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American Children's Diets Not Making the Grade

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Many health professionals are concerned about the quality of children's diets in the United States. A varied diet is one of the keys to good nutrition, but many children are choosing foods high in fat or added sugars at the expense of nutrient-dense fruits, vegetables, whole grains, and other foods. These diet choices may be exacerbating the trend toward increasing obesity and other health problems among the Nation's young people.

Where children obtain foods can affect their food choices. Between 1977 and 1996, eating out became a much larger part of American children's lives, posing a growing challenge to the nutritional quality of their diets. An American child's diet typically contains too much fat, saturated fat, and sodium, and not enough fiber and calcium—characteristics more likely associated with away-from-home foods than home foods. School meals, which provide high amounts of fiber and calcium, are the only away-from-home exception. Excessive intakes of fat and saturated fat are common problems facing children of all ages and both genders, but some dietary defi-

ciencies vary by age and gender. Excessive intake of cholesterol and sodium is a problem facing many male teens, while insufficient intake of iron and calcium is a major dietary problem for female teens.

Away-from-home foods and home foods are defined by where the foods are obtained, not where they are eaten. Home foods are purchased at retail stores, such as grocery stores or supermarkets. Away-from-home foods consist of foods obtained from foodservice and entertainment establishments.

Away-from-home foods are classified into four groups: "restaurants," or places with waiter service; "fast food," such as self-service and carry-out eating places and cafeterias; "schools," including day care centers and summer camps; and "others," which include vending machines, community feeding programs, and someone else's home.

The information for this article is obtained from food consumption surveys conducted by USDA since 1977, including Nationwide Food Consumption Surveys 1977-78 and 1987-88 (NFCS 1977-78 and NFCS 1987-88) and Continuing Survey of Food Intakes by Individuals 1989-91 and 1994-96 (CSFII 1989-91 and CSFII 1994-96). These surveys collect information on what, when, where, and how much Americans eat. Data are collected from a nationwide sample, which yields results repre-

senting the American population. USDA's Agricultural Research Service (ARS) maintains a nutrient database, which is used to calculate the amount of nutrients in each food eaten. This article analyzed 1-day individual intakes for children age 2-17, with particular emphasis on meal and snack patterns and sources of foods. Children were grouped into four categories according to their gender and age: children age 2-5, children age 6-11, males age 12-17, and females age 12-17.

Fast Foods Contributing More Calories to Children's Diets

The number of meals eaten by children age 2-17 has been stable at 2.8 meals per day over the past two decades. However, children are snacking more frequently and these snacks are increasingly being obtained away from home. In 1977-78, children ate 1.1 snacks per day, compared with 1.8 snacks in 1994-96. Older children ate fewer meals and snacked less frequently than younger children. For example, teenagers ate 2.6 meals and 1.6 snacks per day during 1994-96 and pre-school children age 2-5 ate 2.9 meals and 2.1 snacks per day. Twenty percent of children's snacks were obtained away from home in 1994-96, up from 13 percent in 1977-

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78. During 1994-96, schools and fast food places evenly split a 35-percent share of away-from-home snacks. Snacking at someone else's home is also popular with children.

Over the past two decades, the proportion of meals eaten away from home by children rose from 17 percent in 1977-78 to 30 percent in 1994-96. In the same period, pre-school children more than doubled their meals eaten away from home, from 10 percent to 22 percent. During 1994-96, school-age children ate about 33 percent of their meals away from home. As children start schooling, they can participate in the School Breakfast Program and the National School Lunch Program. These programs provided meals to about 26 million school children each day in 1996. Younger children who attend licensed day care centers and family day care homes and children in summer camps and after-school programs also can obtain meals and snacks through USDA food assistance programs. As with school meals, these meals and snacks must meet nutritional standards set by USDA's Food and Nutrition Service (FNS). However, children at school also can obtain a la carte items from school cafeterias or vending machines, which do not have to meet USDA standards. In this article, all foods obtained at school, regardless of requirement for meeting USDA standards, are included in school meals and snacks.

During 1977-78, school meals accounted for 63 percent of all meals children ate away from home. This proportion declined to 36 percent in 1994-96 due to the increasing popularity of eating at fast food places and restaurants. In 1977-78, only 1 in every 10 meals eaten away from home by children was purchased at a fast food place; this proportion rose to 1 in every 3 away-from-home meals in 1994-96. Restaurants increased their representation of the away-from-home meals consumed

by children from 4 percent in 1977-78 to 11 percent in 1994-96.

As children eat out more frequently, the nutritional quality of away-from-home food plays an increasingly important role in determining the overall quality of their diets. In 1977-78, home foods accounted for 80 percent of total calories consumed by children. This percentage declined steadily to 68 in 1994-96 (table 1). Fast food places, which boosted the popularity of eating out, accounted for only 2 percent of children's total caloric consumption in 1977-78 but 10 percent in 1994-96. During the same period, restaurants increased their share of

children's caloric intake from 1 percent to 4 percent. School meals, however, reduced their contribution to children's caloric consumption from 11 percent in 1977-78 to 9 percent in 1994-96.

Comparing Nutritional Quality of Foods

We compared the nutritional quality of foods from various sources using the nutrient-to-calorie (or nutrient) density, which measures the amount of a nutrient or food component for each 1,000 calories of that food. Because dietary recommendations for fat and saturated fat

Table 1
Fast Food Has Become Children's Preference for Eating Out

Food source by age group	1977-78	1987-88	1989-91	1994-96
<i>Percent of total caloric intake</i>				
Age 2-17:				
Home foods	80	73	71	68
Away-from-home foods ¹	20	27	29	32
Fast food	2	7	8	10
Schools ²	11	10	10	9
Restaurants	1	1	3	4
Others	6	8	9	8
Age 2-5:				
Home foods	88	84	78	76
Away-from-home foods	12	16	22	24
Fast food	2	4	6	7
Schools	3	3	6	7
Age 6-11:				
Home foods	79	71	70	68
Away-from-home foods	21	29	30	32
Fast food	2	6	7	9
Schools	14	14	12	11
Males age 12-17:				
Home foods	80	69	72	65
Away-from-home foods	20	31	28	35
Fast food	3	11	8	14
Schools	12	11	10	9
Females age 12-17:				
Home foods	78	71	67	65
Away-from-home foods	22	29	33	35
Fast food	3	9	10	11
Schools	11	10	11	8

¹The categories "restaurant" and "others" are dropped for children by age and gender due to limited number of observations.

²Schools include day care centers and camps.

Sources: Compiled by USDA's Economic Research Service from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, CSFII 1994-96, 1-day data.

are expressed as a percentage of total calories consumed, we used the proportion of total calories that come from fat and from saturated fat as measures of the fat and saturated fat densities.

For each nutrient or food component, we also derived a “benchmark” density by dividing the recommendation for a given nutrient or food component by an individual’s reported caloric intake in 1,000 calories. The benchmark density represents the nutrient density necessary for an individual’s diet to meet the dietary recommendation at the reported caloric-intake level.

We used dietary recommendations from the 2000 edition of the *Dietary Guidelines for Americans* and other health authorities to derive the benchmark densities for seven nutrients and dietary components: fat, saturated fat, cholesterol, sodium, fiber, calcium, and iron (only fat, calcium, and iron were reported in NFCS 1977-78). The *Dietary Guidelines for Americans* defines benchmark densities for fat and saturated fat—fat intake should not exceed 30 percent of total calories and saturated fat should be less than 10 percent of total calories. The benchmark densities for cholesterol,

sodium, fiber, calcium, and iron vary according to the reported caloric intakes (table 2). For example, to meet the dietary recommendations in 1994-96, children age 2-17 should consume at least 7.3 grams of dietary fiber, 530 milligrams of calcium, and 5.8 milligrams of iron for each 1,000-caloric intake. Children age 2-17 should limit their cholesterol and sodium consumption to no more than 153 and 1,222 milligrams, respectively, for each 1,000-caloric intake.

We calculated benchmark densities for specific groups of children by dividing the sum of the recom-

Table 2
Benchmark Nutrient Densities for Children Vary by Age and Gender

Age group	Benchmark nutrient density ¹				
	Cholesterol	Sodium	Fiber	Calcium	Iron
	Milligrams per 1,000 calories	Milligrams per 1,000 calories	Grams per 1,000 calories	Milligrams per 1,000 calories	Milligrams per 1,000 calories
1977-78:					
Age 2-17	-	-	-	564	6.2
Age 2-5	-	-	-	467	7.1
Age 6-11	-	-	-	563	5.7
Males age 12-17	-	-	-	516	4.8
Females age 12-17	-	-	-	707	8.2
1987-88:					
Age 2-17	170	1,363	8.2	589	6.5
Age 2-5	224	1,795	6.3	490	7.5
Age 6-11	169	1,349	7.6	586	6.0
Males age 12-17	127	1,016	8.3	550	5.1
Females age 12-17	175	1,399	11.4	758	8.7
1989-91:					
Age 2-17	164	1,313	7.7	560	6.2
Age 2-5	212	1,697	6.0	458	7.1
Age 6-11	161	1,288	7.2	565	5.7
Males age 12-17	124	990	8.1	536	4.9
Females age 12-17	165	1,324	10.8	717	8.3
1994-96:					
Age 2-17	153	1,222	7.3	530	5.8
Age 2-5	197	1,572	5.6	427	6.6
Age 6-11	156	1,251	7.1	553	5.5
Males age 12-17	110	877	7.1	475	4.4
Females age 12-17	159	1,270	10.3	688	7.9

- = Intakes of cholesterol, sodium, and fiber were not reported in the NFCS 1977-78.

¹Benchmark densities are obtained by dividing the recommended intake for each nutrient by the individual’s reported food energy intake. The benchmark densities for specific groups of individuals are the ratios of the sum of recommended intakes for all individuals to the sum of their food energy intakes.

Sources: Compiled by USDA’s Economic Research Service from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, CSFII 1994-95, 1-day data.

mended intakes for all children in the group by the sum of their reported caloric intakes. Due to limited numbers of surveyed children who reported eating at restaurants, nutrient content of restaurant foods is reported only for all children age 2-17, not for age and gender. Also, due to lack of interpretive value, nutrient content of the others category is not reported.

Children Need To Trim Fat Intakes, Especially When Eating Out

Although children have reduced their fat intake since 1977, they still consume too much fat and saturated fat. In 1994-96, fat accounted for 33 percent of children's total caloric consumption, down from 39 percent in 1977-78. Children obtained 12 percent of calories from saturated fat in 1994-96, compared with 13

percent in 1987-88. During 1994-96, 37 percent of children met the recommendation for fat intake and 31 percent of children met the recommendation for saturated fat intake (table 3).

Over the past two decades, foods eaten by children at home have become less dense in fat than foods eaten away from home. In 1994-96, away-from-home foods had 36 percent of calories from fat, higher than the 32 percent for home foods. Foods obtained by children at fast food places, schools, and restaurants were much more dense in fat than foods children ate at home (table 4).

Similarly, away-from-home foods were higher in saturated fat than home foods. Foods that children obtained at schools in 1994-96 were lower in total fat, but higher in saturated fat, than foods from fast food places and restaurants. In 1994-96, total fat contributed 36 percent of total calories from school foods,

compared with 38 percent for foods from fast food places or restaurants. Saturated fat contributed 14.4 percent of calories from school foods in 1994-96, compared with 13.6 percent for foods from fast food places and 12.5 percent for restaurant foods.

USDA's School Meals Initiative for Healthy Children of 1994 aims to lower the fat and saturated fat content of school meals to levels consistent with recommendations of the *Dietary Guidelines for Americans*. The initiative was not put in place until the fall of 1996, and many schools received permission to delay its implementation; therefore, these data do not represent the effects of its implementation. A recent study commissioned by USDA's FNS shows significant reductions in fat and saturated fat in school meals offered between 1991-92 and 1998-99, but fat content in school meals still exceeds the recommended level. For example, lunches served to ele-

Table 3
Children Reduced Their Fat Intake But Are Still Over the Recommended Allowance

Years	Food energy <i>Calories</i>	Total fat <i>Grams</i>	Saturated fat <i>Grams</i>	Cholesterol <i>Milligrams</i>	Sodium <i>Milligrams</i>	Fiber <i>Grams</i>	Calcium <i>Milligrams</i>	Iron <i>Milligrams</i>
Average daily intake:								
1977-78	1,900	83.2	-	-	-	-	921	11.1
1987-88	1,761	70.3	26.2	253	2,846	11.4	897	13.0
1989-91	1,827	70.1	26.8	238	3,006	12.4	925	13.3
1994-96	1,964	72.0	26.2	225	3,094	13.1	908	14.9
<i>Percent</i>								
Intake as share of recommendation:								
1977-78	90	129	-	-	-	-	92	96
1987-88	86	118	132	84	119	84	94	115
1989-91	90	113	130	79	125	93	99	119
1994-96	95	108	119	75	129	97	95	132
<i>Percent</i>								
Share of children meeting the recommendation:								
1977-78	33	14	-	-	-	-	37	39
1987-88	28	20	14	73	45	30	38	47
1989-91	35	30	20	76	40	35	40	51
1994-96	38	37	31	77	39	39	37	59

- = Intakes of saturated fat, cholesterol, sodium, and fiber were not reported in NFCS 1977-78.

Sources: Compiled by USDA's Economic Research Service from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, CSFII 2994-96, 1-day data for children age 2-17.

mentary school children in 1998-99 contained 33 percent of calories from total fat and 12 percent of calories from saturated fat.

Restaurant Foods High in Cholesterol, Sodium

Many health authorities recommend that daily cholesterol intake should not exceed 300 milligrams (mg). The U.S. Food and Drug Administration (FDA) uses this recommendation to set the daily value for cholesterol on nutrition labeling. Cholesterol intake was first reported in the 1987-88 NFCS. From 1987 to 1996, children's cholesterol intake declined and the proportion of chil-

dren meeting the recommendation rose.

Cholesterol density (the amount of cholesterol per 1,000 calories) in home and away-from-home foods has declined since 1987 (table 5). In 1994-96, foods eaten by children had a cholesterol density of 115 mg, lower than the 153-mg benchmark. In 1994-96, foods prepared at restaurants contained more cholesterol than foods prepared at home or other away-from-home sources.

Foods eaten by boys age 12-17 contained 114 mg of cholesterol per 1,000 calories, higher than the 110-mg benchmark. Excessive cholesterol consumption is more of a problem for teenage boys, who tend to

consume more food than other children. The recommended cholesterol intake is set at 300 mg per day for all individuals, regardless of age and gender. During 1994-96, 63 percent of male teens met the cholesterol recommendation, compared with 84 percent of pre-school children.

The National Academy of Sciences' *Diet and Health* recommends an upper limit of 2,400 mg of sodium per day, regardless of age or gender. Sodium intakes in the NFCS and CSFII include sodium occurring naturally in foods, as well as that added via food processing and preparation. Intakes reported do not include sodium added at the table.

Table 4

Children's Food Choices at Home Lower in Fat and Saturated Fat Than Away From Home

Food source by age group	Share of calories from fat				Share of calories from saturated fat			
	1977-78	1987-88	1989-91	1994-96	1977-78	1987-88	1989-91	1994-96
	Percent							
Age 2-17	39.4	36.0	34.5	33.0	-	13.4	13.2	12.0
Home foods	39.4	35.2	33.7	31.6	-	13.0	12.7	11.5
Away-from-home foods	39.5	38.0	36.6	36.1	-	14.5	14.4	13.2
Fast food	38.9	38.8	38.4	38.2	-	15.5	14.4	13.6
Schools	40.1	38.0	37.1	36.3	-	13.9	15.5	14.4
Restaurants	42.2	40.5	37.4	38.1	-	15.2	14.1	12.5
Age 2-5	38.1	34.6	33.6	32.7	-	12.8	13.2	12.4
Home foods	38.1	34.3	32.8	31.6	-	12.6	13.0	12.1
Away-from-home foods	37.9	36.4	36.1	36.0	-	14.0	14.0	13.3
Fast food	39.1	37.9	37.2	38.4	-	15.6	14.2	13.7
Schools	38.8	37.4	35.7	33.2	-	13.9	14.3	13.2
Age 6-11	38.9	35.9	34.4	33.0	-	13.3	13.3	12.1
Home foods	38.8	35.1	33.6	31.5	-	12.8	12.7	11.5
Away-from-home foods	39.4	37.8	36.5	35.9	-	14.4	14.5	13.4
Fast food	38.7	39.8	39.3	37.9	-	16.0	14.7	13.4
Schools	39.8	37.5	36.7	35.9	-	13.8	15.4	14.7
Males age 12-17	40.3	36.6	35.3	33.7	-	13.7	13.2	12.0
Home foods	40.4	35.7	34.6	32.1	-	13.2	12.6	11.3
Away-from-home foods	40.1	38.6	37.2	36.6	-	14.7	14.7	13.4
Fast food	38.8	38.7	38.7	38.2	-	15.4	15.1	13.7
Schools	40.6	38.8	39.6	38.3	-	14.0	16.9	15.2
Females age 12-17	40.1	36.6	34.9	32.5	-	13.8	12.9	11.5
Home foods	40.1	35.9	34.0	30.7	-	13.4	12.4	11.0
Away-from-home foods	39.8	38.4	36.6	35.8	-	14.6	14.0	12.4
Fast food	39.0	37.8	37.4	38.2	-	15.0	13.4	13.6
Schools	40.4	38.3	36.3	37.4	-	13.8	14.8	13.6

- = Saturated fat intake was not reported in NFCS 1977-78.

Notes: The category "others" in away from home is dropped due to limited interpretive value. The category "restaurants" for children by age and gender has also been dropped due to the small number of observations.

Sources: Compiled by USDA's Economic Research Service from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, CSFII 1994-96, 1-day data.

The USDA surveys first measured sodium content in 1987-88.

Children's sodium intake has increased since 1987 as their food consumption has increased (table 3). The proportion of children meeting the sodium recommendation declined from 45 percent in 1987-88 to 40 percent in 1989-91 and to 39 percent in 1994-96.

As with cholesterol, excessive consumption of sodium is more common among teenage boys than other children. Teen boys consumed an average of 2,726 calories and 4,371 mg of sodium per day during 1994-96, resulting in a sodium density of 1,598 mg per 1,000 calories. The 1994-96 sodium-density benchmark is 877 mg for teenage boys.

Only 18 percent of male teens consumed less than 2,400 mg of sodium per day during 1994-96, compared with 58 percent of pre-school children and 37 percent of children age 6-11.

Foods eaten by children during 1994-96 contained 1,575 mg of sodium per 1,000 calories (table 5), almost 30 percent higher than the 1,222-mg benchmark. Home foods eaten by children contained 1,570 mg of sodium per 1,000 calories, less than the 1,588 mg in away-from-home foods. School meals contained less sodium than foods prepared at fast food places or restaurants but still exceeded the 1994-96 1,222-mg benchmark. Restaurant foods had a sodium density of 1,721 mg per

1,000 calories during 1994-96, which is more than 40 percent higher than the benchmark.

Overconsumption of sodium is a problem for most consumers, except young children and elderly women. Children, as well as other consumers, have to make a greater effort to reduce the amount of sodium in foods they eat at home and away from home.

School Foods Lead in Fiber, Calcium

The American Health Foundation recommends a dietary fiber intake of "age plus five" for children age 2 and older. For example, 15 grams of dietary fiber each day is recom-

Table 5
Male Teens Consume Too Much Cholesterol and Sodium

Food source by age group	Cholesterol			Sodium		
	1987-88	1989-91	1994-96	1987-88	1989-91	1994-96
<i>Milligrams per 1,000 calories</i>						
Age 2-17	143	130	115	1,616	1,645	1,575
Home foods	149	134	118	1,637	1,676	1,570
Away-from-home foods	129	121	106	1,561	1,567	1,588
Fast food	125	115	101	1,484	1,582	1,621
Schools	121	117	104	1,604	1,510	1,607
Restaurants	176	174	142	1,674	1,852	1,721
Age 2-5	142	135	121	1,558	1,612	1,555
Home foods	145	139	124	1,572	1,631	1,541
Away-from-home foods	126	121	111	1,483	1,542	1,601
Fast food	97	103	104	1,380	1,488	1,602
Schools	118	105	106	1,561	1,473	1,562
Age 6-11	143	130	112	1,594	1,626	1,563
Home foods	148	137	115	1,613	1,654	1,550
Away-from-home foods	132	116	105	1,547	1,563	1,591
Fast food	143	121	96	1,451	1,545	1,621
Schools	122	120	108	1,612	1,542	1,629
Males age 12-17	144	131	114	1,645	1,697	1,598
Home foods	151	130	117	1,690	1,727	1,609
Away-from-home foods	128	134	107	1,546	1,621	1,578
Fast food	126	119	104	1,485	1,767	1,602
Schools	119	123	100	1,591	1,494	1,634
Females age 12-17	145	123	114	1,687	1,662	1,592
Home foods	153	127	120	1,697	1,727	1,595
Away-from-home foods	126	114	103	1,662	1,534	1,587
Fast food	113	109	102	1,578	1,524	1,672
Schools	120	111	93	1,618	1,460	1,541

Sources: Compiled by USDA's Economic Research Service from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, CSFII 1994-96, 1-day data.

mended for a 10-year-old child. Since 1987, children have increased their consumption of dietary fiber from 11.4 grams per day in 1987-88 to 12.4 grams in 1989-91 and to 13.1 grams during 1994-96. In 1994-96, the average consumption amounted to 97 percent of the recommended level but only 39 percent of children met the recommendation.

Based on a daily intake of 1,964 calories in 1994-96, the fiber-density benchmark is 7.3 grams per 1,000 calories for all children. Foods eaten by children during 1994-96 contained 6.7 grams of fiber per 1,000 calories, with 6.9 grams from home foods and 6.2 grams from away-from-home foods (table 6). While school meals had the highest fiber

density of away-from-home foods (7.1 grams per 1,000 calories in 1994-96), the fiber density of school meals was higher in 1989-91 with 7.7 grams per 1,000 calories. In light of the increased popularity of eating out, the relatively low fiber density in fast food (5.6 grams) and restaurant foods (6.2 grams) indicates that it may become more difficult to close the gap between actual and recommended fiber consumption.

Recommended levels of fiber intake rise with age for children, regardless of gender. A larger proportion of older children failed to meet the fiber recommendation than younger children. During 1994-96, 57 percent of pre-school children met the fiber recommendation,

whereas only 33 percent of male teens and 18 percent of female teens met the recommendation. With a daily intake of 1,890 calories in 1994-96, female teens needed 10.3 grams of fiber per 1,000 calories in order to meet their recommendation, compared with 7.1 grams of fiber for male teens. Teenage girls consumed only 6.9 grams of fiber per 1,000 calories, about two-thirds of the benchmark level. Teenage boys consumed slightly less, 6.3 grams of fiber per 1,000 calories, equivalent to 88 percent of their benchmark level.

School meals consumed by children under 12 were rich in fiber. For example, children age 6-11 obtained 7.6 grams of fiber per 1,000 calories

Table 6
Older Children Made Poorer Food Choices at School Than Younger Children

Food source by age group	Fiber			Calcium			Iron				
	1987-88	1989-91	1994-96	1977-78	1987-88	1989-91	1994-96	1977-78	1987-88	1989-91	1994-96
	Grams per 1,000 calories			Milligrams per 1,000 calories							
Age 2-17	6.4	6.8	6.7	485	509	506	462	5.8	7.4	7.3	7.6
Home foods	6.6	6.9	6.9	479	520	518	474	6.0	8.0	7.9	8.3
Away-from-home foods	6.2	6.5	6.2	507	480	476	437	5.1	5.7	5.6	6.0
Fast food	4.9	5.5	5.6	310	338	343	357	5.1	5.4	5.5	5.9
Schools	7.6	7.7	7.1	643	648	640	662	5.0	5.4	5.6	6.2
Restaurants	5.2	5.4	6.2	327	341	416	336	5.4	5.7	5.7	6.1
Age 2-5	6.4	6.7	6.8	534	569	575	528	5.9	7.6	7.6	7.9
Home foods	6.4	6.8	6.9	543	593	601	552	6.0	7.9	8.1	8.3
Away-from-home foods	6.2	6.5	6.6	472	442	483	451	5.2	5.9	6.0	6.4
Fast food	5.7	5.7	5.5	317	261	351	366	5.1	5.0	5.1	6.0
Schools	7.4	7.9	8.0	645	675	622	657	5.0	5.8	6.7	7.1
Age 6-11	6.7	6.9	6.7	499	517	509	476	5.9	7.4	7.2	7.9
Home foods	6.8	6.9	6.9	485	522	516	472	6.1	8.0	7.9	8.7
Away-from-home foods	6.5	6.7	6.4	551	505	494	486	5.1	5.9	5.5	6.2
Fast food	4.5	5.5	5.7	292	323	334	353	5.2	5.4	5.5	5.9
Schools	7.9	8.0	7.6	673	646	651	743	5.0	5.6	5.5	6.4
Males age 12-17	6.2	6.6	6.3	467	483	477	427	5.8	7.6	7.3	7.2
Home foods	6.5	6.9	6.6	458	493	475	437	5.9	8.6	8.0	8.0
Away-from-home foods	5.8	6.1	5.7	499	461	482	407	5.0	5.4	5.6	5.8
Fast food	4.8	5.2	5.2	334	329	401	353	5.0	5.6	5.7	6.0
Schools	7.7	7.2	6.3	625	618	684	619	4.9	5.3	5.2	5.6
Females age 12-17	6.2	6.8	6.9	447	466	449	408	5.7	6.7	6.8	7.1
Home foods	6.3	7.0	7.2	443	460	461	426	5.9	7.2	7.5	7.9
Away-from-home foods	5.9	6.4	6.2	462	479	426	375	5.0	5.4	5.6	5.7
Fast food	5.0	5.5	6.1	297	414	291	367	5.0	5.3	5.4	5.9
Schools	6.6	7.5	6.2	605	693	568	496	4.9	5.0	5.7	5.3

Sources: Compiled by USDA's Economic Research Service from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, CSFII 1994-96, 1-day data.

from school meals, higher than the 7.1-gram benchmark. The fiber density in school meals dropped to 6.3 grams for male teens and 6.2 grams for female teens. The nutrient standards for school meals served to teens are the same as those for younger children, but it appears that older children make poorer food choices at school than younger children. The same finding is also reported for calcium intake.

In 1997, the Institute of Medicine of the National Academy of Sciences revised dietary recommendations for calcium and several other nutrients. The 1997 calcium recommendations are 500 mg for children age 2-3, 800 mg for children age 4-8, and 1,300 mg for children age 9-18. The proportion of children meeting the calcium recommendation has fluctuated between 37 and 40 percent over the past two decades. As with fiber intake, older children's diets were lower in calcium than younger children's; however, the deficit was worse among girls than boys. For example, 60 percent of pre-school children met their calcium recommendations, whereas only 32 percent of teenage boys and 13 percent of teenage girls met their recommendations in 1994-96.

Calcium density in foods consumed by children rose between 1977-78 and 1989-91 but then declined. During 1977-78, home foods provided less calcium than away-from-home foods because of high calcium density in school meals, which accounted for more than half of calories from outside the home. Today, however, a larger share of children's away-from-home meals are eaten at fast food places and restaurants, where foods are lower in calcium.

In 1994-96, the calcium density was 357 mg per 1,000 calories for fast food and 336 mg for restaurants, compared with 662 mg for school meals. Clearly, the increased popularity of eating out at fast food places and restaurants poses a chal-

lenge to improving children's calcium intakes.

Low calcium intakes have been identified as a serious public health concern, especially among teenage girls. Teenage girls have higher recommended calcium intakes and consume foods lower in calcium density than other children. Even the calcium density of meals that teenage girls eat at school has declined. During 1994-96, school foods provided 764 mg of calcium per 1,000 calories for girls age 6-11 but dropped to 496 mg for girls age 12-17. In comparison, teenage girls obtained 605 mg of calcium per 1,000 calories from school meals in 1977-78. The data suggest that although calcium-rich foods are available in school cafeterias, teenage girls are increasingly less likely to choose them.

Even though teenage boys maintained the amount of calcium they obtained from school foods from 1977-78 to 1994-96, they consumed far less calcium-rich food at school than younger children. During 1994-96, school foods provided 724 mg of calcium per 1,000 calories for boys

age 6-11 and 619 mg of calcium for boys age 12-17.

Teenage Girls' Diets Too Low in Iron

The 1989 recommended daily allowances (RDA) for iron are 12 mg per day for boys 11 and older, 15 mg for girls 11 and older, and 10 mg for children 2-10. Children increased their iron intake 34 percent over 20 years, from 11.1 mg per day in 1977-78 to 14.9 mg per day in 1994-96. Consequently, the proportion of children meeting the iron RDA increased from 39 percent in 1977-78 to 59 percent in 1994-96. After rising substantially between 1977-78 and 1987-88, children's iron intake levels have been stable.

Home foods eaten by children are much higher in iron than away-from-home foods. In 1977-78, the iron density for home foods was 18 percent above the level for away-from-home foods; the differential increased to 38 percent in 1994-96. An earlier study indicated that morning meals provided the largest share of iron intake among children



The popularity of eating out poses a challenge to the nutritional quality of children's diets, which are typically high in fat and sodium.

in 1989-91. Iron-fortified breakfast cereals, which are mostly eaten at home, help explain the high iron density of morning meals.

Female teens have the highest recommended iron intake of all children, yet their foods contained the least amount of iron. During 1977-78, only 15 percent of female teens met their iron recommendation. For 1994-96, female teens needed 7.9 mg of iron per 1,000 calories to meet their iron recommendation. Home foods eaten by female teens in 1994-96 provided 7.9 mg of iron per 1,000 calories, but away-from-home foods provided only 5.7 mg of iron per 1,000 calories. With an average of 7.1 mg of iron per 1,000 calories in their diets, only 33 percent of female teens met their iron recommendation in 1994-96.

Wiser Food Choices Needed, Especially When Eating Out

To improve children's diets, two basic challenges must be met: increase intakes of some nutrients and food components, such as fiber, calcium, and iron; and limit others, such as fat, saturated fat, cholesterol, and sodium.

Overall dietary quality tends to decline as children get older. Preschool children had diets that compared favorably with benchmark densities for cholesterol, sodium, fiber, calcium, and iron. Among teenagers, however, boys met the benchmark density only for iron, whereas girls met the benchmark only for cholesterol. Excessive intakes of fat and saturated fat occur among all children, but teenagers face additional dietary problems. Teenage girls, despite having the greatest needs for calcium and iron, obtain the least amount of these nutrients in their diets. Teenage boys are the most likely group to have excessive intakes of cholesterol and sodium.

An increase in eating out appears to be a factor in the age-related decline in diet quality. Away-from-home foods contributed 20 percent of total calories consumed by children in 1977, rising to 32 percent during 1994-96. During 1994-96, teenagers obtained 35 percent of their caloric intake away from home, compared with 32 percent for children age 6-11 and 24 percent for children age 2-5. Away-from-home foods generally contain more of the overconsumed nutrients and food components and less of the underconsumed nutrients and food components than home foods. Away-from-home foods are no longer the occasional treats they were two decades ago. Children and their parents need to recognize away-from-home foods for their effect on the overall diet. Furthermore, since eating out is expected to continue trending upward, nutrition policy, education, and promotion strategies need to stress the importance of making wise food choices when eating out.

The findings in this study suggest that broad messages appropriate for all audiences need to be supplemented with targeted messages designed to reach high-need groups. For example, the National Institute of Child Health and Human Development launched a "Crash Course on Calcium" in partnership with a coalition of government, private sector, and medical groups. This program features videos, advertisements, and other media featuring teen celebrities promoting the benefits of calcium. A similar program targeting cholesterol and sodium intake might be useful for teen boys.

USDA has taken action to improve the nutritional quality of school meals and to encourage more nutrition education in schools. USDA's School Meals Initiative for Healthy Children has devoted considerable resources to developing and disseminating educational materials for use with foodservice

staff, students, teachers, parents, and the community. A recent study has demonstrated that the devoted resources have led to improvement in the nutritional quality of meals served through the school meals programs. Some restaurants and fast food places have also taken steps to serve more nutritious foods by adding more healthful options, such as salads and low-fat dairy products, to their menus.

Unfortunately, serving more nutritious foods does not guarantee the foods will be eaten. Our results indicate that even when school meals are good sources of nutrients, such as fiber and calcium, children may not choose to eat them. This finding is particularly true for teenagers. Schools serving meals to older children and teenagers tend to offer more choices than elementary schools. They are more likely to follow the "offer versus serve" provision for school meal service, which typically allows students to choose only three of the five USDA meal-pattern items offered (milk, meat or meat alternative, two servings of vegetables and/or fruits, bread or bread alternative). Schools serving older children are also more likely to serve a la carte foods and beverages that are not part of the USDA-subsidized school meal. Other competing foods and beverages may be available through noncafeteria sources, such as school stores and vending machines. These factors may influence teenagers' school meal choices. Research on how we can encourage teenagers to take advantage of the nutritional benefits of school meals may be useful.

In 1994-96, fast food places contributed an average of 10 percent of children's total calories. The caloric contribution from fast food rises with children's age, increasing from 7 percent among preschoolers to 15 percent among teen boys. Fast foods consumed by children are relatively high in fat, saturated fat, and sodium, and low in fiber and cal-

cium, compared with home foods. Improvements in the nutritional composition of fast foods are most likely to be influenced by consumers. Strategies that promote nutrition need to encourage both parents and children to make the most healthful choices available from among the various menu items and to demand a wider range of nutritious options.

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