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The Diets of America's Children: Influence of Dining Out, Household Characteristics, and Nutrition Knowledge. By Biing-Hwan Lin, Food and Consumer Economics Division, Economic Research Service, USDA; Joanne Guthrie, Center for Nutrition Policy and Promotion, USDA; and James R. Blaylock, Food and Consumer Economics Division, Economic Research Service, USDA. Agricultural Economic Report No. 746.

Abstract

Recent USDA surveys point out several shortcomings in children's diets. The share of calories from total and saturated fat averaged 4 and 3 percentage points above the recommendations. The sodium intake averaged 23 percent above the 2,400 milligrams recommended by some authorities. These dietary problems start early in childhood and continue into adulthood. Additionally, only a small fraction of female adolescents met the recommended intakes for calcium, fiber, and iron. Compared with home foods, away-from-home foods were higher in total and saturated fat and lower in cholesterol, fiber, calcium, iron, and sodium. With increasing popularity in dining out, efforts to improve children's diets may need strengthening.

Keywords: Children's diets, food away from home, diet and health knowledge, household characteristics.

Acknowledgments

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Summary

Food away from home has a higher ratio of fat to calories and lower fiber and calcium than food prepared at home, a fact that may particularly affect female teens, who consume a larger proportion of food away from home than do other children. This report uses data from USDA's 1989-91 Continuing Survey of Food Intakes by Individuals and the Diet and Health Knowledge Survey to examine various aspects of children's diets.

The report's major findings are:

- Children's diets were high in total fat, saturated fat, and sodium and low in food energy and fiber. The share of calories from total fat and saturated fat was fairly consistent among children across age and gender, averaging 34 percent for total fat and 13 percent for saturated fat, which are 4 and 3 percentage points above the recommended levels. Children consumed an average of 2,948 milligrams of sodium per day (excluding salt added at the table), which is 23 percent above the 2,400 milligrams recommended by some health authorities.
- Female adolescents' diets were high in total fat, saturated fat, and sodium. In addition, only a small fraction of female adolescents met the recommended intakes for calcium, dietary fiber, and iron. Low calcium intakes may have serious long-term consequences. The National Academy of Sciences recommends a relatively high allowance of calcium for teenage girls—1,200 milligrams per day—because bone mass develops primarily during the teenage and young adult period.
- The shortcomings in the female adolescents' diets may be related to their eating patterns. Compared with other children, female teens had the highest tendency to skip morning meals (high in iron and calcium), ate the smallest number of meals and snacks, had the largest proportion of meals and snacks away from home (low in fiber, iron, and calcium), and drank the least fluid milk.
- Compared with home foods, higher levels of total fat and saturated fat and lower levels of cholesterol, dietary fiber, calcium, iron, and sodium were found in away-from-home foods eaten by children.
- During the 1989-91 period, foods prepared at schools were higher in fat, fiber, and calcium and lower in cholesterol, iron, and sodium when compared with home foods. Similar results were obtained in a 1993 USDA-sponsored assessment of the nutrient quality of school meals. Consequently, USDA began working on an initiative to improve school meals in 1993. To show support for USDA, the Congress passed the Healthy Meals for Healthy Americans Act of 1994 (Public Law 103-448) requiring that meals served under the National School Lunch Program and School Breakfast Program meet the *Dietary Guidelines for Americans* by July 1, 1996. In June 1994, USDA launched the School Meals Initiative for Healthy Children, a comprehensive approach to turning Congress' mandate into a successful program. The Initiative includes both actions to support State and local food service organizations in improving school meals and a broad-based nutrition promotion program to increase the popularity of school meals and encourage children to improve their overall diets.

- During 1989-91, foods prepared at schools were higher in fat, fiber, and calcium and lower in cholesterol, iron, and sodium when compared with home foods. The Healthy Meals for Healthy Americans Act of 1994 (Public Law 103-448) requires meals that are served under the National School Lunch Program and School Breakfast Program to meet the Dietary Guidelines for Americans as of July 1, 1996. USDA launched the School Meals Initiative for Healthy Children, a comprehensive approach to turning Congress's mandate into a successful program. The Initiative includes both actions to support State and local food service organizations in improving school meals and a broad-based nutrition promotion program to increase the popularity of school meals and encourage children to improve their overall diets.

ERS has previously estimated that the United States accrues \$250 billion in medical costs and lost productivity as a result of seven health conditions linked to dietary behavior. Some people believe that nutritional guidance should start early in life for the greatest long-term health benefits. Understanding children's dietary patterns can help to identify necessary dietary modifications and hence aid in developing effective messages for improved diets.

Dining out has been increasing for young and old alike, raising questions about nutrient intake, particularly for children. Do children's intakes of food calories, total fat, saturated fat, cholesterol, fiber, calcium, iron, and sodium vary by eating occasion (meals and snacks) and by whether the foods were prepared at home or away from home? Does the source of food away from home (fast food outlets, schools, and restaurants) influence the nutritional content of meals? These two issues are examined in this study. The report compiles children's nutrient intakes according to their social, economic, and demographic characteristics as well as their meal planners' knowledge about diet and health issues. The report also presents the average values of nutrient consumption and related variables for children by age and gender and by food sources.

The Diets of America's Children

Influence of Dining Out, Household Characteristics, and Nutrition Knowledge

Biing-Hwan Lin
Joanne Guthrie
James R. Blaylock

Introduction

The Economic Research Service places a yearly price tag of \$250 billion in medical costs and lost productivity associated with seven health conditions linked to dietary behavior. These enormous costs are one reason that the U.S. Department of Agriculture and private and public partners place a high priority on improving the diet of the public. American diets have a long way to go before reaching generally accepted recommendations on total fat, saturated fat, sodium, complex carbohydrates, and fiber.

American children, like their elders, are dining out more often than ever. As children eat away from home more frequently and at a variety of establishments, parents may lose some control over the quality of their offsprings' diets. Some people also believe that nutritional guidance should start early in life for the greatest long-term health impacts. The development of effective dietary messages will gain from knowing more about the implications of current eating choices and the feasibility of prescribed changes.

We address several questions surrounding children's eating habits. First, do children's intake of food calories, total fat, saturated fat, cholesterol, fiber, calcium, iron, and sodium vary by eating occasion (morning, midday, and evening meals and snacks) as well as by whether the foods were prepared at home or away? Second, does the source of food away (fast food, schools, and restaurants) influence the nutritional content of meals? Third, how do nutrient intakes vary by the children's social, economic, and

demographic characteristics as well as their meal planners' (typically a female in the household) diet and health-related knowledge? The analysis is based on a comparison of average values of selected nutrients computed from a large, nationally representative sample of individuals.

The severity of problems in children's diets is documented in the *Third Report on Nutrition Monitoring in the United States* (IBNMRR, 1995). The U.S. Department of Health and Human Services (1989) report, *Healthy People 2000, National Health Promotion and Disease Prevention Objectives*, lists goals for improving the nutritional status of children and adolescents, including reducing obesity, growth retardation, and dietary fat intake; increasing calcium and iron intakes; enhancing nutrition education from preschool through grade 12; and making school menus consistent with nutrition principles in the *Dietary Guidelines for Americans* (USDA, 1995). This report will help document the influence of eating away from home on the nutrient intake and diet quality of children.

One of our principal findings is that food consumed away from home has a higher ratio of fat to calories (fat density), and lower fiber and calcium densities than foods prepared at home. School meals were relatively rich in fiber and calcium and relatively low in sodium compared with other away-from-home foods. These findings apply to all age and sex groups and highlight the importance of expanding information about the nutritional content of away-from-home foods, which is limited. This will become a larger issue as people dine out more often.

Data

Data from USDA's 1989-91 Continuing Survey of Food Intakes by Individuals (CSFII) and the companion Diet and Health Knowledge Survey (DHKS) provided the basis for this report. The 1989-91 CSFII/DHKS surveys were implemented by USDA's Human Nutrition Information Service (HNIS). Two independent samples of households—the "basic" or all-income sample and low-income sample—were selected using a multistage, stratified selection procedure targeted at private households in the 48 contiguous States. In the 1989-91 surveys, 23,142 housing units were selected, which after screening resulted in 8,443 eligible households, of which 6,718 (79.6 percent) participated.

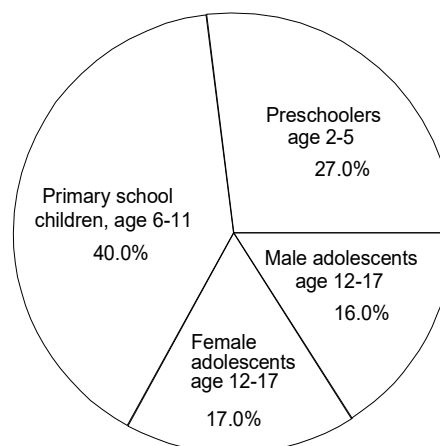
The CSFII survey collects information on what, when, where, and how much Americans eat. Each CSFII participant was asked to provide 3 consecutive days of dietary data. The first day's data were collected in an inhome interview using a 1-day dietary recall. The second and third days' data were collected using a self-administered 2-day dietary record. Social, economic, and demographic characteristics of survey participants are also included in the CSFII. There were 17,721 individuals living in the 6,718 participating households; 15,192 (85.7 percent) completed the 1-day recall and 11,912 (67.2 percent) completed both the 1-day recall and 2-day record. The data were weighted using USDA-provided weights that adjust for the survey's oversampling of low-income households and differing response rates among population subgroups. These weights provide results more representative of the U.S. population.

In the CSFII survey, each food item eaten was recorded using a coding system that contains about 6,700 food codes. USDA's Agricultural Research Service (ARS) maintains a database with the nutrient composition for each food code. The amount of nutrients in each food was calculated by multiplying the amount of food reported eaten by its nutritive value.

One DHKS respondent, usually the household's main meal planner, was contacted by telephone about 6 weeks after collection of the dietary data and asked to answer questions about knowledge of and attitudes toward diet, health, and food safety issues. Among the 6,718 participating households, 5,730 (85.3 percent) completed the DHKS.

Figure 1

Distribution of children by age and gender



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages.

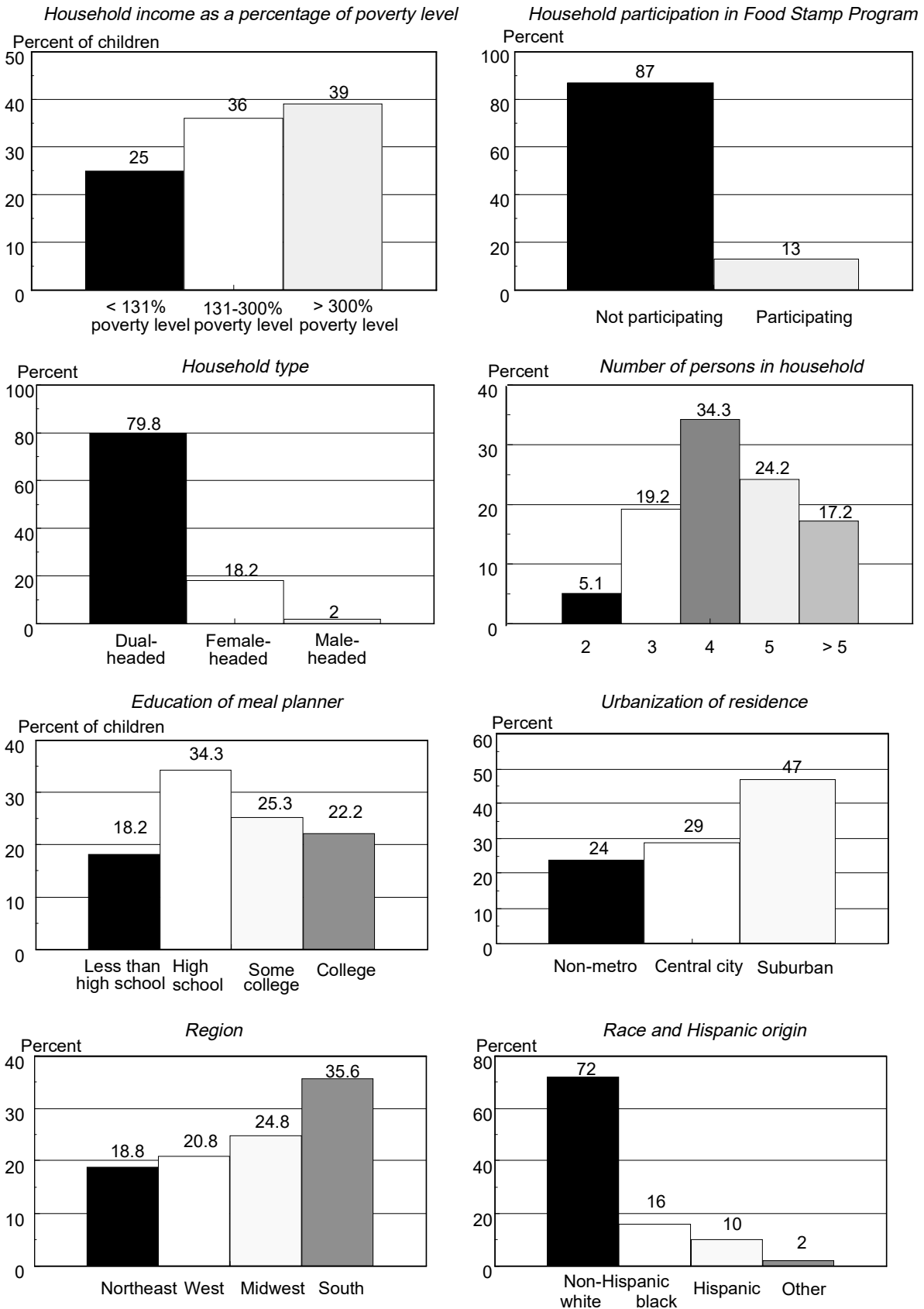
The surveys have been used to describe food consumption behavior and to assess the nutritional content of diets. Results from the surveys have major implications for policies relating to food production and marketing, food safety, food assistance, and nutrition education. The surveys are a major component of the National Nutrition Monitoring and Related Research Program, a set of related Federal activities intended to provide regular information on the nutritional status of the U.S. population.

The focus of this report is on children and adolescents between the ages of 2 and 17 (hereafter called children), who reported (intakes of children under 12 were provided by their meal planners/preparers) 3-day intake information. Children in this study are grouped into four age/gender categories: children age 2-5 (preschoolers), children age 6-11 (primary school children), females age 12-17 (female adolescents), and males age 12-17 (male adolescents). In total, 3,010 children were included in this analysis, representing more than 57 million children over 3 years. Among them, 27 percent were preschoolers, 40 percent primary school children, 17 percent female adolescents, and 16 percent male adolescents (fig. 1).

Household characteristics include household income, participation in the Food Stamp Program, household type, household size, education of children's meal planners, race and Hispanic origin, region, and urbanization of residence (fig. 2). Children's intakes of food energy and selected nutrients per day are tabulated according to their meal planners' diet and health-related information: whether the meal planner

Figure 2

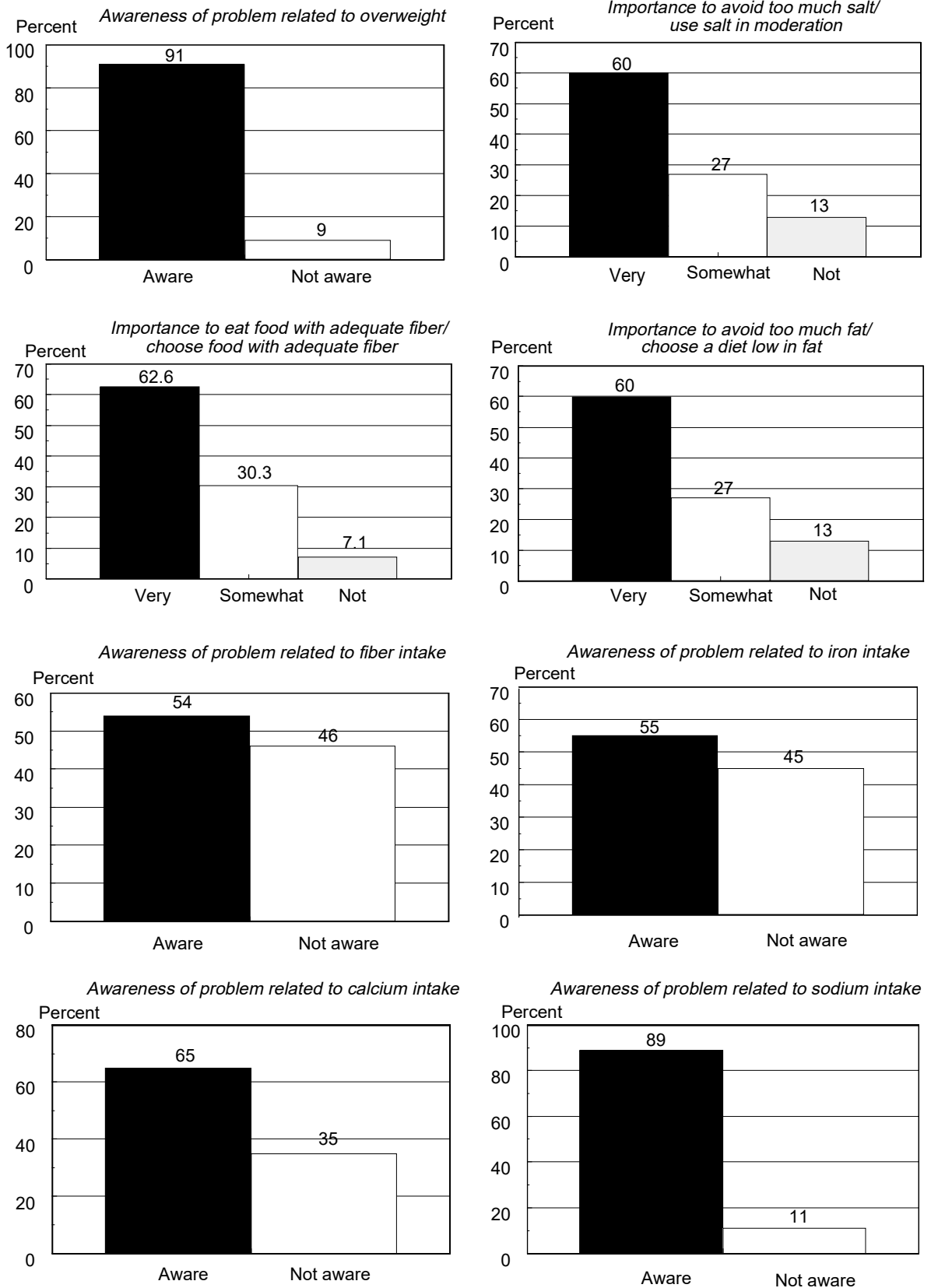
Distribution of children by household characteristics



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted average

Figure 3

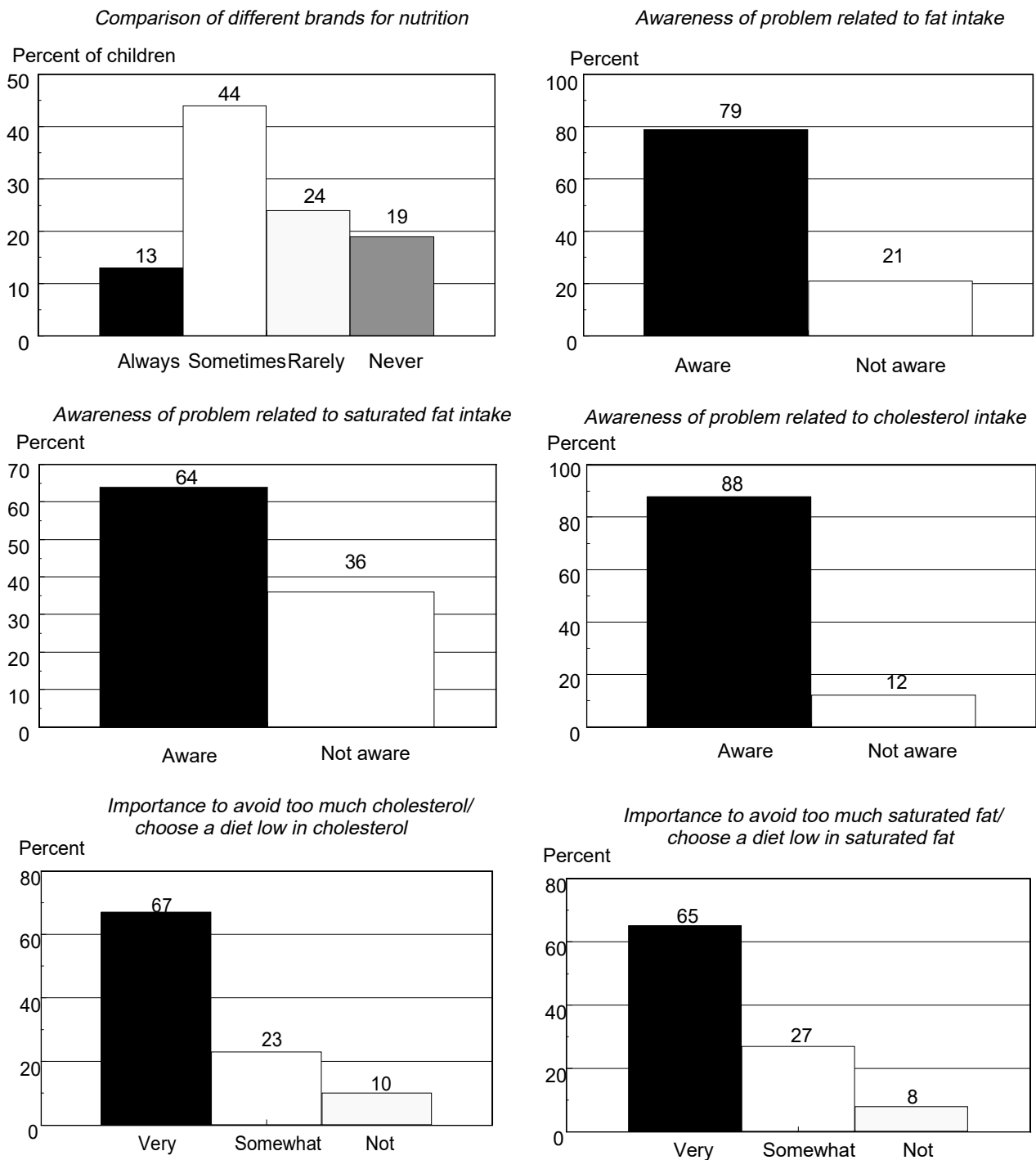
Distribution of children by meal planners' diet and health knowledge



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted average.

Figure 3

Distribution of children, meal planners' diet and health knowledge (cont'd)



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted average.

compares the nutritional content of different brands of the same food, awareness of problems related to nutrient intakes, and perceived importance of dietary advice (fig. 3).

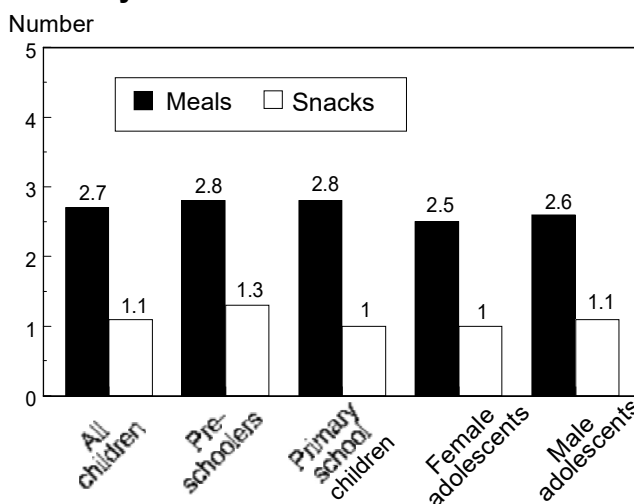
Meal and Snack Eating Patterns

CSFII respondents reported all foods and beverages consumed throughout the day and the associated eating occasion and time. An eating occasion can be a meal (breakfast, brunch, lunch, dinner, or supper) or snack. During 1989-91, the average number of eating occasions was 3.8 (2.7 meals and 1.1 snacks) per day among children 2 to 17 years of age. More than half of all children ate 3 meals each day, and the number of meals decreased with age. Preschoolers had the most meals (2.8) and snacks (1.3) per day (fig. 4), and female adolescents the fewest (2.5 meals and 1.0 snack).

It is common to describe the first eating occasion of the day as breakfast, but brunch, lunch, dinner, and supper are used interchangeably, depending on regional and cultural differences. Meals can be classified on the basis of time or occasion. Meals are categorized here as morning, midday, and evening meals according to the self-reported eating occasion and time. Morning meals include breakfast and brunch eaten before 10 a.m.; midday meals include lunch eaten between 10 a.m. and 3:30 p.m. as well as dinner, or supper eaten before 3:30 p.m.; and evening meals include supper eaten after 3:30 p.m. Foods can be eaten as snacks at any time, and they are treated as a separate occasion. This categorization enables us to find out

Figure 4

Number of meals and snacks eaten by children each day



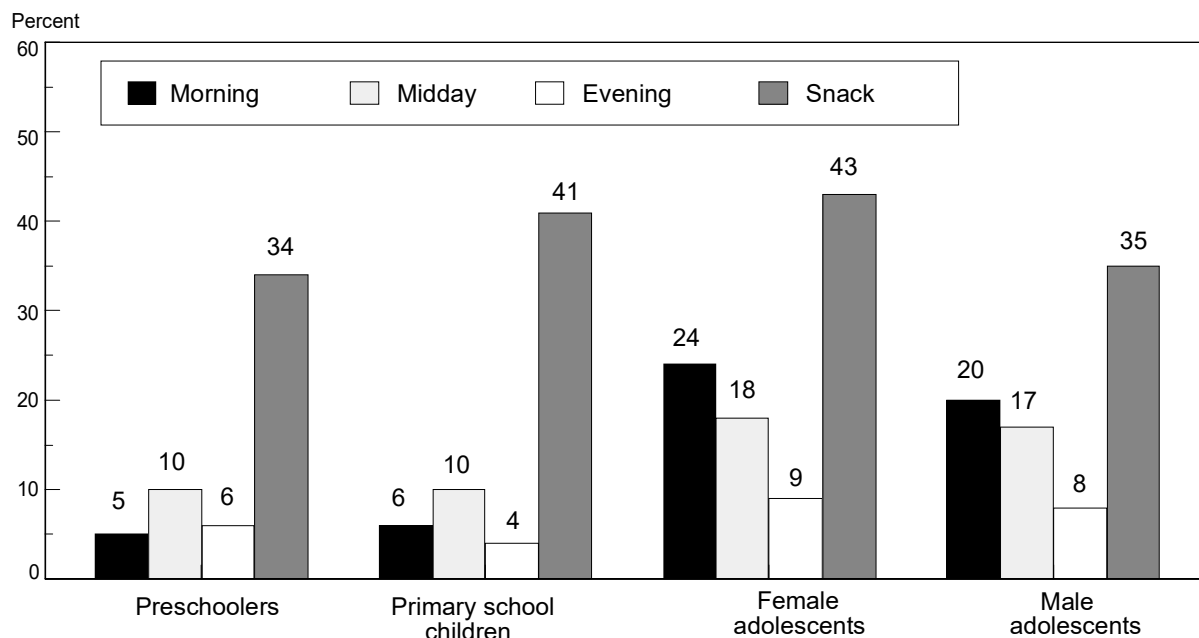
Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted average.

the frequency of skipping (or eating) a particular meal/snack category and the distribution of caloric and nutrient intakes across meal/snack categories.

Different meal patterns emerge as children reach secondary school age (fig. 5). On a given day during the survey period, the percentage of children skipping morning meals increased with age, from 5-6 percent among children age 2-11 to 20-24 percent among

Figure 5

Percentage of children skipping a meal or snack



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages.

adolescents. About 10 percent of children age 2-11 skipped midday meals and 17-18 percent of adolescents skipped midday meals. Relative to morning and midday meals, a smaller percentage of adolescents skipped evening meals. Still, a smaller percentage of adolescents ate evening meals than did younger children.

Food Away From Home

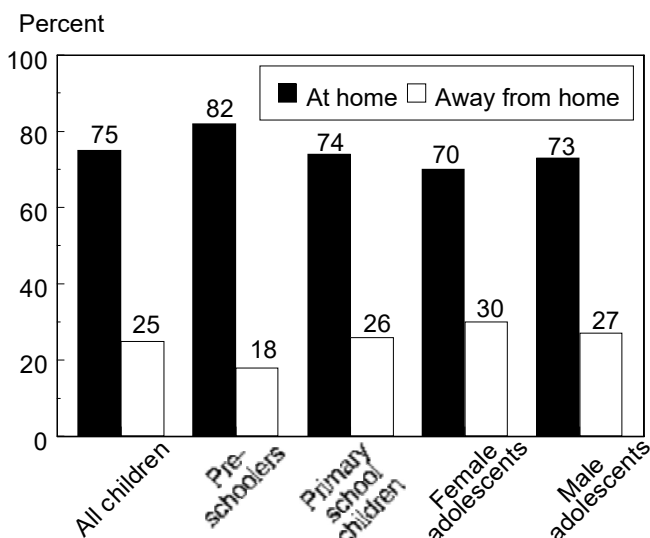
Previous research reported conflicting results concerning whether eating out improves or worsens nutritional quality in our diets (Bunch and Hall, 1983; Guenther and Chandler, 1980). The nutritional quality of away-from-home foods may differ from the nutritional quality of home foods for several reasons. The nutrition facts label, now required on most processed foods, can help consumers choose foods lower in fat and sodium and without added sugar. However, the nutrition information requirement is waived for food served for immediate consumption, such as in restaurants and cafeterias, except when a restaurant or cafeteria item carries a health or nutrient claim (such as "low fat," etc.). Consumers have little control over preparation techniques for away-from-home foods. Furthermore, consumers' reaction to their concerns over nutrition may differ between foods at home and away from home. Several fast-food chains introduced reduced-fat hamburgers, but later withdrew them from the menu because they did not sell. And a number of restaurant operators claim that although consumers may say they want healthful foods, they typically order something else (Parseghian, 1992).

Home and away-from-home foods are defined in this study according to where the foods are obtained, not where they are eaten. Both can be eaten at or away from home. The distinction between home and away-from-home foods is related to the degree of control a consumer has over the nutritional content of the food. In CSFII surveys, respondents were asked whether the food item was ever brought home. In this study, away-from-home foods include those items never brought home or brought home from fast-food/carryout places or meals on wheels.

Sources for away-from-home foods are combined into four groups: fast-food places, schools, restaurants, and others. Fast-food places include self-service restaurants, carryout places, cafeterias, and meals on wheels; schools include day-care centers and summer camps; restaurants are those with waiter or waitress service; others include vending machines,

Figure 6

Percentage of meals eaten at home and away from home



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages.

recreation/entertainment places, community feeding programs, and someone's home. A meal or snack sometimes contains both home and away-from-home foods. When this is the case, an eating occasion is classified as at-home if home foods contribute 50 percent or more of total calories consumed during the occasion.

The 1989-91 CSFII data reveal that one-quarter of meals consumed by children age 2-17 were away from home. Older children ate a higher proportion of meals away from home, increasing from 18 percent for preschoolers to 30 percent for female adolescents (fig. 6 and app. table 1).

Fast-food places provided 42 percent of away-from-home meals to preschoolers, followed by other locations with 29 percent, schools (day-care facilities) with 18 percent, and restaurants with 12 percent (fig. 7). As children reach school age, schools provided the most away-from-home meals (36-43 percent), followed by fast-food places (30-32 percent), others (17-22 percent), and restaurants (8-12 percent).

Children ate a higher percentage of snacks at home (83 percent) than meals at home (75 percent) (app. table 1). As with meals, older children ate a higher percentage of snacks from away-from-home sources: 15 percent for 2-11 years old, 18 percent for male adolescents, and 22 percent for female adolescents. Places other than schools, fast food, and restaurants

accounted for more than 50 percent of snacks eaten by all children. For example, eating snacks at recreation and entertainment places, such as movie theaters and ball parks, accounted for 30 percent of snacks eaten at places other than schools, restaurants, and fast-food establishments. For preschoolers, day-care facilities provided 40 percent of away-from-home snacks. As children reach school age, fast-food places became the most popular snack providers.

Food Energy Intakes

The healthy body needs energy for metabolic processes, to support physical activity and growth, and to maintain body temperature. The National Research Council's Recommended Energy Allowances (REA) are based on age, physical activity, body size, and gender. The average 1989 REA's are 1,300, 1,800, and 2,000 calories for children age 1-3, 4-6, and 7-10. For males age 11-14

and 15-18, the recommendations average 2,500 and 3,000 calories, while 2,200 calories are the recommended average intake for females age 11-18.

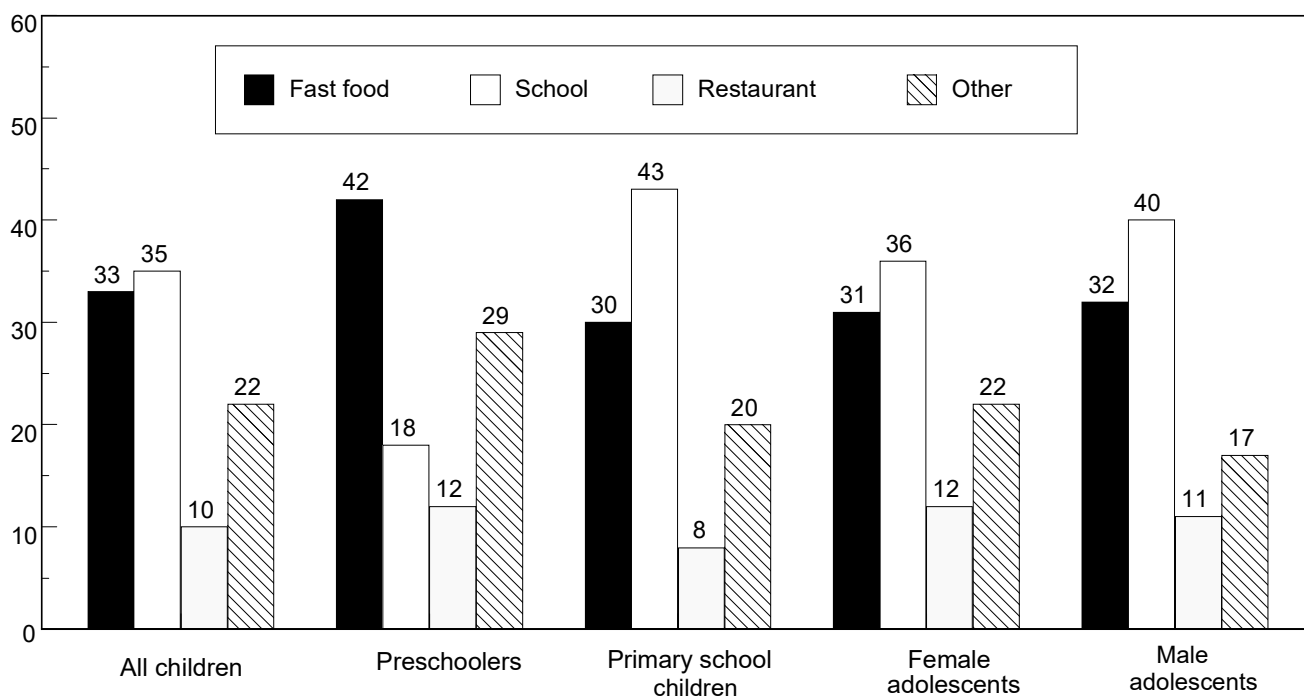
In 1991, researchers in USDA's Agricultural Research Service reported that volunteers in their nutrition studies underreported their caloric intake by an average of 18 percent (Mertz and others, 1991). In addition, the data from the Third National Health and Nutrition Examination Survey (HANES III) conducted by the National Center for Health Statistics also indicate underreporting in food consumption, especially among females and overweight persons (Briefel and others, 1995). Therefore, energy and nutrient intake estimates from dietary recall surveys, such as CSFII, represent a lower limit of actual intakes.

In the 1989-91 CSFII surveys, children's caloric intakes averaged 1,781 calories per day—only 88 percent of their average 1989 REA (fig. 8). Both daily caloric intakes expressed as a percentage of the mean REA and a percentage of children meeting their

Figure 7

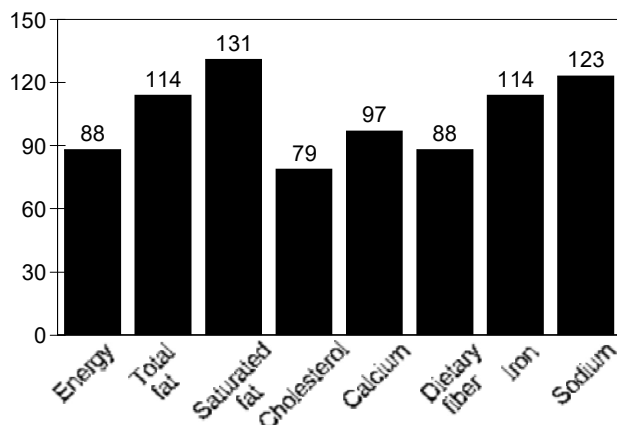
Distribution of away-from-home meals by source

Percent



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages

Figure 8
Average intake as a percentage of recommended levels: all children



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages

mean REA's decreased with age (table 1). Preschoolers, on average, obtained 92 percent of the mean REA and about 34 percent of them met their mean recommended level. Female adolescents achieved 82 percent of the mean REA and only 22 percent of them met the mean recommendation.

Among all children, snacks accounted for 15 percent of total calories, the smallest share among the four meal/snack categories. As the day progressed, children increased their caloric intakes from 21 percent at morning meals to 30 percent at midday meals to 35 percent at evening meals. Older children had a larger share of calories from evening meals at the expense of morning meals, reflecting their relative tendency to skip morning meals (fig. 5). The morning meal's share of daily calories decreased from 23 percent among preschoolers to 21 percent among primary school children to 18-19 percent among adolescents; the evening meal's share of daily calories increased from 32 percent among preschoolers to 35 percent among primary school children to 37 percent among adolescents.

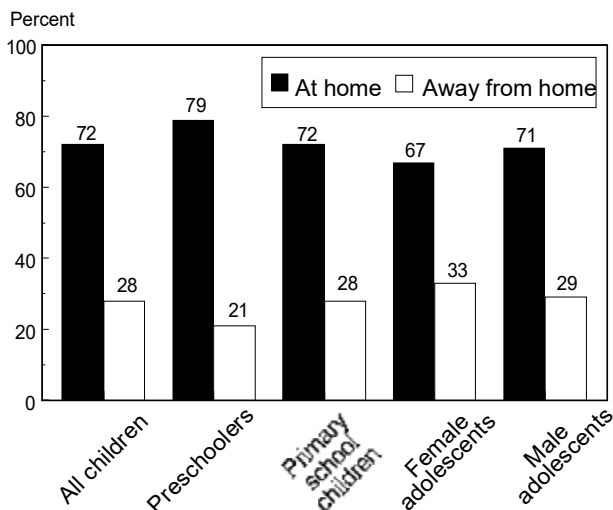
On average, home foods provided nearly three-quarters (72 percent) of food calories to all children (table 2, fig. 9). Older children ate out more often and hence obtained a higher proportion of calories away from home. Preschoolers obtained 21 percent of their food calories away from home.

Primary school children obtained 28 percent and male adolescents obtained 29 percent of their calories away from home.

Female adolescents had the largest share of calories away from home at 33 percent. Fast foods provided 11 percent of food calories to female adolescents, the highest among all children included in this study (table 2). Schools provided children with the most calories among the four away-from-home sources.

While the CSFII data indicate that many children's reported caloric intakes fell below the mean recommended level, overweight has become a significant public health problem for both children and adults in the United States. For example, the prevalence of overweight children and adolescents increased from 5 percent in the 1960's to 11 percent in 1988-91 (Troiano and others, 1995). This inconsistency could be caused, at least partially, by the fact that dietary recall data are subject to considerable underreporting. Furthermore, factors in addition to caloric intake could have contributed to the increased prevalence of overweight. Decreased physical activity and hence decreased energy expenditure is a major contributor to overweight (McPherson and others, 1995). For example, Dietz and Gortmaker (1985) found a positive and significant association between the amount of TV watching and childhood overweight. Attempts to increase physical activity may mitigate this important public health problem (Troiano and others, 1995).

Figure 9
Distribution of food energy: at home and away from home



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages.

Table 1—Daily caloric and selected nutrient intakes of children age 2-17

Calories/nutrient	Unit	Age and gender groups				
		All children	Preschoolers age 2-5	Children age 6-11	Female adolescents age 12-17	Male adolescents age 12-17
Daily intakes:						
Food energy ¹	calories	1,781	1,395	1,796	1,799	2,349
From protein	calories	267	213	268	271	352
From carbohydrate	calories	900	711	911	903	1,174
From total fat	calories	614	473	617	625	823
	percent ²	34.2	33.7	34.3	34.3	34.5
From saturated fat	calories	233	186	236	232	304
	percent ²	13.1	13.3	13.2	12.7	12.9
Cholesterol	mg	236	196	236	234	303
Sodium	mg	2,948	2,274	2,947	3,057	3,926
Calcium	mg	900	800	923	820	1,103
Dietary fiber	grams	11.8	9.1	12.0	11.8	15.3
Iron	mg	12.8	10.4	12.8	12.6	16.8
Intake as percent of recommended levels: ³						
Food energy	percent	88	92	89	82	86
Total fat	percent	114	112	114	114	115
Saturated fat	percent	131	133	132	127	129
Cholesterol	percent	79	65	79	78	101
Sodium	percent	123	95	123	127	164
Calcium	percent	97	100	109	68	92
Dietary fiber	percent	88	108	90	61	79
Iron	percent	114	104	123	84	140
Percent of children meeting the recommended intake level:						
Food energy	percent	30	34	33	22	26
Total fat	percent	22	26	21	20	17
Saturated fat	percent	13	14	11	20	11
Cholesterol	percent	77	86	77	76	64
Sodium	percent	34	60	30	28	10
Calcium	percent	43	47	53	16	38
Dietary fiber	percent	32	53	30	11	24
Iron	percent	54	48	64	21	71

¹ Food energy is sum of calories from protein, carbohydrate, and fat intakes. Calories from protein, carbohydrate, and fat are derived from multiplying grams of intakes by 4, 4, and 9 calories.

² Percent of calories from total or saturated fat.

³ The recommended intakes used in this study are: the National Research Council's Recommended Energy Allowances (REA) for energy and Recommended Daily Allowances (RDA) for calcium and iron; the FDA's Daily Reference Value for sodium (2,400 mg) and cholesterol (less than 300 mg); and the American Health Foundation's "age plus 5" for fiber.

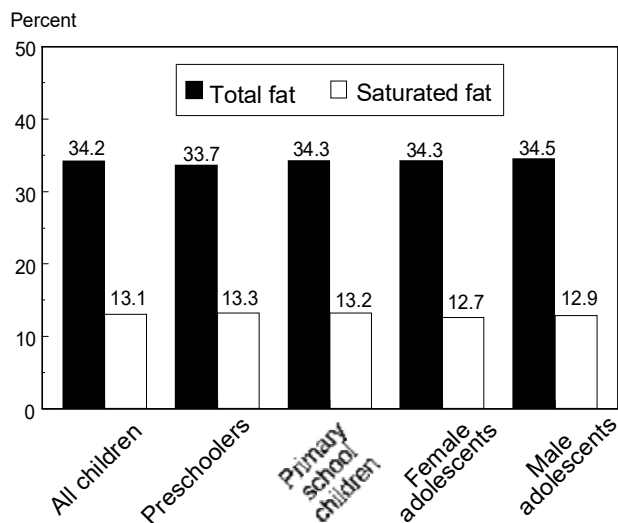
Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

Table 2—Distribution of intakes by meal/snack categories and sources

Age/gender/meal category and source	Calories	Total fat	Saturated fat	Cholesterol	Sodium	Fiber	Calcium	Iron
<i>Percent</i>								
Children age 2-17								
Morning meals	21	17	18	29	18	18	30	36
Midday meals	30	31	32	27	32	32	29	23
Evening meals	35	37	36	37	42	38	29	32
Snacks	15	13	14	8	9	12	13	9
Preschoolers								
Morning meals	23	19	21	33	20	21	31	40
Midday meals	30	32	32	27	34	31	28	23
Evening meals	32	33	32	32	38	35	27	27
Snacks	16	14	15	8	8	13	14	10
Primary school children								
Morning meals	21	17	19	30	19	19	30	38
Midday meals	30	32	32	25	32	33	30	23
Evening meals	35	38	37	37	41	37	30	31
Snacks	13	12	13	7	8	11	10	8
Female adolescents								
Morning meals	18	15	17	25	16	16	28	32
Midday meals	30	32	32	29	31	30	31	25
Evening meals	37	38	37	38	43	41	28	34
Snacks	15	13	14	8	10	13	13	9
Male adolescents								
Morning meals	19	16	18	26	17	16	27	32
Midday meals	28	30	30	27	29	30	28	23
Evening meals	37	39	37	39	44	40	30	34
Snacks	16	13	15	8	9	13	15	11
Children age 2-17								
Home foods	72	70	70	74	74	73	74	79
Away from home ¹	28	30	30	26	26	27	26	22
Fast food	8	9	9	7	8	7	6	6
Schools	10	11	12	10	10	12	13	8
Restaurants	2	3	3	3	3	2	2	2
Others	7	7	6	6	6	6	5	5
Preschoolers								
Home foods	79	78	78	82	80	80	83	83
Away from home ¹	21	22	22	18	20	20	17	17
Fast food	6	7	7	5	6	5	4	5
Schools	6	7	7	6	6	7	7	6
Restaurants	2	2	2	2	2	2	1	2
Others	6	6	6	5	6	6	5	5
Primary school children								
Home foods	72	70	69	75	72	72	73	78
Away from home ¹	28	30	31	25	28	28	27	22
Fast food	8	9	8	6	8	7	6	6
Schools	13	14	15	12	12	15	16	10
Restaurants	2	2	2	2	2	2	2	2
Others	6	6	6	5	6	5	4	5
Female adolescents								
Home foods	67	65	64	69	70	69	69	74
Away from home ¹	33	35	36	31	30	31	31	26
Fast food	11	12	12	9	10	10	9	8
Schools	11	12	12	10	10	12	13	8
Restaurants	3	3	3	4	3	3	3	2
Others	9	9	8	8	8	7	6	7
Male adolescents								
Home foods	71	70	68	71	73	73	72	78
Away from home ¹	29	30	32	29	27	27	28	22
Fast food	9	10	10	8	9	7	7	7
Schools	10	12	13	11	10	12	14	8
Restaurants	3	3	3	4	3	2	2	2
Others	7	6	6	6	6	5	5	5

¹ Away from home presents the aggregate of fast foods, schools, restaurants, and others. Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages of observations with complete information on meal categories and food sources.

Figure 10
Percent of calories from total and saturated fat



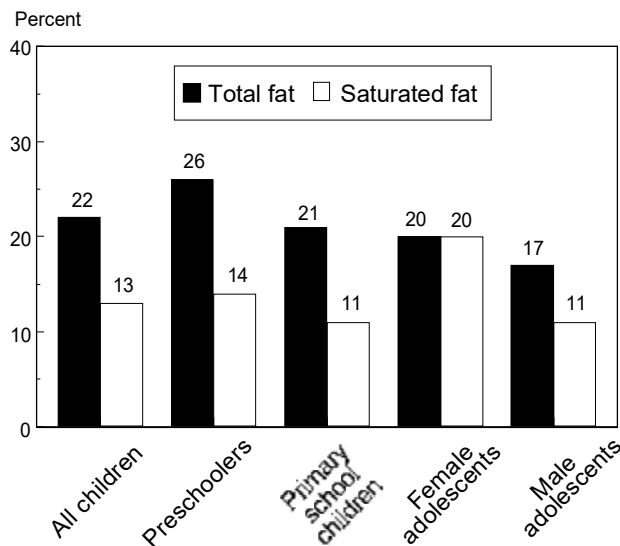
Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages.

Fat Intake

Carbohydrate, protein, and fat are the main energy sources for the body. Dietary fat supplies essential fatty acids for proper growth in children and is a carrier of fat-soluble vitamins, A, D, E, and K. However, excess fat consumption is now a source of concern in American diets, and has been associated with heart disease, certain cancers, obesity, and gall bladder disease. In this study, fat intakes are compared with the recommendations from the 1995 *Dietary Guidelines for Americans*: no more than 30 percent of calories from total fat and less than 10 percent of calories from saturated fat. On average, each gram of carbohydrate, protein, and fat generates 4, 4, and 9 calories. In this study, fat intakes were converted into calories and then divided by total calories from carbohydrate, protein, and fat to derive the percent of calories from fat.

Over the past decades, Americans have made substantial progress in reducing fat intakes in their diets, in part due to heightened dietary concerns and increased availability of nutritionally improved products in the market. For example, based on USDA food consumption survey data, the percentage of calories from fat in Americans' diets has been reduced from 40 percent in 1977/78 to 34-35 percent in 1989/91—a marked improvement but still above the recommended level.

Figure 11
Percent of children meeting the fat guidelines



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages.

While caloric intakes of children varied substantially by age and gender, the share of calories from total and saturated fat was fairly consistent, differing by less than 1 percentage point for both total and saturated fat among the four age/gender groups (fig. 10). Children age 2-17 had an average of 34.2 and 13.1 percent of calories from total fat and saturated fat. About 22 percent of the children met the 30-percent guideline for total fat, and only 13 percent met the 10-percent guideline for saturated fat (fig. 11). Only 17 percent of male adolescents met the total-fat guideline (11 percent met the saturated-fat guideline), while 26 percent of preschoolers met the total-fat guideline (fig. 11).

The distributions of total fat and saturated fat intakes by meal/snack category and food source exhibited similar patterns among age/gender groups (table 2). For all children, evening meals provided the largest share of fat intakes, exceeding one-third of the total (37 percent for total fat and 36 percent for saturated fat) (table 2). Home foods accounted for 70 percent of total and saturated fat intakes. Among the four away-from-home food sources, schools provided the highest percentages of calories, total fat, and saturated fat. Among the four groups of children, female adolescents had the highest proportion of fat intakes (35 and 36 percent for total and saturated fat) from away-from-home sources mainly because they had the highest tendency to eat foods away from home.

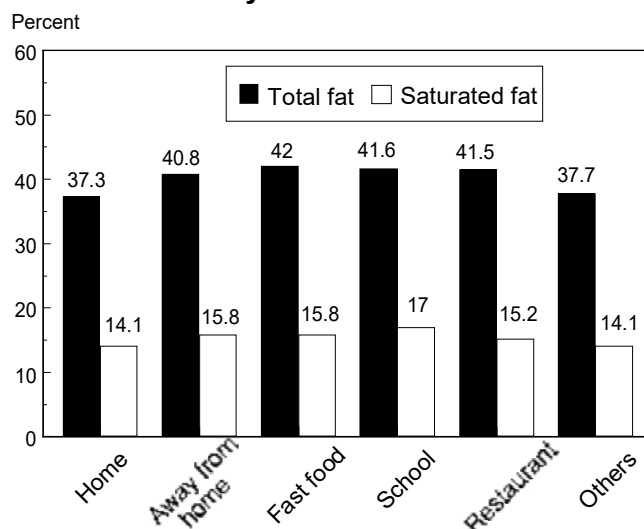
To compare the nutritional quality of meals and snacks eaten at different locations and occasions, we can examine their nutrient-to-calorie density (the amount of a nutrient per 1,000 calories (called nutrient density hereafter). Nutrient densities of foods by meal/snack category and source are reported in table 3. Because energy intake varies from person to person, average nutrient density in this study is weighted by the individual energy intake.

The distribution pattern of fat density across the four meal/snack categories is quite similar among the four groups of children. For all children, morning meals had the lowest total fat (32.3 grams per 1,000 calories) and saturated fat (13.4 grams per 1,000 calories) densities among the four meals and snacks. Among all children, midday meals had the highest total and saturated fat densities (41.5 grams of total fat and 15.6 grams of saturated fat per 1,000 calories), about 29 and 16 percent higher in total and saturated fat than morning meals. Evening meals had a slightly lower fat density (40.9 grams of total fat and 14.8 grams of saturated fat per 1,000 calories) than midday meals. Snacks had a fat density slightly higher than morning meals but much lower than midday and evening meals; however, snacks eaten by male adolescents had a fat density lower than the level in morning meals.

Home foods had a lower fat density (37.3 grams of total fat and 14.1 grams of saturated fat per 1,000 calories) than away-from-home foods (40.8 grams per 1,000 calories and 15.8 grams per 1,000 calories) (fig. 12). The higher fat density for away-from-home foods occurred across age and gender. This is an important finding for nutrition educators and policymakers because dining out is expected to continue its upward trend. Since 1994, the Nutrition Labeling and Education Act (NLEA) has required that virtually all packaged foods carry a standardized nutrition label. Foods sold in restaurants are not required to routinely carry nutrition information. However, if a restaurant item carries a health or nutrient claim (such as "low fat"), it is expected that the item meets FDA's definition of the claim (e.g., a low-fat meal should contain no more than 10 grams of fat). Moreover, if a claim is made, the restaurant must furnish nutrition information about the food to consumers, upon request. However, in most instances, less nutrition information is available to consumers when they eat out.

Figure 12

Total and saturated fat-to-calories density: at home and away from home



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages.

During the 1989-91 period, foods prepared at schools were higher in fat, fiber, and calcium and lower in cholesterol, iron, and sodium when compared with home foods. Similar results were obtained in a 1993 USDA-sponsored assessment of the nutrient quality of school meals. Consequently, USDA began working on an initiative to improve school meals in 1993. To show support for USDA, the Congress passed the Healthy Meals for Healthy Americans Act of 1994 (Public Law 103-448) requiring that meals served under the National School Lunch Program and School Breakfast Program meet the *Dietary Guidelines for Americans* by July 1, 1996. In June 1994, USDA launched the School Meals Initiative for Healthy Children, a comprehensive approach to turning Congress' mandate into a successful program. The Initiative includes both actions to support State and local food service organizations in improving school meals and a broad-based nutrition promotion program to increase the popularity of school meals and encourage children to improve their overall diets.

The fact that school meals and snacks were high in total and saturated fat has been recognized by the USDA. A USDA-sponsored assessment of the nutritional quality of school meals indicated that while school lunches provide one-third or more of the daily RDA for key nutrients, very few schools meet the dietary guidelines for total and saturated fat (Burghardt and others, 1993). Consequently, the Healthy Meals for Healthy Americans Act of 1994 (Public Law 103-448) requires that meals served

Table 3—Nutrient-to-calorie density of dietary components by meal/snack categories and food sources

Age/gender groups/ nutrient-to-calorie density ¹	Total fat	Saturated fat	Cholesterol	Sodium	Fiber	Calcium	Iron
Unit per 1,000 calories	<i>grams</i>	<i>grams</i>	<i>mg</i>	<i>mg</i>	<i>mg</i>	<i>mg</i>	<i>mg</i>
Children age 2-17							
Morning meals	32.3	13.4	188	1471	5.9	731	12.7
Midday meals	41.5	15.6	119	1774	7.1	502	5.7
Evening meals	40.9	14.8	139	1950	7.1	414	6.5
Snacks	34.7	13.9	71	997	5.5	437	4.5
Preschoolers							
Morning meals	32.1	13.6	204	1468	6.1	795	13.4
Midday meals	41.7	16.0	127	1858	6.8	540	5.8
Evening meals	40.0	14.9	143	1939	7.2	481	6.5
Snacks	34.4	14.7	75	891	5.6	520	4.7
Primary school children							
Morning meals	31.4	13.3	190	1476	6.0	749	13.0
Midday meals	40.9	15.4	111	1738	7.4	505	5.5
Evening meals	41.5	15.1	140	1916	7.0	437	6.3
Snacks	34.7	13.7	72	1001	5.4	395	4.3
Female adolescents							
Morning meals	32.7	13.5	179	1475	5.8	692	12.2
Midday meals	41.7	15.4	127	1774	6.7	474	5.9
Evening meals	39.9	14.1	135	1968	7.2	346	6.5
Snacks	36.0	13.5	69	1158	5.7	408	4.4
Male adolescents							
Morning meals	33.9	13.2	174	1464	5.5	654	11.7
Midday meals	42.5	15.7	122	1763	6.9	480	5.9
Evening meals	41.4	14.4	135	2007	7.1	373	6.6
Snacks	33.8	13.8	65	968	5.5	449	4.8
Children age 2-17							
Home foods	37.3	14.1	137	1687	6.7	521	7.8
Away from home ²	40.8	15.8	122	1574	6.4	469	5.6
Fast food	42.0	15.8	109	1584	5.7	372	5.5
Schools	41.6	17.0	124	1566	7.6	623	5.7
Restaurants	41.5	15.2	161	1736	6.1	393	5.9
Others	37.7	14.1	121	1514	5.5	374	5.4
Preschoolers							
Home foods	36.9	14.6	145	1644	6.6	600	7.9
Away from home ²	40.4	15.5	122	1580	6.3	471	6.0
Fast food	41.5	15.6	104	1536	5.7	356	5.5
Schools	39.5	16.4	127	1567	7.3	653	6.7
Restaurants	42.3	14.1	158	1890	5.8	349	5.6
Others	39.4	15.1	123	1533	6.0	444	5.8
Primary school children							
Home foods	37.2	14.1	137	1663	6.7	522	7.8
Away from home ²	40.6	15.9	117	1587	6.7	493	5.6
Fast food	42.8	16.0	110	1659	5.8	376	5.7
Schools	40.9	16.9	120	1573	7.9	644	5.6
Restaurants	42.9	15.6	135	1669	6.4	383	5.9
Others	36.2	14.0	115	1496	5.3	366	5.3
Female adolescents							
Home foods	37.4	13.8	135	1787	6.8	469	7.8
Away from home ²	41.0	15.5	122	1532	6.1	430	5.4
Fast food	41.3	15.5	104	1476	5.8	374	5.2
Schools	42.4	16.6	126	1559	7.2	563	5.5
Restaurants	40.3	15.2	179	1591	5.6	410	5.5
Others	39.0	14.3	123	1550	5.6	344	5.4
Male adolescents							
Home foods	37.9	13.7	129	1707	6.7	471	7.9
Away from home ²	41.4	16.1	130	1584	6.2	460	5.5
Fast food	41.7	15.9	116	1607	5.5	373	5.5
Schools	43.8	18.1	130	1555	7.2	609	5.3
Restaurants	40.0	15.5	185	1856	6.1	427	6.5
Others	37.5	13.4	128	1488	5.4	352	5.4

¹ Because energy intake varies from person to person, nutrient-to-calorie density is weighted by the individual energy intake in addition to the population weight.

² Away from home presents the aggregate of fast foods, schools, restaurants, and others.

Compiled by USDA/ERS from 1989-91 CSFII, 3-day averages weighted by population and individual energy intake.

under the National School Lunch Program and School Breakfast Program meet the *Dietary Guidelines for Americans*. USDA launched the School Meals Initiative for Healthy Children, a comprehensive approach to turning Congress's mandate into a successful program. The Initiative includes both actions to support State and local food service organizations in improving school meals and a broad-based nutrition promotion program to increase the popularity of school meals and encourage children to improve their overall diets. The Initiative represents the first programwide reform of the school meals program since it was established by President Truman in 1946.

In addition, USDA has intensified its efforts in improving children's diets. Under Team Nutrition, USDA intends to educate children to make healthy choices about food. Children are encouraged to eat a variety of foods; increase grain products, vegetables, and fruits in their diets; and lower fat intakes.

Cholesterol Intake

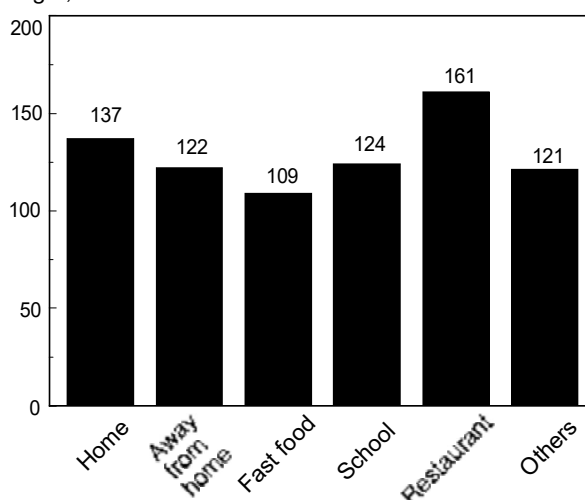
Dietary cholesterol is not a fat, but rather a fatlike substance that is found only in animal products. Too much cholesterol in the blood can accumulate in the walls of the blood vessels, which can reduce the flow of blood in major arteries and lead to heart attack. Most cholesterol in blood is manufactured by the body at a rate of 800 to 1,500 mg per day, compared with a 3-day average intake of 258 mg/day in American diets during 1989-91. There is no RDA for cholesterol. Many health authorities recommend a daily cholesterol intake of less than 300 mg, which is used as the Daily Reference Value (DRV) by the FDA. This DRV value does not vary across age/gender groups.

The 1989-91 CSFII data reveal that most children met the recommendation for cholesterol. Children age 2-17 had an average daily cholesterol intake of 236 mg, and 77 percent of them met the recommendation (table 1). Older children ate more and hence had higher cholesterol intakes. Preschoolers had an average cholesterol intake of 196 mg per day, and 86 percent of them met the recommendation. Cholesterol intake increased to 236 mg for primary school children (77 percent met the recommendation) and to 303 mg for male adolescents (64 percent met the recommendation).

Figure 13

Cholesterol-to-calories density: at home and away from home

mg/1,000 calories



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages.

The cholesterol densities in children's diets were 133 and 132 mg per 1,000 calories for females and males. Average REA's are 2,200 and 2,900 calories for female and male adults age 19-50. To meet the 300-mg guideline for cholesterol intake while consuming their average REA's, women age 19-50 should consume no more than 136 mg cholesterol per 1,000 calories and men age 19-50 no more than 103 mg cholesterol per 1,000 calories. Clearly, male children have a more urgent need to modify their eating habits as they grow older in order to meet the recommended cholesterol intake guideline during adulthood.

The cholesterol distribution mirrors the caloric distribution: the evening meal's share of cholesterol intake increased with age while the morning meal's share decreased with age (table 2). Older children ate out more often and hence obtained a higher proportion of calories and cholesterol away from home. Foods prepared at schools had the largest shares of calories and cholesterol intake among the four away-from-home sources.

For all children, morning meals had the highest cholesterol density (188 mg per 1,000 calories) among the four meal/snack categories. Evening meals had a cholesterol density of 139 mg per 1,000 calories and snacks only 71 mg per 1,000 calories (table 3).

Home foods had a higher cholesterol density (137 mg per 1,000 calories) than away-from-home foods (122 mg per 1,000 calories) (fig. 13). However, foods

prepared at restaurants with waiter/waitress services had the highest cholesterol density (161 mg per 1,000 calories) among all food sources, averaging 18 percent higher than home foods. Fast foods had a cholesterol density of 109 mg per 1,000 calories, about 80 percent of the level in home foods. School meals had a cholesterol density (124 mg per 1,000 calories) higher than fast foods but lower than home foods by about 10 percent.

The cholesterol density in morning meals, evening meals, and snacks tended to decrease with age. Cholesterol density in home foods also tended to decrease with age. Restaurant foods consumed by adolescents had a much higher cholesterol density than those consumed by younger children. Older children ate more and hence consumed more cholesterol, but the cholesterol density decreased with age, from 140 mg per 1,000 calories among preschoolers to 131 mg per 1,000 calories among primary school children to 130 mg per 1,000 calories among adolescents.

Sodium Intake

Most Americans consume more sodium than is needed. Epidemiological studies indicate a relationship between a high sodium intake and the occurrence of high blood pressure and stroke (USDHHS, 1988). Sodium estimates in CSFII include sodium occurring naturally in foods, added via food processing, and used in food preparation. They do not include sodium added at the table.

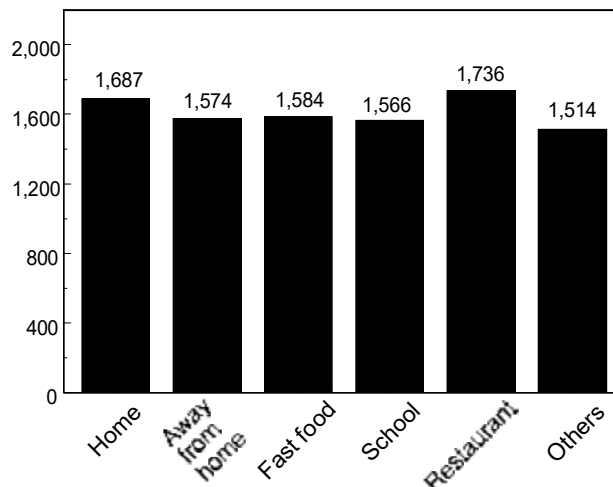
Children in the 1989-91 CSFII surveys consumed an average of 2,948 mg of sodium. The FDA's Daily Reference Value for sodium is 2,400 mg, a fixed amount regardless of age and gender. Daily sodium intakes increased with age, from 2,274 mg for preschoolers to 2,947 mg for primary school children to 3,926 mg among male adolescents (table 1). The percentage of children meeting the sodium recommendation decreased with age, declining from 60 percent among preschoolers to 10 percent among male adolescents.

The sodium densities were 169 and 164 mg per 1,000 calories for females and males age 2 to 17. To meet the 2,400-mg sodium recommendation while consuming their average REA's, women and men age 19 to 50 need to consume no more than 109 and 83 mg of sodium per 1,000 calories. Therefore, major

Figure 14

Sodium-to-calories density: at home and away from home

mg/1,000 calories



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages.

dietary changes have to occur as children grow up for them to meet the recommended limit on sodium intake as adults.

Among all children, evening meals accounted for 42 percent of sodium intake, followed by midday meals (32 percent) and morning meals (18 percent). Snacks accounted for 15 percent of calories and 9 percent of sodium intakes (table 3), indicating snacks eaten by children were quite low in sodium.

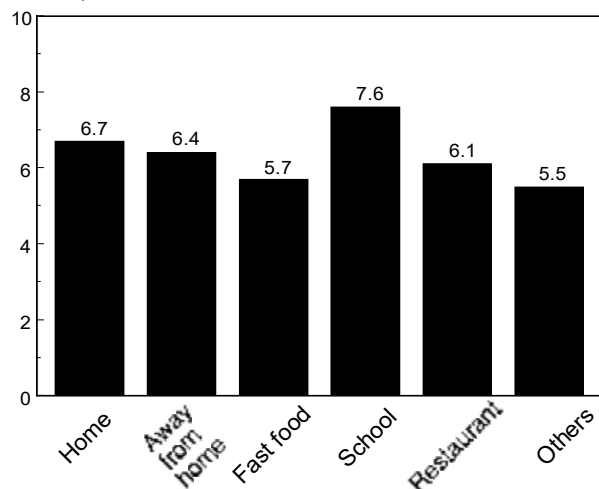
Sodium-to-calorie density pattern across the four meal/snack categories was similar among the four groups (table 3). Snacks contained the least amount of sodium per calorie (997 mg per 1,000 calories). Midday and evening meals were high in sodium density (1,774 and 1,950 mg per 1,000 calories). Home foods had a higher sodium density than away-from-home foods (1,687 mg per 1,000 calories vs. 1,574 mg per 1,000 calories), with the exception of restaurant foods (1,736 mg per 1,000 calories). The major source of sodium in children's diets comes from processed foods (Kennedy and Goldberg, 1995). Therefore, strategies to reduce sodium intake must involve not only meal preparers but also food manufacturers.

School meals had the largest share of sodium intake among the four away-from-home sources, but the sodium density in school meals (1,566 mg per 1,000 calories) was lower than the level in fast foods (1,584 mg per 1,000 calories) and restaurant foods (1,736 mg per 1,000 calories) (fig. 14).

Figure 15

Fiber-to-calories density: at home and away from home

Grams/1,000 calories



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages.

Fiber Intake

Dietary fiber has important health benefits in childhood, especially in promoting normal laxation. In addition, fiber may help reduce the risk of heart disease and some cancers. The National Cancer Institute recommends a daily intake of 20 to 30 grams with an upper limit of 35 grams per day. A new recommendation from the American Health Foundation proposes that a reasonable goal for dietary fiber intake during childhood and adolescence may be the child's age plus 5 grams per day—"age plus 5" (Williams, 1995). This "age plus 5" guideline levels out with 17-year-olds eating 22 grams/day, within the range recommended by the National Cancer Institute.

Despite intensive efforts by nutritionists, manufacturers, and others in the health care industry to promote the virtues of fiber, intakes remain below the recommended level. During 1989-1991, children consumed 11.8 grams of fiber per day, or 88 percent of the "age plus 5" recommendation (table 1). Fiber intake, both as a percentage of the "age plus 5" recommendation and as a percentage of children meeting the recommendation, decreased with age. More than half of preschoolers exceeded the "age plus 5" recommendation, with average intakes 8 percent above the recommendation. Primary school children had an average fiber intake of 12 grams per day, or 90 percent of the "age plus 5" recommendation, and 30 percent of them met the recommended level. Slightly more than 10 percent of female adolescents

met the "age plus 5" recommendation, with an average intake of 11.8 grams per day (61 percent of the recommended level).

For all children, morning meals and snacks contained 5.9 grams of fiber per 1,000 calories (table 3); midday and evening meals had the same fiber density of 7.1 grams.

The fiber density in home foods (6.7 grams per 1,000 calories) was higher than away-from-home foods (6.4 grams per 1,000 calories) as a whole (fig. 15). However, foods prepared at schools and day-care facilities had the highest fiber density (7.6 grams per 1,000 calories) among foods from all sources, averaging 113 percent of the level in home foods and 133 percent of the level in fast foods (5.7 grams per 1,000 calories). Adolescents tended to have a lower fiber density from school foods than did younger children. If eating out continues to increase in popularity, fiber intake in adolescents' and adults' diets could decrease.

Iron Intake

Iron deficiency has been shown to cause functional impairments in work performance, behavior, intellectual development, and resistance to infections. Health care experts have identified iron as a priority category for nutrition monitoring. Young children, adolescents, and women of childbearing age are considered to be at greatest risk of iron deficiency. The 1989 RDA's are 10 mg of iron per day for children age 1-10, 12 mg for males age 11-17, and 15 mg for females age 11-17.

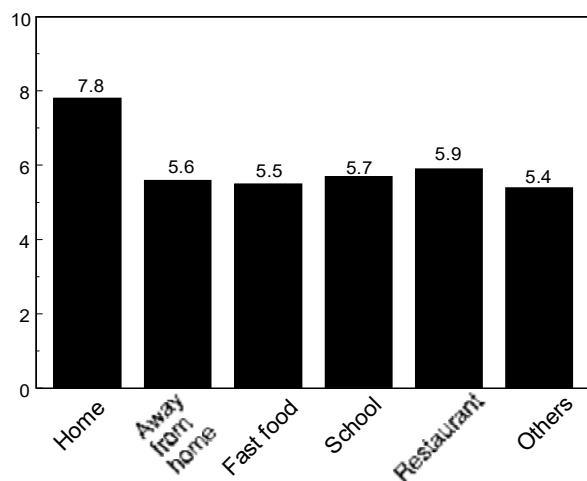
The 1989-91 CSFII data show that less than half of preschoolers met their iron recommendations (table 1). However, the majority of primary school children (64 percent) and male adolescents (71 percent) met their iron recommendations, and their average intakes exceeded their respective recommendations. Only 21 percent of female adolescents met their iron RDA, and their average intake fell below the RDA by 16 percent.

The RDA's are recommendations for usual intake. Nutrient intakes vary from day to day and a lower-than-recommended intake on a given day does not necessarily indicate a poor diet. Moreover, the RDA's are recommended allowances, not requirements—they are intentionally set high to cover the needs of almost everyone in a given age-sex group. Therefore, nutrient intakes below the RDA do

Figure 16

Iron-to-calories density: at home and away from home

Grams/1,000 calories



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages.

not necessarily mean that physiological nutrient deficiencies exist. Nevertheless, such a high prevalence of low intakes indicates a need for dietary guidance and improvement.

For all children, morning meals had the largest share (36 percent) of iron intakes (table 2). Because morning meals accounted for only 21 percent of calories, morning meals had an iron density (12.7 mg per 1,000 calories) far exceeding the levels in other meals and snacks (table 3). One reason for the high iron density in morning meals is the iron fortification of breakfast cereals.

Iron density in morning meals decreased with age, from 13.4 mg per 1,000 calories among preschoolers to 11.7 mg per 1,000 calories among female adolescents. Evening meals had the second highest iron density (6.5 mg per 1,000 calories), while iron density in midday meals and snacks reached only 45 and 35 percent of the level in morning meals.

Relatively high iron density in morning meals is correlated with relatively high iron density in home foods. Away-from-home foods had an iron density of 5.6 mg per 1,000 calories (fig. 16), about 72 percent of the level in home foods (7.8 mg per 1,000 calories). Female adolescents had the fewest meals and snacks, had the highest proportions of both meals and snacks from outside their home, had the highest tendency to skip morning meals, and had the highest

iron RDA among the four groups of children. Consequently, they were the only group of children with an average iron intake falling below the RDA.

Calcium Intake

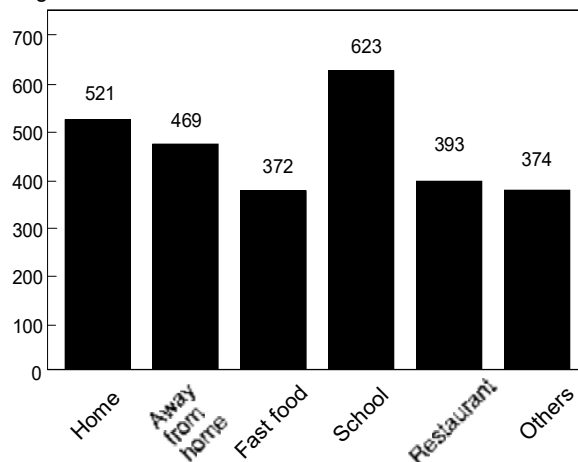
Calcium is essential in the formation of bones and teeth and in the maintenance of bone strength; it is also required for contraction of muscle, clotting of blood, and integrity of cell membranes. Low calcium intake is one of several factors associated with osteoporosis, a loss of bone mass that increases susceptibility to fractures (USDHHS/USDA, 1986). *The NIH Consensus Statement* on optimal calcium intake suggests that higher intakes of dietary calcium during adolescence and early adulthood could increase peak bone mass and delay the onset of bone fractures later in life (USDHHS, 1988). Thus, increased consumption of foods rich in calcium may be especially beneficial for adolescents and young women.

The 1989 daily calcium RDA's are 800 mg for children up to 10 years in age and 1,200 mg for older children. The CSFII data suggest that adolescents, in particular females, need to consume more calcium. Female adolescents had an average calcium intake of only 820 mg per day (68 percent of the RDA), and only 16 percent of them met the RDA (table 1). Male adolescents had a calcium intake of 1,103 mg per day (92 percent of the RDA), and 38 percent of them met the calcium recommendation. More than half of primary school children met their calcium

Figure 17

Calcium-to-calories density: at home and away from home

Mg/1,000 calories



Compiled by USDA/ERS from CSFII 1989-91, 3-day weighted averages.

recommendation, with an average intake of 923 mg per day (9 percent above their RDA). Slightly less than half of preschoolers met their calcium RDA, and their average intake just met the recommended 800 mg per day.

Among commonly eaten foods, milk and cheese are the richest sources of calcium. The CSFII data show that as children entered secondary school, they curtailed drinking milk as beverage from more than 11 cups in 3 days as primary school children to 6-9 cups. Other foods rich in calcium include dark-green leafy vegetables, certain canned fish (with soft bones), tofu (processed with calcium sulfate), and tortillas (made from lime-processed corn).

As with fiber, home foods were richer in calcium density (521 mg per 1,000 calories) than were away-from-home foods (469 mg per 1,000 calories) as a whole (fig. 17). However, meals and snacks prepared at schools had much higher calcium density (623 mg per 1,000 calories) than home foods. For example, school meals and snacks prepared for primary school children had a calcium density of 644 mg per 1,000 calories, 123 percent of the level in home foods and 171 percent of fast foods. Because of reduced milk drinking among older children, calcium density per calorie in school meals decreased with age.

Relatively high calcium density in home foods is related to relatively high calcium density in morning meals (731 mg per 1,000 calories) because of milk and cereals. For all children, midday meals had the second highest calcium density (502 mg per 1,000 calories), and evening meals the lowest (414 mg per 1,000 calories) (table 3).

While increased consumption of foods rich in calcium may be especially beneficial to adolescents and young women, female adolescents fared worst in meeting their calcium recommendation. The calcium density in the diet of female adolescents was 456 grams per 1,000 calories, which was 16 percent below the target of 545 grams (1,200 grams divided by the REA of 2,200 calories). Compared with other children, female adolescents drank the least amount of fluid milk, had the highest tendency to skip morning meals (which had the highest calcium density), and had the highest share of calories from fast-food places (which had a calcium density much lower than foods prepared at home, schools, or restaurants).

Weekday and Weekend

Nutritional quality of children's diets may vary according to the day of the week. As reported in table 3, school meals were relatively rich in fiber and calcium and relatively low in sodium. Therefore, the absence of school meals during weekends makes it likely that the nutritional quality of foods eaten by children during weekdays is better than foods eaten during weekends, at least for some dietary components. CSFII surveys were conducted throughout the year.

Slightly more than 70 percent of children's intake days in CSFII 1989-91 fell on weekdays (app. table 2). Children age 2-11 had a higher proportion of their intake days fall on weekdays than did older children. For all children, foods eaten during weekdays achieved 92, 100, and 117 percent of the daily recommended intakes for fiber, calcium, and iron as compared with 79, 90, and 106 percent during weekends. Daily cholesterol intake during weekdays averaged 75 percent of the recommended level, compared with 87 percent during weekends. Among all children, especially female adolescents, away-from-home shares of nutrient intakes were higher for all nutrients, except iron, during weekdays than weekends.

Household Characteristics

CSFII respondents also reported an array of social, economic, and demographic characteristics of their households. Diet quality, measured by average nutrient intake as a percentage of the recommended intake, and home/away-from-home share of nutrient intakes are tabulated according to household characteristics. Household characteristics analyzed include: household income (table 4), Food Stamp Program participation (table 5), household type (table 6), household size (table 7), meal planner's education (table 8), race and Hispanic origin (table 9), region (table 10), and urbanization of residence (table 11). The distributions of children with respect to their household characteristics are depicted in figure 2. The categorization of children by age, gender, and household characteristics inevitably leaves some classifications with small sample sizes. In this report, average intakes and away-from-home shares are not reported for those classifications representing 1 percent or less of all children included in this study. Readers need to exercise caution with other reported figures, especially when those represent a small percentage of all children.

Other factors are not held constant when we examine any one characteristic. For example, the relationship between Food Stamp Program participation and nutrient intakes that we report does not hold income constant. Thus, since households on food stamps are by definition low-income, the comparison of participants and nonparticipants includes effects of differences in income as well as other factors.

Household income expressed as a percentage of the poverty level is grouped into three ranges: below 131 percent of the poverty level (low income), between 131 and 300 percent (middle income), and greater than 300 percent (high income) (130 percent of the poverty level is the cutoff for Food Stamp Program eligibility). Household income appears to have rather minor influences on nutrient intakes expressed as a percentage of the recommended level. For all children, food energy, dietary fiber, calcium, and iron intakes as a percentage of their recommended levels increased somewhat with income, while total fat, saturated fat, and cholesterol intakes decreased. Away-from-home share of nutrient intakes was highest among children from middle-income households.

Thirteen percent of children age 2-17 in the CSFII surveys came from households receiving Food Stamps (table 5). When measured against the recommended levels, intakes of calories, total fat, saturated fat, cholesterol, dietary fiber, and sodium were higher while intakes of calcium and iron were lower among children living in Food Stamp participating households than other children. They also had a smaller percentage of their nutrient intakes away from home.

Nearly 80 percent of surveyed children lived in dual-headed households, 18 percent of children lived in households headed by a female only, and only 2 percent of children lived in households headed by a male only (table 6). Compared with other children, children living in male-headed households had higher intakes, in terms of a percentage of the recommended level, of calories, total fat, saturated fat, cholesterol, iron, and sodium. They also had the smallest share of intakes away from home. With the exception of primary school children, children living in dual-headed households had the largest share of nutrient intakes away from home.

Children living in households with two or three persons had a higher share of nutrient intakes away from home than children living in households with four or more people (table 7). Primary school

Table 4—Household income: nutrient intakes as percent of recommended levels and from away from home

Age/gender/energy/nutrient	Intake as percent of recommended level			Percent of total from away from home		
	Income as percentage of poverty level			Income as a percentage of poverty level		
	<131%	131-300%	>300%	<131%	131-300%	>300%
<i>Percent</i>						
Children age 2-17						
% of all children	25	36	39			
Food energy	86	89	89	25	30	27
Total fat	115	114	113	27	33	29
Saturated fat	132	131	129	27	33	29
Cholesterol	80	78	78	20	29	26
Dietary fiber	88	88	89	25	29	27
Calcium	91	98	99	25	29	24
Iron	107	116	117	21	23	21
Sodium	119	125	123	23	29	26
Preschoolers						
% of all children	8	9	10			
Food energy	89	90	95	16	21	24
Total fat	114	112	112	17	23	26
Saturated fat	135	133	137	16	23	24
Cholesterol	72	63	62	13	20	21
Dietary fiber	103	109	111	15	19	24
Calcium	93	102	104	14	18	18
Iron	101	104	107	13	15	20
Sodium	95	95	95	15	20	24
Primary school children						
% of all children	10	16	14			
Food energy	87	92	88	27	31	27
Total fat	115	115	113	28	34	28
Saturated fat	133	132	130	29	35	29
Cholesterol	81	78	78	22	31	22
Dietary fiber	90	91	90	28	31	27
Calcium	106	110	109	28	32	23
Iron	118	125	124	22	25	20
Sodium	122	127	119	25	31	26
Female adolescents						
% of all children	4	6	7			
Food energy	81	80	85	32	35	34
Total fat	116	114	113	34	37	35
Saturated fat	129	126	126	34	39	36
Cholesterol	82	77	77	26	33	34
Dietary fiber	61	61	61	30	33	32
Calcium	63	68	71	32	34	30
Iron	79	89	82	27	24	27
Sodium	129	126	128	30	31	30
Male adolescents						
% of all children	3	6	7			
Food energy	78	87	88	28	33	26
Total fat	114	118	113	30	35	28
Saturated fat	126	133	127	32	36	30
Cholesterol	97	103	102	24	33	28
Dietary fiber	78	76	81	27	31	25
Calcium	76	92	100	31	32	25
Iron	124	137	151	22	25	20
Sodium	128	153	166	25	30	26

Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

Table 5—Food Stamp Program participation: nutrient intakes as percent of recommended levels and from away from home

Age/gender/energy/nutrient	Intake as percent of recommended level		Percent of total from away from home	
	Food stamp		Food stamp	
	Receiving	Not receiving	Receiving	Not receiving
	<i>Percent</i>			
Children age 2-17				
% of all children	13	87		
Food energy	89	88	24	28
Total fat	115	114	25	30
Saturated fat	132	130	26	31
Cholesterol	81	78	20	27
Dietary fiber	94	87	24	27
Calcium	93	97	24	26
Iron	114	114	20	22
Sodium	124	123	22	27
Preschoolers				
% of all children	4	22		
Food energy	93	92	15	22
Total fat	114	112	16	23
Saturated fat	134	132	17	23
Cholesterol	74	64	13	19
Dietary fiber	107	108	15	21
Calcium	93	101	14	18
Iron	106	104	14	17
Sodium	99	94	14	21
Primary school children				
% of all children	5	35		
Food energy	94	89	28	29
Total fat	116	114	28	31
Saturated fat	133	131	30	32
Cholesterol	84	78	23	26
Dietary fiber	102	88	29	29
Calcium	108	109	28	27
Iron	131	121	22	22
Sodium	135	121	26	28
Female adolescents				
% of all children	2	15		
Food energy	81	82	31	34
Total fat	118	114	32	36
Saturated fat	132	126	32	37
Cholesterol	78	78	25	32
Dietary fiber	61	61	30	32
Calcium	63	69	33	32
Iron	77	84	28	26
Sodium	129	127	29	30
Male adolescents				
% of all children	2	15		
Food energy	77	87	23	29
Total fat	112	115	25	31
Saturated fat	124	129	27	33
Cholesterol	94	102	21	30
Dietary fiber	70	80	22	28
Calcium	71	94	26	29
Iron	116	143	18	22
Sodium	151	165	21	28

Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

Table 6—Household type: nutrient intakes as percent of recommended levels and from away from home

Age/gender/energy/nutrient	Intake as percent of recommended level			Percent of total from away from home		
	Household type			Household type		
	Single-headed			Single-headed		
	Dual-headed	Female	Male	Dual-headed	Female	Male
<i>Percent</i>						
Children age 2-17						
% of all children	79	18	2			
Food energy	88	87	92	28	29	21
Total fat	114	115	118	30	31	21
Saturated fat	130	130	138	30	32	20
Cholesterol	77	83	89	26	26	14
Dietary fiber	88	87	89	27	28	21
Calcium	99	89	95	26	28	19
Iron	113	116	140	22	23	15
Sodium	122	125	129	27	27	21
Preschoolers						
% of all children	22	4	1/			1/
Food energy	92	80		21	19	
Total fat	111	114		23	20	
Saturated fat	132	133		22	20	
Cholesterol	63	70		19	15	
Dietary fiber	110	102		20	20	
Calcium	102	88		17	16	
Iron	105	100		17	17	
Sodium	94	97		21	18	
Primary school children						
% of all children	32	7	1/			1/
Food energy	89	89		28	33	
Total fat	114	115		30	34	
Saturated fat	132	130		31	36	
Cholesterol	78	81		25	30	
Dietary fiber	90	91		28	35	
Calcium	111	99		27	33	
Iron	123	123		2227		
Sodium	123	122		27	31	
Female adolescents						
% of all children	13	4	1/			1/
Food energy	81	84		34	32	
Total fat	113	116		37	34	
Saturated fat	126	127		37	35	
Cholesterol	77	83		33	28	
Dietary fiber	60	66		33	28	
Calcium	68	68		32	31	
Iron	81	88		27	24	
Sodium	125	134		31	28	
Male adolescents						
% of all children	12	3	1/			1/
Food energy	86	84		30	27	
Total fat	115	114		31	30	
Saturated fat	128	128		33	32	
Cholesterol	101	104		30	29	
Dietary fiber	77	83		28	23	
Calcium	92	90		29	27	
Iron	135	152		23	19	
Sodium	165	159		28	26	

1/ The sample size is 1 percent or less of all children and the figures are not reported. Caution also needs to be exercised with those figures representing small percentages of all children.

Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

Table 7—Household size: nutrient intakes as percent of recommended levels and from away from home

Age/gender/ energy/nutrient	Intake as percent of recommended level					Percent of total from away from home				
	Household size					Household size				
	2	3	4	5	> 5	2	3	4	5	> 5
<i>Percent</i>										
Children age 2-17										
% of all children	5	19	34	24	18					
Food energy	88	86	88	91	87	35	30	27	26	28
Total fat	116	113	112	116	116	37	31	30	27	30
Saturated fat	133	129	129	131	134	36	32	30	28	30
Cholesterol	84	77	74	84	80	32	26	25	23	27
Dietary fiber	85	84	89	90	89	36	29	27	24	26
Calcium	83	90	98	102	98	30	28	25	24	27
Iron	118	113	115	111	116	28	25	21	20	19
Sodium	125	121	118	128	126	34	29	26	25	25
Preschoolers										
% of all children	1/	6	10	6	4	1/				
Food energy		92	92	90	90		29	20	16	17
Total fat		112	109	114	117		31	22	17	18
Saturated fat		131	128	133	143		31	22	17	17
Cholesterol		61	64	68	68		25	17	12	17
Dietary fiber		108	112	104	106		31	20	14	13
Calcium		91	102	102	109		26	17	13	13
Iron		101	110	98	107		28	15	12	11
Sodium		91	96	95	97		29	19	16	15
Primary school children										
% of all children	2	6	14	11	8					
Food energy	85	89	90	90	89	46	26	30	28	27
Total fat	116	115	113	115	116	47	27	32	29	29
Saturated fat	130	134	131	130	133	45	28	33	30	30
Cholesterol	73	79	75	83	79	43	23	27	25	24
Dietary fiber	91	84	87	92	98	50	25	31	26	27
Calcium	92	107	111	111	108	39	25	29	26	27
Iron	114	123	120	119	132	41	20	25	22	18
Sodium	115	119	119	124	132	44	24	30	27	25
Female adolescents										
% of all children	1/	3	5	4	3	1/				
Food energy		78	76	91	81		36	33	31	35
Total fat		111	113	117	114		38	36	32	38
Saturated fat		123	124	130	129		40	36	33	39
Cholesterol		77	64	85	86		32	33	27	38
Dietary fiber		54	58	72	60		34	33	28	32
Calcium		59	62	80	73		31	30	32	35
Iron		74	75	93	87		31	27	22	24
Sodium		121	117	145	128		33	30	27	31
Male adolescents										
% of all children	1/	5	5	3	3	1/				
Food energy		81	88	94	79		31	27	27	33
Total fat		113	116	119	114		32	29	28	36
Saturated fat		127	127	133	128		34	31	30	38
Cholesterol		92	102	118	98		28	28	28	34
Dietary fiber		77	81	84	70		28	25	26	31
Calcium		90	91	106	80		32	25	26	37
Iron		140	152	136	117		24	19	21	27
Sodium		159	164	179	154		30	25	26	30

1/ The sample size is 1 percent or less of all children and the figures are not reported. Caution also needs to be exercised with those figures representing small percentages of all children.

Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

Table 8—Education of children’s meal planners: nutrient intakes as percent of recommended levels and from away from home

Age/gender/ energy/nutrient	Intake as percent of recommended level				Percent of total from away from home			
	Education of children’s meal planners				Education of children’s meal planners			
	Less than high school	High school	Some college	College or more	Less than high school	High school	Some college	College or more
<i>Percent</i>								
Children age 2-17								
% of all children	18	34	25	22				
Food energy	86	88	89	89	25	28	28	28
Total fat	114	114	116	111	27	30	31	30
Saturated fat	132	131	131	127	27	31	31	31
Cholesterol	84	78	78	75	21	26	28	26
Dietary fiber	88	87	89	89	25	27	27	27
Calcium	89	96	103	98	24	26	27	25
Iron	116	111	117	115	19	23	21	21
Sodium	124	121	123	124	23	27	28	26
Preschoolers								
% of all children	5	9	7	6				
Food energy	89	93	92	92	16	22	18	24
Total fat	114	110	116	110	16	24	19	27
Saturated fat	135	130	137	129	16	24	18	26
Cholesterol	72	64	67	58	13	20	15	22
Dietary fiber	106	111	102	112	15	20	17	26
Calcium	93	96	107	105	13	19	15	18
Iron	111	102	104	105	11	18	14	20
Sodium	98	93	95	94	13	21	18	25
Primary school children								
% of all children	7	14	11	8				
Food energy	93	89	89	89	27	28	29	31
Total fat	115	116	116	109	28	29	32	33
Saturated fat	134	133	131	127	28	30	33	35
Cholesterol	88	81	75	70	22	24	29	27
Dietary fiber	100	88	92	85	28	28	28	31
Calcium	108	109	113	104	27	27	29	28
Iron	137	122	122	113	20	22	23	24
Sodium	133	124	121	114	26	26	30	30
Female adolescents								
% of all children	4	5	4	3				
Food energy	77	82	83	86	28	37	37	31
Total fat	115	112	116	113	30	39	39	33
Saturated fat	129	126	127	125	30	39	41	34
Cholesterol	82	72	79	80	24	35	34	32
Dietary fiber	55	58	65	71	28	36	34	26
Calcium	61	69	72	73	26	35	34	30
Iron	79	83	87	89	21	30	27	23
Sodium	124	125	126	137	24	35	33	27
Male adolescents								
% of all children	2	6	3	5				
Food energy	80	83	91	87	30	29	30	25
Total fat	111	117	115	115	32	31	33	26
Saturated fat	123	134	127	127	33	32	35	29
Cholesterol	98	99	112	97	26	29	35	23
Dietary fiber	79	74	83	81	28	28	28	23
Calcium	75	90	101	95	33	27	31	25
Iron	128	126	161	147	24	24	21	19
Sodium	155	156	179	166	28	28	29	23

Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

Table 9—Race and Hispanic origin: nutrient intakes as percent of recommended levels and from away from home

	Intake as percent of recommended level				Percent of total from away from home			
	Non-Hispanic				Non-Hispanic			
Age/gender/energy/nutrient	White	Black	Others	Hispanic	White	Black	Others	Hispanic
	Percent							
Children age 2-17								
% of all children	72	16	2	10	7			
Food energy	89	87	90	84	28	28	24	29
Total fat	114	118	107	111	30	29	26	28
Saturated fat	130	133	121	131	31	30	26	21
Cholesterol	77	81	87	85	27	24	19	26
Dietary fiber	89	83	108	83	27	29	23	23
Calcium	101	83	94	91	26	29	22	22
Iron	117	106	127	103	21	23	19	26
Sodium	124	127	126	111	27	26	23	2
Preschoolers								
% of all children	20	3	1/	3			1/	3
Food energy	94	89		82	22	19		14
Total fat	112	120		111	24	19		13
Saturated fat	131	141		137	24	18		1
Cholesterol	63	67		73	21	15		80
Dietary fiber	111	92		98	21	21		1
Calcium	104	80		95	18	16		9
Iron	108	92		93	18	16		91
Sodium	96	95		83	22	18		1
Primary school children								
% of all children	28	6	1/	5			1/	9
Food energy	90	92		85	28	29		21
Total fat	114	120		108	30	31		30
Saturated fat	131	138		129	31	31		31
Cholesterol	76	84		82	26	26		29
Dietary fiber	90	94		83	28	31		25
Calcium	112	102		100	27	30		24
Iron	124	120		112	21	24		29
Sodium	122	134		109	27	28		2
Female adolescents								
% of all children	11	4	1/	2			1/	2
Food energy	81	82		88	34	34		33
Total fat	114	113		118	37	36		33
Saturated fat	129	119		135	37	37		38
Cholesterol	75	77		103	34	28		23
Dietary fiber	59	64		66	31	35		32
Calcium	72	60		70	31	37		31
Iron	84	83		83	26	25		30
Sodium	124	133		136	31	29		3
Male adolescents								
% of all children	13	2	1/	1/			1/	1/
Food energy	87	77			29	27		
Total fat	115	119			31	27		
Saturated fat	129	131			33	29		
Cholesterol	101	105			31	20		
Dietary fiber	80	69			28	25		
Calcium	96	74			29	28		
Iron	142	125			23	20		
Sodium	168	145			28	23		

1/ The sample size is 1 percent or less of all children and the figures are not reported.
 Caution also needs to be exercised with those figures representing small percentages of all children.
 Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

Table 10—Region: nutrient intakes as percent of recommended levels and from away from home

Energy/nutrient	Intake as percent of recommended level				Percent of total from away from home			
	Northeast	Midwest	South	West	Northeast	Midwest	South	West
	<i>Percent</i>							
Children age 2-17								
% of all children	19	25	36	21				
Food energy	92	88	89	85	26	24	33	25
Total fat	113	115	115	112	28	25	35	27
Saturated fat	132	132	130	128	28	26	36	27
Cholesterol	77	73	81	82	24	22	31	21
Dietary fiber	88	90	85	92	25	23	34	22
Calcium	100	102	91	98	23	22	33	21
Iron	119	118	110	112	21	17	27	18
Sodium	127	123	126	114	25	22	32	24
Preschoolers								
% of all children	5	6	9	6				
Food energy	95	93	90	89	18	19	27	16
Total fat	117	111	113	110	19	20	29	17
Saturated fat	143	131	129	130	18	19	29	17
Cholesterol	69	60	63	70	17	18	25	10
Dietary fiber	103	110	107	113	19	16	28	13
Calcium	108	105	91	100	13	16	24	12
Iron	103	113	99	104	16	12	24	11
Sodium	96	96	96	91	18	17	27	15
Primary school children								
% of all children	7	11	14	9				
Food energy	92	91	91	84	29	24	35	24
Total fat	111	116	116	112	31	25	37	26
Saturated fat	130	133	132	130	32	26	38	26
Cholesterol	72	77	83	80	28	22	31	20
Dietary fiber	90	93	87	92	29	25	36	22
Calcium	109	114	104	110	29	22	35	21
Iron	124	127	122	117	24	18	28	18
Sodium	126	128	123	114	30	22	34	23
Female adolescents								
% of all children	3	3	8	3				
Food energy	83	78	84	78	31	28	36	35
Total fat	113	116	114	114	33	29	39	37
Saturated fat	123	132	125	127	34	30	39	38
Cholesterol	74	65	82	86	29	28	36	26
Dietary fiber	68	60	59	61	30	25	35	30
Calcium	71	72	68	64	28	25	36	32
Iron	88	85	80	87	24	19	31	24
Sodium	133	122	131	118	27	25	33	31
Male adolescents								
% of all children	4	4	5	3				
Food energy	87	82	87	87	26	26	32	31
Total fat	111	116	120	111	27	29	33	32
Saturated fat	125	132	132	122	29	30	36	34
Cholesterol	102	87	108	109	25	26	31	34
Dietary fiber	80	73	80	84	23	25	32	27
Calcium	95	90	92	92	24	24	36	28
Iron	156	128	139	140	19	19	25	24
Sodium	172	149	174	155	24	25	30	29

Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

Table 11—Urbanization: nutrient intakes as percent of recommended levels and from away from home

Age/gender/energy/nutrient	Intake as percent of recommended level			Percent of total from away from home		
	Central cities	Suburban	Nonmetropolitan	Central cities	Suburban	Nonmetropolitan
<i>Percent</i>						
Children age 2-17						
% of all children	29	47	24			
Food energy	87	88	91	25	28	31
Total fat	115	113	115	27	30	34
Saturated fat	130	131	130	28	30	34
Cholesterol	76	78	84	22	25	30
Dietary fiber	86	88	92	24	28	29
Calcium	92	101	95	24	24	31
Iron	114	114	114	19	22	24
Sodium	119	122	130	24	27	29
Preschoolers						
% of all children	8	13	6			
Food energy	89	93	94	19	20	24
Total fat	115	111	113	20	21	27
Saturated fat	133	132	133	20	20	26
Cholesterol	68	63	67	15	17	24
Dietary fiber	102	104	115	17	21	21
Calcium	91	108	94	16	15	23
Iron	102	104	108	14	18	16
Sodium	91	97	95	18	20	22
Primary school children						
% of all children	12	18	10			
Food energy	88	88	94	28	29	29
Total fat	115	114	115	30	31	31
Saturated fat	131	132	131	30	32	31
Cholesterol	75	77	86	25	26	27
Dietary fiber	88	88	97	29	29	28
Calcium	104	112	109	27	27	29
Iron	127	120	123	22	23	22
Sodium	120	119	134	28	28	27
Female adolescents						
% of all children	5	8	4			
Food energy	78	82	86	31	31	40
Total fat	113	115	116	33	33	43
Saturated fat	125	127	129	34	34	43
Cholesterol	72	79	84	29	30	37
Dietary fiber	59	63	60	30	30	38
Calcium	65	68	72	33	28	36
Iron	77	85	89	25	24	31
Sodium	125	126	134	28	29	36
Male adolescents						
% of all children	4	8	4			
Food energy	87	86	85	20	31	34
Total fat	117	114	115	21	32	37
Saturated fat	130	128	128	24	34	38
Cholesterol	101	100	104	22	28	37
Dietary fiber	81	77	81	18	30	31
Calcium	90	96	87	21	28	37
Iron	144	145	128	15	23	26
Sodium	166	163	161	19	29	31

Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

children living in households with only two persons had the largest share of nutrients away from home among all groups of children, but they accounted for only 2 percent of all children included in this study.

Education of children's meal planners is grouped into four categories: less than high school (18 percent), high school (34 percent), some college (25 percent), and college or more (22 percent). The percentage of nutrients from away-from-home sources was lowest among children, especially preschoolers and female adolescents, whose meal planners had not completed high school (table 8).

Preschoolers and primary school children whose meal planners had completed college had the highest percentage of nutrient intakes away from home. College-educated individuals tend to have higher income and are more likely to be employed than less educated people, both strong determinants of away-from-home dining. However, adolescents whose meal planners had completed college had a relatively small share of their nutrient intakes away from home. Compared with other children, children whose meal planners had completed college had lower levels of total fat, saturated fat, and cholesterol intakes when measured against the recommended intakes.

Race and Hispanic origin are classified into four groups: Hispanic (10 percent), non-Hispanic White (72 percent), non-Hispanic Black (16 percent), and others (2 percent). Children of "other" race/origin had a smaller share of nutrient intakes away from home (table 9). Away-from-home share of nutrient intakes increased with age among non-Hispanic White and non-Hispanic Black children. Non-Hispanic White children had a higher calcium intake than children of "other" race/origin, who generally had relatively high intakes of fiber, iron, and cholesterol, and relatively low fat intakes.

Children living in the South had the largest share of their nutrient intakes away from home (table 10). Adolescents living in the West also had a high percentage of nutrient intakes away from home. Compared with other adolescents, adolescents living in the Midwest tended to have a lower level of cholesterol and those living in the West tended to have a higher level of cholesterol. Male adolescents living in the Northeast and South had relatively high sodium intakes compared with other children.

Almost half (47 percent) of all children in the analysis lived in suburban areas, 29 percent lived in central cities, and 24 percent lived in nonmetropolitan areas (table 11). Children living in nonmetropolitan areas had a higher percentage of caloric and nutrient intakes away from home than did other children. For example, male adolescents living in nonmetropolitan areas had 34 percent of total calories and 37 percent of fat intake away from home, compared with 20 percent of total calories and 21 percent of fat intake away from home among male adolescents living in central cities and suburban areas. These results are caused partly by the fact that the ratio of surveyed days being on weekdays to surveyed days being on weekends is higher for adolescents living in nonmetropolitan areas than for those living in central cities and suburban areas. During weekdays, children, especially female adolescents, had a higher percentage of caloric and nutrient intakes away from home than at home (app. table 2).

Diet and Health Knowledge of Meal Planners

In the CSFII surveys, meal planners were contacted with a followup Diet and Health Knowledge Survey (DHKS) in which they responded to an array of questions related to diet, nutrition, and health. Children's nutrient intakes, expressed as a percentage of the recommended level, are tabulated according to their meal planners' DHKS responses, including the frequency in comparing nutrient contents of different brands of the same food, awareness of health problems related to nutrient intakes, and perceived importance of dietary advice.

Household meal planners were asked how often (always, sometimes, rarely, or never) they compare the nutrients—such as protein, fat, or vitamins—for different brands of the same food. Forty-four percent of children came from households whose meal planners sometimes compared nutrient contents, 24 percent of children's meal planners rarely compared, 19 percent never compared, and 13 percent always compared (app. table 3). On average, children whose meal planners never compared nutrient contents generally had relatively high intakes of total fat, saturated fat, cholesterol, and sodium and relatively low intakes of dietary fiber, calcium, and iron. These results suggest that nutrition labeling may have the desired influence on at-home food selections for people who read them.

Household meal planners were asked whether they had heard about any health problems related to intakes of fat, saturated fat, fiber, sodium, calcium, cholesterol, iron, and overweight. On average, 79, 64, and 88 percent of children came from households in which meal planners had heard about health problems related to fat, saturated fat, and cholesterol (app. table 4). Children's intakes of total fat, saturated fat, and cholesterol, expressed as a percentage of the recommended level, did not appear to correlate to their meal planners' awareness of health problems related to fat, saturated fat, or cholesterol intakes.

Slightly over half of the children's meal planners had heard about health problems related to fiber and iron intakes. School-age children whose meal planners had heard about health problems related to fiber and iron intakes had slightly higher intakes of fiber and iron than other children. Almost two-thirds of children came from households in which meal planners had heard about health problems related to calcium intake and these children, except female adolescents, had a higher calcium intake than other children. An overwhelming majority of meal planners had heard about health problems related to sodium intake and overweight. Adolescents whose meal planners had heard about health problems related to sodium intake actually had a higher sodium intake than other adolescents.

Meal planners' perceived importance of dietary advice was classified into three categories: not important (numerical responses of 1 or 2), somewhat important (3 or 4), and very important (5 or 6). Over half of children came from households in which meal planners considered it very important to avoid too much salt (or to use salt in moderation) (60 percent), eat foods with adequate fiber (or choose a diet with adequate fiber) (62 percent), avoid too much fat (or choose a diet low in fat) (60 percent), avoid too much saturated fat (or choose a diet low in saturated fat) (65 percent), and avoid too much cholesterol (or choose a diet low in cholesterol) (67 percent) (app. table 5).

Among children age 2-11, sodium intakes, as a percentage of the recommended level, increased with their meal planners' perceived importance in avoiding too much salt. In fact, male adolescents whose meal planners considered it unimportant to avoid too much salt had sodium intakes only 140 percent of the recommended level, compared with 179 and 163 percent for male adolescents whose meal planners considered it somewhat and very important. It is plausible that meal planners for children with high

sodium intakes recognized the importance of avoiding too much salt but were unable to reduce their children's intakes.

Generally, children's fiber intake appears to correspond to their meal planners' perceived importance in eating foods rich in fiber. However, about 7 percent of meal planners for female adolescents considered it unimportant to eat foods with adequate fiber and these children's fiber intake was 71 percent of the recommended level, compared with 59-60 percent by other female adolescents.

Children's intake of total fat and saturated fat, as a percentage of the recommended level, did not appear to correlate with their meal planners' perceived importance in avoiding too much fat and saturated fat. As with sodium, children's cholesterol intakes increased with their meal planners' perceived importance in avoiding too much cholesterol.

Improving children's diets is predicated on two basic challenges: increasing intakes of some nutrients and food components like fiber, calcium, and iron; and limiting others like fat, saturated fat, cholesterol, and sodium. Results indicate that general knowledge, such as awareness of diet-health relationships and motivation (the "importance" variables), is useful for increasing intakes of "underconsumed" food components but ineffective in limiting intake of "overconsumed" components. Label reading, on the other hand, does seem to be associated with decreased intake of the "overconsumed" as well as increased intake of the "underconsumed." These conclusions are tentative, given that other factors such as the meal planners' education are not controlled in this analysis. Nevertheless, the findings do offer some insight into the particular value that label reading may have for diet improvement. It is relatively easy to learn and incorporate good sources of some desired nutrients (for example, whole grains have fiber and milk has calcium) and include them in the meal planner's and his/her children's diets, as long as the meal planner is aware and motivated. But fat and sodium are in a wide range of food products, and it may require more knowledge of food composition to successfully limit them. Furthermore, fat and sodium play important roles in determining the taste and/or texture of foods, requiring not only knowledge but also discipline.

Conclusions

American diets have a long way to go before reaching generally accepted recommendations to reduce total fat, saturated fat, and sodium and to increase complex carbohydrates and fiber. Additionally, iron and calcium have been identified as problem nutrients for some age and gender groups. Some people believe that nutritional guidance should start early in life for the greatest long-term health impacts. Dietary improvement requires great effort and progress comes only gradually.

Dining out is on an upward trend for the young and old alike. There is some concern that this trend will lessen our control over what we and our children eat, how it is prepared, and subsequently, the nutrient quality of our diets.

Data from USDA's 1989-91 Continuing Survey of Food Intakes by Individuals and the companion Diet and Health Knowledge Survey provided the basis for this report. The major findings of this study are:

- Children's diets were high in total fat, saturated fat, and sodium and low in food energy and fiber. The share of calories from total fat and saturated fat was fairly consistent among children across age and gender, averaging 34 percent for total fat and 13 percent for saturated fat, which are 4 and 3 percentage points above the recommended levels. Children consumed an average of 2,948 milligrams of sodium per day (excluding salt added at the table), which is 23 percent above the recommended 2,400 milligrams by some health authorities. Since fat and sodium are key ingredients in determining the taste and/or texture of foods, reducing fat and sodium intake in American diets requires great effort.
- Female adolescents' diets were high in total fat, saturated fat, and sodium. In addition, only a small fraction of female adolescents met the recommended intakes for calcium, dietary fiber, and iron. The National Academy of Sciences recommends a relatively high allowance of calcium for teenage girls—1,200 mg per day—because peak bone mass develops during the teenage and young adult period.
- The shortcomings in the female adolescents' diets may be related to their eating patterns. Compared with other children, female teens had the highest tendency to skip morning meals (high in iron and calcium), ate the fewest meals and snacks, had the

largest proportion of meals and snacks away from home (low in fiber, iron, and calcium), and drank the least fluid milk.

- Compared with home foods, higher levels of total fat and saturated fat and lower levels of cholesterol, dietary fiber, calcium, iron, and sodium were found in away-from-home foods eaten by children.
- During the 1989-91 period, foods prepared at schools were higher in fat, fiber, and calcium and lower in cholesterol, iron, and sodium when compared with home foods. Similar results were obtained in a 1993 USDA-sponsored assessment of the nutrient quality of school meals. Consequently, USDA began working on an initiative to improve school meals in 1993. To show support for USDA, the Congress passed the Healthy Meals for Healthy Americans Act of 1994 (Public Law 103-448) requiring that meals served under the National School Lunch Program and School Breakfast Program meet the *Dietary Guidelines for Americans* by July 1, 1996. In June 1994, USDA launched the School Meals Initiative for Healthy Children, a comprehensive approach to turning Congress' mandate into a successful program. The Initiative includes both actions to support State and local food service organizations in improving school meals and a broad-based nutrition promotion program to increase the popularity of school meals and encourage children to improve their overall diets.

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Appendix table 1—Meal and snack eating patterns of children

Eating occasion	Unit	Children age 2-17	Preschool children	Primary school children	Female adolescents	Male adolescents
<i>Number of eating occasions per day or percent of eating occasions</i>						
Meals	Number	2.7	2.8	2.8	2.5	2.6
At home	Percent	75	82	74	70	73
Away from home	Percent	25	18	26	30	27
Snacks	Number	1.1	1.3	1.0	1.0	1.1
At home	Percent	83	85	85	78	82
Away from home	Percent	17	15	15	22	18
Meals and snacks	Number	3.8	4.1	3.8	3.5	3.7
At home	Number	3.0	3.4	2.9	2.5	2.8
Away from home	Number	0.9	0.7	0.9	1.0	0.9
At home	Percent	77	83	76	72	75
Away from home	Percent	23	17	24	28	25
<i>Percent of away-from-home eating occasions</i>						
Away from home meals						
Fast-food ¹		33	42	30	31	32
Schools ²		35	18	43	36	40
Restaurants ³		10	12	8	12	11
Others ⁴		22	29	20	22	17
Away from home snacks						
Fast-food ¹		21	12	21	28	27
Schools ²		19	40	12	11	8
Restaurants ³		3	1	2	3	6
Others ⁴		58	47	65	58	59

¹ Include self-service restaurants, carry out, and cafeteria.

² Include schools, day-care centers, and summer camps.

³ Include restaurants with waiter or waitress service.

⁴ Include vending machines, stores, recreation/entertainment places, community feeding programs, someone's home, others.

Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

Appendix table 2—Day of the week: nutrient intakes as percent of recommended levels and from away from home

Age/gender/ energy/nutrient	Intake as percent of recommended level		Percent of total from away from home	
	Weekday	Weekend	Weekday	Weekend
<i>Percent</i>				
Children age 2-17				
% of intake days	71	29		
Food energy	89	86	28	27
Total fat	113	113	30	28
Saturated fat	130	128	31	28
Cholesterol	75	87	27	24
Dietary fiber	92	79	28	25
Calcium	100	90	28	21
Iron	117	106	22	22
Sodium	123	123	27	26
Preschoolers				
% of intake days	19	7		
Food energy	93	88	22	18
Total fat	111	112	23	20
Saturated fat	132	131	23	19
Cholesterol	64	69	19	15
Dietary fiber	112	97	21	18
Calcium	103	93	19	12
Iron	109	91	17	15
Sodium	95	94	21	18
Primary school children				
% of intake days	28	12		
Food energy	91	85	29	28
Total fat	114	114	31	29
Saturated fat	131	130	32	29
Cholesterol	75	86	27	22
Dietary fiber	96	76	29	27
Calcium	113	99	30	21
Iron	128	110	22	24
Sodium	126	115	28	28
Female adolescents				
% of intake days	12	5		
Food energy	82	82	36	29
Total fat	113	112	38	31
Saturated fat	126	121	39	31
Cholesterol	74	87	34	27
Dietary fiber	61	62	34	26
Calcium	69	66	35	25
Iron	83	86	27	23
Sodium	125	132	32	27
Male adolescents				
% of intake days	115			
Food energy	85	88	29	29
Total fat	114	115	31	30
Saturated fat	128	127	33	31
Cholesterol	95	114	28	31
Dietary fiber	80	76	27	26
Calcium	94	87	30	25
Iron	140	140	21	23
Sodium	159	173	27	27

Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

Appendix table 3—Comparing nutritional contents of different brands: nutrient intakes as percent of recommended levels and from away from home

Age/gender/energy/nutrient	Intake as percent of recommended level				Percent of total from away from home			
	Nutrition comparison of different brands							
	Always	Sometimes	Rarely	Never	Always	Sometimes	Rarely	Never
	<i>Percent</i>							
Children age 2-17								
% of all children	13	44	24	19				
Food energy	89	89	87	89	25	29	26	30
Total fat	110	114	113	117	28	31	27	32
Saturated fat	126	130	131	133	29	31	27	33
Cholesterol	82	75	79	83	24	27	21	31
Dietary fiber	99	89	87	81	24	28	28	29
Calcium	102	97	101	90	24	26	25	29
Iron	119	117	109	115	18	22	22	23
Sodium	124	124	118	128	25	27	26	28
Preschoolers								
% of all children	4	11	7	4				
Food energy	91	91	94	95	22	23	20	23
Total fat	108	112	112	120	24	24	21	25
Saturated fat	122	132	133	142	24	24	20	24
Cholesterol	64	60	72	65	19	19	17	26
Dietary fiber	119	111	105	102	22	22	18	22
Calcium	100	101	106	96	19	19	16	19
Iron	116	103	105	102	17	18	16	18
Sodium	97	94	94	99	26	22	19	20
Primary school children								
% of all children	6	17	11	7				
Food energy	94	90	90	86	27	30	25	32
Total fat	110	115	115	114	30	32	25	34
Saturated fat	128	132	134	129	31	32	26	35
Cholesterol	84	75	82	76	24	28	20	31
Dietary fiber	105	91	90	80	26	30	29	31
Calcium	117	109	116	95	26	29	26	29
Iron	124	126	118	123	20	23	22	23
Sodium	133	123	123	118	24	29	25	30
Female adolescents								
% of all children	2	8	3	5				
Food energy	73	83	75	85	28	34	36	35
Total fat	118	111	110	118	30	36	37	38
Saturated fat	131	123	123	131	30	36	37	39
Cholesterol	71	78	61	90	25	33	30	33
Dietary fiber	60	61	56	60	24	31	36	32
Calcium	62	71	58	71	29	29	35	36
Iron	73	86	71	90	23	25	29	27
Sodium	117	131	110	136	27	30	34	30
Male adolescents								
% of all children	2	8	4	3				
Food energy	82	86	77	95	24	29	32	28
Total fat	109	116	112	120	29	30	33	29
Saturated fat	124	131	127	129	31	31	34	32
Cholesterol	113	92	94	115	29	28	27	33
Dietary fiber	80	80	69	87	19	26	33	27
Calcium	97	92	82	98	24	27	31	31
Iron	147	144	121	147	15	22	26	23
Sodium	151	163	153	182	23	27	30	27

Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

Appendix table 4—Awareness of health problem related to nutrient intake: nutrient intakes as percent of recommended levels and from away from home

Meal planner's diet/health knowledge/ Children's nutrient intake	Children age 2-17	Preschoolers	Primary schoolchildren	Female adolescents	Male adolescents
	<i>Percent</i>				
Problem related to fat intake					
Percent of children's meal planners					
Not aware of the problem	21	23	22	20	18
Aware of the problem	79	77	78	80	82
Fat intake: percent of recommendation					
Not aware of the problem	114	113	115	113	115
Aware of the problem	114	112	113	118	116
Problem related to saturated fat intake					
Percent of children's meal planners					
Not aware of the problem	36	36	36	41	31
Aware of the problem	64	64	64	58	69
Sat. fat intake: percent of recommendation					
Not aware of the problem	131	135	130	124	133
Aware of the problem	130	131	132	128	127
Problem related to cholesterol intake					
Percent of children's meal planners					
Not aware of the problem	12	14	15	8	11
Aware of the problem	88	89	85	92	89
Cholesterol intake: percent of recommendation					
Not aware of the problem	78	68	81	74	91
Aware of the problem	78	64	78	79	101
Problem related to fiber intake					
Percent of children's meal planners					
Not aware of the problem	46	48	46	46	42
Aware of the problem	54	52	54	54	58
Fiber intake: percent of recommendation					
Not aware of the problem	86	112	86	59	71
Aware of the problem	90	106	95	60	80
Problem related to iron intake					
Percent of children's meal planners					
Not aware of the problem	45	42	49	42	43
Aware of the problem	55	58	51	58	57
Iron intake: percent of RDA					
Not aware of the problem	114	107	123	81	133
Aware of the problem	115	104	123	85	145
Problem related to calcium intake					
Percent of children's meal planners					
Not aware of the problem	35	36	38	36	28
Aware of the problem	65	64	62	64	72
Calcium intake: percent of RDA					
Not aware of the problem	94	97	105	68	89
Aware of the problem	98	103	111	68	93
Problem related to sodium intake					
Percent of children's meal planners					
Not aware of the problem	11	13	11	10	10
Aware of the problem	89	87	89	90	90
Sodium intake: percent of recommendation					
Not aware of the problem	120	98	125	119	154
Aware of the problem	124	95	123	129	164
Problem related to overweight					
Percent of children's meal planners					
Not aware of the problem	9	10	10	7	6
Aware of the problem	91	90	91	93	94
Energy intake: percent of REA					
Not aware of the problem	88	95	87	78	87
Aware of the problem	88	92	90	82	85

Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.

Appendix table 5—Children's meal planner's perceived importance of food/nutrient advice: nutrient intakes as percent of recommended levels and from away from home

Meal planner's perception/ Children's nutrient intake	Children age 2-17	Preschoolers	Primary school children	Female adolescents	Male adolescents
<i>Percent</i>					
Importance in avoiding too much salt					
Percent of meal planners perceived					
Not important ¹	13	12	14	15	14
Somewhat important ¹	27	29	27	26	22
Very important ¹	60	60	59	59	65
Sodium intake: percent of recommendation					
Not important ¹	118	87	118	137	140
Somewhat important ¹	122	95	120	128	179
Very important ¹	125	97	126	126	163
Importance in eating food with adequate fiber					
Percent of meal planners perceived					
Not important ¹	7	6	9	7	6
Somewhat important ¹	30	33	29	26	32
Very important ¹	62	61	62	67	62
Fiber intake: percent of recommendation					
Not important ¹	84	102	86	71	63
Somewhat important ¹	86	105	90	60	69
Very important ¹	90	112	92	59	85
Importance in avoiding too much fat					
Percent of meal planners perceived					
Not important ¹	13	10	15	17	12
Somewhat important ¹	27	27	27	26	26
Very important ¹	60	62	59	57	62
Fat intake: percent of recommendation					
Not important ¹	112	112	109	114	118
Somewhat important ¹	110	110	117	115	119
Very important ¹	114	114	114	113	113
Importance in avoiding too much saturated fat					
Percent of meal planners perceived					
Not important ¹	8	8	8	10	7
Somewhat important ¹	27	28	28	28	22
Very important ¹	65	64	64	62	71
Sat. fat intake: percent of recommendation					
Not important ¹	130	135	122	136	130
Somewhat important ¹	130	128	132	124	135
Very important ¹	131	134	132	126	127
Importance in avoiding too much cholesterol					
Percent of meal planners perceived					
Not important ¹	10	8	10	12	8
Somewhat important ¹	23	25	23	25	19
Very important ¹	67	67	67	63	72
Cholesterol intake: percent of recommendation					
Not important ¹	71	60	74	71	81
Somewhat important ¹	76	59	73	91	99
Very important ¹	80	67	81	75	102

¹The three classifications are derived from responses ranging from 1 to 6 with 1 being not important at all and 6 being very important. The item "very important" includes responses of 5 and 6, "somewhat important" includes responses of 3 and 4, and "not important" includes 1 and 2. Compiled by USDA/ERS from 1989-91 CSFII, 3-day weighted averages.