

# Trends in Food and Nutrient Intakes by Adults: NFCS 1977-78, CSFII 1989-91, and CSFII 1994-95

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Evaluations of diet quality and tracking changes in the diet over time have many useful applications, including policy formation, program planning, and targeting appropriate nutrition education messages. CSFII 1994-95 data on food and nutrient intakes by adults were used to examine diet quality in 1994-95 and changes since 1977-78. The largest changes were decreased consumption of whole milk and increased consumption of grain products, especially grain mixtures; bananas; meat, poultry, and fish mixtures; beer and ale; fruit drinks and ades; and soft drinks. In general, the nutrients that were below the RDA in 1994-95 are the same nutrients that were below the RDA in 1977-78. In 1994-95, intakes of magnesium and zinc were below the RDA for both women and men. Women's intakes were also below the RDA in vitamin B<sub>6</sub>, vitamin E, and calcium. Future increases in whole grains, fruits, dark green vegetables, legumes, nonfat or lowfat dairy products, and lean meats and decreases in fats and sugars are desirable.

**I**n accordance with the National Nutrition Monitoring and Related Research (NNMRR) Act of 1990 (P.L. 101-445), the NNMRR Program (NNMRRP) monitors the nutritional status of the U.S. population. As a cornerstone of the NNMRRP, USDA surveys such as the Continuing Survey of Food Intakes by Individuals (CSFII) provide up-to-date information on food intakes by Americans for use in policy

formation, regulation, program planning and evaluation, education, and research. For example, CSFII data have been used to evaluate the impact of food fortification on nutrient intakes, to estimate exposure to pesticide residues and other contaminants from foods, and to target nutrition programs to those who need them most. CSFII data are essential for monitoring changes over time in the food choices Americans make and the adequacy of their diet.

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This article contains information from the first 2 years of the 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII), conducted by the Agricultural Research Service (ARS) of the U.S. Department of Agriculture (USDA). Some comparisons are made between intakes in the CSFII 1994-95 and intakes in the Nationwide Food Consumption Survey (NFCS) 1977-78 and the CSFII 1989-91. Methods and comparability of the data from the three surveys are discussed briefly in the "Design and Methods" section below.

Mean intakes and percentages of individuals using foods from 12 food groups and 29 selected subgroups are presented for women (tables 1 and 2, pp. 4 and 5) and men (tables 3 and 4, pp. 6 and 7) age 20 years and over who participated in the NFCS 1977-78, CSFII 1989-91, and CSFII 1994-95. Some trends in food intakes that can be traced from the NFCS 1977-78 through the CSFII 1989-91 to the CSFII 1994-95 are highlighted in table 5, p. 8 (see section on "Design and Methods" regarding the definition of a trend). The effect of analyzing food group intakes with grain mixtures and meat mixtures broken down is shown in tables 6 and 7, pp. 8 and 9 and figure 1, p. 10.

Intakes of energy and nutrients as percentages of the Recommended Dietary Allowances (RDA) are presented in table 8, p. 11. Figure 2, p. 12, shows trends in intakes of fat and carbohydrate from 1977-78 to 1994-95. Saturated fat, cholesterol, and dietary fiber intakes are discussed.

## Design and Methods

The recently completed CSFII 1994-96, popularly referred to as "What We Eat in America," was conducted by Westat, Inc. (Rockville, MD) under contract to USDA's Food Surveys Research Group (FSRG), Agricultural Research Service (ARS). In each of the 3 survey years, a nationally representative sample of non-institutionalized individuals residing in the United States provided, through in-person interviews using a 1-day dietary recall, food intakes on 2 nonconsecutive days and health-related information.

Some estimates from the NFCS 1977-78 and the CSFII 1989-91 are compared with estimates from the first 2 years of the CSFII 1994-96. Some differences exist between the three surveys in sampling and methodology. Detailed information on the methodology of each survey is available elsewhere (13-17).

In 1994-96, the target population was noninstitutionalized individuals in all 50 States; in 1977-78 and 1989-91, the target population covered only the 48 conterminous States. The 1994-96 survey included an oversampling of the low-income population; earlier surveys included separate supplemental samples for the low-income population. In the summer, fall, and winter quarters of the NFCS 1977-78, in households with more than one individual 19 years or over, one-half of the individuals in that age group were asked to participate. In the CSFII 1988-91, all individuals in sample households were eligible. CSFII 1994-96 data were collected from selected individuals within each household. The 1994-96 survey provides a proportionately larger sample in selected sex-age categories, specifically young children and elderly people.

In the NFCS 1977-78 and the CSFII 1989-91, dietary information was collected on 3 consecutive days using a 1-day dietary recall and a 2-day dietary record. In the CSFII 1994-96, dietary data were collected by means of 1-day dietary recalls on 2 nonconsecutive days (3 to 10 days apart). The 1-day recall was modified for the CSFII 1994-96 to include multiple passes through the list of all foods and beverages recalled by the respondent in order to maximize the amount of information collected. The multiple-pass approach and its development are described in detail elsewhere (3, 5, 13). The procedure has respondents provide a list of all foods eaten the previous day, using any recall strategy they desire. Then interviewers get a more detailed list by probing for additions to food and giving respondents an opportunity to recall food items initially forgotten. In a third pass, the interviewers review with the respondents the list of food they reported to stimulate more reports of food and eating occasions.

In order to track trends over time from surveys with different numbers of days of dietary information, tables and figures comparing food and nutrient intake estimates among the surveys are based on only the first day's data collected from each individual. All estimates are weighted to be nationally representative.

In addition to the changes outlined above, the USDA nutrient data base was updated for each survey to reflect changes in foods on the market and also to incorporate improved nutrient values.

**Table 1. Mean intakes per individual from selected<sup>1</sup> food groups and standard errors of the mean, women 20 years and over, 1 day, NFCS 1977-78, CSFII 1989-91, and CSFII 1994-95**

Food group <sup>2</sup>	1977-78		1989-91		1994-95	
	Mean	(SEM)	Mean	(SEM)	Mean	(SEM)
	<i>Grams</i>					
Total grain products	177	( 2.4)	234	( 5.8)	255	( 5.3)
Yeast breads and rolls	48	( .5)	45	( .9)	45	( 1.0)
Cereals and pasta	42	( 3.5)	63	( 3.2)	64	( 2.6)
Ready-to-eat cereals	7	( .2)	11	( .5)	13	( .5)
Mixtures mainly grain	42	( 1.8)	71	( 3.0)	87	( 4.3)
Total vegetables	205	( 2.4)	187	( 3.6)	189	( 3.8)
Dark-green vegetables	10	( .7)	12	( .8)	14	( 1.2)
Deep-yellow vegetables	10	( .3)	9	( .7)	10	( .9)
Tomatoes	27	( 1.0)	25	( 1.1)	28	( 1.3)
Total fruits	142	( 4.4)	150	( 4.7)	156	( 5.0)
Citrus juices	54	( 2.6)	53	( 2.7)	52	( 2.9)
Bananas	8	( .4)	13	( .7)	17	( .8)
Noncitrus juices and nectars	12	( .8)	20	( 2.2)	16	( 1.7)
Total milk and milk products	203	( 4.2)	206	( 5.6)	202	( 6.0)
Total fluid milk <sup>3</sup>	151	( 3.5)	156	( 5.1)	135	( 4.2)
Whole milk	67	( 4.3)	46	( 2.9)	35	( 2.9)
Lowfat milk	34	( 1.2)	74	( 4.2)	56	( 3.5)
Skim milk	13	( .7)	34	( 2.4)	41	( 2.7)
Milk desserts	16	( .6)	18	( .9)	25	( 1.8)
Cheese	16	( .7)	12	( .7)	15	( 1.0)
Total meat, poultry, fish	184	( 1.9)	167	( 3.3)	168	( 3.1)
Beef	47	( 1.5)	22	( 1.1)	19	( .9)
Pork	18	( .5)	10	( .5)	10	( .6)
Mixtures mainly meat, poultry, fish	60	( 2.0)	78	( 3.2)	85	( 3.4)
Eggs	24	( .9)	16	( .9)	16	( .8)
Legumes	18	( 1.4)	17	( 1.3)	19	( 1.2)
Nuts and seeds	2	( .2)	3	( .3)	3	( .3)
Total fats and oils	13	( .6)	16	( .5)	16	( .6)
Table fats	6	( .2)	5	( .2)	3	( .2)
Salad dressings	6	( .3)	9	( .5)	10	( .5)
Total sugars and sweets	17	( .6)	17	( .8)	19	( 1.0)
Sugars	5	( .2)	4	( .2)	4	( .2)
Candy	2	( .2)	4	( .3)	5	( .5)
Total alcoholic beverages	32	( 2.1)	40	( 4.7)	59	( 5.6)
Beer and ale	19	( 1.7)	27	( 4.2)	38	( 4.6)
Total nonalcoholic beverages	698	(18.1)	753	(14.5)	854	(20.4)
Coffee	376	(14.5)	327	(13.0)	332	(13.9)
Total fruit drinks and ades	29	( 2.1)	46	( 2.7)	58	( 4.4)
Total carbonated soft drinks	137	( 4.0)	238	( 7.6)	293	(13.3)
Regular carbonated soft drinks	101	( 4.5)	140	( 6.4)	178	(10.8)
Low-calorie carbonated soft drinks	34	( 3.4)	97	( 5.5)	115	( 8.9)

<sup>1</sup>Because only selected food groups are included here, intakes from subgroups may not sum to totals.

<sup>2</sup>For descriptions of the foods included in the food groups named in this article, see "Table Notes" in reference 21.

<sup>3</sup>The proportion of total fluid milk intake that could be classified as whole, lowfat, or skim on the basis of information obtained from respondents was much higher in 1994-95 (nearly 98 percent) than in 1977-78 (75 percent or less).

**Table 2. Mean percentages of individuals using items from selected food groups and standard errors of the percentage, women 20 years and over, 1 day, NFCS 1977-78, CSFII 1989-91, and CSFII 1994-95**

Food group <sup>1</sup>	1977-78		1989-91		1994-95	
	Mean	(SEP)	Mean	(SEP)	Mean	(SEP)
	<i>Percent</i>					
Total grain products	94.8	(0.24)	96.3	(0.34)	96.8	(0.30)
Yeast breads and rolls	76.4	(.46)	69.6	(1.00)	66.9	(.81)
Cereals and pasta	35.6	(.52)	41.3	(1.11)	43.8	(1.01)
Ready-to-eat cereals	18.4	(.41)	23.3	(.70)	24.0	(.86)
Mixtures mainly grain	16.8	(.41)	26.6	(.88)	31.2	(1.08)
Total vegetables	86.3	(.37)	82.7	(.73)	84.0	(.79)
Dark-green vegetables	7.8	(.29)	11.4	(.68)	12.4	(.74)
Deep-yellow vegetables	10.2	(.33)	11.1	(.64)	15.3	(.84)
Tomatoes	25.5	(.47)	30.5	(.78)	39.0	(1.11)
Total fruits	54.2	(.54)	54.5	(1.18)	54.8	(1.12)
Citrus juices	26.7	(.48)	22.2	(.98)	20.8	(.87)
Bananas	7.1	(.27)	12.1	(.67)	14.9	(.64)
Noncitrus juices and nectars	4.9	(.24)	6.7	(.56)	5.1	(.45)
Total milk and milk products	77.1	(.45)	76.3	(.88)	77.1	(.87)
Total fluid milk <sup>2</sup>	59.1	(.53)	57.1	(1.11)	51.8	(1.16)
Whole milk	25.2	(.47)	19.6	(.85)	14.7	(1.23)
Lowfat milk	12.2	(.35)	26.3	(1.04)	22.8	(.90)
Skim milk	5.2	(.24)	11.8	(.65)	14.4	(.81)
Milk desserts	13.1	(.36)	13.1	(.60)	17.0	(.83)
Cheese	26.4	(.48)	27.1	(1.03)	32.1	(1.08)
Total meat, poultry, fish	92.1	(.29)	88.0	(.67)	85.3	(.70)
Beef	33.4	(.51)	20.5	(.87)	19.4	(.74)
Pork	25.1	(.46)	15.8	(.65)	16.6	(.79)
Mixtures mainly meat, poultry, fish	27.7	(.48)	32.7	(1.18)	34.0	(1.23)
Eggs	30.9	(.50)	19.2	(.76)	18.5	(.74)
Legumes	10.6	(.33)	11.3	(.58)	14.1	(.62)
Nuts and seeds	7.2	(.28)	8.5	(.51)	8.2	(.49)
Total fats and oils	63.2	(.52)	64.4	(.79)	60.9	(1.21)
Table fats	45.4	(.54)	40.2	(1.02)	33.6	(1.09)
Salad dressings	27.9	(.49)	32.8	(.89)	32.1	(1.21)
Total sugars and sweets	53.0	(.54)	51.4	(1.12)	56.8	(.95)
Sugars	38.5	(.52)	34.8	(1.03)	36.1	(.83)
Candy	4.6	(.23)	9.3	(.65)	12.2	(.74)
Total alcoholic beverages	9.7	(.33)	10.1	(.88)	11.8	(.91)
Beer and ale	3.2	(.19)	4.0	(.48)	4.3	(.38)
Total nonalcoholic beverages	91.8	(.30)	89.1	(.85)	90.7	(.54)
Coffee	66.9	(.51)	55.5	(1.31)	54.2	(1.17)
Total fruit drinks and ades	8.8	(.30)	12.2	(.65)	13.1	(.58)
Total carbonated soft drinks	32.2	(.50)	44.3	(1.07)	48.7	(1.32)
Regular carbonated soft drinks	24.5	(.48)	28.2	(.97)	31.7	(1.24)
Low-calorie carbonated soft drinks	8.1	(.30)	18.2	(.78)	18.5	(.93)

<sup>1</sup>For descriptions of the foods included in the food groups named in this article, see "Table Notes" in reference 21.

<sup>2</sup>The proportion of total fluid milk intake that could be classified as whole, lowfat, or skim on the basis of information obtained from respondents was much higher in 1994-95 (nearly 98 percent) than in 1977-78 (75 percent or less).

**Table 3. Mean intakes per individual from selected<sup>1</sup> food groups and standard errors of the mean, men 20 years and over, 1 day, NFCS 1977-78, CSFII 1989-91, and CSFII 1994-95**

Food group <sup>2</sup>	1977-78		1989-91		1994-95	
	Mean	(SEM)	Mean	(SEM)	Mean	(SEM)
	<i>Grams</i>					
Total grain products	252	( 4.3)	324	( 7.5)	361	( 9.7)
Yeast breads and rolls	75	( 1.0)	61	( 1.3)	63	( 2.0)
Cereals and pasta	52	( 3.6)	87	( 4.6)	89	( 4.5)
Ready-to-eat cereals	9	( .3)	14	( .8)	16	( .8)
Mixtures mainly grain	56	( 3.1)	104	( 5.1)	128	( 6.7)
Total vegetables	251	( 5.5)	222	( 4.5)	242	( 4.4)
Dark-green vegetables	10	( 1.0)	13	( 1.3)	14	( 1.4)
Deep-yellow vegetables	10	( .4)	10	( .8)	8	( .6)
Tomatoes	30	( .9)	31	( 1.4)	37	( 2.0)
Total fruits	142	( 4.6)	150	( 6.4)	172	( 5.8)
Citrus juices	51	( 2.8)	59	( 4.2)	65	( 4.6)
Bananas	10	( .7)	11	( .7)	19	( 1.0)
Noncitrus juices and nectars	11	( 1.0)	16	( 1.9)	19	( 2.4)
Total milk and milk products	276	( 6.5)	254	( 9.6)	256	( 9.7)
Total fluid milk <sup>3</sup>	214	( 6.4)	193	( 8.1)	178	( 6.6)
Whole milk	102	( 5.8)	66	( 5.2)	54	( 3.8)
Lowfat milk	45	( 2.1)	92	( 5.5)	85	( 5.6)
Skim milk	10	( 1.0)	32	( 3.8)	35	( 3.6)
Milk desserts	23	( 1.2)	24	( 2.0)	33	( 2.4)
Cheese	17	( .6)	16	( .9)	18	( 0.9)
Total meat, poultry, fish	280	( 2.7)	260	( 5.4)	275	( 5.3)
Beef	72	( 2.4)	36	( 1.9)	38	( 2.4)
Pork	28	( .8)	15	( 1.2)	15	( 1.0)
Mixtures mainly meat, poultry, fish	92	( 3.7)	124	( 5.4)	137	( 5.0)
Eggs	38	( 1.0)	26	( 1.5)	23	( 1.1)
Legumes	26	( 1.5)	30	( 2.7)	31	( 3.0)
Nuts and seeds	4	( .3)	4	( .4)	4	( .4)
Total fats and oils	17	( .8)	18	( .8)	18	( .9)
Table fats	8	( .4)	7	( .4)	5	( .4)
Salad dressings	7	( .4)	10	( .5)	11	( .6)
Total sugars and sweets	24	( 1.0)	19	( 1.1)	24	( 1.4)
Sugars	6	( .2)	6	( .4)	4	( .3)
Candy	2	( .3)	3	( .4)	6	( .5)
Total alcoholic beverages	138	( 8.4)	162	(10.3)	238	(23.6)
Beer and ale	121	( 8.0)	145	(10.2)	216	(22.9)
Total nonalcoholic beverages	752	(12.9)	900	(21.8)	1,066	(21.7)
Coffee	421	(13.0)	408	(15.6)	408	(13.4)
Total fruit drinks and ades	35	( 2.3)	60	( 5.1)	86	( 6.5)
Total carbonated soft drinks	154	( 5.6)	292	(12.3)	404	(16.1)
Regular carbonated soft drinks	136	( 6.5)	212	(10.4)	312	(15.8)
Low-calorie carbonated soft drinks	15	( 1.5)	79	( 6.2)	92	( 6.8)

<sup>1</sup>Because only selected food groups are included here, intakes from subgroups may not sum to totals.

<sup>2</sup>For descriptions of the foods included in the food groups named in this article, see "Table Notes" in reference 21.

<sup>3</sup>The proportion of total fluid milk intake that could be classified as whole, lowfat, or skim on the basis of information obtained from respondents was much higher in 1994-95 (nearly 98 percent) than in 1977-78 (75 percent or less).

**Table 4. Mean percentages of individuals using items from selected food groups and standard errors of the percentage, men 20 years and over, 1 day, NFCS 1977-78, CSFII 1989-91, and CSFII 1994-95**

Food group <sup>1</sup>	1977-78		1989-91		1994-95	
	Mean	(SEP)	Mean	(SEP)	Mean	(SEP)
	<i>Percent</i>					
Total grain products	96.9	(0.22)	95.8	(0.47)	96.8	(0.37)
Yeast breads and rolls	82.5	(.49)	71.3	(.86)	69.0	(1.17)
Cereals and pasta	36.5	(.62)	40.5	(1.27)	40.8	(1.23)
Ready-to-eat cereals	19.7	(.51)	21.7	(.98)	22.0	(.87)
Mixtures mainly grain	16.9	(.48)	28.7	(1.14)	32.9	(1.19)
Total vegetables	87.9	(.42)	82.9	(.79)	86.1	(.71)
Dark-green vegetables	7.2	(.34)	10.6	(.82)	10.7	(.74)
Deep-yellow vegetables	8.7	(.37)	10.1	(.69)	12.2	(.75)
Tomatoes	25.8	(.57)	32.6	(1.20)	41.7	(1.09)
Total fruits	51.0	(.64)	47.8	(1.37)	49.9	(.99)
Citrus juices	23.9	(.56)	21.1	(1.03)	19.8	(1.15)
Bananas	8.4	(.37)	10.4	(.71)	14.8	(.72)
Noncitrus juices and nectars	4.4	(.27)	4.9	(.48)	5.0	(.46)
Total milk and milk products	78.0	(.53)	74.7	(1.17)	74.7	(1.31)
Total fluid milk <sup>2</sup>	61.6	(.63)	54.8	(1.32)	49.4	(1.30)
Whole milk	28.4	(.58)	21.3	(1.20)	15.0	(.87)
Lowfat milk	12.1	(.42)	25.4	(1.22)	24.5	(1.26)
Skim milk	3.0	(.22)	8.6	(.79)	9.7	(.68)
Milk desserts	15.5	(.47)	13.7	(.87)	18.3	(.88)
Cheese	26.0	(.57)	27.1	(1.10)	32.1	(1.10)
Total meat, poultry, fish	95.8	(.26)	91.7	(.51)	90.6	(.69)
Beef	38.8	(.63)	25.1	(1.19)	24.9	(.99)
Pork	31.0	(.59)	19.6	(.88)	17.9	(.83)
Mixtures mainly meat, poultry, fish	31.4	(.60)	38.5	(1.08)	40.1	(1.07)
Eggs	39.1	(.63)	24.1	(.89)	21.2	(.80)
Legumes	11.7	(.41)	13.4	(.82)	14.0	(.76)
Nuts and seeds	8.3	(.36)	8.6	(.61)	8.7	(.49)
Total fats and oils	63.5	(.62)	64.0	(1.12)	58.0	(1.18)
Table fats	48.6	(.64)	40.3	(1.18)	32.4	(1.08)
Salad dressings	27.1	(.57)	31.9	(1.16)	31.3	(1.08)
Total sugars and sweets	57.4	(.64)	49.7	(1.20)	52.2	(1.14)
Sugars	42.0	(.64)	33.9	(1.22)	33.4	(.99)
Candy	4.1	(.26)	7.1	(.61)	12.5	(.64)
Total alcoholic beverages	19.0	(.51)	21.6	(1.15)	23.7	(.96)
Beer and ale	12.8	(.43)	15.2	(.83)	17.9	(.78)
Total nonalcoholic beverages	90.4	(.38)	89.6	(.88)	92.2	(.52)
Coffee	67.7	(.60)	59.1	(1.30)	56.2	(1.03)
Total fruit drinks and ades	8.1	(.36)	11.5	(.78)	14.7	(.79)
Total carbonated soft drinks	31.3	(.59)	47.0	(1.33)	54.4	(1.30)
Regular carbonated soft drinks	27.7	(.59)	35.0	(1.16)	42.6	(1.53)
Low-calorie carbonated soft drinks	3.3	(.23)	13.2	(.71)	13.4	(.73)

<sup>1</sup>For descriptions of the foods included in the food groups named in this article, see "Table Notes" in reference 21.

<sup>2</sup>The proportion of total fluid milk intake that could be classified as whole, lowfat, or skim on the basis of information obtained from respondents was much higher in 1994-95 (nearly 98 percent) than in 1977-78 (75 percent or less).

Sample sizes for adults age 20 years and over were the following: 10,035 women and 7,027 men in the NFCS 1977-78; 6,229 women and 4,219 men in the CSFII 1989-91; and 3,284 women and 3,352 men in the CSFII 1994-95. Overall analytic Day-1 response rates were 56.9 percent in the NFCS 1977-78, 57.6 percent in the CSFII 1989-91, and 80 percent in the CSFII 1994-95.

Mean intakes are presented “per individual,” meaning they include intakes by both consumers and nonconsumers of the food group. To calculate “per user” intakes, divide the mean intake by the percentage of individuals using the food expressed as a decimal. Since only selected subgroups are presented, subgroup intakes will not sum to the food group total.

For this article, a “trend” was defined very narrowly. For a given food group, a trend is claimed to exist only when mean intakes of the food (or percentages of individuals using the food) either rose or fell continuously from 1977-78 through 1989-91 to 1994-95. Further analysis with more complex methods may reveal additional trends.

## Results and Discussion

### Time Trends in Food Intakes

**Grain products.**—As shown in tables 1 to 5, adults 20 years and over in the United States ate more grain products,<sup>1</sup> especially grain mixtures (such as pizza and tacos), in 1994-95 than in 1977-78.

<sup>1</sup>For descriptions of the foods included in the food groups named in this article, see “Table Notes” in reference 12.

**Table 5. Trends in food intakes, 1977-78 to 1994-95: Women and men 20 years and over, 1 day, NFCS 1977-78 and CSFII 1994-95**

Food	Percent change in amounts consumed	
	Women	Men
Grain products	+44	+43
Mixtures	+107	+129
Fruit	+10	+21
Bananas	+112	+90
Fluid milk	-11	-17
Whole milk	-48	-47
Meat, poultry, and fish mixtures	+42	+49
Beverages	+25	+47
Beer and ale	+100	+79
Fruit drinks and ades	+100	+146
Soft drinks	+114	+162

**Table 6. Food mixtures: Mean intakes and percentages of total weight by ingredient, adults 20 years and over, 1 day, 1994**

Intakes and ingredients	Grain mixtures	Meat mixtures
	<i>Grams</i>	
Mean intakes	109	105
	<i>Percent</i>	
Ingredient:		
Grain products	32	14
Vegetables	24	28
Milk and milk products	8	6
Meat, poultry, and fish	8	34
Water	19	10
Other	9	8

**Table 7. Vegetable intakes: Intakes of vegetables coded separately, intakes from grain mixtures and meat mixtures, and adjusted total intakes, adults 20 years and over, 1 day, CSFII 1989-91 and CSFII 1994**

Intake source	Women		Men	
	1989-91	1994	1989-91	1994
	<i>Grams</i>			
Vegetables coded separately	187	190	222	242
From grain mixtures	16	22	25	30
From meat mixtures	22	25	35	33
Adjusted total vegetables	225	237	282	305

**Vegetables.**—No clear trend in vegetable intakes can be seen in this series of tables because of the widespread consumption of vegetables as part of grain mixtures and meat mixtures. This issue is explored further in the section called “Breaking Down Mixtures.”

**Fruits.**—Overall, the average intake of fruit rose slightly, but the percentages of women and men eating fruit or drinking fruit juice<sup>2</sup> in a day remained about the same. In 1994-95, only 55 percent of women and 50 percent of men ate fruit or drank fruit juice in a day. Meanwhile, intakes of fruit drinks and ades<sup>3</sup> doubled for women and more than doubled for men between 1977-78 and 1994-95, partly due to increases in the percentages of individuals consuming those drinks. Percentages of individuals eating bananas also doubled for women and nearly doubled for men between 1977-78 and 1994-95.

<sup>2</sup>Fruit juices (includes citrus juices plus noncitrus juices and nectars) are 100 percent juice.

<sup>3</sup>Fruit drinks and ades contain less than 100 percent juice.

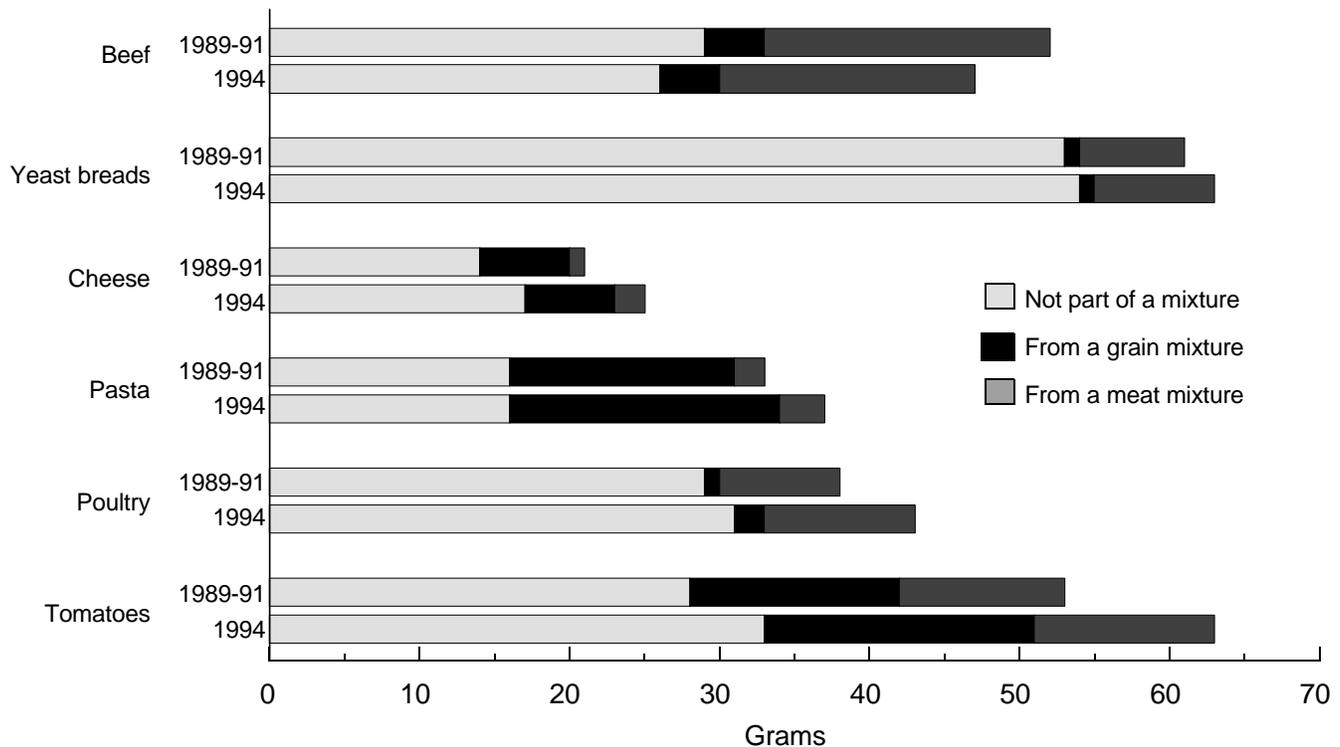
**Milk and milk products.**—The percentages of adults drinking whole milk declined progressively for both women and men, while the percentages drinking skim milk increased.

**Meat, poultry, and fish.**—In the meat, poultry, and fish group, the percentages of individuals eating separate cuts of beef and pork decreased. Higher percentages of women and men ate meat mixtures (such as stew or a hamburger on a bun), and they ate larger amounts.

**Beverages.**—Observed increases in intakes of beer and ale between 1977-78 and 1994-95 among both women and men may in part reflect a decrease in underreporting. This possibility is suggested because the trend seen here is not paralleled by per capita consumption trends for the same time period (see 11). It has been noted that “sensitive items” for which “public awareness is heightened” are subject to bias in self-reporting (12). Perhaps the level of sensitivity associated with reporting beer intakes has decreased. Another

**...since 1989-91, amounts of soft drinks consumed by both women and men have surpassed their intakes of milk.**

**Figure 1. Ingredients from breakdown of grain mixtures and meat mixtures added to foods coded separately, selected food groups, adults 20 years and over, 1 day**



Source: U.S. Department of Agriculture, Agricultural Research Service, Beltsville Human Nutrition Research Center, Food Surveys Research Group. USDA Continuing Survey of Food Intakes by Individuals 1989-91 and 1994.

reason for increased intakes of beer and ale, as well as other foods, may be improved quality of the data collected using the multiple-pass approach (see “Design and Methods” above).

Both the percentages of adults 20 years and over drinking carbonated soft drinks and mean intakes of soft drinks increased progressively and substantially between 1977-78 and 1994-95. In fact, since 1989-91, amounts of soft drinks consumed by both women and men have surpassed their intakes of milk. In 1994-95, a higher percentage of men drank

soft drinks than drank milk. In 1994-95, men’s mean intake of beer exceeded their intake of fluid milk, although it was lower than their intakes of coffee and soft drinks.

### Breaking Down Mixtures

When CSFII food intake tables such as tables 1 to 5 are created, a food mixture that was reported and coded as a single item is classified under the food group of its major ingredient. For this reason, secondary ingredients may be included

under food groups other than the ones they would appear in if each ingredient were reported and coded separately. For example, cheese pizza is a mixture of dough, tomato sauce, and cheese. Pizza’s major ingredient is dough, so pizza is classified under grain products in the subgroup “grain mixtures.” Thus, the secondary ingredients in the pizza (cheese and tomato sauce) are included in the grain category rather than under milk and milk products (cheese) and vegetables (tomatoes).

**Table 8. Nutrient intakes as percentages of 1989 Recommended Dietary Allowances (RDA): Selected mean intakes per day and standard errors of the mean, adults 20 years and over, 1 day, CSFII 1994-95**

Nutrient	Percentage of RDA			
	Women		Men	
	Mean	(SEM)	Mean	(SEM)
	<i>Percent</i>			
Protein	127	( 1.2)	154	( 2.2)
Vitamin A <sup>1</sup>	118	( 3.3)	116	( 4.7)
Vitamin B <sub>6</sub>	94	( 1.0)	110	( 1.8)
Vitamin B <sub>12</sub>	212	( 7.7)	335	(25.7)
Folate	122	( 1.8)	150	( 2.5)
Vitamin C	147	( 3.2)	186	( 4.2)
Vitamin E	88	( 1.9)	100	( 2.3)
Calcium	77	( 1.1)	107	( 2.2)
Iron	100	( 1.0)	185	( 3.6)
Magnesium	83	( .9)	94	( 1.5)
Zinc	76	( .9)	94	( 1.9)
Food energy	78	( .7)	91	( 1.3)

<sup>1</sup>The unit of vitamin A intake used in this calculation was µg RE.

This method of categorizing mixtures gives a good picture of what types of dishes people eat, but it can mask what is happening with intakes of foods that are widely used as ingredients in mixtures. Because of the increasing popularity of mixtures, the ability to look at foods that are ingredients in mixtures can make an important contribution to understanding trends in food intakes. For this reason, the grain mixtures and meat mixtures food groups were broken

down into their ingredients to provide the information shown in tables 6 and 7 and figure 1. Predictably, the predominant ingredient (by weight) of grain mixtures is grain products, and the predominant ingredient of meat mixtures is meat, poultry, and fish (table 6).

Vegetables are the second largest ingredient of both grain mixtures and meat mixtures. Illustrated in figure 1 are the intakes of several foods that are often

ingredients in mixtures; for each food, the corresponding bar represents the intake from food coded separately plus the intakes from grain mixtures and meat mixtures. In both 1989-91 and 1994,<sup>4</sup> intake of pasta was doubled when mixtures were broken down, and intakes of beef and tomatoes were nearly doubled.

As mentioned in the preceding section, no clear trend in vegetable intakes was apparent from tables 1 to 4. However, as shown in table 7, when vegetable intakes are adjusted by adding the amount from mixtures to the intake of vegetables coded separately, small increases over time can be seen in vegetable intakes for both women and men.

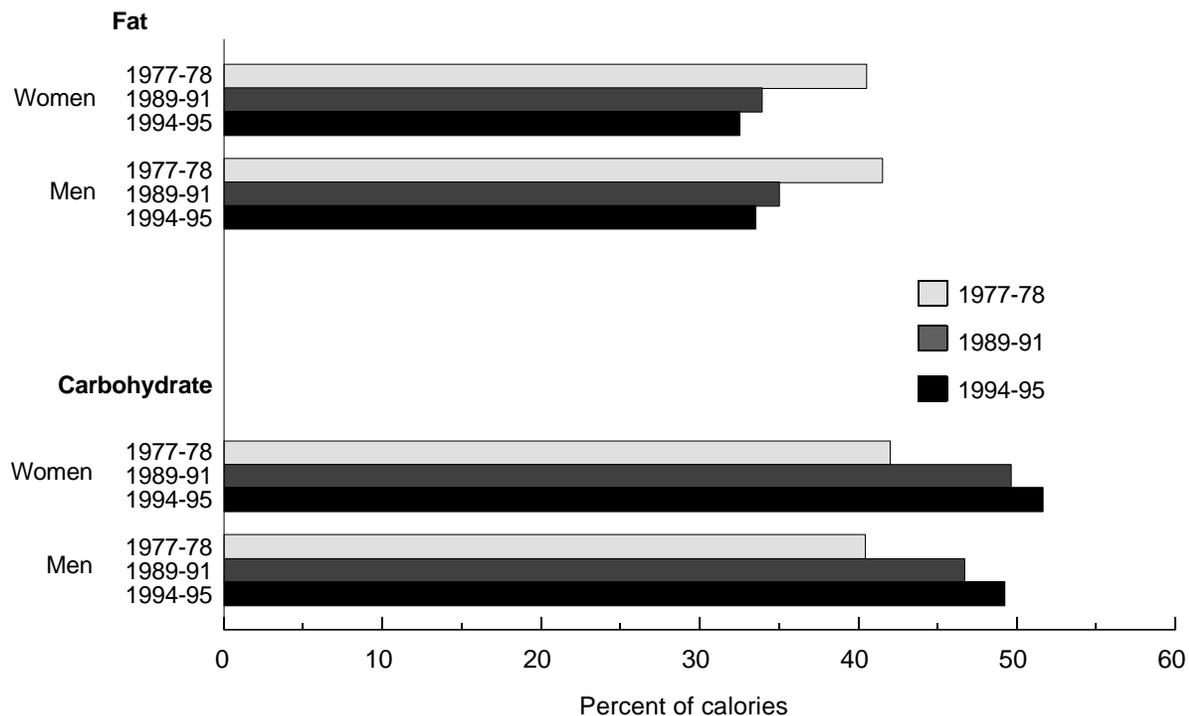
### Energy, Nutrients, and Other Food Components

**Energy.**—In 1994-95, mean food energy intakes were estimated to be 1,633 kcal for women and 2,470 kcal for men (21). This level of energy intake represents 78 percent of the RDA (8) for women and 91 percent for men (table 8). In apparent contradiction to this finding, 31 percent of women and 32 percent of men in the CSFII 1994-95 were overweight,<sup>5</sup> according to body mass index estimates from self-reported height and weight data (21). A similar percentage of overweight men and a slightly higher percentage of overweight women were found in the National Health and Nutrition Examination Survey (NHANES) 1988-94 (9).

<sup>4</sup>Mixtures breakdown data from the CSFII 1995 were not available as this article was being written.

<sup>5</sup>Overweight is defined as body mass index (kg/m<sup>2</sup>) ≥27.3 for women and ≥27.8 for men (85th percentiles from NHANES II for ages 20 to 29 years).

**Figure 2. Food energy intake from fat and carbohydrate, adults 20 years and over, 1 day**



Source: U.S. Department of Agriculture, Agricultural Research Service, Beltsville Human Nutrition Research Center, Food Surveys Research Group. USDA Nationwide Food Consumption Survey 1977-78 and USDA Continuing Survey of Food Intakes by Individuals 1989-91 and 1994-95.

Underreporting and sedentary lifestyles are two factors that may help to explain the disparity between energy intake estimates and prevalence of overweight. It is widely recognized that some individuals in nutrition studies underreport the food they eat (1, 7, 12). Also, the average energy allowances are designed for a light-to-moderate level of physical activity. The actual level of physical activity of many individuals in the United States is lower than light-to-moderate. In the CSFII 1994-95, in answer to the question, "How often do you exercise vigorously enough to work up a sweat?", 44 percent of women and 28 percent of men answered "rarely" or "never" (21). In 1996, the Surgeon General

concluded that 60 percent of American adults are not regularly active and 25 percent are not active at all (20), based on data from 1985 through 1994.

**Energy-providing nutrients.**—For both women and men, the proportion of food energy intake provided by protein was 16 to 17 percent of calories in all three survey periods. In contrast, the proportion of energy from fat decreased between 1977-78 and 1994-95, and the proportion of energy from carbohydrate increased as discussed below. In 1994-95, the proportion of energy from alcohol was 1 percent of calories for women and 3 percent of calories for men.

For women, the proportion of energy from fat fell from 40 percent of calories in 1977-78 to 32 percent in 1994-95, and the proportion of energy from carbohydrate climbed from 42 to 52 percent of calories (fig. 2). Likewise for men, the proportion of energy from fat dropped from 42 to 34 percent of calories, and the proportion of energy from carbohydrate rose from 40 to 49 percent of calories. The shift to lower fat intakes has been paralleled by a decrease in the average serum total cholesterol level of individuals age 20 through 74 years in the United States from 213 mg/dL in 1976-80 to 205 mg/dL in 1988-91 (6).

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In 1994-95, average fat intakes as a percentage of calories by both women and men still exceeded the Dietary Guidelines recommendation of 30 percent of calories or less, and saturated fat intakes (11 percent of calories for both women and men) still exceeded the recommendation of less than 10 percent of calories (19).

When CSFII 1994 food intakes were compared with the Food Guide Pyramid (18), discretionary fat<sup>6</sup> intake accounted for 25 percent of calories for both women and men 20 years and over (2). Although the Pyramid does not mention a specific percentage of calories from discretionary fat, 25 percent is most likely much too high. Individuals will get up to half of the recommended 30 percent of calories from fat if they eat the recommended number of servings from each Pyramid food group, choose the lowest fat choices within each food group, and add no fat to foods in preparation or at the table (18). Any additional fat—that is, discretionary fat—should be low enough to keep the total fat at 30 percent or less of calories.

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<sup>6</sup>Discretionary fat was defined as fat added to foods in preparation or at the table and as excess fat above amounts people would consume if they selected only the lowest fat foods within the major food groups. Examples cited were the fat absorbed by french-fried potatoes during preparation, the fat from margarine spread on bread at the table, and the fat in whole milk.

In 1994, sugar intake was also higher than the Food Guide Pyramid recommends. Women consumed almost 15 teaspoons of added sugars<sup>7</sup> in a diet providing 1,587 calories, and men consumed 21 teaspoons of added sugars at an energy intake of 2,403 calories (2). The Pyramid suggests that Americans try to limit their added sugars to 6 teaspoons a day if they eat about 1,600 calories, 12 teaspoons at 2,200 calories, or 18 teaspoons at 2,800 calories.

**Vitamins and minerals.**—As shown in table 8, mean nutrient intakes<sup>8</sup> by both women and men age 20 years and over met or exceeded the RDA for protein, vitamins A, B<sub>12</sub>, and C, folate, and iron. (However, women age 20 to 49 years had mean iron intakes below the RDA.) Mean intakes by men (but not women) also met or exceeded the RDA for vitamins B<sub>6</sub> and E and calcium. Neither women nor men had intakes that met the RDA for magnesium or zinc. In general, the nutrients that were below the RDA in 1994-95 are the same nutrients that were below the RDA in 1977-78. (Vitamin E and zinc were not examined in 1977-78.)

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<sup>7</sup>The definition of added sugars included white sugar, brown sugar, raw sugar, corn syrup, honey, molasses, and artificial sweeteners containing carbohydrate that were eaten separately or used as ingredients in processed or prepared foods such as breads, cakes, soft drinks, jams, and ice cream; it did not include sugars such as fructose and lactose that occur naturally in foods such as fruit and milk. Quantities were standardized on a carbohydrate equivalent basis. One teaspoon of added sugars was defined as the quantity of a sweetener that contains the same amount of carbohydrate as 1 teaspoon (4 grams) of table sugar (sucrose).

<sup>8</sup>Nutrient intake estimates in table 8 are based on intakes from food and do not include intakes from supplements.

**Other food components.**—Between 1989-91 and 1994-95,<sup>9</sup> cholesterol intakes decreased slightly among both women and men, and dietary fiber intakes increased somewhat (14, 21). The 1994-95 mean cholesterol intake by women (217 mg) met the recommendation to consume less than 300 mg per day, but the average cholesterol intake by men (337 mg) still exceeded the recommendation (19). Mean dietary fiber intakes in 1994-95 were 13.7 g for women and 18.5 g for men, in contrast with the 1989-91 estimates of 12.3 g and 16.7 g, respectively. Many expert groups recommend increasing fiber intakes by increasing intakes of vegetables, fruits, and whole grain products without specifying a fiber goal in grams; other groups have proposed increasing fiber intakes to 20 to 35 g per day (4, 10).

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<sup>9</sup>Cholesterol and fiber intake data are not available from the NFCS 1977-78.

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## Summary and Recommendations

Adults in the United States ate somewhat differently in 1994-95 than their counterparts did two decades before, with mixed results. Adults' low intakes of fiber, magnesium, and zinc could be improved by increasing intakes of whole grains, fruits, dark green vegetables, legumes, and lean meats and meat alternates as recommended by the Food Guide Pyramid (18). The proportion of milk intake that was skim milk increased, but milk intakes overall declined. Women's low calcium intakes could be boosted by increasing intakes of skim and lowfat dairy products.

The proportion of energy from fat was lower and that from carbohydrate higher in 1994-95 than in 1977-78. This shift was consistent with other national data showing a decrease in the average blood cholesterol level among adults. On the other hand, more adults were overweight in 1994-95 than before. Adults' diets would benefit overall by decreasing intakes of foods and beverages that are high in fats and sugars but provide few other nutrients. In addition, when choosing among more nutrient-dense foods, adults would do well to shift toward items lower in fat and sugar.

Low activity levels probably contributed to the high percentage of adults who were overweight in 1994-95. For better health, adults should become more active.

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