consumption, Prices, and Expenditures, 1970-97*. SB-965. USDA's Economic Research Service, Apr. 1999.

Figure 1a
Americans are eating more, but leaner, meat...

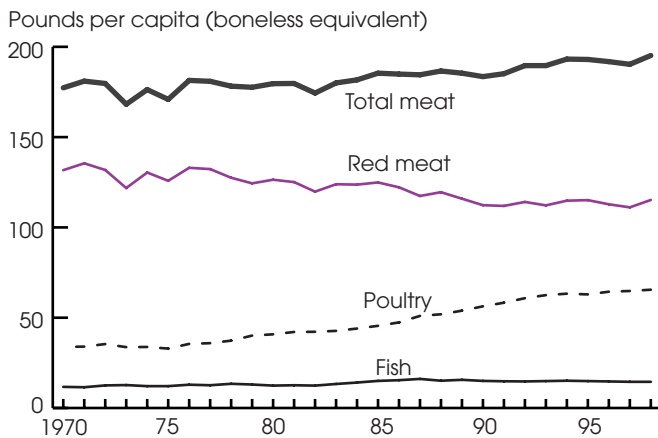


Figure 1b
But they are eating less beef and more chicken

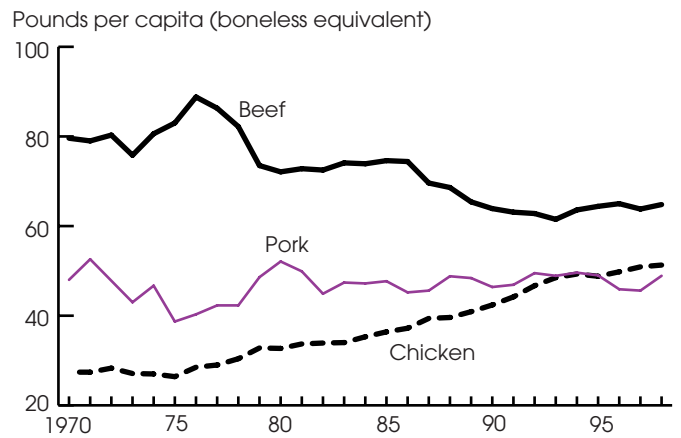
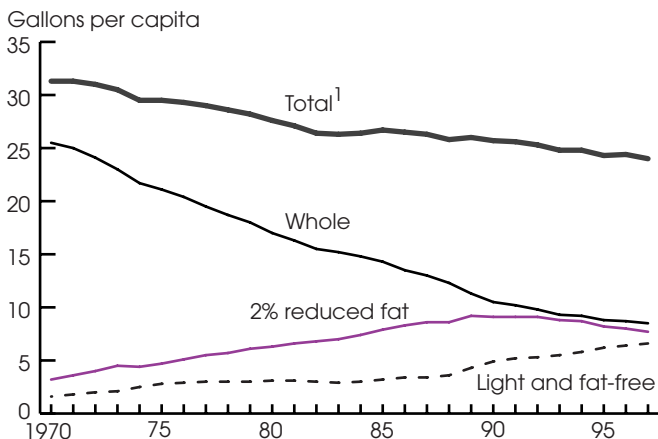
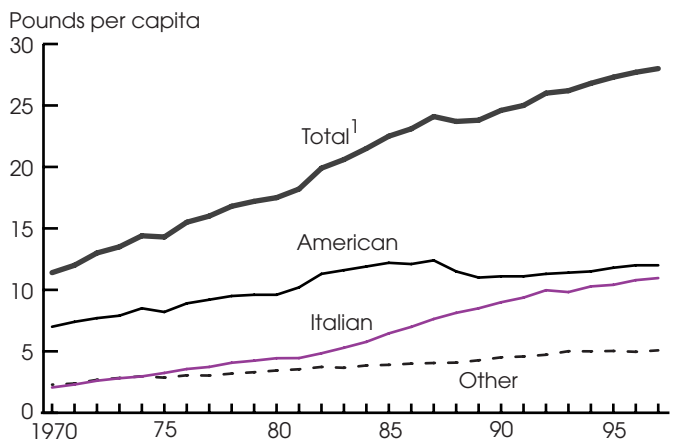


Figure 2a
Americans are drinking less milk...



Note: ¹Includes flavored milk and buttermilk.

Figure 2b
But, cheese consumption continues to rise



Note: ¹Excludes cottage cheese.

Figure 3a
Consumption of added fats increased 25 percent between 1970 and 1997...

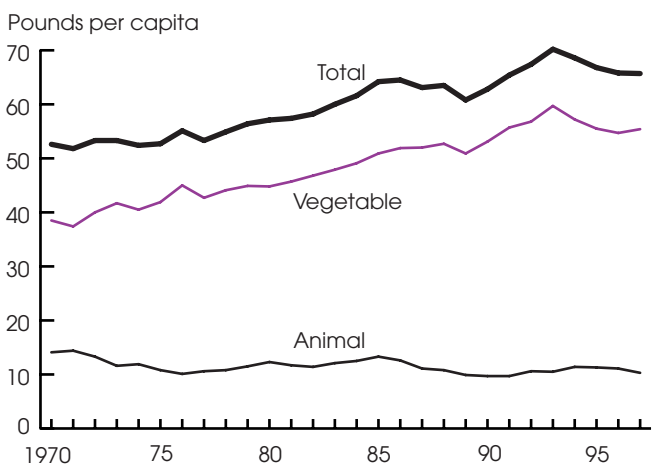


Figure 3b
But, it was down 7 percent from 1993's record, as declines in shortening and table spreads offset an increase in salad and cooking oils

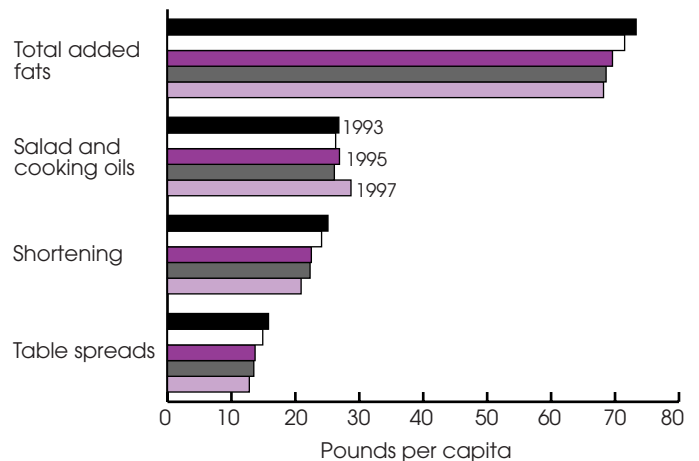
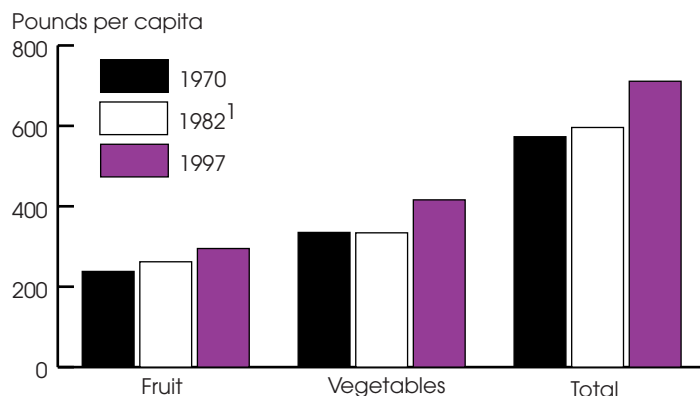
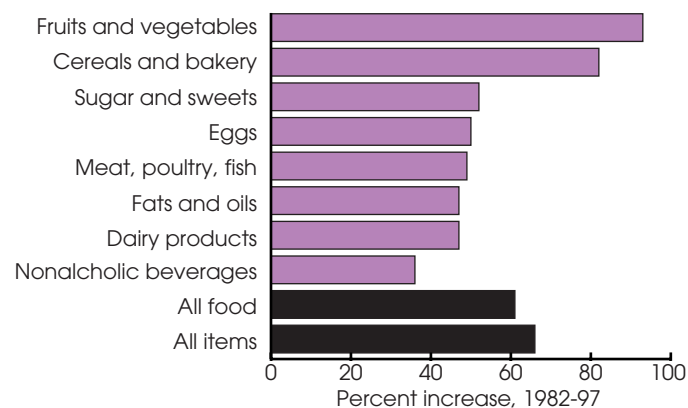


Figure 4a
Fruit and vegetable consumption increased 19 percent from 1982 to 1997...



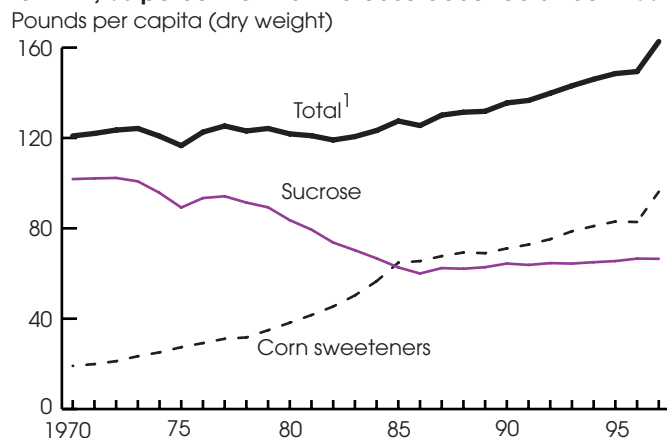
Note: ¹Publication of *Diet, Nutrition, and Cancer*, which emphasized the importance of fruit and vegetables in the daily diet.

Figure 4b
Even as fruits and vegetables led in retail price increases



Source: Calculated by USDA's Economic Research Service from the Consumer Price Index.

Figure 5a
Caloric sweetener consumption rose 26 percent from 1970 to 1997; 85 percent of that increase occurred since 1986...



Note: ¹Includes honey, molasses, and other refiner's syrups.

Figure 5b
Accordingly, consumption of nondiet carbonated soft drinks jumped 47 percent from 1986 to 1997

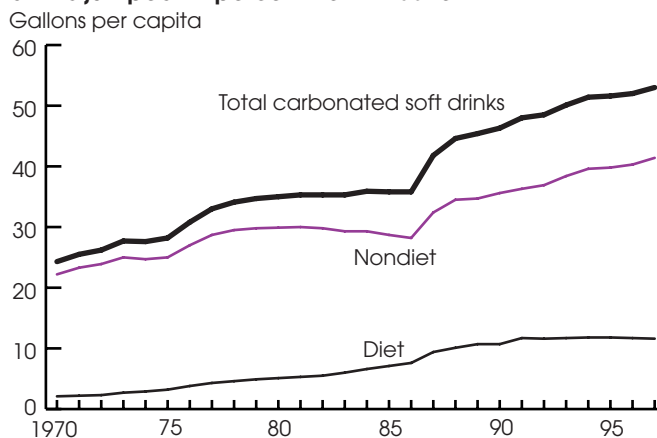
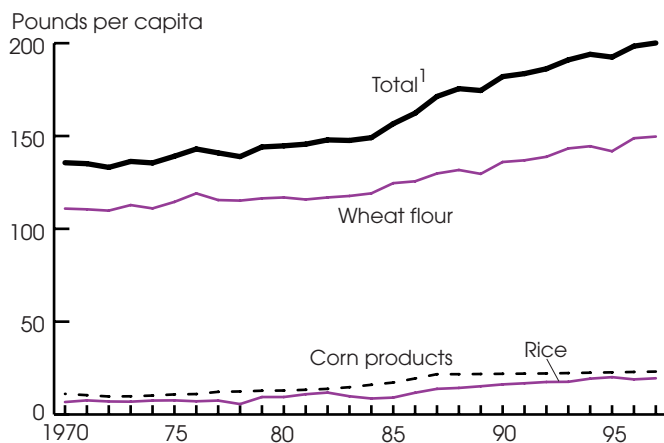
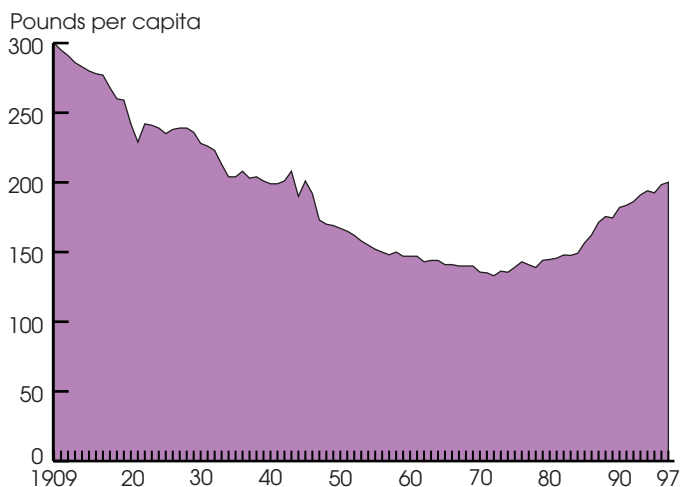


Figure 6a
Consumption of flour and cereal products increased 50 percent between 1972 (an all-time low) and 1997...



Note: ¹Includes oat, rye, and barley products.

Figure 6b
But in 1997, it remained 100 pounds below the 1909 level



\$1.06. The CPI for eggs increased 13 percent between 1990 and 1997. That compares with a 19-percent increase in the CPI for all food during the same period and a 27-percent increase in the CPI for cereals and bakery products.

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 nearly doubled since 1983, reaching the equivalent of 68 eggs per person by 1998. The growth period followed more than two decades of relatively constant consumption. Egg product consumption will continue to increase as consumers opt for more prepared foods.

Nation Fails To Cut Milkfat Consumption

In 1997, Americans drank an average of 23 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 milks and yogurt) has declined by half since 1970 due to lower milk consumption and a trend toward lower fat milks. Americans cut their average consumption of fluid whole milk by two-thirds between 1970 and 1997, 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 during 1970-97 due to lower con-

sumption of these products and increasing preference for lower fat versions.)

Annual per capita consumption of beverage milk declined from 31 gallons in 1970 to 24 gallons in 1997 (fig. 2a). A sixfold increase in per capita consumption of yogurt since 1970—to 9.5 half-pint servings per person in 1997—partially offset the decline in beverage milks. Consumption of 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 35 percent in 1997. As a result, total beverage milk contributed 51 percent less fat to the average American's diet in 1997 than in 1970. In contrast, rising consumption of fluid cream products meant that they contributed two times as much milkfat to the average diet in 1997 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 17.0 half pints in 1997.)

On balance, however, annual per capita consumption of milkfat from all fluid milk and cream products declined 37 percent in 1970-97, from 9.1 pounds per person to 5.8 pounds. Of that 5.8 pounds, whole milk contributed 2.4 pounds; lower fat milks, 1.7 pounds; and fluid cream products, 1.6 pounds. Skim milk added 0.05 pound of fat to the average diet in 1997, and yogurt (most of which is reduced fat or fat-free) added 0.09 pound of fat.

Average consumption of cheese (excluding full-skim American and cottage, pot, and baker's cheeses)

increased 146 percent between 1970 and 1997, from 11 pounds per person to 28 pounds (fig. 2b). 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 1997, consumption of Cheddar cheese, America's favorite cheese, increased 66 percent to 9.6 pounds per capita. Per capita consumption of mozzarella—the main pizza cheese—in 1997 was 8.4 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, with consumption at 2.3 pounds per person in 1997. Despite the flurry of lower fat cheese introductions in the 1990's, these products still accounted for a fifth (reduced-fat, 16 percent; nonfat, 4 percent) of supermarket cheese sales for the 52 weeks ending July 11, 1998 (at 20 percent, that is down 2 percentage points from 2 years earlier), according to the International Dairy Foods Association. In the year ending July 11, 1998, sales of nonfat cheese fell 20 percent, while sales of reduced-fat cheese and regular cheese increased 3.3 percent and 4.0 percent, respectively. Lower fat cheeses make up a much smaller proportion of the total cheese used by food manufacturers and foodservice operators.

Consumption of Added Fats Jumped 25 Percent Between 1970 and 1997

Average use of added fats and oils in 1997 was a fourth above the 1970 level (fig. 3a). 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.

However, 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 (fig. 3b). Annual per capita consumption of added fats and oils declined 7 percent between 1993 and 1997, from a record-high 70.2 pounds (fat-content basis) per person to 65.6 pounds. Declines in consumption of shortening and table spreads more than offset an increase in use of salad and cooking oils.

Studies in the 1950's and 1960's showed that replacing saturated fatty acids (SFA's) and animal fat with polyunsaturated fatty acids (PUFA's) lowered serum cholesterol levels (Keys, Anderson, and Grande, 1957). Consequently, diets high in PUFA's were widely recommended for the prevention of heart disease. Within the added fats and oils group, animal fats declined roughly a fifth from 1970 to 1997, on a per capita basis, and vegetable fats increased roughly two-fifths. Per capita consumption of salad and cooking oils (high in PUFA's) nearly doubled between 1970 and 1997, from 15 pounds per person to 29 pounds.

However, concern later developed about the safety of PUFA's, and interest in the health benefits of monounsaturated fatty acids (MUFA's) also increased. Some

research suggests that replacing SFA's with PUFA's reduces LDL cholesterol but also reduces beneficial HDL cholesterol, while replacing SFA's with MUFA's lowers LDL cholesterol but leaves HDL levels stable. In addition, PUFA's are more easily oxidized than MUFA's, making PUFA's more likely to contribute to atherosclerosis. Monounsaturated fatty acids are the most common fat in foods, but they are particularly plentiful in olive oil, canola oil, almonds, and avocados. In the 1997 food supply, olive oil and canola oil together accounted for 16 percent of total salad and cooking oils, up from 2 percent in 1985. Canola oil also is used in some soft, liquid oil margarines.

In 1993, health concern about trans fatty acids (or trans fats) hit newspaper headlines. Trans fats are created when liquid oils are hydrogenated to make them more solid and stable at room temperature. They raise LDL cholesterol and lower beneficial HDL cholesterol levels, and are associated with increased risk of coronary heart disease. These hydrogenated fats are used in everything from margarines, shortenings, crackers, cookies, baked goods, and peanut butter to foods fried in fast-food eateries, fried snack foods, and even some soups, beans, and cereals. From 1993 to 1997, consumption of margarine declined 23 percent per capita and consumption of shortening declined 17 percent per capita. About 40 percent of the margarine on supermarket shelves today is the old-fashioned stick variety, with the other 60 percent made up of tub or liquid margarines. In 1970, most margarine was the stick variety. In general, the softer the margarine, the lower its percentage of partially hydrogenated oils, and thus the lower the amount of trans fats.

The next generation of margarines may be launched in 1999. In December 1998, the Food and Drug Administration notified the makers

of Benacol Spread and Take Control, two new margarines that promise to lower serum cholesterol, that it is willing to consider classifying the ingredients in their products as "generally recognized as safe."

According to studies and clinical trials, both margarines, which are derived from sterols, are proven to reduce levels of LDL cholesterol by up to 13 percent with minimum daily use.

Fruits and Vegetables: The Array of Choices Widens

As Americans increasingly embrace national health authorities' recommendation of consuming at least 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 since the early 1980's. 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 at the end of 1993 and eclipsing 2,746 in 1998. Some analysts suggest 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 4.4 pounds (or 15 percent) between 1989 and 1997, while per capita consumption of romaine and leaf lettuces increased 2.5 pounds (or 69 percent) during the same period. In addition, many specialty lettuces not yet tracked in USDA's food supply database—such as radicchio, frisee, 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 the 129 commercially produced fruits and vegetables for which ERS has U.S. production data rose 24 percent, from 573 pounds in 1970 to 711 pounds in 1997 (fig. 4a). 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 19-percent gain in fruit and vegetable consumption between 1982 and 1997 was probably tempered by the fact that fruits and vegetables led in retail price increases from 1982 to 1997 (fig. 4b). Price increases for fresh fruits and vegetables were more than double those for processed items. Despite the bigger price increases for fresh than processed products, per capita consumption from 1982 to 1997

increased 24 percent for fresh fruits and 5 percent for processed fruits. Better quality, increased variety, and year-round availability have boosted consumption of fresh fruits and vegetables. Price, convenience, and increasing preference for fast-food eateries and ethnic foods have hiked consumption of frozen vegetables (especially french fries) and canned tomato products.

Consumption of Added Sugars Up 32 Pounds Per Person Since 1970

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 34 pounds, or 28 percent between 1982 and 1997 (fig. 5a). In 1997, each American consumed a record average 154 pounds of caloric sweeteners. That amounted to more than two-fifths of a pound—or 53 teaspoons—of added sugars per person per day in 1997. USDA's Food Guide Pyramid suggests that people consuming 1,600 calories 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, 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 43 percent in 1997, while corn sweeteners increased from 16 percent to 56 percent. All other caloric sweeteners—including honey, maple syrup, and molasses—combined to maintain a 1-percent share.

The steep rise in caloric sweetener consumption since the mid-1980's

coincides with a 47-percent increase in annual per capita consumption of regular (nondiet) carbonated soft drinks, from 28 gallons per person in 1986 to 41 gallons in 1997 (that amounts to 14.5 ounces per person per day, an amount that contains 11 teaspoonfuls of sugar) (fig. 5b). Carbonated soft drinks now provide more than a fifth of the refined and processed sugars in the American diet. USDA's 1994-96 Continuing Survey of Food Intakes by Individuals found that only two-fifths of the population including nearly a quarter of children 5 years and under drink regular carbonated soda, suggesting that the typical nondiet soda consumer 6 years and over drinks and/or wastes the equivalent of three or more cans of regular soda a day.

Convenience and Health Concerns Behind Big Hike in Grain Consumption

Per capita use of flour and cereal products—excluding quantities used in alcoholic beverages and fuel—reached 200 pounds in 1997 from an annual average of 145 pounds in 1980 and 136 pounds in 1970 (fig. 6a). The expansion in supplies reflects ample grain stocks, strong consumer demand for variety breads and other instore bakery items as well as grain-based snack foods, and increasing fast-food sales of products made with buns, doughs, and tortillas. Yet this consumption level is far below the 300 pounds consumed per person in 1909 (the earliest year for which data are available) (fig. 6b). In 1909, the major source of protein in the American diet was grain products. In 1998, it is meat, poultry, and fish. In addition, 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 recommends.

As in the case of fruits and vegetables, four-fifths of the increase after 1970 occurred since 1982, the year of the landmark *Diet, Nutrition, and Cancer* report. The 52-pound increase between 1982 and 1997 occurred even as prices for cereal and bakery products rose much faster than prices for most other grocery foods (fig. 4b). The rise in consumption is attributed to the quest for increased fiber in the diet, to aggressive advertising and health claims by food processors, and to the convenience of many of these foods.

Wheat is the major grain product eaten in the United States, with wheat flour and other products representing 75 percent of total grain consumption in 1997. However, wheat's share of total grain con-

sumption has declined 7 percentage points since 1970, as rice, corn, and oat products have gained momentum. Consumption of wheat flour in 1997 was 150 pounds per person, up 35 percent from 1970.

Consumption increased for other cereal products as well. Per capita use of corn products (corn flour, corn meal, hominy, grits, and starch) more than doubled between 1970 and 1997, to 23 pounds per capita. Per capita use of rice and oat products (rolled oats, ready-to-eat cereals, oat flour, and oat bran) climbed 191 percent and 38 percent from 1970 to 1997. In contrast, consumption of rye flour and barley products (barley flour, pearl barley, and malt and malt extracts used in food processing) has continued to decline.

Between 1970 and 1997, consumption of breakfast cereals increased 64 percent to 17 pounds per capita.

Consumption of ready-to-eat and ready-to-cook cereals in 1997 was 14.3 pounds and 2.6 pounds, compared with 8.6 pounds and 1.7 pounds in 1970.

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