

Food and Nutrient Composition of CACFP Tier 2 Breakfasts

This and subsequent sections examine in more detail the food and nutrient composition of meals and snacks offered in Tier 2 family child care homes. The analysis is motivated by the hypothesis that Tier 2 providers might adjust to their lower reimbursement rates by offering meals of lesser nutritional quality than they would otherwise have offered.

Three kinds of information bearing on this issue are presented. First, foods most commonly offered in each meal or snack by Tier 2 providers are examined. Second, the average food energy and nutrient content of the meals and snacks offered are compared with nutrition standards established for USDA's school meal programs and additional dietary recommendations promulgated in *Dietary Guidelines for Americans* and the National Research Council's *Diet and Health* report. To the extent that meals offered in Tier 2 homes deviate substantially from these benchmarks, this could be a matter for concern even if reimbursement tiering played no role. Third, the extent to which the food and nutrient composition of Tier 2 meals in 1999 differs from the composition of meals offered by similar providers in 1995 is estimated, using the multivariate approach described in the Introduction and Appendix D of this report.

All food and nutrient measures describe what is *offered* to children rather than what is actually *served* or *consumed*.²⁴ Food served and consumed is typically less than food offered, as individual children may not accept or eat everything they are offered. Some children may get second helpings and, although these were considered in the estimates of portion size²⁵, food consumption was not measured in this study. Findings are therefore indicative of the potential contribution of CACFP meals and snacks to children's daily food and nutrient needs.

The analyses reported here show that Tier 2 breakfasts in 1999 largely met the nutrient-based benchmarks established for this study. Two exceptions are total food energy and the percent of energy from saturated fat. Less than one-fifth of providers offered breakfasts that met one-fourth of the RDA for food energy, and about half offered breakfasts that exceeded the *Dietary Guidelines* recommended level of food energy from saturated fat.

Tier 2 providers in 1999 generally offered breakfasts that differed little from those offered by providers in 1995, controlling for characteristics that determine tier status. The data do not suggest that Tier 2 providers responded to lower reimbursement rates by reducing the nutritional quality of the breakfasts they offered.

²⁴ The only data available for the full sample of Tier 2 providers are contained in the menu survey, which indicates what the provider made available but not how the children responded. For example, if a provider records turnips on the menu, we consider turnips to be offered. Some children may refuse to have turnips put on their plate or may not eat some or all of the turnips, but these behaviors are not known or estimated.

The amount "offered" is the average portion size served to or taken by the average child, based on meal observations conducted in a subsample of Tier 2 homes. Appendix C describes the analytic approach used in determining the nutrient content of meals and snacks offered.

²⁵ While it is possible that second helpings are provided to only some children in a provider's care, the meal observation method used in the 1995 study did not identify "seconds" as such. To maintain comparability, the same procedure was used for the meal observations conducted in 1999.

Benchmarks Used to Evaluate Nutrient Content

The nutrients selected for analysis in the remaining sections of this report were based on the analyses presented in the *Early Childhood and Child Care Study*. They include the nutrient and food components identified as priorities for public health monitoring by the Joint Nutrition Monitoring Evaluation Committee (JNMEC) of the U.S. Departments of Health and Human Services and Agriculture (1995) and those targeted by USDA in ongoing efforts to improve the nutritional quality of meals offered in all Child Nutrition programs.²⁶ CACFP regulations and guidance materials provide general menu planning and nutrition guidelines for meals and snacks offered under the program, but specific nutrition standards have not been established.²⁷ For the purposes of this study, it was therefore necessary to define a set of nutrient-based benchmarks that could be used to evaluate the relative nutritional quality of meals and snacks offered in CACFP family child care homes.

Three sources of benchmarks for evaluating the nutrient content of meals and snacks offered in family child care homes were identified (Exhibit 9). Since 1995, the National School Lunch Program (NSLP) and the School Breakfast Program (SBP) have been required to provide, in meals offered over a school week, one-third and one-fourth of the RDAs (National Research Council, 1989a),²⁸ respectively, for total food energy (calories) and key nutrients (protein, vitamin A, vitamin C, iron, and calcium) needed by growing children.²⁹ Separate RDAs have been established for several child age and gender groups: 1-3 years, 4-6 years, 7-10 years, and, separately for boys and girls 11-14 years of age. Since the 3-5 and 6-12 CACFP age groups are not contained within those age-specific

²⁶ There are two exceptions. Dietary fiber was not included as there is no scientific consensus about optimal fiber intake, therefore no standard for comparison. And, although included in the 1995 study, protein as a percentage of food energy was omitted from the analyses presented here. The total protein content of the menus is addressed.

²⁷ The CACFP meal patterns are designed for planning meals and snacks that make a substantive contribution to children's major nutritional needs.

²⁸ The RDAs are currently being replaced with new standards—*Dietary Reference Intakes* (DRIs). DRIs were not available for all nutrients examined in this report when the analyses were run, and DRIs have not yet been incorporated into nutrition standards for any of USDA's Child Nutrition programs. Therefore, we have not used DRIs as benchmarks for evaluating the nutrient composition of CACFP meals. The Institute of Medicine (IOM, 2000) recommends using Estimated Average Requirements (EAR) instead of RDAs to assess the prevalence of inadequate nutrient intakes among individuals in a group. This value is set lower than the RDA which represents an intake level that exceeds the requirements of 97 to 98 percent of individuals in a group. Using the EAR should reduce the chance of overestimating the prevalence of nutrient inadequacy for groups. Using the EAR as the benchmark in the 1995-99 comparisons of nutrient content of meals offered in child care homes would probably have shown larger proportions of providers meeting the standard for any nutrient in both years. In any event, the study findings with respect to the effect of tiering on the nutrient composition of Tier 2 provider meals are unlikely to change whether based on DRIs or RDAs.

²⁹ 7CFR, parts 210 and 220.

Exhibit 9
Benchmarks Used in Evaluating CACFP Meals and Snacks

Nutrient	Benchmark
Nutrition Standards for the NSLP and SBP^a	
Food energy, protein, vitamin A, vitamin C, calcium, and iron	Breakfast: One-fourth of the RDA ^b Lunch: One-third of the RDA ^b
Nutrients included in the <i>Dietary Guidelines</i> for Americans^c	
Total fat	≤ 30% of total calories
Saturated fat	< 10% of total calories
National Research Council <i>Diet and Health</i> Recommendations^d	
Carbohydrate	> 55% of total calories
Sodium ^d	Breakfast: ≤ 600 mg Lunch: ≤ 800 mg
Cholesterol ^d	Breakfast: ≤ 75 mg Lunch: ≤ 100 mg

^a 7 CFR, parts 210 and 220. Program regulations also include goals for breakfasts and lunches that are consistent with the 1990 Dietary Guidelines recommendations for fat and saturated fat.

^b National Research Council, 1989a.

^c U.S. Departments of Health and Human Services and Agriculture, 2000.

^d National Research Council, 1989b. Standards used for cholesterol and sodium are adapted from recommendations for maximum daily intake.

RDA ranges, comparing the food energy and nutrient content of meals offered with RDAs required the calculation of age-weighted RDA values. (See Appendix C for a discussion of these calculations.)

In addition to the RDAs, NSLP and SBP meals must conform to the recommendations of the *Dietary Guidelines for Americans* (U.S. Departments of Health and Human Services and Agriculture, 1990), in particular, the limitations on the percentages of energy from total fat (no more than 30 percent of food energy) and saturated fat (less than 10 percent of food energy). The National Research Council's *Diet and Health* report (1989b) (NRC recommendations) is the basis for recommendations for cholesterol (no more than 300 mg. per day). It also recommends limiting total sodium levels to 2,400 mg. per day (equivalent to 6 grams of salt) and maintaining carbohydrate at more than 55 percent of total food energy.

Current recommendations for fat, saturated fat, cholesterol, sodium, and carbohydrate apply to all healthy children age 2 and older. In keeping with these recommendations, quantitative benchmarks for the percent of energy from energy-supplying macronutrients (total fat, saturated fat, and carbohydrate) as well as cholesterol and sodium are applied only to the meals and snacks offered to children in the 3-5 and 6-12 CACFP age groups.

The *Dietary Guidelines* and NRC recommendations are intended to apply to average total daily food intake. It is generally permissible in nutrition research to examine the nutrient contribution of major meals such as breakfast and lunch, averaged over several days, to daily goals. The assumption made

is that meals that meet the goals increase the likelihood that total daily intake will meet the goals. In this study we present the average nutrients in breakfasts, lunches, snacks, and common combinations of meals and snacks offered over 3-5 days relative to all of the selected benchmarks of nutritional quality. Where possible, daily nutrient recommendations are expressed as one-fourth of the goal at breakfast and one-third of the goal at lunch, consistent with the school meal program nutrition standards for these meals. Since no such proportions of daily goals have been suggested for Child Nutrition programs serving snacks, it is not possible to examine the proportion of providers offering snacks or common combinations of meals and snacks that are consistent with daily recommendations.³⁰ We do, however, present the mean nutrient content of snacks and common combinations of meals snacks offered, so that their relative contribution to daily recommendations can be evaluated.

Finally, it is important to recognize that *CACFP family child care homes are not required to offer meals or snacks that meet the school meal program nutrition standards or any other quantitative nutrient recommendations*. The benchmarks used in this report were selected solely to facilitate interpretation of the data.

Foods Offered in CACFP Breakfasts

Exhibit 10 summarizes the foods most commonly offered to children aged 3-5 at breakfast, including foods in the three required meal component categories and other, noncreditable, foods.³¹ Breakfast menus differ very little across the three age groups (1-2, 3-5, and 6-12). The 3-5 age group, which is the largest, is used for illustrative purposes. Figures in the exhibit are the percent of all observed breakfasts that included the food item or group.³² This may be interpreted as the percent of CACFP breakfasts offered nationwide on any given day that include the specified food. Only food items or groups offered in at least 5 percent of all breakfasts are listed.³³

³⁰ There are no widely accepted standards for snacks because snacks are considered to be supplementary and, *on an individual basis*, are not expected to make major contributions to children's daily nutrient intake. For this reason it was also not possible to define RDA-based benchmarks for snacks or for the total complement or common combinations of meals and snacks offered.

³¹ Noncreditable foods are foods that do not contribute to satisfying the CACFP meal pattern for a particular meal (e.g., condiments, meat or meat alternates at breakfast, juice drinks).

³² Menus were obtained for 3-5 days for each provider. A given provider might offer breakfast on none, some, or all of the menu days. Five breakfasts were recorded for most providers, which means that most providers contribute five observations to this analysis. The number of included breakfasts for a single provider ranges from three to five. Breakfasts offered on 1 or 2 days are excluded from the analysis.

³³ This criterion is applied separately to 1999 and 1995 data. Any food offered in at least 5 percent of breakfasts in either period is included in the exhibit.

Exhibit 10
Share of Breakfasts Containing Foods Commonly Offered to Children Aged 3-5^a

Meal Component/Food	Tier 2 1999	Difference 1999-95 ^b
	Percentage of Breakfasts in which Item is Offered	
Milk	98.9%	0.1%
White, 2%	54.3	1.7
White, whole	34.2	10.7*
White, skim	5.6	-0.4
White, no further specification ^c	0.7	-26.0***
Fruits and Juices	97.8	0.4
<i>Any fresh, canned, or dried fruit</i>	66.6	1.2
<i>Any fresh fruit</i>	49.7	1.2
Banana	25.0	0.2
Orange	7.2	0.6
Apple	7.1	0.7
<i>Any canned fruit</i>	13.6	0.9
Applesauce	5.6	0.5
<i>Any juice</i>	40.0	1.1
Orange/grapefruit juice	22.9	1.8
Apple juice	10.6	1.1
Breads and Bread Alternates	100.0	1.2***
Cold cereal	43.3	1.8
Pancakes, waffles, French toast	23.1	2.6
White bread, rolls	18.9	-3.3
Hot cereal	8.7	-2.5
Noncreditable Foods^d		
<i>Meat/meat alternates</i>	10.5	-4.4*
Eggs	6.7	-1.5
<i>Other noncreditable</i>	52.0	-1.8
Syrup, honey	22.4	3.6**
Sugar	8.2	2.0
Jelly	4.7	-1.2
High-fat condiments ^e	29.6	-3.0
Unweighted sample	2,093	3,975

a Includes only foods offered in at least 5 percent of daily breakfast menus, in either 1995 or 1999.

b Regression estimate. See Appendix D.

c Menu survey did not include information on the fat content of milk.

d Foods that do not contribute to satisfying the CACFP meal pattern.

e Butter, margarine, cream cheese, and other high-fat toppings.

Significance levels:

* = .10

** = .05

*** = .01

One may roughly describe a “typical” CACFP breakfast as including the most commonly offered food in each of the three required categories. The typical Tier 2 breakfast in 1999 would thus consist of milk (white, 2-percent fat), a banana or orange juice, and cold cereal.

The analysis indicates that the foods that Tier 2 providers offered for breakfast in 1999 differed little from the foods that similar providers offered in 1995, especially for the three required categories of food.

Milk. Just over half of all breakfasts included white, 2-percent fat milk. White whole milk was next most common, offered in about one-third of breakfasts. Skim milk was offered in only about 6 percent of breakfasts, and flavored milks were rarely offered at breakfast. Milk patterns do not differ meaningfully from the patterns for similar providers in 1995.³⁴

Fruits, Vegetables, and Juices. Two-thirds of breakfasts included some kind of fresh, canned, or dried fruit. The most common example was bananas, which were offered in 25 percent of breakfasts. Fruit juice was offered at 40 percent of breakfasts, most commonly orange or grapefruit juice (23 percent) and apple juice (11 percent). None of these patterns changed significantly from 1995.

Bread and Bread Alternates. Cold cereal is the most frequently offered food in this group, appearing in 43 percent of all breakfasts. Pancakes, waffles, and French toast are also common, as are white bread and rolls (23 percent and 19 percent, respectively). No particular foods in this group differ significantly in their serving frequency from those offered in 1995, but bread and bread alternates as a group show a small but statistically significant increase in 1999.

Noncreditable Foods. About 11 percent of CACFP breakfasts included a food that would be classified as a meat or meat alternate, most commonly eggs. Foods in this category may have been offered less frequently by Tier 2 providers in 1999 than by similar providers in 1995 ($p < 0.10$). As discussed in the section above on meal components, this may reflect an effort on the part of some Tier 2 providers to reduce food costs without compromising compliance with CACFP regulations.

Just over half of CACFP breakfasts included some other form of noncreditable food, most commonly condiments. Syrup or honey, offered in 22 percent of breakfasts, were significantly more common in 1999 than in 1995.

³⁴ The increase in the estimate for whole milk ($p < 0.10$) appears to result from the fact that a substantial proportion of milk observations in 1995 did not specify the type of milk, while less than 1 percent of milk observations in 1999 had no further specification.

Nutrient Content of CACFP Breakfasts Relative to RDAs

Tier 2 providers in 1999 offered breakfasts that provide, on average, more than 25 percent of the 1989 RDA for all nutrients examined, with the exception of food energy (Exhibit 11).³⁵ For all age groups combined, the average breakfast supplies three-fourths of the RDA for vitamin C, over half of the RDA for protein and vitamin A, and over one-third of the RDA for calcium and iron.³⁶ Mean iron content is strongly influenced by the frequency with which enriched or fortified cereals are offered; for example, such cereals account for 65 percent of the iron in breakfasts offered to the 3-5 age group (data not shown). For food energy, the average breakfast provides about one-fifth of the RDA. These patterns are roughly consistent across age groups.³⁷

The analysis indicates that the Tier 2 breakfasts offered in 1999 provide significantly more food energy than those offered by similar providers in 1995. Although the difference is small—less than 2 percent of the RDA—it is statistically significant for breakfasts offered to children aged 3-5, the largest age group served, and for all age groups served by the provider.³⁸ There were no significant differences in the mean percentage of RDA for other key nutrients in breakfasts offered by Tier 2 1999 providers and similar providers in 1995.

³⁵ In contrast to the RDAs for other nutrients, recommended energy allowances (REAs) represent the *average* needs of individuals in a group rather than an upper level of requirement variability among individuals (National Research Council, 1989a). For ease in presentation, we refer to the REAs as RDAs throughout this report.

³⁶ “All ages” refers to the overall mean percent of RDA across the particular age group(s) served by each provider.

³⁷ As age increases, there is a tendency for the percent RDA for calories, protein, and vitamin A to decrease and the percent RDA for vitamin C, calcium, and iron to increase. This is because the magnitude of the change in RDA for each age group differs among nutrients relative to the change in estimated portion sizes. For example, while the average increase in portion sizes is about 13 percent for both breakfast and lunch, the RDA for vitamin A is 42 percent higher for children in the 6-12 group than children in the 3-5 group. Conversely, the RDA for vitamin C is only 6 percent higher for the 6-12 group than the 3-5 group.

³⁸ The increase in total food energy does not appear to be due to the significant increase in whole milk in 1999. Differences in milk offerings in the two time periods account for only 0.2 of a percentage point of the difference in food energy.

Exhibit 11
Mean Percentage of RDA Offered at Breakfast

	Age 1-2		Age 3-5		Age 6-12		All Ages	
	Tier 2 1999	Difference 1999-95 ^a	Tier 2 1999	Difference 1999-95 ^a	Tier 2 1999	Difference 1999-95 ^a	Tier 2 1999	Difference 1999-95 ^a
Total energy	22.2%	0.9%*	21.2%	1.5%***	19.8%	1.1%*	21.4%	1.5%***
Protein	62.9	-0.1	54.4	1.5	44.1	-1.5	56.4	1.8
Vitamin A	61.7	6.0	62.9	4.4	51.1	1.0	59.7	4.6
Vitamin C	69.3	-0.2	79.2	2.8	86.9	2.4	74.9	0.4
Calcium	34.4	0.1	37	0.7	37.5	-1.1	36.4	0.6
Iron	34.0	3.3	41.1	2.0	45.7	-2.8	39.1	1.1
Un-weighted sample	412	759	441	830	231	458	499	929

^a Regression estimate. See Appendix D.

Significance levels:

- * = .10
- ** = .05
- *** = .01

Percent of Providers Offering at Least One-Fourth of the RDA at Breakfast

Most Tier 2 providers in 1999 offered breakfasts with at least one-fourth of the RDA for all nutrients except food energy (Exhibit 12). Over 97 percent offered breakfasts that supply at least one-fourth of the RDA for protein, vitamin A, and calcium; over 90 percent offered breakfasts that met this benchmark for vitamin C; and 77 percent offered breakfasts that met this benchmark for iron (for all age groups combined). Far fewer providers—about 15 percent overall and just 6 percent for 6-12 year olds—offered one-fourth of the RDA for food energy at breakfast.

Despite the relatively low percentage of providers whose breakfasts contained one-fourth of the RDA for food energy in 1999, significantly more Tier 2 providers in 1999 met this threshold for the 3-5 age group than did similar providers in 1995. The effect amounts to an additional 8 percent of providers offering breakfasts with one-fourth of the RDA for energy for this age group.

Exhibit 12
Percentage of Providers Offering at Least One-Fourth of the RDA at Breakfast

	Age 1-2		Age 3-5		Age 6-12		All Ages	
	Tier 2	Difference	Tier 2	Difference	Tier 2	Difference	Tier 2	Difference
	1999	1999-95 ^a	1999	1999-95 ^a	1999	1999-95 ^a	1999	1999-95 ^a
Total energy	18.5%	5.8%	13.0%	8.2%***	6.3%	1.8%	14.7%	5.1%
Protein	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0
Vitamin A	99.2	1.3	99.3	0.3	97.0	3.1	98.6	2.5
Vitamin C	91.4	0.8	92.1	-2.0	94.9	0.4	91.6	-3.7
Calcium	97.1	-2.8	98.2	0.7	98.6	1.2	98.0	1.2
Iron	73.4	10.9	80.8	-2.3	82.5	-9.6	76.8	-2.6
Un-weighted sample	412	759	441	830	231	458	499	929

^a Regression estimate. See Appendix D.

Significance levels:

- * = .10
- ** = .05
- *** = .01

Nutrient Content of CACFP Breakfasts Relative to *Dietary Guidelines* and NRC Recommendations

Tier 2 breakfasts offered to children aged 3-12 are largely consistent with the *Dietary Guidelines* and NRC recommendation benchmarks applied in this study. The average provider offered breakfasts that met these recommendations for the percent of energy from fat and carbohydrate, as well as falling under the recommended maxima for cholesterol and sodium (Exhibit 13).

The partial exception to this pattern concerns the percent of energy from saturated fat for which the recommended level is less than 10 percent. The estimates for the percent of energy from saturated fat in breakfasts offered to 3-5 year olds and 6-12 year olds are 10.4 and 9.8 percent, respectively. Neither of these estimates are significantly different from 10 percent. (The 95-percent confidence interval for this estimate falls across the 10-percent boundary for both groups.)

The Tier 2 providers in 1999 offered breakfasts with essentially the same levels of fat, saturated fat, and carbohydrate, as a percentage of food energy, as breakfasts offered by similar providers in 1995. The mean amounts of cholesterol and sodium offered did not differ significantly between the two years.

Exhibit 13
Mean Nutrient Levels Relative to *Dietary Guidelines* and NRC Recommendations Offered at Breakfast^a

	Recommen- dation	Age 3-5		Age 6-12	
		Tier 2 1999	Difference 1999-95 ^b	Tier 2 1999	Difference 1999-95 ^b
Percent of food energy from:					
Fat (%)	≤ 30%	22.0%	0.1%	21.6%	0.5%
Saturated fat (%)	<10%	10.4	0.0	9.8	0.0
Carbohydrate (%)	> 55%	66.5	0.5	67.4	0.2
Cholesterol (mg)	≤ 75 mg	52.9	8.5	57.9	8.9
Sodium (mg)	≤ 600 mg	460.1	45.1	538.3	44.1
Unweighted sample		441	830	231	458

^a Note that the *Dietary Guidelines* and NRC recommendations are only applicable to children beginning at 2 years of age and older. This analysis is limited to breakfasts offered to children 3-5 and 6-12, the only CACFP age groups for which the standards fully apply.

^b Regression estimate. See Appendix D.

Significance levels:

* = .10

** = .05

*** = .01

Percent of Providers Meeting the *Dietary Guidelines* and NRC Recommendations at Breakfast

A large majority of Tier 2 providers offered breakfasts that meet most of the *Dietary Guidelines* and NRC recommendations, as shown in Exhibit 14. For children aged 3-5 and 6-12, at least 90 percent of providers met the recommendations for the percentages of energy from fat and carbohydrate, and around 80 percent offered breakfasts with cholesterol and sodium in the recommended range. A lower proportion, but still at least half of all providers, offered breakfasts for which the percentage of food energy from saturated fat was within the recommended range.

The percentages of Tier 2 providers meeting the *Dietary Guidelines* and NRC recommendations in 1999 vary little from the percentages for similar providers in 1995. This is true for children in both the 3-5 and 6-12 age group.

Exhibit 14
Percentage of Providers Meeting *Dietary Guidelines* and NRC Recommendations at Breakfast^a

	Age 3-5		Age 6-12	
	Tier 2 1999	Difference 1999-95 ^b	Tier 2 1999	Difference 1999-95 ^b
Percent of food energy from:				
Fat	90.4%	-1.4	92.8	-0.4%
Saturated fat	50.7	6.4	57.7	5.1
Carbohydrate	94.6	-1.8	96.7	-0.1
Cholesterol	78.5	-5.9	79.2	-5.3
Sodium	87.4	-5.4	78.3	-6.5
Unweighted sample	441	830	231	458

^a Note that the *Dietary Guidelines* and NRC recommendations are only applicable to children beginning at 2 years of age and older. This analysis is limited to breakfasts offered to children 3-5 and 6-12, the only CACFP age groups for which the recommendations fully apply.

^b Regression estimate. See Appendix D.

Significance levels:

* = .10

** = .05

*** = .01