

Fats, Cholesterol, and Sodium Intake in the Diet of Persons 1-74 Years: United States

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Introduction

Several dietary components of the current diet in the United States may be risk factors in the development of major diseases, particularly cardiovascular diseases and cancer.¹⁻¹² Because of the importance of the reported relationship between dietary components and disease patterns, this report provides reference data on the consumption patterns and food groups that are the major sources of these components.

The dietary data were obtained during the first National Health and Nutrition Examination Survey NHANES I. The survey is a program in which measures of nutrition status are collected for a scientifically designed sample representative of the civilian noninstitutionalized population of the United States in a broad range of ages.

Of the 28,043 sample persons selected to represent 194 million persons aged 1-74 years in the U.S. population, 20,749 persons, or 74 percent, were examined. This is an effective response rate of 75 percent when adjustment is made for the effect of oversampling among preschool children, women of childbearing age, the poor, and the elderly.

The NHANES I nutrition examination component included a general medical examination by a physician for indicators of nutritional deficiencies, a skin examination by a dermatologist, and a dental examination by a dentist. Body measurements were taken by a trained technician; a dietary interview, consisting of a 24-hour recall of food consumption and a food frequency questionnaire, was administered by professional dietary staff; and numerous laboratory tests were performed on whole blood, serum, plasma, and urine. A description of the sampling process, NHANES I operations, and response rates has been published.¹³

Estimates in this report were based on weighted observations, i.e., data obtained on examined persons

are inflated to the level of the total population using appropriate weights to account for both sampling fractions and response results.

Findings on the consumption patterns and sources of food groups from dietary components will be analyzed and discussed in a future report.¹⁴ Selected data from that report are presented in tables 1-8 and figure 1.

Information on food intake was obtained by the 24-hour recall method for the day, midnight to midnight, preceding the interview and accounted for all regular meals eaten as well as for between-meal foods or snacks. Food recall included foods eaten on Monday through Friday but generally excluded foods eaten on weekends which may pertain to unusual food intakes.

Foods reported by individuals were grouped under 18 main headings (figure 1). Eleven of these food groups were major sources of the nutrients, cholesterol, and sodium intake and are shown in tables 1-7. These 11 food groups and the other 7—sources of only small proportions of nutrients, cholesterol, and sodium—are shown in table 8. Contents of food groups 1-18 referred to in this report are presented in figure 1.

Fat intake

NHANES I provided data on dietary intake of total fat and saturated fat. The data did not permit evaluation of total polyunsaturated and monounsaturated fatty acids, but intake data were available for linoleic and oleic fatty acids.

The quality and kind of fat in the diet affects the serum lipid concentration. Saturated fat tends to elevate and polyunsaturated tends to decrease the serum cholesterol levels. Polyunsaturated fatty acids considered essential for nutrition are linoleic, linolenic, and arachidonic. Of the three, linoleic is relatively more abundant in foods than the other two. Mono-unsaturated fat, of which oleic acid is the most

Figure 1. Food or food groups contributing to fat, cholesterol, and sodium intakes

FOOD OR FOOD GROUP	EXPLANATION OF FOOD ITEMS
1 Milk and milk products	Includes milk drunk as a beverage or used on cereals; flavored milk drinks; cocoa made with milk; skim milk, yogurt, or buttermilk; ice milk; ice cream or puddings made with milk; cheese and cheese dishes. EXCEPTION: CREAM CHEESE
2 Meat	Includes beef, pork, lamb, veal, luncheon meats, canned meats, frankfurters
Organ meats	Includes liver, kidney, heart, spleen, etc.
3 Fats and oils	Includes butter, margarine, salad oils, salad dressings, bacon, cream cheese, cream, peanut butter, non-dairy cream
4 Desserts and sweets	Includes cake, pie, cookies, fruit puddings, doughnuts (cake-type and yeast-type), sherbert, sweet snacks. EXCEPTIONS: ICE CREAM, ICE MILK
5 Mixed protein dishes with carbohydrates-starches or vegetables	Includes casseroles, pot pies, pizza, spaghetti with meat, etc. EXCEPTIONS: PLAIN CHEESE DISHES
6 Cereals	Includes breakfast cereals either dry such as cornflakes or cooked such as oatmeal.
7 Poultry	Includes chicken, turkey, duck, game birds, cornish hen, etc.
8 Fish or shellfish	Includes all varieties of fish and shellfish regardless of whether canned, fresh, frozen, dried or salted.
9 Eggs	Includes eggs eaten e.g., fried, boiled, poached, deviled, or egg salad. EXCEPTIONS: EGGS IN COOKED OR BAKED DISHES SUCH AS CUSTARDS, AND PUDDINGS
10 Fruits and vegetables	Includes: a. All kinds: fresh, canned, frozen, cooked or raw; juices, including fruit drinks b. Fruits and vegetables rich in Vitamin A c. Fruits and vegetables rich in Vitamin C
11 Salty snacks	Includes potato chips, corn chips, puffed snacks, cheese snacks, salted popcorn, salted pretzels, etc.
12 Grain products	Includes bread, rolls, biscuits, muffins, cornbread, crackers, unsalted pretzels.
13 Alcoholic beverages	Includes a) beer, b) wine, c) distilled liquors
14 Sugar free and low calorie beverages	Includes coffee (regular, and decaffeinated), tea, bouillion, consomme and diet carbonated drinks
15 Soups	Includes milk and water-based; gravies and sauces (meat and vegetable based)
16 Legumes and nuts	Includes dry beans and peas such as pinto beans, red beans, black-eyed peas, peanuts, soybeans, soy products, etc.
17 Miscellaneous	Includes mustard, gelatin, malt, beverage powders, chili powders, seeds, low fat salad dressings, etc.
18 Sugar and primarily sugar products	Includes candy, soft drinks, lemonade, limeade.

Table 1. Mean daily fat intake and percent of calories provided by fat, by sex and age: United States, 1971-74

Age	Both sexes		Male		Female	
	Mean fat intake (gram)	Percent of calories from fat	Mean fat intake (gram)	Percent of calories from fat	Mean fat intake (gram)	Percent of calories from fat
1-74 years	83	37	100	37	66	36
1-5 years	63	36	65	36	60	37
6-11 years	83	36	89	37	77	36
12-17 years	96	37	115	37	77	37
18-44 years	90	37	114	37	68	36
45-64 years	75	37	93	37	60	36
65-74 years	61	35	74	36	51	35

common fatty acid, does not elevate or lower the serum lipids.

Findings from NHANES I showed that the average reported consumption of fat was 83 grams on the day of recall. Fat represented 37 percent of the calories consumed daily (table 1). Males reported a higher fat intake, a mean of 100 grams per day, than females (66 grams) did. The percent of calories from fat was 37 percent for males and 36 percent for females.

The daily mean fat intake of females increased with age from 60 grams at the youngest age group (1-5 years) to a maximum of 77 grams at the age group (6-17 years) and then declined in each successively older age group (table 1).

A somewhat similar pattern was found for males. However, the mean fat intake was higher in each age group than that for females (an expected occurrence

since the reported food intakes of males provided more calories than the diets of females did).

The major sources of fat in the diet for both males and females aged 1-74 years, in descending order of their percent contribution, were meat, milk and milk products, fats and oils, desserts and sweets, and grain products. These five food groups provided more than 70 percent of the fat for each sex and age group in the population (table 2).

Meat

The meat group includes beef, pork, lamb, veal, luncheon meats, canned meats, frankfurters, and organ meats. For both males and females the percent contribution of meat to the fat value of the diet increased with age from the youngest ages (1-5 years), peaked at the adult ages (18-44 years), and then de-

Table 2. Mean daily fat intake and percent of fat provided by selected major food groups, by sex and age: United States, 1971-74

Sex and age	Mean fat intake (gram)	Source of fat					
		Meat	Milk and milk products	Fats and oils	Desserts and sweets	Grain products	Other
Male		Percent					
1-74 years	100	25	19	15	8	6	26
1-5 years	65	16	30	14	9	6	25
6-11 years	89	17	28	13	10	7	25
12-17 years	115	21	25	12	10	6	26
18-44 years	114	28	16	15	7	6	27
45-64 years	93	27	14	19	7	7	26
65-74 years	74	24	15	20	8	7	25
Female							
1-74 years	66	21	20	16	8	7	28
1-5 years	60	16	31	13	9	5	25
6-11 years	77	17	29	13	9	7	26
12-17 years	77	21	23	12	9	6	28
18-44 years	68	23	16	17	8	7	29
45-64 years	60	24	15	19	8	7	27
65-74 years	51	21	16	22	8	8	26

clined slightly. Adult males consumed larger percents of fat from meat than adult females did. There was no difference in the percent contributions of meat to total fat intake for males and females ages 1-17 years.

Milk and milk products

The milk and milk products group includes whole milk, skim milk, or buttermilk reported as a beverage or used on cereal, flavored milk drinks, cocoa made with milk, yogurt, ice milk, ice cream, puddings made with milk, and cheese and cheese dishes. Foods from this group supplied more of the fat in the diets of children 1-11 years of age than any other food group did, accounting for roughly 30 percent of the total fat consumed by young boys and girls. The percent contribution of milk and milk products to fat intake for males and females generally declined with age, with the lowest percents falling in the older age groups. This pattern for children was the opposite of that found for the meat group.

Fats and oils

The fats and oils group includes butter, margarine, salad oils and dressings, bacon, cream cheese, creamy peanut butter, and nondairy cream. Gravies and low calorie salad dressings are not included. The largest percent contribution of fats and oils to fat intake was at the oldest age group (65-74 years) of males and females where it accounted for 20 and 22 percent, respectively. However, a smaller percent contribution of fats and oils was in the intakes of children and adolescents.

Desserts, sweets, and grain products

The desserts and sweets and the grain products groups were less important as sources of fat in the U.S. diet. Desserts and sweets, excluding candy, contributed 7-10 percent of the daily fat intake, with the percent contribution about the same in each age group and for both sexes.

Grain products generally contributed a slightly smaller percent of fat to the diet than the desserts and sweets groups did. By age, values ranged from 6-7 percent for males and 5-8 percent for females.

Saturated fat

Table 3 shows that the age patterns described for total fat consumption of males and females were also observed for saturated fat. Table 3 also shows the seven food groups that were the major sources of saturated fat. Altogether, these groups provided 85 percent or more of the saturated fat for each age-sex group. As with total fat intake, the milk and milk products group is the major source of saturated fat for children and adolescents of both sexes. For adults the meat group was the major source.

Other sources of saturated fat were fats and oils, mixed protein dishes, grain products, desserts and sweets, and eggs.

Milk and milk products (table 3) supplied 29 percent of the saturated fat in the food intakes of males and females ages 1-74 years. The age patterns found in percent contributions of these foods to total fat intake for males and females were also found for saturated fat. The largest percent was observed in the lowest age group (1-5 years). After these ages the

Table 3. Mean daily saturated fat intake and percent of saturated fat provided by major food groups, by sex and age: United States, 1971-74

Sex and age	Mean saturated fat intake (gram)	Source of saturated fat							
		Milk and milk products	Meat	Fats and oils	Mixed protein dishes	Grain products	Desserts and sweets	Eggs	Other
		Percent							
Male									
1-74 years	37	29	28	12	5	5	5	4	12
1-5 years	25	43	17	10	5	4	5	5	11
6-11 years	34	41	19	9	6	5	5	3	12
12-17 years	42	36	24	10	6	4	5	2	13
18-44 years	42	24	33	12	6	5	5	4	13
45-64 years	34	21	32	16	4	5	4	5	12
65-74 years	27	23	27	17	4	5	5	7	11
Female									
1-74 years	24	29	25	13	6	5	5	4	13
1-5 years	23	45	17	9	5	4	5	5	11
6-11 years	30	42	19	9	6	4	5	2	13
12-17 years	29	34	24	9	5	4	6	2	15
18-44 years	25	24	27	13	6	5	6	4	14
45-64 years	22	23	28	17	5	5	5	6	12
65-74 years	18	24	25	18	5	6	6	6	12

Table 4. Mean daily linoleic fatty acid intake and percent of linoleic fatty acids provided by major food groups, by sex and age: United States, 1971-74

Sex and age	Mean linoleic fatty acids intake (gram)	Source of linoleic fatty acids							
		Fats and oils	Salty snacks	Fruits and vegetables	Meat	Desserts and sweets	Grain products	Poultry	Other
Male		Percent							
1-74 years	10	38	9	12	10	6	5	4	16
1-5 years	6	38	11	10	8	7	5	4	17
6-11 years	8	37	14	10	7	7	6	4	16
12-17 years	11	31	16	14	7	7	6	3	15
18-44 years	12	38	8	12	11	6	5	4	16
45-64 years	9	44	2	10	11	5	5	5	16
65-74 years	7	45	1	9	11	7	5	5	17
Female									
1-74 years	7	39	9	10	8	6	5	5	17
1-5 years	5	37	14	9	7	6	4	5	17
6-11 years	7	34	17	8	7	6	6	5	17
12-17 years	8	32	18	11	7	7	5	3	17
18-44 years	8	40	7	12	8	6	5	5	16
45-64 years	6	44	3	10	9	6	5	5	17
65-74 years	5	49	2	7	8	6	5	7	16

share of saturated fat from the milk group declined with increased age, falling from 41 and 42 percent, respectively, for males and females ages 6-11 years to about 23 percent in the oldest age group (65-74 years) for both sexes.

The meat group (table 3) supplied 28 and 25 percent, respectively, of the saturated fat in the food intakes of males and females ages 1-74 years. The percent contribution increased from the younger ages for both sexes, peaked at ages 18-44 years for males and at ages 45-64 years for females and then declined.

In the younger ages, both sexes showed a relatively larger share of saturated fat from milk and milk products than from meat products. After ages 12-17 years, the share from meat was relatively higher than that from milk and milk products.

The contribution of fats and oils to saturated fat intake ranged from 9 to 17 percent for males; older males reported the largest percent of their saturated fat from fats and oils. A similar pattern was generally observed for females. The contributions of mixed protein dishes, desserts and sweets, grain products, and eggs to this dietary component were relatively smaller. For each food group, the percents by each sex-age group were fairly constant with no observable age pattern.

Linoleic acids

Fats and oil products were the major sources of linoleic acids for males and females in all age groups (table 4). The largest percent intake from this fatty acid occurred after age 44 years—more than 40 per-

cent for both males and females. At the younger ages this food group contributed more than 30 percent of the daily linoleic acid.

Salty snacks were the second major contributor to linoleic acid for both males and females ages 1-17 years. The percent contribution of salty snacks to linoleic acid decreased rapidly after ages 12-17 years for both males and females. Fruits and vegetables were the second major contributors to linoleic acid for males ages 18-44 years and for females ages 18-64 years, while meat was the second major contributor to linoleic acid for males ages 45-74 years and females ages 65-74 years.

Other major contributors to linoleic acid were desserts and sweets, grain products, and poultry. Generally, the share of linoleic acids from these food groups remained fairly stable with age.

Oleic acids

Meat, milk and milk products, fats and oils, desserts and sweets, grain products, and mixed protein dishes were the major sources of oleic fatty acids, providing about 80 percent of the oleic acids in the intakes of most sex-by-age groups (table 5).

For the population aged 1-74 years, meat was the major source of oleic acids. The percent contributed by those foods peaked at ages 18-44 years for males and at ages 18-64 years for females and then declined slightly.

The share of oleic acids reported from the milk and milk products group was largest among children and adolescents, the pattern previously observed for

Table 5. Mean daily oleic fatty acid intake and percent of oleic fatty acids provided by major food groups, by sex and age: United States, 1971-74

Sex and age	Mean oleic fatty acids intake (gram)	Source of oleic fatty acids						
		Meat	Milk and milk products	Fats and oils	Desserts and sweets	Grain products	Mixed protein dishes	Other
Male		Percent						
1-74 years	37	28	15	15	9	8	6	19
1-5 years	24	18	24	16	10	8	6	18
6-11 years	33	19	23	15	10	9	7	17
12-17 years	41	24	20	13	10	8	7	18
18-44 years	43	31	13	14	8	8	7	19
45-64 years	36	30	11	18	8	9	4	20
65-74 years	29	25	12	20	10	9	4	20
Female								
1-74 years	25	24	16	16	10	8	6	19
1-5 years	22	18	25	15	9	7	6	18
6-11 years	28	20	24	14	9	8	7	17
12-17 years	28	24	19	13	10	8	7	20
18-44 years	26	26	13	16	10	8	7	20
45-64 years	23	26	12	19	9	8	5	20
65-74 years	20	23	12	22	10	9	4	19

other sources of fat. After age 18 the percent contribution of oleic acids from this food group decreased most rapidly with age, declining to about 12 percent in the oldest age groups.

The third source of oleic acids, the fats and oils group, contributed 13-20 percent of the oleic acids in the daily intake of males with a slight increase for the oldest age group. A similar narrow range of 13-22 percent was noted for females of comparable ages, with a slight increase also noted for the oldest age group.

Desserts and sweets and grain products each contributed about the same percent of oleic acids with no noticeable differences between sex and age groups.

Cholesterol intake

Eggs, meat, and milk and milk products were the major sources of cholesterol, contributing 77 percent of the daily intake of cholesterol for males and 74 percent for females (table 6). The desserts and sweets group and the fats and oils group contributed 3-6 percent and 2-4 percent, respectively, of the cholesterol for all the sex and age groups.

Eggs were the major source of cholesterol for children aged 1-5 years and for adults of both sexes. Each of these subgroups reported more than a third of their cholesterol from this source.

Adolescents aged 12-17 years reported relatively more cholesterol intake from the meat food group—more than one-fourth of their daily intake—than the other major food sources.

Milk and milk products and eggs were the major

sources of cholesterol reported by boys ages 6-11 years (about 28 percent) but only milk and milk products were the major sources of cholesterol reported by girls of similar ages (30 percent).

The percent contribution of eggs to cholesterol intake generally declined with age after ages 1-5 years for both sexes to a low at ages 6-11 years for females and at ages 12-17 years for males and then increased with age.

The largest percent of cholesterol intake from meat occurred at ages 18-44 years for males and at ages 12-17 years for females. The share of cholesterol intake from meat then decreased with age, declining to 21 percent for males and 23 percent for females in the oldest age group. The percent contribution of cholesterol from milk and milk products peaked at ages 6-11 years for both sexes with the foods from this group supplying least of the cholesterol intake in the oldest age groups (table 6).

The mean cholesterol consumption of males increased from age group 1-5 years, peaked at age group 18-44 years, and then declined. The mean cholesterol consumption of females increased with age, peaked at age group 45-64 years, and then declined; the average cholesterol consumption for females was the same for the youngest age group (1-5 years) and the oldest age group (65-74 years).

Sodium intake

NHANES I data on sodium intake were converted to salt intake, assuming a ratio of 1 gram of salt to 400 mg. of sodium. The salt data from NHANES I

Table 6. Mean daily dietary cholesterol intake and percent of cholesterol provided by major food groups, by sex and age: United States, 1971-74

Sex and age	Mean cholesterol intake (mg) ¹	Source of cholesterol					
		Eggs	Meat	Milk and milk products	Desserts and sweets	Fats and oils	Other
Male		Percent					
1-74 years	445	35	26	16	4	4	16
1-5 years	301	40	15	25	4	3	14
6-11 years	347	28	19	27	5	3	18
12-17 years	410	23	26	25	5	4	17
18-44 years	521	35	28	13	4	3	16
45-64 years	465	39	27	11	3	4	16
65-74 years	411	45	21	11	4	4	14
Female							
1-74 years	303	34	24	16	5	4	18
1-5 years	274	40	15	26	4	2	13
6-11 years	277	21	20	30	5	3	20
12-17 years	291	25	26	23	6	3	18
18-44 years	311	34	25	13	5	4	19
45-64 years	327	40	25	11	4	4	17
65-74 years	274	40	23	11	5	4	17

¹Milligram

are incomplete because the values cover only naturally occurring sodium in foods and sodium added by processors. Table salt is not included in these data. Males reported an average daily consumption of 2,701 mg. of sodium or about 7 grams of salt and females reported an average daily consumption of 1,850 mg. of sodium or about 5 grams of salt.

Among age groups, the differences in reported percent by source of sodium were small (table 7).

Table 7 also shows the seven food groups that supplied 78 percent or more of sodium for all sex and age groups. Foods such as mustard, ketchup, Worcestershire sauce, and other condiments, the major sources of sodium, accounted for only 0.2 percent in

Table 7. Mean daily sodium intake and percent of sodium provided by major food groups, by sex and age: United States, 1971-74

Sex and age	Mean sodium intake (mg) ¹	Source of sodium							
		Grain products	Milk and milk products	Mixed protein dishes	Soups	Meat	Fruits and vegetables	Fats and oils	Other
Male		Percent							
1-74 years	2,701	24	13	12	10	9	7	6	19
1-5 years	1,886	20	18	11	12	7	6	6	20
6-11 years	2,532	23	16	13	9	7	6	5	22
12-17 years	2,965	23	15	14	8	8	6	5	21
18-44 years	3,032	23	12	13	9	10	8	6	18
45-64 years	2,540	25	11	8	11	10	8	8	19
65-74 years	2,229	26	11	6	13	9	8	7	21
Female									
1-74 years	1,850	23	14	11	10	8	8	6	19
1-5 years	1,721	20	19	12	11	7	6	6	20
6-11 years	2,238	23	16	12	10	7	7	5	20
12-17 years	2,001	23	16	12	9	8	8	5	19
18-44 years	1,863	23	13	13	10	9	8	7	18
45-64 years	1,702	24	12	8	11	10	9	7	18
65-74 years	1,526	27	13	5	11	7	8	8	21

¹Milligram

NOTE: HANES sodium intake values converted to salt intake values assuming a ratio of 1 gram of salt to 400 mg of sodium.

Table 8. Percent distribution of dietary components provided by food groups appearing in the 24-hour recall of food consumption and mean intake of dietary components of persons aged 1-74 years: United States, 1971-74

<i>Food or food group</i>	<i>Calories</i>	<i>Protein (gram)</i>	<i>Fat (gram)</i>	<i>Sodium (mg)¹</i>	<i>Saturated fatty acid (gram)</i>	<i>Oleic acid (gram)</i>	<i>Linoleic acid (gram)</i>	<i>Cholesterol (mg)¹</i>
	Percent distribution							
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Skim milk or buttermilk	1.2	2.5	0.4	1.3	0.1	0.1	-	0.2
Cheese and cheese products	1.9	3.5	3.4	4.1	4.9	2.9	1.0	2.4
Milk and milk products excluding cheese	12.9	15.9	15.8	8.2	23.9	12.5	-	13.6
Meat	13.6	29.5	22.9	8.7	26.5	25.7	8.7	22.9
Poultry	2.0	6.6	2.3	0.2	1.9	2.5	4.6	4.1
Organ meats	0.2	0.6	0.4	0.1	0.3	0.4	0.3	2.0
Fish or shellfish	1.1	3.6	1.2	0.7	0.8	1.1	1.4	2.5
Eggs	2.5	4.2	4.6	3.1	4.1	4.9	3.0	34.2
Soups	1.6	1.1	2.0	9.9	1.7	1.7	2.6	0.6
Fats and oils	6.3	2.0	15.6	6.3	12.3	15.5	38.8	3.6
Legumes and nuts	1.7	2.1	1.6	2.0	1.2	1.7	2.2	0.2
Cereals	1.8	1.2	0.4	3.3	0.1	0.1	0.5	-
Grain products	14.7	10.8	6.4	23.4	4.7	8.2	5.1	3.6
Fruits and vegetables	10.8	5.0	5.1	7.6	3.3	3.5	11.1	1.1
Sugar and primarily sugar products	8.8	0.6	1.9	0.5	1.9	2.2	1.6	0.1
Desserts and sweets	8.4	2.9	8.2	6.5	5.0	9.1	6.4	4.3
Miscellaneous	0.6	0.4	0.3	0.3	0.1	0.1	1.2	-
Mixed protein dishes	5.0	6.7	5.4	11.4	5.4	6.3	2.7	4.5
Alcoholic beverages	3.3	0.4	-	0.3	-	-	-	-
Sugar free and low calorie beverages	0.4	0.1	-	0.6	-	-	-	0.1
Salty snacks	1.5	0.5	2.2	1.5	1.6	1.4	8.8	-
Mean	1,989	79	83	2,262	30	31	9	372

¹Milligram

the 24-hour recall data because of minimal volume consumption. NHANES I data indicate that grain products are the major contributing source of sodium in the 24-hour recall data. Grain products contributed about one-quarter of the sodium intake in all sex and age subgroups, providing 20-27 percent in all groups. The percents are fairly stable throughout the age groups.

The milk and milk products group was generally the second major source of sodium intake. Younger males and females showed a higher percent of sodium intake from milk and milk products than adults did. This pattern is expected because of the higher consumption of milk and milk products by the younger groups. Other major sources of sodium were mixed protein dishes and soups.

Mixed protein dishes contributed 6-14 percent of the daily sodium intake for males and 5-13 percent for females. Both sexes aged 45-74 years showed smaller shares of sodium from this group of foods than those in the younger age group.

The percent contribution of soups to sodium remained fairly stable with age ranging from 8-13 percent for males and from 9-11 percent for females.

Other food groups contributing smaller amounts of sodium in the diets of the U.S. population were meats, fruits and vegetables, and fats and oils. These

food groups generally contributed less sodium to the daily intake in all population subgroups than grain products, milk and milk products, and mixed protein dishes did. The differences between sexes in percent of sodium intake were small. For each sex, age was not a factor. The percent of dietary components provided by all food groups appearing in the 24-hour recall of all persons aged 1-74 years in the United States is presented in table 8.

Discussion

Reference data on dietary components implicated in increased risk to disease have been presented and analyzed by sex and age because of the medical interest in such data. These estimates are generalized for the U.S. population and provide cross-sectional data on the consumption of selected dietary components as reported by persons representing different age groups in the U.S. population. The limitations of cross-sectional data should be recognized in considering age group changes. The use of 24-hour recall to estimate dietary habits is also a limitation. Recent food intakes do not necessarily reflect lifetime dietary habits. Since the disease processes of those cited are long-term, it is questionable to relate recent dietary habits to the risk of these diseases. The esti-

mates in this report will be compared with NHANES II data on food consumption patterns which will be available in 1981.

There are limitations to the dietary estimates obtained from NHANES I. The major source of data for the basic nutritional values of food items is from the U.S. Department of Agriculture Handbook No. 8.¹⁵ Because of the introduction of new food items in the market, updated and added values for new foods are made according to information provided by the U.S. Department of Agriculture (USDA), food processors, and manufacturers. With the exception of cholesterol, all nutrient values for chicken, steak, pork chops, and meat loaf were calculated using USDA Handbook No. 456.¹⁶ Cholesterol values were calculated using an article by R.F. Feeley, P.E.

Criner and B.K. Watts.¹⁷ However, despite the considerable data on the nutrient composition of foods, information is less than optimal in those areas of the macronutrients whose importance is of immediate interest.

More of the data used in NHANES I, obtained from the USDA data bank, are for commodities than for brand name convenience foods.

Another problem is lack of information on the lipid content of food served by institutions, restaurants, and fast food outlets;¹⁸ the main sources of compiled data have covered only food eaten in the home. The present dietary data bank was compiled mainly for nutrients—e.g., vitamins A and C, calcium, and iron—whose deficiency led to the classical nutritional diseases.

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Technical notes

The sampling plan for the 65 examination locations in the National Health and Nutrition Examination Survey (NHANES) followed a highly stratified multistage probability design in which a sample of the civilian noninstitutionalized population of the conterminous United States aged 1-74 years was selected. Successive elements used in the sampling process were the primary sampling unit, census enumeration district, segment (a cluster of households), household, eligible person, and sample person. The sampling design provided for oversampling among persons living in poverty areas, preschool children, women of childbearing age, and the elderly.

The dietary component values are shown as population estimates, i.e., the findings for each individual have been "weighted" by the reciprocal of the probability of selecting the person. An adjustment for persons in the sample who were not examined and post-stratified ratio adjustments were also made so that the final sampling estimates of the population size are brought into closer alignment with the independent U.S. Bureau of the Census estimates for the civilian noninstitutionalized population of the United States as of November 1, 1972, by race, sex, and age.

Symbols

- Data not available
 - ... Category not applicable
 - Quantity zero
 - 0.0 Quantity more than 0 but less than 0.05
 - * Figure does not meet standards of reliability or precision
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