Chapter 12

Nutrient Contribution of Food Away From Home

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The increased popularity of dining out has raised some concerns about its impact on diet quality. Between 1977-78 and 1994-95, away-from-home foods showed smaller nutritional improvements than foods at home. Away-from-home foods generally contain more of the nutrients overconsumed and less of the nutrients underconsumed in the United States. Since there is no expectation that the trend toward increased eating out will reverse itself, nutrition policy, education, and promotion strategies are needed that focus on improving the nutritional quality of food away from home and consumers' food choices when eating away from home.

Introduction

Over the past decades, one of the most noticeable changes in eating habits of Americans has been the increased popularity of dining out. In 1970, the food-away-from-home sector captured about a quarter of total food spending. In 1995, about 40 percent of the food budget was spent on food away from home (fig. 1). A number of factors contribute to the increasing trend in dining out, including a growing number of working women, more two-earner households, higher incomes, more fast-food outlets making eating out affordable and convenient, increased advertising and promotion by large foodservice chains, and smaller families (Nayga and Capps, 1994).

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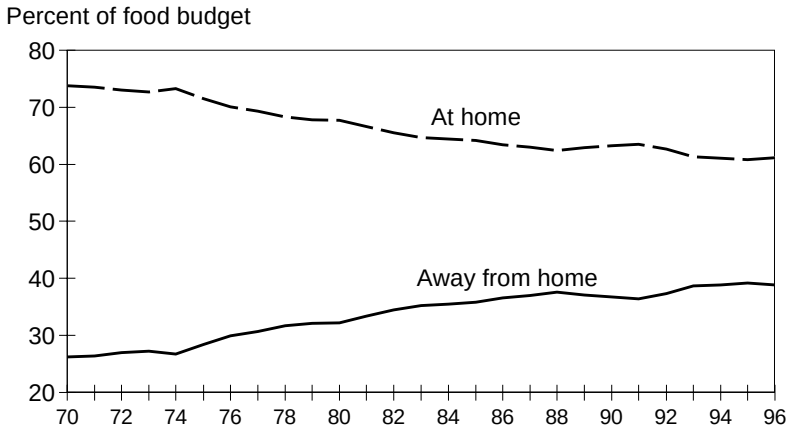
Figure 1

Percent of food budget spent at home and away from home, 1970-96



Source: Putnam and Allshouse, 1996.

The increased volume of food obtained away from home may adversely affect the nutritional quality of the diet. For example, Lin and others (1996) showed that away-from-home foods consumed by children were higher in fat and saturated fat and lower in fiber and calcium than home foods. Similarly, the nonprofit consumer advocacy group Center for Science in the Public Interest (CSPI) has called attention to the high fat, saturated fat, and sodium contents of many menu items in popular restaurants.

The social, demographic, and economic factors that have favored dining out are expected to continue boosting the away-from-home share of the food budget. Consequently, the increased popularity in dining out may represent a barrier to meeting dietary recommendations for fat, saturated fat, sodium, and other nutrients.

We analyzed food intake survey data collected over the past two decades to compare the nutritional qualities of home- and away-from-home foods and how they have changed over time. This historical comparison shows how dining out is likely to influence specific dietary components. We focus on the nutrients that are considered of current public health concern: excessive intakes of total fat, saturated fat, cholesterol, and sodium, and low intakes of fiber, calcium, and iron (IBNMRR, 1995).

The Data: 1977-95

The U.S. Department of Agriculture (USDA) has conducted household food consumption surveys in the United States since the 1930's. In spring 1965, USDA also began collecting national information on the dietary intakes of individual household members. USDA conducted two decennial Nationwide Food Consumption Surveys (NFCS) in 1977-78 and 1987-88. In 1985, USDA initiated the Continuing Survey of Food Intakes by Individuals (CSFII) for relatively small national samples in years between the decennial surveys. During 1989-91, USDA conducted three separate 1-year surveys of individual food intakes. These CSFII surveys drew year-round, national representative samples to describe food consumption behavior and to assess the nutritional content of American diets. Most recently, USDA conducted another three separate 1-year CSFII surveys for 1994-96.

Data from seven year-round, nationwide surveys of individual food intakes are used in this study: NFCS 1977-78, NFCS 1987-88, CSFII 1989, CSFII 1990, CSFII 1991, CSFII 1994, and CSFII 1995. The 1965 data were not included because they were conducted for the spring only, and surveyed only housekeeping households—households with at least 1 person having 10 or more meals from the household food supply during a 7-day period. The CSFII 1985-86 data were excluded because they did not include all age/gender groups. The CSFII 1996 was in progress when this study was underway.

The first five surveys, prior to CSFII 1994, collected dietary intakes for 3 consecutive days—a 1-day recall and a 2-day record. The 1994-96 CSFII collected 2 nonconsecutive days of dietary intake recalls. Self-reported dietary intake surveys, such as NFCS and CSFII, are subject to underreporting, and the degree of underreporting worsens with the number of days in the survey. Also, the method of collecting information—recall vs. record—can have an effect on the information obtained. To maximize comparability of data collected across the seven surveys, and to minimize the underreporting bias, only the first day of dietary recalls from each of the seven surveys were included in the analysis.

The surveys collected information on what and how much individuals eat and where the food was obtained. Because the *Dietary Guidelines for Americans* are not aimed at individuals under age 2,

those individuals are excluded from this analysis. Pregnant and lactating women are also excluded from the analysis because their dietary needs differ considerably from the rest of the population. Although only the first day's intake was used in the analysis, individuals with incomplete dietary intake data (that is, less than 3 days of dietary intake data in the first five surveys and less than 2 days of data in the CSFII 1994-95) are also excluded to avoid any biases that may exist between those who completed and those who only partially completed the survey.

We define home and away-from-home foods based on where the foods are obtained, not where they are eaten. Food at home consists of foods purchased at a retail store, such as a grocery store, a convenience store, or a supermarket. Food away from home consists of foods obtained at various places other than retail stores (mainly foodservice establishments). Both food at home and food away from home can be eaten at home or away from home (except for food reported in 1977-78, when respondents only reported where the food was eaten. Because take-out was not very frequent in those days, most of the food obtained away from home was likely consumed at the place of purchase).

This definition differs from the definition used by the Agricultural Research Service (ARS), which defines any food consumed at home (for example, a pizza delivered to the home) as food at home (Borrud and others, 1996). Our 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. Although retail stores offer an increasing proportion of ready-to-eat foods (such as roast chicken and frozen entrees), much is still used as ingredients in meal preparation, and the consumer has some control over the nutritional quality of meals and snacks prepared at home. Away-from-home foods are typically ready-to-eat and consumed "as is," and the consumer has less control over and less knowledge of their nutritional content.

In response to the dynamic structure of the U.S. foodservice industry over the past two decades, categories of away-from-home foods were modified from survey to survey, making it impossible to have a consistent definition of away-from-home food sources for the seven surveys. In this study, sources of away-from-home foods are grouped into five categories: fast-food places, schools, restaurants, other public places, and others. Fast-food places include self-service restau-

rants and carryout places; schools—a separate category for children age 2-17—include day-care centers and summer camps; restaurants are those with waiter and waitress service; other public eating places include cafeterias, residential dining facilities, bars, taverns, lounges, soup kitchens, shelters, meals-on-wheels, and other community food programs; and others, a catchall category, include vending machines, gifts, and food eaten at someone else's home. Meals and snacks consisting of a combination of away-from-home and home foods are classified according to the component that contributes the most calories to that particular eating occasion.

Meal and Snack Eating Patterns

Over the past two decades, the number of meals consumed has remained fairly stable at 2.6 to 2.7 per day (table 1). However, snacking has increased, from less than once a day in 1987-88 to 1.6 times per day in 1995. The increased popularity in dining out is evident as the proportion of meals away from home increased from 16 percent in 1977-78 to 29 percent in 1995, and the proportion of snacks away from home rose from 17 percent in 1977-78 to 22 percent in 1995. Overall, eating occasions (meals and snacks) away from home increased by more than two-thirds over the past two decades, from 16 percent of all eating occasions in 1977-78 to 27 percent in 1995.

The increasing frequency of away-from-home eating occasions translates into a greater proportion of each nutrient's total intake being obtained from the away-from-home sector (table 2). For example, away-from-home eating occasions provided 38 percent of total fat intake in 1995, double the 19 percent it provided in 1977-78. Similarly, away-from-home eating occasions contributed 29 percent of total calcium intake and 27 percent of total iron intake in 1995, compared with 17 and 16 percent, respectively, in 1977-78. Thus, the nutritional quality of food away from home becomes increasingly important in determining the overall nutritional quality of diets in the United States.

Table 1—Meal/snack eating patterns of Americans 2 and over

Item	1977-78	1987-88	1989	1990	1991	1994	1995
				Number			
Meals/day	2.7	2.6	2.6	2.6	2.6	2.7	2.6
Snacks/day	1.1	0.9	1.2	1.2	1.4	1.5	1.6
				Percent			
Meals:							
At home	84	76	76	77	73	72	71
Away from home[1]	16	24	24	23	27	28	29
Snacks:							
At home	83	80	80	82	82	79	78
Away from home[1]	17	20	20	18	18	21	22
All eating occasions:							
At home	84	77	77	78	76	74	73
Away from home[1]	16	23	23	22	24	26	27
Restaurant	2	4	4	4	4	6	5
Fast food	3	7	7	7	7	8	9
School[2]	3	2	2	2	3	2	2
Other public	3	2	2	2	2	2	2
Others	6	8	8	7	8	8	9

[1] Away from home presents the aggregate of fast foods, restaurants, schools, other public places, and others.

[2] Schools are classified as a separate category for children only; for adults, they are included in the "others" category.

Source: Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, first-day intake data.

Nutritional Quality of Home and Away-from-Home Foods

We compare the nutritional quality of eating occasions from various locations using the nutrient-to-calorie density (nutrient density), which measures the amount of a nutrient or food component for each 1,000 calories provided by the eating occasion. However, because dietary recommendations for fat and saturated fat are expressed in terms of total calories consumed, we use the proportion of calories from fat and from saturated fat as measures of nutrient density.

For each nutrient or food component we also devised a "benchmark" density. Obtained by dividing the recommendation for a given nutri-

Table 2—Contribution of away-from-home foods, selected nutrients and food components, 1977-95

Item	1977-78	1987-88	1989	1990	1991	1994	1995
				Percent			
Calories:							
At home	82	73	73	74	71	69	66
Away from home[1]	18	27	27	26	29	31	34
Total fat:							
At home	81	72	71	72	68	65	62
Away from home[1]	19	28	29	28	32	35	38
Saturated fat:							
At home	na	72	71	72	69	67	63
Away from home[1]	na	28	29	28	31	33	37
Cholesterol:							
At home	na	74	75	75	70	68	66
Away from home[1]	na	26	25	25	30	32	34
Sodium:							
At home	na	73	74	74	70	68	66
Away from home[1]	na	27	26	26	30	32	34
Fiber:							
At home	na	78	77	78	75	74	73
Away from home[1]	na	22	23	22	25	26	27
Calcium:							
At home	83	77	77	78	75	74	71
Away from home[1]	17	23	23	22	25	26	29
Iron:							
At home	84	78	78	79	75	74	73
Away from home[1]	16	22	22	21	25	26	27

na = Not available.

[1] Away from home presents the aggregate of fast foods, restaurants, schools, other public places, and others.

[2] Schools are classified as a separate category for children only; for adults, they are included in the "others" category.

Source: Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, first-day intake data.

Table 3—Recommended daily intakes of dietary components

Gender/ age	Calories[1]	Fat[2]	Satur. fat[2]	Choles- erol[3]	Sodium[3]	Fiber[4]	Calcium[1]	Iron[1]
	Kcal	*--Percent--*		*----Mg----*		*Grams*	*----Mg----*	
All:								
2-3	1,300	< 30	< 10	300	2,400	Age + 5	800	10
4-6	1,800	< 30	< 10	300	2,400	"	800	10
7-10	2,000	< 30	< 10	300	2,400	"	800	10
Males:								
11-14	2,500	< 30	< 10	300	2,400	"	1,200	12
15-18	3,000	< 30	< 10	300	2,400	"	1,200	12
19-20	2,900	< 30	< 10	300	2,400	"	1,200	10
21-24	2,900	< 30	< 10	300	2,400	33	1,200	10
25-50	2,900	< 30	< 10	300	2,400	33	800	10
51+	2,300	< 30	< 10	300	2,400	26	800	10
Females:								
11-14	2,200	< 30	< 10	300	2,400	Age + 5	1,200	15
15-18	2,000	< 30	< 10	300	2,400	"	1,200	15
19-20	2,000	< 30	< 10	300	2,400	"	1,200	15
21-24	2,000	< 30	< 10	300	2,400	23	1,200	15
25-50	2,000	< 30	< 10	300	2,400	23	800	15
51+	1,900	< 30	< 10	300	2,400	22	800	10

[1] National Research Council, *Recommended Dietary Allowances*, 1989b.

[2] U.S. Department of Agriculture and U.S. Department of Health and Human Services, 1995.

[3] National Research Council, *Diet and Health*, 1989a.

[4] American Health Foundation for "age plus 5" per day for children 2-20 (Williams, 1995); FDA's Daily Value for 11.5 grams/1,000 kcal for all others (Saltos and others, 1994).

ent or food component by an individual's reported caloric intake in 1,000 calories, the benchmark density represents the nutrient density an individual's diet would have to attain to meet the dietary recommendation at the individual's caloric intake level.[1] When an individual consumes an excessive (insufficient) amount of a nutrient, the benchmark density of the nutrient will be lower (higher) than the nutrient density. Dietary recommendations of the *Dietary Guidelines for Americans* and other health authorities are summarized in table 3.

[1] For fat and saturated fat, the benchmark density is constant at 30 percent of calories from fat and 10 percent of calories from saturated fat.

We calculate benchmark densities for specific groups of individuals by summing the recommended intakes for all individuals in the group and dividing by the sum of those individuals' reported caloric intakes. Because caloric intakes vary over time, benchmark densities also vary from year to year. Since nutrient densities are based on caloric intake, food calories are discussed first.

Caloric Intake

Caloric intake is subject to underreporting (Mertz and others, 1991; Briefel and others, 1995). Therefore, caloric and nutrient intake estimates from dietary recall surveys such as the NFCS and CSFII represent a lower limit of actual intakes. Also, changes in methodology of conducting dietary recall interviews have been made (most notably in the 1994-96 CSFII) to improve the completeness of reporting. Therefore, some of the reported increases in caloric and nutrient intakes over time may be due to changes in survey methodology.

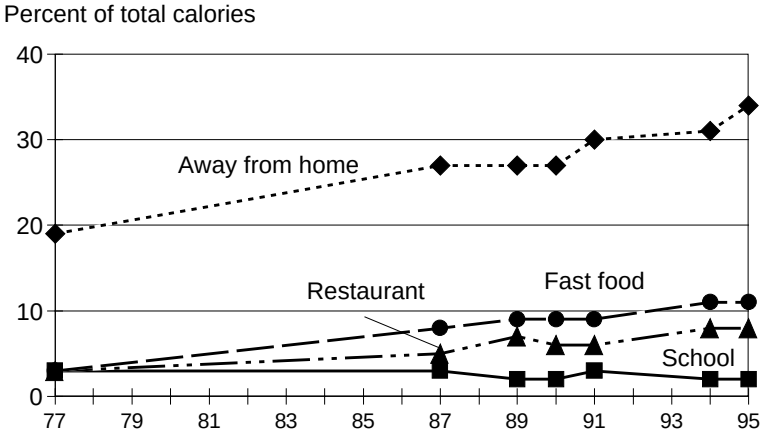
Average caloric intake declined from 1,876 calories per person per day in 1977-78 to 1,807 calories per person per day in 1987-88, then rose steadily to 2,043 calories per person per day in 1995 (see appendix table). The proportion of individuals age 2 and older who consume the recommended energy allowance (REA) or more rose from 22 percent in 1987-88 to 31 percent in 1995.

Although caloric intakes for most individuals fall below the average REA, overweight has become more prevalent. More than one in three adults (35 percent) in the United States were considered to be overweight in 1988-94, compared with one in four adults in 1976-80 (Centers for Disease Control and Prevention, 1997). Because overweight is associated with many chronic diseases and adverse health outcomes, the increased prevalence of overweight is a cause for public health concern. Decreased physical activity and hence decreased energy expenditure may also be a contributor to overweight (McPherson and others, 1995).

Some of the observed increase in caloric intake may be associated with the increase in eating out. The food-away-from-home sector contributed to 16 percent of all eating occasions in 1977-78 (table 1), and accounted for 19 percent of total caloric intake (table 2). In 1995, the away-from-home sector accounted for 27 percent of all eating occasions and 34 percent of total food energy consumption.

Figure 2

Proportion of total calories obtained away from home on the rise, 1977-95



Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day

These numbers suggest that, when eating out, people either eat more or eat higher-calorie foods—or both. Further, this tendency appears to be intensifying, since each percent of eating occasions away from home provided an average of 1.26 percent of total calories in 1995, up from 1.19 percent in 1977-78.

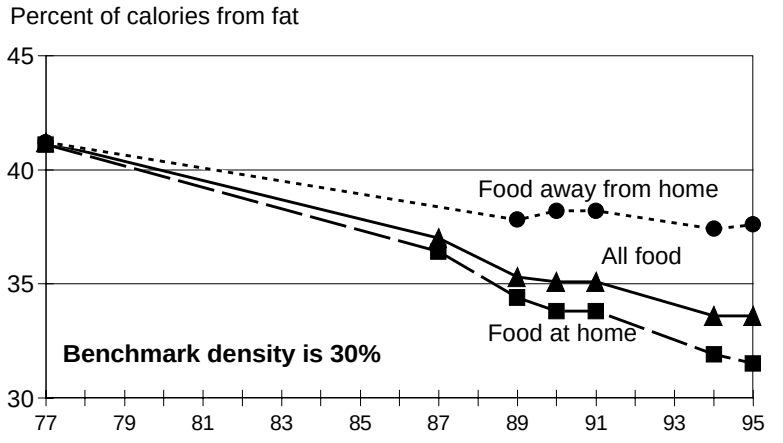
Consistent with the increasing share of eating occasions from fast-food places and restaurants over the past two decades, the proportion of total calories consumed from these locations has also risen (fig. 2). Whereas fast-food places and restaurants each accounted for 3 percent of total caloric intake in 1977-78, their shares of total calories increased to 12 percent and 8 percent, respectively, in 1995. The share of total caloric intake from schools has remained stable over the past two decades, at 2-3 percent.

Fat and Saturated Fat

According to the *Dietary Guidelines for Americans*, fat intake should be limited to no more than 30 percent of total calories and saturated fat should account for less than 10 percent of total calories. These

Figure 3

Away-from-home foods show smaller improvements in fat density than food at home, 1977-95



Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day.

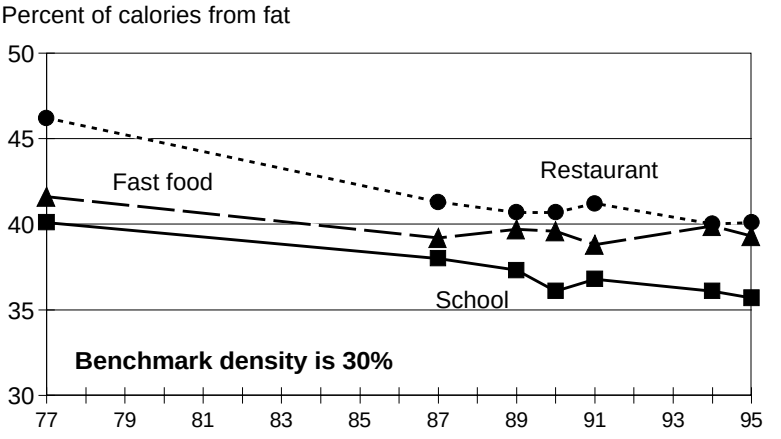
recommendations represent the benchmark densities for fat and saturated fat.

Over the past two decades, Americans have made appreciable progress in reducing the fat density in the foods they consume.[2] Fat provided an average of 33.6 percent of total calories in both 1994 and 1995, considerably less than the 41.2 percent of total calories in 1977-78—albeit still higher than the recommended 30-percent limit (fig. 3). Although fat density declined for both home and away-from-home foods, Americans have been more successful in reducing the fat density in home foods than in away-from-home foods. In 1977-78, both home and away-from-home foods provided slightly more than 41 percent of their calories from fat. By 1987-88, the fat density of home foods had declined to 36.4 percent of total calories from fat, compared with 38.7 for away-from-home foods. Since then, the fat density of home foods declined steadily to 31.5 percent

[2] However, the total grams of fat consumed per person per day has steadily increased since 1989 (see appendix table).

Figure 4

Fat density of away-from-home food sources has declined slowly but steadily, 1977-95



Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day

of calories from fat, but declined only slightly to 37.6 percent of calories from fat for away-from-home foods.

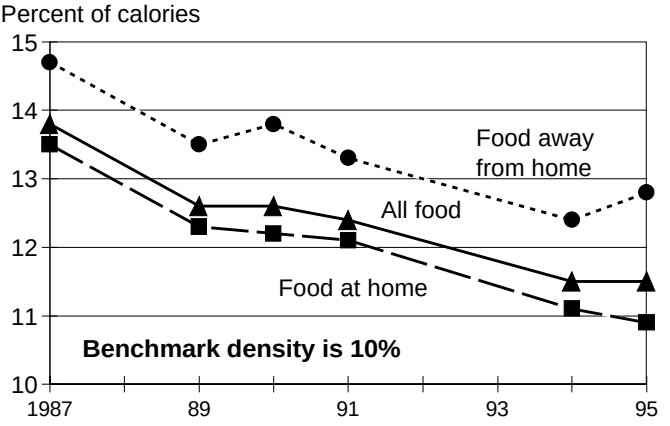
Restaurant foods had a considerably higher fat density than either fast foods or school foods in 1977-78, with fat providing over 46 percent of calories (fig. 4). Although the fat density of restaurant foods declined to 40.1 percent of calories in 1995, this was still higher than the fat densities of fast foods or school foods. Fast foods also experienced a considerable decline in fat density between 1977-78 and 1987-88, but the density has fluctuated slightly below 40 percent of total calories since 1987-88. The fat density in school foods has declined steadily from 40.1 percent in 1977-78 to 35.7 percent in 1995.

As with fat, the saturated fat density of American diets has also declined steadily since 1987-88 (when it was first measured) (fig. 5).[3] Home foods have typically had lower saturated fat density than away-from-home foods, and both experienced similar declines in the

[3] However, intake of total grams of saturated fat per person per day has been fairly stable since 1990 (see appendix table).

Figure 5

Home foods have lower saturated fat density than away-from-home foods, 1987-95



Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day.

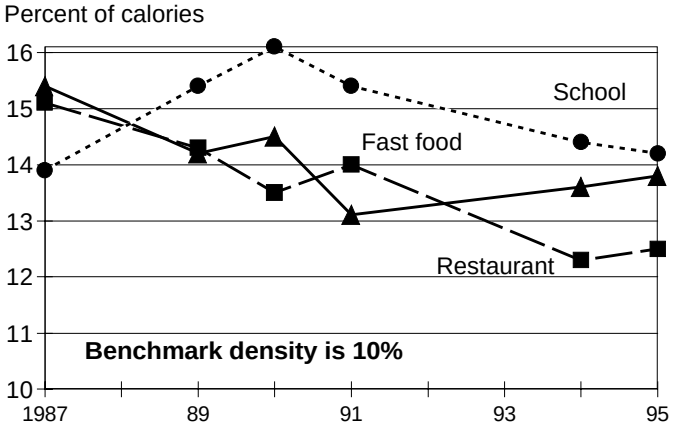
proportion of calories from saturated fat until 1994. Between 1994 and 1995, the saturated fat density of home foods continued to decline but that of away-from-home foods rose from 12.4 to 12.8 percent of calories from saturated fat.

In 1987-88, restaurant and fast foods had similar saturated fat densities, higher than school foods (fig. 6). Between 1987-88 and 1989, the saturated fat density of both restaurant foods and fast foods declined sharply. The saturated fat density of restaurant foods continued to decline in the mid-1990's, while the saturated fat density in fast foods rose. The saturated fat density in school foods rose from 13.9 percent of total calories in 1987-88 to 16.1 percent in 1990, then declined steadily to 14.2 percent of total calories in 1995, higher than the saturated fat density of both restaurant foods and fast foods.

Overall, the fat and saturated fat densities of both home and away-from-home foods have been declining, although the away-from-home sector has shown less improvement. With the increasingly important role of the away-from-home sector in the overall diet, the fat and saturated fat densities of away-from-home foods will be a key to consumers' progress in reducing their fat and saturated fat intake.

Figure 6

Away-from-home food sources show erratic decline in saturated fat density, 1987-95



Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day.

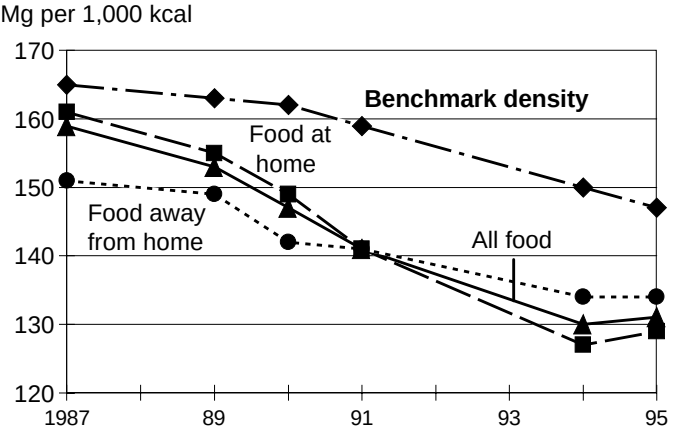
Cholesterol

Many health authorities recommend that daily cholesterol intake not exceed 300 milligrams (mg), regardless of age, gender, or overall caloric intake (National Research Council, 1989). Because average caloric intake has increased since 1987-88, the benchmark cholesterol density has declined since then (fig. 7).

Average cholesterol intake has been declining since 1987-88, when the cholesterol content of Americans' diets was first measured, from 286 mg to 268 mg in 1995. Between 1987-88 and 1990, the cholesterol density of home foods was actually higher than that of away-from-home foods. However, the relationship reversed after 1991, indicating that consumers have been more successful in reducing the cholesterol in home foods than in away-from-home foods. Nevertheless, cholesterol densities in both home and away-from-home foods have declined markedly during the past decade. Although restaurant foods have a higher cholesterol density than fast food and school foods, all three have experienced an overall downward trend (fig. 8).

Figure 7

Cholesterol density of all foods has declined in the past decade, 1987-95

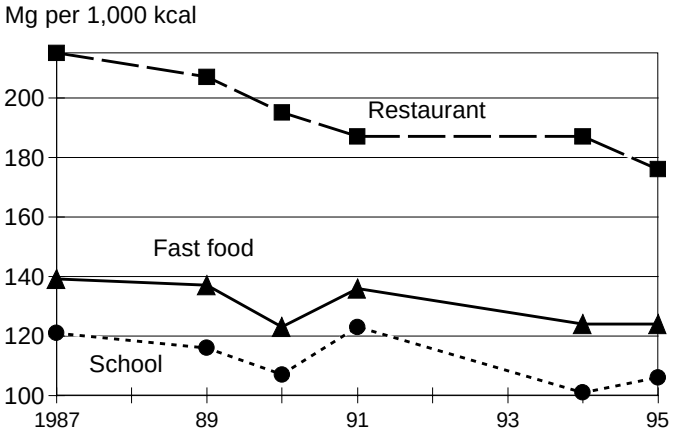


Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day.

Average cholesterol density has been below the benchmark density since 1987-88, indicating that average cholesterol intake was below the recommended limit of 300 mg per day. Sixty-six percent of individuals age 2 and older met the cholesterol guideline in 1987-88; by 1990, 70 percent did so, with little change after that. However, those who exceed the limit of 300 mg of cholesterol per day are concentrated in certain age/gender groups—namely adolescent boys and adult men. Adolescent boys and adult men tend to eat more than others, yet they face the same recommended cholesterol intake as others. Consequently, less than one in every six males age 12-59 met the recommended 300 mg or less of cholesterol per day in 1995. In 1995, males age 12-39 consumed an average of 2,763 calories per day, which translates into a benchmark cholesterol density of 109 mg per 1,000 calories. The cholesterol densities for home and away-from-home foods for that group were 122 and 127 mg per 1,000 calories, respectively. To meet the cholesterol guideline, adolescent boys and adult men have to reduce the cholesterol content of foods at home and away from home, especially at restaurants, where their cholesterol density was 158 mg per 1,000 calories in 1995.

Figure 8

Cholesterol density of food away from home: fast food, school, and restaurant, 1987-95



Source: Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day.

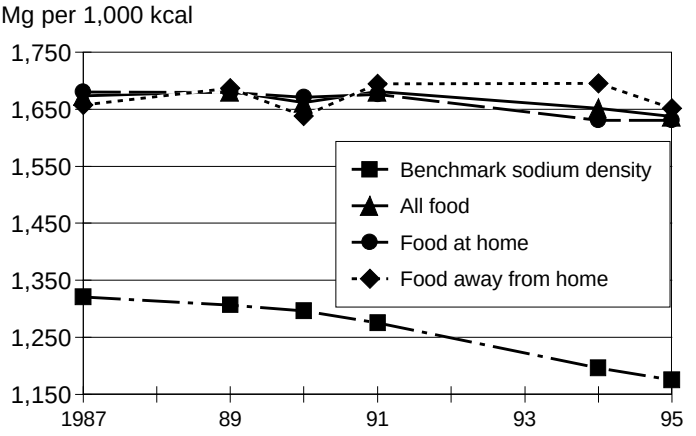
Sodium

The *Diet and Health* report recommends that consumption of sodium not exceed 2,400 mg per day, regardless of age and gender (National Research Council, 1989). As with cholesterol, individuals who eat more calories have lower benchmark density values than individuals who eat fewer calories. Sodium intakes in the NFCS and 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. The surveys first measured sodium content in 1987-88.

Because of rising caloric intake, sodium benchmark density has declined over time (fig. 9), indicating that Americans need to limit the sodium density of their diets more than previously. Whereas the sodium densities of home and away-from-home foods are fairly similar, both are substantially higher than the benchmark density. More important, the gap between the sodium density and the benchmark density has widened during the past decade. As a result, the percentage of individuals age 2 and older who meet the sodium recommendation declined from 41 percent in 1987-88 to 34 percent in 1995. Obviously,

Figure 9

Sodium densities of all foods are substantially higher than benchmark density, 1987-95



Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day.

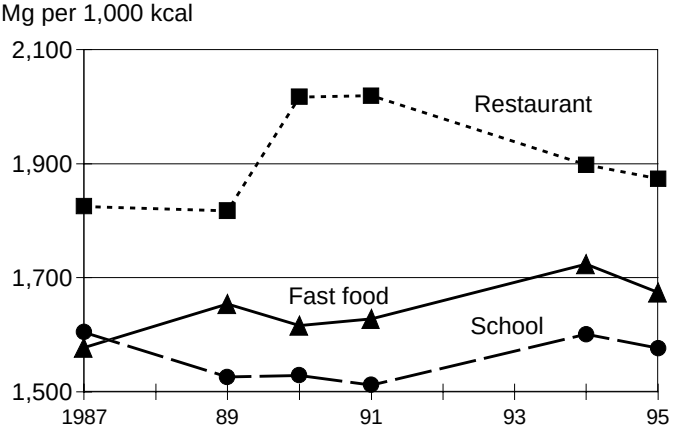
consumers have to exert greater efforts to reducing the sodium density of foods consumed both at home and away from home.

The sodium density of restaurant foods rose sharply between 1989 and 1990, but has declined since 1991 (fig. 10). The sodium densities of fast foods and school foods also increased between 1987-88 and 1994, declined in 1995, and remained considerably lower than restaurant foods. For example, the sodium density of restaurant foods was 1,873 mg per 1,000 calories in 1995, 12 percent higher than the level in fast foods and 19 percent above the level in school foods (see appendix table).

Overconsumption of sodium is a problem for most consumers, except for young children and senior women—who tend to consume the fewest calories. The problem is more severe for men than women because men tend to eat more than women. Males age 12-39, for example, had a sodium density of 1,646 mg per 1,000 calories in 1995, 89 percent above their benchmark sodium density of 869 mg per 1,000 calories.

Figure 10

Sodium density of restaurant food is higher than fast food and school food, 1987-95



Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day.

Dietary Fiber

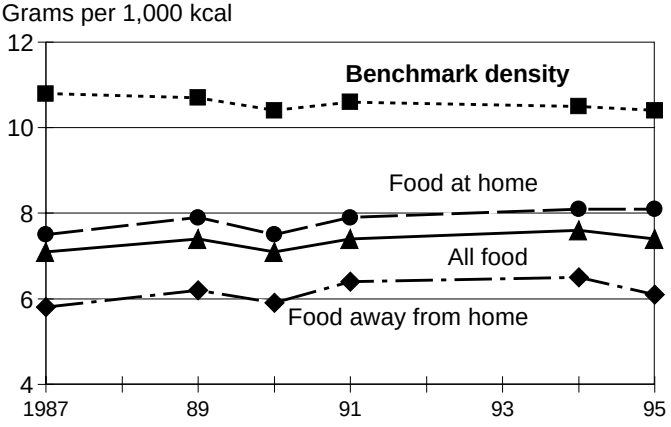
The American Health Foundation recommends a dietary fiber intake of "age plus five" (grams) for those age 2-20 (Williams, 1995), and the FDA uses a Daily Value (DV) of 11.5 grams per 1,000 calories (Saltos and others, 1994). We use the "age plus five" for those age 2-20 years, and the FDA's DV for those older than 20 (table 3).

Over the past decade, fiber densities of home and away-from-home foods have increased slightly, but they still remain far below the benchmark fiber density (fig. 11). Home foods had a fiber density of 8.1 grams per 1,000 calories in 1995, about three-fourths of the benchmark fiber density, and away-from-home foods had a fiber density of 6.1 grams per 1,000 calories. In 1995, fiber intake averaged 15.2 grams per day, and only 24 percent of individuals age 2 and older met the fiber intake recommendations.

School foods have had the highest fiber density of the three main sources of away-from-home foods (fig. 12). However, after reaching its peak at 8.0 grams per 1,000 calories in 1990, the fiber density of school foods declined to 7.1 grams per 1,000 calories in 1994 and

Figure 11

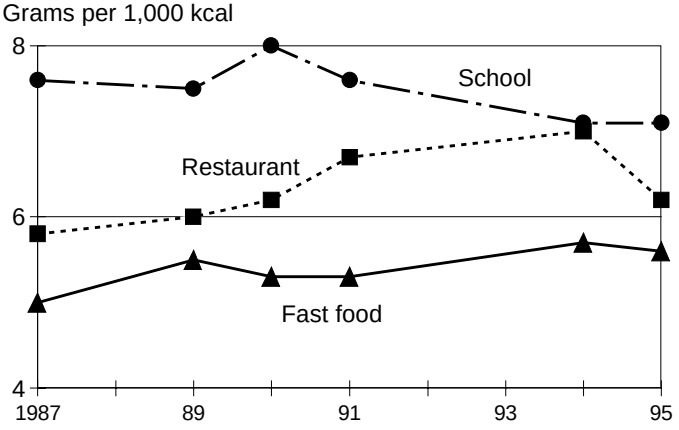
Fiber densities remain below benchmark, 1987-95



Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day

Figure 12

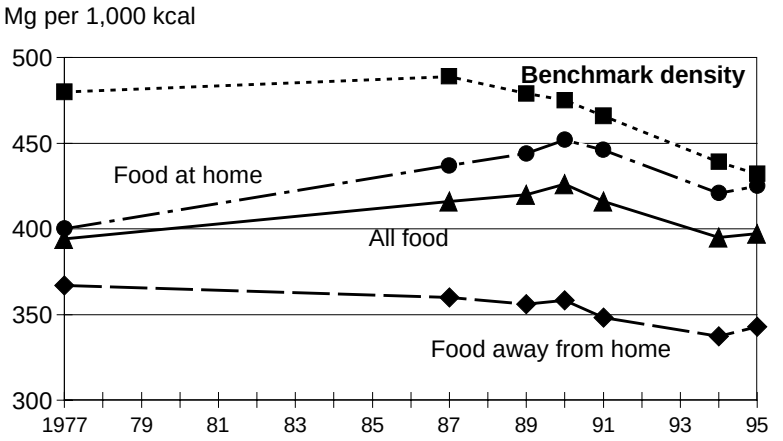
School foods have higher fiber density than restaurant foods or fast foods, 1987-95



Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day.

Figure 13

Calcium density of foods has declined since 1990



Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day.

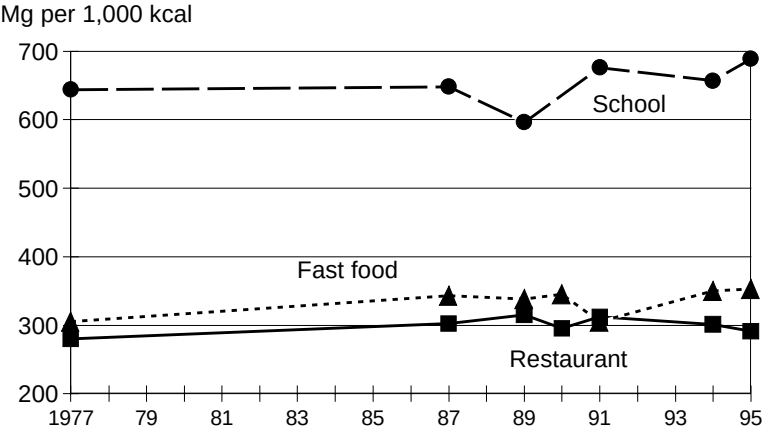
1995. The fiber density of fast foods has shown a general upward trend, although its 5.6 grams per 1,000 calories in 1995 was the lowest among all foods. The fiber density of restaurant foods increased from 5.8 grams per 1,000 calories in 1987-88 to 7.0 grams in 1994, then fell to 6.2 grams in 1995. Increased popularity in dining at fast-food places and restaurants may reverse the slight progress made in increasing the fiber density of foods at home and overall fiber intake.

Calcium

The Recommended Daily Allowances (RDA) for calcium are 1,200 mg for those age 11-24 and 800 mg for all others (National Research Council, 1989). Calcium density rose between 1977-78 and 1990, then declined (fig. 13). Meanwhile, rising caloric intake since 1987-88, associated with a declining benchmark calcium density since 1987-88, has narrowed the gap between average and benchmark calcium density. A higher proportion of individuals age 2 and older met the calcium RDA in 1995 than in 1977-78.

Calcium density in home foods showed a general upward trend, while in away-from-home foods it declined slightly. In 1995, the cal-

Figure 14
Calcium density of school foods higher than restaurant or fast foods, 1977-95



Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day.

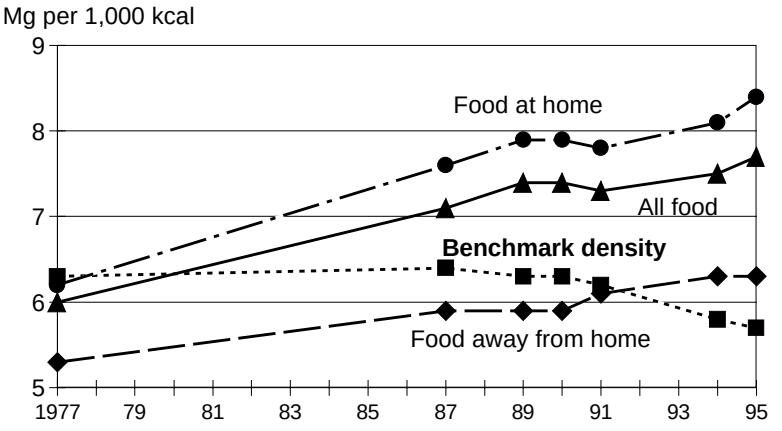
cium density of home foods was 425 mg per 1,000 kcal, fairly close to the benchmark density. Away-from-home foods—which contributed 34 percent of total caloric intake in 1995—had a calcium density of 343 mg per 1,000 calories, 21 percent below the benchmark.

The calcium density of school foods has always been considerably higher than that of restaurant or fast foods—or even home foods (fig. 14). School foods had a calcium density of 689 mg per 1,000 calories in 1995, considerably higher than the 425 mg for home foods, the 353 mg for fast foods, or the 291 mg for restaurant foods. Clearly, the trend toward increased consumption of fast foods or restaurant foods will slow any progress in reaching the guideline for calcium.

Insufficient calcium intake is a more severe problem for adolescent girls and adult women because of their higher calcium requirements and their lower overall food consumption. In 1995, only 18 percent of females age 12-17 met their calcium RDA's. Foods eaten by adolescent girls had an average calcium density of 413 mg per 1,000 calories, 64 percent of their benchmark density of 642 mg per 1,000

Figure 15

Iron density of at-home foods has risen more rapidly than that of food away from home, 1977-95



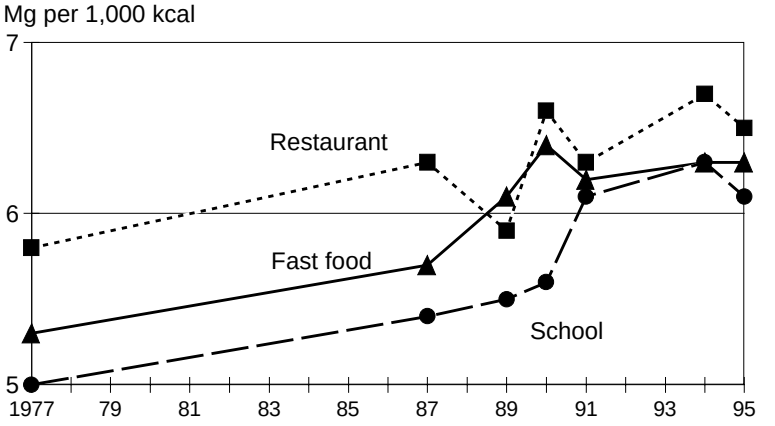
Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day.

calories. School foods eaten by adolescent girls had a calcium density of 544 mg per 1,000 calories, while school foods eaten by adolescent boys and children age 6-11 had calcium densities of 647 and 759 mg per 1,000 calories, respectively. In August 1997, the Institute of Medicine of the National Academy of Sciences issued new dietary recommendations for several nutrients, including calcium. The report raises the recommended calcium intakes (the term is changed from RDA to DRI—Dietary Reference Intake) for many Americans, especially children age 9 and older and adults age 25 and older (Institute of Medicine, 1997). Clearly, all groups, especially female adolescents and female adults, have to increase their calcium intakes.

Dietary Iron

The RDA's for iron are 12 mg for males age 11-18, 15 mg for females age 11-50, and 10 mg for others age 2 and older (National Research Council, 1989). Over the past two decades, the iron density of home foods has risen more rapidly than that of away-from-home foods (fig. 15). The increased iron density in home foods can be partially attributed to increased home consumption of iron-fortified breakfast cereals.

Figure 16
Iron densities show upward trend, 1977-95



Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1 day.

As with other nutrients, iron benchmark density has declined over time because of rising caloric intake. Meanwhile, iron densities of both home and away-from-home foods have risen (fig. 15). The result is that the mean daily dietary iron consumption of those age 2 and above has exceeded RDA's since 1987-88. In 1995, 61 percent of all individuals age 2 and older met their dietary iron RDA's, compared with only 42 percent in 1977-78 (see appendix table).

Iron densities of fast food, school food, and restaurant food have shown a general upward trend over the past two decades (fig. 16). Although restaurant food has a higher iron density than fast food or school food, the differences in the iron density among these three major away-from-home food sources have narrowed over time.

While most individuals consume recommended amounts of dietary iron, low iron intakes are common among adolescent girls and adult women—those with the highest requirements and typically low food consumption. For example, only one in every three women age 18-39 met their iron RDAs in 1995. Home foods consumed by those women had an iron density of 8.2 mg per 1,000 calories and away-from-home foods had 6.0 mg of dietary iron per 1,000 calories, compared with a benchmark density of 8.4 mg per 1,000 calories.

Therefore, the increased popularity of dining out may exacerbate the problem of low iron intakes among some women.

Conclusion

Improving the nutritional quality of diets in the United States is predicated on two basic challenges: increasing intakes of some nutrients and food components such as fiber, calcium, and iron; and reducing intakes of other nutrients such as fat, saturated fat, cholesterol, and sodium. Over the past two decades, Americans have made marked progress in reducing the densities of fat, saturated fat, and cholesterol in their foods and in increasing the iron density of foods they consume. However, little progress has been made in increasing the fiber or calcium density of foods or in reducing the sodium density of foods.

Overall, away-from-home foods have shown smaller nutritional improvements than foods at home. Away-from-home foods generally contain more of the nutrients overconsumed and less of the nutrients underconsumed in the United States. As a result, the increased popularity in dining out presents a barrier to dietary improvements—particularly in terms of reducing intakes of calories, fat, and saturated fat. For example, we calculate that if food away from home had the same average nutritional densities as food at home in 1995, Americans would have consumed 197 fewer calories per day, and reduced their fat intake to 31.5 percent of calories from fat (instead of 33.6 percent) and their saturated fat intake to 10.9 percent of calories from saturated fat (instead of 11.5 percent). In addition, Americans would have increased their consumption of calcium by 7 percent and their consumption of fiber and iron by 9 percent each. Cholesterol and sodium intakes would not have changed much.

Since there is no expectation that the trend toward increased eating out will reverse itself, nutrition policy, education, and promotion strategies are needed that focus on improving the nutritional quality of food away from home and consumers' food choices when eating away from home. In the case of meals provided to children at school, policy changes are addressing nutritional improvements. The Healthy Meals for Healthy Americans Act of 1994 (Public Law 103-448) now requires meals served as part of the National School Lunch and School Breakfast Programs to meet the *Dietary Guidelines for Americans* over a 1-week period. In addition, USDA's Team Nutrition provides nutri-

tion education through schools, families, the community, and the media in an attempt to educate and motivate children to make more healthful food choices at school and outside of school.

For meals eaten at restaurants, fast-food places, and other foodservice establishments, however, other strategies for change are needed. There is no intrinsic reason why food away from home must differ nutritionally from food prepared at home. Indeed, professional chefs and foodservice organizations may be particularly adept at preparing good-tasting meals that meet dietary recommendations. However, consumer demand for such meals must be strong enough to create an economic incentive for increased marketing of nutritious items by restaurants, fast-food places, and other foodservice establishments. Currently, it appears that consumers are more likely to value the nutritional properties of foods when eating at home than when eating away from home. Several fast-food chains have introduced reduced-fat hamburgers, for example, but later withdrew them from the menu because they did not sell. A number of restaurant operators claim that although consumers say they want healthful foods, that is not what they typically order (Parseghian, 1992).

It may be that consumers have different attitudes about food away from home than food at home. Consumers may believe it less important to consider the nutritional quality of food away from home or be less willing to sacrifice taste when eating out—perhaps because they consider eating out to be an occasional treat that does not have the same impact on overall diet as food at home. This attitude may have been reasonable 20 years ago when eating out was much more infrequent, but as eating out has become more common that belief becomes increasingly inappropriate. Consumers may not realize the extent to which eating out has become a part of their usual diets or its effect on overall diet quality. To the degree that consumer attitudes are a barrier to change, nutrition education and promotion strategies are needed to inform consumers of the impact of food away from home on overall diet quality and help create positive attitudes about making healthful food choices when eating out.

Another factor may be related to differences in information, in that the nutritional quality of away-from-home foods may be less readily apparent to consumers as that for food at home, especially for foods consumers may not be used to preparing themselves. In addition, much of traditional nutrition education has focused on knowledge

and skills that relate to home food purchase and preparation—such as providing tips on cooking without added fat. With the increasing trend toward eating out, more nutrition intervention activities are needed that focus on the attitudes, knowledge, and skills consumers need if they are to make more healthful food choices when eating away from home.

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Appendix table—Intake levels and nutrient densities of foods at home and away from home, individuals age 2 and over, 1977-95

	1977-78	1987-88	1989	1990	1991	1994	1995
Calories:							
Average intake (kcal)	1,876	1,807	1,837	1,853	1,883	2,006	2,043
% consuming > REA[1]	26	22	24	26	26	28	31
% of total calories:							
At home	82	73	73	74	71	69	66
Away from home[2]	18	27	27	26	29	31	34
Restaurants	3	5	7	6	6	8	8
Fast food	3	8	9	9	9	11	12
Schools[3]	3	3	2	2	3	2	2
Other public places	3	2	3	2	3	3	2
Others	6	9	7	8	9	7	9
Fat:							
Avg. intake (grams)	86.3	74.7	72.0	72.9	73.4	74.9	76.2
Avg. intake (% of cal.)	41.2	37.0	35.3	35.4	35.1	33.6	33.6
% meeting recom.[1]	13	21	20	29	30	36	37
Nutrient density (% of cal.):							
Benchmark density[4]	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Average nutrient density	41.2	37.0	35.3	35.4	35.1	33.6	33.6
Home foods	41.1	36.3	34.4	34.5	33.8	31.9	31.5
Away from home[2]	41.2	38.7	37.8	38.1	38.2	37.4	37.6
Restaurants	46.2	41.3	40.7	40.7	41.2	40.0	40.1
Fast food	41.6	39.7	39.7	39.6	38.8	39.9	39.3
Schools[3]	40.1	38.0	37.7	36.1	36.8	36.1	35.7
Other public places	41.4	41.2	34.8	40.9	42.3	30.3	32.6
Others	38.6	36.4	33.9	33.1	34.2	34.1	34.9
Saturated fat:							
Avg. intake (grams)	n.a.	27.7	25.7	26.0	26.0	25.6	26.2
Avg. intake (% of cal.)	n.a.	13.8	12.6	12.6	12.4	11.5	11.5
% meeting recom.[1]	n.a.	17	29	29	31	40	39
Nutrient density (% of cal.):							
Benchmark density[4]	n.a.	10.0	10.0	10.0	10.0	10.0	10.0
Average nutrient density	n.a.	13.8	12.6	12.6	12.4	11.5	11.5
Home foods	n.a.	13.5	12.3	12.2	12.1	11.1	10.9
Away from home[2]	n.a.	14.7	13.5	13.8	13.3	12.4	12.8
Restaurants	n.a.	15.5	14.3	13.5	14.0	12.3	12.5
Fast food	n.a.	15.4	14.2	14.5	13.1	13.6	13.8
Schools[3]	n.a.	13.9	15.4	16.1	15.4	14.4	14.2
Other public places	n.a.	15.2	12.0	14.6	13.8	9.8	9.8
Others	n.a.	13.7	12.0	11.8	12.0	11.1	12.1

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Appendix table—Intake levels and nutrient densities of foods at home and away from home, individuals age 2 and over, 1977-95, cont.

	1977-78	1987-88	1989	1990	1991	1994	1995
Cholesterol:							
Average intake (mg)	n.a.	286	282	272	265	260	268
% meeting recom.[1]	n.a.	66	66	70	70	71	69
Nutrient density (mg/1,000 kcal):							
Benchmark density[4]	n.a.	166	163	162	159	150	147
Average nutrient density	n.a.	158	153	147	140	130	131
Home foods	n.a.	161	155	148	143	127	129
Away from home[2]	n.a.	151	149	143	143	134	134
Restaurants	n.a.	215	207	195	187	187	176
Fast food	n.a.	138	137	123	136	124	124
Schools[3]	n.a.	121	116	107	123	101	106
Other public places	n.a.	160	161	189	152	103	114
Others	n.a.	131	116	117	116	113	122
Sodium:							
Average intake (mg)	n.a.	3,023	3,090	3,081	3,168	3,313	3,348
% meeting recom.[1]	n.a.	41	40	40	39	36	34
Nutrient density (mg/1,000 kcal):							
Benchmark density[4]	n.a.	1,328	1,307	1,296	1,275	1,196	1,175
Average nutrient density	n.a.	1,672	1,681	1,662	1,681	1,651	1,637
Home foods	n.a.	1,678	1,679	1,671	1,670	1,630	1,630
Away from home[2]	n.a.	1,656	1,686	1,638	1,708	1,695	1,651
Restaurants	n.a.	1,824	1,817	2,017	2,019	1,898	1,873
Fast food	n.a.	1,575	1,654	1,616	1,628	1,724	1,674
Schools[3]	n.a.	1,604	1,526	1,529	1,512	1,601	1,576
Other public places	n.a.	1,911	1,807	1,657	1,738	1,469	1,548
Others	n.a.	1,590	1,607	1,402	1,579	1,551	1,476
Fiber:							
Average intake (grams)	n.a.	12.7	13.7	13.1	14.0	15.2	15.2
% meeting recom.[1]	n.a.	18	20	20	20	24	24
Nutrient density (grams per 1,000 kcal):							
Benchmark density[4]	n.a.	10.7	10.7	10.5	10.6	10.5	10.4
Average density	n.a.	7.0	7.4	7.1	7.4	7.6	7.4
Home foods	n.a.	7.5	7.9	7.5	7.9	8.1	8.1
Away from home[2]	n.a.	5.8	6.2	5.9	6.4	6.5	6.1
Restaurants	n.a.	5.8	6.0	6.2	6.7	7.0	6.2
Fast food	n.a.	5.0	5.5	5.3	5.3	5.7	5.6
Schools[3]	n.a.	7.6	7.5	8.0	7.6	7.1	7.1
Other public places	n.a.	6.9	7.2	6.1	6.3	6.5	6.8
Others	n.a.	5.9	6.6	5.8	6.9	6.8	6.2

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Appendix table—Intake levels and nutrient densities of foods at home and away from home, individuals age 2 and over, 1977-95, cont.

	1977-78	1987-88	1989	1990	1991	1994	1995
Calcium:							
Average intake (mg)	743	756	773	791	785	794	813
% meeting recom.[1]	31	32	33	36	33	35	36
Nutrient density (mg/1,000 kcal):							
Benchmark density[4]	481	491	479	475	466	439	432
Average nutrient density	396	418	420	426	416	395	397
Home foods	402	439	444	448	446	421	425
Away from home[2]	368	360	356	365	350	337	343
Restaurants	280	302	315	295	312	301	291
Fast food	304	342	338	345	305	350	353
Schools[3]	645	648	596	707	676	657	689
Other public places	341	346	430	368	316	302	317
Others	308	330	326	316	321	286	296
Iron:							
Average intake (mg)	11.3	12.9	13.5	13.6	13.7	15.1	15.7
% meeting recom.[1]	42	47	50	51	50	57	61
Nutrient density (mg/1,000 kcal):							
Benchmark density[4]	6.3	6.4	6.3	6.3	6.2	5.8	5.7
Average nutrient density	6.0	7.1	7.4	7.3	7.3	7.5	7.7
Home foods	6.2	7.6	7.9	7.8	7.8	8.1	8.4
Away from home[2]	5.3	5.9	5.9	6.0	6.2	6.3	6.3
Restaurants	5.8	6.3	5.9	6.6	6.3	6.7	6.5
Fast food	5.3	5.7	6.1	6.4	6.2	6.3	6.3
Schools[3]	5.0	5.4	5.5	5.6	6.1	6.3	6.1
Other public places	5.4	6.1	5.9	5.7	5.6	5.3	5.5
Others	5.2	5.9	5.8	4.8	6.1	6.1	6.4

n.a. = not available

[1] See recommendations in Table 3.

[2] Away from home presents the aggregate of fast foods, restaurants, schools, other public places, and others.

[3] Schools are classified as a separate category for children only; for adults, they are included in the "others" category.

[4] Benchmark densities are obtained by dividing the recommended intake for each nutrient by the individual's actual food energy intake. The benchmark density for specific groups of individuals is the sum of recommended intakes for all individuals divided by the sum of their actual caloric intakes.

Source: Compiled by ERS from NFCS 1977-78, NFCS 1987-88, CSFII 1989-91, and CSFII 1994-95, 1-day intake data.