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***School Nutrition Dietary Assessment
Study—III:***

***Volume I: School Foodservice, School
Food Environment, and Meals Offered
and Served***



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Department of
Agriculture

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School Nutrition Dietary Assessment Study-III: Volume I: School Foodservice, School Food Environment, and Meals Offered and Served

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The SNDA-III Preliminary Survey of School Food Authorities was conducted as part of a separate contract between MPR and FNS. Anne Gordon directed the study, and Rhoda Cohen led the data collection, with assistance from Eric Zeidman and Annalee Kelly. John Hall developed the sample design and the weights for the Preliminary Survey. Under subcontract to MPR, Christopher Logan and Ryan Kling at Abt added secondary data to the files and prepared descriptive analyses.

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EXECUTIVE SUMMARY

The U.S. Department of Agriculture (USDA) National School Lunch Program (NSLP) and School Breakfast Program (SBP) provide subsidized meals to children in school, and provide these meals free or at a reduced price to children from low-income families. In school year 2004-2005, these two programs together provided benefits of nearly \$10 billion in cash and commodities. Created in 1946, the NSLP operates in nearly all public and many private schools. On an average school day in 2005, the NSLP provided lunch to 27.5 million children; 59 percent of these lunches were served free or at a reduced price. The SBP, which became a permanent Federal program in 1975, is offered in a somewhat smaller number of schools and serves fewer children per school. In 2005, the SBP provided breakfast to 8.7 million children per school day; the majority of these breakfasts (82 percent) were served free or at a reduced price.

The Food and Nutrition Service (FNS) of USDA sponsored the third School Nutrition Dietary Assessment study (SNDA-III) to provide up-to-date information on the school meal programs, the school environments that affect the food programs, the nutrient content of school meals, and the contributions of school meals to children's diets. During the time SNDA-III was conducted, many State agencies and schools were establishing nutrition policies, supplemental to USDA regulations, to address growing concerns about child obesity. Many of these policies included additional requirements for school meals and for foods that schools often sell in competition with USDA school meals, known as "competitive foods." State agencies and schools were also beginning to plan school wellness policies, required by Congress as of school year 2006-2007, which must include goals for nutrition education and physical activity, as well as nutrition standards for all foods sold on campus, including competitive foods.

A. BACKGROUND

The SNDA-III study, which is based on data collected in the second half of school year 2004–2005, builds on the methods used in two previous SNDA studies sponsored by FNS and, thus, allows some examination of trends over time:

- The first SNDA study (SNDA-I), in SY 1991–1992, determined that school meals provided targeted levels of vitamins and minerals, but offered, on average, higher levels of fat and saturated fat than recommended in the *Dietary Guidelines for Americans*.
- SNDA-I helped prompt new policies, known as the School Meals Initiative for Healthy Children (SMI), which require schools to offer meals that provide no more than 30 percent of total calories from fat and less than 10 percent from saturated fat, while providing adequate levels of target nutrients (defined as one-quarter of daily needs at breakfast and one-third at lunch, on average). School Food Authorities (SFAs)—school districts or groups of districts operating the NSLP—were encouraged to use computerized nutrient analysis to plan school meals, but were also given the option of continuing food-based menu planning.

- SNDA-II, conducted in school year 1998–1999, early in the SMI implementation period, showed that schools had reduced fat and saturated fat levels in school meals while maintaining levels of target nutrients. However, school meals were still not consistent with standards for fat and saturated fat content established under SMI.

SNDA-III offers information on how the programs are operating eight years after the start of SMI implementation. It also provides a baseline for FNS to use in determining how best to improve the programs.

Another important challenge is that new scientific knowledge has led to changes in key recommendations for dietary standards. The new Dietary Reference Intakes (DRIs) provide the best measures of nutrient adequacy or inadequacy for individuals to achieve a healthy diet and prevent disease. The DRIs are used to assess children’s dietary intakes but have not yet been translated for application to menu planning for school meals. Because school meals were still required to meet SMI standards during the period of this study, those standards are used to evaluate the nutrition they provided. While SMI required schools to offer meals with less than 30 percent of energy from total fat, the DRIs set a range of fat intakes from 20 to 35 percent of energy as acceptable and place more emphasis on types of fat.

This report, the first of three volumes, focuses on the analysis of school meal program characteristics at the SFA and school levels. Volume II focuses on characteristics of students who participate in school meals, student and parent satisfaction with the meals, and analyses of the dietary intakes of school meal participants and nonparticipants. Volume III provides in-depth information on the sample design and data collection procedures used in the study.

B. RESEARCH QUESTIONS

This study examined school meal program operations, foods and nutrients offered and served in school meals, competitive foods, and students’ dietary intake. Key research questions covered in this volume include:

- How do SFAs and schools provide NSLP and SBP meals?
- What are the characteristics of the school environment that affect school foodservice—for example, scheduling, rules about student mobility and open campus, and nutrition education?
- To what extent are competitive food sources available? Are there school policies that limit these foods? What types of foods and beverages are available from competitive sources?
- What is the food and nutrient content of USDA meals offered and served to students? How well do these meals meet SMI nutrient standards?
- How has the nutrient content of USDA meals served changed since the SNDA-II study in SY 1998–1999?

C. DATA SOURCES

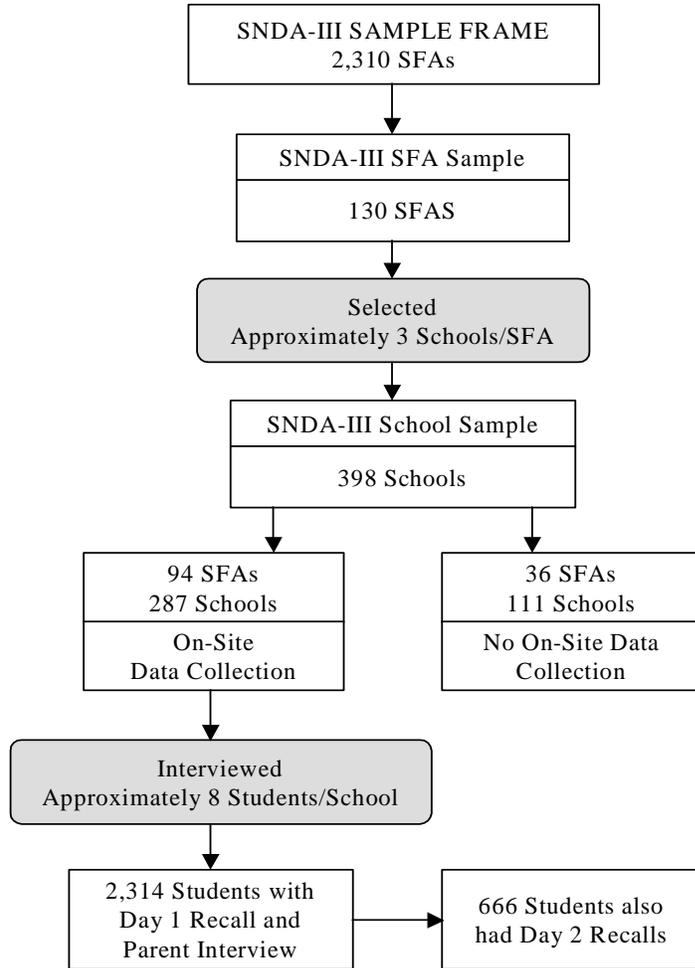
SNDA-III data represent all public SFAs that offer the NSLP in the contiguous United States, schools in those SFAs, and students in those schools. To represent these groups, the following three-stage sampling process was used: (1) SFAs were selected; (2) schools within these SFAs were selected (one elementary, one middle, and one high school, if possible); and (3) (for some SFAs and schools) students who attended these schools were selected (see Figure 1). Students were selected from lists of those enrolled at each school. Parents (or guardians) of the selected children provided consent for their child's participation, and were also interviewed.

Substantive data for the study were obtained at each of these levels; here, we describe the SFA- and school-level data used in this volume. SFA directors provided information on district-wide policies (such as menu planning) and operations (such as food purchasing). School foodservice managers completed a Menu Survey, providing detailed information on all foods offered on their menus during a selected week, including detailed food descriptions, portion sizes, and the number of servings provided in reimbursable meals. They also completed a brief telephone or in-person interview regarding their school's foodservice operations (for example, types of special needs they accommodated) and on competitive foods available in or near the foodservice area. Principals in each school were also interviewed concerning school schedules and rules about student mobility, nutrition education offered, and availability of competitive foods outside the foodservice area. In the representative subsample of schools in which student-level data were collected, study staff (on-site to interview students) also completed checklists based on their observations of competitive food sources and foods available through each major source (a la carte, vending machines, school stores, snack bars, and other sources).

All analyses in this report have been weighted to be representative of public SFAs or schools (as appropriate) in the contiguous United States that offer the NSLP.

FIGURE 1

SNDA-III SAMPLES



Note: Samples (when weighted) are representative of all public SFAs, schools, and students in schools offering the NSLP.

SFA = School Food Authority.

D. SCHOOL FOODSERVICE OPERATIONS

1. Eligibility and Prices

USDA subsidizes lunches and breakfasts for American schoolchildren through the NSLP and SBP at levels that vary by family income. Students from families with incomes at or below 130 percent of the poverty level are eligible for free meals, those with family incomes greater than 130 percent but no more than 185 percent of the poverty level are eligible for reduced-price meals, and children from higher-income families must pay “full price” for their meals, but such meals are also slightly subsidized. Parents often must complete an application for their children to qualify to receive free or reduced-price meals. “Direct certification”—when students whose families receive certain types of public assistance are certified to receive school meal benefits through computer-matching to public assistance program records—is also widespread.

Based on reports of foodservice managers in the SNDA-III schools, the average full price for lunch in school year 2004–2005 was \$1.60, and the average for breakfast was \$.88, not counting schools that offer free meals for all. Children who qualify for reduced-price meals may be charged a maximum of \$.40 for lunch and \$.30 for breakfast. Approximately 15 percent of schools (usually those with high proportions of students certified for free or reduced-price meals) offered meals free to all students under special rules, known as Provisions 2 and 3. Students not eligible for free or reduced-price meals were more likely to purchase school meals in schools that charged lower prices.

2. Menu-Planning Systems

FNS has always required schools to plan their menus to ensure that Federally subsidized meals meet specific requirements. Traditionally, schools used food-based menu planning—which required school meals to offer set numbers of servings from specific food groups, with minimum portion sizes that varied by age. For example, NSLP lunches were required to offer one serving of meat or meat alternate (cheese, beans); one serving of grains or bread; two servings of different fruits and/or vegetables, and one serving of fluid milk. SMI introduced nutrient-based standards for school meals, as well as a new menu-planning system—nutrient standard menu planning (NSMP). NSMP allowed schools greater flexibility in the types of foods offered, but required nutrient analysis of planned menus to ensure they met age-/grade-appropriate nutrient standards. Because of concerns about staff burden, the school nutrition community protested proposals that all schools be required to use NSMP. The final SMI regulations included the nutrient-based standards as the new benchmarks for school meals but allowed schools flexibility in the approach used for planning menus. In addition to the traditional food-based menu-planning system and NSMP, an enhanced food-based system was introduced. The enhanced food-based system calls for larger fruit/vegetable portions and more grains and breads.

In school year 2004–2005, more than two-thirds of schools used food-based menu planning. Nearly half (48 percent) of schools used the traditional food-based menu-planning system, and 22 percent used the enhanced food-based menu-planning system. Less than a third of schools (30 percent) used NSMP; NSMP was more often used in larger, urban districts.

The SMI regulations specified that schools would be evaluated based on a weighted analysis of the nutrient content of their menus in a typical school week. Nutrients in each food are weighted by the proportion of students that selected that item. However, because it is challenging for many schools to collect the production data needed for weighted analysis, USDA allows use of an unweighted nutrient analysis under a waiver provided by Congress, which is available until September 30, 2009. The unweighted nutrient analysis gives equal weight to all choices in each food group in computing the average nutrients for that food group. About two-thirds of schools were in districts that conducted ongoing nutrient analysis of their menus—30 percent of schools were in districts that conducted only weighted analyses, 19 percent were in districts that conducted only unweighted analyses, and 19 percent were in districts that conducted both types of analyses.

3. Meal Production and Service

During the 2004–2005 school year, most SFAs offered the SBP in some or all schools. About 85 percent of public schools overall offered school breakfasts to students.

Most schools prepared food on-site. More than two-thirds of schools (70 percent) prepared meals on-site for consumption only in their school, 19 percent of schools received fully or partially prepared meals from a base or central kitchen, and 11 percent of schools prepared meals on-site for service in their school, as well as for shipment to other schools. About 5 percent of SFAs used central or commissary kitchens, including 15 percent of large (more than 5,000 enrolled) SFAs.

Nationally, 13 percent of SFAs contracted with foodservice management companies. These contracts were more common in large or medium-sized districts than in small ones and in lower-poverty areas than in high-poverty ones.

Offer-versus-serve (OVS) is a school meal policy under which students are allowed to refuse one or two of the components of a reimbursable school meal, with the goal of reducing the amount of food wasted. All high schools were required to use OVS, but it is optional for elementary and middle schools. In school year 2004–2005, 78 percent of elementary schools and 93 percent of middle schools used OVS.

E. CHARACTERISTICS OF THE SCHOOL FOOD ENVIRONMENT

Closely associated with school foodservice operations are school policies and practices that may affect school meal participation and school foodservice operations but that generally are outside the control of school foodservice staff—for example, nutrition education and recess policies. Such policies and practices comprise the environment in which school meal programs operate; data about that environment can help policymakers further understand factors affecting students' participation decisions and food choices.

Nearly all schools (99 percent) provided some form of nutrition education to students, and more than two-thirds of schools taught nutrition in all grades. Sixty-one percent of schools shared information with students and/or parents about the nutrient content of school meals on a

regular basis. Forty-four percent of schools had already met the Federal mandate to have a local wellness policy in place by the 2006–2007 school year.

On average, students had about 30 minutes to eat lunch, regardless of school type (elementary, middle, or high) or enrollment. Forty percent of schools had at least one lunch period that started before 11:00 A.M., although very few scheduled a lunch period to start after 1:30 P.M. Students had about half an hour from when breakfast started until classes began.

Among schools that had recess, about one-third of elementary schools and more than half of middle schools scheduled recess right after lunch for all students. Only 23 percent of schools with recess after lunch, however, let students go to recess as soon as they finished eating.

About 40 percent of schools allowed all or some students to leave the lunch area after a predetermined time, and 29 percent let them leave at their own discretion. These policies were largely used by high schools, where about two-thirds of schools allowed students to leave the lunch area at any time. Eleven percent of schools followed an open campus policy, with high schools most likely to offer it (25 percent). In general, mobility privileges increased with age.

F. AVAILABILITY OF COMPETITIVE FOODS

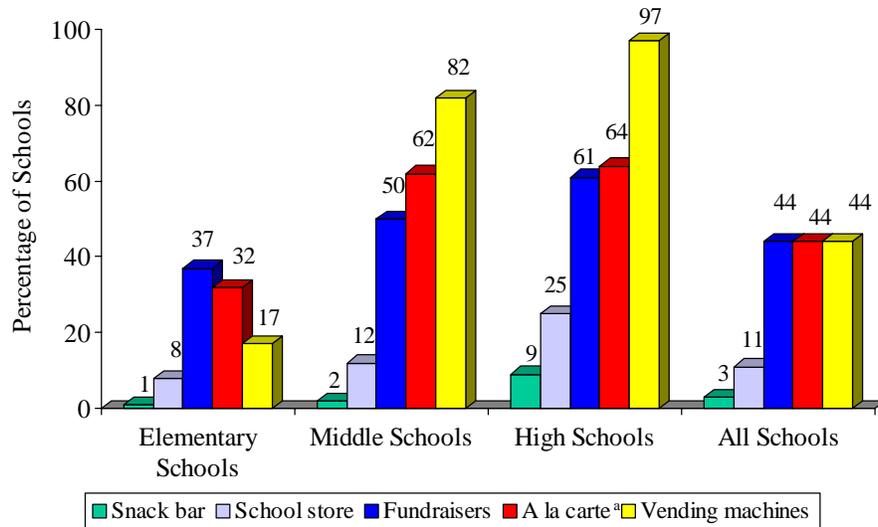
In recent years, interest in the healthfulness of foods offered in school meal programs has expanded to include competitive foods—foods and beverages sold on an a la carte basis in school cafeterias or through vending machines, snack bars, school stores, or other venues. Such venues may be operated by departments or groups other than the school foodservice program.

In school year 2004–2005, competitive foods were widely available, especially in middle and high schools (Figure 2). The most common sources of competitive foods were a la carte sales, fundraisers, and vending machines:

- Roughly one-third of elementary schools and close to two-thirds of middle and high schools had foods or beverages other than milk for sale on an a la carte basis during lunch periods.
- Fundraisers that focused on food or beverage sales occurred in 37 percent of elementary schools and 50 to 60 percent of middle and high schools, but were typically offered less than once a week.
- Vending machines were available in only 17 percent of elementary schools but were much more widespread in middle and high schools. Students in more than 80 percent of middle schools and all but 3 percent of high schools had access to vending machines.

FIGURE 2

COMPETITIVE FOODS WERE WIDELY AVAILABLE, ESPECIALLY IN MIDDLE AND HIGH SCHOOLS



Source: School Nutrition Dietary Assessment-III, Menu Survey of Food Service Managers and Principals (see Table III.6 and III.7 and A la Carte Checklist (see Table IV.8)

^aFood or beverages other than milk available during lunch.

According to principals' reports, income from vending machines located outside of the foodservice area usually went to school funds (57 percent). In 33 percent of high schools, some or all revenues went to the athletic department. In about one-fifth of schools, some portion of these funds went to the school foodservice department. Not including revenues that went to the foodservice department, 31 percent of schools earned \$100 to \$999 per month, and about 10 percent earned between \$1,000 and \$5,000 per month.¹

G. MEALS OFFERED AND SERVED

This section describes the food and nutrient content of meals offered and served in the NSLP and SBP, and assesses the proportion of schools meeting SMI standards and related benchmarks. Comparisons to the SNDA-II findings from school year 1998–1999 are also discussed.

¹ In most other cases (36 percent of all schools), the principal did not know the level of revenues; 20 percent of principals reported revenues of less than \$100 per month.

1. SMI Standards and Related Benchmarks

Before SMI, FNS had recommended that school breakfasts provide at least one-quarter of a student's daily needs and required that school lunches provide at least one-third of a student's needs. SMI and associated statutes formalized the requirements for energy (calories), protein, vitamin A, vitamin C, calcium, and iron (see Table 1). Standards for total fat and saturated fat were based on the 1995 *Dietary Guidelines for Americans*. SMI regulations recommended reducing sodium and cholesterol and increasing fiber in school meals, but no quantitative standards were established. To assess the levels of these dietary components, benchmarks for sodium and cholesterol were based on the National Research Council's (NRC's) 1989 *Diet and Health* study, as was done in the previous SNDA studies. The benchmark for fiber was based on a standard recommended by the Institute for Cancer Prevention—grams of fiber should be at least equal to age in years plus 5.

2. Methods for Analysis of Nutrient Content of Meals Offered and Served

Analyses of nutrients offered and served in school meals are similar to the unweighted and weighted nutrient analyses used by FNS to monitor whether school meals are meeting requirements. Analyses of the menu data are based on food groups in schools that used food-based menu-planning systems (meat/meat alternate, grain/bread, fruit/vegetable, milk) and on “menu items” (entrees, side dishes, and milk) in schools that used NSMP. For the unweighted analysis, nutrients in all the items offered that count for the same food group or menu item are simply averaged, and the average nutrients in each group or item are summed. This is interpreted as the average nutrients in the meal *as offered*, on the assumption that students could select any of the options. The weighted analysis incorporates data on how frequently each menu item was served/selected. The nutrients in the different options are weighted by how frequently they were served or selected, and then weighted averages for each food group or type of menu item are summed. These results are interpreted as representing the average nutrients in meals *as served to or selected by* students.²

3. Lunches Offered and Served in Public NSLP Schools

Using data on lunch menus provided by school foodservice managers, the study analyzed the types of foods offered in NSLP lunches, the proportions of schools offering meals that met the SMI standards, and the proportion of schools that offered students the *opportunity to select* a meal meeting SMI standards for total fat or saturated fat, if they selected items that would minimize the fat content of their meal.

² See Appendix C for further details.

TABLE 1

SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS USED
TO EVALUATE NSLP LUNCHES AND SBP BREAKFASTS

Nutrient	Standard/Recommendation	
	Lunch	Breakfast
SMI Nutrient Standards		
Based on 1989 RDAs		
Food energy (calories)	One-third of the REA	One-fourth of the REA
Protein, vitamin A, vitamin C, calcium, and iron	One-third of the RDA	One-fourth of the RDA
Based on 1995 Dietary Guidelines for Americans		
Total fat	≤ 30 percent of total calories	≤ 30 percent of total calories
Saturated fat	< 10 percent of total calories	< 10 percent of total calories
Other Nutrition Benchmarks		
National Research Council (NRC) 1989 Recommendations:		
Cholesterol	< 100 mg	< 75 mg
Sodium	< 800 mg	< 600 mg
Based on Institute for Cancer Prevention Recommendation		
Dietary Fiber	One-third of daily target	One-fourth of daily target

Note: “Other Nutrition Benchmarks” are not USDA requirements, but benchmarks used to assess dietary components for which USDA regulations do not provide a quantitative standard. Cholesterol and sodium benchmarks are one-third of the NRC daily recommendations for lunch and one-fourth of the NRC daily recommendations for breakfast.

RDA = Recommended Dietary Allowance; REA = Recommended Energy Allowance; SMI = School Meals Initiative for Healthy Children. Daily target for fiber = (age + 5) grams.

a. Food Choices

Students usually had a range of choices at lunch, particularly in secondary schools. The median number of fruit and vegetable options offered over the course of a week was 13 in secondary schools, and the percentage of menus offering *only* the minimum of two fruit/vegetable options per day was 27 percent, down from 37 percent at the time of SNDA-II. More than half of the schools (58 percent) offered students some type of fresh fruit and/or raw vegetables every day.

Food bars—which allow students to serve themselves, and may include many options—are another approach to offering variety to students. They were available at least once a week in 47 percent of high schools, 30 percent of middle schools, and 20 percent of elementary schools. Most were salad bars (available in 37 percent of high schools, 23 percent of middle schools, and

19 percent of elementary schools), which could be used to offer either entree salads or side salads. Eighteen percent of secondary schools and 13 percent of elementary schools offered a salad bar every day.

The type of milk offered most often was 1% low-fat milk (flavored and unflavored combined)—this was included in 83 percent of daily lunch menus. Whole milk appeared considerably less often (in 31 percent of daily lunch menus).

Lunch entrees varied by school type, but sandwiches with plain meat or poultry, such as turkey and ham sandwiches, were among the top five entrees for each type of school. Pizza with meat topping and entree salads (for example, chef's salad) were included in one-third or more of secondary school lunch menus.

b. Nutrients Offered and Served in NSLP Lunches Relative to SMI Standards

More than two-thirds of schools offered and served lunches that met SMI standards for protein, vitamins, and minerals at lunch (Figure 3); more than 85 percent of lunches *offered* met these standards, but slightly fewer lunches *served* did so. Although 71 percent of schools offered the required minimum for energy, only half of them served meals that met the energy standard, suggesting that students (given OVS) did not select all meal components. Elementary schools were more likely than middle or high schools to meet the energy standard for both lunches offered and served.

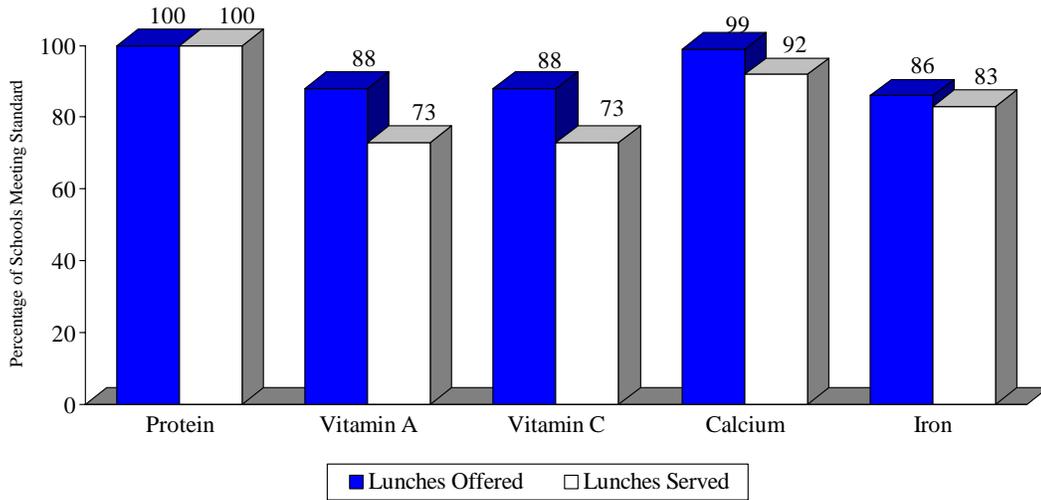
In most schools, lunches offered and served did not meet standards for fat and saturated fat (Figure 4). About 20 percent of schools offered and served lunches that met the total fat standard, and about 30 percent offered and served lunches that met the saturated fat standard. On average, school lunches both as offered and as served contained about 34 percent of energy from total fat and about 11 percent of energy from saturated fat. Thus, students' choices did not affect the fat content of their meals (as a percentage of energy).

Essentially no schools offered lunches that met the sodium benchmark; average sodium levels in school lunches were about twice the benchmark level. However, this result should be viewed in context. Other studies have found Americans of all ages consume much more sodium than recommended.

At the same time, almost all schools offered and served lunches consistent with benchmarks for fiber and cholesterol. However, only about five percent of lunch menus offered foods made from whole grains or dried beans, which are excellent sources of fiber.

FIGURE 3

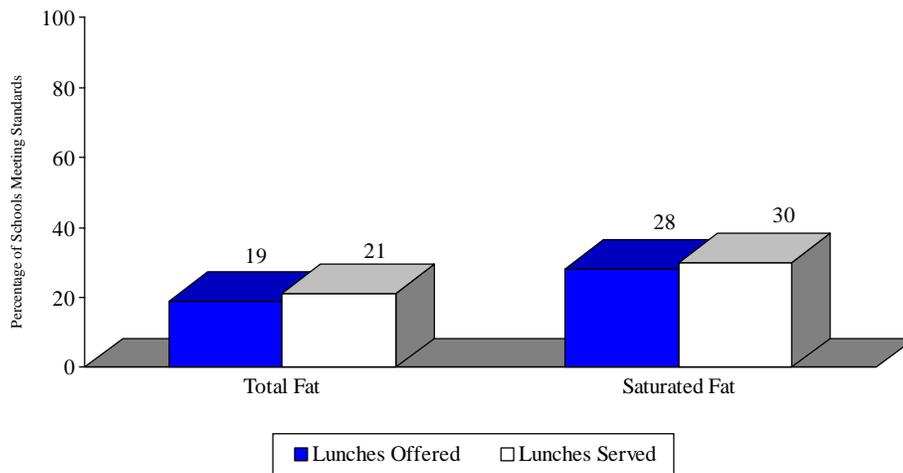
LARGE PROPORTIONS OF SCHOOLS MET SMI STANDARDS FOR KEY NUTRIENTS OFFERED AND SERVED IN NSLP LUNCHES



Source: School Nutrition Dietary Assessment-III, Menu Survey (see Tables VI.3 and VI.6).

FIGURE 4

LESS THAN ONE-THIRD OF SCHOOLS MET THE SMI STANDARDS FOR FAT AND SATURATED FAT IN NSLP LUNCHES



Source: School Nutrition Dietary Assessment-III, Menu Survey (see Tables VI.3 and VI.6).

c. Availability of Low-Fat and Low-Saturated-Fat Options at Lunch

One question was whether students could select a lunch that met SMI standards for fat and saturated fat if they made appropriate choices. Both low-fat and low-saturated-fat options (defined as full lunches that contained 30 percent of calories from fat or less, and less than 10 percent from saturated fat, respectively) were widely available (Figure 5). Ninety-three percent of elementary schools and 86 percent of secondary schools offered students the *opportunity to select* a low-fat lunch on a typical day. Ninety percent of elementary schools and 96 percent of secondary schools offered students the *opportunity to select* a low-saturated-fat lunch.

4. SBP Breakfasts Offered and Served in Public SBP Schools

Schools were more likely to offer and to serve SBP breakfasts that met SMI standards for total and saturated fat and key nutrients than NSLP lunches that met these standards.

a. Foods Offered

Breakfasts tend to have simpler menus than lunch, in part because they are not required to include entrees (in NSMP) or meat/meat alternates (in food-based menu planning). NSMP breakfasts must offer fluid milk and two side dishes. Food-based menu planning requires fluid milk; one serving of fruit or vegetable or 100% fruit or vegetable juice; and either two servings of bread/grains, two servings of meats/meat alternates, or one serving of each. The fruit/vegetable serving is most often juice (available in 88 percent of breakfast menus), and grains/breads are almost always available (on 95 percent of menus), particularly cold cereals (on 78 percent of breakfast menus). In contrast, meats or meat alternates and combination entrees were available on 40 and 35 percent of breakfast menus, respectively. The most popular meat/meat alternates were sausage (on 17 percent of menus) and yogurt (on 13 percent), while the most popular meat/grain combinations were breakfast sandwiches (on 13 percent); in general, only one meat/alternate or combination meat/bread option was offered per menu.

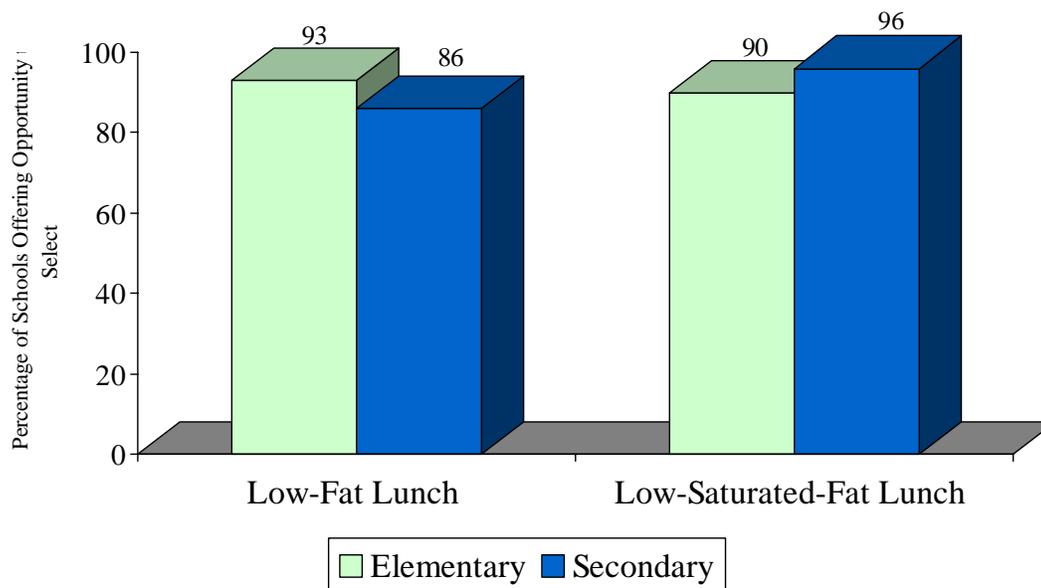
b. Nutrients Offered and Served in SBP Breakfasts Relative to Standards

Schools offered and served breakfasts that usually met standards for targeted nutrients (in more than 90 percent of schools for breakfasts offered, in more than 75 percent for breakfasts served). However, less than one-third of schools met the standard for energy (23 percent of schools met the standard for breakfasts offered, and 31 percent met the standard for breakfasts served). Elementary schools were more likely to meet the standard for breakfasts offered; surprisingly, secondary schools were more likely to meet the standard for breakfasts served than breakfasts offered, suggesting that students selected more energy-dense options at breakfast.

In contrast to energy, school breakfasts most often met the SMI standards for both total fat and saturated fat (88 and 81 for breakfasts offered; 75 and 69 for breakfasts served). Sodium in school breakfasts was higher than the NRC benchmark, but less so than at lunch. Fully 43 percent of schools offered breakfasts that met the sodium benchmark.

FIGURE 5

LOW-FAT AND LOW-SATURATED-FAT LUNCH OPTIONS WERE WIDELY AVAILABLE



Source: School Nutrition Dietary Assessment-III, Menu Survey (see Tables VIII.6, VIII.7 and VIII.9).

5. Comparisons with SNDA-II

SNDA-III used data collection and analytic methods similar to those of SNDA-II, to make it easier to analyze trends in the nutrient content of school meals over time. Some differences could not be avoided, however. Thus, differences in the nutrient content of the meals may reflect differences in the nutrient databases used, in coding of recipes and pre-prepared foods, or other factors. Nonetheless, differences discussed are large enough that they seem likely to reflect real trends. Because resources were not available to reanalyze the SNDA-II data, comparisons focus on the nutrient content of meals *as served*, as some relevant data on meals *as offered* are not available in the SNDA-II report.

a. Lunch

There were no major changes in the calories, vitamins, or minerals served in NSLP lunches between school year 1998–1999 (SNDA-II) and school year 2004–2005 (SNDA-III), particularly among elementary schools. Among secondary schools, there was a statistically significant decline in percentage of schools meeting the vitamin A standard for secondary students;

however, differences between the two studies in nutrient databases or default coding assumptions may have affected this result.

In contrast, some improvement occurred in saturated fat content of the average lunch served (a decrease from 12 to 11 percent of calories from saturated fat) and in the proportion of schools meeting the SMI standard for saturated fat (less than 10 percent of energy). The proportion of schools whose average lunch met the standard roughly doubled from 15 percent in 1998–1999 to 34 percent in 2004–2005 for elementary schools, and from 13 to 24 percent for secondary schools. The percentage of schools meeting the total fat standard did not change significantly.

b. Breakfast

In general, large proportions of schools served SBP breakfasts that met the RDA standards for SMI nutrients in both SNDA-II and SNDA-III, and changes were not statistically significant. Exceptions were vitamin C (for which the proportion of elementary schools meeting the SMI standard fell from 98 to 87 percent) and iron (for which the proportion of secondary schools meeting the standard increased from 57 to 78 percent). On the other hand, in both time periods, most schools fell short of the SMI energy standard.

Breakfasts made progress in meeting the standards for both total fat and saturated fat. There were statistically significant increases in the proportion of schools meeting the standards for total fat (from 75 to 88 percent) and in the proportion of schools meeting the standard for saturated fat—about 71 percent of schools met the standard for fat (versus 54 percent in 1998–1999).

I. INTRODUCTION

The U.S. Department of Agriculture (USDA) sponsors child nutrition programs to promote children's health and well-being by providing nutritious meals in schools, child care settings, and summer programs. The National School Lunch Program (NSLP) and the School Breakfast Program (SBP) provide subsidized meals to children in school, and provide these meals free or at a reduced price to children from low-income families. In school year 2004–2005, these two programs together provided benefits of nearly \$10 billion in cash and commodities. During this time, to address growing concerns about the high rates of child obesity, many State agencies, districts, and schools were establishing nutrition policies supplemental to USDA regulations that imposed additional requirements for school meals and for foods sold in competition with USDA school meals, known as “competitive foods.” Schools were also beginning to plan for the new Federal requirement that districts or schools offering USDA school meal programs develop a “wellness policy” that would set goals for nutrition education and physical activity and nutrition standards for all foods offered in schools. This requirement took effect in school year 2006–2007.

The Food and Nutrition Service (FNS) of USDA has sponsored the third School Nutrition Dietary Assessment study (SNDA-III) to provide up-to-date information on the school meal programs, the school environments that affect the food programs, the nutrient content of school meals, and the contributions of school meals to children's diets. The study builds on the methods used in two previous SNDA studies sponsored by FNS and, thus, allows some examination of trends over time. Mathematica Policy Research, Inc. (MPR) was awarded contracts by FNS to collect and analyze the study data and produce reports.

This report, the first of three volumes, focuses on the analysis of school meal program characteristics at the school level, as well as at the level of the School Food Authority (SFA) (usually a school district or a small group of districts that sponsors the school meal programs). A second volume focuses on characteristics of students who participate in school meals, student and parent satisfaction with the meals, and descriptions of the dietary intakes of schoolchildren. A third volume provides in-depth information on the sample design and data collection procedures used in the study.

The rest of this chapter provides an overview of the NSLP and SBP, as well as the research and policy context for this study. It also summarizes the study's sampling and data collection procedures and key methodological features, and describes the background characteristics of the SFA and school samples.

A. OVERVIEW OF THE NSLP AND SBP

The FNS Strategic Plan for 2000 through 2005 outlined two key targets for the agency: (1) reducing hunger among America's children, and (2) ensuring that USDA programs contribute to good nutrition for program participants. The NSLP and SBP play a central role in USDA's efforts to meet these objectives. Some of the key performance targets the plan set for these programs included:

- Ensuring that, by school year 2004–2005, 55 percent of children enrolled in school participate in the NSLP, and that 18 percent participate in the SBP (up from 51 and 13 percent, respectively, in school year 1995–1996).
- Ensuring that, by school year 2004–2005, NSLP and SBP meals provide fewer than 30 percent of calories from total fat and less than 10 percent of calories from saturated fat.
- Ensuring that the NSLP provides at least 33 percent of the 1989 Recommended Dietary Allowances (RDAs) for food energy and certain vitamins and minerals, and that the SBP provides at least 25 percent of the RDAs.

The SNDA-III analyses are part of an assessment of the success of the programs in meeting these targets using national data from school year 2004–2005. The study was shaped by a substantial history of studying school meals, as well as by complex research and policy environments. This section provides information on the background of the programs, previous research, changes during the 1990s, and the policy context the programs faced in 2007.

1. Early History and Structure of the National School Lunch and School Breakfast Programs

The NSLP provided \$7 billion in cash reimbursements in fiscal year 2005. Created in 1946, the program operates in nearly all public and many private schools throughout the country, providing reimbursement for nutritious meals to 27.5 million children each day in 2005 (USDA Food and Nutrition Service 2006). The NSLP's companion program, the SBP, was made a permanent Federal program in 1975. The SBP is implemented in a smaller number of schools and serves fewer children per school; in 2005 it provided about 8.7 million children per day with breakfast. A key objective of these programs is to ensure that children have access to healthy, well-balanced meals.

Although few restrictions have been placed on which schools can participate in the NSLP and SBP, participating schools face several key requirements. Schools must make meals available to all children and provide free and reduced-price meals to qualifying low-income children. NSLP and SBP meals must also meet nutrition requirements concerning their energy (calorie) and nutrient content. (These requirements are discussed in detail below.)

Decentralized Administration. The programs are Federally funded and administered through State child nutrition agencies and local SFAs. The Federal government establishes overall program rules, as expressed in legislation and regulations. The States convey these requirements to their SFAs, serve as conduits for meal reimbursements, provide technical

assistance, and monitor local schools and districts for compliance with established regulations. The individual SFAs have responsibility for determining student eligibility for free and reduced-price meals, and for offering meals that meet nutrient standards to all children who participate.

Eligibility for Free and Reduced-Price Meals. Children living in households with incomes at or below 130 percent of the poverty level are eligible to receive meals for free. Those with incomes between 130 and 185 percent of the poverty level are eligible to receive reduced-price meals, which are substantially subsidized by the program, with a maximum price of 40 cents for lunch and 30 cents for breakfast. Children from households with incomes greater than 185 percent of poverty are referred to as “paid” or “full-price” students; their meals are also subsidized, although to a much lower degree than are the meals for low-income children. (For example, SFAs received a reimbursement of 21 cents per full-price lunch and 23 cents per full-price breakfast in fiscal year 2005.)

The SFAs are responsible for determining the eligibility of students for free or reduced-price meals, largely by assessing applications submitted by households at the start of the school year. Other means of determining eligibility are available, however, including direct certification procedures based on evidence of the households’ receipt of means-tested public assistance.

Meal Requirements. Until 1995, to qualify for Federal reimbursements, school meals had only to follow prescribed meal patterns. The overall goal was to provide 25 percent of the RDA for energy (calories) and key nutrients at breakfast¹ and 33 percent of the RDA at lunch. The traditional meal pattern for lunch required four components (and five items): components are fluid milk, a meat or meat alternate, a bread or grain product, and fruits and vegetables, with two

¹ This goal of 25 percent of the RDA for breakfast was not officially established in regulations until 1995; however, it was used as a guideline in developing the meal patterns and assessing the SBP.

servings of different fruits and/or vegetables required.² Serving sizes for each item were specified for various age groups, but the meal pattern for grades 4–12 could be served to all grades in a school.

2. Previous Research

At its most basic level, the need for the proposed study arises from concerns about the food and nutrient intakes of the 27.5 million American schoolchildren who eat NSLP meals each day, as well as those of the 8.7 million who eat SBP meals each day. It is well established that at all ages, diet is an important aspect of health (U.S. Department of Agriculture and U.S. Department of Health and Human Services 2000). Furthermore, for most American children, food from the school cafeteria represents a significant amount of their overall energy intake on the days they attend school: on average, in 1994 through 1996, cafeteria foods provided 19 percent of calories for all schoolchildren, 34 percent of calories for NSLP-only participants, and about half of all calories for participants in both the SBP and NSLP (Gleason and Suitor 2001).

In light of these factors, USDA has for some time monitored the nutrition quality of the meals produced and consumed in schools under the NSLP and SBP, particularly because the school meals system operates at a very decentralized level, with most meal production decisions made in individual school districts and often in individual schools. No mechanisms exist to enable USDA to dictate the content of the meals centrally, and attempts to influence meal content have proved to be challenging. Thus, USDA must monitor school meal quality periodically to assess whether school meals are meeting nutrition goals. To do this, FNS has

² Two different fruits or two different vegetables may be used to meet the requirement. Fruit or vegetable juice could be counted as a fruit/vegetable serving, as long as the beverage contained at least 50% juice. In a 50% juice drink, only the juice portion counted toward the meal pattern.

sponsored a series of national studies to assess the role of the school meal programs in student's diets, including the three SNDA studies.³

In the early 1990s, in SNDA-I, MPR examined school meals offered and dietary intakes of schoolchildren (Burghardt et al. 1993a, 1993b, and 1993c, and Devaney et al. 1993). That study was extremely influential in shaping subsequent policy, largely because of its finding that, on average, 38 percent of calories from school lunches were obtained from fat. That figure was widely reported, and it had a significant effect on the policy climate because of its contrast to the 1990 dietary guideline that no more than 30 percent of calories should be derived from fat. SNDA-I also found that school lunches contained higher-than-recommended levels of saturated fat and sodium.

At the same time, SNDA-I found that school meals, on average, provided one-fourth of the RDA at breakfast and one-third at lunch for most vitamins and minerals, which was consistent with the SBP and NSLP targets. In addition, school meal participation led to higher intakes of several key nutrients, even after adjusting for other factors.

The SNDA-I findings concerning fat were one factor leading to legislation that altered the nutrition goals and menu-planning requirements of the school meal programs (as discussed further below). In addition, FNS increased training and technical assistance for school food service staff. Overall, these changes are known as the School Meals Initiative for Healthy Children (SMI). Based on menu data collected relatively early in the SMI implementation period, the SNDA-II study found that schools had made some improvement in meeting nutrition

³ The first study to assess the effects of the school nutrition programs, sponsored by FNS in 1980, was known as the National Evaluation of the School Nutrition Programs (NESNP-I) (Wellisch et al. 1983). The study collected data on student participation, dietary intakes, and household and school characteristics from approximately 6,500 students and their parents. These data were further analyzed by Devaney and Fraker (1989), who reanalyzed data on nutrients consumed at breakfast, and Fraker (1987), who examined sodium and macronutrients.

goals, but that policy objectives had not been fully met (Fox et al. 2001). Specifically, the percentage of calories from fat in school lunches was estimated as 33 to 34 percent, on average, which was lower than the SNDA-I finding but still above the *Dietary Guidelines* recommendation of no more than 30 percent.

The FNS-sponsored study by Gleason and Sutor (2001 and 2003) used data from the 1994–1996 Continuing Survey of Food Intakes by Individuals, a national survey of what people eat, to analyze the role of school meals in the dietary intakes of schoolchildren in the mid-1990s. Their work confirmed the SNDA-I finding that children who ate school meals had diets that were higher in fat than those of children who did not consume reimbursable meals. A new finding of theirs, however, was that the diets of children who ate school meals were lower in added sugars than the diets of children who did not.⁴

3. The School Meals Initiative

After the SNDA-I findings that school lunches did not meet the dietary guidelines for fat and saturated fat were released, USDA and Congress responded to the findings in several stages. First, USDA drafted regulations for SMI that created nutrient standards applicable to school meals so that they would be consistent with the *Dietary Guidelines*. The original proposal for SMI regulations also called for all school districts to replace the traditional menu-planning system with a computer-based system known as Nutrient Standard Menu Planning (NSMP).⁵ In November 1994, Congress passed the Healthy Meals for Healthy Americans Act (P.L.104-448), which required that schools in the NSLP and SBP serve meals consistent with the *Dietary*

⁴ Added sugars are sugars added to foods as sweeteners (such as cane sugar or high fructose corn syrup), rather than sugars inherently part of foods such as fruit and dairy products.

⁵ Assisted Nutrient Standard Menu Planning (ANSMP) was also proposed at this time and remains an option. ANSMP is a system whereby SFAs or schools obtain menus from an outside source that have been planned using NSMP.

Guidelines, but also required that USDA develop a food-based menu-planning system as an option. Final SMI regulations were published in 1995 and implementation began in school year 1996–1997. Later legislation allowed SFAs to comply with SMI nutrient guidelines using NSMP, the traditional menu-planning system, an enhanced food-based menu-planning system, or any reasonable approach.

SMI Nutrient Standards. A major change from past practice was that SMI required that school menus be evaluated for compliance with appropriate nutrition standards, in addition to compliance with menu-planning system requirements. Furthermore, SMI set nutrient standards that were consistent with the *Dietary Guidelines* (see Table I.1) and required schools to reduce the fat content of meals to no more than 30 percent of calories and the saturated fat content to less than 10 percent. As required in the 1995 legislation, the regulations formalized the standard that breakfasts should provide 25 percent of the RDA and retained the standard that lunch should provide 33 percent of the RDA for energy (calories), protein, vitamin A, vitamin C, calcium, and iron. In addition, the regulations encouraged reductions in sodium and cholesterol, and increased availability of fiber, without setting quantitative targets.

Menu-Planning Systems. Under SMI, schools participating in the NSLP and SBP have five options for planning menus that meet the programs' nutrition requirements:

1. ***Traditional Food-Based Menu-Planning System.*** The traditional system for lunch of four meal components and five food items (because of two different servings from the fruit/vegetable component), and minimum serving sizes by age/grade group, remains an option. Breakfasts must offer fluid milk, a fruit or vegetable, and two servings from either the bread/grain group or the meat/meat alternate group (or one of each).
2. ***Enhanced Food-Based Menu-Planning System.*** This system, which is similar to the traditional food-based system, requires more servings of grain products and larger serving sizes for fruits and vegetables.
3. ***Nutrient Standard Menu Planning.*** NSMP provides schools with more flexibility in planning menus. Foodservice staff can create their own menus, using

computerized nutrient analysis systems to ensure that the menus meet the programs' nutrition requirements. Lunch menus are required to offer milk, an entree, and one or more side dishes. Breakfast menus must offer milk and at least two side dishes.⁶

4. ***Assisted Nutrient Standard Menu Planning.*** ANSMP allows schools to contract with external sources for assistance with NSMP.
5. ***Other Reasonable Approaches.*** Schools may use any other reasonable approach to planning menus, as long as the menus still meet the nutrition requirements. However, such an approach usually must be approved by their State agency.

TABLE I.1
SMI NUTRIENT STANDARDS

Nutrient	Standard
Based on 1989 RDAs:^a	
Calories, protein, vitamin A, vitamin C, calcium, and iron	Breakfast: One-fourth of the RDA Lunch: One-third of the RDA
Based on 1995 Dietary Guidelines for Americans:^b	
Total fat	Breakfast and Lunch: ≤ 30 percent of total calories
Saturated fat	< 10 percent of total calories

^aNational Research Council (1989a).

^bU.S. Departments of Health and Human Services and Agriculture (1990, 1995). Regulations were based on the 1990 Dietary Guidelines from 1995 to 2000, and were updated to the 1995 Dietary Guidelines in May 2000.

RDA = Recommended Dietary Allowance; SMI = School Meals Initiative for Healthy Children.

4. Policy Context of SNDA-III

This study was conducted at a time of unparalleled public interest in the nutrition status of children and the role of foods eaten at school in affecting children's health. The incidence of overweight is increasing for virtually all groups of Americans, including schoolchildren. In 2006, the role of schools in preventing or reducing child obesity was featured in sources ranging

⁶ Side dishes may include bread/grain items, fruits, vegetables, or desserts. Schools can group side dishes so students must choose a variety of sides.

from a report from an eminent Institute of Medicine panel (Institute of Medicine 2006) to a cover story in the *New York Times Magazine* (Belkin 2006). Both USDA-funded school meals and competitive foods—such as a la carte snacks or entrees, vending machine offerings, or foods sold in a school store or snack bar—have been identified as policy targets, along with other school policies that affect students’ food consumption.

Competitive Foods. Many observers have reasoned that competitive foods in schools—many of which are high in calories and fat and low in nutrients—may be contributing to child obesity. For example, the American Academy of Pediatrics published a policy statement against having soft drinks available in schools (American Academy of Pediatrics 2004). They recommended that pediatricians work “to eliminate sweetened drinks in school,” and they were critical of pouring rights contracts with soft drink manufacturers (in which schools earn revenue by allowing manufacturers exclusive rights to sell beverages, other than milk, in their vending machines and, at times, in the cafeteria).

The widespread availability of competitive foods in schools has been well documented, both by the previous SNDA studies and by other sources (Weschler et al. 2001). This study provides information as of spring 2005 on school policies regarding competitive foods and specific types of competitive foods offered.

School Meals and the School Environment. The NSLP and SBP can play a prominent role in obesity prevention—particularly for the low-income students who receive free and reduced-priced meals—as these meals can constitute a substantial portion of a student’s daily intake. Providing students with access to balanced, nutritious meals can help improve the dietary choices that the students make.

In addition, aspects of the school environment other than the meal programs can affect children’s eating habits. These aspects include whether students are allowed to leave campus

during lunch periods, the timing and duration of lunch periods, whether younger children have recess before or after lunch (or not at all), and whether nutrition education is part of the school curriculum. Some of these issues have also been part of current or proposed policy initiatives.

B. STUDY RESEARCH QUESTIONS

Stated in its broadest terms, the objective of the SNDA-III study is to provide a basis for the next generation of school meal program policies and associated research. The data analyses provide a comprehensive picture of the nutrient content of meals offered and served to students in school year 2004–2005, as well as an assessment of whether and how well school meals meet nutrition standards. Although SMI nutrient standards pre-date the most recent Dietary Guidelines and the development of the new Dietary Reference Intakes (discussed in detail in Volume II), they are used to evaluate school meals because they are the current regulatory standards. In addition, the study provides national data on what schoolchildren eat on school days, and on the role in children’s diets of USDA-sponsored school meals and competitive foods sold in school. These results (presented in Volume II) have taken on particular importance amid the growing concern about child obesity.

Research questions examined in SNDA-III fit into four basic categories:

1. What are the characteristics of SFAs and schools participating in the NSLP and SBP? How do they provide school meals, what is the environment in which meals are offered, and to what extent are competitive food sources available?
2. What is the food and nutrient content of USDA meals offered and served to students? How well do these meals meet SMI nutrition standards?
3. What are the levels of school meal program participation and customer satisfaction, the characteristics of participants and nonparticipants, and the factors that affect participation and satisfaction?
4. What is the quality of schoolchildren’s diets and the role of school meals and competitive foods in their diets?

The analyses presented in this volume fit under the first two research areas and draw on data collected at the SFA and school levels. The subsequent chapters in this report address detailed research questions in each of these areas. Volume II presents analyses of the third and fourth research areas, using data on the dietary intakes of schoolchildren and data from interviews with students and their parents. As appropriate, both volumes compare current findings to those in the SNDA-I and SNDA-II reports and other relevant earlier studies.

C. STUDY DESIGN AND DATA COLLECTION METHODS

The SNDA-III study was designed to provide national estimates at the SFA, school, and student levels of analysis. This section provides an overview of the sample design and data collection, focusing on the SFA and school levels. Volume II presents similar information on the student-level data. Volume III of this report describes the design and data collection methods for the full study in detail.

1. Sample Design

SNDA-III was based on a multistage sampling approach, which first sampled SFAs, then schools served by these SFAs, and then children who attended these schools. Children were sampled from lists of all students enrolled at the sampled school. Parents of the sampled children were also interviewed. Substantive data for the study were obtained at each of these levels. This volume uses data from the first two stages only.

The SFA sample was divided randomly into two parts: (1) SFAs that would participate in SFA-, school-, student-, and parent-level data collection (*the student sample*); and (2) SFAs that would participate only in SFA- and school-level data collection (*the supplemental sample*). The latter sample was included to increase the precision level of the menu survey and school-level interview data; together, they comprised the *menu survey sample* at the SFA level.

For each sampled SFA, the sample design called for selecting three schools, if available: one elementary school, one middle school, and one high school. Within each school in the student sample, children were randomly selected as eligible for completing the dietary recalls; sample students and their parent or guardian were both interviewed, if possible. A subsample of students who completed the recall interview completed another dietary recall interview about a week later, to capture the variability of students' intakes from day to day.⁷

SFAs, schools, and students who declined to participate in the data collection were replaced by randomly chosen substitutes.⁸ The final sample of SFAs was 129 for the menu sample and 94 for the student sample (that is, 94 of the 129 SFAs were visited to collect data from students and their parents). The final sample of schools was 398 for the menu sample and 287 for the student sample (that is, 287 visited schools in the 94 SFAs).

2. Data Collection

MPR conducted most of the data collection from January through August 2005. Data were collected from SFA directors and their staff (SFA level), school foodservice managers and principals (school level), and parents and students (student level). In addition, field interviewers completed checklists during their visits to the schools sampled for student-level data collection. Table I.2 summarizes the data collection instruments included in the SNDA-III database. Because this volume focuses on the SFA and school levels of analysis, data collection instruments used at these levels are described, in brief, below.

⁷ Students in kindergarten and pre-kindergarten were omitted from the study because of concerns about their ability to provide accurate dietary recall information. For similar reasons, special education students in self-contained classes were also ineligible. Schools that served only these groups were also treated as ineligible.

⁸ In total, 35 replacement SFAs were released for recruiting, and 28 participated in the study.

TABLE I.2
SNDA-III INSTRUMENTS

Instrument	Respondent(s)	Mode
SFA Level		
Initial Contact Survey Part I	SFA director or designee	Telephone interview prior to visit or data collection (mailed upon request).
Survey of SFA Directors	SFA director	Telephone interview after visit or data collection (mailed upon request).
School Level		
Initial Contact Survey Part II	School staff in visited schools	Telephone interview prior to visit (visited schools only)
Menu Survey	School foodservice manager	Mail with intensive telephone training, technical assistance, and followup; in-person followup in 287 visited schools; the proportion a la carte form was completed by telephone after remaining menu survey forms were returned.
1. Daily Meal Counts Form		
2. Reimbursable Foods Form: Breakfast		
3. Reimbursable Foods Form: Lunch		
4. Recipe Form		
5. Self-Serve/Made-to-Order Bar Form		
6. Point-of-Sale Form		
School Foodservice Manager Survey	School foodservice manager	Telephone (mailed upon request) in 111 schools; in-person interview in 287 visited schools
Principal Survey	Principal	Telephone (mailed upon request) in 108 schools; in-person interview in 287 visited schools
Alternative Food Source Checklist	n.a.	Completed by interviewer during visit to 287 schools
A La Carte Checklist	n.a.	Completed by interviewer during visit to 287 schools
Vending Machine Checklist	n.a.	Completed by interviewer during visit to 287 schools
Student/Parent Level		
Student Dietary Recall and Interview	Student	In-person interview
Student Interview		
Day 1 Recall (plus parent-assisted recall for elementary school students)		
Day 2 Recall (plus parent-assisted recall for elementary school students)		
Weight and Standing Height Measurement	Student	In-person observation
Parent Interview	Parent	In-person interview for parent of elementary student/telephone interview for parent of secondary student

n.a. = not applicable.

a. SFA-Level Data

At the SFA level, the Initial Contact Survey (Part I) collected data on the characteristics of the three schools in the main sample from SFA staff, and the SFA Director Survey collected data on SFA characteristics and policies. The Initial Contact Survey asked, for each school, about participation in the NSLP and SBP, the type of menu-planning system used, enrollment, and numbers of reimbursable meals served. The SFA Director Survey collected data on SFA policies and practices regarding menu planning, food purchases, competitive foods, and other issues, such as nutrition promotion and meal pricing.

b. School-Level Data

At the school level, data were collected from the school foodservice manager and the principal. School-level data were also collected via checklists that field interviewers completed when they were on-site for the student-level data collection.

Menu Survey. The menu survey was completed by school foodservice managers, with help by telephone from trained technical assistants. The goal of the survey was to collect data on all foods offered in school breakfasts (if available) and school lunches over the course of a typical school week, along with information on the number of servings students selected of each food. The survey included the following forms:

- The Daily Meal Counts Form collected counts of reimbursable meals for each day of the target week by whether the meals were free, reduced price, or full price; in addition, dollar amounts of a la carte sales for each day were collected.
- The Reimbursable Foods Forms (one each for breakfast and lunch) included detailed lists of food items, portion sizes, the amounts of each food item available, and the amounts of each left over. A separate form was completed for each breakfast and lunch on each day of the target week.
- The Recipe Form supplemented the Reimbursable Foods Forms by collecting recipes for all items made by combining two or more foods or ingredients.

- The Self-Serve/Made-to-Order Bar Form described items included in various self-serve and made-to-order bars (for example, salad bars, deli bars).
- The Point-of-Sale (POS) Form recorded all locations within a school where food could be obtained, including an entry for each line in the cafeteria, and the proportions of foods sold as reimbursable meals at each location. These forms were generally completed by on-site observers or technical assistants.⁹

Data collected on the Daily Meal Counts Form and POS form were data-entered. Data provided on the remaining menu survey forms were used to create a “menu database” for each school. The menu database included, for each school, separate daily records for lunch and, where offered, for breakfast. Each day-and-meal-specific record (for example, the record for Monday lunch) included the following information for every item offered in reimbursable meals: food name/description; portion size; number of servings served or sold in reimbursable meals; and nutrient content per serving.¹⁰

School Foodservice Manager Survey and Principal Survey. These surveys collected information on school policies and practices. School foodservice managers were asked to provide descriptions of kitchen characteristics and practices with regard to vending machines, meal prices, meal counts, and meal periods. In addition, they were asked about accommodations for students with special dietary needs and availability of nutrition education programs. The Principal Survey collected information on mealtime policies (including whether students were allowed off campus and what the rules were about buying a la carte foods), other activities scheduled during mealtimes, vending machines, school stores and snack bars, after-school

⁹ These data were used to help identify the source of the foods the interviewed students ate; they were used in coding the dietary recall foods by source and in developing measures of students’ NSLP and SBP participation. See Appendix A of Volume II for more information on participation measures.

¹⁰ USDA’s Survey Net database was used for nutrient data; over 60 nutrients are available from this database. A list of the nutrients included is available at [www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/fndds_doc.pdf#nutrientlist].

programs, and nutrition education and promotion. These surveys were completed in person if possible in the schools visited for student data collection, and otherwise by telephone (or by mail upon request).

Alternative Food Source Checklist, A La Carte Checklist, and Vending Machine Checklist. These checklists were completed by field interviewers when they were on-site. The forms are thus only available for schools that were visited for the student data collection. Interviewers used the checklists to collect data on the availability of foods from various sources (school stores, a la carte in the cafeteria, snack bars, food carts, vending machines) that compete with reimbursable school meals, including details about the specific types of food available.

3. Response Rates of SFAs and Schools

Recruiting SFAs to participate in SNDA-III was challenging, for several reasons. School districts face many requests for information and requirements to complete forms related to various funding sources; they also have security and confidentiality concerns. In addition, participation in the SNDA-III study was challenging for districts and schools. All districts had to devote staff time to completing the various interviews, especially the menu survey, which could take several days of staff time overall. Districts were even more concerned about the student data collection, largely because of privacy and consent issues involved in interviewing students in school, and the burden on school staff of circulating and collecting consent forms.

To recruit SFAs, FNS and then MPR first contacted State child nutrition directors and requested that they contact sampled SFAs and encourage support of the study. Recruiters began to contact SFA directors by telephone in October 2004. Initial calls discussed the background and purpose of the study, as well as methods for student sampling and the scheduling of data collection. The recruiters also obtained information on the district's policy on research participation, district characteristics, and any recent changes in district configuration that were

not reflected in data originally used for sampling. Some districts had specific research requirements, such as submission of a research application, a review of survey instruments, or security checks of site visitors; the study team fulfilled these requirements where relevant.

Several strategies were used to persuade reluctant school districts to participate in the study. These included a letter from the director of the Child Nutrition Division of USDA, a telephone call from the survey director, intervention by the FNS project officer, and soliciting the encouragement of the State child nutrition director. These strategies met with mixed success. Reasons school districts cited for refusing to participate included skepticism about the usefulness of research in general, lack of resources, concerns about security and confidentiality, and concerns about intrusion on instructional time. When initially sampled districts refused to participate, recruiters contacted sampled replacement school districts.

Recruiting efforts led to an 83 percent response rate among SFAs in the full menu sample and a 79 percent rate among SFAs selected for student data collection (Table I.3).¹¹ This rate is based on all SFAs ever released for recruitment efforts, including replacements for those that refused. Essentially all nonresponse at the SFA level was due to refusals; only one SFA agreed to participate (and provided school-level data) but did not complete the SFA Director Survey.

After the SFA agreed to participate, schools in the SFA generally agreed as well. About 95 percent of schools in SFAs that agreed to participate completed the menu survey, our criterion for considering a school a completed sample case; 93 percent of schools selected for both school- and student-level data collection participated.¹²

¹¹ These response rates were weighted using raw sampling weights—prior to nonresponse adjustment. They thus reflect the proportion of SFAs or schools nationally represented in the sample.

¹² Response rates for the student sample are discussed in Volume II.

TABLE I.3
SNDA-III RESPONSE RATES AMONG SFA AND SCHOOLS

	Response Rate (Percentage)	Completed Sample Size
SFAs (Menu Sample)	83	129
SFAs (Student Sample)	79	94
Schools (Menu Sample)	95	398
Schools (Student Sample)	93	287

Source: School Nutrition Dietary Assessment-III.

Note: Response rates for schools reflect the percentage of eligible sample schools participating, given their SFA had agreed to participate. Response rates are weighted using raw sampling weights—that is, weights that correct for unequal probability of selection, before any nonresponse adjustments. For more information, see Volume III.

4. Background Characteristics of SFAs and Schools

Table I.4 shows the distributions of key subgroup characteristics among SFAs, weighted to be nationally representative, as well as, for each subgroup, the number of sample SFAs (unweighted) and the estimate of the number of SFAs nationally (weighted). Subgroups examined included district size (as measured by enrollment), urbanicity, child poverty (the child poverty rate for children ages 5 to 17 as measured in the 2000 Census), and region (using the seven FNS administrative regions). Given the relatively small size of the SNDA-III SFA sample, it is reassuring that the national estimates from these data closely match the estimates from the sample frame of over 2,000 SFAs from which the SNDA-III sample was selected (see Appendix Table A-I.1).¹³

¹³ Table I.4 also shows that weights have a substantial effect on the results at the SFA level, particularly for variables related to SFA enrollment, which is expected, because the sample of SFAs was selected with probability proportional to enrollment, and the weights were based on the inverse of the probability of selection.

TABLE I.4
CHARACTERISTICS OF PUBLIC SCHOOL FOOD AUTHORITIES (SFAs)

	Number of Sample SFAs (Unweighted)	Number of SFAs (Weighted)	Percentage of SFAs (Weighted)
Enrollment			
5,000 or fewer	43	11,600	86.0
More than 5,000	86	1,900	14.0
Urbanicity			
Primarily serves as a central city of MSA	46	900	6.8
Serves as MSA but not primarily its central city	55	5,400	39.9
Does not serve as MSA	28	7,200	53.3
Child Poverty Rate			
Low (less than 20 percent)	83	9,200	67.7
Higher (20 percent or more)	43	4,400	32.3
FNS Region			
Northeast	12	1,600	12.2
Mid-Atlantic	15	2,000	14.8
Southeast	27	1,200	9.2
Midwest	22	3,100	23.1
Southwest	22	1,100	8.2
Mountain-Plains	11	3,200	23.4
West	21	1,200	9.2
Number of SFAs	129	13,500	

Source: School Nutrition Dietary Assessment-III, Preliminary Survey, school year 2003-2004. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public SFAs offering the NSLP.

MSA = Metropolitan Statistical Area.

Key background characteristics of the school sample include the ranges of grades in each school, by their grouping into elementary, middle, and high schools; the school's enrollment; and the district's urbanicity, child poverty level, and FNS region (Table I.5). Our definitions of elementary, middle, and high schools match those used in the previous SNDA studies:

- **Elementary schools** are either (1) those with lowest grades between pre-kindergarten and 3rd grade, and the highest up through 12th grade; or (2) those with the lowest grade either 4 or 5 and the highest less than 8. Schools with grade ranges such as K-8 and K-12 are classified as elementary schools, so all schools fit into one or the other category.¹⁴
- **Middle schools** are schools in either of two situations: (1) the lowest grade is 4 or 5, and the highest grade is 8 or higher; or (2) the lowest grade is 6, 7, 8, or 9, and the highest is less than 10.
- **High schools** are those with either (1) both the lowest grade 6, 7, 8, or 9 and the highest grade 10 or above; or (2) the lowest grade 10, 11, or 12.

Table I.5 illustrates the various grade level configurations that fall under each category, and the weighted and unweighted counts of schools with each configuration. Despite the wide variations in grade levels shown in the table, it also shows that most middle schools include grades 6 to 8, most high schools are composed of grades 9 to 12 (although there were a few grade 6- or 7-12 high schools), and most elementary schools go from pre-kindergarten or kindergarten through grades 5 or 6.¹⁵

D. OVERVIEW OF ANALYSIS METHODS

In this section, we provide background on aspects of our analysis approach that apply throughout this report.

1. Analysis Samples

For consistency in the analyses, samples for each level of analysis were limited to observations with valid information on key data elements. At the SFA and school levels, the analysis samples were defined as follows:

¹⁴ This classification was chosen to be consistent with the SNDA-I and SNDA-II studies. Note that only 11 schools (2 K-12 and 9 K-8) fell into these categories.

¹⁵ Appendix A, Table A-1.2, shows characteristics of NSLP public schools by school type.

TABLE I.5
CHARACTERISTICS OF PUBLIC NSLP SCHOOLS

Characteristics	Number of Sample Schools (Unweighted)	Number of Schools (Weighted)	Weighted Percentage
Grade Level			
Elementary Schools	143	56,500	62.3
Pre-K - 3	2	1,400	1.4
Pre-K - 4	3	1,300	1.4
Pre-K - 5	26	12,600	13.9
Pre-K - 6	6	1,700	1.9
Pre-K - 8	4	2,400	2.6
K - 2	3	1,800	2.0
K - 3	5	2,000	2.2
K - 4	6	2,300	2.5
K - 5	35	11,500	12.7
K - 6	28	10,400	11.4
K - 8	9	3,700	4.0
K - 12	2	800	0.8
1 - 5	2	700	0.8
1 - 6	1	100	0.1
2 - 5	1	200	0.2
3 - 4	2	700	0.7
3 - 5	6	2,600	2.9
4 - 6	1	600	0.6
5 - 6	1	100	0.1
Middle Schools	127	16,900	18.7
4 - 8	2	100	0.1
4 - 12	1	<100	<0.1
5 - 8	10	2,600	2.9
5 - 12	1	100	0.1
6 - 7	1	200	0.3
6 - 8	80	10,400	11.4
7 - 8	24	2,900	3.2
7 - 9	5	400	0.4
8 only	1	100	0.1
9 only	2	2,200	0.2
High Schools	125	17,200	19.1
6 - 12	5	900	1.0
7 - 12	6	3,100	3.5
8 - 12	1	100	0.1
9 - 12	111	13,000	14.3
10 - 12	2	100	0.1
Enrollment			
Small (less than 500 students)	98	43,500	49.9
Medium (500 - 999)	167	35,200	40.3
Large (1,000 or more)	113	8,600	9.8

TABLE I.5 (continued)

Characteristics	Number of Sample Schools (Unweighted)	Number of Schools (Weighted)	Weighted Percentage
Urbanicity			
Primarily serves as a central city of MSA	156	29,000	32.0
Serves as MSA but not primarily its central city	161	32,100	35.5
Does not serve as MSA	78	29,500	32.5
District Child Poverty Level			
Low (less than 20 percent in poverty)	243	57,300	63.2
Higher (20 percent or more in poverty)	152	33,400	36.8
FNS Region			
Mid-Atlantic	42	9,400	10.4
Midwest	66	17,300	19.1
Mountain-Plains	30	12,200	13.4
Northeast	39	9,100	10.1
Southeast	81	17,300	19.1
Southwest	69	14,000	15.4
Western	68	11,400	12.5
Number of Schools	395	90,700	

Source: School Nutrition Dietary Assessment-III Pre-visit data, school year 2004-2005. U.S. Department of Education, Common Core of Data 2002-2003; U.S. Census, school district file for district poverty rate for children ages 5 to 17.

Note: Weighted estimates of numbers of schools have been rounded to the nearest hundred. Missing data were excluded from the weighted estimates.

MSA = Metropolitan Statistical Area.

- **SFA Sample:** Responded to the SFA Director Survey (n = 129).
- **School Sample:** Provided data for the Menu Survey (n = 398 overall, n = 397 lunch menus and n = 331 breakfast menus).¹⁶ The full Menu Survey samples are used in the analysis of meals offered and served. In the analysis of SFA and school characteristics, the staff surveys were of critical importance, so the main sample analyzed was defined as those schools that completed the Menu Survey and the Principal Survey (n = 395).

¹⁶ The sample includes one school that provided lunch menus but not breakfast menus and one school that provided breakfast menus but not lunch menus, although both schools offered the SBP.

2. Weighting and Estimation

All analyses in this report are weighted so that the sample is nationally representative. The final weights adjust both for unequal probabilities of selection at each stage of sampling and for nonresponse at each stage of data collection. Instead of preparing separate weights for each data collection instrument, one weight was developed for the SFA level of analysis, and one for the school level of analysis. These final weights were based on the largest analysis samples at each level (129 SFAs and 398 schools).

Because of the complex sample design for the SNDA-III study, when standard errors were estimated and/or statistical tests were conducted for this report, estimates were adjusted for the complex study sample design using the SUDAAN statistical package (Research Triangle Institute 2006). Standard errors are explicitly presented only for the estimates of the nutrients in school menus (see Appendixes D and E). Because of the descriptive nature of this report and the relatively small size of the SFA and school samples, statistical tests of differences between subgroups were not conducted for the analyses of SFA and school characteristics. Only very large differences are likely to be statistically significant, and comparisons thus should be viewed with caution. However, for the analyses of school menus, all differences highlighted in the text were tested for statistical significance.

3. Statistical Reporting Standards

To help readers assess the reliability of the estimates, we are applying reporting standards based on those of the joint USDA/National Center for Health Statistics Working Group (Federation of American Societies for Experimental Biology 1995). Specifically, based on a rough estimate of 1.5 for the average school-level design effect, data are not reported for any subgroup with less than 44 schools or SFAs—tables show a dash instead of numbers. For the nutrient data, estimates that have a coefficient of variation greater than 0.3 were flagged with a ~,

and percentages (but not percentiles) in the tails of a distribution (less than 25 percent or greater than 75 percent) were similarly flagged when the number of observations represented by the percentage p ($p*n$, where n is the sample size) or by $(1-p)*n$ is less than 12 (8 times the estimated design effect of 1.5).

E. PLAN OF THE REPORT

The rest of this report is divided into two parts. The first part provides a description of the characteristics of public SFAs and schools, including characteristics of the school foodservice (Chapter II); the food environment in the schools, including competitive foods policies (Chapter III); and the types of competitive foods offered (Chapter IV). The second part describes the food and nutrient content of meals offered and served at participating schools, and how well they meet the SMI standards—including types of foods offered (Chapter V), nutrient content of lunches offered and served (Chapter VI), nutrient content of breakfasts offered and served (Chapter VII), and comparisons to SNDA-II results (Chapter VIII).

II. SCHOOL FOODSERVICE OPERATIONS

Policymakers are concerned about improving the dietary quality of school meals, as reflected in the Food and Nutrition Service (FNS) Strategic Plan for 2000–2005. As discussed in Chapter I, FNS began to address these concerns through the School Meals Initiative for Healthy Children (SMI) in 1996. Implementation has been gradual. Because USDA has given local programs considerable discretion in how they implement SMI, it is of interest to document the range of approaches to school foodservice operations that School Food Authorities (SFAs) use. This chapter provides information on school foodservice operations under SMI in the 2004–2005 school year. These data will help programs and policymakers understand how school food services function and how these operations may affect student participation, the quality of school meals, and, ultimately, the quality of students' diets.

The SNDA-III analysis addressed the following research questions concerning school foodservice operations:

- What meals are served by the school foodservice? What proportion of SFAs and schools offer the School Breakfast Program (SBP) and the After-School Snack Program?
- What types of food production systems are SFAs and schools using? What proportion of SFAs use foodservice management companies, and what functions do they typically handle?
- How are school menus planned?
- What policies and procedures do SFAs follow to ensure food safety?
- What types of purchasing systems do SFAs use?
- What approaches to meal counting and pricing are used?

Data to address these questions are from the SNDA-III SFA Director Survey, the Principal Survey, the Initial Contact Survey (which included questions on menu planning), and the

Foodservice Manager Survey. In addition, some information is drawn from the SNDA-III Preliminary Survey, a survey one year earlier (in school year 2003–2004) of about 2,300 SFAs, which comprised the sample frame from which the SNDA-III SFAs were selected.¹

A. SUMMARY OF FINDINGS

- During the 2004–2005 school year, most SFAs offered the SBP in some or all schools, resulting in about 85 percent of public schools overall offering school breakfasts to students. Nearly one-quarter of SFAs offered the NSLP After-School Snack Program; the program was more common in large districts, urban districts, and districts with high poverty levels.
- The majority of schools (70 percent) prepared meals on-site that would only be consumed by their own students and staff. A smaller proportion of schools received fully or partially prepared meals from an outside kitchen (19 percent), or prepared meals that could be consumed on-site as well as distributed to other schools for consumption (11 percent).
- Less than 15 percent of SFAs contracted with a foodservice management company. These contracts were concentrated in the Mid-Atlantic, Northeast, and Midwest regions.
- Almost half of schools used the traditional food-based menu-planning system, 30 percent used the nutrient-based menu-planning system, and 22 percent used the enhanced food-based menu-planning system. Most menus were planned at the district or SFA level.
- Most SFAs required staff to receive training in food safety and sanitation—71 percent required training for new staff, and 60 percent required periodic training for current staff. Food safety and sanitation training was typically a part of general training. The majority of SFAs (83 percent) reported visiting schools to monitor food handling and sanitation practices at least once a month.
- SFAs used a variety of approaches to food purchasing, the most popular of which was belonging to a purchasing cooperative (62 percent). Other purchasing arrangements included the Department of Defense’s Fresh Fruit and Vegetable Program (15 percent), and farm-to-school programs (10 percent).
- The average full price for a school lunch was \$1.60, and the most common (modal) price was \$1.50. For breakfast, the average full price was \$0.88, and the most

¹ This report presents tabulations from these data using only the SNDA-III SFA sample, in general. However, data for the full Preliminary Survey sample are presented for topics that were pursued in the Preliminary Survey but not in SNDA-III, because they required a large sample of SFAs. Preliminary Survey tables are based on tabulations prepared by Logan and Kling (2005).

common price was \$1.00. Overall, prices were higher in large schools, high schools, suburban schools, and low-poverty schools.

- Almost all elementary and middle schools (78 percent of elementary schools and 93 percent of middle schools) used the offer-versus-serve (OVS) option when determining whether a student had selected a reimbursable meal.² Personal identification numbers were the most common means of recording reimbursable meals and tracking which students received a free or reduced-price meal; nearly half of schools used this method.

The rest of this chapter presents descriptive analyses of school foodservice operations in public SFAs and schools offering the NSLP. First, it presents the prevalence of the SBP and the NSLP After-School Snack Program in SFAs and public schools. It then describes food preparation, foodservice management, and menu-planning approaches. The next sections discuss food safety policies, and then food-purchasing policies and practices, such as specific types of contracts, guidelines on buying locally grown produce, and nutrition requirements on purchasing contracts. The chapter concludes with an examination of meal-pricing and -counting policies, which considers factors that influence the price of reimbursable meals, average and modal prices for school breakfasts and lunches, use of the OVS option, and how schools tracked which students receive free or reduced-price meals at checkout.

B. PROGRAMS OFFERED

The SNDA-III study is representative of public SFAs that offer the National School Lunch Program (NSLP). Most of the SFAs and schools that offered the NSLP in the 2004–2005 school year also offered the SBP (Table II.1); approximately 90 percent of public SFAs offered the SBP at some or all of their schools, and approximately 85 percent of public schools served SBP

² OVS is the term used for a policy that allows students to take less than the minimum number of meal components offered, in order to minimize plate waste. For instance, in schools using food-based menu systems, OVS allows students to select three of the five required NSLP meal components and still be counted as receiving a reimbursable lunch. All high schools must use OVS.

TABLE II.1

SBP PARTICIPATION AMONG PUBLIC NSLP SFAs AND SCHOOLS
(Percentage of SFAs or Schools)

Program	SFAs	Elementary Schools	Middle Schools	High Schools	All Schools
SBP	91.1	85.0	90.1	82.3	85.4
Number of SFAs or Schools	129	143	127	125	395

Source: School Nutrition Dietary Assessment-III, Preliminary Survey (for SFA data), school year 2003–2004; Initial Contact Survey (for school-level data), school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public SFAs or schools offering the NSLP.

Note: Full sample sizes are shown. Five SFAs and 11 schools were omitted from the tabulations because of missing data.

breakfasts. The SBP has grown extensively since the early 1990s; at the time of SNDA-I, in the 1990–1991 school year, 44 percent of NSLP schools offered the SBP, and at the time of SNDA-II (school year 1998–1999), 76 percent of public NSLP schools offered the SBP (Burghardt et al. 1993a; Fox et al. 2001). Factors behind the expansion included research suggesting that breakfast affects children’s learning and campaigns by antihunger groups and the school nutrition community. Lawmakers have taken notice—for example, the District of Columbia makes free breakfasts available to all schoolchildren, State legislatures in 26 States have passed laws requiring some or all schools to offer the SBP (with requirements generally tied to the percentage of free- or reduced-price-eligible students), and 25 States have provided State-level funding to expand the program or to supplement reimbursements in certain schools (Food Research and Action Center 2005).

In 1998, Congress authorized USDA to fund after-school snacks for school-sponsored educational or enrichment programs through the NSLP. Based on the SNDA-III Preliminary Survey, the NSLP After-School Snack Program was available in 23 percent of SFAs in school

year 2003–2004, up from 16 percent in school year 1999–2000 (Abraham et al. 2002). The snack program was more likely to be available in large districts, urban districts, and districts with high levels of child poverty (Table II.2).³

TABLE II.2
 AVAILABILITY OF THE NSLP AFTER-SCHOOL SNACK PROGRAM
 IN SOME OR ALL SCHOOLS
 (Percentage of SFAs)

SFA Subgroup	Percentage Participating in NSLP After-School Snack Program
SFA Size	
Small (enrollment less than 1,000)	15.3
Medium (enrollment 1,000 to 4,999)	23.1
Large (enrollment more than 5,000)	48.8
SFAs Located in Area That	
Primarily serves as a central city of MSA	56.4
Serves as MSA but not primarily its central city	17.1
Does not serve as MSA	22.3
SFAs with Child Poverty Rate	
Low (less than 20 percent)	16.3
Higher (20 percent or more)	40.1
All SFAs	23.0

Source: School Nutrition Dietary Assessment-III, Preliminary Survey, school year 2003–2004. From Logan and Kling (2005), Table B.9.

Note: SFA poverty levels refer to the percentage of schoolchildren in families with income less than 100 percent of poverty, based on 2000 census data. Higher-poverty areas are defined as those with 20 percent or more of schoolchildren in poverty.

MSA = Metropolitan Statistical Area.

³ USDA also funds after-school snacks through the Child and Adult Care Food Program, but such snacks were outside the scope of this study.

C. FOOD PREPARATION AND FOODSERVICE MANAGEMENT

Most schools prepared food on-site. More than two-thirds of schools (70 percent) prepared meals on-site for consumption only on-site, 19 percent of schools received fully or partially prepared meals from a base or central kitchen, and 11 percent of schools prepared meals on-site for service on-site and shipment to other schools (Table II.3). About 5 percent of SFAs used central or commissary kitchens, including 15 percent of large (more than 5,000 enrolled) SFAs (not shown in table; Logan and Kling [2005], Table B-11). Elementary schools were much more likely than middle or high schools to receive partially prepared or fully plated meals from a central or base kitchen. In contrast, high school kitchens were twice as likely as elementary or middle schools to prepare meals for other schools.

Some SFAs contracted with foodservice management companies (FSMCs) to run all or part of their foodservice operations. Overall, 13 percent of SFAs contracted with FSMCs (Table II.4). These contracts were more common in large or medium-sized districts than in small districts and in lower-poverty areas than in high-poverty areas. In SFAs with such contracts, FSMCs generally handled food purchasing (in 73 percent of SFAs with contracts) and food preparation and service (55 percent) on their own, while SFAs generally provided and maintained equipment and facilities (73 percent). Administrative functions were about equally likely to be handled by the SFA, by the FSMC, by joint work, or by a combination of these methods (see Appendix Table A.II.1).⁴

⁴ Under Federal regulations, some administrative functions must be handled by the SFA, but this question did not distinguish which functions each handled. Specifically, under Federal regulations, SFAs retain the responsibility for determining children's eligibility for free or reduced-price meals, and for ensuring that claims for reimbursement include only reimbursable meals, and that FSMCs are only paid for allowable costs.

TABLE II.3
LOCATION OF FOOD PREPARATION AND PRODUCTION
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Among All Schools: (n = 395)				
Location of Food Preparation				
All meals prepared on-site for serving on-site only	65.7	76.6	77.7	70.1
Meals prepared on-site for serving on-site and shipment to other schools	8.5	9.7	19.8	10.9
Received partially or fully prepared meals from base or central kitchen	25.7	13.7	2.4	19.1
Received Fully Plated Meals Prepared Off-Site	9.3	3.7	1.7	6.8
Among Schools That Did Not Receive Fully Plated Meals: (n = 362)				
Received Chilled or Frozen Foods That Had to Be Heated	77.9	89.3	72.5	79.0
Assembled or Completed Assembly of Food Items (e.g., sandwiches)	92.6	97.4	95.9	94.2
Number of Schools	143	127	125	395

Source: School Nutrition Dietary Assessment-III, Foodservice Manager Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: One school did not answer the questions about location of meal preparation and fully plated meals, and 11 did not answer the question about food assembly.

TABLE II.4
 USE OF FOODSERVICE MANAGEMENT COMPANIES
 (Percentage of SFAs)

	Percentage of SFAs Contracting with Foodservice Management Companies
All Public SFAs	13.4
SFA Size (Enrollment)	
Small (less than 1,000)	10.0
Medium (1,000 to 4,999)	16.0
Large (5,000 or more)	16.9
Child Poverty Rate	
Low (less than 20 percent)	14.8
Higher (20 percent or more)	9.6
SFAs Located in Area That	
Primarily serves as a central city of MSA	26.2
Serves as MSA but not primarily its central city	20.3
Does not serve as MSA	5.5
Region	
Northeast	20.4
Mid-Atlantic	35.2
Southeast	1.0
Midwest	16.7
Southwest	7.8
Mountain Plains	3.5
West	10.3
Number of SFAs	2,054

Source: School Nutrition Dietary Assessment-III, Preliminary Survey, school year 2003-2004.
 From Logan and Kling (2005), Table B-16.

D. MENU PLANNING

FNS has always required schools to plan their menus according to specific rules, to ensure that Federally subsidized meals meet specific nutrition standards. The SMI provided a new menu-planning system—nutrient standard menu planning (NSMP)—which allowed districts greater flexibility in the types of foods offered, but required use of nutrient analysis software to analyze the nutrient content of school menus in order to plan meals that meet age/grade-appropriate nutrition standards. Because of concerns about staff burden, the school nutrition community protested proposals to require NSMP to be used by all SFAs. The final SMI regulations also included the traditional or enhanced food-based meal-planning systems as options; however, SFAs using food-based menu-planning systems must also meet SMI nutrition standards (see Chapter I for further discussion).

Nearly half (48 percent) of schools in the 2004–2005 school year used the traditional food-based menu-planning system, 30 percent used the nutrient-based menu-planning system, and 22 percent used the enhanced food-based menu-planning system (Table II.5).⁵ About three-quarters of schools reported that menus were planned at the district or SFA level, about 20 percent said the school planned the menus or worked with the district to plan menus, and 8 percent said menus were planned by a foodservice management company.⁶ About 40 percent of schools were in districts where the menus were planned by a master’s-level nutritionist, licensed nutritionist, or registered dietitian. Elementary and middle schools were more likely (44 percent) to be in districts with menu planners with these credentials than high schools (31 percent).

⁵ In Table II.5 and the rest of this report, Assisted NSMP schools are grouped with NSMP schools.

⁶ Responses were not mutually exclusive.

TABLE II.5
MENU-PLANNING POLICIES AND PROCEDURES
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Menu Planning Method Used:				
Nutrient-Based ^a	31.1	28.0	28.6	30.0
Enhanced Food-Based	21.5	24.2	19.4	21.6
Traditional Food-Based	47.4	47.8	52.0	48.4
Level Responsible for Menu Planning:^b				
District	52.4	53.0	40.1	50.1
SFA	29.8	23.5	23.2	27.4
This school	5.1	12.0	28.3	10.9
Foodservice management company	8.9	7.1	7.7	8.3
Shared district and school	7.1	8.3	8.7	7.6
Other	6.0	5.6	5.8	5.9
Off-site kitchen	1.2	0.0	0.0	0.8
Credentials of SFA's Primary Menu Planner:^{b,d}				
On-the-job training	39.6	39.7	56.4	42.8
Registered dietitian	32.3	25.9	20.3	28.8
Bachelor's degree in family and consumer science, hotel/restaurant management, baking/culinary arts, etc.	27.2	26.0	19.5	25.5
School Nutrition Specialist and/or SNA certified ^e	23.4	23.3	17.1	22.2
State foodservice certificate	22.0	20.0	19.9	21.2
Master's-level nutritionist	18.5	23.5	12.7	18.4
Associate's degree in family and consumer science, hotel/restaurant management, baking/culinary arts, etc.	10.2	7.6	7.7	9.2
Licensed nutritionist	9.7	10.3	6.7	9.2
Highest Credential of Menu Planner				
Master's level or licensed nutritionist or registered dietitian	44.0	44.4	31.4	41.7
Bachelor's in nutrition	14.6	15.6	11.9	14.3
ASFSA certificate	11.7	12.1	10.0	11.5
Associate's degree or State certificate	11.9	6.3	11.2	10.7
No formal training ^f	17.7	21.7	35.5	21.9
USDA Tools Used to Assist Menu Planning:^{b,d}				
<i>Food Buying Guide for Child Nutrition Programs</i>	78.0	83.3	73.9	78.2
<i>Serving It Safe: A Tool Kit (Second Edition)</i>	52.9	55.5	45.9	52.1
<i>Menu Planner for Healthy School Meals</i>	50.1	47.1	60.1	51.9
<i>Healthy School Meals Training Program</i>	49.7	52.4	54.6	51.1
<i>Fruits and Vegetables Galore</i>	54.5	52.6	35.1	50.1
<i>Quantity Recipes for School Foodservice</i>	48.0	47.5	41.9	46.7
<i>Serving It Safe Training Video</i>	37.0	32.8	30.5	35.0
<i>Serving It Safe: A Tool Kit for Managers</i>	35.1	33.5	26.8	33.2
<i>Changing the Scene: Improving the School Nutrition Environment</i>	30.0	31.9	37.7	31.8

TABLE II.5 (continued)

	Elementary Schools	Middle Schools	High Schools	All Schools
<i>New School Lunch and Breakfast Recipes/Tool Kit for Healthy School Meals</i>	28.1	25.9	24.4	27.0
<i>First Choice (Second Edition)</i>	25.8	30.4	22.6	26.1
<i>Nutrient Analysis Protocols: How to Analyze Menus for USDA's School Meals Programs</i>	22.0	20.4	34.9	24.2
<i>Choice Plus: A Reference Guide for Foods and Ingredients</i>	23.7	20.9	27.5	23.9
<i>Team Nutrition Guide to Purchasing Foodservice Equipment</i>	23.5	20.8	27.0	23.7
<i>Assisted NuMenus Guidance: School Lunch and Breakfast Menus</i>	19.8	19.3	27.2	21.1
<i>Fight Bac Managers' Self-Inspection Checklist</i>	18.9	18.8	13.1	17.8
<i>Community Nutrition Action Kit</i>	12.8	14.6	22.2	15.0
<i>Cooking a World of Tastes (video)</i>	7.4	6.9	4.9	6.8
Other	8.9	8.7	5.1	8.2
Used a Cycle Menu	54.0	55.6	38.4	51.3
Mean Length of Cycle in Days ^c	25	21	21	23
Nutrient Analysis in SFA: ^d				
Analysis was weighted	30.8	26.4	28.1	29.5
Analysis was unweighted	18.7	19.4	19.9	19.0
Both	18.0	20.1	19.6	18.7
No nutrient analysis conducted	32.5	34.1	32.5	32.8
Among Schools in SFAs That Conducted Nutrient Analysis for Breakfast and Lunch (n = 259), Type of Analysis^d				
Separate	75.2	77.4	68.1	74.4
Combined	19.9	16.8	24.6	20.1
Only analyzed lunch	4.5	4.8	6.6	4.9
Among Schools in SFAs That Used a Computerized System for Conducting Nutrient Analyses (n = 215), Software Used for Nutrient Analysis of Menus:^{b,d}				
NutriKids	74.8	81.1	83.9	77.5
PCS Revenue Control Systems	2.9	2.7	1.4	2.6
Keeping TRAC	2.1	2.1	3.0	2.2
Visual B.O.S.S. (Back Office Software Solutions)	2.1	2.9	1.6	2.2
B.O.S.S. (Back Office Software Solutions)	0.7	0.9	0.0	0.6
CAFS (Computer Assisted Foodservice)	0.6	0.5	0.3	0.5
Other commercial point-of-sale software	16.9	9.9	9.9	14.4
Number of Schools	143	127	125	395

TABLE II.5 (continued)

Source: School Nutrition Dietary Assessment-III, Initial Contact Survey, SFA Director Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 395 schools; 12 respondents did not answer the question about who was responsible for menu planning, 8 did not answer the question about credentials of menu planner, 3 did not answer the question about USDA tools, 28 did not answer the question about cycle menus, 34 did not answer the question about weighted versus unweighted nutrient analysis, and 3 did not answer the question about software.

^aNutrient-based methods included NSMP and Assisted NSMP.

^bMultiple answers allowed.

^cMinimum length of menu cycle was five days across all schools. Maximum length of cycle was 90 days in elementary schools and 80 days in middle and high schools.

^dSFA-level variables (from SFA Director Survey) were applied to each school in the SFA.

^eSNA = School Nutrition Association. Before 2004, it was known as the American School Foodservice Association.

^fIncludes responses “on-the-job-training” and “none of the above.”

The SMI regulations specified that schools would be evaluated based on a weighted analysis of the nutrient content of their menus in a typical school week. Essentially, the average nutrient content of a week’s meals would be assessed by weighting the nutrients in each food by the proportion of students that selected that item (estimated from past foodservice production consumption records). Many nutrient-based menu-planning programs provide for such weighted analyses. However, it is challenging for many schools to collect the production data needed for weighted analysis, so USDA allows use of an unweighted nutrient analysis under a waiver provided by Congress, which is available until September 30, 2009. The unweighted menu analysis gives equal weight to all choices in each meal-component group in computing the

average levels of nutrients for the meal component. Then, the average nutrients in each meal component are summed to estimate the nutrients in an average meal.⁷

About two-thirds of schools are in districts that conduct ongoing nutrient analysis of their menus—30 percent of schools are in districts that conduct only weighted analyses, 19 percent are in districts that conduct only unweighted analyses, and 19 percent are in districts that conduct both types of analyses (Table II.5A). As expected, the type of nutrient analysis varies by menu-planning method. Surprisingly, in 20 percent of schools with nutrient-based menu planning, SFA directors reported that they did not do nutrient analysis.⁸ Schools with nutrient-based menu planning most commonly used only weighted analysis (54 percent), but about one-quarter used unweighted analysis or both types. In contrast, fully half of schools using enhanced

TABLE II.5A
METHOD FOR NUTRIENT ANALYSIS OF MENUS, BY MENU-PLANNING SYSTEM
(Percentage of Schools)

	Traditional Food Based	Enhanced Food Based	Nutrient Based	All Schools
Nutrient Analysis:				
Analysis was weighted	25.0	2.5	53.6	29.5
Analysis was unweighted	21.8	18.7	15.4	19.0
Both	19.5	28.3	11.1	18.7
No nutrient analysis conducted	33.6	50.5	19.9	32.8
Number of Schools	173	81	107	395

Source: School Nutrition Dietary Assessment-III, SFA Director Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

⁷ See Chapter VI for a discussion of how our analyses of nutrients in meals offered and served parallels the unweighted and weighted analyses that SFAs and State regulators use to evaluate school menus.

⁸ Reasons for this result are unclear. It is possible the respondent thought the question applied to her/him specifically, rather than the district.

food-based menu planning and two-thirds of schools using traditional food-based menu planning reported that they conducted nutrient analysis of their menus, although they are not required to do so. Almost no schools using enhanced food-based menu planning used only weighted analysis (3 percent), but 28 percent reported using both weighted and unweighted analyses. Traditional menu-planning schools were more likely to be in districts using only weighted analyses (25 percent), but others used only unweighted analyses (22 percent) or both types (20 percent).

E. FOOD SAFETY AND SANITATION

High-quality food safety and sanitation practices are critical for any foodservice program. Most SFA directors reported that they required staff to receive training in food safety and sanitation—71 percent required training for new staff, and 60 percent required periodic training for current staff (Table II.6). Food safety and sanitation training was typically a part of general training. Eighty-three percent of SFA directors reported they visited schools to monitor food-handling and sanitation practices at least once per month. Thirty-five percent of SFA directors reported having a formal Hazard Analysis and Critical Control Points (HACCP) plan.

F. FOOD PURCHASING

SFAs used a variety of approaches to food purchasing. Fifteen percent reported they participated in the Department of Defense's Fresh Fruit and Vegetable Program (a program that uses military distribution channels to make fresh produce more available to schools as USDA commodities), 10 percent participated in a Farm to School program (a USDA program that connects schools to local farms to help them serve healthy meals), and 62 percent belonged to a purchasing

TABLE II.6
FOOD SAFETY AND SANITATION POLICIES AND PROCEDURES
(Percentage of SFAs)

	Percentage of SFAs
Among all SFAs:	
Required New Employees to Receive Training in Food Safety and Sanitation	71.4
Among SFAs That Required <i>New</i> Employees to Receive Training in Food Safety and Sanitation (n = 121):	
New Foodservice Staff Received Training in: ^a	
Food safety/sanitation training as part of general training	95.9
Serving it Safe	88.2
Certification as food safety manager	61.7
Test or exam in food safety/sanitation	61.2
Other separate course or class in food safety/sanitation	45.3
Number of Required Annual Training Hours in Food Safety and Sanitation for New Foodservice Managers	
Less than 5 hours	14.0
Between 5 and 10 hours	27.8
Between 11 and 20 hours	11.0
More than 20 hours	9.5
Not applicable ^b	37.7
Number of Hours Required for New Cooks	
Less than 5 hours	30.9
Between 5 and 10 hours	24.0
Between 11 and 20 hours	7.5
More than 20 hours	1.2
Not applicable ^b	36.5
Number of Hours Required for Other New Staff	
Less than 5 hours	30.7
Between 5 and 10 hours	23.9
Between 11 and 20 hours	6.2
More than 20 hours	1.1
Not applicable ^b	38.1
Among all SFAs:	
Required Current Employees to Receive Periodic Training in Food Safety and Sanitation	60.1
Among SFAs That Required <i>Current</i> Employees to Receive Training in Food Safety and Sanitation (n = 104):	
Current Foodservice Staff Received Training in: ^a	
Food safety/sanitation training as part of general training	96.6
Serving it Safe	81.9
Other separate course or class in food safety/sanitation	62.2
Certification as food safety manager	57.0
Test or exam in food safety/sanitation	47.2

TABLE II.6 (continued)

	Percentage of SFAs
Number of Required Annual Training Hours for Current Foodservice Managers	
Less than 5 hours	19.2
Between 5 and 10 hours	28.8
Between 11 and 20 hours	5.7
More than 20 hours	0.3
Not applicable ^b	46.0
Number of Required Annual Training Hours for Current Cooks	
Less than 5 hours	20.3
Between 5 and 10 hours	29.5
Between 11 and 20 hours	3.8
More than 20 hours	0.3
Not applicable ^b	46.1
Number of Required Annual Training Hours for Current Other Staff	
Less than 5 hours	19.0
Between 5 and 10 hours	29.8
Between 11 and 20 hours	3.5
More than 20 hours	0.3
Not applicable ^b	47.5
Among All SFAs:	
Frequency of Visits from District to Monitor Kitchens for Safe Food-Handling Practices and Sanitary Conditions	
Once a month or more	83.2
Less than once a month but at least once every other three months	10.8
Less than once every three months, but at least once every six months	3.0
About once a year	2.8
Never	0.2
Frequency of Visits from State, County, or Local Health Department to Monitor Kitchens for Safe Food-Handling Practices and Sanitary Conditions	
Once a month or more	3.9
Less than once a month but at least once every other three months	10.3
Less than once every three months, but at least once every six months	28.2
About once a year	57.7
Never	<.1
Followed Health Policy for Restricting or Excusing Ill Foodservice Employees	51.6
Had HACCP Plan	35.4
Most Common Safety and Sanitation Problem(s) or Challenge(s)^a	
Food storage problems	34.3
Temperature of food	19.5
Inconsistent or lack of use of gloves and/or hair restraints	17.5
Pests	17.0
Food-handling problems	14.4
Other	9.1
Cleanliness of the cupboards, counters, floors	4.7
Personal cleanliness	3.0
Number of SFAs	129

TABLE II.6 (continued)

Source: School Nutrition Dietary Assessment-III, SFA Director Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public SFAs offering the NSLP.

Note: N = 129. Three respondents did not answer the question on the HACCP plan, and one respondent did not answer the question on common safety and sanitation challenges.

^aMultiple answers allowed; list of possible answers read out loud to respondents.

^bRespondents said training was required but selected “not applicable” response. It is not clear if this response refers to cases in which there were no new/current staff in this job category, or if it means no specific number of hours were required.

HACCP = Hazard Analysis and Critical Control Points.

cooperative (Table II.7). About 22 percent of SFAs had State or local guidelines on purchasing locally grown foods, and 4 percent had guidelines on purchasing fresh produce other than locally grown foods.

One-quarter of SFA directors reported that they had pouring rights contracts with beverage distributors at the district level or in some schools.⁹ However, a much larger proportion of school principals reported such contracts, perhaps suggesting they may not typically be arranged through the school foodservice (see Chapter III for the principals’ perspective and further discussion on this topic).

More than half of the SFAs reported that they included nutrition requirements in purchasing specifications and/or required Child Nutrition labels (53 and 60 percent, respectively) (Table II.8). Among SFAs with nutrition requirements, fat and saturated fat were the most common nutrients with specified requirements (in 92 and 89 percent of SFAs with requirements, respectively), but more than two-thirds of the SFAs specified requirements for calories, most SMI nutrients, cholesterol, sodium, and sugar, and 92 percent specified required portion sizes.

⁹ A “pouring rights” contract is an agreement between a beverage distributor and an organization (for example, a school district) that allows the distributor to be the only entity selling beverages at a given location.

TABLE II.7

SFA FOOD-PURCHASING POLICIES

	Percentage of SFAs
Purchased Foods Through the U.S. Department of Defense's (DoD's) Fresh Fruit and Vegetable Program ^a	15.4
Purchased Food Through the State's Farm-to-School Program ^b	9.7
Guidelines for Purchasing Locally Grown Foods and Fresh Produce	
Had State guidelines on purchasing locally grown foods	13.1
Had local guidelines on purchasing locally grown foods	8.5
Did not have guidelines on purchasing locally grown foods	78.5
Had State guidelines on purchasing fresh produce, other than locally grown foods	3.2
Had local guidelines on purchasing fresh produce, other than locally grown foods	1.1
Did not have guidelines on purchasing fresh produce, other than locally grown foods	95.7
Participated in a Purchasing Cooperative	61.5
Among SFAs That Participated in a Purchasing Cooperative (n = 55):	
Effects of Participating in Purchasing Cooperative:	
Limited ability to purchase desired food items	2.3
Expanded ability to purchase desired food items	47.8
No effect on ability to purchase desired food items	49.9
Decreased total food costs	84.6
Increased total food costs	0.0
No effect on total food costs	15.4
Pouring Rights Contracts	
Entered into pouring rights contracts districtwide	17.2
Entered into pouring rights contracts in some schools	8.2
Did not enter into pouring rights contracts	74.6
Number of SFAs	129

Source: School Nutrition Dietary Assessment-III, SFA Director Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public SFAs offering the NSLP.

Note: N = 129, although two respondents did not answer the question about the Fresh Fruit and Vegetable Program, one respondent did not answer the questions about the Farm to School Program and about purchasing guidelines, and four respondents did not answer the question about the effects of participating in a purchasing cooperative.

^aThe DoD's Fresh Fruit and Vegetable Program, a pilot program that began in 1995, enables USDA to offer schools a wider variety of fresh produce than would be available through normal USDA commodity purchases by leveraging produce distribution networks than had been in place through the DoD to military institutions, Federal prisons, and veterans' hospitals.

^bInitiated in 2000, the national farm-to-school program connects schools with local farms with the objectives of serving healthy meals in school cafeterias, improving student nutrition, providing health and nutrition education opportunities, and supporting local small farmers.

TABLE II.8
NUTRITION REQUIREMENTS ON PURCHASING CONTRACTS

	Percentage of SFAs
Included Nutrient Requirements in Purchasing Specifications for Any Foods	52.9
Required Child Nutrition (CN) or Other Labels on Some or All Purchased Foods	59.9
Among SFAs That Included Nutrition Requirements in Purchasing Specifications (n = 177):	
Food Components with Requirements ^a	
Calories	75.9
Protein	77.1
Vitamin A	37.2
Vitamin C	66.0
Calcium	69.9
Iron	53.2
Fat	92.2
Saturated fat	89.4
Cholesterol	68.2
Sodium	74.3
Sugar	80.2
Portion or serving size	91.8
Among Those SFAs That Required CN Labels (n = 89):	
Requirements on ^a	
Pre-prepared breakfast items	93.3
Pre-prepared lunch foods	100.0
Other foods	1.1
Number of SFAs	129

Source: School Nutrition Dietary Assessment-III, SFA Director Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public SFAs offering the NSLP.

Note: N = 129. One respondent did not answer the question about imposing nutrient requirements, and one respondent did not provide specific components for nutrient requirements.

^aMultiple answers allowed.

However, only 53 percent reported specifying requirements for iron and 37 percent for vitamin A.

G. MEAL PRICING AND COUNTING

USDA offers a range of options for SFAs in setting prices for school meals and associated meal-counting and -claiming procedures. Provisions 2 and 3 are parts of the school meal regulations that allow schools (particularly schools with many free- or reduced-price-eligible students) to offer free meals to all students in a manner that reduces the schools' administrative costs. Provision 2 is more popular than Provision 3, as it requires less paperwork.¹⁰ The availability of the free meals is also intended to increase participation. In the 2004–2005 school year, 14 percent of schools offered free breakfasts under Provision 2, and 3 percent offered free breakfasts under Provision 3 (Table II.8A). Thirteen percent of schools used Provision 2 and one percent used Provision 3 to offer free lunches to all students. Elementary schools were much more likely than secondary schools to use Provision 2 or 3.

¹⁰ Provision 2 requires that the school serve meals to participating children at no charge, but reduces application burdens and meal-counting and -claiming procedures by allowing a school to collect applications and count meals only in the first (base) year, and then receive meal reimbursement in the remaining years based on counting the number of reimbursable meals and applying the base-year claiming percentages by category. Participation in Provision 2 is for four years, but can be renewed under certain conditions.

Provision 3 requires that schools serve meals to participating children at no charge, but bases reimbursement on the level of cash and commodity assistance received in the last year in which free or reduced-price determinations were made, adjusted for enrollment, inflation, and operating days, if applicable. Participation is for four years, but can be renewed under certain conditions.

TABLE II.8A
SCHOOLS OFFERING FREE MEALS THROUGH PROVISION 2 OR PROVISION 3,
BY SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	Total
Lunch				
Used Provision 2	16.9	10.9	10.3	12.9
Used Provision 3	1.8	1.9	1.0	1.3
Breakfast				
Used Provision 2	18.5	14.5	9.6	14.4
Used Provision 3	2.8	3.9	<1.0	2.5
Number of Schools Reporting	136	119	117	372

Source: School Nutrition Dietary Assessment-III, Initial Contact Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Meal Pricing. Schools not using Provision 2 or 3 generally depended on students who paid full price for their school meals for a part of their revenue. The full price of a meal, however, could not be so high as to discourage participation. Almost all SFA directors reported that food and labor costs influenced the full price charged for reimbursable meals (Table II.9). At the same time, 38 percent reported that constraints set by school boards played a role, and 26 percent reported that incentives for student participation were a factor.

Although average prices for reduced-price breakfasts and lunches were close to the maximum allowed, the average “full price” for breakfast and lunch varied considerably.¹¹ On average, the reduced price for lunch was between 39 and 40 cents; the most common price was the maximum permitted, 40 cents, but a few schools charged as little as 20 cents (Table II.10).

¹¹ Note that “full-price” meals in fact are subsidized by a small cash subsidy and by USDA commodities provided.

TABLE II.9

PRICING OF REIMBURSABLE MEALS

	Percentage of SFAs
Factors That Influenced Setting Costs of Full-Price Reimbursable Meals ^a	
Food costs	97.1
Production labor costs (e.g., wages, benefits)	93.6
Other production costs (e.g., utilities, equipment, supplies)	66.0
Administrative or indirect costs	43.7
Ease of collecting payments	40.2
Constraints set by school boards	37.8
Incentives for student participation	25.8
Transportation costs	22.2
Other	5.0
Used Percentage Markup on Food to Set Prices of Full-Price Reimbursable Meals	9.9
Number of SFAs Reporting	129

Source: School Nutrition Dietary Assessment-III, SFA Director Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public SFAs offering the NSLP.

Note: N = 129. One respondent did not answer the question on cost factors for reimbursable meals, and four did not answer the question on percentage markup on reimbursable meals.

^aMultiple answers allowed; list of possible answers was read out loud to respondents.

TABLE II.10
 PRICES FOR REDUCED- AND FULL-PRICE REIMBURSABLE LUNCHES,
 BY SCHOOL CHARACTERISTICS
 (Dollars)

	Prices for Reduced-Price Lunches				Prices for Full-Price Lunches			
	Mode	Mean	Minimum	Maximum	Mode	Mean	Minimum	Maximum
All Schools	0.40	0.39	0.20	0.40	1.50	1.60	0.65	3.00
School Type								
Elementary	0.40	0.39	0.20	0.40	1.50	1.55	0.65	2.25
Middle	0.40	0.40	0.25	0.40	1.75	1.70	0.75	2.50
High	0.40	0.40	0.20	0.40	1.50	1.66	0.75	3.00
Enrollment								
Small school (less than 500)	0.40	0.39	0.25	0.40	1.50	1.57	0.75	2.50
Medium school (from 500 to 1,000)	0.40	0.39	0.20	0.40	1.50	1.59	0.65	2.50
Large school (more than 1,000)	0.40	0.39	0.20	0.40	1.75	1.73	0.75	3.00
District Urbanicity								
Primarily serves as a central city of MSA	0.40	0.39	0.20	0.40	1.50	1.55	0.65	2.50
Serves as MSA but not primarily its central city	0.40	0.39	0.21	0.40	1.75	1.77	1.25	3.00
Does not serve as MSA	0.40	0.40	0.40	0.40	1.50	1.46	0.75	2.50
District Child Poverty								
Low (less than 20 percent)	0.40	0.39	0.21	0.40	1.75	1.70	1.00	3.00
Higher (20 percent or more)	0.40	0.39	0.20	0.40	1.50	1.38	0.65	2.50
Number of Schools	353	353	353	353	361	361	361	361

Source: School Nutrition Dietary Assessment-III, Foodservice Manager Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 353 schools for reduced-price lunches and n = 361 for full-price lunches, out of 395 schools participating in the NSLP. Values of zero from schools that offered universal free lunches through Provision 2 or 3 were excluded from the analysis.

In addition, 13 schools that reported reduced-price lunch costs exceeding 40 cents (the maximum price allowed), ranging from \$0.50 to \$2.10, were excluded from the reduced-price figures, because respondents appear to have misunderstood the question.

MSA = Metropolitan Statistical Area.

The full price of lunch was \$1.60 on average, and the most common (modal) price was \$1.50. The full price ranged from \$.65 to \$3.00; on average, it was higher in secondary schools than in elementary schools, and higher in large schools than in smaller ones. The full price was also higher in suburban and lower-poverty schools than in schools not in those categories.

Similar patterns applied to breakfast prices (Table II.11). Reduced prices were largely set at the maximum of 30 cents, but occasionally were as low as 10 cents. Full prices ranged from \$.25 to \$1.80, but were most often \$1.00 and averaged \$0.88. In general, the full prices for breakfast varied with school characteristics in the same ways as lunch prices.

Meal-Counting Practices. The approaches used to determining what constitutes a reimbursable meal and to track meal-price benefit status also affect SFA revenues and administrative costs, and can affect participation. Most elementary and middle schools used the OVS option when determining whether a student had selected a reimbursable meal—78 percent of elementary schools and 93 percent of middle schools used OVS for both breakfast and lunch (Table II.11a).¹² OVS allows students to refuse one or two of the meal components (or menu items in Nutrient Standard Menu Planning schools) offered and still be counted as taking a reimbursable meal.¹³

About half of all schools (49 percent) used a personal identification number to track students who received reimbursable meals and determine who received free or reduced-price meals at the cashier's station (Table II.12). Several other electronic procedures, such as bar codes or

¹² All high schools must use OVS.

¹³ The OVS rules vary slightly, depending on menu-planning system. For food-based menu planning, students must take at least three of the offered food items at lunch, and at least three of the four food items offered at breakfast. Under nutrient-based menu planning, at least three menu items (an entrée, one or more sides, and fluid milk) must be offered at lunch, but additional menu items may be needed to meet nutrient standards. At least three menu items must be offered at breakfast. Students must take at least two menu items and can decline no more than two menu items at lunch and only one item at breakfast.

TABLE II.11
 PRICES FOR REDUCED- AND FULL-PRICE REIMBURSABLE BREAKFASTS,
 BY SCHOOL CHARACTERISTICS
 (Dollars)

	Prices for Reduced-Price Breakfasts				Prices for Full-Price Breakfasts			
	Mode	Mean	Minimum	Maximum	Mode	Mean	Minimum	Maximum
All Schools	0.30	0.29	0.10	0.30	1.00	0.88	0.25	1.80
School Type								
Elementary	0.30	0.29	0.10	0.30	1.00	0.86	0.33	1.60
Middle	0.30	0.29	0.10	0.30	1.00	0.94	0.40	1.80
High	0.30	0.29	0.10	0.30	1.00	0.89	0.25	1.65
Enrollment								
Small school (less than 500)	0.30	0.30	0.10	0.30	1.00	0.84	0.40	1.50
Medium school (from 500 to 1,000)	0.30	0.29	0.10	0.30	0.75	0.90	0.25	1.80
Large school (more than 1,000)	0.30	0.29	0.10	0.30	1.00	1.01	0.40	1.65
District Urbanicity								
Primarily serves as a central city of MSA	0.30	0.29	0.10	0.30	1.00	0.89	0.25	1.75
Serves as MSA but not primarily its central city	0.30	0.30	0.20	0.30	1.00	1.03	0.33	1.80
Does not serve as MSA	0.30	0.29	0.10	0.30	0.75	0.77	0.40	1.50
District Child Poverty								
Low (less than 20 percent)	0.30	0.29	0.10	0.30	1.00	0.94	0.50	1.80
Higher (20 percent or more)	0.30	0.29	0.10	0.30	1.00	0.78	0.25	1.55
Number of Schools	252	252	252	252	278	278	278	278

Source: School Nutrition Dietary Assessment-III, Foodservice Manager Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 252 for reduced-price breakfasts and n = 278 for full-price breakfasts, out of 331 schools participating in the SBP. Values of zero from schools that offered universal-free breakfast (n = 42) were excluded from the analysis. Other respondents offering free breakfast may have skipped this item.

In addition, 19 schools that reported reduced-price breakfast costs exceeding the maximum of 30 cents (ranging from \$0.35 to \$1.50) were excluded from the reduced-price figures, because they appear to have misunderstood the question.

MSA = Metropolitan Statistical Area.

TABLE II.11A
 USE OF OFFER-VERSUS-SERVE OPTION
 (Percentage of Schools)

	Elementary Schools	Middle Schools	Elementary and Middle Schools
Among Schools That Served Breakfast (n = 226):			
Used OVS Option at Breakfast			
Did not use OVS at breakfast	21.3	7.5	17.9
Used OVS at breakfast for all students	77.6	92.5	81.3
Used OVS at breakfast for some students ^a	1.1	0.2	0.8
Used OVS Option at Lunch			
Did not use OVS at lunch	16.7	7.3	14.5
Used OVS at lunch for all students	78.1	92.6	81.5
Used OVS at lunch for some students ^a	5.2	0.2	4.0
Different Portion Sizes Available to Different Grade Levels	21.2	2.9	16.9
Number of Schools	139	127	264

Source: School Nutrition Dietary Assessment-III, Foodservice Manager Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Six respondents did not answer the question about OVS at breakfast, four did not answer the question about OVS at lunch, and six did not answer the question about portion sizes.

^aThis answer could apply to schools with a wide grade range.

TABLE II.12

MEAL-COUNTING POLICIES
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Methods to Count Students Who Received Meal				
Benefits at the Cashier:^a				
Personal ID numbers	41.5	63.4	59.6	48.9
Cashier lists	18.7	24.1	19.6	19.9
Bar code/magnetic strip	17.5	8.3	10.6	14.5
Coded tickets or tokens	14.0	15.0	14.1	14.2
Coded identification cards	12.4	6.6	9.0	10.6
Visual identification ^b	9.9	3.5	2.1	7.3
Verbal identification	4.8	1.5	3.5	3.9
Recorded in Point of Sale, computer ^b	3.6	1.5	0.3	2.6
All students eat for free ^b	1.6	0.9	0.7	1.3
Other	2.2	0.0	0.0	1.4
Students Received a Bonus Item When They				
Took a Reimbursable Lunch:				
Never	72.2	72.4	79.0	73.5
Sometimes	25.1	26.4	19.0	24.2
Usually	2.7	1.2	2.1	2.3
Among Schools Where Students Received a Bonus				
When Taking a Reimbursable Lunch (n = 105)				
Types of Bonuses That Students Received:^a				
Drink	--	--	--	13.7
Food	--	--	--	81.8
Nonfood item	--	--	--	32.1
Number of Schools	143	127	125	395

Source: School Nutrition Dietary Assessment-III, Foodservice Manager Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Four respondents did not answer the question about methods to count students, four did not answer the question about bonus items, and one did not answer question on type of bonus item.

^aMultiple answers allowed; list of possible answers was read out loud to respondents.

^bVolunteered response.

--Indicates sample sizes are too small for reliable estimates.

magnetic strips on ID cards, were reported. Many of these features were applied to both certified and noncertified students, so they helped maintain the confidentiality of a student's certification status. At the same time, in determining meal-price status, 20 percent of school foodservice managers reported that the cashier referred to a printed list, 7 percent reported that visual identification was used, and 4 percent reported that verbal identification was used, suggesting that it was challenging for some schools to keep students' meal-price status confidential.

The next chapter describes aspects of the school environment outside the control of the school foodservice. It also discusses school policies related to competitive foods, as well as revenues obtained from those foods.

III. CHARACTERISTICS OF THE SCHOOL FOOD ENVIRONMENT

In 1995, the Food and Nutrition Service (FNS) of the U.S. Department of Agriculture (USDA) launched the School Meals Initiative for Healthy Children (SMI) with the long-term goal of improving the nutritional quality of meals provided through the National School Lunch Program (NSLP) and the School Breakfast Program (SBP). As described in Chapter II, documenting the range of approaches to school foodservice operations used by School Food Authorities (SFAs), such as menu-planning systems and food-purchasing agreements, provides policymakers with information on the degree to which local SFAs have implemented SMI. Closely associated with school foodservice operations are the policies and practices that may affect school meal participation and school foodservice operations, such as nutrition education and policies on competitive foods, but that generally do not fall under the control of school foodservice staff. Such policies and practices comprise the environment in which school meal programs operate; data about the environment can help policymakers further understand SMI implementation by examining how the school environment may influence the quality of school meals, as well as students' access to those meals.

The following are the key research questions related to characteristics of the school environment:

- What nutrition education and outreach efforts are used by SFAs and schools?
- What are the key scheduling policies, and how do they affect the school meal programs?
- What SFA-level and school-level policies about access to food and beverages sold in competition with USDA meals and snacks have been established?
- How mobile are students on school grounds? Are students allowed to leave school to obtain lunch off campus (a policy known as open campus)? Which students are permitted to leave campus, and under what circumstances?

- How much revenue is generated by competitive food and beverage sales?
- How do school food policies and practices vary with the demographic and institutional characteristics of SFAs and schools?

Data to address these research questions were collected using the SNDA-III SFA Director Survey, the Principal Survey, the Foodservice Manager Survey, and the Initial Contact Survey.

A. SUMMARY OF FINDINGS

- Nearly all schools (99 percent) provided some form of nutrition education to students, and more than two-thirds of schools taught nutrition in all grades. Sixty-one percent of schools shared information with students and/or parents about the nutrient content of school meals on a regular basis. Forty-four percent of schools had already met the Federal mandate to have a local wellness policy in place by the 2006–2007 school year.
- On average, students had about 30 minutes to eat lunch, regardless of school type or enrollment. Forty percent of schools had at least one lunch period that started before 11:00 a.m., although very few scheduled a lunch period to start after 1:30 p.m. While data were not collected on the length of breakfast periods, students had about half an hour from when breakfast started until classes began.
- Among those elementary and middle schools with recess, about one-third of elementary schools and over half of middle schools scheduled recess right after lunch for *all* students. Only 23 percent of these schools, however, let students go to recess as soon as they were done eating.
- At the SFA level, 20 percent of SFAs had schools that offered foods from brand-name or chain restaurants. Fourteen percent of all SFAs allowed these types of food items to be included in reimbursable meals. About one-quarter of SFAs reported pouring rights contracts either districtwide or in some schools.¹ Aside from the USDA ban on foods of minimal nutritional value in the foodservice area, 53 percent of SFAs did not restrict the types of sodas, non-carbonated soft drinks, or juice drinks sold on campus, and more than two-thirds (68 percent) did not restrict the types of snack foods sold.
- At the school level, the availability of vending machines in schools was highly correlated with school type; almost all high schools (97 percent) and most middle schools (82 percent) had machines available for students, but only 17 percent of elementary schools had them. Vending machines were most frequently available to students after their last class, but many schools had them available at other times as

¹ Pouring rights contracts are agreements between beverage distributors and organizations (such as a schools) that allow the distributor to be the only company selling soft drinks at a given location.

well. Other kinds of sources for competitive foods, such as school stores and snack bars, were much less common. Moreover, school groups were rarely permitted to sponsor fundraisers that involved selling pizza or other entrees during lunch.

- About 40 percent of schools allowed all or some students to leave the lunch area after a predetermined time, and 29 percent let them leave at their own discretion. Eleven percent of schools followed an open campus policy, with high schools most likely to offer it (25 percent). Generally, mobility privileges increased with age.
- According to principals' reports, income from vending machines located outside of the foodservice area usually went to school funds (57 percent), and one-fifth of schools had a portion that went to the school foodservice. Thirty-three percent of high schools gave revenues to the athletic department. Not including revenues that went to the foodservice, 31 percent of schools earned \$100 to \$999 per month, and about 10 percent earned between \$1,000 and \$5,000 per month.²

The rest of this chapter presents descriptive analyses of school environment characteristics. First, the study team considers the ways in which SFAs and schools conducted outreach and provided nutrition education to students and families. The next section discusses scheduling policies, such as the duration, as well as the start and end times, of meals, along with student mobility on school grounds and the degrees to which schools permitted open campus policies. The chapter then turns to SFA and school policies on competitive foods, which are any foods sold on the school campus in competition with the USDA school meals programs. The chapter concludes with an examination of the revenues collected from competitive food sales. Note that this chapter describes competitive food policies; Chapter IV presents data on the types of competitive foods and beverages observed by field staff in a subsample of schools.

B. NUTRITION EDUCATION AND OUTREACH

While nutrition education efforts cannot guarantee that individuals will be more likely to select more nutritious foods, providing accurate and pertinent information to students and parents

² In most other cases (36 percent of all schools), the principal did not know the level of revenues; 20 percent of principals reported revenues less than \$100 per month.

may help them make better-informed dietary decisions that could affect their overall health. According to a legislative mandate, all schools offering USDA-sponsored meals were required to establish a local wellness policy by the 2006–2007 school year.³ More than half of schools (56 percent) reported they did not yet have a wellness policy at either the State, district, or school level as of the spring of the 2004–2005 school year (more than a year before the requirement took effect). Elementary schools were the most likely to have a policy in place (see Table III.1).

Although a sizable proportion of schools had not yet implemented the impending Federal wellness policy requirement, nearly all schools (99 percent) offered some kind of nutrition education: about two-thirds of schools (68 percent) taught nutrition at all grade levels. Elementary and middle schools (80 and 72 percent, respectively) were much more likely than high schools (26 percent) to teach nutrition classes or offer nutrition education to all students. The most prevalent nutrition education approaches included the American Heart Association Program (offered in 28 percent of schools) and approaches that incorporated nutrition as part of the standard curriculum (in 22 percent). Programs developed by the American Cancer Society and Cooperative Extension Services were more prevalent in high schools, whereas 5-A-Day and Food Play were used more often in elementary schools. USDA’s Team Nutrition program was cited as a source of nutrition education in 7 percent of elementary schools and 4 percent of middle and high schools.⁴ About 40 percent of schools selected none of the above (of a

³ This provision was part of the Child Nutrition and WIC Reauthorization Act of 2004 [www.fns.usda.gov/tn/Healthy/wellnesspolicy-faq.html].

⁴ Team Nutrition is an initiative of the USDA FNS to support the Child Nutrition Programs through training and technical assistance for food service, nutrition education for children and their caregivers, and school and community support for healthy eating and physical activity. Team Nutrition’s goal is to improve children’s lifelong eating and physical activity habits by using the principles of the Dietary Guidelines for Americans and MyPyramid. Six communication channels are identified to offer a comprehensive network for delivering consistent nutrition messages to children, their caretakers, and child nutrition food service professionals. The channels are designed to promote the importance of healthy eating and to reinforce the messages through a variety of sources.

TABLE III.1
CHARACTERISTICS OF NUTRITION EDUCATION AND OUTREACH, BY SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Principal Report				
Has a Wellness Policy Addressing Student Nutrition and Physical Activity				
Has a State-level policy	5.7	6.0	6.2	5.9
Has a district-level policy	28.6	22.4	14.0	25.0
Has a school-level policy	13.1	10.8	15.5	13.0
No wellness policy	52.6	60.8	64.3	56.1
When Students Get Nutrition Education				
Every grade	80.1	71.5	26.2	68.2
Some grades	19.1	26.0	73.8	30.8
Not at all	0.8	2.5	0.0	1.0
Has a Nutrition or Health Advisory Council	18.6	13.0	37.2	21.1
Nutrition Education Programs Offered ^a				
American Heart Association	29.2	19.9	28.9	27.8
Nutrition part of regular curriculum	18.7	20.1	33.9	21.7
5-A-Day	12.8	3.2	4.1	9.5
American Cancer Society	8.0	9.0	14.4	9.3
Cooperative Extension Service	5.8	5.2	23.9	8.9
USDA Team Nutrition	6.5	3.6	4.2	5.6
Nutrition education through health class or health curriculum	3.1	2.3	0.2	2.5
Linkage with hospital/university	2.6	1.0	0.0	1.8
Food Play	2.5	0.0	0.0	1.6
Other	24.1	11.3	2.2	17.9
None of the above	35.8	48.0	48.1	40.4
Don't know	7.0	9.5	12.5	8.5
Foodservice Manager Report				
Activities of Foodservice Staff to Promote Nutrition Education in Past 12 Months ^a				
Invited family members to a school meal	78.1	71.0	68.0	74.8
Provided families with information about school foodservice program	71.8	74.0	48.5	67.8
Conducted a nutrition education activity in foodservice area	42.0	29.5	38.6	39.0
Attended a PTA or other parent group meeting to discuss foodservice program	31.6	30.3	23.6	29.8
Participated in a nutrition education classroom activity	30.6	25.4	31.8	29.8

TABLE III.1 (continued)

	Elementary Schools	Middle Schools	High Schools	All Schools
Routinely Makes Information Available on Nutrient Content of School Meals to Students or Parents	61.7	62.2	55.5	60.7
Among Schools That Routinely Make Information Available on Nutrient Content of School Meals (n = 260):				
How Nutrition Information Is Shared ^a				
Send menus or flyers home	79.1	85.5	59.5	77.3
Post information in school	56.9	56.1	57.6	56.8
Post information online	42.1	45.9	42.5	42.9
Post information in newspapers	18.8	21.1	27.7	20.6
Post information on television	9.2	12.9	15.6	10.9
Provide upon request	6.9	2.5	8.1	6.2
Radio, public service announcements	3.2	0.6	1.4	2.4
School nurse	1.3	2.8	2.2	1.7
Teachers, in class	2.2	0.0	0.5	1.5
Parent handbook	0.4	1.2	0.0	0.5
Other	18.6	10.1	25.2	18.0
Number of Schools	143	127	125	395

Source: School Nutrition Dietary Assessment-III, Foodservice Manager Survey and Principal Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 395 (14 respondents did not answer the question about a wellness policy, 8 did not answer the question about having a nutrition or health advisory council, 59 did not answer the question about nutrition education programs, 13 did not answer the question about grade level for nutrition education, 4 did not answer the question about collecting feedback, and one did not answer the question about how nutrition education information is shared).

^aMultiple answers allowed.

predetermined list on the survey) or other (18 percent), which suggests that schools may be using more informal methods of nutrition education. In addition, foodservice staff from all schools had engaged in some form of outreach activity to promote nutrition education among students and/or parents during the previous 12 months (as reported by foodservice managers during the 2004–2005 school year). Popular methods targeted other family members, including inviting the family to a school meal (75 percent), sending parents information about school meals and the

school foodservice (68 percent), and attending PTA meetings in person to educate parents about school meals (30 percent). Among the 61 percent of schools that shared information with students and/or parents about the nutrient content of school meals on a regular basis, a little more than three-quarters of them disseminated nutrient data by sending menus home. However, posting information in school and on the school's website were other common outreach strategies.

C. SCHOOL MEAL-SCHEDULING POLICIES

School meal-scheduling policies have a significant influence on foodservice operations. Factors such as the timing of breakfast and lunch periods, how long those meal periods last, and how long students wait in line to get food can, in turn, affect students' school meal participation and even the nutrients consumed at mealtime. For example, the timing of breakfast service relative to times when buses arrive, when the school building opens, and when classes start could affect SBP participation rates. Likewise, lunch periods that begin too early or too late could affect students' appetites, while short lunch periods or long waits in line could deter students from obtaining a reimbursable school lunch and may encourage them to purchase a portable food or snack item on the go instead.

Another issue related to school meal schedules is the scheduling of recess. Previous small studies have suggested that students who have recess after lunch is served may be more prone to plate waste, which may also imply lower nutrient intakes (Getlinger et al. 1996; Read and Moosburner 1985). Getlinger et al. suggest that elementary school students who have recess after lunch may not eat as much as they normally would because they are anxious to go play.

1. Lunch Schedules

Almost all schools (98 percent) provided a scheduled lunch period for all students (see Table III.2). Lunch periods generally lasted about half an hour. Average durations did not notably fluctuate according to enrollment size or school type (see footnote b on Table III.2 for how lengths of lunch periods were calculated). Among those schools with multiple lunch periods (93 percent), the most common start time for the first period was 11:00 a.m., and the most common start time of the last lunch period was 12:00 p.m. Moreover, 41 percent of these schools included at least one lunch period that started outside of the hours considered to be a traditional lunchtime. Forty percent of schools began serving lunch before 11:00 a.m., although only one percent had any lunch period that started after 1:30 p.m.

According to foodservice managers, students spent a relatively short amount of time waiting in line to get lunch. They usually stood in line for about 5 minutes, ranging from no waiting time to 20 minutes. The majority of schools (95 percent) had enough serving lines and stations to ensure that all students got served during the first half of their lunch period.

2. Breakfast Schedules

Breakfast start times ranged from 6:30 a.m. to 9:10 a.m., with an average start time of 7:48 a.m. The most common (modal) time that breakfast began to be served was 7:30 a.m. in middle and high schools, and 8:00 a.m. in elementary schools (see Table III.3). Neither long waiting times in line nor school activities scheduled during breakfast seemed to emerge as barriers to having enough time to eat breakfast at school. Students spent little time waiting in line to get breakfast—two minutes on average (as reported by foodservice managers). Across all schools there was an average of 32 minutes between when breakfast started and classes began. This would probably be enough time to eat if a student received food when or soon after

TABLE III.2

SCHOOL MEAL-SCHEDULING POLICIES RELATED TO LUNCH, BY ENROLLMENT AND SCHOOL TYPE
(Percentage of Schools)^a

	School Enrollment			School Type			
	Small (Less than 500)	Medium (Between 500 and 1,000)	Large (More than 1,000)	Elementary	Middle	High	All Schools
All Students Have a Scheduled Lunch Period Every Day	98.1	97.5	99.4	97.3	100.0	99.5	97.5
Number of Schools Reporting	65	112	88	98	90	90	272
Only Has One Lunch Period	2.8	3.6	1.7	2.8	4.0	1.7	8.4
Number of Schools Reporting	56	89	61	75	73	70	218
Among Schools with Multiple Lunch Periods (n = 190):							
Start Time of First Lunch							
Mean	11:07	11:15	11:00	11:07	11:08	10:59	11:07
Mode	11:00	11:00	10:30	11:00	10:30	11:00	11:00
Minimum	9:55	10:21	10:00	9:55	10:00	9:55	9:55
Maximum	12:15	12:10	12:00	12:15	12:10	12:15	12:15
Start Time of Last Lunch							
Mean	12:18	12:14	12:21	12:18	12:17	12:19	12:18
Mode	12:00	12:00	12:45	12:00	12:35	12:30	12:00
Minimum	11:00	11:05	11:00	11:00	11:00	11:30	11:00
Maximum	2:00	1:10	1:55	2:00	1:50	2:00	2:00
Length of Lunch Period (Minutes) ^b							
Mean	31	29	33	31	32	30	31
Minimum	29	27	31	29	30	29	29
Maximum	32	30	35	32	34	32	32
Among All Schools (n = 280):							
Lunch Service Starts							
Before 11:00 a.m.	32.9	50.4	31.9	29.2	47.5	21.0	39.7
Between 11:00 a.m. and 1:30 p.m.	65.8	48.7	66.1	70.1	50.5	77.3	59.0
After 1:30 p.m.	1.3	0.9	2.0	0.7	2.0	1.5	1.3
Interval Seating ^c	2.7	11.0	6.2	13.3	1.7	0.0	6.2
How Long Students Wait in Line to Get Lunch (Minutes)							
Mean	5	5	6	4	4	6	5
Minimum	1	0	1	1	0	1	0
Maximum	11	15	18	15	20	18	20

TABLE III.2 (continued)

	School Enrollment			School Type			
	Small (Less than 500)	Medium (Between 500 and 1,000)	Large (More than 1,000)	Elementary	Middle	High	All Schools
Has Enough Serving Lines or Stations to Serve Students During First Half of Each Lunch Period	96.5	95.5	88.4	96.6	93.9	92.0	95.2
Has Early Release Days	77.1	76.7	79.0	77.7	70.6	84.4	77.6
Among Schools with Early Release Days (n = 173):							
Annual Number of Days	--	10	9	11	9	8	8
Meals Offered on Release Days ^d							
None	--	4.2	8.8	6.3	4.1	28.0	10.5
Breakfast	--	80.9	62.3	81.5	72.4	81.2	79.8
Snack	--	1.2	1.8	0.9	2.6	27.0	6.7
Limited lunch	--	12.9	11.7	12.7	13.2	4.1	11.0
Full lunch	--	64.4	54.0	62.0	59.2	74.6	64.1
Number of Schools	66	112	88	98	90	92	280

Source: School Nutrition Dietary Assessment-III, Foodservice Manager Survey and Initial Contact Survey (Part 2), school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 280 for Part 2 of the Initial Contact Survey. Eight respondents did not answer the question about getting a lunch every day, 90 did not answer the question about how long lunch lasts, 81 did not answer the question about start time of first lunch, and 85 did not answer the question about start time of last lunch. Fourteen schools are missing enrollment data, and were thus omitted from the tabulations by enrollment.

^aData are percentages of schools unless otherwise noted.

^bThe range of reported lunch period lengths was 15 minutes to 1.5 hours. Among schools with multiple lunch periods, the study team first calculated the average lunch period in minutes for each school, since in some cases these varied somewhat by grade. Then it used these averages to produce the average, minimum, and maximum lunch period lengths in minutes across subgroups and all schools. Therefore, reported minimums and maximums represent school averages—specific lunch periods within a school could be longer or shorter.

^cInterval seating is defined as sending groups of students to the cafeteria in regular intervals during a specific lunch period rather than sending all students at one time. For example, if grades 1 and 2 eat from 11:30 a.m. to 12:15 p.m., classroom A might go at 11:30 a.m. and have 30 minutes to eat, classroom B might go at 11:35 a.m. and have 30 minutes to eat, and so forth. Foodservice staff may take this approach to avoid a bottleneck of students at the serving stations.

^dMultiple answers allowed.

-- Indicates sample sizes are too small for reliable estimates.

TABLE III.3

SCHOOL MEAL-SCHEDULING POLICIES RELATED TO BREAKFAST, BY SCHOOL TYPE
(Percentage of Schools)^a

	Elementary Schools	Middle Schools	High Schools	All Schools
Start Time of Breakfast				
Mean	7:48 a.m.	7:56 a.m.	7:38 a.m.	7:48 a.m.
Mode	8:00 a.m.	7:30 a.m.	7:30 a.m.	7:30 a.m.
Minimum	6:30 a.m.	7:00 a.m.	6:30 a.m.	6:30 a.m.
Maximum	9:10 a.m.	9:10 a.m.	9:05 a.m.	9:10 a.m.
School Doors Open Before Breakfast Starts	28.3	26.3	55.8	33.4
Number of Schools Reporting	74	68	65	207
Among Schools Where Doors Open Before Breakfast Starts (n = 82)				
Number of Minutes in Between				
Mean	--	--	--	22
Minimum	--	--	--	2
Maximum	--	--	--	90
Schools with First Bus Arriving Before Breakfast Starts	27.4	41.8	36.1	32.2
Schools with Last Bus Arriving Before Breakfast Starts	24.2	22.3	15.3	22.0
Schools with First Bus Arriving After Breakfast Starts	27.9	33.6	16.1	26.7
Schools with Last Bus Arriving After Breakfast Starts	57.5	64.4	62.3	59.9
Number of Schools Reporting	84	81	78	243

TABLE III.3 (continued)

	Elementary Schools	Middle Schools	High Schools	All Schools
Number of Minutes Students Wait in Breakfast Line				
Mean	2	2	2	2
Minimum	0	0	0	0
Maximum	12	10	8	12
Number of Schools Reporting	97	89	92	278
Number of Minutes in Between When Breakfast Starts and First Class Starts (Mean)				
	32	31	31	32
Number of Schools Reporting	72	67	59	198
How Often Activities Are Scheduled During Breakfast				
Sometimes	0.5	3.5	10.7	3.2
Never or almost never	99.5	96.5	89.3	96.9
Number of Schools Reporting	81	79	74	234
Number of Schools	98	90	92	280

Source: School Nutrition Dietary Assessment-III, Foodservice Manager Survey and Initial Contact Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 280 (73 respondents did not answer the question about a start time for breakfast, 90 did not answer the question about when school opens, 82 did not answer the question about when classes start, and 17 did not answer the question about activities during breakfast). Due to the number of missing responses for the previous variables, the study team was unable to calculate the number of minutes in between school opening and breakfast for 198 schools or the number of minutes in between when breakfast starts and the first class for 82 schools. Thus, “Number of Schools Reporting” indicates the number of schools with nonmissing data on each variable.

^aData are percentages of schools, unless otherwise noted.

-- Indicates sample sizes are too small for reliable estimates.

breakfast started, but it could become a challenge if a student was involved in competing activities or if a student arrived closer to the start of the school day.

While only three percent of schools reported sometimes scheduling other activities during breakfast, bus schedules were much more likely to make it difficult for certain students to have enough time to eat breakfast before classes started. About one-quarter (27 percent) of schools had all students who rode the bus arrive after breakfast started, and 60 percent had at least some bus riders arrive after breakfast started. Just 22 percent of schools had *all* bus-riding students arrive before breakfast began.⁵

3. Recess Schedules

Nearly all elementary schools (96 percent) and over a quarter of middle schools (27 percent) had recess (see Table III.4).⁶ Of those schools with recess, most (87 percent) scheduled recess for at least some students directly after lunch. About one-third of elementary schools and over half of middle schools scheduled recess for *all* students immediately after lunch, although only 23 percent of those schools permitted students to go to recess as soon as they were done eating.

D. POLICIES ON COMPETITIVE FOODS AND BEVERAGES

Less than five years after SMI was launched, the U.S. Department of Health and Human Services (DHHS) released *Healthy People 2010*, a comprehensive set of disease prevention and health promotion objectives for the nation (DHHS 2000). To counter the rising prevalence of obesity and overweight and to improve students' dietary intake, the initiative included a focus on

⁵ Some schools reported breakfast starting at the exact same time that the first bus or last bus arrived. Thus, about 51 percent of schools had the first bus arrive at the same time that breakfast began, and 18 percent of schools had the last bus arrive at the same time that breakfast began.

⁶ Middle schools could include schools with a configuration of grade 4 and above, although middle schools that included grades below sixth were rare.

TABLE III.4

SCHEDULING RECESS, BY SCHOOL TYPE
(Percentage of Elementary and Middle Schools)

	Elementary Schools	Middle Schools	Elementary and Middle Schools
Has a Scheduled Recess	95.6	26.5	79.9
Among Schools with Recess (n = 161)			
Some Students Have Recess Immediately <i>Before</i> Lunch	32.9	25.2	32.3
Some Students Have Recess Immediately <i>After</i> Lunch	88.0	84.2	87.3
Among Schools Where Some Students Have Recess Immediately After Lunch (N = 108)			
Percentage of Schools' Students That Have Recess Immediately After Lunch			
5 percent or less	22.9	19.4	22.6
More than 5 but less than 10 percent	3.7	0.0	3.4
More than 10 but less than 20 percent	1.1	1.9	1.1
20 or more but less than 100 percent	39.1	26.8	38.2
All students	33.4	51.9	34.7
Students Can Go to Recess Before End of Lunch	22.0	35.1	22.9
Number of Schools	143	127	270

Source: School Nutrition Dietary Assessment-III, Principal Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 270 (27 respondents did not answer the question about recess, 6 did not answer the question about having recess immediately before lunch, 7 did not answer the question about having recess scheduled immediately after lunch, 35 did not answer the question about the percentage of students who have recess after lunch, and 14 did not answer the question about allowing students to go to recess before lunch ends). High school principals were not asked about recess.

^aMultiple answers allowed.

improving the school nutrition environment, including a recommendation to “increase the proportion of children and adolescents, ages 6 to 19, whose intake of meals and snacks at school contributes proportionally to good overall dietary quality... The establishment of an environment that supports a good overall diet would enable school nutrition and foodservices, in conjunction with students, their families, and other school employees, to make an important contribution to short- and long-term disease prevention and health promotion” (DHHS 2000).⁷ Reviewing data on competitive foods policies and practices will enable policymakers to assess, as of school year 2004–2005, the efforts of SFAs and schools to regulate students’ access to foods and beverages sold in competition with USDA meals and snacks. At the time of this study, FNS directly regulated only the sale of “foods of minimal nutritional value” and only in the foodservice area. As noted earlier, in 2004, Congress passed the requirement that schools participating in the school meal programs develop wellness policies in 1994, which include policies concerning all foods available in school, but the requirement did not take effect until school year 2006–2007.

The discussion of competitive foods in this section is based on data on the availability of competitive foods (and related policies concerning their types, location, and times available) as reported by SFA directors, school principals, and foodservice managers.⁸ The next chapter provides information on the availability of competitive foods and the types of foods offered based on *observations* in the subsample of schools where student interviews were conducted. Because policies related to location and timing are less relevant for a la carte offerings, the foodservice manager survey did not ask about a la carte foods, although they were widely

⁷ Although this developmental objective was requested by FNS, it was subsequently dropped due to lack of a suitable data source that would provide at least two sets of nationally representative estimates this decade.

⁸ SFA directors provided information on SFA-level policies, while data on school-level policies were provided by food service managers, who reported on competitive foods available in and around the cafeteria, and principals, who reported on competitive foods available elsewhere in the school.

available; information on this important source is reported in Chapter IV. Reports from the surveys on the overall availability of vending machines, school stores, or other competitive food sources in or outside the foodservice area may differ slightly from the observational data, because of differences in the samples or reporting errors.

1. SFA-Level Policies

One-fifth of SFAs had schools that offered foods from national or regional brand-name or chain restaurants, such as a fast-food chain (see Table III.5). Almost three-quarters of those SFAs (14 percent of all SFAs) allowed chain or brand-name food items to be eligible for inclusion in reimbursable meals.⁹ Low-poverty SFAs were more than twice as likely to have these foods available for students and were more than 11 times more likely to include these items in reimbursable meals as compared with higher-poverty SFAs (see Appendix A, Table A.III.1).

Pouring rights contracts, which are agreements between beverage distributors and organizations (such as schools) that allow the distributor to be the only company selling soft drinks at a given location, provide schools with valuable revenues, but many have called for their restriction. One-fourth of SFA directors reported these contracts were present in their districts for some or all schools (Table III.5).¹⁰ Seventeen percent of SFAs directors reported there were pouring rights contracts in *all* schools, and 8 percent reported that some schools used pouring rights contracts. Among SFAs reporting these contracts, 6 percent saw an increase in the number of vending machines in schools during the previous two years, and 16 percent had installed

⁹ Almost three quarters is derived as 14 percent/19.6 percent.

¹⁰ School-level data reveal a somewhat different picture. According to principals, 76 percent of schools with vending machines had a pouring rights contract. When data were cross-checked, there were 5 principals who reported no pouring rights even though the SFA director reported that there was a districtwide contract in effect, and 30 principals who reported having a contract when the SFA director did not. One possibility is that contractual decisions were made by principals at the school level, so SFA directors may not have had complete information.

TABLE III.5
SFA POLICIES ON COMPETITIVE FOODS OFFERED IN SCHOOLS,
AS REPORTED BY SFA DIRECTORS
(Percentage of SFAs)

	All SFAs
Brand-Name or Chain Restaurant Foods	
Any Schools in SFA That Offer Foods from National or Regional Brand-Name or Chain Restaurants	19.6
Any Schools in SFA Where These Items Are Eligible for Inclusion in Reimbursable Meals	14.0
Pouring Rights Contracts^a	
SFA or Schools Engage in Pouring Rights Contracts	
Yes, districtwide	17.2
Yes, some schools	8.2
Among SFAs Reporting Pouring Rights Contracts Districtwide or in Some Schools (n = 56):	
Pouring Rights Contract Limits Types or Brands of Beverages Sold in Foodservice Areas	43.5
Recipients of Income from Pouring Rights Contracts	
Individual school funds	47.3
School foodservice account	39.8
Athletic department	33.4
District fund	32.6
Other	7.3
In Past Two Years, Number of Vending Machines in Schools Has Increased	6.2
In Past Two Years, Vending Machines Have Been Installed in Schools with No Machines Previously	16.4
In Past Two Years, Number of Other In-School Sites Selling Beverages (Such as Snack Bars) Has Increased	2.7
Access to Competitive Food Venues	
Restricts Types of Soda, Soft Drinks, and Sweetened Fruit Beverages (Less than 100% Juice) Sold to Students in Schools or on School Grounds ^b	
Yes, districtwide ban or restriction	5.8
Yes, school-level ban or restriction	17.0
No ban or restriction	52.7
Never has offered soda, soft drinks, or sweetened fruit beverages	24.5

TABLE III.5 (continued)

	All SFAs
Restricts Types of Food or Snacks Sold to Students in Schools or on School Grounds ^c	
Yes, districtwide ban or restriction	9.7
Yes, school-level ban or restriction	18.2
No ban or restriction	72.1
Among SFAs That Sell Soda, Non-Carbonated Soft Drinks, or Juice Drinks, Limits When Students Can Purchase Them in Schools or on School Grounds (n = 106):^c	
Yes, districtwide time restriction	18.8
Yes, school-level time restriction	24.7
No time restriction	56.5
Number of SFAs	129

Source: School Nutrition Dietary Assessment-III, SFA Director Survey, school year 2004–2005, CCD 2002–2003. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public SFAs offering the NSLP.

Note: N = 129. One respondent did not answer the questions about whether brand-name or chain restaurant food items are eligible for inclusion in reimbursable meals, 17 did not answer the question about types of schools where brand-name food items can be included in reimbursable meals, 3 did not answer the question about limits from pouring rights contracts, 5 did not answer the question about income from pouring rights contracts, 2 did not answer the question about an increase in vending machines, 1 did not answer the question about whether vending machines were installed in schools for the first time, 1 did not answer the question about other in-school sites selling beverages.

^aA pouring rights contract is an agreement between a beverage distributor and an organization (such as a school) that allows the distributor to be the only entity selling beverages at a given location.

^bAside from USDA ban on selling soft drinks during school meals; includes vending machines.

^cAside from USDA restrictions on foods of minimal nutritional value; includes school stores and vending machines.

vending machines for the first time in at least some schools.¹¹ Forty-four percent of SFA directors with contracts reported that the contracts limited the types of beverages sold in foodservice areas. As was the case with brand-name food items, low-poverty SFAs were about twice as likely to have pouring rights contracts as higher-poverty SFAs (see Table A.III.1).

¹¹ These percentages do not capture the proportion of schools within a given SFA that saw an increase in vending machines being installed, only that the trend was occurring.

The majority of SFA directors reported that neither their district nor schools within the district placed restrictions on access to competitive food venues (Table III.5). More than half of SFAs (53 percent) did not ban or restrict the types of sodas, soft drinks, and sweetened fruit beverages sold to students anywhere in the school (including from vending machines or school stores), and 68 percent did not ban or restrict the types of food or snacks sold to students, aside from the USDA ban on selling foods of minimal nutritional value in the foodservice area. The 25 percent of SFAs that had never offered these kinds of nutrient-poor beverages were eight times as likely to be in a low-poverty area as in a higher-poverty area (Table A.III.1).

More than half the SFAs (57 percent) reported that their district did not restrict the times when sodas, soft drinks, and sweetened fruit beverages were sold to students at school. Higher-poverty SFAs were much less likely to limit access times than low-poverty SFAs (70 versus 47 percent; see Table A.III.1).

2. School-Level Policies

Because policies on competitive foods are frequently determined by principals and their staff as opposed to SFA officials, reviewing school-level policies may help policymakers further understand the extent to which students have access to these types of foods during the school day.

Availability of Vending Machines. The availability of vending machines in schools increased with the school's grade level (see Table III.6).¹² As reported by principals, almost all high schools (97 percent) and most middle schools (82 percent) had vending machines available for students, but only 17 percent of elementary schools did. Among the 44 percent of schools

¹² Principals were only asked about vending machines other than those that only sell milk, 100% juice, and/or bottled water.

TABLE III.6

AVAILABILITY OF VENDING MACHINES IN SCHOOL OR ON SCHOOL GROUNDS, BY SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
As Reported by Principals				
Vending Machines Available for Students	17.2	81.7	96.7	44.4
Number of Schools Reporting	142	127	123	392
Among Schools That Make Vending Machines Available to Students (n = 252):^b				
Locations of Machines in School or on School Grounds ^a				
Foodservice area	--	44.2	55.8	45.9
Other indoor area(s)	--	66.8	74.7	67.6
Outside school buildings, on school grounds	--	11.5	18.5	15.0
Among Schools with Any Vending Machines Outside Foodservice Area (n = 247):^b				
No Beverage Machines Outside Foodservice Area	--	20.5	12.0	21.0
No Snack Machines Outside Foodservice Area	--	61.2	51.7	62.5
Among Schools with Beverage Machines Outside the Foodservice Area (n = 198):				
Times Students Can Use <i>Beverage</i> Machines (Exclusive of Milk, 100% Juice, or Water) ^a				
Before school	--	25.3	66.6	41.3
During school hours, before lunch	--	22.6	36.4	24.2
During lunch	--	28.5	40.7	31.1
After lunch, before end of last regular class	--	26.3	49.9	39.4
After last regular class	--	81.7	63.9	60.4
Any time	--	1.4	0.8	0.8
During recess or in between classes	--	0.0	3.3	2.6
At athletic event or during/after gym class	--	3.7	0.7	1.6
Other	--	0.0	0.7	0.3

TABLE III.6 (continued)

	Elementary Schools	Middle Schools	High Schools	All Schools
Among Schools with Snack Machines Outside the Foodservice Area (n = 247):				
Times Students Can Use <i>Snack</i> Machines ^a				
Before school	--	--	69.8	56.4
During school hours, before lunch	--	--	39.8	30.2
During lunch	--	--	58.4	46.1
After lunch, before end of last regular class	--	--	44.0	38.0
After last regular class	--	--	81.3	75.7
Anytime	--	--	1.4	0.7
During recess or in between classes	--	--	1.0	2.8
As Reported by Foodservice Managers				
Among Schools with Vending Machines Inside Foodservice Area (n = 124):				
No Beverage Machines Inside Foodservice Area	--	35.5	21.2	31.3
No Snack Machines Inside Foodservice Area	--	46.8	52.9	56.1
Among Schools with Beverage Machines in the Foodservice Area (n = 83):				
Times Students Can Use <i>Beverage</i> Machines (Exclusive of Milk, 100% Juice, or Water) ^a				
Before school	--	--	65.6	46.9
During school hours, before lunch	--	--	32.3	25.5
During lunch	--	--	43.0	54.8
After lunch, before end of last regular class	--	--	36.3	34.5
After last regular class	--	--	80.0	63.4
Anytime	--	--	6.6	3.8
Among Schools with Snack Machines in the Foodservice Area (n = 61):				
Times Students Can Use <i>Snack</i> Machines ^a				
Before school	--	--	--	38.2
During school hours, before lunch	--	--	--	37.8
During lunch	--	--	--	63.5

TABLE III.6 (continued)

	Elementary Schools	Middle Schools	High Schools	All Schools
After lunch, before end of last regular class	--	--	--	46.0
After last regular class	--	--	--	64.6
Anytime	--	--	--	5.3
Number of Schools	143	127	125	395

Source: School Nutrition Dietary Assessment-III, Foodservice Manager Survey, Principal Survey, and Preliminary Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 395 (3 schools did not answer the questions about vending machine availability or location of vending machines, 5 did not answer the question about times to use beverage machines, and 7 did not answer the question about times to use snack machines).

^aMultiple answers allowed.

^bOutside foodservice area can be either “other indoor area” or “outside on school grounds.” Foodservice area was defined as “indoor area where meal are served/eaten.”

--Indicates sample sizes are too small for reliable estimates.

with vending machines, most (68 percent) placed them in indoor areas outside the foodservice area, such as hallways or gyms. However, almost half of the schools with vending machines put one or more in the foodservice area, and 15 percent placed one or more outside on school grounds. Beverage vending machines were more prevalent than snack machines both inside and outside of the foodservice area.

The most common time for students to be able to purchase items from vending machines—regardless of the type or location—was after their last class; nonetheless, many schools allowed access at other times. Among schools with vending machines in the foodservice area, over half (55 percent) allowed students access to beverage machines during lunch, and almost two-thirds (64 percent) allowed access to snack machines in the foodservice area during lunch.¹³

¹³ See Appendix A, Table A.III.2 for data on availability of competitive foods according to urbanicity and poverty level.

Availability of Other Competitive Food Sources. Some schools also made other kinds of competitive food venues available to students, including school stores, snack bars, and fundraisers.¹⁴ Eleven percent of schools had stores that sold competitive foods and beverages (see Table III.7). High schools were twice as likely (25 percent) as middle schools (12 percent) and three times as likely as elementary schools (8 percent) to have school stores. Snack bars were considerably less prevalent than school stores (not including snack bars located in the food service area). Only 3 percent of schools had snack bars, and most were found in high schools.

In addition to snack bars or similar venues outside the foodservice area and a la carte sales in the foodservice area, fundraisers for student groups can compete with the reimbursable school lunch or breakfast. Based on principals' reports, more than half the schools (56 percent) never had groups hold sales during lunch of sweet or salty snacks to raise money. However, these restrictions were less common as grade level increased. Among schools that allowed fundraisers of this type (44 percent), most (33 percent of all schools) held them less than once a week. School groups rarely sold pizza or other entrees during lunch to raise money—less than five percent of schools reported this, although it was not clear if they were specifically prohibited.

E. STUDENT MOBILITY AND OPEN CAMPUS POLICIES

Aside from mealtime schedules, the degree to which students were permitted to move about on school grounds (aside from the classroom or other supervised activities) or to leave school property during lunch—commonly known as an open campus policy—could affect their consumption of competitive foods or off-campus foods as alternatives to USDA school meals.

¹⁴ Snack bars were defined for principals as venues outside of the food service area that prepare and serve food but do not offer reimbursable meals.

TABLE III.7

AVAILABILITY OF OTHER COMPETITIVE FOOD SOURCES, BY SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
School Stores				
Has a School Store That Sells Competitive Foods or Beverages	7.8	12.2	24.8	11.0
Among Schools with a School Store (n = 79):				
School Store Operates Every Day	--	--	95.5	93.0
Times When Students Can Access School Store ^a				
Before school	--	--	46.0	33.9
During school hours	--	--	27.8	37.6
During lunch period	--	--	64.8	44.3
After school	--	--	14.7	25.9
Snack Bars				
Has a Snack Bar Outside of Foodservice Area That Sells Competitive Foods or Beverages	1.1	2.0	9.0	2.8
Fundraisers				
How Often School Organizations Sell Sweet or Salty Snacks as Fundraisers (Not Including Food Sold During Lunch in Foodservice Area)				
Every day	3.1	4.8	2.9	3.4
One to four times per week	6.7	10.0	8.6	7.7
Less than once a week	27.6	34.7	49.2	33.0
Never	62.6	50.4	39.3	56.0
How Often School Organizations Sell Pizza or Other Main Entree Items During Lunch:				
Every day	0.2	1.7	2.2	0.9
Three to four times per week				
One to two times per week	0.0	2.2	0.4	0.5
Less than once a week	1.0	2.1	10.4	3.0
Never	95.2	92.2	86.9	93.1
District forbids organizations from selling food during lunch	3.7	1.8	0.0	2.6
Number of Schools	143	127	125	395

TABLE III.7 (continued)

Source: School Nutrition Dietary Assessment-III, Foodservice Manager Survey and Principal Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 395 (2 schools did not answer the questions about presence of any school stores, if the store operates every day, and times when students can access school stores; 3 did not answer the question about the presence of snack bars, 11 did not answer the question about fundraisers, and 5 did not answer the question about pizza/main entree sales).

^aMultiple answers allowed.

--Indicates sample sizes are too small for reliable estimates.

A related issue is whether students can leave the cafeteria during lunch at any time, after a certain time, or not at all. These factors may influence their access to vending machines and other competitive food sources.

1. Student Mobility on School Grounds

During lunchtime, about one-quarter of schools allowed students to be in classrooms with a teacher's permission (26 percent) or outside on campus (24 percent; see Table III.8). Forty percent of schools allowed all or some students to leave the lunch area after a predetermined time, and 29 percent let students leave the foodservice area whenever they wanted. Students had the freedom to go anywhere on campus at very few schools (3 percent), although high schools were much more likely to grant this permission (10 percent versus 1 percent and less than 1 percent for elementary and middle schools, respectively). In general, mobility privileges increased with age.

2. Open Campus Policies During Lunch

Eleven percent of schools followed an open campus policy. Not surprisingly, high schools were more likely to have such a policy (25 percent) and grant older students these privileges, while middle schools were least likely to have one (see Table III.9). One possible explanation

TABLE III.8
STUDENT MOBILITY POLICIES, BY SCHOOL TYPE
(Percentage of Schools)

	School Type			
	Elementary Schools	Middle Schools	High Schools	All Schools
Where Students Can Go During Lunch^a				
Foodservice area/cafeteria or other places meals are served	94.7	98.9	99.0	96.3
Classroom but only with teacher permission	23.7	27.5	32.3	26.1
Outside, on campus	17.9	24.7	42.4	23.9
Library	6.9	16.3	24.7	12.1
Off-campus/home	8.8	5.4	23.0	10.6
Restroom facilities	2.1	0.8	2.1	10.4
Gym	4.4	14.9	19.9	9.4
Classroom open to students during lunch period	7.4	8.3	11.0	8.3
Designated areas (such as hallways, student commons)	1.5	1.7	3.3	2.9
Anywhere on campus	1.2	0.1	10.4	2.8
Computer lab, media center	0.0	0.2	14.7	1.8
Other	7.7	5.9	23.3	1.9
Can Students Leave Lunch Area After a Certain Time?				
Yes, all students	27.1	36.6	66.0	36.3
Yes, some students	2.8	3.0	6.9	3.6
No	70.1	60.4	27.1	60.1
Can Students Leave Lunch Area <i>Any Time</i>, with or Without Permission?				
Yes, all students	5.9	25.1	63.6	20.3
Yes, some students	8.0	10.7	11.2	9.1
No	86.2	64.2	25.2	70.6
Number of Schools	143	127	125	395

Source: School Nutrition Dietary Assessment-III, Principal Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 395 (4 respondents did not answer the question about where students can go during lunch, and 5 did not answer the question about whether students can leave the lunch area).

^aMultiple answers allowed.

TABLE III.9

OPEN CAMPUS POLICIES DURING LUNCH, BY SCHOOL TYPE
(Percentage of Schools)

	School Type			
	Elementary Schools	Middle Schools	High Schools	All Schools
School Follows an Open Campus Policy ^a	8.4	3.8	24.9	10.7
Among Schools with an Open Campus Policy (n = 44):				
Off-Campus Food Sources Close Enough for Students to Walk or Drive During Lunch ^b				
Fast-food restaurants	--	--	--	76.4
Supermarkets, convenience stores, or other stores	--	--	--	68.1
Other restaurants, cafeterias, or diners	--	--	--	59.1
Other food sources (includes home, friend's or relative's house)	--	--	--	32.0
Off-campus lunch wagons or push carts	--	--	--	6.8
Number of Schools	143	127	125	395

Source: School Nutrition Dietary Assessment-III, Principal Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 395 (10 respondents did not answer the question about an open campus policy, and 2 did not answer the question about other food sources in walking or driving distance).

^aOpen campus is defined here as a school that allows students (any or all) to leave school property (go off campus) during their lunch period.

^bMultiple answers allowed.

--Indicates sample sizes are too small for reliable estimates.

for why elementary schools followed an open campus policy more frequently than middle schools is the fact that elementary schools may be more likely to operate on a neighborhood school model, in which children can walk to school—and thus go home for lunch.¹⁵

Of the schools with open campuses, the majority had at least one alternative food source within walking distance of the school, according to their principals. The most common venues in close proximity were fast-food restaurants (76 percent) and supermarkets or convenience stores (68 percent). (Due to small sample sizes, percentages should be interpreted with caution.)

F. REVENUES FROM COMPETITIVE FOODS

The issue of revenue generated from competitive food sales in schools is a controversial one. School officials may contend that such funding sources contribute to the overall school budget and frequently pay for important expenses (for example, textbooks, new team uniforms, or school clubs). Profits may be enhanced if a school engages in a pouring rights contract—an agreement with a beverage distributor that gives the distributor exclusive sales rights to beverages other than milk in that school. Child nutrition advocates may counter that offering low-nutrient, energy-dense foods and beverages at school as a way to supplement the school's budget is not a responsible management strategy. Some also argue that replacing items high in sugar and/or fat with healthier alternatives is worth trying—it might not jeopardize revenue streams. Therefore, policymakers are interested in knowing how much revenue schools collected from competitive food sources and who benefited from these revenues.¹⁶

¹⁵ Alternatively, it could be explained by K–12 schools—which were counted as elementary schools in the study's definition of school type—that allowed older students to leave campus. However, there were only two K–12 schools in the study sample (see background characteristics tables in Chapter I).

¹⁶ Data discussed in this section should be interpreted with caution due to small sample sizes, “don't know” responses from about one-third of principals and food service managers, and the fact that dollar amounts were based on principal and food service manager reports and not an analysis of administrative financial data by the study team.

1. A la Carte Revenues

A la carte revenues are the type of competitive foods' revenue most likely to benefit the school foodservice itself, rather than other school activities. In fact, many SFAs report they rely on this type of revenue to break even (GAO 2004 and 2005). Some schools offer only beverages, desserts, and snacks a la carte. However, schools may also offer entrees, along with snacks, desserts, and non-carbonated beverages, a la carte, sometimes through separate a la carte lines.¹⁷

Although Chapter II showed that nearly all SFAs reported prices for reimbursable meals that were primarily based on food costs, SFA pricing policies for a la carte foods were not usually based on food costs. Only 35 percent of SFA directors reported that food costs affected their prices (Table III.10). However, almost all SFA directors cited labor costs (99 percent) and other production costs (90 percent) as important factors in setting a la carte prices. Other considerations mentioned by SFA directors were the effects of the prices on incentives to purchase reimbursable meals (51 percent) and on incentives for purchase of specific items (such as milk) (28 percent), which suggests they are concerned about the competitive nature of these offerings.

Few SFAs (30 percent or less, depending on the type of food) used mark-up pricing in setting a la carte prices, which is in accord with the low percentage citing food costs as major factors in setting prices. Among the small group that did use mark-up pricing, they tended to mark up a-la-carte-only foods more than items that were part of reimbursable meals.

¹⁷ USDA regulations prohibit selling "foods of minimal nutritional value" in the food service area. Such foods include all carbonated drinks (diet or regular), water ices not made with fruit or juice, chewing gum, and certain candies. States and SFAs may impose further restrictions. Individuals may petition USDA for an exemption for specific foods.

TABLE III.10
MEAL PRICING FOR A LA CARTE MEALS
(Percentage of SFAs)

	Percentage of SFAs
Among SFAs That Sell a la Carte Items in School Foodservice Area (n = 112):	
Factors That Influence Setting Prices for a la Carte Items ^a	
Production labor costs (e.g., wages, benefits)	99.4
Other production costs (e.g., utilities, equipment, supplies)	89.6
Ease of collecting payments	52.8
Incentive for student participation in reimbursable meal program	51.2
Transportation costs	45.9
Food costs	35.3
Incentive for student consumption of specific items (e.g., milk)	28.0
Administrative or indirect costs	25.3
Other	47.7
Uses Percentage Markup or Fixed-Dollar Markup to Set Prices of a la Carte Items	59.9
Among SFAs That Use Percentage Markups or Fixed-Dollar-Amount Markups to Set a la Carte Price for Some or All Items (n = 88):	
Markup for Milk	
50% or less	11.5
More than 50%	4.7
Uses fixed-dollar markup for milk	4.7
Does not use markup for milk	79.1
Markup for Other Items on Reimbursable Menu When Sold a la Carte	
50% or less	12.4
More than 50%	7.6
Uses fixed-dollar markup for other items on reimbursable menu	1.6
Does not use markup for other items on reimbursable menu	78.2
Markup for a la Carte-only Items	
50% or less	18.2
More than 50%	9.5
Uses fixed-dollar markup for a la carte-only items	1.7
Does not use markup for a la carte-only items	70.5
Types of Costs Included in the Base of Percentage for a la Carte Items	
Food cost	100.0
Production labor cost	85.0
Other production costs	42.7
Transportation cost	26.6
Administrative or indirect costs	17.3

TABLE III.10 (continued)

	Percentage of SFAs
Among SFAs That Changed a la Carte Prices in Last Five Years (n = 81):	
Price change in milk	
Increased	67.0
Reduced	0.0
No change	33.0
Price change in other items on reimbursable menu	
Increased	76.6
Reduced	0.4
No change	23.0
Price change in a-la-carte-only items	
Increased	95.1
Reduced	0.2
No change	4.7
Reasons for Price Change for a la Carte Items ^a	
Change in food costs	81.2
Change in labor costs (wages, benefits, etc.)	59.3
Change in other production costs	41.8
Change in transportation costs	30.5
Increased charge to foodservice account for district administrative/indirect costs	23.9
Unspecified cost increase/losing money	22.9
Change in administrative/indirect costs	18.4
Reduction in State/school district subsidy	13.8
Declining participation in reimbursable meals	9.2
Other	18.9
Number of SFAs	129

Source: School Nutrition Dietary Assessment-III, SFA Director Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public SFAs offering the NSLP.

Note: N = 129. (1 respondent did not answer the question on cost factors for reimbursable meals, 4 did not answer the question on percentage markup on reimbursable meals, and 3 did not answer the questions about changing prices on a la carte items).

^aMultiple answers allowed; list of possible answers was read out loud to respondents.

In the week in which schools provided data on menus for reimbursable meals, they also reported their total a la carte revenue for the week (Table III.11). Schools generally reported modest a la carte revenues—about one in five schools had no a la carte revenues, and 50 percent had less than \$100 in revenues in the survey week. Not surprisingly, elementary schools were particularly likely to have little or no a la carte revenues; only 15 percent of elementary schools had revenues exceeding \$100 for the week. Most middle and high schools, however, had revenues in excess of \$100, and 10 percent of high schools had weekly revenue of at least \$1,000. The maximum weekly revenue reported by a high school was over \$3,300 per week. The larger revenues for high schools may reflect the greater amount and variety of foods offered a la carte, as well as their larger enrollments and the higher level of discretionary income available to their students. The next chapter will provide some insights into the types of foods sold a la carte at each of these school levels, which may also help explain the differences in revenues.

2. Vending Machines

Data on vending machines outside the foodservice area were collected from principals, while data on machines in the foodservice area were collected from foodservice managers. According to foodservice managers, few school foodservice programs earned sizable revenues from vending machines located in the foodservice area; less than ten percent of schools earned any revenues (see Table III.12). In contrast, principals reported higher revenues from vending machines located outside of the foodservice area, which benefit school programs other than or in addition to the school food service. Not including revenues to the food service, 31 percent of schools earned \$100 to \$999 per month, and about 10 percent earned \$1,000 to \$5,000 per month. Very few schools (only large high schools) earned more than \$5,000 per month. In most

TABLE III.11

A LA CARTE REVENUE DURING TARGET WEEK, BY SCHOOL TYPE
(Percentage of Schools)

Weekly Revenue	Elementary Schools	Middle Schools	High Schools	All Schools
None	21.6	10.5	15.4	18.3
\$1 - <\$100	63.9	24.7	32.0	50.0
\$100 - \$400	13.8	47.3	24.9	22.3
\$400 - <\$1,000	0.1	16.2	17.9	7.2
\$1,000 or more	0.0	1.3	9.8	2.3
Mean (Dollars per Week)	45	250	351	146
Number of Schools	143	127	125	395

Source: School Nutrition Dietary Assessment-III, Daily Meal Count Form, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

schools, income from vending machines outside the food service area went to school funds (57 percent), and one-fifth gave revenues to the school food service. Thirty-three percent of high schools gave revenues to their athletic departments.

Among the 44 percent of schools with vending machines, about three-quarters were engaged in a pouring rights contract, as reported by the principal. Half of these schools (51 percent) earned less than \$1,000 per month. However, due to small sample sizes, revenue data from schools without a pouring rights contract could not be presented.

3. School Stores

As reported by school principals, among those schools that operated school stores (11 percent of all schools), monthly revenue from the store most often fell between \$100 and \$999 (in 44 percent of schools with stores). Sixteen percent of schools with stores reported revenues above \$500 per month, and a little more than one-fifth of schools (22 percent) with

TABLE III.12

REVENUES RECEIVED FROM VENDING MACHINES, BY ENROLLMENT AND SCHOOL TYPE
(Percentage of Schools)

	School Enrollment			School Type			
	Small (Less than 500)	Medium (Between 500 and 1,000)	Large (More than 1,000)	Elementary	Middle	High	All Schools
Has Vending Machines for Students	36.3	47.9	77.6	17.2	81.7	96.7	44.4
Among Schools with Vending Machines as Reported by Principals (n = 255):							
Has a Pouring Rights Contract ^a	--	72.6	80.0	--	68.9	78.2	76.4
Who Receives Income from Vending Machines ^b							
School	--	71.3	57.8	--	51.3	52.0	57.2
School foodservice	--	17.7	30.3	--	24.0	16.0	19.8
Other school district department or fund	--	27.9	19.1	--	18.7	15.3	17.8
Athletic department	--	9.8	25.7	--	7.6	32.8	17.2
Student council, activities/clubs	--	6.4	16.1	--	16.3	28.4	17.2
Other	--	0.0	1.0	--	0.0	0.8	0.4
Number of Schools Reporting	44	104	97	29	104	122	255
Monthly Net Income to School or SFA from Vending Machines (Not Including Foodservice Income, as Reported by Principals)							
Less than \$100	--	15.9	5.1	--	24.9	4.1	20.2
\$100 to \$999	--	24.5	29.4	--	29.8	45.7	31.3
\$1,000 to \$5,000	--	14.4	18.3	--	7.4	13.5	10.4
More than \$5,000	--	0.0	5.3	--	0.0	2.1	0.9
No income to school or district	--	2.7	0.0	--	0.9	0.0	1.3
Don't know	--	42.5	42.0	--	37.0	34.6	36.0
Number of Schools Reporting	23	46	49	12	47	64	123
Monthly Net Income to School or SFA from Vending Machines in Schools with Pouring Rights Contract (Not Including Foodservice Income, as Reported by Principals)							
Less than \$100	--	--	--	--	--	0.0	22.2
\$100 to \$999	--	--	--	--	--	48.3	28.9
\$1,000 to \$5,000	--	--	--	--	--	14.2	13.4
More than \$5,000	--	--	--	--	--	2.7	1.3
No income to school or district	--	--	--	--	--	0.0	0.3
Don't know	--	--	--	--	--	34.8	33.9
Number of Schools Reporting	16	32	42	10	31	52	93

TABLE III.12 (continued)

	School Enrollment			School Type			
	Small (Less than 500)	Medium (Between 500 and 1,000)	Large (More than 1,000)	Elementary	Middle	High	All Schools
Among Schools with Vending Machines as Reported by Foodservice Managers (n = 289)							
Monthly Net Income to School Foodservice from Vending Machines (as Reported by Foodservice Managers)							
Less than \$100	6.1	0.6	1.3	2.4	0.0	7.1	3.1
\$100 to \$999	2.9	4.0	15.7	1.5	7.1	8.5	4.9
\$1,000 to \$5,000	0.0	2.1	3.6	0.0	1.2	3.3	1.3
More than \$5,000	0.0	0.0	0.9	0.0	0.0	0.4	0.1
No income to school foodservice	65.9	59.2	44.8	70.7	63.0	44.0	61.1
Don't know	25.1	34.2	33.7	25.5	28.7	36.8	29.5
Number of Schools Reporting	60	123	93	70	104	115	289
Number of Schools	98	167	113	143	127	125	395

Source: School Nutrition Dietary Assessment-III, Foodservice Manager Survey and Principal Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 395 (3 principals did not answer the question about availability of vending machines for students, 10 did not answer the question about pouring rights, 129 principals did not give a dollar amount for non-foodservice revenues from vending machines, and 22 foodservice managers did not give a dollar amount for foodservice revenues from vending machines). Seventeen schools are missing from the output for enrollment.

Principals provided income estimates for machines located outside of the foodservice area, whereas foodservice managers provided estimates for vending machine revenues received by the school foodservice and for machines located outside and inside the foodservice area. Dollar estimates provided by principals did not include any revenues that went to the school foodservice. Because of differences in reporting and in missing data, sample sizes differ for the two sources.

^aA pouring rights contract is an agreement between a beverage distributor and an organization (such as a school) that allows the distributor to be the only entity selling beverages at a given location.

^bMultiple answers allowed.

--Indicates sample sizes are too small for reliable estimates.

school stores earned less than \$100 per month in revenues (see Table III.13).¹⁸ Fifty-nine percent of these schools distributed the money directly into a school fund; others distributed funds to the student council or a school club (21 percent) and/or to a business or marketing club (11 percent).

¹⁸ Eleven percent of schools with stores reported receiving none of the revenues, and 7 percent did not know the level of revenues received.

TABLE III.13

REVENUES RECEIVED FROM SCHOOL STORES, BY ENROLLMENT AND SCHOOL TYPE
(Percentage of Schools)

	School Enrollment			School Type			
	Small (Less than 500)	Medium (Between 500 and 1,000)	Large (More than 1,000)	Elementary	Middle	High	All Schools
Has School Stores for Students	--	--	37.1	--	--	24.8	11.0
Among Schools with School Stores (n = 80)							
Who Receives Income from School Stores: ^a							
School	--		34.6	--	--	37.0	58.7
Student council, activities/clubs	--		21.1	--	--	21.5	21.2
Business/marketing class or club (includes DECA, Inc., an association of marketing students)	--		22.6	--	--	27.5	11.0
School foodservice only	--		4.4	--	--	3.3	5.7
Athletic department	--		2.5	--	--	1.8	5.1
School foodservice with others	--		7.5	--	--	5.5	2.2
Other	--		9.8	--	--	9.7	5.3
Monthly Net Income to School or SFA from School Store							
Less than \$100	--	--	8.8	--	--	8.3	22.2
\$100 to \$999	--	--	18.7	--	--	24.5	44.4
\$1,000 to \$5,000	--	--	31.8	--	--	24.0	14.2
More than \$5,000	--	--	7.9	--	--	5.5	1.9
No income to school or district	--	--	18.6	--	--	19.2	10.8
Don't know	--	--	14.2	--	--	18.5	6.5
Number of Schools	98	167	113	143	127	125	395

Source: School Nutrition Dietary Assessment-III, Principal Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 395. Seventeen schools are missing from the results by school size because of missing enrollment data.

^aMultiple answers allowed.

--Indicates sample sizes are too small for reliable estimates.

IV. COMPETITIVE FOODS OFFERED IN SCHOOLS

This chapter presents information based on the availability of, access to, and types of competitive foods in the school environment. (In contrast, Chapter III focuses on competitive food *policies*.) Competitive foods include any foods or beverages offered for sale at school—apart from meals offered through U.S. Department of Agriculture (USDA) school meal programs—from venues such as a la carte items in the cafeteria, vending machines, school stores, and snack bars. In the context of increased concerns over childhood obesity rates, as well as the fact that competitive foods are often energy dense, nutrient poor, and/or high in saturated fat (for example, sodas, potato chips, doughnuts), the degree to which students have access to such venues is of great interest to USDA and policymakers at the Federal, State, and local levels. Furthermore, the availability and prevalence of these foods are also of concern to USDA because they could affect students' participation in the School Breakfast Program (SBP) and/or the National School Lunch Program (NSLP).¹

The following are the key research questions related to competitive foods offered in schools:

- What sources of competitive foods are available in schools? How many vending machines, school stores, or snack bars are available? Are foods sold a la carte in the cafeteria?
- What types of foods are sold from each of the competitive food outlets?
- How does the availability of competitive foods vary with School Food Authority (SFA) and school demographic and institutional characteristics?

Data to address these research questions were collected using the A La Carte Foods Checklist, the Alternative Food Source Checklist, and the Vending Machine Checklist. Field

¹ Volume II of this report includes analysis of the relationship between availability of competitive foods and school meal participation.

data collectors who were visiting schools to conduct student interviews and dietary recalls completed these three checklists; they marked “none available” if a particular source was not present in the school. The form for the Alternative Food Source Checklist allowed observers to enter information on school stores, snack bars, food carts, and any other competitive food sources observed. All checklists included specific categories of foods, and interviewers were trained to check off each food item offered by the relevant source. Foods available were also recorded separately by location within the school (in or near the cafeteria, versus other locations in school, versus outside on school grounds).² To facilitate comparisons, food categories (for example, fruits and vegetables) and subcategories (for example, canned and dried fruit) were based on those used in previous School Nutrition Dietary Assessment (SNDA) studies, with ample room for other items to be added to reflect current food issues. Some of these other items were coded into existing or new categories, and some remained in generic “other” categories.

Please note that the maximum sample size for these checklists (n = 287 schools) is smaller than for school-level data presented in Chapters II and III (n = 395 schools) because the data were intentionally collected in conjunction with the student data collection, using on-site field interviewers/observers. Thus, our ability to investigate differences in results for subgroups of schools is more limited than for other school-level data, because the smaller sample implies less precise estimates. Nonetheless, the subsample of visited schools was selected so that the estimates are nationally representative.

A. SUMMARY OF FINDINGS

- All high schools, nearly all middle schools (97 percent), and most elementary schools (80 percent) had some competitive food sources available to students. A la carte

² “Near” is defined as within 20 feet of the cafeteria.

items sold in the cafeteria were the most common competitive food source in elementary schools.

- Only a quarter of elementary schools (27 percent) had vending machines on campus, but most middle schools (87 percent) and almost all high schools (98 percent) had them. Among schools with vending machines, the mean number of machines per school was 5; high schools had an average of 10 machines.
- Schools were less likely to place vending machines in or around the cafeteria (34 percent) than elsewhere in school or outside the school building (44 percent).
- About as many schools offered 100% juice or water in vending machines as offered other beverages with added sugar and/or caffeine (such as soda or coffee). Nonbeverage food items were less prevalent in vending machines; fruits and vegetables were rarely sold in machines.
- Eighty-two percent of schools offered a la carte items during lunch, although just over half these schools (44 percent of all schools) offered a la carte items other than milk. Most elementary schools that offered a la carte items at lunch only offered milk, which was the most popular beverage offered across all schools. Between 35 and 42 percent of schools offered baked goods, frozen desserts, and snack items; 30 percent of schools offered fruit, and 14 percent offered yogurt. About half of all schools (48 percent) offered a la carte entrees at lunch, particularly middle schools (63 percent) and high schools (77 percent). Popular entrees and mixed dishes included pizza, hamburgers and cheeseburgers, and breaded chicken patties, all of which were offered by at least one-fifth of schools.
- Sixty-one percent of schools offered a la carte items at breakfast, although fewer offered a la carte items other than milk. At breakfast, schools offered a la carte beverage items more frequently than food items. Milk and bread/grain products were the most popular a la carte categories offered at breakfast.
- Competitive food venues such as school stores or snack bars were less prevalent than vending machines or a la carte; 26 percent of schools had one or more of these alternative venues. These venues tended to sell items such as candy, chips, and juice drinks more often than items such as water, 100% juice, pretzels, and low-fat/reduced-fat snacks.

The rest of this chapter presents details of these findings on the availability of competitive foods in schools. First, it gives an overview of the availability of various types of competitive food venues. The chapter then describes the specific food and beverage items offered through these venues, as identified through the three checklists—vending machines, a la carte lines, and all other competitive food sources.

B. AVAILABILITY OF COMPETITIVE FOODS IN SCHOOLS

This section describes the wide availability in school year 2004–2005 of competitive food sources in schools—particularly middle and high schools—sources that included vending machines, a la carte items sold in the cafeteria, school stores, and snack bars.

1. Types and Combinations of Competitive Food Sources

All high schools, nearly all middle schools (97 percent), and most elementary schools (80 percent) had some competitive food source available to students (see Table IV.1). A la carte offerings sold in the cafeteria were common in all types of schools (available in 82 percent of schools at lunch) and were the most common competitive food source in elementary schools (available in 76 percent at lunch). In fact, elementary schools were far more likely (48 percent) to have a la carte as their only competitive food source than middle schools (5 percent) or high schools (1 percent) and were much less likely than schools for higher grades to have vending machines or other alternative food sources such as school stores or snack bars.

Most schools offered some a la carte foods at breakfast (61 percent) and at lunch (82 percent), with middle and high schools being more likely than elementary schools to offer a la carte items. However, these figures include schools that only offered milk a la carte, with no additional a la carte items. If schools that only offered milk a la carte are excluded, then 44 percent of schools offered a la carte at lunch, and 33 percent of schools offered a la carte at breakfast.³

When considering the availability of different combinations of competitive food sources, schools with only a la carte, or a la carte along with other competitive food sources, were the most common. For example, 30 percent of schools just had a la carte (representing fully

³ See the discussions pertaining to Tables IV.8 and IV.10 for additional information on milk-only schools.

TABLE IV.1
 AVAILABILITY OF COMPETITIVE FOODS IN SCHOOL, BY SCHOOL TYPE
 (Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Any a la Carte				
Offered a la carte at breakfast	51.4	70.4	79.9	60.7
Offered a la carte at lunch	75.8	92.1	91.7	82.1
Any Vending Machines	26.5	87.1	98.4	52.3
Any Other Alternative Food Sources	20.2	40.9	34.9	27.1
Combinations of Sources				
A la carte only	47.5	5.2	1.1	30.2
Vending machines only	2.7	2.5	6.3	3.4
Other alternative food sources only	0.0	1.5	0.0	0.3
Vending machines and a la carte	10.7	46.8	60.6	27.5
A la carte and other alternative food sources	6.1	3.2	0.5	4.5
Vending machines and other alternative food sources	1.9	0.8	0.8	1.5
Vending machines, a la carte, and other alternative food sources	11.0	36.6	30.6	19.8
Any Competitive Food Source (Vending Machines, a la Carte, or Alternative Food Sources)	79.9	96.8	100.0	87.1
Number of Schools	100	93	94	287

Source: School Nutrition Dietary Assessment-III, A La Carte Checklist, Alternative Food Source Checklist, and Vending Machine Checklist, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 287 (alternative food source checklists were not completed for 4 schools). Checklists were collected only in schools visited for student data collection. Sources include school stores; snack bars (includes sources labeled as concession stands, cafes, or restaurants); food carts; and others (after-school programs, fundraisers, and any similar venues). All locations on campus were included.

48 percent of elementary schools, but almost no secondary schools); 28 percent of schools had vending machines and a la carte (11 percent of elementary schools, 47 percent of middle schools, and 61 percent of high schools); and 20 percent had vending machines, a la carte, and other venues (11 percent of elementary schools, 37 percent of middle schools, and 31 percent of high schools). Three percent of schools offered vending machines only, and less than one percent of schools offered only alternative food sources such as snack bars.

2. Number and Locations of Vending Machines

Only slightly more than a quarter of elementary schools (27 percent) had vending machines on campus, but most middle schools (87 percent) and almost all high schools (98 percent) had them (see Table IV.2). Among elementary and middle schools, fewer schools had vending machines in or near the cafeteria (13 percent in elementary schools, 53 percent in middle schools) than elsewhere in the school or outside of the building on school grounds (22 percent and 71 percent, respectively). At the high school level, however, more than 80 percent of schools had vending machines in both areas.

The number of vending machines available to students increased with grade level (see Table IV.3).⁴ About one-third of schools had one to three machines, and about one-fifth had more than three machines. High schools were more likely to have larger numbers of vending machines—51 percent had seven or more machines, compared with 12 percent of middle schools and no elementary schools. Among all schools with vending machines, the mean number of machines per school was five and the median was three; high schools had twice as many machines, on average, as middle schools.

⁴ Interviewers were instructed to include only vending machines available to students, not those in teachers' lounges.

TABLE IV.2

LOCATIONS OF VENDING MACHINES AVAILABLE TO STUDENTS, BY SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Vending Machines Available (Anywhere on Campus)	26.5	87.1	98.4	52.3
Vending Machines Available in or Near Cafeteria	12.5	52.5	82.6	34.0
Vending Machines Available Elsewhere in School or Outside on School Grounds	22.1	70.8	86.9	44.2
Number of Schools	100	93	94	287

Source: School Nutrition Dietary Assessment-III, Vending Machine Checklist, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Checklists were collected only in schools visited for student data collection.

TABLE IV.3

NUMBER OF VENDING MACHINES AVAILABLE, BY SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Total Number of Vending Machines				
No machines	75.4	13.4	1.6	49.1
1 to 3 machines	24.6	54.1	31.5	31.6
4 to 6 machines	0.0	20.3	16.0	7.0
7 to 10 machines	0.0	9.5	28.7	7.4
11 to 20 machines	0.0	1.9	10.3	2.4
21 to 30 machines	0.0	0.9	8.2	1.8
More than 30 machines	0.0	0.0	3.8	0.7
Among Schools with Vending Machines (n = 194)				
Mean Number of Machines	--	5	10	5
Median	--	3	7	3
Number of Schools Reporting	99	90	93	282

Source: School Nutrition Dietary Assessment-III, Vending Machine Checklist, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 287 (Vending Machine Checklists were not completed in 5 schools that were visited, most likely because of time constraints). Checklists were collected only in schools visited for student data collection.

-- Indicates sample sizes too small for reliable estimates.

As one might expect, the number of machines was directly proportional to student enrollment—larger schools had more machines (see Appendix A, Table A.IV.1, for data by enrollment). In addition, schools with pouring rights contracts, as reported by principals, were more likely to have large numbers of vending machines.⁵ For example, 29 percent of schools with a pouring rights contract had seven or more machines available to students, but only 3 percent of schools without such a contract had as many (see Appendix A, Table A.IV.2). Pouring rights contracts and large enrollments are more common among secondary schools, possibly explaining why they have more machines. Another possible factor is that older students are likely to have more spending money.

3. Alternative On-Campus Food Sources

About one in four schools (26 percent) had a place on campus, other than the cafeteria or vending machines, where students could buy competitive foods or beverages (see Table IV.4). School stores were found in 9 percent of schools, food carts in 7 percent, snack bars (outside of the foodservice area) in 6 percent, and other sources (such as fundraisers or after-school programs) in 14 percent of schools. Alternative sources for competitive foods were much less common in elementary schools than in secondary schools—81 percent of elementary schools, versus 58 percent of middle schools and 68 percent of high schools, did not have any of these food sources available for students.

Overall, students were slightly more likely to have access to these venues before or after lunch than during their lunch periods.⁶ In secondary schools, they were about as likely to have

⁵ A pouring rights contract is an agreement between a beverage distributor and an organization (such as a school) that allows the distributor to be the only entity selling beverages at a given location.

⁶ Categories were not mutually exclusive.

TABLE IV.4

AVAILABILITY OF ALTERNATIVE ON-CAMPUS FOOD SOURCES, BY SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Types of Alternative Food Sources^a				
School stores	5.6	8.6	20.3	9.1
Snack bars	1.0	12.4	14.3	5.8
Food carts	5.6	6.9	9.8	6.7
Other sources	8.4	30.6	14.2	13.9
No alternative food sources	81.0	57.8	68.0	73.9
Locations of Alternative Food Sources^a				
In foodservice area	6.4	14.1	4.2	7.5
Adjacent to foodservice area (within 20 feet)	4.5	8.7	12.8	6.9
Elsewhere in school building or on school grounds	<1.0	16.5	7.9	5.0
Times Alternative Food Sources Were Available to Students^a				
Before school and/or after school	8.6	16.6	23.3	13.0
During lunch period	3.1	17.2	23.3	9.8
During school hours other than lunch	9.7	15.6	16.4	12.2
Number of Schools Reporting	98	92	93	283

Source: School Nutrition Dietary Assessment-III, Alternative Food Source Checklist, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 287 (checklists were not completed for 4 schools). Alternative food sources includes school stores, snack bars, food carts, concession stands, cafes, restaurants, after school programs, fundraisers, and any similar venue. Concession stands, cafes, and restaurants were all counted as snack bars. All on-campus locations were included. Checklists were collected only in schools visited for student data collection.

^aMultiple answers were possible.

access during lunch as before or after school. Elementary school students, however, were much less likely to have access to these venues during lunch; they were available during lunch in only

3 percent of elementary schools, versus 17 percent of middle schools and 23 percent of high schools.

C. FOODS AND BEVERAGES OFFERED IN VENDING MACHINES

This section presents inventories of the foods and beverages that students could purchase from vending machines. Because the proximity of vending machines to the foodservice area may affect students' consumption of school meals, checklist data were analyzed according to whether the machines were located in or near the cafeteria or elsewhere on school grounds.

Slightly more than half of all schools (52 percent) had vending machines. Before turning to the types of foods available in these machines, it is worth noting that almost no schools (less than 1 percent) had vending machines that sold food items exclusively; most sold beverages only (33 percent of all schools) or a combination of beverages and food (18 percent) (see Table IV.5). Moreover, essentially all elementary schools that did have machines only offered beverages in these machines.^{7,8}

1. Vending Machine Items Offered

Overall, schools offered either 100% juice or water just as often as the group of beverages that contained added sugar and/or caffeine, such as carbonated soft drinks or coffee (each category was offered in about 43 percent of schools; see Table IV.6). Less than one-fifth of all elementary schools offered either type of beverage, but about three-quarters of middle schools

⁷ One elementary school in the sample was observed to sell ice cream from a vending machine; the weighted percentage was quite small (less than one percent).

⁸ The figures in Table IV.5 and subsequent tables of this chapter may be different than those reported in Chapter III, because these reflect on-site observations and those were reported by the principals or foodservice managers, who may not have recalled or reported all vending machines. In addition, the sample for the checklists is smaller than the sample used in Chapter III.

TABLE IV.5
 VENDING MACHINE ITEMS OFFERED ANYWHERE ON SCHOOL GROUNDS,
 BY SCHOOL TYPE
 (Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Any Vending Machines on School Grounds	26.5	87.1	98.4	52.3
Number of Schools	100	93	94	287
Items Offered in Vending Machines				
Beverages only	24.6	51.6	39.0	32.6
Food items only	<1.0	1.4	0.0	<1.0
Combination of beverages and food items	<1.0	33.6	59.4	18.0
Number of Schools Reporting	99	90	93	282

Source: School Nutrition Dietary Assessment-III, Vending Machine Checklist, school year 2004–2005. Checklists were completed by interviewer-observers at schools visited for student data collection. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Checklists were collected only in schools visited for student data collection. Vending Machine Checklists were not completed for 5 schools that were visited. In computing the percentage of schools with vending machines (first row), data from the Principal Survey were used for these 5 schools.

did. Nearly all high schools offered beverages other than juice, milk, or water (95 percent), while 86 percent offered juice or water.

Among specific beverages, 37 percent of schools offered water, and 23 percent offered 100% juice. The other beverages frequently offered were juice drinks (35 percent), followed by energy and sports drinks (31 percent), and regular soda or soft drinks (31 percent). Specific beverage items were offered in few elementary schools, a much higher proportion of middle schools, and an even higher proportion of high schools.

Dairy items—including varieties of milk, yogurt, and cheese—were found in only six percent of machines in or near the cafeteria, and not at all in elementary school vending machines. Few schools offered milk in vending machines, but yogurt was available from vending machines in 10 percent of middle schools and 14 percent of high schools.

TABLE IV.6

VENDING MACHINE ITEMS OFFERED, BY SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Any Vending Machine Food or Beverage Items Offered on Campus	26.5	87.1	98.4	52.3
Number of Schools	100	93	94	287
Items Offered in Vending Machines				
Juice and Water	18.6	77.0	86.0	42.9
Juice (100% juice)	12.2	24.0	57.4	23.3
Water (spring, flavored, sparkling, mineral, seltzer)	16.4	64.7	76.7	37.4
Water (water with juice)	3.6	11.2	15.5	7.4
Other Beverages	17.4	74.8	95.2	43.6
Carbonated sweetened soft drink	9.5	48.7	81.1	31.0
Carbonated diet soft drink	8.1	34.5	73.1	25.8
Juice drinks (such as fruit blends, lemonade, punch)	12.9	57.5	80.0	34.5
Coffee	0.0	0.0	1.6	0.3
Tea	1.4	15.1	18.1	7.3
Hot chocolate	0.0	0.0	1.7	0.3
Yogurt drinks	0.0	0.0	3.8	0.7
Energy and sports drinks	12.3	43.7	78.4	31.2
Chocolate drinks	0.4	5.7	7.8	2.8
Other	0.2	3.1	1.8	1.1
Dairy Foods and Beverages	0.0	11.4	17.8	5.7
Whole milk	0.0	0.0	0.9	0.2
Reduced-fat (2%) white milk	0.0	0.3	6.9	1.4
Low-fat (1%) white milk	0.0	0.3	4.0	0.8
Fat-free milk	0.0	1.6	2.0	0.7
Flavored milk	0.0	0.0	2.1	0.4
Yogurt	0.0	10.0	13.8	4.6
Cheese	0.0	3.3	5.4	1.7
Baked Goods-Desserts	0.0	33.7	52.2	16.6
Cake-type (brownies, cupcakes)	0.0	11.7	22.6	6.7
Cake-type (low-fat/reduced-fat brownies, cupcakes)	0.0	3.0	9.0	2.3
Cookies	0.0	21.4	39.8	11.9
Cookies (low-fat/reduced-fat)	0.0	7.0	5.2	2.4
Pastries (pies, turnovers)	0.0	24.3	46.7	13.8
Doughnuts/crispy rice bars	0.0	16.5	42.9	11.5
Other baked goods-desserts	0.0	8.6	19.9	5.5
Bread or Grain Products	0.0	31.9	49.8	15.8
Regular bread (breads, rolls, bagels)	0.0	0.7	4.3	1.0
Other bread (biscuits, croissants, hot pretzels)	0.0	0.7	0.8	0.3
Muffins	0.0	0.0	1.7	0.3
Muffins (low-fat/reduced-fat)	0.0	0.0	0.2	0.0
Granola bars	0.0	7.0	6.6	2.6
Granola bars (low-fat/reduced-fat)	0.0	0.0	1.7	0.3
Pretzels	0.0	17.5	29.7	9.2

TABLE IV.6 (continued)

	Elementary Schools	Middle Schools	High Schools	All Schools
Crackers/cracker sandwiches (peanut butter)	0.0	13.0	13.9	5.2
Crackers/cracker sandwiches (cheese)	0.0	20.8	30.6	10.0
Cereal/cereal bars	0.0	17.9	18.3	7.0
Other crackers	0.0	13.9	14.4	5.5
Other	0.0	9.2	11.1	3.9
Frozen Desserts	0.8	10.5	15.3	5.5
Frozen non-dairy (fruit bars, popsicles)	0.0	1.4	10.9	2.4
Ice cream (bars, cups, sundaes)	0.0	2.6	2.2	0.9
Low-fat frozen desserts (frozen yogurt, ice milk, sherbet)	0.8	4.2	2.9	1.9
Milkshakes/smoothies	0.8	8.0	8.2	3.6
Fruits and Vegetables	0.0	12.1	9.7	4.2
Canned, cooked fruit	0.0	3.0	2.7	1.1
Fresh fruit	0.0	0.1	0.4	0.1
Fruit salad	0.0	0.0	0.0	0.0
Dried fruit	0.0	6.8	5.6	2.4
Vegetables, side salad	0.0	0.0	0.0	0.0
Other fresh vegetables	0.0	2.2	1.0	0.6
Snacks	0.0	33.5	59.5	18.0
Chips (corn, potato, puffed cheese, tortilla)	0.0	17.2	34.2	10.0
Chips (lower-fat/reduced-fat corn, potato, puffed cheese, tortilla)	0.0	12.0	6.4	3.5
Nuts and seeds (almonds, peanuts, sunflower seeds, trail mix)	0.0	30.2	49.6	15.5
Fruit roll-up	0.0	10.4	13.3	4.6
Popcorn	0.0	15.9	34.3	9.7
Meat snacks (jerky, pork rinds)	0.0	15.9	14.2	5.8
Candy with chocolate	0.0	20.4	40.4	11.8
Candy without chocolate	0.0	19.1	38.1	11.1
Energy bars	0.0	13.1	24.0	7.2
Gum	0.0	19.2	31.8	9.9
Other snacks	0.0	3.7	2.5	1.2
Number of Schools Reporting	99	90	93	282

Source: School Nutrition Dietary Assessment-III, Vending Machine Checklist, school year 2004–2005. Checklists were completed by interviewer-observers at schools visited for student data collection. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Vending Machine Checklists were not completed for 5 schools. In computing the percentage of schools with vending machines, data from the Principal Survey were used for these 5 schools. Checklists were collected only in schools visited for student data collection. Food categories are listed as they appeared on each checklist.

Items other than beverages were less prevalent in vending machines than beverages. Thirty-four percent of middle schools and 60 percent of high schools had machines that offered snack

items, 34 and 52 percent of middle and high schools, respectively, had machines with baked goods, and 32 and 50 percent had bread or grain products in vending machines (most of which were crackers, cracker sandwiches, pretzels, and cereal or cereal bars).⁹ Except for a machine with frozen desserts (observed in only one school), elementary schools did not offer nonbeverage food items in vending machines. Fruits or vegetables (mostly canned or dried fruit) were available from vending machines in 12 percent of middle schools and 10 percent of high schools.

2. Vending Machine Offerings, by Location of Machines on Campus

One-third of schools (34 percent)—13 percent of elementary schools, 53 percent of middle schools, and 83 percent of high schools—offered vending machines in or near the cafeteria (see Table IV.7). On the other hand, more schools (44 percent) offered vending machines elsewhere in school (for example, in the gymnasium) or outside the building than in or around the cafeteria. Machines in these areas were found in 22 percent of elementary schools, 71 percent of middle schools, and 87 percent of high schools.

Schools were more likely to offer beverages other than juice or water, such as sodas and juice drinks, when machines were located away from the cafeteria (that is, more than 20 feet away). Less than a quarter of schools (23 percent) offered 100% juice and water as beverages in vending machines outside of the cafeteria or foodservice area, while 32 percent of schools offered other beverages. In contrast, 100% juice or water and other beverages were equally present in vending machines in or near the cafeteria (each at 28 percent). However, this result reflects different trends among schools at each level; (1) high schools were much more likely to offer juice or water inside the cafeteria (73 percent, versus 43 percent outside), while elementary and middle schools were more likely to offer these beverages outside the cafeteria; and (2) high

⁹ Data on the whole-grain content of these foods were not available.

TABLE IV.7

VENDING MACHINE ITEMS OFFERED, BY LOCATION ON CAMPUS AND SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Any Vending Machine Food or Beverage Items Offered in or Near the Cafeteria ^a	12.5	52.5	82.6	34.0
Number of Schools	100	93	94	287
Items Offered in Machines in or Near the Cafeteria				
100% juice and water	9.6	39.2	72.8	27.6
Other beverages (such as soda, juice drinks, tea)	8.9	40.3	74.2	27.6
Dairy foods and beverages	0.0	11.4	17.7	5.6
Baked goods-desserts	0.0	16.6	30.1	9.0
Bread or grain products	0.0	15.8	27.8	8.5
Frozen desserts	0.8	8.1	7.9	3.6
Fruits and vegetables	0.0	2.2	5.5	1.5
Snacks (such as chips, candy, energy bars, gum)	0.0	17.3	35.9	10.3
Number of Schools Reporting	99	90	93	282
Any Vending Machine Food or Beverage Items Offered Away from Cafeteria (Elsewhere in School or Outside of School Building)	22.1	70.8	86.9	44.2
Number of Schools	100	93	94	287
Items Offered in Machines Away from Cafeteria				
100% juice and water	9.4	47.6	43.0	23.2
Other beverages (such as soda, juice drinks, tea)	14.4	47.1	71.8	31.9
Dairy foods and beverages	0.0	1.4	2.1	0.7
Baked goods-desserts	0.0	18.3	34.6	10.3
Bread or grain products	0.0	18.3	31.7	9.7
Frozen desserts	0.0	0.0	2.1	0.4
Fruits and vegetables	0.0	8.2	2.9	2.1
Snacks (such as chips, candy, energy bars, gum)	0.0	19.4	35.7	10.7
Number of Schools Reporting	99	90	93	282

Source: School Nutrition Dietary Assessment-III, Vending Machine Checklist, school year 2004–2005. Checklists were completed by interviewer-observers at schools visited for student data collection. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 287. Vending Machine Checklists were not completed for 5 schools. In computing the percentage of schools with vending machines, data from the Principal Survey were used for these 5 schools. Checklists were collected only in schools visited for student data collection.

^a“Near” was defined as within 20 feet.

schools were about as likely to offer other beverages in each location (74 and 72 percent), while elementary and middle schools were less likely to offer them in or near the cafeteria. Although schools were somewhat less likely to offer juice drinks and energy or sports drinks outside of the foodservice area, they were twice as likely to offer carbonated sweetened soft drinks or soda (24 versus 11 percent). (See Tables A.IV.3 and A.IV.4 for detailed inventories of items offered in vending machines according to location on campus).

About as many schools (10 to 11 percent) offered vending machine snacks in or near the cafeteria as outside the foodservice area. Among the specific types of snacks offered, schools were about equally likely to offer low-nutrient, energy-dense snacks (such as chips and candy) in vending machines inside and outside of the foodservice area, particularly at the high school level.

D. FOODS AND BEVERAGES OFFERED A LA CARTE

Schools offer a la carte items simultaneously with—and in the same location as—reimbursable school meals. Therefore, the types of food and beverage items offered may affect students' participation in the NSLP or SBP even more than items offered through other competitive food venues. A la carte foods that appeared on checklists included various items also available in reimbursable meals (such as cheeseburgers or fruit), along with drinks, snacks, and desserts not available in reimbursable meals. The following section presents information on the kinds of foods and beverages that were offered a la carte at lunch and breakfast. Information on a la carte offerings among schools with each major menu-planning system is also presented.

1. A la Carte at Lunch

Most schools (82 percent) offered a la carte items at lunch, and nearly all middle and high schools did (both 92 percent; see Table IV.8). Fewer schools, however, served a la carte items *aside from* milk, especially among elementary schools (32 percent versus more than 60 percent

TABLE IV.8

A LA CARTE ITEMS OFFERED AT LUNCH, BY SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Offered a la Carte Items at Lunch	75.8	92.1	91.7	82.1
Offered a la Carte Items at Lunch, Excluding Schools, That Only Offer Milk a la Carte	32.0	61.6	63.9	44.0
Offered a la Carte Entrees at Lunch	33.9	62.8	77.4	48.0
Offered a la Carte Items, but not Entrees	42.0	29.4	15.6	34.4
Items Offered a la Carte at Lunch				
Milk^a	65.6	70.2	84.5	70.2
Milk Only^a	43.8	30.5	26.5	37.9
Juice and Water	45.3	71.6	71.5	55.5
Juice (100% juice)	36.5	52.5	54.0	43.0
Juice (50% juice)	1.7	21.3	21.5	9.4
Water (spring, flavored, sparkling, mineral, seltzer)	25.7	57.3	58.3	38.2
Water (water with juices, sparkling water with juices)	1.8	8.7	11.2	5.0
Other Beverages	23.8	61.6	57.5	37.7
Carbonated sweetened soft drink	0.0	2.1	6.9	1.8
Carbonated diet soft drink	0.0	0.4	6.1	1.3
Coffee	0.0	1.9	10.0	2.3
Hot chocolate	0.6	4.9	8.7	3.0
Juice drinks (less than 50% juice, such as fruit blends, lemonade, punch)	14.3	41.9	40.2	24.8
Tea	2.8	15.3	24.1	9.4
Yogurt drinks	0.6	4.6	0.8	1.4
Energy and sports drinks	14.0	33.9	42.3	23.4
Other beverages	0.0	2.0	4.5	1.3
Baked Goods-Desserts	27.5	65.4	57.6	40.8
Cake-type (brownies, cupcakes)	8.5	31.3	35.2	18.2
Cake-type (low-fat/reduced-fat brownies, cupcakes)	5.5	5.1	8.3	6.0
Cookies	22.8	51.1	52.9	34.2
Cookies (low-fat/reduced-fat)	5.1	13.0	13.0	8.2
Pastries (pies, turnovers)	8.6	8.6	21.8	11.2
Crispy rice bars	0.0	0.6	0.3	0.2
Other baked goods-desserts	7.8	30.8	16.4	14.0
Other baked goods-desserts (low- fat/reduced-fat)	3.2	3.6	6.9	4.0
Bread or Grain Products	21.9	48.4	50.5	32.6
Regular bread (breads, rolls, bagels)	12.3	26.9	35.0	19.6
Other bread (biscuits, croissants, hot pretzels)	6.7	19.4	26.8	13.1
Muffins	4.9	12.8	20.7	9.5
Tortillas	4.8	8.2	10.5	6.6

TABLE IV.8 (continued)

	Elementary Schools	Middle Schools	High Schools	All Schools
Crackers with cheese or peanut butter	0.0	3.2	0.8	0.8
Dry cereal	0.0	0.8	3.1	0.8
Other grain products (crackers, granola bars, pretzels)	15.7	36.2	36.8	23.8
Candy	2.6	5.6	19.2	6.4
With chocolate	1.8	5.1	15.9	5.2
Without chocolate	0.8	3.2	14.1	3.9
Frozen Desserts	26.9	52.9	40.7	34.7
Frozen non-dairy (fruit bars, gelatin pops, popsicles)	16.1	27.7	19.7	19.0
Ice cream (bars, cups, sundaes)	24.4	40.8	27.5	28.2
Low-fat frozen desserts (frozen yogurt, ice milk, sherbet)	9.3	13.4	17.2	11.6
Milkshakes/smoothies	2.8	11.1	15.5	6.9
Fruit	21.7	40.6	43.6	29.7
Canned, cooked fruit	18.6	29.6	28.7	22.7
Fresh fruit	20.5	40.6	38.8	27.9
Fruit salad	7.8	8.3	14.9	9.3
Dried fruit	5.8	10.1	8.2	7.1
Meat and Meat Alternates Entrees				
Meat Entrees	20.4	46.9	44.4	30.2
Beef				
Hamburger or cheeseburger	16.9	33.1	33.0	23.2
Chili or burrito	9.6	20.0	22.0	14.0
Other beef	9.9	10.4	15.9	11.2
Poultry				
Chicken patty (breaded)	13.7	31.5	29.4	20.3
Chicken (other)	11.6	27.1	22.7	16.8
Turkey	14.1	13.5	24.3	16.0
Other meat				
Hot dog (corn dog, franks and beans)	14.4	23.7	18.3	17.0
Cold cuts (bologna, salami, and other similar cuts)	14.4	20.6	22.0	17.1
Sausage or pork	12.3	10.7	11.9	11.9
Meat Alternates	15.3	34.5	35.4	23.0
Cheese sandwich	13.3	18.3	17.6	15.1
Other cheese	9.1	16.2	16.8	12.0
Beans or peas (chick peas, garbanzo beans, kidney beans, refried beans)	10.7	12.7	9.9	10.9
Eggs (hard cooked, egg salad, scrambled, fried)	2.2	7.8	11.4	5.1
Fish	8.7	20.7	13.4	11.9
Nuts and seeds (peanuts, peanut butter, sunflower seeds, other nuts)	11.0	15.1	20.9	13.7
Lower-Fat Entrees	3.2	11.9	7.3	5.7
Mixed Dishes (Entrees)	21.7	54.6	71.3	37.8
Chef's salad	8.1	29.3	29.4	16.4
Lasagna	7.4	11.5	12.1	9.1
Macaroni and cheese	13.5	12.3	15.9	13.7
Pizza (no meat)	13.6	32.9	28.7	20.3
Pizza (with meat)	9.9	48.1	40.1	23.3

TABLE IV.8 (continued)

	Elementary Schools	Middle Schools	High Schools	All Schools
Spaghetti	12.0	16.9	14.8	13.5
Soup with meat or beans (bean, chicken, clam chowder, minestrone)	10.5	14.8	15.1	12.2
Mexican food (other)	11.7	17.8	29.7	16.4
Chinese food	4.7	9.1	15.6	7.6
Breakfast burrito/breakfast sandwich	0.0	0.4	0.0	0.1
Chili, with meat or meat alternate	0.0	1.7	0.0	0.3
Peanut butter and jelly sandwich	5.5	1.1	18.1	7.1
Sandwiches, unspecified	0.0	1.7	2.4	0.8
Prepared salads, unspecified	0.0	0.6	1.9	0.5
Salad bar	0.0	0.0	4.1	0.5
Miscellaneous sandwiches, with meat	0.0	6.9	4.8	2.3
Other mixed dishes	0.0	9.0	10.1	3.7
Vegetables	19.0	45.0	47.1	29.6
Fried potatoes (including pre-fried, oven baked, french fries, potato puffs)	13.6	35.9	40.1	23.1
Salad (tossed, potato, three bean, raw vegetables)	14.1	30.7	32.8	21.0
Vegetable (other cooked)	15.4	20.4	23.0	17.9
Vegetable (soup)	10.5	16.5	12.9	12.1
Any vegetable other than fried potatoes	16.0	33.9	34.5	23.1
Snacks	32.5	61.4	54.1	42.3
Chips (corn, potato, puffed cheese, tortilla)	24.6	57.0	49.0	35.7
Nuts and seeds (almonds, peanuts, sunflower seeds, trail mix)	5.9	11.5	15.6	8.9
Popcorn	12.5	18.9	17.7	14.8
Fruit snacks (roll-ups, shapes)	14.9	32.5	29.1	21.1
Meat snacks (jerky, pork rinds)	0.0	5.6	7.0	2.5
Energy bars	0.0	2.5	8.7	2.2
Other snacks	6.2	16.6	14.3	9.8
Yogurt	10.6	19.7	17.6	13.7
Other a la Carte Items				
Nachos	0.6	4.2	5.9	2.3
Pickles	1.9	8.7	0.3	2.9
Pudding	0.5	4.4	3.2	1.8
Other a la carte items, fried	0.0	6.8	6.8	2.7
Other	21.5	42.2	53.0	31.7
Number of Schools	100	93	94	287

Source: School Nutrition Dietary Assessment-III, A La Carte Checklist, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 287. Percentages given are based on all schools. There were 241 schools with a la carte offerings at lunch, 95 of which only offered milk a la carte at lunch. Checklists were collected only in schools visited for student data collection. Food categories are listed as they appeared on each checklist.

^aThe “milk” category refers to schools that offer whole, reduced-fat, low-fat, and/or fat-free milks alone or in addition to other a la carte items. This category does not include other dairy products such as yogurt drinks, yogurt, or cheeses. The “milk-only” category refers to schools that serve only milk a la carte; all other items offered are included in reimbursable meals; it is a subset of the milk category. The percentage of schools offering milk only may be understated and the percentage offering no a la carte may be overstated, if interviewers did not realize a la carte milk was available.

of middle and high schools). The majority of elementary schools with a la carte offered only milk (44 percent out of 76 percent).

Across all schools, milk was the most common a la carte beverage offered at lunch (offered in 70 percent of schools), followed by 100% juice (43 percent) and water without added juice (38 percent). Other a la carte beverages offered fairly often included juice drinks (25 percent) and energy and sports drinks (23 percent). All of these items were offered much more frequently in middle and high schools than in elementary schools. Tea was offered in middle and high schools also (in 15 percent of middle schools and 24 percent of high schools). Few schools (and no elementary schools) offered carbonated soft drinks or sodas—either sweetened or diet—as a la carte options, as would be expected given the USDA rules prohibiting sale of foods of minimal nutritional value (FMNV) in the foodservice area.¹⁰

Some schools, particularly middle and high schools (63 percent of middle schools and 77 percent of high schools), offered entrees a la carte at lunch. Seventy-one percent of high schools and 55 percent of middle schools offered items in the mixed dishes category, defined as dishes that combine a meat or meat alternate and a grain or bread, with or without vegetables. The most frequently offered mixed dishes were pizza with meat (23 percent), pizza without meat (20 percent), chef's salad and Mexican food (16 percent each), and spaghetti and macaroni and cheese (14 percent each). However, elementary students were more often offered pizza without meat, while secondary students preferred pizza with meat. High school students were much more frequently offered sandwiches a la carte than elementary or middle school students.

Thirty percent of schools offered meat entrees, which included such items as hamburgers or cheeseburgers (23 percent); breaded chicken patties (20 percent); hot dogs, cold cuts, and other

¹⁰ Both regular and diet sodas are considered FMNV. Exceptions to the rule may be granted by FNS.

chicken dishes (each 17 percent); and turkey (16 percent). In general, these items were about twice as likely to be available a la carte in secondary schools than in elementary schools. Meat alternate entrees were somewhat less prevalent and consisted of items such as cheese sandwiches (15 percent); nuts and seeds, such as peanuts, peanut butter, and sunflower seeds (14 percent); fish (12 percent); beans (11 percent); and eggs (5 percent). Six percent of schools offered lower-fat entrees.

Popular non-entree a la carte items included chips (available in 36 percent of schools; cookies (in 34 percent); ice cream (28 percent); fresh fruit (28 percent); other grain products such as crackers, granola bars, or pretzels (24 percent); fried potatoes (23 percent); and cooked or canned fruit (23 percent). About one-fifth of schools offered fruit snacks; salads such as bean, potato, tossed, or raw vegetables; regular bread; and cake-type desserts. Most of these foods were available about twice as often in secondary schools as in elementary schools. Two exceptions were ice cream (available more often in middle schools than either elementary or high schools), and fried potatoes (available in 14 percent of elementary schools, but in 36 percent of middle schools and 40 percent of high schools). Vegetables other than fried potatoes were available a la carte in 16 percent of elementary schools, and in just over one-third of middle and high schools.

More secondary schools offered higher-nutrient or lower-calorie beverages a la carte than offered beverages with added sugar or caffeine.¹¹ The most frequently offered beverages were divided into two groups—those that were high-nutrient or low-calorie, and those that were low in

¹¹ This discussion focuses on secondary schools because almost two-thirds of schools at these grade levels offered a la carte items in addition to milk at lunch (see Table IV.8), whereas only one-third of elementary schools did.

nutrients and energy-dense (see Figure IV.1).¹² More than half of schools made beverages in the first category available a la carte, including 100% juice (53 percent), water without added juice (58 percent), and milk (77 percent). Forty-one percent of schools offered juice drinks, the top low-nutrient, energy-dense beverage. As noted earlier, five percent of schools made carbonated sweetened soft drinks available a la carte despite the USDA rules regarding FMNV.¹³

In contrast, more secondary schools offered students a la carte side dishes or snack items for lunch that were relatively high in fat and calories than offered lower-fat or lower-calorie options. In secondary schools, among the five most popular foods that are relatively low in fat, four were available in about one-fifth of schools or less; 40 percent of schools offered fresh fruit (see Figure IV.2).¹⁴ However, more than half of secondary schools made chips and cookies available to students, and between 33 and 38 percent offered fried potatoes, ice cream, and cake-type desserts. Thus, secondary school students more frequently had the opportunity to purchase side dishes or snacks that were lower in nutrients and higher in calories.

2. A la Carte at Breakfast

The majority of schools (61 percent), especially middle and high schools, offered a la carte items at breakfast (see Table IV.9). As was the case with lunch, some schools offered only milk. One-third of schools (27 percent of elementary schools, 40 percent of middle schools, and

¹² Tea was offered in 20 percent of secondary schools. While in many cases “tea” most likely referred to sweetened iced tea, the checklist option could have referred to black, herbal, or green teas. As such, this item was excluded from the figure.

¹³ This appears to be contrary to USDA rules concerning FMNV, but we do not have enough information to evaluate this fully. Some schools may have been granted an exemption.

¹⁴ Popcorn was offered in 19 percent of secondary schools. It was excluded from the analysis, however, because the checklist did not indicate whether butter had been added to the popcorn (which would increase fat).

FIGURE IV.1

POPULAR A LA CARTE BEVERAGES OFFERED AT LUNCH
IN SECONDARY SCHOOLS
(Percentage of Schools)

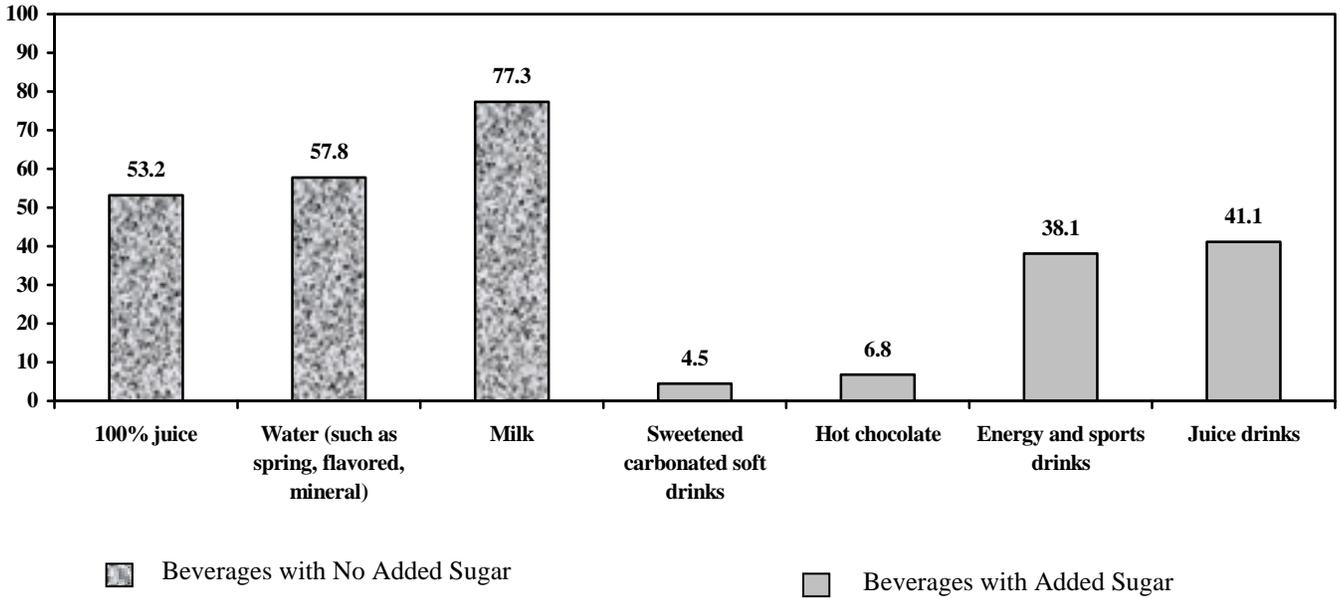


FIGURE IV.2

POPULAR A LA CARTE NON-ENTREE FOODS OFFERED AT LUNCH
IN SECONDARY SCHOOLS
(Percentage of Schools)

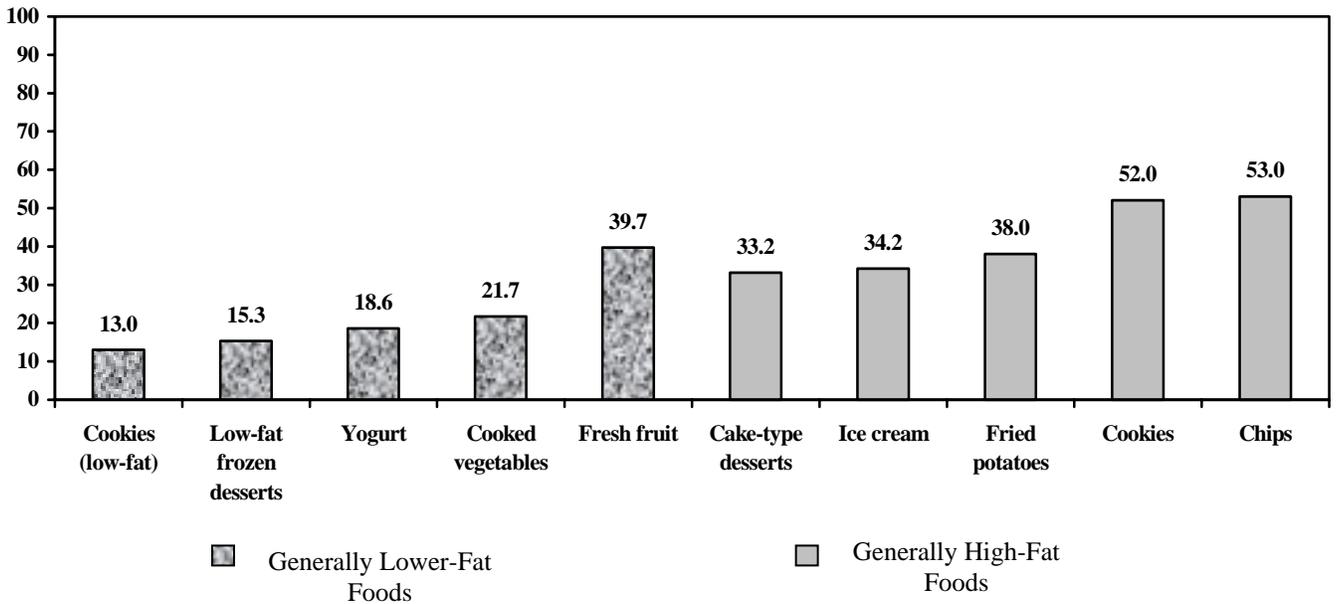


TABLE IV.9

A LA CARTE ITEMS OFFERED AT BREAKFAST, BY SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Offered a la Carte Items at Breakfast	51.4	70.4	79.9	60.7
Offered a la Carte Items at Breakfast, Excluding Schools, That Only Offer Milk a la Carte	27.4	40.3	53.4	33.3
Items Offered a la Carte at Breakfast				
Milk^a	45.9	54.5	74.4	53.1
Milk Only^a	43.8	30.5	26.5	37.9
Juice and Water	30.3	54.1	58.3	40.4
Juice (100% juice)	30.3	50.4	50.9	38.2
Juice (50% juice)	0.6	5.7	18.3	5.0
Water (spring, flavored, sparkling, mineral, seltzer)	6.8	33.4	40.5	18.6
Water (water with juices, sparkling water with juices)	0.0	1.3	5.6	1.3
Other Beverages	3.8	39.4	39.0	17.6
Carbonated sweetened soft drink	0.0	1.7	5.6	1.4
Carbonated diet soft drink	0.0	0.0	3.6	0.7
Coffee	0.0	3.7	10.8	2.8
Hot chocolate	0.6	6.2	10.9	3.7
Juice drinks (less than 50% juice, such as fruit blends, lemonade, punch)	3.1	24.9	26.7	11.9
Tea	0.7	3.2	14.4	3.9
Yogurt drinks	0.0	2.3	0.8	0.6
Energy and sports drinks	1.0	18.8	27.8	9.7
Other beverages	0.0	2.0	2.4	0.9
Baked Goods-Desserts	3.9	13.5	29.5	10.7
Cake-type (brownies, cupcakes)	0.0	2.4	17.6	3.9
Cake-type (low-fat/reduced-fat brownies, cupcakes)	0.0	0.7	1.3	0.4
Cookies	0.4	3.7	20.2	4.9
Cookies (low-fat/reduced-fat)	0.0	1.0	7.0	1.5
Pastries (pies, turnovers)	2.2	7.4	13.1	5.4
Other baked goods-desserts	1.7	3.5	7.0	3.0
Other baked goods-desserts (low- fat/reduced-fat)	0.0	0.3	1.1	0.3

TABLE IV.9 (continued)

	Elementary Schools	Middle Schools	High Schools	All Schools
Bread or Grain Products	14.7	33.3	36.7	22.6
Regular bread (breads, rolls, bagels)	9.8	14.7	30.7	14.8
Pancakes, french toast, waffles	1.3	2.7	0.8	1.5
Other bread (biscuits, croissants, hot pretzels)	7.5	10.8	14.5	9.5
Muffins	5.5	20.8	30.0	13.3
Tortilla	0.0	0.0	0.3	0.1
Dry breakfast cereal	3.6	2.5	4.6	3.5
Oatmeal	0.0	0.4	2.3	0.5
Crackers with cheese or peanut butter	0.0	3.1	3.0	1.2
Other bread or grains products	0.9	6.0	14.1	4.5
Candy	0.0	0.0	10.5	2.0
With chocolate	0.0	0.0	10.5	2.0
Without chocolate	0.0	0.0	7.3	1.4
Frozen Desserts	1.4	3.5	7.8	3.0
Fruit	10.5	21.0	27.5	15.8
Canned, cooked fruit	7.1	8.3	10.2	7.9
Fresh fruit	10.1	20.1	25.8	15.1
Fruit salad	0.6	1.2	6.9	1.9
Dried fruit	0.7	5.2	2.4	1.9
Meat and Meat Alternates Entrees (Eggs, sausage)	8.9	23.2	33.5	16.5
Vegetables	0.0	1.4	3.1	0.9
Snacks	0.0	11.6	26.3	7.4
Yogurt	3.7	13.1	10.9	6.9
Other a la Carte Items	6.1	13.9	18.0	9.9
Number of Schools	100	93	94	287

Source: School Nutrition Dietary Assessment-III, A La Carte Checklist, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: N = 287. There were 184 schools with a la carte offerings at breakfast, 77 of which only offered milk. Checklists were collected only in schools visited for student data collection. Food categories are listed as they appeared on each checklist.

^aMilk refers to schools that offer whole, reduced-fat, low-fat, and/or fat-free milks, in addition to other a la carte items. This category does not include other dairy products such as yogurt drinks, yogurt, or cheeses, which were captured under other categories. Milk only refers to schools that only serve milk a la carte; all other items offered are included in reimbursable meals.

53 percent of high schools) offered a la carte items at breakfast other than milk. A la carte items—both food and beverages—were generally less prevalent at breakfast than at lunch.¹⁵

Schools offered beverages more often than food at breakfast. The most popular a la carte beverages were milk (53 percent), 100% juice (38 percent), and water without added juice (19 percent). While 33 and 41 percent of middle and high schools, respectively, offered water a la carte, only 7 percent of elementary schools did. In fact, elementary schools seldom provided beverages aside from milk or 100% juice at breakfast. Almost no schools (one percent) offered carbonated soft drinks as an a la carte option at breakfast. In general, the beverages available a la carte were those also offered in reimbursable meals.

Other than beverages, bread and grain products comprised the most prevalent a la carte category available at breakfast (offered in 23 percent of schools). Regular bread, such as rolls and bagels, were offered at 15 percent of schools; other popular items included muffins (13 percent) and other bread items such as biscuits, croissants, and hot pretzels (10 percent). Sixteen percent of schools offered fruit, usually fresh fruit (15 percent) or canned/cooked fruit (8 percent). Some schools (34 percent of high schools, 23 percent of middle schools, but just 9 percent of elementary schools) offered meat and meat alternate entrees such as eggs, sausage, and ham. While candy and frozen desserts were relatively rare overall, 11 percent of schools offered baked desserts and 7 percent offered snacks. Snacks and baked goods were more commonly offered at higher grade levels. Twenty-seven percent of high schools made snacks available at breakfast, and 30 percent sold baked goods such as cakes, cookies, and pastries.

¹⁵ Data in Table IV.9 include both schools that do and do not offer the SBP. A la carte items were generally offered along with the SBP. However, about one-quarter of secondary schools that did not offer the SBP offered a la carte items at breakfast. In contrast, no elementary schools did (not shown in table).

3. A la Carte Offerings, by Menu-Planning System

A school's menu-planning system may affect not only its reimbursable meals, but also the types of foods available a la carte, because many foods are only offered a la carte when available as part of a reimbursable meal. Eighty-eight percent of schools that used the traditional food-based menu-planning system offered a la carte items at lunch, compared with schools using nutrient-based (79 percent) or enhanced food-based (73 percent) menu planning (Table A.IV.5). Schools with enhanced food-based menu plans were the least likely to offer a la carte items other than milk during lunch (23 percent).

Some variations in foods offered a la carte emerged according to menu-planning system (see Table A.IV.5). Schools using the enhanced food-based menu system more frequently offered fruits (41 percent) and vegetables (39 percent), compared with schools using other menu-planning systems (22 and 24 percent for nutrient-based, and 30 and 29 percent for traditional food-based, respectively). Enhanced food-based menu-planning schools were also more likely to offer bread or grain products, meat alternate entrees, and only milk a la carte. These findings may reflect that the enhanced food-based menu-planning system requires more servings of fruits, vegetables, and grain products, which may also make them more available a la carte. Enhanced food-based schools were the least likely to offer frozen desserts and other beverages such as juice drinks and energy and sports drinks, again possibly reflecting their commitment to more fruits and vegetables.

Schools with traditional food-based menu planning were the most likely to offer mixed dishes a la carte (for example, spaghetti or Mexican entrees). Almost all schools that served peanut butter and jelly sandwiches a la carte used a traditional food-based menu approach. Although there were some differences among specific non-entree food items, schools were about

as likely (within a few percentage points) to offer baked goods, candy, and snacks, regardless of their menu-planning system.

E. FOODS AND BEVERAGES OFFERED FROM ALTERNATIVE FOOD SOURCES

Overall, on-site observations indicated that about a quarter of schools offered students access to competitive foods from outlets other than vending machines or a la carte offerings in the cafeteria, an observation consistent with the school-level competitive food policies discussed in Chapter III. One-quarter of schools had other types of competitive food sources, the most prevalent of which were school stores (see Table IV.10). The most common categories of foods offered from alternative sources were snacks (19 percent), followed by baked goods/desserts and bread and grain products (each 14 percent), juice or water (12 percent), and other beverages, excluding dairy beverages (11 percent).

Seven percent of schools had alternative sources that offered prepared entrees. Pizza was the most frequently offered entree (available from an alternative source in three percent of schools), followed by hot dogs (two percent). Hamburgers or cheeseburgers, cold sandwiches, peanut butter and jelly sandwiches, and burritos were each available from alternative sources in one percent of schools.

More schools had alternative sources that offered low-nutrient, energy-dense snacks and beverages than less energy-dense or more nutrient-dense alternatives (Table A.IV.6).¹⁶ Thirteen percent of schools sold non-chocolate candy through an alternative source, and 12 percent sold chips. Between eight and nine percent of schools sold chocolate candy, juice drinks, and cookies. Some beverage options with less added sugar included water without added juice (available from one of these sources in 9 percent of schools) and 100% juice (8 percent). Some

¹⁶ Table A.IV.6 in Appendix A provides a detailed inventory of food and beverages offered through alternative competitive food sources. Table IV.10 only lists the three most frequently offered items in each group.

TABLE IV.10

SELECTED FOOD AND BEVERAGE ITEMS OFFERED FROM ALTERNATIVE FOOD SOURCES^a
(Percentage of Schools)

	School Stores	Snack Bars	Food Carts	Other Sources	Any Source
Has Alternative Source on Campus	9.1	8.3	6.7	15.0	26.1
Number of Schools Reporting	283	283	283	283	283
Selected Items Offered Through Alternative Food Sources					
Juice or Water	2.6	3.8	3.3	4.9	11.7
Water (spring, flavored, sparkling, mineral, seltzer)	2.5	3.6	1.6	3.6	8.5
Juice (100% juice)	1.2	2.0	3.1	2.5	7.3
Water (water with juices, sparkling water with juices)	0.2	0.9	0.1	0.4	1.2
Other Beverages	2.6	6.0	1.5	5.7	11.3
Juice drinks (less than 50% juice, such as fruit blends, lemonade, punch)	1.3	5.3	0.8	5.1	9.2
Carbonated sweetened soft drink	1.3	3.5	0.6	2.4	6.0
Energy and sports drinks	1.2	2.6	0.6	2.2	4.8
Milk or Dairy Products	0.3	1.8	3.8	3.0	7.8
Flavored milk	0.1	1.2	3.4	2.5	6.7
Low-fat (1%) white milk	0.0	0.9	2.3	1.6	4.7
Fat-free milk	0.1	0.9	2.2	0.8	3.5
Baked Goods-Desserts	6.5	4.4	1.7	4.9	13.9
Cookies	2.6	2.8	0.8	2.6	7.8
Cake-type (brownies, cupcakes)	2.7	3.3	1.1	2.1	7.4
Pastries (pies, turnovers)	2.8	0.6	1.2	1.6	5.3
Bread or Grain Products	4.4	3.8	3.8	5.0	13.6
Crackers/cracker sandwiches (cheese)	2.7	2.0	0.5	2.5	7.2
Pretzels	3.0	1.5	0.6	1.9	5.9
Crackers/cracker sandwiches (peanut butter)	1.2	2.1	0.7	2.0	5.6
Frozen Desserts	1.4	1.2	0.4	1.5	4.0
Ice cream (bars, cups, sundaes)	1.2	1.2	0.3	1.5	3.9
Low-fat frozen desserts (frozen yogurt, ice milk, sherbet)	0.8	0.5	0.1	1.1	2.2
Frozen non-dairy (fruit bars, popsicles)	0.9	0.4	0.1	0.3	1.6
Fruit and Vegetables	0.4	2.2	2.7	2.4	6.1
Fresh fruit	0.0	2.0	0.9	2.3	4.1
Canned, cooked fruit	0.3	0.6	2.1	1.0	3.7
Vegetables, side salad	0.0	0.5	0.8	0.3	1.3
Snacks	6.8	6.8	3.2	10.0	19.2
Candy without chocolate	4.4	5.9	1.4	7.6	13.2
Chips (corn, potato, puffed cheese, tortilla)	3.8	5.3	2.0	4.9	12.3

TABLE IV.10 (continued)

	School Stores	Snack Bars	Food Carts	Other Sources	Any Source
Candy with chocolate	2.6	3.7	0.4	4.3	8.0
Prepared/Pre-Prepared Entrees and Food	3.1	2.0	1.3	2.2	6.6
Pizza	0.3	1.4	1.0	1.0	2.9
Hot dogs	0.1	1.2	0.4	0.7	1.5
Hamburgers or cheeseburgers	0.1	0.6	1.0	0.4	1.4
Number of Schools Reporting	283	283	283	283	283

Source: School Nutrition Dietary Assessment-III, Alternative Food Source Checklist, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Data shown are percentages of all schools offering each type of food from each source. Checklists were collected only in schools visited for student data collection (but were not collected in 4 schools). Sources include school stores; snack bars (includes sources labeled as concession stands, cafes, or restaurants); food carts; and others (after school programs, fundraisers, and miscellaneous other venues). Food categories are listed as they appeared on each checklist.

^a This table presents the *three most frequently offered items* within each food or beverage category, as determined using figures in the “any source” column. A complete inventory of foods listed on the checklist is in Appendix A, Table A.IV.6.

lower-calorie snacks included pretzels (six percent), reduced-fat chips (three percent), reduced-fat cookies (two percent), reduced-fat cake-type items and reduced-fat granola bars (each one percent), and reduced-fat muffins (less than one percent). Four percent of schools offered fresh or canned fruit from alternative food sources; even fewer offered vegetables.

Foods offered varied to some extent across alternative venues—school stores offered mostly snacks, while snack bars offered a mix of juice, water, soft drinks, desserts, and snacks. Food carts were not major sources of soft drinks, desserts, or snacks but offered juice, milk, and fresh fruit as much or more than the other venues.

V. CHARACTERISTICS OF REIMBURSABLE MEALS OFFERED

The regulations establishing the School Meals Initiative for Healthy Children (SMI) required that meals served under the National School Lunch Program (NSLP) and School Breakfast Program (SBP) be consistent with the 1995 *Dietary Guidelines for Americans* (Office of the Federal Register 1995). The *Dietary Guidelines* stress the importance of choosing a variety of fruits, vegetables, and grains and also of selecting foods low in fat, saturated fat, and cholesterol (U.S. Department of Health and Human Services/U.S. Department of Agriculture 1995, 2005). Schools participating in the USDA school meal programs are encouraged to provide students with the opportunity to choose from a variety of different food items each day and to vary these items throughout the menu cycle. Choice and variety in school meals allows students to select foods they like, try new foods, choose healthy alternatives, and ultimately develop healthy eating habits (U.S. Department of Agriculture, Food and Nutrition Service 2007).

This chapter describes the extent to which NSLP and SBP meals allow for student choice by providing a range of food options. It also discusses how often specific foods are offered during a typical school week. Both the variety and the types of foods offered influence students' ability to select a school meal that meets the nutrition standards defined in the SMI regulations, the subject of the next chapter.

The main research questions related to the types and variety of foods offered in school meals are as follows:

- How many food choices are offered to students on a daily basis? What is the variety of foods offered per day and over the course of a week?
- What is the prevalence of self-service food bars?
- What are the most common types of foods offered? What proportion of school days are these foods available to students?

- How often do NSLP lunches include fresh fruits and raw vegetables?

The source of information used to address these questions, the SNDA-III Menu Survey, was completed by school foodservice managers, with extensive technical assistance from specially trained MPR telephone interviewers. Data were recorded for five consecutive school days during spring of the 2004–2005 school year on all foods offered in reimbursable meals, including food name and description, portion size, number of portions served to students, and recipes (if applicable).¹ The menu data were coded and entered using USDA’s Survey Net food coding and nutrient analysis system. Detailed descriptions of menu data collection and food and nutrient coding are in Volume III of this report.

A. SUMMARY OF FINDINGS

- Most public schools offered a choice of food and beverage items in daily lunch menus in school year 2004–2005. The median NSLP menu included three types of milk, four different fruit/vegetable/juice options, and three entrees. Middle and high schools offered more entree choices than elementary schools but were also somewhat more likely to repeat the entrees offered over the course of the week.
- NSLP menus offered in all types of schools varied the fruit, vegetable, and/or juice options offered during the week. NSLP menus offered a median of 12 different fruit/vegetable/juice choices during a week. Starchy vegetables (potatoes, corn) and canned fruit were the types most frequently offered.
- Salad bars and other types of self-serve food bars were available in almost half (47 percent) of all high schools, one in three middle schools (30 percent), and one-fifth of elementary schools (20 percent). Entree salad bars and side salad bars were the most common types of self-serve bar offered at lunch.
- Nearly all schools (99 percent) included fresh produce in their lunch menus. More than half of all schools (58 percent) offered students some type of fresh fruit and/or raw vegetable every day.

¹ Because of school holidays or other school closures, some schools provided data for only four days. A very small number of schools provided data for only three days. (See Chapter III in Volume III of this report, *School Nutrition Dietary Assessment-III: Sampling and Data Collection Methods*.)

- One-percent low-fat milk (flavored and unflavored combined) was the type of milk offered most often, included in 83 percent of daily lunch menus. Whole milk appeared considerably less often (in 31 percent of daily lunch menus).
- Lunch entrees varied by school type, but sandwiches with plain meat or poultry, such as turkey and ham sandwiches, were among the top five entrees for each type of school. Pizza with meat topping and entree salads (for example, chef's salad) were included in one-third or more secondary school lunch menus.
- SBP menus offered less choice and variety of foods than lunch menus. The median numbers of choices in daily breakfast menus were three types of milk, two fruit/vegetable/juice choices (usually 100 percent fruit juice), and two bread/grain items. Meat or meat alternates (optional at breakfast) were included in about one-third of breakfast menus. Combination entrees (with both meat/meat alternate and bread/grain) were also in about one-third of menus.
- Breads and other grain products were the most prevalent component of SBP breakfast menus. Ninety-five percent of breakfast menus offered a daily choice of grains and/or breads (other than those that were part of a combination entree), with five to six different items available throughout the week. Four out of five breakfast menus included cold cereals.
- The leading option among combination entrees offered in SBP menus was breakfast sandwiches (with egg, cheese, and/or meat). Breads and rolls made with whole grain ingredients were offered on fewer than five percent of menus among all school types.

The sections that follow present data on characteristics of NSLP and SBP meals offered to students during a typical school week in the 2004–2005 school year. Section B presents tabulations of the percentage of daily and weekly lunch menus that offered students choice and variety among food items offered within each of the main meal component groups. It also includes an analysis of the prevalence of salad bars and other self-serve food bars that typically include a variety of food choices. Section C discusses the types of foods offered and the frequency with which they appear on daily lunch menus. Sections D and E present analogous information for SBP breakfasts offered to students. Also discussed in each section are notable findings from analyses comparing choice, variety, and types of foods offered among schools

using each major type of menu-planning system (traditional food-based, enhanced food-based, and nutrient-based).² Appendix B includes detailed results for these analyses.

In this chapter, differences in means or proportions between elementary, middle, and high schools or across menu planning systems were tested for statistical significance on the basis of two-tailed *t*-tests.³ The tables indicate the particular subgroup comparisons that were made and results of the tests.

B. CHOICE AND VARIETY OF FOODS OFFERED IN NSLP LUNCHES

To assess choice and variety in NSLP and SBP meals, each item reported in the menu survey was assigned to one of six meal component groups: (1) milk; (2) fruits, vegetables, and 100 percent fruit or vegetable juices; (3) meats and meat alternates; (4) entrees (typically a meat/meat alternate combined with grain and/or fruit/vegetable); (5) grains and breads (not part of an entree); and (6) desserts (lunch only). The percentage of daily and weekly menus in which choices among unique food items were offered was computed for each group.

All USDA school lunches must offer fluid milk in a variety of fat levels.⁴ In the 2004–2005 school year, nearly all lunch menus (99 percent) offered more than one type of milk—for example, whole, skim, and one-percent chocolate (Table V.1). About one-third of daily lunch

² Nutrient-based includes meals planned using Nutrient Standard Menu Planning and Assisted Nutrient Standard Menu Planning. The various menu planning methods are described in Chapter I and further discussed in Chapter II.

³ Tests were conducted using the SUDAAN statistical software, which adjusts standard errors for the complex sample design.

⁴ As a result of the Child Nutrition and WIC Reauthorization Act (P.L.108-265) and ensuing regulations as of July 1, 2005, schools must offer fluid milk in a variety of fat levels and are no longer constrained by prior-year preferences (Office of the Federal Register 2004). Although this date was after the SNDA-III data collection, schools were notified of the upcoming requirement.

TABLE V.1
AMOUNT OF CHOICE AND VARIETY OFFERED IN NSLP LUNCHES, BY SCHOOL TYPE

	Percentage of Daily Menus			
	Elementary Schools	Middle Schools	High Schools	All Schools
Number of Types of Milk Offered per Day				
No more than 1	1	2	1	1
2	37	25	33	34
3	28	38	42	32
4 to 6	35	35	24	33
<i>Median number of different items per day</i>	3	3	3	3
<i>Median number of different items per week^a</i>	3	3	3	3
Number of Fruits/Vegetables/100% Juices Offered per Day^b				
No more than 2	31	23	16 ^γ	27
3 to 4	39	34	40	38
5 to 7	24	30	25	25
8 or more	5 ^α	13	19 ^γ	9
<i>Median number of different items per day</i>	3	4	4	4
<i>Median number of different items per week^a</i>	12	13	13	12
Number of Entrees Offered per Day^c				
1	28	19	18	25
2 to 3	44 ^α	21	33	38
4 to 5	20	20	15	19
6 or more	7 ^α	40	34 ^γ	18
<i>Median number of items per day</i>	2	4	3	3
<i>Median number of different items per week^a</i>	8	12	11	9
Number of Separate Grains/Breads Offered per Day^d				
None	59	49	51	56
1	35	40	36	36
2	5 ^α	9	10 ^γ	7
3 or more	1	2	3 ^γ	1
<i>Median number of different items per day</i>	0	1	0	0
<i>Median number of different items per week^a</i>	3	3	3	3
Number of Desserts Offered per Day^e				
None	68	67	63	67
1	29	28	32	29
2 or more	3	6	5	4
<i>Median number of different items per day</i>	0	0	0	0
<i>Median number of different items per week^a</i>	2	2	2	2
Number of Daily Menus	699	609	607	1,915
Number of Schools	145	126	126	397

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Differences in medians were not tested for statistical significance.

^aIncludes only schools that provided menu information for five days.

^bFruits and vegetables not included in combination entrees.

^cIncludes meats and meat alternates as well as combination entrees.

TABLE V.1 (continued)

^dGrains and breads not included in combination entrees or served solely with another menu item.

^eUnder enhanced food-based menu planning, grain-based desserts may count toward the grains/breads requirement; desserts are not creditable toward a reimbursable lunch under traditional food-based menu planning.

^aDifference between elementary and middle schools is significantly different from zero at the .05 level.

^bDifference between middle and high schools is significantly different from zero at the .05 level.

^cDifference between elementary and high schools is significantly different from zero at the .05 level.

menus offered as many as four to six types of milk. The median number of milks offered each day was three, with the same milk choices typically offered throughout the week.

Seventy-three percent of all school lunch menus included more than the two fruit/vegetable/juice choices required under the traditional food-based menu-planning system. Elementary school menus offered a median of three different fruit/vegetable/juice options per day, while both middle and high school menus offered a median of four. A substantial proportion of lunch menus included five or more fruit/vegetable/juice options per day, although this differed somewhat by school level (29 percent for elementary schools, compared to 43 and 44 percent for middle and high schools). All three school types varied at least some of their fruit/vegetable/juice offerings during the week.

Three-quarters (75 percent) of all lunch menus offered a choice of entree. Middle school menus offered the most opportunity for entree choice with a median of four entrees per day, compared to three per day for high school and two per day for elementary school menus. At least half of the lunch menus in middle and high schools (60 and 49 percent) included four or more entree choices, while just over one-quarter (27 percent) of elementary school lunches did. Although the median number of different entrees offered *per week* was greater in middle and high school menus than in elementary school menus, comparison of the number of daily versus weekly choices suggests menus in secondary schools were more likely than those in elementary schools to repeat entree choices throughout the week.

Fewer than half (44 percent) of lunch menus offered a separate grain/bread item—that is, a grain or bread that was neither part of an entree nor served solely with another menu item. When a separate grain/bread was offered, there was generally just one type to choose from. Weekly variety was usually limited to three different (separate) grain/bread items.

Desserts were on one-third of daily lunch menus (33 percent), and typically, no more than one dessert choice was available per day. The median number of different desserts offered per week was two. Schools using enhanced food-based menu planning may offer up to one serving per day of a grain-based dessert, such as cookies, cake, or pie made with whole grain or enriched flour, to meet the grains/breads requirement for lunch (U.S. Department of Agriculture, Food and Nutrition Service 2007). Desserts are not creditable toward a reimbursable lunch under the traditional food-based menu planning system, although they are sometimes offered as an “extra.” Nutrient-standard menu planners may include desserts in their menus as long as the average nutrient content meets the appropriate age- or grade-based targets.

There was little difference in the degree of choice and variety in either desserts or grains/breads among the three school types. Differences by menu planning system are discussed in later in this section.

1. Prevalence of Self-Serve Food Bars

One way in which schools can offer a variety of foods is through self-serve food bars. The availability of self-serve food bars in the NSLP in the 2004–2005 school year varied with school type. High schools were more likely to offer some type of self-serve food bar at least once per week (47 percent compared to 20 percent of elementary schools (Table V.2).⁵ A smaller

⁵ Data from SNDA-II indicate that some schools offered self-serve food bars, but not every week. Thus, the prevalence data presented here is likely to be a lower-bound estimate of the percentage of schools ever offering self-serve food bars among public schools offering NSLP lunches (U.S. Department of Agriculture, Food and Nutrition Service 2002b).

TABLE V.2

PERCENTAGE OF SCHOOLS THAT OFFERED SELF-SERVE FOOD BARS IN NSLP LUNCHES,
BY SCHOOL TYPE

	Percentage of Schools in Which Food Bar Offered			
	Elementary Schools	Middle Schools	High Schools	All Schools
Any Self-Serve Food Bar				
At least once per week	20	30	47 ^γ	27
Every day	13	21	28 ^γ	18
Any Salad Bar				
At least once per week	19	23	37	23
Every day	13	18	18	15
Side Salad Bar				
At least once per week	10	17	10	11
Every day	9	13	7	9
Salad Bar as Entrée				
At least once per week	10	10	27	13
Every day	4	4	11	5
Sandwich/Deli Bar				
At least once per week	1 ^α	8	13 ^γ	4
Every day	1 ^α	5	11 ^γ	3
Other Entree Food Bars^a				
At least once per week	1 ^α	7	11 ^γ	4
Every day	1	3	5 ^γ	2
Number of Schools	145	126	126	397

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

^aIncludes baked potato bars, nacho and taco bars, and Italian/pasta bars.

^αDifference between elementary and middle schools is significantly different from zero at the .05 level.

^βDifference between middle and high schools is significantly different from zero at the .05 level.

^γDifference between elementary and high schools is significantly different from zero at the .05 level.

proportion of schools offered a self-serve food bar every day, but the pattern across school types was similar.

Salad bars were the most common type of self-serve food bar in school lunches, offered in 23 percent of schools overall (Table V.2). Side salad bars usually included an assortment of vegetables and fruits and were offered as the fruit/vegetable component of a reimbursable meal.

Side salad bars were offered in 11 percent of schools and, if offered, tended to be available daily. However, only nine percent of schools offered side salad bars every day.

Entree salad bars, by definition, included a meat or meat alternative (for example, chicken, cheese, eggs, or nuts/seeds), as well as a variety of vegetables, fruits, or other side items. High schools were almost three times as likely as elementary and middle schools to offer entree salad bars (27 percent, versus 10 percent of both elementary and middle schools), although the differences were just short of statistical significance at the .05 level. Entree salad bars usually were not available every day. Other types of entree food bars, which were offered almost exclusively in secondary schools, included sandwich or deli bars, potato bars, nacho or taco bars, and pasta bars.

2. Choice and Variety of Foods Offered in NSLP Lunches, by Menu-Planning Method

NSLP regulations allow schools to use either a food-based or nutrient-based method of menu planning, as long as their menus are consistent with SMI nutrition standards.⁶ The meal pattern that serves as the basis for traditional food-based menu planning ensures that schools offer the opportunity for students to select, at a minimum, milk; two fruit, vegetable, or juice items; a grain/bread; and a meat/meat alternate.⁷ Under the enhanced food-based system meal pattern, additional fruits/vegetables and grains/breads are required (and recommended for traditional food-based schools) to help offset the loss of food energy (calories) when reducing total fat (U.S. Department of Agriculture/Food and Nutrition Service 2007). Under nutrient-

⁶ Schools may also use “any other reasonable approach” to plan menus that meet SMI standards. A small number of schools reported using an “other approach.” Based on the descriptions provided and information available from school district websites, it was possible to code these approaches into one of the three main types of menu-planning systems; thus, they are included in all analyses.

⁷ Combination entrees may fulfill the requirement for up to two items—for example, a meat/meat alternate and a grain/bread or a meat/meat alternate and one fruit/vegetable.

standard menu planning, NSLP lunches offered must include milk, an entree, and at least one side item, while meeting energy and nutrient requirements. Side items may include fruits, vegetables, grains/breads, desserts, or other items.

Despite the differences in requirements, when compared across five main meal components, the meals offered by schools using different menu-planning systems did not differ substantially in the extent of food choice and variety available to students. One exception was desserts. Desserts were offered somewhat more frequently by schools using nutrient-based menu planning compared to schools using either of the food-based menu planning systems (36 percent versus 26 to 27 percent of daily lunch menus; Table V.3).

Data collected from School Food Authorities (SFAs) that used nutrient-based menu planning indicated that some schools had rules about the number and types of side items that students could select at each meal. For example, some schools specified a maximum number of side items of any type, others specified maximums within particular meal component groups, and others set no limits. The choice and variety data presented in Table V.3 do not differentiate schools by their specific policies but provide some indication of the number of different side items available to students overall.

Nearly all menus (97 percent) planned under a nutrient-based system offered more than one type of side item at lunch (Table V.3).⁸ About a third (37 percent) of nutrient-based menus included two to four sides, and another third (33 percent) offered five to six sides per day. The median number of sides offered was 5 per day, with 18 different side items typically available over the course of a week.

⁸ Because of the relatively small (unweighted) sample sizes for elementary schools that used the enhanced food-based (n = 33) and nutrient-standard (n = 40) menu-planning systems, the data were tabulated only for all school types combined.

TABLE V.3

AMOUNT OF CHOICE AND VARIETY OFFERED IN NSLP LUNCHES,
BY MENU-PLANNING METHOD

	Percentage of Daily Menus				
	Food Based			Nutrient Based	All Schools
	Traditional	Enhanced	All		
Number of Types of Milk Offered per Day					
No more than 1	0	3	1	1	1
2	32	38	34	35	34
3	35	27	33	31	32
4 to 6	33	32	33	34	33
<i>Median number of different items per day</i>	3	3	3	3	3
<i>Median number of different items per week^a</i>	3	3	3	3	3
Number of Fruits/Vegetables/100% Juices Offered per Day^b					
No more than 2	26	34	29	24	27
3 to 4	39	31	37	42	38
5 to 7	26	28	27	23	25
8 or more	9	7	8	11	9
<i>Median number of different items per day</i>	4	4	4	4	4
<i>Median number of different items per week^a</i>	12	11	12	13	12
Number of Entrees Offered per Day^c					
1	24	27	25	23	25
2 to 3	40	34	38	38	38
4 to 5	17	20	18	22	19
6 or more	19	19	19	16	18
<i>Median number of different items per day</i>	3	3	3	3	3
<i>Median number of different items per week^a</i>	9	10	9	10	9
Number of Separate Grains/Breads Offered per Day^d					
None	54	56	55	58	56
1	38	36	37	34	36
2 or more	8	9	8	8	8
<i>Median number of different items per day</i>	0	0	0	0	0
<i>Median number of different items per week^a</i>	3	3	3	3	3
Number of Desserts Offered per Day					
None	70	69	70	61 ^γ	67
1	26	27 ^β	26	36 ^γ	29
2 or more	4	5	4	3	4
<i>Median number of different items per day</i>	0	0	0	0	0
<i>Median number of different items per week^a</i>	2	2	2	2	2
Number of Side Items Offered per Day^c					
No more than 1	n.a.	n.a.	n.a.	3	n.a.
2 to 4	n.a.	n.a.	n.a.	37	n.a.
5 to 6	n.a.	n.a.	n.a.	33	n.a.
7 or more	n.a.	n.a.	n.a.	28	n.a.
<i>Median number of different items per day</i>	n.a.	n.a.	n.a.	5	n.a.
<i>Median number of different items per week^a</i>	n.a.	n.a.	n.a.	18	n.a.

TABLE V.3 (continued)

	Percentage of Daily Menus				
	Food Based			Nutrient Based	All Schools
	Traditional	Enhanced	All		
Number of Daily Menus	927	438	1,365	550	1,915
Number of Schools	193	90	283	114	397

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Differences in medians were not tested for statistical significance.

^aIncludes only schools that provided menu information for five days.

^bFruits and vegetables not included in combination entrees.

^cIncludes meats and meat alternates as well as combination entrees.

^dGrains and breads not included in combination entrees or served solely with another menu item.

^eSide items apply to nutrient-based menu planning only and may include fruits, vegetables, breads or other grain products, meat or meat alternatives, desserts, or other menu items. Under nutrient-standard menu planning, lunches offered are required to include milk, an entree, and at least one side.

^aDifference between traditional and enhanced food-based is significantly different from zero at the .05 level.

^bDifference between enhanced food-based and nutrient-based is significantly different from zero at the .05 level.

^cDifference between traditional food-based and nutrient-based is significantly different from zero at the .05 level.

n.a. = not applicable.

The availability of self-serve salad bars was associated with a school's menu-planning system. (See Appendix B, Table B-V.2.) Twenty-one percent of schools using nutrient-standard menu planning offered a side salad bar, compared to 5 percent using the traditional food-based menu-planning system and 12 percent using the enhanced food-based system. In contrast, only 2 percent of the nutrient-standard schools offered an entree salad bar, compared to 21 and 10 percent of schools using the food-based menu-planning methods. A possible explanation for this finding is that it may be too difficult for schools using nutrient-standard menu planning to let students know what constitutes an entree in the salad bar setting and for cashiers to assess whether the students have taken a complete entree.

C. TYPES AND FREQUENCY OF FOODS OFFERED IN NSLP LUNCHES

A food-grouping system was developed to provide further insight into the specific types of foods offered in school meals. The meal component groups used in the previous analysis were expanded to create nine major food groups—milk, vegetables, fruits, combination entrees, meat/meat alternates, grains/breads, desserts, accompaniments (condiments and toppings), and other menu items (for example, snack items, juice drinks).⁹ The major food groups were then divided into minor food groups to further classify foods by characteristics related to nutrition, including ingredients and preparation methods. Each menu item was assigned major and minor food groups to determine the proportion of daily menus in which the most commonly offered foods were available to students. (See Appendix B for details; Table B-V.1 provides the complete food group system used for the study.) Table V.4 shows foods or food groups that were offered in five percent or more menus by at least one school type.

⁹ Juice drinks are sweetened, fruit-flavored drinks that may or may not contain real fruit juice.

TABLE V.4

MOST COMMONLY OFFERED FOOD ITEMS IN NSLP LUNCHES, BY SCHOOL TYPE

	Percentage of Daily Menus in Which Item Was Offered			
	Elementary Schools	Middle Schools	High Schools	All Schools
Milk	100	100	100	100
1% fat	85	81	76	83
2% fat	57	58	59	58
Skim or nonfat	49 ^α	51	60	52
Whole	30	32	29	31
Flavored ^δ	99	98	99	99
Vegetables	95	97 ^β	99 ^γ	96
Vegetables, except french fries	86	89	91	88
Starchy	49	64	72 ^γ	56
French fries/similar potato products ^b	21	40	45	29
Corn	14	17	23 ^γ	16
White potatoes	14	15	21	15
Green salads (non-entree)	34 ^α	47	45	39
Lettuce salads	25	32	36 ^γ	28
Side salad bar	9	16	9	11
Deep yellow/dark green	31	28	23	29
Carrots	21	18	18	20
Broccoli	6	8	5	7
Other vegetables	23	23	24	23
String beans	15	12 ^β	16	15
Mixed vegetables	5	7	5	6
Legumes (kidney or baked beans, bean soups)	8	12	13	10
Fruits and Juices	94	91	95	94
Canned fruit, sweetened	59	61 ^β	73 ^γ	62
Peaches	17	22	28 ^γ	20
Pears	14	17	19	16
Pineapple	15	13 ^β	20 ^γ	15
Fruit cocktail	14	18	17	15
Fresh fruit	48 ^α	55	53	50
Apple	29 ^α	45	43	35
Orange	17	27	29 ^γ	21
Banana	11	18	13	13
Fruit juice, 100%	32	29	31	31
Orange juice	21	21	26	22
Apple juice	17	14	16	16
Combination Entrees	91 ^α	97	94	93
Sandwiches with plain meat or poultry	25	32	36	28
Peanut butter sandwiches	28	30	15	26
Entree salads (chef's salads)	18 ^α	36	33 ^γ	24
Pizza with meat	13 ^α	36	40 ^γ	22
Mexican-style entrees (burritos, tacos, nachos)	18 ^α	26	28 ^γ	21
Hamburgers, similar beef/pork sandwiches	15 ^α	30	23	19
Pizza without meat	15 ^α	30	25	19
Cheeseburgers, similar beef/pork sandwiches	8 ^α	32	32 ^γ	17
Hot dog, corn dog, similar sausage sandwiches	15	21	20	17
Sandwiches with breaded/fried meat, poultry, or fish	9 ^α	30	32 ^γ	17
Self-serve salad bars and other food bars	7 ^α	16 ^β	27 ^γ	12
Mixtures with a pasta or noodle base (spaghetti with meat sauce, macaroni and cheese, lasagna)	11	13	13	12

TABLE V.4 (continued)

	Percentage of Daily Menus in Which Item Was Offered			
	Elementary Schools	Middle Schools	High Schools	All Schools
Sandwiches with mayonnaise-based poultry or tuna salads	6 ^α	11	8	7
Sandwiches with cheese only	9	7 ^β	2	7
Other mixtures with meat, grain, and/or vegetables	6	11	8	7
Bag lunches and pre-plated meals	4	9	5	5
Grains/Breads (not part of a combination entree)	66	71	72	68
Breads, rolls, bagels, and other plain breads	31	37	39	34
White	27	32	35	30
Whole grain	5 ^α	5	5	5
Crackers and pretzels	25	25	25	25
Bread or bread alternates with added fat	7	10	12	9
Rice	5	8	7	6
Corn/tortilla chips	5	7	7	6
Biscuits, croissants, cornbread	5	6	6	5
Pasta	3	5	8 ^γ	4
Meats/Meat Alternates (not part of a combination entree)	47	45	51	47
Breaded/fried chicken nuggets, patties, similar products	17	20	23	19
Plain (not breaded or fried) chicken and turkey	5	6	8	6
Meat (plain or breaded/fried beef, pork)	11	11	13	11
Other (cheese, eggs, nuts)	11	6	9	10
Yogurt	9	7	3 ^γ	8
Other Menu Items	37	41	47	40
Cookies, cakes, brownies	17	19	24 ^γ	19
Dessert items that contain fruit or juice (fruit juice bars, fruited gelatin)	8	7	4	7
Juice drinks (not 100% juice)	5	10	10	7
Dairy-based desserts (ice cream, pudding)	6	6	9	7
Snack chips (popcorn, potato chips)	1	2	7	3
Number of Daily Menus	699	609	607	1,915
Number of Schools	145	126	126	397

Source: School Nutrition Dietary Assessment-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Notes: Table is limited to minor food groups offered in at least five percent of menus for one or more school type. Table does not account for individual food items offered as part of food bars, bag lunches, or pre-plated meals.

^aIncludes all flavored low-fat, skim, and whole milk.

^bIncludes oven-baked and deep-fried french fries/similar potato products.

^αDifference between elementary and middle schools is significantly different from zero at the .05 level.

^βDifference between middle and high schools is significantly different from zero at the .05 level.

^γDifference between elementary and high schools is significantly different from zero at the .05 level.

Milk was offered daily, with the option of flavored milk (for example, chocolate or strawberry milk) on almost all (98 to 99 percent of) menu days. One percent low-fat milk was the type offered most frequently (83 percent of menus overall). In contrast, whole milk appeared in less than a third (29 to 32 percent) of daily lunch menus. Nearly all lunch menus (96 percent) included one or more vegetable option—88 percent, excluding french fries and similar commercially prepared potato products. Starchy vegetables, including french fries, other white potatoes, and corn, were the most regularly offered vegetables in all school types (on 56 percent of menus), but were significantly less available in elementary schools than high schools (49 percent versus 72 percent). French fries and similar potato products appeared about twice as often on daily menus in high schools than in elementary schools, which contributes to this difference. Deep-fried french fries appeared in almost one-quarter of high school menus (22 percent) but were rarely available in elementary schools (3 percent of menus; not shown in table).

More than 90 percent of lunch menus included some type of fruit or 100 percent fruit juice. Sweetened canned fruit, such as canned peaches, pears, and pineapple (usually in light syrup), was offered more frequently than fresh fruit or fruit juice. Sixty-two percent of menus overall included canned fruit, compared to 50 percent with fresh fruit (apples, oranges, bananas) and 31 percent with fruit juice.

The top five most frequently offered combination entrees in lunch menus varied by school type:

- In *elementary schools*, the most commonly available entrees were peanut butter sandwiches (28 percent); sandwiches with plain meat or poultry, such as turkey and ham sandwiches (25 percent); entree salads, such as chef's salad and tuna salad on lettuce (18 percent); and Mexican-style entrees, such as burritos, tacos, and nachos (18 percent).

- The most commonly offered entrees in *middle schools* were entree salads (36 percent); pizza with meat (36 percent); sandwiches with plain meat or poultry (32 percent); and cheeseburgers and similar beef/pork sandwiches (32 percent).
- In *high schools*, the leading entrees were pizza with meat (40 percent); sandwiches with plain meat or poultry (36 percent); entree salads (33 percent); cheeseburgers and similar beef/pork sandwiches (32 percent); and sandwiches with breaded/fried meat, poultry, or fish (32 percent).

Almost half of all lunch menus (47 percent) offered a meat or meat alternate (not combined with bread or other grains). Breaded chicken items, such as nuggets and patties, were the most commonly offered meat/meat alternate among all school types (on 19 percent of menus).¹⁰ Yogurt, which has been creditable under food-based menu planning as a meat alternative since 1997, appeared in three to nine percent of lunch menus, depending on school type (it was significantly more common in elementary schools than in high schools). Nearly all menus that included yogurt offered a low-fat or fat-free variety.

More than two-thirds (68 percent) of lunch menus included grains or breads in addition to those that were part of a combination entree; there was little difference in grain/bread offerings by school type. White bread and rolls were offered in a much larger share of menus (30 percent) than breads and rolls made with whole grain ingredients,¹¹ such as 100 percent whole wheat, some whole wheat, multigrain, or rye (5 percent).

Desserts and other snack-type items are not required under any of the NSLP menu-planning systems, although 37 percent (elementary schools) to 47 percent (high schools) of lunch menus included at least one of these items. Cookies, cakes, and brownies were the most frequently

¹⁰ The breading on these products may count toward the required servings of grains/breads under food-based menu planning.

¹¹ Breads and rolls were classified as whole grain if any of the main ingredients are among those considered in calculating whole grain equivalents for MyPyramid. For example, whole wheat flour is classified as a whole grain ingredient but white wheat flour is not (Friday and Bowman 2006).

offered foods in this category, appearing in approximately one of five lunch menus for all schools combined. As noted previously, these types of desserts (grain-based) may count toward the minimum requirement for grains/breads in enhanced food-based menu planning.

1. Availability of Raw Vegetables and Fresh Fruits

USDA has worked to promote an increase in fruits and vegetables in the school meal programs (U.S. Department of Agriculture, Food and Nutrition Service 2002a). Team Nutrition materials have been developed and made available to school foodservice personnel for purchasing, preparing, and promoting fruits and vegetables in the school meal programs.¹² In addition, USDA has greatly increased the amount and variety of fresh produce available to schools by using the Department of Defense's purchasing and distribution system for fresh fruits and vegetables.¹³

In the 2004–2005 school year, fresh produce, including raw vegetables and fresh fruits, was offered at least once a week by nearly all schools (99 percent), and more than half the schools (58 percent) offered some type of fresh produce every day (Table V.5). Raw vegetables were offered somewhat more often than fresh fruits. On average, schools offered raw vegetables three to four days per week and offered fresh fruit two to three days per week.

¹² Team Nutrition is an initiative of the USDA Food and Nutrition Service that provides support for the SMI and may include training and technical assistance for school foodservice staff and nutrition education for children and parents.

¹³ USDA also funded the Fruit and Vegetable Pilot Project in school year 2002–2003 to promote an increase in fruit and vegetable consumption and interest in participating in the school meal programs (Buzby et al. 2003). This project provided free fresh and dried fruits and fresh vegetables to students in 100 schools in 4 States and 7 schools in one Indian Tribal Organization.

TABLE V.5

PERCENTAGE OF SCHOOLS THAT OFFERED RAW VEGETABLES AND FRESH FRUITS IN NSLP LUNCHES, BY SCHOOL TYPE^a

	Percentage of Schools in Which Item Offered			
	Elementary Schools	Middle Schools	High Schools	All Schools
Number of Days on Which Any Fresh Produce Was Offered				
None	0	3	2	1
1 to 2	22	14	13	19
3 to 4	24	15	22	22
5	54	68	62	58
<i>Mean number of days fresh produce offered</i>	4	4	4	4
<i>Median number of days fresh produce offered</i>	5	5	5	5
Number of Days on Which Raw Vegetables Were Offered ^b				
None	5	7	3	5
1 to 2	33	22	19	28
3 to 4	24	18	28	24
5	39	53	51	44
<i>Mean number of days raw vegetables offered</i>	3	4	4	3
<i>Median number of days raw vegetables offered</i>	3	5	5	4
Number of Days on Which Fresh Fruits Were Offered ^c				
None	20	18	31	22
1 to 2	33	26	22	30
3 to 4	23	22 ^β	10 ^γ	20
5	24	34	38	29
<i>Mean number of days fresh fruits offered</i>	2	3	3	3
<i>Median number of days fresh fruits offered</i>	2	4	2	2
Number of Schools	119	106	104	329

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Differences in medians were not tested for statistical significance.

^aIncludes only schools that provided menu information for five days.

^bExcludes canned and frozen vegetables, vegetable juices, and fresh vegetables that were cooked.

^cExcludes canned, frozen, and dried fruits and fruit juices.

^αDifference between elementary and middle schools is significantly different from zero at the .05 level.

^βDifference between middle and high schools is significantly different from zero at the .05 level.

^γDifference between elementary and high schools is significantly different from zero at the .05 level.

2. Types and Frequency of Foods Offered in NSLP Lunches, by Menu-Planning Method

Because of the flexibility allowed, schools using nutrient-based menu planning might be expected to offer more or different types of foods than other schools, particularly foods that are not creditable under food-based menu planning. Program staff and other stakeholders also speculated that highly fortified products would be included more often in meals planned with the nutrient-based approach. Differences between the two food-based systems might also be expected given the greater number of required servings of grain/breads, larger portions of fruits/vegetables, and the grain-based desserts allowed under the enhanced system. While the analysis of foods offered by menu-planning system does not fully address these potential differences (see Appendix B, Table B-V.3), some patterns of interest emerge:

- Schools using a nutrient-based menu-planning system offered deep yellow or dark green vegetables in menus significantly more often than schools using a food-based system (38 versus 25 percent of menus).
- Schools whose menus were planned with the traditional food-based system offered deep-fried french fries in a significantly larger share of lunches (12 percent) than schools with either the nutrient-standard or the enhanced food-based system (5 percent each).
- A larger percentage of menus in schools using nutrient-based menu planning included green salads (including side salad bars) than in schools with food-based menus (51 versus 33 percent). As described previously, however, schools using a food-based menu planning system, particularly the traditional system, were more likely to offer entree salad bars (Table B-V.2).
- Nutrient-standard schools included “other” menu items, such as desserts, snacks, and juice drinks (some of which were vitamin-fortified), in almost half of their lunches (50 percent), compared to about one-third (36 percent) of lunches in food-based schools.

D. CHOICE AND VARIETY OF FOODS OFFERED IN SBP BREAKFASTS

The extent of food choice and variety available to students in school breakfasts was somewhat more limited than in school lunches (Table V.6). Most daily breakfast menus in high schools (96 percent) offered two or more varieties of milk; however, 15 percent of middle school

TABLE V.6
AMOUNT OF CHOICE AND VARIETY OFFERED IN SBP BREAKFASTS,
BY SCHOOL TYPE

	Percentage of Daily Menus			
	Elementary Schools	Middle Schools	High Schools	All Schools
Number of Types of Milk Offered per Day				
No more than 1	22	15 ^β	4 ^γ	17
2	26	29	40	29
3	27	32	38	30
4 to 6	25	25	19	24
<i>Median number of different items per day</i>	3	3	3	3
<i>Median number of different items per week^a</i>	3	3	3	3
Number of Fruits/Vegetables/100% Juices Offered per Day				
No more than 1	43	46 ^β	16 ^γ	39
2	33	25	34	32
3	13	15	30 ^γ	17
4 or more	11	14	20	13
<i>Median number of different items per day</i>	2	2	3	2
<i>Median number of different items per week^a</i>	3	3	3	3
Number of Separate Grains/Breads Offered per Day^b				
No more than 1	27	21	12 ^γ	23
2	37 ^α	29	38	36
3	26	31	28	27
4	7	11	9	8
5 or more	3	9	12 ^γ	6
<i>Median number of different items per day</i>	2	3	2	2
<i>Median number of different items per week^a</i>	5	6	6	5
Number of Separate Meats/Meat Alternates Offered per Day^b				
None	62	61	54	60
1	30	31	31	31
2 or more	8	8	15	9
<i>Median number of different items per day</i>	0	0	0	0
<i>Median number of different items per week^a</i>	2	2	1	2
Number of Combination Entrees Offered per Day				
None	68 ^α	56	58	64
1	28	32	26	29
2 or more	4 ^α	12	16 ^γ	7
<i>Median number of different items per day</i>	0	0	0	0
<i>Median number of different items per week^a</i>	2	2	2	2
Number of Daily Menus	579	532	494	1,605
Number of Schools	120	109	102	331

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Differences in medians were not tested for statistical significance.

^aIncludes only schools that provided menu information for five days.

^bNot included in combination entrees. All varieties of cold cereal counted as one grain/bread choice.

^αDifference between elementary and middle schools is significantly different from zero at the .05 level.

^βDifference between middle and high schools is significantly different from zero at the .05 level.

^γDifference between elementary and high schools is significantly different from zero at the .05 level.

menus and 22 percent of elementary school menus offered only one type of milk. For all school types, however, the median breakfast menu still offered three milk choices per day.

High schools provided the most opportunity for daily choice among fruit, vegetable, or juice items. Eighty-four percent of high school breakfast menus offered two or more fruit/vegetable/juice options, compared to 57 percent of menus in elementary schools and 54 percent in middle schools. All three school types offered a median of three different fruit/vegetable/juice items per week, indicating that some items did not vary from day to day.

Grains and breads were the most prevalent component of breakfast menus (aside from milk). Furthermore, school breakfasts offered a greater variety of grain/bread items than of other meal components.¹⁴ More than three-quarters (77 percent) of daily breakfast menus offered two or more grain or bread products, other than those included as part of a combination entree. (All types of cold cereal counted as one choice.) Secondary schools offered the greatest variety over the course of a week (with high schools offering significantly more options than elementary schools). Middle and high schools provided a median of six different grain/bread offerings at breakfast, whereas elementary schools' median was five.

When assessing choice and variety among combination entrees and meat or meat alternates, it is important to recognize that these items are optional for SBP breakfasts. To meet the minimum requirements for reimbursement, a breakfast planned with a food-based system may include two grains/breads and no meat/meat alternate. Under nutrient-standard menu planning, a breakfast must include two menu items other than milk, but neither item is required to be an entree, meat, or meat alternative. For schools planning food-based menus, one combination entree will typically satisfy the breakfast meal pattern requirement (along with milk and a

¹⁴ Some schools using food-based menu planning expected students to select two grain/bread servings at breakfast to meet the requirements for a reimbursable meal.

fruit/vegetable/juice); schools using a nutrient-standard system, however, may only count a combination entree as one menu item.

Thirty-six percent of breakfast menus included a combination entree, with elementary schools offering them least often. It was less common for breakfast menus to include more than one combination entree, especially in elementary schools (only 4 percent did). Twelve percent of menus in middle schools and sixteen percent in high schools did offer a choice of two or more combination entrees.

In menus in which a separate meat or meat alternative was available (40 percent of breakfast menus overall), usually only one option was offered. Breakfast menus offered a median of two different meat/meat alternate options per week.

Choice and Variety of Foods Offered in SBP Breakfasts, by Menu-Planning Method.

The meal patterns for SBP breakfasts planned with either the traditional or enhanced menu-planning system call for a minimum of milk; one fruit/vegetable; and either two grain/bread items, two meat/meat alternate items, or one of each (separately or as a combination entree). Under nutrient-standard menu planning, breakfasts offered to students must include milk and two sides. Side items may include fruits, vegetables, juice, grains/breads, meat/meat alternates, or other items.

Contrary to findings for NSLP lunches, when compared across the six meal component groups assessed for school breakfasts (Appendix B, Table B-V.5), schools did differ in some aspects of food choice and variety based on menu-planning system:

- The weekly median number of different fruit, vegetable, or juice items offered in enhanced food-based breakfasts was four, compared to three items offered in traditional food-based and nutrient-based system breakfasts.
- Breakfasts in schools using nutrient-standard menu planning were significantly more likely to provide a choice of grains/breads than those in schools using food-based methods (86 versus 73 percent). Weekly variety among grains/breads was also

greater in nutrient-based breakfast menus than in food-based ones (medians of six versus five different items offered).

- The share of breakfast menus that offered any meat/meat alternate was significantly smaller among nutrient-based menus compared to food-based ones (29 versus 44 percent).

Ninety-five percent of schools that used nutrient-based menu planning offered more than the minimum requirement of two sides (Appendix Table B-V.5). The most common number of side items available per day was five, although one-quarter of the schools offered seven or more side options. Some schools specified the number and types of sides students were allowed to select at breakfast, as they did for lunch.

E. TYPES AND FREQUENCY OF FOODS OFFERED IN SBP BREAKFASTS

Breakfast menu items were classified into major and minor food groups using the same approach described for school lunch menu items. The most frequently offered fat level for milk was one-percent (flavored and unflavored)—available in 71 percent of schools; two-percent milk was also widely available (in 56 percent of schools). Skim milk was available in 44 percent of schools. Whole milk was the least commonly offered of all milk types, appearing in less than a third (29 percent) of breakfast menus.

Flavored milk was offered less frequently at breakfast than at lunch (79 versus 99 percent of menus), but was increasingly available as grade levels increased. Seventy-three percent of elementary school menus and 81 percent of middle school menus included flavored milk, while 95 percent of high school menus did.

Nearly all breakfast menus offered fruit or juice, but the most popular item was fruit juice (on 88 percent of all menus). Both citrus (primarily orange juice) and non-citrus juices (apple juice, juice blends) were usually available—about one-quarter (27 percent) of the non-citrus juices were reported as “with added vitamin C” (not shown). High school menus were most

likely to include calcium-fortified orange juice (not shown). Fresh fruit (apples, bananas, oranges) was offered in a quarter (26 percent) of all breakfast menus, and canned fruit in 14 percent of menus. Vegetables, mainly potato products, were offered in fewer than five percent of breakfast menus; thus, they are not included in Table V.7.

Cold (ready-to-eat) breakfast cereals were the leading grain/bread item at breakfast, offered in four out of five menus (78 percent overall). Presweetened cold cereals were available in most of these menus (72 percent) while unsweetened cereals were only available in 27 percent of menus.¹⁵ Pastry-like items, such as sweet rolls, doughnuts, toaster pastries, and fruit turnovers, were included in twice as many middle and high school menus (40 to 44 percent) as elementary school menus (21 percent). Other grain/bread items were offered in roughly one of five breakfast menus and included breads with added fat (butter, margarine, cream cheese); plain breads, rolls, and bagels; pancakes, waffles, and French toast; and biscuits, croissants, and cornbread. Breads, rolls, or bagels made with whole grains were relatively rare and appeared in fewer than five percent of breakfast menus for all school types (not shown).

Meats and meat alternates offered as a separate menu item, rather than as part of an entree, appeared in 40 percent of breakfast menus. Sausage was offered most often, followed by yogurt and eggs. High schools offered sausage in 24 percent of breakfast menus, compared to 15 to 16 percent in elementary and middle schools' menus.

Combination entrees were offered somewhat more frequently in middle and high school menus than in elementary school menus (42 versus 31 percent). Breakfast sandwiches (sandwiches with sausage, egg, cheese, ham, or other meat on a biscuit, English muffin, bagel, or croissant) were the most common type of combination entree in middle and high schools and

¹⁵ A cereal was classified as sweetened if it contained 21.3 grams of sugar or more per 100 gram serving—the current criterion for cereals not allowed under the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

TABLE V.7

MOST COMMONLY OFFERED FOOD ITEMS IN SBP BREAKFASTS, BY SCHOOL TYPE

	Percentage of Daily Menus in Which Item Was Offered			
	Elementary Schools	Middle Schools	High Schools	All Schools
Milk	99 ^a	100	100	99
1% fat	72	76	62	71
2% fat	52	56	69	56
Skim or nonfat	41	43	56	44
Whole unflavored	29	29	28	29
Flavored ^b	73	81 ^β	95 ^γ	79
Fruits and Juices	99	98	100	99
Fruit Juice	85	89 ^β	97 ^γ	88
100% citrus juice (orange)	68	67 ^β	88 ^γ	72
100% non-citrus juice	61	58 ^β	76 ^γ	63
Apple juice	52	50 ^β	68 ^γ	55
Fruit juice blend	5	6	4	5
Fresh fruit	22	31	31	26
Apple	8 ^α	16	19 ^γ	12
Banana	6 ^α	14	21 ^γ	10
Orange	9	14	14	11
Canned fruit (peaches, pears)	15	12	9	14
Grains/Breads (not part of a combination entree)	94	97	98 ^γ	95
Cold cereal	76	80	83	78
Sweetened	70	70	80	72
Unsweetened	26	27	29	27
Sweet rolls, doughnuts, toaster pastries	21 ^α	40	44 ^γ	29
Buttered toast, bagels with cream cheese	24	26	19	24
White breads, rolls, bagels, other plain breads	16	22	32 ^γ	20
Pancakes, waffles, French toast	19	20	17	19
Biscuits, croissants, cornbread	15	17	23	17
Muffins (excludes English muffins), sweet/quick breads	13	17	20	15
Crackers (mainly graham)	11	9 ^β	3 ^γ	9
Grain and fruit cereal bars, granola bars	4	4	5	5
Meats/Meat Alternates (not part of a combination entree)	39	39	46	40
Sausage	15	16	24	17
Yogurt	14	15	12	14
Eggs	8	8	12	8
Cheese	4	5	5	5
Breaded chicken patty/nuggets	2	2	7	3
Combination Entrees	31 ^α	42	42	35
Breakfast sandwiches ^c	9 ^α	18	22 ^γ	13
Pizza (all types)	10	12	13	11
Sausage with pancake, corn dog, similar products	8	12	10	9
Mexican-style entrees (mainly burritos)	4 ^α	11	10	7
Number of Daily Menus	579	532	494	1,605
Number of Schools	120	109	102	331

TABLE V.7 (continued)

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to minor food groups offered in at least five percent of menus for one or more school type.

^aOne school did not offer fluid milk at breakfast on four of the five days of the menu survey.

^bIncludes flavored low-fat and skim milk. All whole milk was unflavored.

^cIncludes sandwiches with sausage, egg, cheese, ham or other types of meat on a biscuit, English muffin, bagel, or croissant.

^dDifference between elementary and middle schools is significantly different from zero at the .05 level.

^eDifference between middle and high schools is significantly different from zero at the .05 level.

^fDifference between elementary and high schools is significantly different from zero at the .05 level.

were included in 18 and 22 percent of menus, respectively. Pizza was the leading combination entree in elementary school breakfasts, appearing in 10 percent of daily menus. Other combination entrees offered in at least five percent of menus included sausage wrapped in a pancake and similar products, and Mexican-style entrees, such as breakfast burritos.

Types and Frequency of Foods Offered in SBP Breakfasts, by Menu-Planning Method.

The most commonly offered foods in school breakfasts were also analyzed by menu-planning system. (See Appendix B, Table B-V.6.) There were no significant differences among milk offerings, although, in menus planned with the traditional food-based approach, the frequency of including flavored milk was 85 percent versus 71 and 73 percent for the other systems. Breakfast menus planned under the enhanced food-based system were the most likely to include fresh fruit (38 percent, versus 19 and 28 percent for the traditional food-based and nutrient-based systems, respectively). At the same time, enhanced system menus were least likely to include fruit juice.

Cold cereal was the top grain/bread offering, regardless of menu-planning system. However, there were some differences in the frequency with which other items in this category were offered:

- Breads with added fat, such as buttered toast and bagels with cream cheese, were second to cold cereal in schools that used nutrient-based menu planning (35 percent of menus); they appeared much less often in schools that used either type of food-based system (19 percent of menus).
- Very few breakfast menus offered whole-grain breads, rolls, and bagels regardless of menu planning system (4 percent overall). Nonetheless, schools that used nutrient-based menu planning incorporated them into their breakfast menus more often than schools using a food-based approach (8 versus 2 percent of menus).¹⁶

Meats and meat alternates appeared in a significantly larger share of menus in food-based schools than in nutrient-based schools (44 versus 30 percent). Sausage was twice as likely to be offered in traditional food-based breakfasts than in nutrient-based ones (22 versus 10 percent). There was very little difference in the frequency of combination entree offerings based on the menu-planning method used.

¹⁶ Cereals also contributed whole grains to breakfast menus, however, the nutrient database did not classify cereals on that basis.

VI. NUTRIENT CONTENT OF NSLP LUNCHES OFFERED AND SERVED

To ensure that the National School Lunch Program (NSLP) and School Breakfast Program (SBP) contribute positively to the health and well-being of participants, USDA regulates and monitors the dietary quality of school meals. The 1995 School Meals Initiative for Healthy Children (SMI) established specific nutrient standards. These standards call for NSLP lunches and SBP breakfasts to make a minimum contribution to children's daily energy and nutrient needs, as defined by the 1989 Recommended Dietary Allowances (RDA), and to be consistent with the 1995 *Dietary Guidelines for Americans* recommendations for fat and saturated fat. Schools are required to serve meals that meet these standards as a condition of receiving Federal reimbursements. To assist school foodservice personnel in preparing healthy meals that are consistent with SMI nutrient standards and that children will eat, the USDA Food and Nutrition Service (FNS) provides training, technical assistance, and other resources to participating schools.

The data presented in this chapter provide a picture of the average food energy (calorie) and nutrient composition of NSLP lunches offered and served to students in public schools in school year 2004–2005. Nutrient analyses were conducted to approximate both the average meal *offered* (giving equal weight to all menu choices) and the average meal *served* (giving more weight to menu items selected more frequently by students). The energy and nutrient content of each school's lunches are compared to the SMI nutrient standards and other nutrition benchmarks. Together with analyses of the foods offered (from Chapter V), information on nutrient content and compliance with SMI standards can be used by policymakers and program staff in their ongoing efforts to develop strategies for improving the dietary quality of school meals.

Three key research questions pertain to the energy and nutrient composition of NSLP lunches in school year 2004–2005:

1. What is the average energy and nutrient content of NSLP lunches offered and served to students during a typical school week?
2. What percentage of schools offer and serve lunches that meet, on average, each of the SMI nutrient standards and related nutrition benchmarks? What percentage of schools offer and serve lunches that meet *all* of the SMI nutrient standards?
3. What are the major food sources of energy and key nutrients in NSLP lunches offered to students?

The School Nutrition Dietary Assessment-III (SNDA-III) Menu Survey provided the necessary data to address these questions. Data were collected from school foodservice managers in all schools participating in the study. The managers recorded detailed information on all foods and beverages offered to students in USDA-reimbursable lunches in a typical week in the second half of school year 2004–2005.

A. SUMMARY OF FINDINGS

- Elementary schools were significantly more likely than middle or high schools to offer and serve NSLP lunches that met the SMI standard for food energy. While more than 70 percent of all schools *offered* the required minimum for energy, only 38 percent of middle schools and 23 percent of high schools *served* NSLP lunches that met this benchmark.
- Two-thirds or more of all schools (67 to 100 percent) *offered* NSLP lunches that, on average, satisfied the standards for protein, vitamins A and C, calcium, and iron. The percentages of schools meeting individual nutrient standards were somewhat lower for lunches *served*, particularly among middle and high schools.
- One in five schools (19 percent) offered and served NSLP lunches that were consistent with the SMI standard for total fat. About one in three schools (28 percent) offered and served lunches that met the standard for saturated fat. On average, NSLP lunches offered and served provided 34 percent of energy from total fat and 11 percent of energy from saturated fat.
- There were no significant differences in the likelihood of meeting the SMI standard for energy from total fat or saturated fat by menu-planning system for NSLP lunches as *offered*. For lunches *served*, about half as many schools using the traditional

approach compared to the enhanced food-based and nutrient-standard systems satisfied the standards for total fat and saturated fat.

- Although schools were not expected to meet specific quantitative standards for dietary components other than those included in SMI nutrient standards, most NSLP lunches offered and served were consistent with benchmarks for cholesterol and dietary fiber in school meals. At the same time, NSLP lunches offered and served to students were high in sodium.
- The major sources of total fat, saturated fat, and sodium in NSLP lunches *offered* were combination entrees, such as pizza, entree salads and salad bars, sandwiches with meat or cheese, and Mexican-style items. Salad dressings and condiments/spreads also made substantial contributions to fat and sodium. French fries accounted for significantly more of the total fat and sodium in lunches offered by secondary schools than elementary schools.

B. OVERVIEW OF DATA AND METHODS

1. Data Sources

As noted in Chapter V, the SNDA-III Menu Survey provided detailed data on all foods and beverages available in NSLP and SBP meals during a typical school week in the spring of school year 2004–2005. For each reimbursable meal item, school foodservice managers recorded the food name; a complete description (including cooking method, whether low-fat, and manufacturer and brand, if purchased); a portion size; and, for items prepared from scratch, detailed recipes. To allow an analysis of meals *served* to students, data were also collected on the number of portions of each item selected by students as part of a USDA-reimbursable meal (excluding portions sold to adults or sold to students on an a la carte basis). Because it was often difficult for foodservice managers to provide a count of reimbursable portions for food items that were sold both a la carte and as part of a reimbursable meal, servings data were sometimes estimated or calculated from the total amount of food produced for the meal (less the amount left over) and the reported portion size.

Specially trained MPR staff used USDA's Survey Net system and nutrient database to code, enter, and analyze the menu data for nutrient content. Secondary sources of information on

nutrient composition were sought for the most common pre-prepared food items, such as pizza, chicken patties, burritos, French fries, and breakfast sandwiches. Many of these foods are manufactured specifically for school foodservice and differ in nutrient content from similar foods in the USDA database. Therefore, the nutrient data for pre-prepared school foods, when not available in Survey Net, was obtained from manufacturers or imputed from manufacturers' information for a similar product. Procedures for collecting and coding menu data are described in detail in Volume III of this report.

2. Analysis Approach

To facilitate comparison with previous studies and provide a broader picture of the dietary quality of school meals, the average nutrient content of NSLP lunches and SBP breakfasts was assessed using both unweighted and weighted approaches to nutrient analysis. An *unweighted* nutrient analysis provides an approximation of the *average meal offered* to students. Traditionally, an unweighted analysis represented a simple average of the nutrient content of all foods offered to students, within the context of a food-based meal pattern (a serving of milk, at least two servings of fruit and/or vegetables, one serving of meat/meat alternate or entree, and one serving of grains/breads, if not part of the entree). The basic approach was used in the first School Nutrition Dietary Assessment Study (SNDA-I), prior to SMI, but was updated for SNDA-II to reflect the greater emphasis on fruits, vegetables, and grains represented by the enhanced food-based meal pattern. For SNDA-III, the unweighted methodology was further modified to take into account differences in the required structure of menus planned under the

nutrient-standard system.¹ (A more in-depth description of the unweighted analysis methodology is included in Appendix C.)

The use of a *weighted* nutrient analysis was first introduced as part of SMI to provide a more accurate assessment of the nutrient contribution of school meals to children's dietary intakes. The weighted analysis incorporates information on the number and types of foods actually selected by students, giving greater weight to foods selected more frequently. Thus, a weighted analysis produces an estimate of the *average meal served to or selected by* students. Current NSLP and SBP regulations require that a weighted nutrient analysis be used by State agencies for monitoring purposes and by schools planning menus with a nutrient-based system. A waiver that exempts schools and State agencies from this requirement has been extended through September 2009. Therefore, in school year 2004–2005, schools could choose to use either a weighted or unweighted analysis method to assess the nutrient content of NSLP and SBP meals.

Using both analysis approaches, mean food energy and nutrient content were computed for each daily menu for lunch (and for breakfast, if offered). Daily values were averaged across the week (three, four, or five days) to determine the overall school average. Weekly averages, adjusted to produce nationally representative estimates, were then compared to the Federally defined nutrient standards for NSLP or SBP meals and to related nutrition benchmarks. Data were not available on the particular age/grade groupings (and associated nutrient standards) used by individual schools in menu planning and/or nutrient analysis. The RDA-based standards were weighted to reflect the actual grade configuration in each school. This approach, which was also used in SNDA-II, provides the best approximation of students' nutrient requirements and treats

¹ Methodological differences in the unweighted analyses did not affect comparisons of the nutrient content of school meals between SNDA-III and SNDA-II. These comparisons were made on the basis of a *weighted* analysis. Results are provided in Chapter VIII of this report.

all schools in the same way for the analysis. The methodology is further discussed in Appendix C.

Analyses of average school meals as offered and as served to students were conducted for all schools; for each school type (elementary, middle, and high schools); and for schools using each major menu-planning system (traditional food-based, enhanced food-based, and nutrient-based menu planning). Unless otherwise indicated, the differences highlighted in the tables and discussed in the text are significant at least at the 0.05 level.²

3. Standards Used to Assess Nutrient Content

In assessing the dietary quality of school meals, the primary set of benchmarks used was the 1995 SMI nutrient standards. The SMI standards define goals for NSLP and SBP meals that are based on the 1989 RDAs and the 1995 *Dietary Guidelines for Americans*. (Table VI.1 shows the standards for NSLP lunches.) The SMI standards do not include specific quantitative goals for sodium, cholesterol, or fiber, but regulations encourage a “reduction” of sodium and cholesterol content and an “increase” in fiber content. To make it easier to understand the data, this study used benchmarks for cholesterol and sodium from the National Research Council’s 1989 *Diet and Health* report (as was done in SNDA-I and SNDA-II). Benchmarks for fiber from the Institute for Cancer Prevention (formerly the American Health Foundation) were also used.

Since 1995, there have been major changes in nutrition recommendations and dietary reference standards for the U.S. population. In particular, the 1989 RDAs have been replaced with the Dietary Reference Intakes (DRIs), which require the use of appropriate statistical methods to assess nutrient adequacy and excesses. In addition, the *Dietary Guidelines* were

² The statistical significance of differences between subgroups was determined on the basis of two-tailed t-tests. These tests accounted for the complex sample design, using the SUDAAN statistical software.

TABLE VI.1
SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS USED
TO EVALUATE NSLP LUNCHES

Nutrient	Standard/Recommendation
SMI Nutrient Standards	
Based on 1989 (RDAs)^a:	
Food energy (calories)	One-third of the REA
Protein, vitamin A, vitamin C, calcium, and iron	One-third of the RDA
Based on 1995 Dietary Guidelines for Americans^b	
Total fat	≤ 30 percent of total calories
Saturated fat	< 10 percent of total calories
Other Nutrition Benchmarks	
Cholesterol	< 100 mg ^c
Sodium	< 800 mg ^c
Dietary Fiber	One-third of daily target ^d

^aNational Research Council (1989a).

^bU.S. Departments of Health and Human Services and Agriculture (1995).

^cNational Research Council (1989b). Benchmarks are one-third of suggested maximum daily intake.

^dDaily target is based on using a standard of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Sutor 2001; Williams et al. 1995).

REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance; SMI = School Meals Initiative for Healthy Children.

updated in 2005 and include recommendations for several nutrients that differ from the current SMI nutrient standards.³ Nevertheless, the SMI standards constitute the regulatory benchmarks for school meals that were in place at the time of the study. For this reason, the analysis of school meals focuses on an assessment of the extent to which the meals offered and served in school year 2004–2005 satisfy the SMI standards and related nutrition benchmarks.

³ For example, the guideline for energy from total fat is now based on an Acceptable Macronutrient Distribution Range (AMDR), and the 1989 REA has been replaced by the Estimated Energy Requirement (EER) (Institute of Medicine 2002, 2005). The 2005 guideline for fiber is considerably higher—14 grams per 1,000 calories.

The rest of this chapter presents data on the nutrient content of NSLP lunches offered and served in public schools that participated in the NSLP during the 2004–2005 school year. Section C presents data on the average food energy and nutrient content of NSLP lunches *offered* to students and the extent to which the nutrient composition of these lunches is consistent with SMI nutrient standards and related benchmarks. Section D presents analogous information for NSLP lunches *served* to students. Key findings from analyses that compared the energy and nutrient content of NSLP lunches offered and served by menu-planning system are discussed in Section E. The final section of this chapter, Section F, presents results of analyses that describe the relative contributions of the foods offered to the energy and nutrient content of NSLP lunches. School breakfasts are discussed in Chapter VII.

C. ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES OFFERED

1. Mean Energy and Nutrient Content

In school year 2004–2005, NSLP lunches *offered* to students during a typical school week provided an average of 776 calories, 29 grams of total fat, 9 grams of saturated fat, 100 grams of carbohydrate, and 31 grams of protein (Table VI.2).⁴ Overall, lunches as offered contained an average of 34 percent of energy from total fat, 11 percent from saturated fat, 52 percent from carbohydrate, and 16 percent from protein. The proportion of energy from each of the macronutrients was essentially the same for elementary, middle, and high schools.

In general, the mean amounts of food energy, vitamins, minerals, and other dietary components in NSLP lunches offered increased with the grade level of students in the school. This is consistent with menu-planning guidance that encourages schools to vary the portion sizes

⁴ Appendix Tables D-VI.1 through D-VI.8 provide more detailed data on the distributions and standard errors of the energy and nutrient content of NSLP lunches offered and served, by school type and menu-planning system. Comparable data for secondary schools (middle schools and high schools combined) are provided in Appendix F.

TABLE VI.2
MEAN FOOD ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES
OFFERED TO STUDENTS

	Elementary Schools	Middle Schools	High Schools	All Schools
Mean Amount				
Food Energy (Calories)	741	816	857	776
Macronutrients				
Total fat (g)	28	31	33	29
Saturated fat (g)	9	10	10	9
Monounsaturated fat (g)	10	11	12	11
Polyunsaturated fat (g)	7	8	8	7
Linoleic acid (g)	6	7	7	7
Alpha-linolenic acid (g)	0.7	0.8	0.9	0.8
Carbohydrate (g)	96	105	111	100
Protein (g)	30	32	33	31
Vitamins				
Vitamin A (mcg RE)	388	390	387	388
Vitamin A (mcg RAE)	294	300	299	296
Vitamin C (mg)	32	34	39	34
Vitamin E (mg AT)	2.5	2.8	2.8	2.6
Vitamin B ₆ (mg)	0.5	0.6	0.6	0.6
Vitamin B ₁₂ (mcg)	1.9	2.0	2.0	2.0
Folate (mcg)	126	142	146	133
Folate (mcg DFE)	160	180	184	168
Niacin (mg)	7	7	8	7
Riboflavin (mg)	0.9	1.0	1.0	0.9
Thiamin (mg)	0.5	0.6	0.6	0.6
Minerals				
Calcium (mg)	531	549	547	537
Iron (mg)	4.5	5.0	5.2	4.7
Magnesium (mg)	102	110	113	105
Phosphorus (mg)	571	606	623	587
Potassium (mg)	1124	1249	1309	1180
Sodium (mg)	1377	1520	1588	1442
Zinc (mg)	3.8	4.2	4.3	4.0
Other Dietary Components				
Cholesterol (mg)	62	70	70	65
Dietary fiber (g)	7	8	8	7
Dietary fiber (g/1000 kcal)	9	10	9	9
Mean Percentage of Energy From:				
Total fat	33.6	34.3	34.2	33.8
Saturated fat	10.9	10.9	10.6	10.8
Monounsaturated fat	12.0	12.4	12.4	12.2
Polyunsaturated fat	8.3	8.6	8.7	8.4
Linoleic acid	7.3	7.5	7.6	7.4
Alpha-linolenic acid	0.8	0.9	0.9	0.9
Carbohydrate	51.9	51.5	51.8	51.8
Protein	16.3	16.0	15.8	16.1
Number of Schools	145	126	126	397

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT = Alpha-tocopherol; DFE = Dietary folate equivalents; RE = Retinol equivalents; RAE = Retinol activity equivalent.

of foods to meet the different nutrient requirements of younger and older students. As an example, the mean energy content of NSLP lunches offered in elementary schools was 741 calories, compared to 816 calories in middle schools and 857 calories in high schools. In general, NSLP lunches offered in middle and high schools were comparable to one another but differed in many respects from the NSLP lunches offered in elementary schools.

2. Energy and Nutrient Content Relative to SMI Standards

To assess the extent to which NSLP lunches *offered* in school year 2004–2005 complied with SMI nutrient standards, two sets of comparisons were made. First, the energy and nutrient content of the average lunch offered by each individual school was compared to the standards. Results of this analysis provide data on the percentage of schools (overall and by school type) that offered NSLP lunches that met the SMI standards for each of the target nutrients, as well as the percentage of schools that met *all* of the standards. Second, the mean energy and nutrients in the lunches offered were expressed as percentages of the 1989 REA/RDA and compared across elementary, middle, and high schools. Findings from both analyses are discussed in the nutrient-specific sections that follow.

Food Energy. Elementary schools were more likely than middle or high schools to offer NSLP lunches that met the SMI standard for energy of at least one-third of the 1989 REA (Table VI.3). Eight out of 10 elementary schools (79 percent) met the standard, compared with about 6 in 10 middle schools (58 percent) and just over one-half of high schools (53 percent). On average, NSLP lunches offered to students provided from 34 to 38 percent of the REA for food energy, depending on school type (Table VI.4).

Target Nutrients. Most schools of each type (67 to 100 percent) offered NSLP lunches that met the SMI standard of one-third of the RDA for protein and the target vitamins and minerals (Table VI.3). The standards for protein and calcium were satisfied in lunches offered by nearly

TABLE VI.3

PROPORTION OF SCHOOLS *OFFERING* NSLP LUNCHES THAT SATISFIED SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS

	Standard/ Recommendation	Elementary Schools	Middle Schools	High Schools	All Schools
SMI Nutrient Standards					
Food energy	33% of 1989 REA	79.4 ^a	58.0	52.9 ^y	70.7
Protein	33% of 1989 RDA	100.0~	100.0~	100.0~	100.0~
Vitamin A ^a	33% of 1989 RDA	97.5~ ^a	74.4	67.4 ^y	87.8
Vitamin C	33% of 1989 RDA	85.0 ^a	95.4~	90.2	87.8
Calcium	33% of 1989 RDA	99.0~	99.5~	97.1~	98.7~
Iron	33% of 1989 RDA	95.1~ ^a	70.2	72.2 ^y	86.4
Percentage of energy from total fat	≤ 30%	21.8	16.7	13.9	19.4
Percentage of energy from saturated fat	< 10%	27.1	27.4	31.9	28.1
All SMI standards		6.5~	4.7~	4.2~	5.7~
Other Nutrition Benchmarks					
Cholesterol	< 100 mg ^b	96~	94~	94~	96
Sodium	< 800 mg ^b	0~	0~	0~	0~
Dietary fiber	33% of target ^c	97.6~	88.1 ^β	75.6 ^y	91.8
Number of Schools		145	126	126	397

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-third of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Sutor 2001; Williams et al. 1995).

SMI = School Meals Initiative for Healthy Children; REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance.

^αDifference between elementary and middle schools is significantly different from zero at the .05 level.

^βDifference between middle and high schools is significantly different from zero at the .05 level.

^γDifference between elementary and high schools is significantly different from zero at the .05 level.

~Point estimate is considered imprecise because the coefficient of variation (standard error/estimate) is greater than 30 percent or the sample size is small for that statistic. Using these criteria, percentages close to zero or 100 are often flagged. See Chapter I for more information.

TABLE VI.4

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES OFFERED TO STUDENTS, RELATIVE TO SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS

	Standard/ Recommendation	Elementary Schools	Middle Schools	High Schools	All Schools
Mean Percentage of 1989 REA/RDA					
Food energy (calories)	33%	37.8 ^a	34.9	34.0 ^γ	36.6
Protein	33%	106.3 ^a	71.6 ^β	66.9 ^γ	92.8
Vitamin A ^a	33%	59.7 ^a	43.7	43.0 ^γ	53.8
Vitamin C	33%	69.9	68.6	68.2	69.4
Calcium	33%	64.0 ^a	46.4	45.6 ^γ	57.4
Iron	33%	43.8 ^a	37.2	38.2 ^γ	41.6
Mean Percentage of Energy From:					
Total fat	≤ 30%	33.6	34.3	34.2	33.8
Saturated fat	< 10%	10.9	10.9	10.6	10.8
Mean Amount					
Cholesterol	< 100 mg ^b	62 ^a	70	70 ^γ	65
Sodium	< 800 mg ^b	1,377 ^a	1,520	1,588 ^γ	1,442
Mean Percentage of Target^c					
Dietary fiber	33%	52.0 ^a	44.7 ^β	39.2 ^γ	48.3
Number of Schools		145	126	126	397

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-third of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Suitor 2001; Williams et al. 1995).

SMI = School Meals Initiative for Healthy Children; REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance.

^aDifference between elementary and middle schools is significantly different from zero at the .05 level.

^βDifference between middle and high schools is significantly different from zero at the .05 level.

^γDifference between elementary and high schools is significantly different from zero at the .05 level.

all schools (97 to 100 percent). Elementary schools were significantly more likely than either middle schools or high schools to offer NSLP lunches that satisfied the SMI standards for vitamin A and iron.

As the mean values imply, NSLP lunches offered were a particularly good source of protein, vitamins A and C, and calcium (Table VI.4). Overall, the average NSLP lunch as offered provided from 54 percent of the RDA for vitamin A to 93 percent of the RDA for protein. Except for vitamin C, which did not differ by school type, NSLP lunches offered in elementary schools provided significantly greater mean proportions of the 1989 RDAs than the lunches offered in middle or high schools. For example, on average, NSLP lunches offered to students in elementary schools provided approximately 60 percent of the RDA for vitamin A and 64 percent of the RDA for calcium. In contrast, the relative contributions from the lunches offered in high schools averaged 43 percent for vitamin A and 46 percent for calcium. These differences are most likely due to substantial differences between the RDA values for most elementary school children (ages 7 to 10) and most secondary school children (ages 11 to 18).

Percentage of Energy from Total Fat and Saturated Fat. Approximately one in five schools overall (19 percent) offered NSLP lunches that were consistent with the SMI standard for energy from total fat of no more than 30 percent of energy (Tables VI.3). The percentage of schools meeting the SMI standard for saturated fat (less than 10 percent of energy) was somewhat greater, but still fewer than one in three schools (28 percent). These proportions did not differ significantly by school type.

All three school types offered NSLP lunches that provided, on average, 34 percent of energy from total fat and 11 percent of energy from saturated fat (Table VI.4). Although the average percentage of energy from fat in NSLP lunches offered exceeded the SMI standard, it does fall within the recently defined AMDR for children 4 to 18 years of age (25 to 35 percent of food

energy) (Institute of Medicine 2002, 2005). The AMDR is the percentage of usual daily energy intake that is associated with reduced risk of chronic disease yet provides adequate amounts of essential nutrients. Using the AMDR as the basis for assessing the total fat content of NSLP lunches offered would likely result in a larger proportion of schools meeting the standard for energy from fat. An AMDR has not been established for saturated fat. However, the updated 2005 *Dietary Guidelines* maintained the recommendation for less than 10 percent of energy from saturated fat on which the SMI standard is based.

Percentage of Schools Meeting All SMI Standards. Individual schools are expected to serve lunches that, on average, are consistent with all of the SMI nutrient standards. As discussed in the previous section, the majority of schools offered NSLP lunches that satisfied SMI standards for target nutrients. At the same time, most schools have had difficulty planning lunches that provided targeted levels of energy from fat and saturated fat, and almost half of middle schools and high schools (42 to 48 percent) did not satisfy the SMI standard for energy. Primarily because of the failure to satisfy the fat and food energy standards, only a small proportion of schools (four to seven percent) offered NSLP lunches that complied with all of the SMI standards (Table VI.3).

3. Nutrient Content Relative to Other Dietary Benchmarks

The SMI nutrient standards do not specify maximum levels of sodium or cholesterol, or minimum levels of fiber, but the regulations do include the goals of “reducing” the sodium and cholesterol content and “increasing” the fiber content of school meals. To make it easier to interpret the data on these dietary components, benchmarks from the National Research Council for maximum cholesterol and sodium intake and targets proposed by the former American Health Foundation (now the Institute for Cancer Prevention) for minimum levels of dietary fiber

were used. Benchmarks for the full day were divided by three, which assumes, similar to the RDA-based SMI standards, a goal of one-third of the daily recommendation at lunch.

Cholesterol. Nearly all NSLP lunches offered to students were consistent with the benchmark for cholesterol (one-third of the National Research Council's daily recommendation of 300 mg). Ninety-six percent of elementary schools and 94 percent of middle and high schools offered lunches with average cholesterol content below the 100 milligram (mg) maximum suggested for lunch (Table VI.3). The mean amount of cholesterol in NSLP lunches offered was between 62 and 70 mg, depending on school type (Table VI.4).

Sodium. Effectively, none of the schools offered NSLP lunches with a mean sodium content that was consistent with the benchmark of less than 800 mg sodium (one-third of the 2,400 mg daily maximum suggested by the National Research Council; Table VI.3).⁵ The mean amount of sodium in lunches offered in elementary schools was 1,377 mg (Table VI.4). In middle schools and high schools, the average sodium content of NSLP lunches offered was almost two times the suggested maximum (means of 1,520 mg and 1,587 mg sodium, respectively).

The high sodium content of NSLP lunches is likely influenced by several factors. Salt (sodium chloride) used in food preparation is one factor. The frequent use of commercially prepared items, which tend to contain a large amount of sodium, is another. Although technical assistance is provided to help school foodservice staff lower the sodium content of NSLP lunches, it is possible that the coding rules and nutrient data base used to analyze the menu data did not fully capture schools' efforts to lower sodium. For example, recipes in the USDA

⁵ Since the publication of a Tolerable Upper Intake Limit (UL) for sodium (Institute of Medicine 2005) and the 2005 *Dietary Guidelines*, the suggested daily maximum has decreased slightly, from 2,400 mg to 2,300 mg of sodium per day. There is no meal-specific sodium level, but one-third of the new recommendation would be approximately 767 mg of sodium.

database were only modified when the schools' recipe included lower-fat ingredients or different amounts of fat-containing ingredients. In addition, the sodium content of some commercially prepared foods was imputed.

Dietary Fiber. Nearly all elementary schools (98 percent), almost 9 in 10 middle schools (88 percent), and three-quarters of high schools (76 percent) offered NSLP lunches that met the target of 33 percent of the age-plus-5 grams recommendation for dietary fiber (Table VI.3). Elementary schools offered lunches that provided, on average, 52 percent of the recommended daily amount of fiber, and middle and high school lunches offered means of 45 and 39 percent of the recommended daily amount, respectively (Table VI.4).⁶ Despite these positive results, food-based analyses indicate that there is room for improvement. Fewer than five percent of daily lunch menus included whole grains or dried beans and peas, both of which are rich sources of dietary fiber (see Chapter V, Table V.4).

D. ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES SERVED

1. Mean Energy and Nutrient Content

The average NSLP lunch *served* to (or selected by) students in school year 2004–2005 provided 709 calories, 27 grams of fat, 9 grams of saturated fat, 91 grams of carbohydrate, and 28 grams of protein (Table VI.5). The relative contributions of the macronutrients to total energy were essentially the same as those observed for lunches offered: 34 percent of energy from total fat, 11 percent from saturated fat, 51 percent from carbohydrate, and 16 percent from protein.

⁶ Mean dietary fiber in grams was 7 gm among elementary schools and 8 gm among middle and high schools (Table VI.2). The Adequate Intake (AI) for fiber for school-age children ranges from 25 to 38 grams of *total fiber* per day, considerably higher than the daily age-plus-5 gram recommendation for the same age group of 11 to 23 grams of *dietary fiber* (Institute of Medicine 2002, 2005).

TABLE VI.5
MEAN FOOD ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES
SERVED TO STUDENTS

	Elementary Schools	Middle Schools	High Schools	All Schools
Mean Amount				
Food Energy (Calories)	676	743	787	709
Macronutrients				
Total fat (g)	25	29	32	27
Saturated fat (g)	8	9	10	9
Monounsaturated fat (g)	9	11	12	10
Polyunsaturated fat (g)	6	7	8	6
Linoleic acid (g)	5	6	7	6
Alpha-linolenic acid (g)	0.6	0.7	0.8	0.7
Carbohydrate (g)	88	93	98	91
Protein (g)	28	29	30	28
Vitamins				
Vitamin A (mcg RE)	324	299	312	318
Vitamin A (mcg RAE)	259	242	249	254
Vitamin C (mg)	22	24	27	23
Vitamin E (mg AT)	2.1	2.4	2.6	2.3
Vitamin B ₆ (mg)	0.5	0.6	0.6	0.5
Vitamin B ₁₂ (mcg)	1.7	1.7	1.8	1.7
Folate (mcg)	108	116	121	112
Folate (mcg DFE)	138	150	155	143
Niacin (mg)	6	7	7	6
Riboflavin (mg)	0.8	0.8	0.9	0.8
Thiamin (mg)	0.5	0.5	0.5	0.5
Minerals				
Calcium (mg)	483	469	467	477
Iron (mg)	4.3	4.6	4.7	4.4
Magnesium (mg)	92	97	100	95
Phosphorus (mg)	534	541	554	539
Potassium (mg)	1,030	1,106	1,154	1,067
Sodium (mg)	1,278	1,408	1,529	1,348
Zinc (mg)	3.7	3.8	3.9	3.7
Other Dietary Components				
Cholesterol (mg)	58	61	64	60
Dietary fiber (g)	6	7	7	6
Dietary fiber (g/1000 kcal)	9	9	9	9
Mean Percentage of Energy From:				
Total fat	32.9	35.0	36.0	33.9
Saturated fat	10.8	11.1	10.9	10.9
Monounsaturated fat	12.1	13.1	13.5	12.6
Polyunsaturated fat	7.6	8.3	8.9	8.0
Linoleic acid	6.7	7.3	7.8	7.0
Alpha-linolenic acid	0.8	0.9	0.9	0.8
Carbohydrate	52.0	50.5	49.9	51.3
Protein	16.7	16.0	15.6	16.3
Number of Schools	145	126	126	397

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Estimates are based on a weighted nutrient analysis of menu data for one week. A weighted nutrient analysis takes into account the frequency with which students select each menu item. The methodology is fully described in Appendix C of this report.

AT = Alpha-tocopherol; DFE = Dietary folate equivalents; RE = Retinol equivalents; RAE = Retinol activity equivalent.

As noted for the analysis of lunches offered, the average energy and nutrient content of NSLP lunches served generally increased with grade level. For example, lunches served contained an average of 676 calories in elementary schools, 743 calories in middle schools, and 787 calories in high schools. Total fat ranged from a mean of 25 grams for lunches served in elementary schools to 32 grams for lunches served in high schools. Vitamin A and calcium were notable exceptions to the general pattern, and differences by school type were tested for statistical significance. The average amounts of both nutrients were slightly but significantly higher in lunches served by elementary schools than in lunches served by middle and high schools. One likely explanation is that the younger students were more likely than the secondary school students to select milk.⁷

2. Energy and Nutrient Content Relative to SMI Standards

Food Energy. The likelihood that NSLP lunches *served* to students would satisfy the SMI standard of providing at least one-third of the 1989 REA varied significantly by school type. As the ages of the children increased, the percentage of schools meeting the energy standard decreased, from 60 percent for elementary schools, to 39 percent for middle schools, to 23 percent for high schools (Table VI.6). Elementary schools served lunches that provided an average of 34.5 percent of the 1989 REA, compared with 31 to 32 percent in middle and high schools (Table VI.7). This pattern is consistent with the increased energy needs of older students (higher REAs), greater freedom to refuse components of the school lunch, and more availability of competitive foods in secondary schools.

⁷ As discussed later in this chapter, milk was the leading source of calcium and vitamin A in NSLP lunches offered to students. In addition, milk was reported to be consumed at lunch by 83 percent of elementary school students, compared to 63 and 56 percent of middle and high school students, respectively (NSLP participants only; see Volume II).

TABLE VI.6

PROPORTION OF SCHOOLS *SERVING* NSLP LUNCHES THAT SATISFIED SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS

	Standard/ Recommendation	Elementary Schools	Middle Schools	High Schools	All Schools
SMI Nutrient Standards					
Food energy	33% of 1989 REA	60.3 ^a	38.5 ^β	22.8 ^γ	49.4
Protein	33% of 1989 RDA	100.0~	100.0~	100.0~	100.0~
Vitamin A ^a	33% of 1989 RDA	91.3 ^a	42.8	36.4 ^γ	72.5
Vitamin C	33% of 1989 RDA	74.6	66.1	75.1	73.2
Calcium	33% of 1989 RDA	98.4~ ^a	83.4	80.0 ^γ	92.3
Iron	33% of 1989 RDA	95.5~ ^a	55.2	65.8 ^γ	82.8
Percentage of energy from total fat	≤ 30%	25.6	15.1	9.2~ ^γ	20.7
Percentage of energy from saturated fat	< 10%	33.7	29.3	19.7 ^γ	30.3
All SMI standards		10.7 ^a	2.0~	0.9~ ^γ	7.3~
Other Nutrition Benchmarks					
Cholesterol	< 100 mg ^b	99~	99~	100~	99~
Sodium	< 800 mg ^b	1~	0~	0~	1~
Dietary fiber	33% of target ^c	93.4~ ^a	71.8 ^β	50.2 ^γ	81.5
Number of Schools		145	126	126	397

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Estimates are based on a weighted nutrient analysis of menu data for one week. A weighted nutrient analysis takes into account the frequency with which each menu item is selected by students. The methodology is fully described in Appendix C of this report.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-third of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Sutor 2001; Williams et al. 1995).

SMI = School Meals Initiative for Healthy Children; REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance.

^aDifference between elementary and middle schools is significantly different from zero at the .05 level.

^βDifference between middle and high schools is significantly different from zero at the .05 level.

^γDifference between elementary and high schools is significantly different from zero at the .05 level.

~Point estimate is considered imprecise because the coefficient of variation (standard error/estimate) is greater than 30 percent or the sample size is small for that statistic. Using these criteria, percentages close to zero or 100 are often flagged. See Chapter I for more information.

TABLE VI.7

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES *SERVED* TO STUDENTS, RELATIVE TO SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS

	Standard/ Recommendation	Elementary Schools	Middle Schools	High Schools	All Schools
Mean Percentage of 1989 REA/RDA					
Food energy (calories)	33%	34.5 ^a	31.8	31.2 ^γ	33.4
Protein	33%	99.2 ^a	64.8 ^β	60.1 ^γ	85.8
Vitamin A ^a	33%	50.1 ^a	33.5	34.7 ^γ	44.3
Vitamin C	33%	48.6	47.8	47.8	48.3
Calcium	33%	58.2 ^a	39.6	38.9 ^γ	51.3
Iron	33%	41.5 ^a	34.4	35.2 ^γ	39.0
Mean Percentage of Energy From:					
Total fat	≤ 30%	32.9 ^a	35.0	36.0 ^γ	33.8
Saturated fat	< 10%	10.8	11.1	11.0	10.9
Mean Amount					
Cholesterol	< 100 mg ^b	58 ^a	61	64 ^γ	60
Sodium	< 800 mg ^b	1,278 ^a	1,407 ^β	1,529 ^γ	1,348
Mean Percentage of Target^c					
Dietary fiber	33%	48.0 ^a	38.2 ^β	33.5 ^γ	43.5
Number of Schools		145	126	126	397

Source: School Nutrient Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Estimates are based on a weighted nutrient analysis of menu data for one week. A weighted nutrient analysis takes into account the frequency with which each menu item is selected by students. The methodology is fully described in Appendix C of this report.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-third of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Suitor 2001; Williams et al. 1995).

SMI = School Meals Initiative for Healthy Children; REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance.

^aDifference between elementary and middle schools is significantly different from zero at the .05 level.

^βDifference between middle and high schools is significantly different from zero at the .05 level.

^γDifference between elementary and high schools is significantly different from zero at the .05 level.

Target Nutrients. The majority of all schools served NSLP lunches that met the SMI standard (33 percent of 1989 RDA) for protein, vitamin C, and calcium (Table VI.6). In addition, more than 9 out of 10 elementary schools met the standards for vitamin A and iron (91 and 96 percent, respectively). The percentages of middle and high schools that met the standards for vitamin A and iron were disproportionately lower. For vitamin A, NSLP lunches served in 43 percent of middle schools and 36 percent of high schools satisfied the SMI standard. For iron, the percentages were 55 percent for middle schools and 66 percent for high schools.

In keeping with the findings reported for lunches as offered, NSLP lunches served in elementary schools provided significantly greater mean amounts of the target nutrients, relative to the RDAs, than in either middle schools or high schools (Table VI.7). These results reflect increased nutrient needs of older children, as well as differences in food selections.

Percentage of Energy from Total Fat and Saturated Fat. NSLP lunches served in 21 percent of all schools met the SMI nutrient standard for the percentage of energy from total fat (no more than 30 percent). In contrast to findings for lunches offered, elementary schools were significantly more likely than high schools to meet this standard (26 versus 9 percent; Table VI.6). The mean percentages of energy from fat in lunches served also differed (33 percent of energy in elementary schools, compared to 36 percent in high schools; Table VI.7). Given that the macronutrient distributions in lunches as *offered* were relatively comparable for elementary schools and high schools (Table VI.1), these findings suggest that high school students, who have more discretion than elementary school students in making food selections and generally have a broader array of foods to choose from, tend to select foods that are high in fat and low in carbohydrate more frequently than foods that are high in carbohydrate and low in fat.

Fewer than one in three schools overall (30 percent) served lunches that were consistent with the SMI standard for saturated fat. As with energy from total fat, elementary schools were

significantly more likely than high schools to meet the standard for energy from saturated fat (34 versus 20 percent; Table VI.6).

Percentage of Schools Meeting All SMI Nutrient Standards. Overall, less than 10 percent of schools in school year 2004–2005 served NSLP lunches that met all of the SMI nutrient standards (Table VI.6). This finding was clearly influenced by the low percentages of schools that met the standards for energy and fat.

3. Nutrient Content Relative to Other Dietary Benchmarks

Cholesterol. Nearly all schools (99 to 100 percent) served NSLP lunches that met the cholesterol recommendation (Table VI.6). NSLP lunches served to students contained an average of 58 to 64 mg of cholesterol, well below the recommended 100 mg maximum for cholesterol at lunch (Table VI.7).

Sodium. Very few schools (approximately one percent) served NSLP lunches that were consistent with the recommended maximum for sodium of 800 mg (Table VI.6). The mean sodium content of lunches served was about 60 percent higher than recommended in elementary schools (1,278 mg), 76 percent higher in middle schools (1,407 mg), and 91 percent higher in high schools (1,529 mg; Table VI.7). For all schools combined, the average amount of sodium in lunches *served* was about 7 percent (94 mg) less than in lunches *offered*.

Dietary Fiber. More than 9 in 10 elementary schools (93 percent) and almost three-quarters (72 percent) of middle schools served NSLP lunches that met the fiber target (Table VI.6). In comparison, just half (50 percent) of high schools served lunches that were consistent with the fiber recommendation. Lunches as served provided an average of 48 percent of the daily fiber recommendation for elementary schools, 38 percent for middle schools, and 34 percent for high schools (Table VI.7). Differences between school types were statistically significant.

E. ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHESES OFFERED AND SERVED, BY MENU-PLANNING SYSTEM

1. Mean Energy and Nutrient Content

Data on the average food energy and nutrient content of NSLP lunches offered and served to students by menu-planning system are tabulated in Appendix D, Tables D-VI.9 and D-VI.10.¹ There were no consistent patterns among schools using the different menu-planning systems in the mean amounts of nutrients and other dietary components in lunches offered or served. Menu-planning-related differences in the average energy content of NSLP lunches offered and served are discussed next.

2. Energy and Nutrient Content Relative to SMI Standards

There were a few notable differences in the energy and nutrient content of NSLP lunches compared to SMI standards among schools using different menu-planning systems. The pattern of differences was not always consistent for the analyses of lunches offered and lunches served. In some cases, this led to differences in conclusions about whether lunches satisfied the SMI standards. (That is, accounting for students' choices of items sometimes influenced the energy and nutrient content of NSLP lunches to a different extent, depending on the menu-planning system used.)

A significantly larger proportion of schools that used the traditional food-based menu-planning system (81 percent) *offered* NSLP lunches that met the one-third REA standard for food energy than schools that used the nutrient-standard system (58 percent; Table VI.8). NSLP lunches offered in approximately 65 percent of enhanced food-based schools satisfied the energy

⁸ Tables D-VI.11 through D-VI.16 provide the standard errors of the means and the percentile distributions. Due to the relatively small (unweighted) sample sizes for elementary schools that used the enhanced food-based (n = 33) and nutrient standard (n = 40) menu-planning systems, the data were tabulated for all grade levels combined.

TABLE VI.8

PROPORTION OF SCHOOLS OFFERING NSLP LUNCHES THAT SATISFIED SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS, BY MENU-PLANNING SYSTEM
ALL SCHOOLS

	Standard/ Recommendation	Food-Based			Nutrient- Based (NSMP or ANSMP)
		Traditional	Enhanced	All	
SMI Nutrient Standards					
Food energy	33% of 1989 REA	80.7	65.4	76.1	57.5 ^γ
Protein	33% of 1989 RDA	100.0~	100.0~	100.0~	100.0~
Vitamin A ^a	33% of 1989 RDA	86.6	82.5	85.4	93.6~
Vitamin C	33% of 1989 RDA	89.5	94.1~	90.8	80.6
Calcium	33% of 1989 RDA	99.8~	94.3~	98.2~	100.0~
Iron	33% of 1989 RDA	91.0	88.0~	90.1	77.7
Percentage of energy from total fat	≤ 30%	15.5	27.9	19.2	20.1
Percentage of energy from saturated fat	< 10%	22.5	42.2	28.4	27.4
All SMI standards		7.6~	6.1~	7.1~	2.4~
Other Nutrition Benchmarks					
Cholesterol	< 100 mg ^b	94~	94~	94	100~ ^γ
Sodium	< 800 mg ^b	0~	0~	0~	0~
Dietary fiber	33% of target ^c	94.6~	89.0~	92.9	89.2
Number of Schools		193	90	283	114

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-third of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Sutor 2001; Williams et al. 1995).

SMI = School Meals Initiative for Healthy Children; REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance; NSMP = Nutrient standard menu planning; ANSMP = Assisted nutrient standard menu planning.

^γDifference between traditional food-based and nutrient-based is significantly different from zero at the .05 level. None of the other differences in this table were statistically significant.

~Point estimate is considered imprecise because the coefficient of variation (standard error/estimate) is greater than 30 percent or the sample size is small for that statistic. Using these criteria, percentages close to zero or 100 are often flagged. See Chapter I for more information.

standard. Mean food energy ranged from 735 calories in lunches offered in schools that planned menus with the nutrient standard menu-planning approach to 805 calories in schools that used the traditional food-based approach (Table D-VI.9).

A different pattern was observed for lunches as *served*, where the share of schools that met the standard for food energy was lowest for enhanced food-based schools (36 percent). The percentages of schools meeting the energy standard was not significantly different when comparing those using the nutrient-based versus the traditional food-based system (51 versus 55 percent; Table VI.9). Mean energy content was 674 calories in schools that used the enhanced food-based system, compared to 717 and 719 calories for traditional food-based and nutrient-standard schools (Table D-VI.10).

Compliance with the SMI standards for the target nutrients was not related to the type of menu-planning system used for NSLP lunches as *offered* by the schools. From 78 to 100 percent of schools in each group provided at least 33 percent of the 1989 RDA for these nutrients (Table VI.8). For lunches *served*, schools that used nutrient-standard menu planning were significantly more likely to satisfy the standard for vitamin A (83 percent) than schools using either of the food-based systems (69 and 66 percent); at the same time, they were less likely to meet the vitamin C standard than traditional food-based schools (Table VI.9).

For NSLP lunches *offered*, there were no significant differences in the likelihood of meeting the SMI standard for energy from total fat or saturated fat based on menu-planning system (Table VI.8). For lunches *served*, only about half as many schools using the traditional menu-planning approach compared to the enhanced food-based and nutrient-standard systems satisfied the standards for total fat and saturated fat (Table VI.9). Interestingly, differences in the average total fat content of NSLP lunches offered and served were greater (statistically significant)

TABLE VI.9

PROPORTION OF SCHOOLS *SERVING* NSLP LUNCHES THAT SATISFIED SMI NUTRIENT STANDARDS
AND RELATED BENCHMARKS, BY MENU-PLANNING SYSTEM
ALL SCHOOLS

	Standard/ Recommendation	Food-Based			Nutrient- Based (NSMP or ANSMP)
		Traditional	Enhanced	All	
SMI Nutrient Standards					
Food energy	33% of 1989 REA	54.5 ^a	35.5	48.9	50.8
Protein	33% of 1989 RDA	100.0~	100.0~	100.0~	100.0~
Vitamin A ^a	33% of 1989 RDA	68.7	66.5 ^β	68.0	83.1 ^γ
Vitamin C	33% of 1989 RDA	79.3	78.0	78.9	59.4 ^γ
Calcium	33% of 1989 RDA	92.2	89.9~	91.5	94.1~
Iron	33% of 1989 RDA	84.2	74.0 ^β	81.1	86.9
Percentage of energy from total fat	≤ 30%	12.7 ^a	30.6	18.0	27.1
Percentage of energy from saturated fat	< 10%	21.6	40.1	27.1	38.1
All SMI standards		5.8~	1.8~	4.6~	13.7
Other Nutrition Benchmarks					
Cholesterol	< 100 mg ^b	100~	98~	99~	100~
Sodium	< 800 mg ^b	1~	0~	1~	0~
Dietary fiber	33% of target ^c	86.3 ^a	74.8	82.9	78.1
Number of Schools		193	90	283	114

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Estimates are based on a weighted nutrient analysis of menu data for one week. A weighted nutrient analysis takes into account the frequency with which each menu item is selected by students. The methodology is fully described in Appendix C of this report.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-third of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Suitor 2001; Williams et al. 1995).

SMI = School Meals Initiative for Healthy Children; REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance; NSMP = Nutrient standard menu planning; ANSMP = Assisted nutrient standard menu planning.

^aDifference between traditional and enhanced food-based is significantly different from zero at the .05 level.

^βDifference between enhanced food-based and nutrient-based is significantly different from zero at the .05 level.

^γDifference between traditional food-based and nutrient-based is significantly different from zero at the .05 level.

~Point estimate is considered imprecise because the coefficient of variation (standard error/estimate) is greater than 30 percent or the sample size is small for that statistic. Using these criteria, percentages close to zero or 100 are often flagged. See Chapter I for more information.

between the two food-based menu-planning systems than between the nutrient-standard approach and either of the food-based approaches (Tables VI.10 and VI.11).

Results of the weighted nutrient analysis (lunches served) suggest that nutrient-standard menu-planning schools were *more* likely to satisfy standards for fat and all SMI standards compared with results from the unweighted analysis (lunches offered) (Tables VI.8 and VI.9). When tested for statistical significance, however, the proportions of nutrient standard schools that satisfied the SMI standard for saturated fat in lunches *served* (38 percent) and lunches *offered* (27 percent) did not differ. Schools using nutrient-standard menu planning were more likely to *serve* NSLP lunches than to *offer* lunches that met *all* SMI standards, although the proportions meeting all standards are small for both groups (14 percent compared to 2 percent).

3. Nutrient Content Relative to Other Dietary Benchmarks

For the most part, the type of menu-planning system used by the school did not significantly affect the proportion of schools that met meal-specific benchmarks for cholesterol, sodium, or dietary fiber, nor did it affect the average amount of these dietary components in NSLP lunches as offered or as served (Tables VI.8 through VI.11). One exception was dietary fiber in lunches *served*. A significantly larger share of traditional food-based schools (86 percent) met the fiber target, compared to the other schools (75 and 78 percent).

F. SOURCES OF ENERGY AND NUTRIENTS IN NSLP LUNCHES AS OFFERED

To identify the food sources of energy and key nutrients in NSLP lunches, all menu items were first categorized into one of nine major food groups: milk, fruits, vegetables, combination entrees, meat and meat alternates, grains and breads, desserts, accompaniments, and other.

TABLE VI.10

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES *OFFERED*, RELATIVE TO SMI
NUTRIENT STANDARDS AND RELATED BENCHMARKS,
BY MENU-PLANNING SYSTEM
ALL SCHOOLS

	Standard/ Recommendation	Food-Based			Nutrient- Based (NSMP or ANSMP)
		Traditional	Enhanced	All	
Mean Percentage of 1989 REA/RDA					
Food energy (calories)	33%	37.8	36.0	37.2	34.9 ^γ
Protein	33%	94.5	89.7	93.1	92.1
Vitamin A ^a	33%	54.1	50.9	53.1	55.3
Vitamin C	33%	69.9	79.3 ^β	72.7	61.3
Calcium	33%	56.8	57.5	57.0	58.4
Iron	33%	42.5	41.2	42.1	40.4
Mean Percentage of Energy From:					
Total fat	≤ 30%	34.7 ^α	32.3	34.0	33.4
Saturated fat	< 10%	11.0 ^α	10.4	10.8	10.7
Mean Amount					
Cholesterol	< 100 mg ^b	69	62	67	59 ^γ
Sodium	< 800 mg ^b	1,480	1,425	1,464	1,389
Mean Percentage of Target^c					
Dietary fiber	33%	49.3	49.2	49.3	45.9
Number of Schools		193	90	283	114

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-third of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Sutor 2001; Williams et al. 1995).

SMI = School Meals Initiative for Healthy Children; REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance.

^αDifference between traditional and enhanced food-based is significantly different from zero at the .05 level.

^βDifference between enhanced food-based and nutrient-based is significantly different from zero at the .05 level.

^γDifference between traditional food-based and nutrient-based is significantly different from zero at the .05 level.

TABLE VI.11

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES *SERVED*, RELATIVE TO SMI
NUTRIENT STANDARDS AND RELATED BENCHMARKS,
BY MENU-PLANNING SYSTEM
ALL SCHOOLS

	Standard/ Recommendation	Food-Based			Nutrient- Based (NSMP or ANSMP)
		Traditional	Enhanced	All	
Mean Percentage of 1989 REA/RDA					
Food energy (calories)	33%	33.8 ^a	31.7 ^b	33.2	33.9
Protein	33%	86.3	81.5 ^b	84.9	88.2
Vitamin A ^a	33%	44.2	42.4	43.7	45.8
Vitamin C	33%	48.2	51.4	49.2	46.2
Calcium	33%	50.4	50.4	50.4	53.5
Iron	33%	39.2	37.8	38.8	39.5
Mean Percentage of Energy From:					
Total fat	≤ 30%	34.7 ^a	32.6	34.1	33.3
Saturated fat	< 10%	11.1	10.6	11.0	10.7
Mean Amount					
Cholesterol	< 100 mg ^b	62	58	61	57
Sodium	< 800 mg ^b	1,373	1,300	1,351	1,341
Mean Percentage of Target^c					
Dietary fiber	33%	43.5	42.8	43.3	44.1
Number of Schools		193	90	283	114

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Estimates are based on a weighted nutrient analysis of menu data for one week. A weighted nutrient analysis takes into account the frequency with which each menu item is selected by students. The methodology is fully described in Appendix C of this report.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-third of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Sutor 2001; Williams et al. 1995).

SMI = School Meals Initiative for Healthy Children; REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance.

^aDifference between traditional and enhanced food-based is significantly different from zero at the .05 level.

^bDifference between enhanced food-based and nutrient-based is significantly different from zero at the .05 level.

These groups were then further divided into 103 minor food source groups.⁹ For each of the nutrients targeted by SMI, the percentage contribution of each major and minor food source group was computed by summing the nutrient amounts provided by the food group (using weighting assumptions for NSLP lunches as offered), and dividing this sum by the total mean amount of the nutrient in the daily lunch menus. Therefore, frequently offered foods, such as 1% and 2% milk, have a higher ranking than one might expect based on nutrient content alone.

For energy and 11 nutrients, results for the major food groups and the top 10 contributors are presented in Table VI.12, separately for elementary schools, secondary schools (middle schools and high schools combined), and all schools. A full listing of the food groups that contributed one percent or more of the average nutrients offered is provided (for an expanded set of nutrients) in Appendix D, Tables D-VI.17 through D-VI.37. Differences between school types were tested for statistical significance on the basis of two-tailed t-tests, using the SUDAAN statistical software. Major findings are summarized in the sections below.

Energy. The most important source of food energy in NSLP lunches offered in school year 2004–2005 was combination entrees, providing approximately 34 percent of average lunch calories. Pizza, hamburgers and cheeseburgers, entree salads/salad bars, and sandwiches made the largest contributions to total energy. Milk, mainly of the flavored low-fat variety, was the second leading source of energy in both elementary school (18 percent) and secondary school (15 percent) lunches.¹⁰ Among secondary schools, vegetables contributed significantly more of the total energy in lunches offered compared to elementary schools (12 versus 8 percent). Most

⁹ The food source groups are similar but not identical to the minor food groups used to describe the menu items most frequently offered in NSLP lunches in Chapter V and Appendix B, Table B-V.1.

¹⁰ The most common milk type in lunches offered overall was 1% flavored milk (83 percent of menus; Table V.4). It was also the leading source of carbohydrate, providing about nine percent (elementary schools) and six percent (secondary schools) of the total carbohydrate in NSLP lunches offered (Appendix D, Table D-VI.20).

TABLE VI.12
FOOD SOURCES OF ENERGY AND NUTRIENTS IN NSLP LUNCHES OFFERED

Major Food Group	Percentage Contribution to Average Amount Offered			Top 10 Food Sources	Percentage Contribution to Average Amount Offered		
	Elementary Schools	Secondary Schools	All Schools		Elementary Schools	Secondary Schools	All Schools
Food Energy (Calories)							
Combination Entrees	34.3	34.0	34.2	1% milk, flavored	6.6	5.1**	6.0
Milk	17.7	15.3**	16.7	Pizza and pizza products	6.1	5.7	5.9
Breads/Grains	10.9	11.0	11.0	Peanut butter sandwiches	5.0	2.8*	4.2
Vegetables	8.3	11.9**	9.7	White bread, rolls, bagels	4.1	4.2	4.1
Fruit	8.7	8.7	8.7	Salad dressings	4.2	3.7	4.0
Accompaniments ^a	7.9	7.7	7.9	Condiments and spreads	3.7	4.1	3.9
Meat/Meat Alternate	5.9	4.4**	5.3	Hamburgers, cheeseburgers	3.6	4.2	3.8
Desserts	5.1	5.4	5.2	Entree salads, entree salad bars ^b	3.2	4.3	3.6
Other	1.1	1.7	1.3	Sandwiches with plain meat or poultry ^c	3.8	3.4	3.6
				Cookies, cakes, brownies	3.4	3.8	3.5
Protein							
Combination Entrees	43.5	46.0	44.5	1% milk, flavored	8.2	6.4**	7.5
Milk	26.8	24.2**	25.8	Pizza and pizza products	7.0	6.8	6.9
Meat/Meat Alternate	10.5	8.6	9.7	Hamburgers, cheeseburgers	6.1	7.3	6.6
Breads/Grains	7.2	7.3	7.2	Sandwiches with plain meat or poultry ^c	5.9	5.5	5.8
Vegetables	5.3	7.3**	6.1	Entree salads, entree salad bars ^b	4.8	6.8*	5.6
Accompaniments ^a	2.1	2.1	2.1	1% milk, unflavored	5.3	4.6	5.1
Desserts	1.9	2.0	2.0	2% milk, unflavored	4.8	4.3	4.6
Fruit	1.9	1.9	1.9	Mexican-style entrees	4.5	3.5	4.1
Other	0.8	0.5	0.7	Peanut butter sandwiches	4.3	2.6	3.6
				Skim or nonfat milk, flavored	3.5	3.5	3.5

TABLE VI.12 (continued)

Major Food Group	Percentage Contribution to Average Amount Offered			Top 10 Food Sources	Percentage Contribution to Average Amount Offered		
	Elementary Schools	Secondary Schools	All Schools		Elementary Schools	Secondary Schools	All Schools
Vitamin A (mcg RE)							
Milk	34.1	33.5	33.9	Carrots	18.2	14.9	17.0
Vegetables	33.7	30.6	32.6	1% milk, flavored	11.1	9.5	10.5
Combination Entrees	17.0	20.1	18.2	1% milk, unflavored	7.0	6.6	6.9
Fruit	4.3	4.7	4.5	Entree salads, entree salad bars ^b	5.1	8.2*	6.2
Accompaniments ^a	3.7	4.5*	4.0	2% milk, unflavored	6.1	6.0	6.1
Breads/Grains	2.4	3.3	2.8	Pizza and pizza products	5.0	4.7	4.9
Desserts	2.7	1.7	2.3	Skim or nonfat milk, flavored	4.5	4.8	4.6
Meat/Meat Alternate	1.2	1.2	1.2	Condiments and spreads	3.3	4.1*	3.6
Other	0.8	0.3	0.6	Mixed vegetables	4.0	2.8	3.6
				Lettuce salads, side salad bars	2.4	4.7**	3.2
Vitamin C							
Fruit	59.5	51.7*	56.4	Fruit juice, 100%	24.3	20.8	22.9
Vegetables	17.7	21.4	19.2	Citrus fruit	16.3	17.5	16.8
Combination Entrees	8.6	12.9**	10.3	Peaches	8.1	3.8	6.4
Other	4.9	5.3	5.0	Juice drinks (not 100% juice)	4.5	5.0	4.7
Accompaniments ^a	3.3	4.1	3.6	Entree salads, entree salad bars ^b	2.7	5.1*	3.6
Desserts	2.9	1.5*	2.4	Broccoli	3.9	3.1	3.6
Milk	2.0	1.7*	1.9	Condiments and spreads	3.2	4.0	3.6
Breads/Grains	0.7	0.9	0.8	Lettuce salads, side salad bars	3.0	4.3	3.5
Meat/Meat Alternate	0.4	0.5	0.5	Pineapple	2.4	2.3	2.3
				Apples	2.1	2.6	2.3

TABLE VI.12 (continued)

Major Food Group	Percentage Contribution to Average Amount Offered			Top 10 Food Sources	Percentage Contribution to Average Amount Offered		
	Elementary Schools	Secondary Schools	All Schools		Elementary Schools	Secondary Schools	All Schools
Calcium							
Milk	53.5	51.6*	52.8	1% milk, flavored	16.4	13.8*	15.4
Combination Entrees	27.2	28.0	27.5	1% milk, unflavored	10.6	9.7	10.3
Breads/Grains	4.8	5.7*	5.2	2% milk, unflavored	9.5	9.2	9.4
Vegetables	3.5	4.5**	3.9	Pizza and pizza products	8.7	8.3	8.5
Meat/Meat Alternate	3.7	2.2	3.1	Skim or nonfat milk, flavored	6.8	7.2	7.0
Fruit	2.9	3.0	2.9	Skim or nonfat milk, unflavored	4.3	5.4	4.7
Desserts	1.9	2.4	2.1	Whole milk, unflavored	4.2	4.1	4.2
Accompaniments ^a	2.0	2.1	2.0	Sandwiches with plain meat or poultry ^c	3.4	3.4	3.4
Other	0.6	0.5	0.6	Entree salads, entree salad bars ^b	2.9	4.0	3.3
				Mexican-style entrees	3.0	2.2	2.7
Iron							
Combination Entrees	44.9	45.1	45.0	White bread, rolls, bagels	7.8	7.9	7.9
Breads/Grains	17.3	17.2	17.2	Pizza and pizza products	7.3	7.0	7.2
Vegetables	10.6	12.6*	11.4	Hamburgers, cheeseburgers	6.6	7.5	7.0
Fruit	7.2	7.0	7.1	Sandwiches with plain meat or poultry ^c	5.8	5.2	5.5
Milk	6.0	5.3**	5.7	Peanut butter sandwiches	5.1	3.0*	4.2
Meat/Meat Alternate	5.9	4.9	5.5	Mexican-style entrees	4.6	3.7	4.2
Desserts	3.9	3.9	3.9	Entree salads, entree salad bars ^b	3.3	4.3	3.7
Accompaniments ^a	3.4	3.4	3.4	Cookies, cakes, brownies	3.1	3.5	3.3
Other	0.7	0.8	0.8	Breaded/fried meat or poultry sandwich	2.2	4.1**	3.0
				1% milk, flavored	3.2	2.5**	2.9

TABLE VI.12 (continued)

Major Food Group	Percentage Contribution to Average Amount Offered				Percentage Contribution to Average Amount Offered			
	Elementary Schools	Secondary Schools	All Schools	Top 10 Food Sources	Elementary Schools	Secondary Schools	All Schools	
					Elementary Schools	Secondary Schools	All Schools	
Total Fat								
Combination Entrees	41.9	40.0	41.1	Salad dressings	10.9	9.3	10.3	
Accompaniments ^a	17.6	17.3	17.5	Condiments and spreads	6.7	8.0	7.2	
Vegetables	8.2	13.4**	10.3	Pizza and pizza products	6.6	6.2	6.5	
Milk	10.6	9.0**	10.0	Peanut butter sandwiches	7.4	4.3	6.1	
Breads/Grains	7.9	8.1	8.0	Entree salads, entree salad bars ^b	4.7	5.8	5.1	
Meat/Meat Alternate	8.2	6.2**	7.4	French fries, similar potato products	3.2	6.2**	4.4	
Desserts	4.3	4.3	4.3	Mexican-style entrees	4.5	3.7	4.2	
Fruit	0.8	0.8	0.8	Hamburgers, cheeseburgers	3.9	4.5	4.1	
Other	0.5	0.8	0.7	Sandwiches with plain meat or poultry ^c	3.8	3.4	3.6	
				Cookies, cakes, brownies	3.5	3.7	3.6	
Saturated Fat								
Combination Entrees	44.5	43.9	44.3	Pizza and pizza products	8.0	7.9	7.9	
Milk	21.0	18.5**	20.0	Condiments and spreads	6.0	6.5	6.2	
Accompaniments ^a	11.1	11.0	11.0	2% milk, unflavored	6.0	5.4	5.8	
Meat/Meat Alternate	7.7	6.2	7.1	Entree salads, entree salad bars ^b	5.2	6.6	5.8	
Vegetables	5.4	9.1**	6.9	Hamburgers, cheeseburgers	4.7	5.8	5.1	
Breads/Grains	5.4	5.9	5.6	1% milk, flavored	5.6	4.3**	5.1	
Desserts	4.0	4.3	4.1	Salad dressings	5.0	4.5	4.8	
Other	0.5	0.7	0.6	Mexican-style entrees	5.3	4.1	4.8	
Fruit	0.4	0.4	0.4	Sandwiches with plain meat or poultry ^c	4.9	4.5	4.7	
				Whole milk, unflavored	4.0	3.7	3.9	

TABLE VI.12 (continued)

Major Food Group	Percentage Contribution to Average Amount Offered			Top 10 Food Sources	Percentage Contribution to Average Amount Offered		
	Elementary Schools	Secondary Schools	All Schools		Elementary Schools	Secondary Schools	All Schools
Cholesterol							
Combination Entrees	49.0	55.0**	51.4	Entree salads, entree salad bars ^b	8.3	13.1*	10.2
Milk	19.5	17.1**	18.6	Sandwiches with plain meat or poultry ^c	7.5	6.6	7.2
Meat/Meat Alternate	16.5	13.0*	15.1	Hamburgers, cheeseburgers	6.6	7.7	7.1
Breads/Grains	5.2	4.7	5.0	Breaded/fried chicken products	6.0	4.7	5.5
Accompaniments ^a	4.0	3.7	3.9	2% milk, unflavored	5.6	4.9	5.3
Desserts	3.4	3.5	3.4	Unbreaded poultry, meat, or fish	4.9	4.9	4.9
Vegetables	1.3	2.5**	1.8	Mexican-style entrees	5.1	3.9	4.7
Other	1.0	0.5	0.8	Breaded/fried meat or poultry sandwich	3.4	6.3**	4.6
Fruit	0.0	0.0	0.0	Pizza and pizza products	4.2	4.2	4.2
				1% milk, flavored	4.5	3.4**	4.0
Sodium							
Combination Entrees	43.1	42.6	42.9	Condiments and spreads	9.0	9.6	9.2
Accompaniments ^a	17.8	16.7	17.3	Pizza and pizza products	8.6	8.3	8.5
Breads/Grains	11.5	12.0	11.7	Salad dressings	8.8	7.1	8.1
Vegetables	10.2	13.2**	11.4	Sandwiches with plain meat or poultry ^c	6.8	5.9	6.4
Milk	8.1	7.1**	7.7	Entree salads, entree salad bars ^b	4.5	5.8	5.0
Meat/Meat Alternate	6.1	5.1	5.7	Hot dogs, corn dogs	4.1	4.3	4.1
Desserts	2.0	2.2	2.0	White bread, rolls, bagels	3.8	3.9	3.8
Other	1.0	1.0	1.0	Mexican-style entrees	3.9	2.8*	3.5
Fruit	0.2	0.2	0.2	Hamburgers, cheeseburgers	3.0	3.7	3.3
				Peanut butter sandwiches	3.5	2.0*	2.9

TABLE VI.12 (continued)

Major Food Group	Percentage Contribution to Average Amount Offered			Top 10 Food Sources	Percentage Contribution to Average Amount Offered		
	Elementary Schools	Secondary Schools	All Schools		Elementary Schools	Secondary Schools	All Schools
	Dietary Fiber						
Combination Entrees	29.4	28.3	29.0	Apples	5.6	6.5	6.0
Vegetables	23.3	26.5**	24.6	French fries, similar potato products	4.1	6.4**	5.0
Fruit	22.5	22.9	22.7	Peanut butter sandwiches	5.1	2.8*	4.2
Breads/Grains	9.5	8.9	9.3	Mexican-style entrees	4.4	3.5	4.0
Milk	6.5	5.4**	6.0	Pizza and pizza products	4.0	3.7	3.9
Accompaniments ^a	3.1	3.2	3.1	Entree salads, entree salad bars ^b	3.4	4.5	3.9
Desserts	2.9	2.5	2.7	1% milk, flavored	4.2	3.1**	3.8
Meat/Meat Alternate	2.2	1.6*	2.0	Citrus fruit	3.5	3.7	3.6
Other	0.5	0.7	0.6	Legumes	2.9	4.1	3.4
				White bread, rolls, bagels	3.5	3.2	3.4

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes condiments, toppings, spreads, and salad dressing.

^bIncludes entree salads with hard-cooked eggs or egg salad. Entree salad bars included an average serving of salad dressing.

^cIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

of this difference is due to French fries and similar processed potato products (Appendix D, Table D-VI.17). About five percent of total energy came from desserts—mostly baked goods, such as cookies, cakes, and brownies.

Total Fat. Combination entrees were the leading contributor of total fat in lunches offered (41 percent). In addition to the entrees that contributed most to food energy, Mexican-style entrees were among the top 10 contributors of fat in lunches overall. Accompaniments also contributed a substantial share (18 percent), especially salad dressings and condiments/spreads, such as mayonnaise, ranch dip, and sour cream. It is notable that almost half of the 13 percent of total fat contributed by vegetables in secondary schools came from French fries, compared with less than a quarter in lunches offered by elementary schools.¹¹ The small but statistically significant difference between school types in the contribution of milk to total fat is related more to their relative contributions from low-fat milk; there was no difference in the percent contribution to total fat from whole milk (Table D-VI.18).

Saturated Fat. Approximately 44 percent of the saturated fat in NSLP lunches offered came from combination entrees. Excluding peanut butter sandwiches, the major entree sources of saturated fat were the same as for total fat. Milk contributed a larger proportion of the saturated fat content of NSLP lunches than it did for total fat (21 versus 11 percent in elementary schools, 19 versus 9 percent in secondary schools). Among the 10 largest contributors to saturated fat were 2% milk and, to a lesser extent, whole milk (which was offered less often than 2% milk). Although less important than for total fat, French fries accounted for significantly

¹¹ French fries and similar potato products were among the top 10 food sources *and* contributed more carbohydrate, vitamin E, vitamin B₆, magnesium, potassium, and dietary fiber in the average NSLP lunch offered in secondary schools than in elementary schools (Appendix D, Tables D-VI.20, VI.25, VI.26, VI.31, VI.33, VI.37).

more saturated fat in lunches offered in secondary schools than in elementary schools (Table D-VI.19).

Sodium. Together, combination entrees (43 percent) and accompaniments (17 percent) contributed 60 percent of the sodium in NSLP lunches offered. Major contributors included condiments/spreads; pizza; salad dressings; sandwiches; entree salads/salad bars (which included dressing); and hot dogs, corn dogs, and similar sausage products. Most of the remaining sodium came from breads and grains, vegetables, and milk (about 30 percent combined). Among the vegetables offered at lunch, French fries contributed the most sodium (Table D-VI.34).

Vitamin A. Milk and vegetables each contributed about one-third of the average vitamin A in NSLP lunches offered. Carrots (raw and cooked combined) were the leading vegetable source of vitamin A for all schools. Combination entrees provided another 18 percent of total vitamin A, with entree salads/salad bars and pizza contributing the largest proportions. Consistent with data on the relative frequency with which entree salads/salad bars and lettuce side salads (often with carrots and/or tomatoes) were offered, these items made a somewhat larger contribution to the vitamin A in secondary school lunch menus compared to elementary school menus.

Calcium. Milk provided just over half of the average calcium content of NSLP lunches offered (53 percent overall). Combination entrees containing cheese as a main ingredient also made a substantial contribution (28 percent). Major entree sources of calcium included pizza; sandwiches with meat and cheese; chef's salads; entree salad bars; and Mexican style entrees. Other than a slightly greater proportion of calcium from 1% flavored milk in elementary school (16 percent) versus secondary school lunches (14 percent), there was little difference in calcium sources by school type.

Dietary Fiber. Combination entrees, vegetables, and fruit each provided roughly one fourth of the average dietary fiber content of NSLP lunches offered (29, 25 and 23 percent). Among

the entrees offered, major fiber sources included peanut butter sandwiches, Mexican-style entrees, pizza, and entree salads/salad bars. French fries and legumes were among the top 10 sources of dietary fiber and, along with side salads, accounted for most of the difference between elementary and secondary schools in the contribution to total fiber from vegetables (Table D-VI.37). Apples and oranges contributed the most fiber among the fruits offered. Whole-grain bread products were offered very infrequently and contributed less than one percent to the average fiber in NSLP lunches offered (not shown in tables).

VII. NUTRIENT CONTENT OF SBP BREAKFASTS OFFERED AND SERVED

The primary goal of the School Breakfast Program (SBP), where the program is available, is to provide the opportunity for all children to eat a nutritious breakfast before beginning the school day. To this end, SBP meals provided to students are expected to make a substantive contribution to children's daily energy and nutrient requirements while meeting the health-promoting goals of the 1995 *Dietary Guidelines for Americans*. The SBP operates under the same regulations for menu planning and monitoring as the National School Lunch Program (NSLP). To assess whether current efforts are effective in ensuring the high dietary quality of school breakfasts, USDA desired an assessment of the overall dietary quality of current school meals and the extent to which meals comply with the nutrient standards specified in School Meals Initiative for Healthy Children (SMI) regulations.

This chapter describes results of analyses of the nutrient composition of SBP breakfasts offered and served to students in school year 2004–2005. As in the previous chapter about NSLP lunches, this chapter presents the average food energy and nutrient content of SBP breakfasts and compares the nutrient content of each school's breakfasts to the SMI standards and related nutrition benchmarks.

Three main research questions are addressed in this chapter:

1. What is the average energy and nutrient content of SBP breakfasts offered and served to students during a typical school week?
2. What percentage of schools offer and serve breakfasts that meet, on average, each of the SMI nutrient standards and related nutrition benchmarks? What percentage of schools offer and serve breakfasts that meet *all* of the SMI nutrient standards?
3. What are the major food sources of energy and key nutrients in SBP breakfasts as offered to students?

The School Nutrition Dietary Assessment-III (SNDA-III) Menu Survey provided the necessary data to address these questions. Data were collected from school foodservice managers in all schools participating in the study that offered the SBP. Detailed information was recorded for all foods and beverages offered to students in USDA-reimbursable breakfasts, for the same school week in each school that lunch data were collected (in the spring of school year 2004–2005).

A. SUMMARY OF FINDINGS

- For each of the key SMI nutrients (protein, vitamins A and C, calcium, and iron), more than 90 percent of schools *offered* SBP breakfasts that, on average, satisfied the SMI standard. The percentages of schools meeting individual SMI nutrient standards were somewhat lower for breakfasts as *served*, ranging from 78 to 96 percent.
- Substantially lower proportions of schools satisfied the SMI standard for food energy. Overall, the energy content of SBP breakfasts *offered* in 23 percent of schools was consistent with the SMI standard. For breakfasts *served*, 31 percent of schools met the SMI standard for energy.
- The percentages of schools that *offered* and *served* SBP breakfasts that satisfied SMI standards for energy from total fat and saturated fat, respectively, were 88 and 75 percent (*offered*) and 81 and 69 percent (*served*). Elementary schools were significantly more likely than secondary schools to *serve* breakfasts that met the standard for total fat.
- Relatively few schools *offered* or *served* breakfasts that satisfied all of the SMI standards (13 and 20 percent, respectively, for breakfasts *offered* and breakfasts *served*). However, the average breakfast *offered* in 60 percent of schools and the average breakfast *served* in 44 percent of schools met all SMI standards, except the standard for energy.
- There were no meaningful differences between schools using different menu-planning systems in the average nutrient content of SBP breakfasts *offered* or *served* or in the proportion of schools that met SMI standards.
- With regard to the other dietary components and benchmarks examined in this analysis, SBP breakfasts *offered* and *served* to students included acceptable levels of cholesterol but tended to be high in sodium and low in fiber.
- The leading sources of food energy in SBP breakfasts *offered* were grains and breads, milk, and 100% fruit juice. Cold cereal was the top contributor of calories among elementary schools, whereas sweet rolls, doughnuts, and toaster pastries provided the

most calories in secondary schools and contributed substantially to the fat content of the breakfasts. Both types of grains/breads were also key sources of vitamins, minerals, fiber, and sodium.

B. OVERVIEW OF METHODS

Both unweighted and weighted analyses were conducted to assess the food energy and nutrient content of SBP breakfasts offered and served to students at public schools that participated in the SBP in school year 2004–2005. The methodologies are analogous to those used to analyze the nutrient content of NSLP lunches (see Chapter VI and Appendix C). To assess the percentages of schools that offered and served SBP breakfasts that were consistent with nutrient standards, weekly averages were compared to the standards defined in SMI regulations as shown in Table VII.1.

The table also shows the meal-specific benchmarks that were used to assess the cholesterol, sodium, and dietary fiber content of SBP breakfasts. The SMI standards do not include quantitative standards for these components, but schools are encouraged to monitor them and work toward “increased” levels of fiber and “decreased” levels of sodium and cholesterol. The standards used in the analysis reflect one-fourth of recommended maximum daily intakes (or minimum for fiber), to be consistent with the longtime USDA goal that school breakfasts meet one-fourth of a child’s dietary needs.

As in the Chapter VI analyses of NSLP lunches, the breakfast analyses were conducted for all schools; for each school type (elementary, middle, and high schools); and for schools using each major type of menu-planning system (traditional food-based, enhanced food-based, and nutrient-based menu planning). Unless otherwise indicated, the differences between subgroups

TABLE VII.1
SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS
USED TO EVALUATE SBP BREAKFASTS

Nutrient	Standard/Recommendation
SMI Nutrient Standards	
Based on 1989 (RDAs):^a	
Food energy (calories)	One-fourth of the REA
Protein, vitamin A, vitamin C, calcium, and iron	One-fourth of the RDA
Based on 1995 Dietary Guidelines for Americans^b	
Total fat	≤ 30 percent of total calories
Saturated fat	< 10 percent of total calories
Other Nutrition Benchmarks^c	
Cholesterol	< 75 mg ^c
Sodium	< 600 mg ^c
Dietary Fiber	One-fourth of daily target ^d

^aNational Research Council (1989a).

^bU.S. Departments of Health and Human Services and Agriculture (1995).

^cNational Research Council (1989b). Benchmarks are one-fourth of suggested maximum daily intake.

^dDaily target is based on using a standard of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Sutor 2001; Williams et al. 1995); 2005 dietary guideline—14 grams per 1,000 calories—is considerably higher.

RDA = Recommended Dietary Allowance; REA = Recommended Energy Allowance; SMI = School Meals Initiative for Healthy Children.

discussed in the text were statistically significant at least at the 0.05 level.¹ The rest of this chapter presents detailed data on the nutrient content of SBP breakfasts offered and served to students. Section C presents data on the average food energy and nutrient content of the breakfasts *offered* and the percentage of schools offering breakfasts that satisfied SMI nutrient standards. Section D presents analogous information for SBP breakfasts as *served* to students. Analyses comparing the nutrient content of breakfasts offered and served by menu-planning

¹ The statistical significance of differences between subgroups was determined on the basis of two-tailed t-tests. These tests accounted for the complex sample design, using the SUDAAN statistical software.

system are discussed in Section E. Finally, Section F describes the relative contributions of foods offered to the average energy and nutrient content of SBP breakfasts.

C. ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS OFFERED

1. Mean Energy and Nutrient Content

SBP breakfasts *offered* to students during a typical school week in school year 2004–2005 contained an average of 480 calories, 13 grams of total fat, 5 grams of saturated fat, 77 grams of carbohydrate, and 16 grams of protein (Table VII.2).² Thus, the average breakfast as offered provided 24 percent of energy from total fat, 9 percent from saturated fat, 13 percent from protein, and 64 percent from carbohydrate. Relative to NSLP lunches (see Chapter VI), SBP breakfasts provided (in percentage terms) more energy from carbohydrate and less energy from fat.

The average amounts of energy and most vitamins and minerals offered in breakfasts increased with the grade level of the school. This is consistent with the need to accommodate differences in energy and nutrient requirements of older and younger students. For example, elementary school breakfasts averaged 463 calories, compared with 501 calories for middle schools and 519 calories for high schools.

2. Energy and Nutrient Content Relative to SMI Standards

To assess the extent to which SBP breakfasts *offered* complied with SMI standards, two sets of comparisons were made. First, the energy and nutrient content of the average breakfast offered by each school was compared to the SMI nutrient standards. Results of this analysis

² Appendix Tables E-VII.1 through E-VII.8 provide more detailed data on the distributions and standard errors of the mean nutrient content of SBP breakfasts offered and served, by school type and menu-planning system. Comparable data for secondary schools (middle schools and high schools combined) are provided in Appendix F.

TABLE VII.2

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS OFFERED TO STUDENTS

	Elementary Schools	Middle Schools	High Schools	All Schools
Mean Amount				
Food Energy (Calories)	463	501	519	480
Macronutrients				
Total fat (g)	12	14	15	13
Saturated fat (g)	4	5	5	5
Monounsaturated fat (g)	4	5	6	5
Polyunsaturated fat (g)	2	3	3	3
Linoleic acid (g)	2	3	3	2
Alpha-linolenic acid (g)	0.2	0.2	0.2	0.2
Carbohydrate (g)	75	79	81	77
Protein (g)	15	16	17	16
Vitamins				
Vitamin A (mcg RE)	251	265	265	256
Vitamin A (mcg RAE)	242	257	256	247
Vitamin C (mg)	30	32	37	32
Vitamin E (mg AT)	0.9	1.0	1.0	0.9
Vitamin B ₆ (mg)	0.5	0.5	0.5	0.5
Vitamin B ₁₂ (mcg)	1.9	2.0	1.9	1.9
Folate (mcg)	118	130	124	122
Folate (mcg DFE)	173	191	179	178
Niacin (mg)	5	5	5	5
Riboflavin (mg)	0.8	0.9	0.9	0.8
Thiamin (mg)	0.5	0.5	0.5	0.5
Minerals				
Calcium (mg)	409	432	431	417
Iron (mg)	4.3	4.6	4.5	4.4
Magnesium (mg)	63	64	67	64
Phosphorus (mg)	397	416	427	406
Potassium (mg)	711	730	779	727
Sodium (mg)	573	629	686	604
Zinc (mg)	3.0	3.2	3.1	3.0
Other Dietary Components				
Cholesterol (mg)	35	40	46	38
Dietary fiber (g)	3	3	3	3
Dietary fiber (g/1000 kcal)	6	6	6	6
Mean Percentage of Energy From:				
Total fat	23.3	25.1	25.6	24.1
Saturated fat	8.6	9.2	9.3	8.9
Monounsaturated fat	8.5	9.2	9.5	8.8
Polyunsaturated fat	4.4	4.8	4.9	4.6
Linoleic acid	4.0	4.3	4.4	4.1
Alpha-linolenic acid	0.4	0.4	0.4	0.4
Carbohydrate	64.9	63.5	63.0	64.3
Protein	13.5	13.1	13.0	13.3
Number of Schools	120	109	102	331

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT = Alpha-tocopherol; DFE = Dietary folate equivalents; RAE = Retinol activity equivalents; RE = Retinol equivalents.

provide data on the percentage of schools (overall and by school type) that offered SBP breakfasts that met the standards for each of the nutrients targeted by SMI as well as the percentage that met *all* of the standards. Second, the average energy and nutrient content of SBP breakfasts offered, in terms of percentages of the 1989 REA/RDA, was tabulated for all schools and by school type. Data are presented in Tables VII.3 and VII.4 and discussed briefly below. Again, the discussion is limited to differences between elementary, middle, and high schools that were statistically significant at the .05 level.

Food Energy. Relatively few schools offered breakfasts that met or exceeded the SMI standard for food energy. Overall, SBP breakfasts offered in less than one in four schools (23 percent) provided at least one-fourth of the 1989 REA (Table VII.3). Elementary schools were significantly more likely than other schools to offer breakfasts that provided at least one-fourth of the RDA (30 percent versus approximately 12 percent of both middle and high schools).

The mean energy content of SBP breakfasts offered was less than 25 percent of the 1989 REA, overall and for each of the three school types (Table VII.4). Elementary schools offered breakfasts that contained about 24 percent of the REA, on average; the values were 22 and 21 percent for middle and high schools, respectively.

Target Nutrients. Large majorities of all three school types offered SBP breakfasts that met the SMI standard of one-fourth of the 1989 Recommended Dietary Allowances (RDAs) for protein, vitamin A, vitamin C, calcium, and iron. More than 9 in 10 schools of each type met the standard for protein, vitamin C, and calcium (Table VII.3). For vitamin A and iron, breakfasts offered in elementary schools were significantly more likely than breakfasts in either middle schools or high schools to satisfy SMI standards. Nonetheless, more than three-quarters (76 to 83 percent) of middle schools and high schools met the standards for these two nutrients.

TABLE VII.3

PROPORTION OF SCHOOLS OFFERING SBP BREAKFASTS THAT SATISFIED SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS

	Standard/ Recommendation	Elementary Schools	Middle Schools	High Schools	All Schools
SMI Nutrient Standards					
Food energy	25% of 1989 REA	30.1 ^a	11.5	11.5 ^γ	23.2
Protein	25% of 1989 RDA	100.0~	97.3~	99.6~	99.4~
Vitamin A ^a	25% of 1989 RDA	96.6~ ^a	78.2	81.9 ^γ	90.4
Vitamin C	25% of 1989 RDA	92.9~ ^a	98.0~	97.0~	94.6
Calcium	25% of 1989 RDA	99.0~	100.0~	99.5~	99.3~
Iron	25% of 1989 RDA	97.8~ ^a	82.9	75.5 ^γ	90.9
Percentage of energy from total fat	≤ 30%	90.7~	84.5	82.3	88.0
Percentage of energy from saturated fat	< 10%	75.8	72.8	71.5	74.5
All SMI standards		16.7 ^a	6.6~	5.1~ ^γ	12.7
All SMI standards except energy		67.7 ^a	47.5	46.7 ^γ	60.1
Other Nutrition Benchmarks					
Cholesterol	< 75 mg ^b	96~	95~ ^β	83 ^γ	94
Sodium	< 600 mg ^b	67 ^a	50	35 ^γ	58
Dietary fiber	25% of target ^c	28.7 ^a	8.0~	5.1~ ^γ	20.5
Number of Schools		120	109	102	331

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-fourth of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Sutor 2001; Williams et al. 1995).

RDA = Recommended Dietary Allowance; REA = Recommended Energy Allowance; SMI = School Meals Initiative for Healthy Children.

^aDifference between elementary and middle schools is significantly different from zero at the .05 level.

^βDifference between middle and high schools is significantly different from zero at the .05 level.

^γDifference between elementary and high schools is significantly different from zero at the .05 level.

~Point estimate is considered imprecise because the coefficient of variation (standard error/estimate) is greater than 30 percent or the sample size is small for that statistic. Using these criteria, percentages close to zero or 100 are often flagged. See Chapter I for more information.

TABLE VII.4

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS *OFFERED* TO STUDENTS, RELATIVE TO SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS

	Standard/ Recommendation	Elementary Schools	Middle Schools	High Schools	All Schools
Mean Percentage of 1989 REA/RDA					
Food energy (calories)	25%	23.6 ^a	21.5	20.6 ^γ	22.7
Protein	25%	55.1 ^a	36.0 ^β	33.7 ^γ	47.7
Vitamin A ^a	25%	38.8 ^a	29.8	29.5 ^γ	35.4
Vitamin C	25%	66.3	65.1	65.3	65.9
Calcium	25%	49.3 ^a	36.5	35.9 ^γ	44.5
Iron	25%	41.5 ^a	34.7	33.1 ^γ	38.7
Mean Percentage of Energy From:					
Total fat	≤ 30%	23.3 ^a	25.1	25.6 ^γ	24.1
Saturated fat	< 10%	8.6	9.2	9.3 ^γ	8.9
Mean Amount					
Cholesterol	< 75 mg ^b	35 ^a	40	46 ^γ	38
Sodium	< 600 mg ^b	573 ^a	629	686 ^γ	604
Mean Percentage of Target^c					
Dietary fiber	25%	21.1 ^a	16.7 ^β	14.7 ^γ	19.1
Number of Schools		120	109	102	331

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-fourth of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Sutor 2001; Williams et al. 1995).

RDA = Recommended Dietary Allowance; REA = Recommended Energy Allowance; SMI = School Meals Initiative for Healthy Children.

^aDifference between elementary and middle schools is significantly different from zero at the .05 level.

^βDifference between middle and high schools is significantly different from zero at the .05 level.

^γDifference between elementary and high schools is significantly different from zero at the .05 level.

SBP breakfasts, as offered, were a relatively rich source of the nutrients targeted in SMI, providing from 30 percent of the 1989 RDA for vitamin A to 66 percent of the 1989 RDA for vitamin C (Table VII.4). Except for levels of vitamin C, breakfasts offered in elementary schools were significantly higher in mean nutrient content, relative to the 1989 RDAs, than breakfasts offered in middle schools or high schools. (There were no significant differences among school types in mean vitamin C content.) As noted in the previous chapter, the 1989 RDAs are substantially higher for older children than for younger ones.

Percentage of Energy from Total Fat and Saturated Fat. Close to 9 in 10 schools overall (88 percent) offered SBP breakfasts that complied with the *Dietary Guidelines*-based SMI standard of no more than 30 percent of food energy from total fat (Table VII.3). Approximately 91 percent of elementary schools, 85 percent of middle schools, and 82 percent of high schools offered breakfasts that satisfied the total fat goal. (Differences between elementary schools and both middle and high schools were statistically significant.) In addition, three-quarters of all schools offered breakfasts that were consistent with the SMI standard of less than 10 percent of energy from saturated fat, with little variation across school types.

Despite the statistical significance of the differences in proportions of schools meeting the standards, the mean percentage of energy from total fat in SBP breakfasts offered fell well below the 30 percent maximum for all three school types (Table VII.4). Elementary schools offered breakfasts with an average of 23 percent of energy from total fat. Middle and high school breakfasts averaged 25 and 26 percent of energy from total fat, respectively. The average percentage of energy from saturated fat for breakfasts offered was approximately nine percent, regardless of type of school.

Percentage of Schools Meeting All SMI Standards. Relatively few schools (13 percent overall) offered SBP breakfasts that satisfied *all* of the SMI standards (Table VII.3). Elementary

schools were significantly more likely than middle or high schools to offer breakfasts that satisfied all of the SMI standards. Approximately 17 percent of elementary schools met all standards, compared with 7 percent of middle schools and 5 percent of high schools. These results are largely influenced by the low energy content of the breakfasts, relative to one-fourth of the 1989 REA. *Except* for the standard for energy, SBP breakfasts offered in 68 percent of elementary schools, 48 percent of middle schools, and 47 percent of high schools met all SMI standards.

3. Nutrient Content Relative to Other Dietary Benchmarks

To assess the SMI goals of reducing cholesterol and sodium, the cholesterol and sodium contents of SBP breakfasts offered were compared to one-fourth of the maximum daily intake levels recommended by the National Research Council (NRC) (1989b). Similarly, the dietary fiber content of SBP breakfasts offered was compared to the age-plus-5-gram minimum target for children's dietary fiber intake suggested by the former American Health Foundation (Williams 1995). Results of these analyses are shown in Tables VII.3 and VII.4 and briefly summarized below.

Cholesterol. Nearly all schools (94 percent) offered SBP breakfasts with mean cholesterol levels well below 75 mg—one-fourth of the daily maximum (300 mg) suggested by the NRC. On average, SBP breakfasts offered to students provided 38 mg of cholesterol.

Sodium. The share of schools offering SBP breakfasts that were consistent with the recommendation of less than 600 mg of sodium (one-fourth of the 2,400 mg daily maximum suggested by the NRC) varied significantly across school types.³ Sixty-seven percent of

³ If one-fourth of the Tolerable Upper Intake Limit (UL) for sodium of 2,300 mg per day were used as a benchmark, the daily maximum for breakfast would be 575 mg.

elementary schools, 50 percent of middle schools, and 35 percent of high schools met the recommendation for sodium. Elementary schools offered SBP breakfasts that provided an average of 573 mg of sodium. In contrast, the average sodium content of breakfasts offered in middle schools (629 mg) and high schools (686 mg) exceeded the recommended maximum.

Fiber. Elementary schools were significantly more likely than middle schools and high schools to offer SBP breakfasts with 25 percent or more of the recommended daily fiber target for children. On average, the dietary fiber content of SBP breakfasts offered by elementary schools provided 21 percent of the fiber target, middle schools provided 17 percent, and high schools provided 15 percent.

D. ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS SERVED

1. Mean Energy and Nutrient Content

The average SBP breakfast *served* provided 495 calories, 15 grams of total fat, 5 grams saturated fat, 77 grams carbohydrate, and 16 grams protein (Table VII.5). Overall, breakfasts served were remarkably similar in nutrient composition to breakfasts offered. SBP breakfasts typically offer fewer menu items than do NSLP lunches (less opportunity for choice, fewer “extra” items) and, therefore, students may be more likely to select a breakfast that closely resembles the breakfast offered. In all three school types, however, the mean percentage of energy from fat was higher for breakfasts *served* than breakfasts *offered* (Table VII.2). This suggests that, when choices were available, students tended to select higher-fat breakfast items.

2. Energy and Nutrient Content Relative to SMI Standards

Food Energy. As noted for breakfasts offered, relatively few schools *served* SBP breakfasts that met the SMI standard for food energy of one-fourth or more of the 1989 REA (Table VII.6). Breakfasts selected by students in elementary schools were significantly more likely than

TABLE VII.5

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS *SERVED* TO STUDENTS

	Elementary Schools	Middle Schools	High Schools	All Schools
Mean Amount				
Food Energy (Calories)	465	526	565	495
Macronutrients				
Total fat (g)	13	16	18	15
Saturated fat (g)	5	6	6	5
Monounsaturated fat (g)	5	6	7	6
Polyunsaturated fat (g)	3	3	3	3
Linoleic acid (g)	2	3	3	3
Alpha-linolenic acid (g)	0.2	0.3	0.3	0.2
Carbohydrate (g)	73	81	84	77
Protein (g)	15	16	18	16
Vitamins				
Vitamin A (mcg RE)	231	254	241	237
Vitamin A (mcg RAE)	222	247	233	229
Vitamin C (mg)	29	32	32	30
Vitamin E (mg AT)	0.9	1.0	1.1	0.9
Vitamin B ₆ (mg)	0.5	0.5	0.4	0.5
Vitamin B ₁₂ (mcg)	1.7	2.0	1.6	1.7
Folate (mcg)	112	145	122	120
Folate (mcg DFE)	165	218	177	177
Niacin (mg)	5	6	5	5
Riboflavin (mg)	0.8	0.9	0.8	0.8
Thiamin (mg)	0.5	0.6	0.5	0.5
Minerals				
Calcium (mg)	375	387	385	379
Iron (mg)	4.2	5.4	4.5	4.5
Magnesium (mg)	59	62	63	60
Phosphorus (mg)	387	404	444	401
Potassium (mg)	666	670	722	677
Sodium (mg)	631	761	884	701
Zinc (mg)	2.8	3.3	2.9	2.9
Other Dietary Components				
Cholesterol (mg)	37	45	59	43
Dietary fiber (g)	3	3	3	3
Dietary fiber (g/1000 kcal)	6	5	5	5
Mean Percentage of Energy From:				
Total fat	24.8	27.5	28.1	25.9
Saturated fat	8.9	9.6	9.5	9.1
Monounsaturated fat	9.3	10.5	11.0	9.8
Polyunsaturated fat	4.7	5.3	5.4	5.0
Linoleic acid	4.3	4.8	4.9	4.5
Alpha-linolenic acid	0.4	0.4	0.4	0.4
Carbohydrate	63.6	61.1	60.5	62.6
Protein	13.1	12.7	12.6	12.9
Number of Schools	120	109	102	331

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Estimates are based on a weighted nutrient analysis of menu data for one week. A weighted nutrient analysis takes into account the frequency with which each menu item is selected by students. The methodology is fully described in Appendix C of this report.

AT = Alpha-tocopherol; DFE = Dietary folate equivalents; RAE = Retinol activity equivalents; RE = Retinol equivalents.

TABLE VII.6

PROPORTION OF SCHOOLS *SERVING* SBP BREAKFASTS THAT SATISFIED SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS

	Standard/ Recommendation	Elementary Schools	Middle Schools	High Schools	All Schools
SMI Nutrient Standards					
Food energy	25% of 1989 REA	35.7 ^a	16.3	32.7~	31.4
Protein	25% of 1989 RDA	97.5~	93.2~	91.2~	95.5
Vitamin A ^a	25% of 1989 RDA	89.3 ^a	46.1 ^β	69.5 ^γ	77.5
Vitamin C	25% of 1989 RDA	86.9	93.8~	90.7~	88.9
Calcium	25% of 1989 RDA	95.8~ ^a	80.9	89.5~	91.8
Iron	25% of 1989 RDA	95.2~ ^a	72.5 ^β	83.7 ^γ	88.8
Percentage of energy from total fat	≤ 30%	88.5 ^a	65.7	68.0 ^γ	80.5
Percentage of energy from saturated fat	< 10%	70.8	60.1	70.0	68.6
All SMI standards		24.5 ^a	8.0~	16.5	19.9
All SMI standards except energy		53.0 ^a	22.4	36.7~	44.2
Other Nutrition Benchmarks					
Cholesterol	< 75 mg ^b	95~	90~ ^β	73 ^γ	90
Sodium	< 600 mg ^b	51	40 ^β	22 ^γ	43
Dietary fiber	25% of target ^c	23.9 ^a	6.0~	2.6~ ^γ	16.7
Number of Schools		120	109	102	331

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Estimates are based on a weighted nutrient analysis of menu data for one week. A weighted nutrient analysis takes into account the frequency with which each menu item is selected by students. The methodology is fully described in Appendix C of this report.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-fourth of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Suitor 2001; Williams et al. 1995).

RDA = Recommended Dietary Allowance; REA = Recommended Energy Allowance; SMI = School Meals Initiative for Healthy Children.

^aDifference between elementary and middle schools is significantly different from zero at the .05 level.

^βDifference between middle and high schools is significantly different from zero at the .05 level.

^γDifference between elementary and high schools is significantly different from zero at the .05 level.

~Point estimate is considered imprecise because the coefficient of variation (standard error/estimate) is greater than 30 percent or the sample size is small for that statistic. Using these criteria, percentages close to zero or 100 are often flagged. See Chapter I for more information.

breakfasts selected in middle schools to meet the energy standard (36 versus 16 percent); however, high schools were just as likely as elementary schools to meet the standard (33 percent). While the mean energy content of SBP breakfasts served did not differ by school type (22 to 24 percent of the REA; Table VII.7), the distribution of energy for high schools was considerably narrower and higher than for middle schools (medians of 563 versus 503 calories; Appendix E, Tables E-VII.6 and E-VII.7), which is why high schools were more likely to meet the energy standard. The point estimate for the share of schools overall that did satisfy the SMI standard for food energy (and the median) was greater for breakfasts *served* than for breakfasts *offered* (32 versus 23 percent overall; Tables VII.3 and VII.6). This pattern was especially evident for high schools, where the proportions of schools meeting the energy standard were roughly 33 percent (served) versus 12 percent (offered). This provides further evidence that high school students tended to select more energy-dense breakfast items when such choices were available.

Target Nutrients. Overall, most schools served SBP breakfasts that met the SMI standards for protein and targeted vitamins and minerals at each school level (Table VII.6). One nutrient was an exception, however. Less than half of middle schools (46 percent) satisfied the SMI standard for vitamin A, compared with more than two-thirds of high schools (70 percent) and close to 9 in 10 elementary schools (89 percent). The difference between middle and high schools is notable, especially since both school types were equally likely to *offer* breakfasts that met the SMI standard for vitamin A (78 and 81 percent, respectively).

SNDA-II identified low-fat milk and cold cereals (foods fortified with vitamin A) as the major contributors to the average vitamin A content of breakfasts served for all schools combined. Based on the data presented in Chapter V of this report (Table V.4), however, middle schools were no less likely to offer these foods in breakfast menus than other schools. Upon

TABLE VII.7

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS *SERVED* TO STUDENTS, RELATIVE TO SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS

	Standard/ Recommendation	Elementary Schools	Middle Schools	High Schools	All Schools
Mean Percentage of 1989 REA/RDA					
Food energy (calories)	25%	23.7	22.5	22.4	23.2
Protein	25%	53.8 ^a	35.9	35.8 ^γ	47.1
Vitamin A ^a	25%	35.8 ^a	28.4	26.8 ^γ	32.8
Vitamin C	25%	63.4	64.2	55.6	62.1
Calcium	25%	45.2 ^a	32.7	32.1 ^γ	40.5
Iron	25%	41.1	40.4	33.5 ^γ	39.6
Mean Percentage of Energy From:					
Total fat	≤ 30%	24.8 ^a	27.5	28.1 ^γ	25.9
Saturated fat	< 10%	8.9 ^a	9.6	9.5	9.2
Mean Amount					
Cholesterol	< 75 mg ^b	37 ^a	45 ^β	59 ^γ	43
Sodium	< 600 mg ^b	631 ^a	761	884 ^γ	701
Mean Percentage of Target^c					
Dietary fiber	25%	20.5	16.7	14.5 ^γ	18.7
Number of Schools		120	109	102	331

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Estimates are based on a weighted nutrient analysis of menu data for one week. A weighted nutrient analysis takes into account the frequency with which each menu item is selected by students. The methodology is fully described in Appendix C of this report.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-fourth of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Sutor 2001; Williams et al. 1995).

RDA = Recommended Dietary Allowance; REA = Recommended Energy Allowance; SMI = School Meals Initiative for Healthy Children.

^aDifference between elementary and middle schools is significantly different from zero at the .05 level.

^βDifference between middle and high schools is significantly different from zero at the .05 level.

^γDifference between elementary and high schools is significantly different from zero at the .05 level.

further analysis of the sources of vitamin A in SBP breakfasts, it appears that cold cereals and breakfast pastries, which include highly fortified (“super”) doughnuts and sweet rolls, were more likely to be selected by middle school students in schools that met the vitamin A standard than in schools that did not. For example, cold cereal contributed 25 percent (in schools that met the standard) compared to 13 percent (in schools that did not meet the standard) of the vitamin A in breakfasts served. For breakfast pastries, the relative vitamin A contributions were 10 and 4 percent, respectively (data not shown).

On average, SBP breakfasts selected by students in all three types of schools provided more than one-fourth of the 1989 RDA for all five target nutrients—a range of 27 percent for vitamin A in high schools to 64 percent for vitamin C in middle schools (Table VII.7).

Percentage of Energy from Total Fat and Saturated Fat. Taking into account students’ actual food selections (that is, a weighted versus unweighted nutrient analysis) affected conclusions about whether SBP breakfasts complied with the *Dietary Guidelines*-based SMI standard for energy from total fat but not saturated fat (Table VII.6). Based on the *unweighted* analysis, nearly 9 in 10 schools met the total fat target (no more than 30 percent of energy), with no significant variation by school type. Using a *weighted* analysis, elementary schools were significantly more likely than middle or high schools to *serve* breakfasts that satisfied the SMI standard for energy from total fat (89 percent versus 66 and 68 percent, respectively). Again, one potential explanation for this finding is that students in secondary schools had more high-fat food choices available and were selecting them more often than lower-fat alternatives.

Elementary schools served average SBP breakfasts that contained about 25 percent of energy from total fat and 9 percent of energy from saturated fat (Table VII.7). Middle and high schools served breakfasts that averaged about 28 percent of energy from total fat and 9.5 percent from saturated fat.

Percentage of Schools Meeting All SMI Standards. One-quarter of elementary schools served breakfasts that, on average, satisfied all of the SMI standards (Table VII.6). This is roughly one and a half times the proportion of elementary schools that *offered* SBP breakfasts that met all the SMI standards. Among middle schools and high schools, the proportion of schools that satisfied all of the SMI standards was also greater for breakfasts as served than for breakfasts as offered. Again, the standard for energy proved to be the greatest challenge. As Table VII.6 shows, 53 percent of elementary schools, 22 percent of middle schools, and 37 percent of high schools served breakfasts that met all the SMI standards *except* one-fourth of 1989 REA for energy.

3. Nutrient Content Relative to Other Dietary Benchmarks

Conclusions about how the average SBP breakfast served compares with the nutrient standards for cholesterol, sodium, and fiber are largely consistent with conclusions drawn in the analysis of breakfasts offered. Results are summarized below and in Tables VII.6 and VII.7.

Cholesterol. SBP breakfasts served in most schools (90 percent overall) were well within the suggested maximum for cholesterol of less than 75 mg. The average breakfast served provided means of 37 to 59 mg of cholesterol, depending on school type.

Sodium. About half of elementary schools (51 percent) served SBP breakfasts that were below the benchmark of 600 mg of sodium. In high schools, however, more than three-quarters (77 percent) of breakfasts served to students failed to meet the sodium benchmark. The average amount of sodium in SBP breakfasts served was about 5 percent higher than the benchmark in elementary schools (631 mg), 27 percent higher in middle schools (761 mg), and 47 percent higher in high schools (864 mg).

Dietary Fiber. A relatively small number of schools served an average SBP breakfast that provided the benchmark amount of dietary fiber. As noted for breakfasts offered, elementary

schools (24 percent) were significantly more likely to serve breakfasts that satisfied the fiber benchmark than either middle schools (6 percent) or high schools (3 percent). SBP breakfasts as *served* contained a mean of 14 to 20 percent of the daily fiber recommendation, compared to the goal of 25 percent. The variation by school type is likely due to differences in breakfast food selections of younger versus older children.⁴ For example, 38 percent of elementary school participants in the SBP, compared with 29 and 22 percent of middle and high school participants, reported consuming cold cereal at breakfast (see Volume II, Table VII.9). Graham crackers were also more commonly consumed by the younger SBP participants.

E. ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS, BY MENU-PLANNING SYSTEM

The mean energy and nutrient content of SBP breakfasts offered and served are remarkably similar across menu-planning systems (see Appendix E, Tables E-VII.9 and E-VII.10).⁵ There were no major differences among schools using different menu-planning systems in the proportions of schools meeting SMI nutrient standards or the average nutrient content of SBP breakfasts relative to those standards. Results are shown in Tables VII.8 through VII.11.

F. SOURCES OF ENERGY AND NUTRIENTS IN SBP BREAKFASTS AS OFFERED

To describe the food sources of energy and key nutrients in SBP breakfasts *offered*, the percentage contribution to the energy and nutrient content of the average breakfast was computed for eight major food groups (milk, fruits, vegetables, combination entrees, meat and

⁴ Based on an analysis presented in the final section of this chapter, the relative contributions of fiber sources *offered*, such as cold cereal and whole-grain breads and rolls, did not differ by school type (Table E-VII.37). The lower daily fiber recommendation for younger students, however, may play a role in the results observed for fiber.

⁵ Tables E-VII.11 through E-VII.16 provide the standard errors of the mean and percentile distributions. Due to small sample sizes for elementary schools participating in the SBP that used enhanced food-based (n = 28) and nutrient-based (n = 31) menu planning, the data were tabulated for all schools combined.

TABLE VII.8

PROPORTION OF SCHOOLS OFFERING SBP BREAKFASTS THAT SATISFIED SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS, BY MENU-PLANNING SYSTEM
ALL SCHOOLS

	Standard/ Recommendation	Food-Based			Nutrient- Based (NSMP or ANSMP)
		Traditional	Enhanced	All	
SMI Nutrient Standards					
Food energy	25% of 1989 REA	21.4	28.1	23.2	23.1
Protein	25% of 1989 RDA	99.8~	97.3~	99.2~	100.0~
Vitamin A ^a	25% of 1989 RDA	91.3	91.1~	91.2	88.5~
Vitamin C	25% of 1989 RDA	97.0~	92.0~	95.6~	92.0~
Calcium	25% of 1989 RDA	100.0~	100.0~	100.0~	97.5~
Iron	25% of 1989 RDA	90.2 ^a	98.0~ ^β	92.3	87.4~
Percentage of energy from total fat	≤ 30%	86.8	83.6	85.9	93.3~
Percentage of energy from saturated fat	< 10%	74.1	67.0	72.2	80.1
All SMI standards		12.5	12.4~	12.5	13.2
Other Nutrition Benchmarks					
Cholesterol	< 75 mg ^b	97~	90~	95~	90~
Sodium	< 600 mg ^b	55	65	58	57
Dietary fiber	25% of target ^c	16.8	26.0~	19.3	23.3
Number of Schools		164	74	238	93

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-fourth of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Suitor 2001; Williams et al. 1995).

ANSMP = Assisted nutrient standard menu planning; NSMP = Nutrient standard menu planning; RDA = Recommended Dietary Allowance; REA = Recommended Energy Allowance; SMI = School Meals Initiative for Healthy Children.

^αDifference between traditional and enhanced food-based is significantly different from zero at the .05 level.

^βDifference between enhanced food-based and nutrient-based is significantly different from zero at the .05 level.

~Point estimate is considered imprecise because the coefficient of variation (standard error/estimate) is greater than 30 percent or the sample size is small for that statistic. Using these criteria, percentages close to zero or 100 are often flagged. See Chapter I for more information.

TABLE VII.9

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS *OFFERED*, RELATIVE TO SMI
NUTRIENT STANDARDS AND RELATED BENCHMARKS,
BY MENU-PLANNING SYSTEM
ALL SCHOOLS

	Standard/ Recommendation	Food-Based			Nutrient- Based (NSMP or ANSMP)
		Traditional	Enhanced	All	
Mean Percentage of 1989 REA/RDA					
Food energy (calories)	25%	22.4	23.0	22.5	22.9
Protein	25%	47.0	48.9	47.5	48.0
Vitamin A ^a	25%	35.3	36.6	35.7	34.7
Vitamin C	25%	67.4	60.2	65.4	67.2
Calcium	25%	44.3	46.1	44.8	43.6
Iron	25%	38.2	41.3	39.1	37.7
Mean Percentage of Energy From:					
Total fat	≤ 30%	24.5	23.4	24.2	23.6
Saturated fat	< 10%	9.0	8.9	8.9	8.7
Mean Amount					
Cholesterol	< 75 mg ^b	35	39	36	42
Sodium	< 600 mg ^b	608	587	602	609
Mean Percentage of Target^c					
Dietary fiber	25%	18.2	21.3	19.0	19.4
Number of Schools		164	74	238	93

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: None of the differences between menu-planning systems are statistically significant.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-fourth of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Sutor 2001; Williams et al. 1995).

RDA = Recommended Dietary Allowance; REA = Recommended Energy Allowance; SMI = School Meals Initiative for Healthy Children.

TABLE VII.10

PROPORTION OF SCHOOLS *SERVING* SBP BREAKFASTS THAT SATISFIED SMI NUTRIENT
STANDARDS AND RELATED BENCHMARKS, BY MENU-PLANNING SYSTEM
ALL SCHOOLS

	Standard/ Recommendation	Food-Based			Nutrient- Based (NSMP or ANSMP)
		Traditional	Enhanced	All	
SMI Nutrient Standards					
Food energy	25% of 1989 REA	36.9	24.0	33.3	26.7
Protein	25% of 1989 RDA	96.0~	92.0~	94.9	97.1~
Vitamin A ^a	25% of 1989 RDA	78.4	76.4	77.9	76.7
Vitamin C	25% of 1989 RDA	90.9	84.3~	89.1	88.3~
Calcium	25% of 1989 RDA	93.5~	88.2~	92.1	91.2~
Iron	25% of 1989 RDA	90.6	86.3~	89.4	87.2~
Percentage of energy from total fat	≤ 30%	79.6	80.1	79.8	82.1
Percentage of energy from saturated fat	< 10%	64.4	64.5	64.4	79.1
All SMI standards		25.0	17.0	22.8	12.6~
Other Nutrition Benchmarks					
Cholesterol	< 75 mg ^b	91	85~	90	92~
Sodium	< 600 mg ^b	40	45	42	48
Dietary fiber	25% of target ^c	15.0	24.0	17.4	14.8
Number of Schools		164	74	238	93

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Notes: Estimates are based on a weighted nutrient analysis of menu data for one week. A weighted nutrient analysis takes into account the frequency with which each menu item is selected by students. The methodology is fully described in Appendix C of this report.

None of the differences between menu-planning systems are statistically significant.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks reflect one-fourth of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Sutor 2001; Williams et al. 1995).

ANSMP = Assisted nutrient standard menu planning; NSMP = Nutrient standard menu planning; RDA = Recommended Dietary Allowance; REA = Recommended Energy Allowance; SMI = School Meals Initiative for Healthy Children.

~Point estimate is considered imprecise because the coefficient of variation (standard error/estimate) is greater than 30 percent or the sample size is small for that statistic. Using these criteria, percentages close to zero or 100 are often flagged. See Chapter I for more information.

TABLE VII.11

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS *SERVED*, RELATIVE TO SMI
NUTRIENT STANDARDS AND RELATED BENCHMARKS,
BY MENU-PLANNING SYSTEM
ALL SCHOOLS

	Standard/ Recommendation	Food-Based			Nutrient- Based (NSMP or ANSMP)
		Traditional	Enhanced	All	
Mean Percentage of 1989 REA/RDA					
Food energy (calories)	25%	23.4	23.5	23.4	22.9
Protein	25%	47.4	47.3	47.4	46.5
Vitamin A ^a	25%	32.0	36.7	33.3	31.5
Vitamin C	25%	61.1	65.3	62.2	61.8
Calcium	25%	40.8	41.8	41.1	38.9
Iron	25%	38.1	47.1	40.6	37.1
Mean Percentage of Energy From:					
Total fat	≤ 30%	26.5	24.8	26.0	25.6
Saturated fat	< 10%	9.4	9.1	9.3	8.8
Mean Amount					
Cholesterol	< 75 mg ^b	41	48	43	41
Sodium	< 600 mg ^b	723	708	719	658
Mean Percentage of Target^c					
Dietary fiber	25%	18.1	21.5	19.0	18.0
Number of Schools		164	74	238	93

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Notes: Estimates are based on a weighted nutrient analysis of menu data for one week. A weighted nutrient analysis takes into account the frequency with which each menu item is selected by students. The methodology is fully described in Appendix C of this report.

None of the differences between menu-planning systems are statistically significant.

^aIn retinol equivalents (RE).

^b1989 National Research Council recommendation; not SMI standard. Benchmarks for cholesterol and sodium reflect one-fourth of suggested maximum daily intake.

^cThe daily target for dietary fiber is based on the guideline for total daily intake of “age in years + 5,” expressed in grams, weighted by the ages of students enrolled in the school (Gleason and Suitor 2001; Williams et al. 1995).

ANSMP = Assisted nutrient standard menu planning; NSMP = Nutrient standard menu planning; RDA = Recommended Dietary Allowance; REA = Recommended Energy Allowance; SMI = School Meals Initiative for Healthy Children.

meat alternates, grains and breads, accompaniments, and other items) and 67 minor food source groups.⁶ As in the previous chapter on NSLP lunches, results are presented for both the major food groups and the top 10 food sources for specific nutrients in the average SBP breakfast (Table VII.12). Tabulations of results for all food source groups that provided one percent or more of energy in SBP breakfasts, for an expanded set of nutrients, are included in Appendix E, Tables E-VI.17 through E-VI.37. Only major findings are discussed in the text.

Energy. The leading source of food energy in SBP breakfasts offered in school year 2004–2005 was grains and breads, which provided 38 percent of total calories. Cold cereal was the top contributor from this group in breakfasts offered by elementary schools. Among secondary schools, sweet rolls, doughnuts, and toaster pastries provided the most calories, and these baked goods contributed significantly more of the energy in breakfasts offered in secondary schools than in elementary schools (12 versus 7 percent). Milk, primarily of the low-fat variety, made the second largest contribution to total calories at breakfast (27 percent overall). Of the 12 to 13 percent of breakfast calories attributed to fruit, about three-quarters came from 100% fruit juice. Combination entrees, such as breakfast sandwiches, pizza, and pancake-wrapped sausages, contributed approximately nine percent of the calories in the average SBP breakfast offered.

Vitamin A. Together, milk (52 percent) and grains/breads (36 percent) supplied nearly all of the vitamin A in SBP breakfasts offered. Foods fortified with vitamin A, such as low-fat and skim milk, breakfast cereals, and “super” baked goods were the top contributors. The relative contribution of vitamin A from natural sources, such as fruit, fruit juice, and vegetables, was rather small (less than six percent combined). Secondary schools were more likely to offer

⁶ The food source groups are similar but not identical to the minor food groups used to describe the menu items most frequently offered in SBP breakfasts in Chapter V and Appendix B, Table B-V.1.

TABLE VII.12

FOOD SOURCES OF NUTRIENTS IN SBP BREAKFASTS OFFERED

Major Food Group	Percentage Contribution to Average Amount Offered			Top 10 Food Sources	Percentage Contribution to Average Amount Offered		
	Elementary Schools	Secondary Schools	All Schools		Elementary Schools	Secondary Schools	All Schools
	Food Energy (Calories)						
Grains/Breads	36.5	38.5	37.3	Cold cereal	10.9	9.8	10.5
Milk	27.4	26.2*	26.9	Fruit juice, 100%	9.3	9.2	9.3
Fruit	13.1	12.1*	12.7	Sweet rolls, doughnuts, toaster pastries	7.1	11.9**	9.0
Combination Entrees	8.7	9.2	8.9	Condiments and spreads	7.3	7.7	7.5
Accompaniments ^a	7.3	7.8	7.5	1% milk, flavored	7.4	7.5	7.4
Meat/Meat Alternate	6.3	5.3	5.9	2% milk, unflavored	5.5	5.7	5.6
Other	0.5	0.6	0.6	1% milk, unflavored	6.1	4.0**	5.3
Vegetables ^b	0.2	0.2	0.2	Skim or nonfat milk, flavored	3.6	4.0	3.8
				Pancakes, waffles, French toast	3.9	2.9*	3.5
				Muffins, sweet/quick breads	2.9	3.5	3.1
	Protein						
Milk	52.6	50.7*	51.8	1% milk, unflavored	14.9	10.1**	13.0
Grains/Breads	20.9	22.3	21.4	2% milk, unflavored	11.0	11.9	11.3
Combination Entrees	10.2	11.3	10.6	1% milk, flavored	11.0	11.5	11.2
Meat/Meat Alternate	10.6	9.4	10.2	Skim or nonfat milk, flavored	6.4	7.4	6.8
Fruit	3.6	3.5	3.5	Cold cereal	5.0	4.7	4.9
Accompaniments ^a	1.7	2.3	1.9	Whole milk, unflavored	4.6	4.2	4.4
Other	0.4	0.4	0.4	Sausages, hot dogs, cold cuts	4.2	3.9	4.1
Vegetables ^b	0.1	0.1	0.1	Sweet rolls, doughnuts, toaster pastries	3.1	5.1**	3.9
				Skim or nonfat milk, unflavored	3.5	4.0	3.7
				Breakfast sandwiches ^c	2.8	4.4	3.4

TABLE VII.12 (continued)

Major Food Group	Percentage Contribution to Average Amount Offered			Top 10 Food Sources	Percentage Contribution to Average Amount Offered		
	Elementary Schools	Secondary Schools	All Schools		Elementary Schools	Secondary Schools	All Schools
Vitamin A (mcg RE)							
Milk	52.4	50.8	51.8	Cold cereal	22.4	20.8	21.8
Grains/Breads	35.6	35.5	35.6	1% milk, unflavored	15.5	10.6**	13.6
Fruit	5.0	4.5	4.8	1% milk, flavored	11.7	12.5	12.0
Combination Entrees	2.9	3.1	3.0	2% milk, unflavored	11.2	12.1	11.5
Accompaniments ^a	1.5	4.0*	2.5	Skim or nonfat milk, flavored	6.5	7.5	6.9
Meat/Meat Alternate	1.7	2.0	1.8	Sweet rolls, doughnuts, toaster pastries	4.9	8.2**	6.2
Vegetables ^b	0.8	0.0	0.5	Skim or nonfat milk, unflavored	3.8	4.4	4.1
Other	0.1	0.0	0.0	Fruit juice, 100%	3.3	3.2	3.3
				Condiments and spreads	1.5	4.0*	2.5
				Buttered toast, bagels with cream cheese	2.6	2.1	2.4
Vitamin C							
Fruit	82.7	82.6	82.6	Fruit juice, 100%	72.4	68.3	70.8
Grains/Breads	12.1	11.5	11.9	Cold cereal	9.7	8.4	9.2
Other	2.2	3.0	2.5	Citrus fruit	5.1	10.2*	7.1
Milk	1.6	1.7	1.7	Sweet rolls, doughnuts, toaster pastries	2.2	2.8	2.4
Combination Entrees	0.8	0.6	0.7	Juice drinks (not 100% juice)	2.2	2.5	2.3
Accompaniments ^a	0.2	0.4	0.3	Peaches	1.2	1.3	1.2
Meat/Meat Alternate	0.3	0.2	0.3	1% milk, flavored	1.2	1.2	1.2
Vegetables ^b	0.1	0.1	0.1	Bananas	1.1	1.1	1.1
				Apples	0.6	0.9	0.7
				Mexican-style entrees (mainly burritos)	0.3	0.5	0.4

TABLE VII.12 (continued)

Major Food Group	Percentage Contribution to Average Amount Offered			Top 10 Food Sources	Percentage Contribution to Average Amount Offered		
	Elementary Schools	Secondary Schools	All Schools		Elementary Schools	Secondary Schools	All Schools
Calcium							
Milk	69.3	67.5	68.6	1% milk, unflavored	19.6	13.4**	17.2
Grains/Breads	16.2	17.5	16.7	2% milk, unflavored	14.5	15.8	15.0
Fruit	4.4	5.4	4.8	1% milk, flavored	14.5	15.4	14.9
Combination Entrees	4.5	4.8	4.6	Cold cereal	8.9	9.4	9.1
Meat/Meat Alternate	4.9	3.8	4.5	Skim or nonfat milk, flavored	8.4	9.7	8.9
Accompaniments ^a	0.7	0.9	0.7	Whole milk, unflavored	6.0	5.5	5.8
Other	0.0	0.0	0.0	Skim or nonfat milk, unflavored	4.9	5.6	5.2
Vegetables ^b	0.0	0.0	0.0	Fruit juice, 100%	3.6	4.5	4.0
				Yogurt	3.3	2.2	2.9
				Sweet rolls, doughnuts, toaster pastries	1.9	2.9**	2.3
Iron							
Grains/Breads	74.8	74.8	74.8	Cold cereal	47.4	44.7	46.4
Fruit	9.6	8.6*	9.2	Sweet rolls, doughnuts, toaster pastries	8.4	12.4**	9.9
Combination Entrees	6.9	6.8	6.8	Fruit juice, 100%	7.9	7.6	7.8
Milk	5.1	5.7*	5.4	Pancakes, waffles, French toast	4.5	3.5	4.1
Meat/Meat Alternate	2.3	2.2	2.2	White bread, rolls, bagels	2.8	4.2	3.3
Accompaniments ^a	1.1	1.6*	1.3	Buttered toast, bagels with cream cheese	3.0	2.3	2.7
Other	0.1	0.2	0.1	1% milk, flavored	2.3	2.5	2.4
Vegetables ^b	0.1	0.1	0.1	Muffins, sweet/quick breads	2.0	2.6	2.2
				Breakfast sandwiches ^c	1.8	2.4	2.0
				Biscuits, croissants, cornbread	1.8	1.9	1.8

TABLE VII.12 (continued)

Major Food Group	Percentage Contribution to Average Amount Offered			Top 10 Food Sources	Percentage Contribution to Average Amount Offered		
	Elementary Schools	Secondary Schools	All Schools		Elementary Schools	Secondary Schools	All Schools
	Total Fat						
Grains/Breads	35.5	37.1	36.1	Sweet rolls, doughnuts, toaster pastries	10.6	16.4**	13.0
Milk	25.6	22.1**	24.2	2% milk, unflavored	8.3	8.0	8.2
Combination Entrees	16.7	17.2	16.9	Condiments and spreads	6.1	9.9	7.7
Meat/Meat Alternate	13.4	11.4	12.6	Sausages, hot dogs, cold cuts	6.8	6.0	6.4
Accompaniments ^a	6.1	10.1	7.8	Breakfast sandwiches ^c	4.7	7.4	5.8
Fruit	1.6	1.1	1.4	Whole milk, unflavored	5.9	4.8	5.4
Other	0.6	0.5	0.6	Buttered toast, bagels with cream cheese	5.2	3.6	4.5
Vegetables ^b	0.5	0.5	0.5	1% milk, unflavored	5.4	3.3**	4.5
				1% milk, flavored	4.5	4.2	4.4
				Cold cereal	4.2	3.7	4.0
	Saturated Fat						
Milk	44.7	38.8**	42.3	2% milk, unflavored	14.6	14.1	14.4
Grains/Breads	20.6	21.9	21.1	Whole milk, unflavored	9.3	7.6	8.6
Combination Entrees	14.4	15.8	15.0	Condiments and spreads	6.2	11.2	8.2
Meat/Meat Alternate	12.4	10.8	11.7	1% milk, unflavored	9.7	5.9**	8.1
Accompaniments	6.2	11.3	8.3	1% milk, flavored	7.9	7.4	7.7
Fruit	0.8	0.6	0.7	Sweet rolls, doughnuts, toaster pastries	5.7	8.7**	6.9
Other	0.5	0.4	0.5	Sausages, hot dogs, cold cuts	6.1	5.4	5.8
Vegetables ^b	0.4	0.4	0.4	Breakfast sandwiches ^c	4.3	7.1*	5.5
				Pizza and pizza products	3.4	2.5	3.0
				Hot dog, corn dog, sausage sandwiches ^d	3.0	2.4	2.7

TABLE VII.12 (continued)

Major Food Group	Percentage Contribution to Average Amount Offered			Top 10 Food Sources	Percentage Contribution to Average Amount Offered		
	Elementary Schools	Secondary Schools	All Schools		Elementary Schools	Secondary Schools	All Schools
	Cholesterol						
Milk	37.5	31.6**	35.1	2% milk, unflavored	12.0	11.4	11.8
Meat/Meat Alternate	23.2	22.2	22.8	Eggs	11.4	11.8	11.6
Combination Entrees	19.5	24.5	21.6	Breakfast sandwiches ^c	9.9	13.5	11.4
Grains/Breads	16.2	15.9	16.1	1% milk, unflavored	9.9	5.9**	8.3
Accompaniments ^a	2.8	5.4	3.9	Sausages, hot dogs, cold cuts	7.7	6.5	7.2
Other	0.6	0.4	0.6	Whole milk, unflavored	6.4	5.2	5.9
Fruit	0.1	0.0	0.1	1% milk, flavored	5.6	5.1	5.4
Vegetables ^b	0.0	0.0	0.0	Sweet rolls, doughnuts, toaster pastries	3.9	7.3**	5.4
				Pancakes, waffles, French toast	6.9	3.1*	5.3
				Mexican-style entrees (mainly burritos)	4.0	6.6	5.1
	Sodium						
Grains/Breads	50.5	49.1	50.0	Cold cereal	15.6	13.4	14.7
Milk	19.2	17.5**	18.5	Sweet rolls, doughnuts, toaster pastries	6.1	9.5**	7.4
Combination Entrees	15.0	16.5	15.6	Pancakes, waffles, French toast	7.2	5.1*	6.3
Meat/Meat Alternate	8.3	7.6	8.1	Condiments and spreads	5.0	7.9**	6.2
Accompaniments ^a	5.0	8.0**	6.2	Breakfast sandwiches ^c	4.8	7.4	5.8
Other	0.8	0.7	0.8	Biscuits, croissants, cornbread	5.6	6.0	5.8
Fruit	0.9	0.4	0.7	1% milk, flavored	5.1	5.1	5.1
Vegetables ^b	0.2	0.2	0.2	Buttered toast, bagels with cream cheese	5.1	3.7	4.5
				1% milk, unflavored	5.2	3.3**	4.4
				Sausages, hot dogs, cold cuts	4.2	3.7	4.0

TABLE VII.12 (continued)

Major Food Group	Percentage Contribution to Average Amount Offered			Top 10 Food Sources	Percentage Contribution to Average Amount Offered		
	Elementary Schools	Secondary Schools	All Schools		Elementary Schools	Secondary Schools	All Schools
Grains/Breads	50.8	49.9	50.4	Dietary Fiber			
Fruit	23.8	23.6	23.7	Cold cereal	21.7	18.6	20.5
Milk	11.8	14.3*	12.8	Sweet rolls, doughnuts, toaster pastries	5.8	10.1**	7.5
Combination Entrees	7.7	6.9	7.4	1% milk, flavored	7.2	7.9	7.5
Accompaniments ^a	3.4	3.7	3.5	Fruit juice, 100%	5.5	5.3	5.4
Meat/Meat Alternate	1.8	1.0	1.5	Muffins, sweet/quick breads	4.5	5.2	4.8
Vegetables ^b	0.6	0.4	0.5	Apples	3.9	5.4	4.5
Other	0.2	0.2	0.2	Skim or nonfat milk, flavored	3.9	5.3	4.4
				Bananas	3.8	4.0	3.9
				Citrus fruit	2.6	5.6*	3.8
				White bread, rolls, bagels	3.1	4.7	3.7

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes condiments, toppings, spreads, and salad dressing.

^bMainly hash browns and similar potato products.

^cIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

^dIncludes sausage wrapped in a pancake.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

accompaniments (condiments and spreads) at breakfast, and these accompaniments contributed significantly more to vitamin A than in elementary schools. Butter, margarine, ketchup, and salsa were the most commonly offered vitamin A-containing condiments/spreads in SBP breakfasts.

Vitamin C. Not surprisingly, 100% fruit juice was the most important source of vitamin C in SBP breakfasts offered, providing approximately 71 percent of the vitamin C overall. Citrus fruits, mainly fresh oranges, contributed twice as much of the vitamin C in secondary school breakfasts than in elementary school ones (10 versus 5 percent). Fortified breakfast cereals and pastries contributed most of the remaining vitamin C in breakfasts offered (about 12 percent of the total).

Total Fat. Grains and breads were also the major source of fat in breakfasts offered, contributing more than a third (36 percent) of the total fat. Sweet rolls, doughnuts, and toaster pastries were the top contributors from this group and provided a significantly greater share of the fat in secondary school breakfasts than in elementary school breakfasts (16 versus 11 percent).⁷ Milk was the second most important source of total fat in breakfasts offered, contributing 26 percent of the fat in elementary schools and 22 percent in secondary schools. Other top contributors to total fat overall included condiments and spreads, such as butter, margarine, and cream cheese (eight percent); sausages (six percent); and breakfast sandwiches (six percent).

⁷ As a group, sweet rolls, doughnuts, and toaster pastries were also among the top ten sources of vitamins A and C, calcium, iron, and dietary fiber. Several of the commercially prepared products that were offered at breakfast are highly fortified with vitamins and minerals (for example, Super Doughnuts and Super Buns). The finding that sweet rolls, doughnuts, and toaster pastries offered significantly more of most key nutrients in secondary school versus elementary school breakfasts is consistent with the fact that they were also offered twice as often in middle and high school breakfast menus (40 to 44 percent) compared to elementary school menus (21 percent; Table V.7).

Saturated Fat. Milk provided approximately 45 percent of the average saturated fat content of breakfasts offered in elementary schools and 39 percent in secondary schools. Whole and 2% unflavored milks were the top two sources of saturated fat for all schools combined, but 1% unflavored milk contributed significantly more to the saturated fat content of SBP breakfasts in elementary (10 percent) compared to secondary schools (6 percent). Grains and breads contributed 21 percent of the saturated fat in breakfasts offered overall, and combination entrees contributed another 15 percent. Sweet rolls, doughnuts, and toaster pastries and breakfast sandwiches were the most important sources of saturated fat among these food groups, especially in secondary school breakfasts.

Sodium. Half of the sodium in SBP breakfasts offered in school year 2004–2005 came from bread and grain products. The major contributors of sodium from this group included cold cereals; sweet rolls, doughnuts, and toaster pastries; pancakes, waffles, and French toast; and biscuits, croissants, and cornbread. Most of the remaining sodium came from milk (19 percent), combination entrees (16 percent), and meat/meat alternates, such as sausage (8 percent). Condiments and spreads were another important source of sodium in breakfasts offered, particularly in secondary schools (eight percent).

Cholesterol. About 44 percent of the average cholesterol offered in SBP breakfasts came from meat, meat alternatives, and combination entrees, including eggs, breakfast sandwiches containing egg, meat, and/or cheese, and sausages. Milk provided another 35 percent of total cholesterol. Pancakes, waffles, and French toast were more likely to contribute cholesterol to the breakfasts in elementary schools than those offered in secondary schools (seven versus three percent).

Calcium. Milk was the source of more than two-thirds of the calcium in SBP breakfasts offered (69 percent). Another 17 percent of total calcium was supplied by grain/bread products,

with fortified breakfast cereals and pastries among the top 10 sources. Yogurt contributed just three percent to the calcium content of SBP breakfasts.

Iron. Three-quarters of the average iron content of breakfasts offered were from enriched grains and breads, and more than half of this amount was from breakfast cereals (46 percent), some of which were also iron-fortified. Fruit juice (100% juice) was also among the top three breakfast sources of iron. Meats were relatively uncommon in SBP breakfast menus; thus, they were not a particularly important source of iron at breakfast (less than two percent of total).

Dietary Fiber. Grains and breads contributed half of the total dietary fiber in SBP breakfasts. Cold cereals (some with whole-grain ingredients); breakfast pastries; muffins and quick breads; and white bread, rolls, and bagels were among the top 10 fiber sources.⁸ As noted earlier, graham crackers were also a source of fiber in SBP breakfasts, contributing about two percent of the total (Table E-VII.37). Fruit (apples, bananas, and oranges) and 100% fruit juice made a substantial contribution to breakfast fiber (24 percent). Another 13 percent of the dietary fiber in breakfasts offered was supplied by flavored (primarily, chocolate) low-fat and skim milk.

⁸ Whole-grain breads/rolls were not commonly offered at breakfast and supplied only one percent of the fiber total (Table E-VII.37).

VIII. CHANGES IN THE NUTRIENT CONTENT OF NSLP AND SBP MEALS SINCE SCHOOL YEAR 1998–1999

Until 1995, the overall nutrition goal for school meals provided through the National School Lunch Program (NSLP) and School Breakfast Program (SBP) was to provide 33 percent of the 1989 Recommended Dietary Allowances (RDA) for energy (calories) and key nutrients at lunch and 25 percent of the RDA at breakfast.¹ While school meals had generally met these goals, the first School Nutrition Dietary Assessment Study (SNDA-I), conducted in school year 1991–1992, found that NSLP lunches were not consistent with the 1990 *Dietary Guidelines for Americans* recommendations concerning total fat and saturated fat (Burghardt and Devaney 1995).² At the time, Federal program regulations did not require that school meals meet the *Dietary Guidelines*' fat goals.

In response to the SNDA-I findings, USDA and Congress worked to incorporate the *Dietary Guidelines* recommendations into Federal regulations for the NSLP and SBP. In 1995, these efforts culminated in regulations establishing the School Meals Initiative for Healthy Children (SMI) and nutrient standards that required schools to reduce the fat content of NSLP and SBP meals to no more than 30 percent of energy from total fat and less than 10 percent from saturated fat. In addition to meeting these 1995 *Dietary Guidelines* fat goals, under SMI, lunches were still to provide 33 percent of the RDA and breakfasts to provide 25 percent of the RDA for energy, protein, vitamin A, vitamin C, calcium, and iron. The SMI regulations also encouraged

¹ This goal of 25 percent of the RDA for breakfast was not officially established in regulations until 1995; however, it was used as a guideline in developing the meal patterns and assessing the SBP. The RDA for energy is also called the Recommended Energy Allowance (REA).

² SNDA-I also found that, on average, school lunches contained a higher-than-recommended level of sodium and that school breakfasts exceeded the benchmark level of cholesterol, as well as the *Dietary Guidelines* goal for saturated fat (Burghardt et al. 1993a).

reductions in sodium and cholesterol, and increases in dietary fiber, without setting quantitative standards.

The 1995 SMI introduced new procedures for planning and evaluating school meals based on their nutrient content. SMI regulations required that a *weighted* nutrient analysis of the average meal *served* to students be used by schools using nutrient-standard menu planning and by State agencies conducting SMI reviews to monitor compliance with the new nutrient standards. A 2003 waiver that exempted schools and State agencies from the requirement to use weighted averages for nutrient analysis has been extended until September 30, 2009.³

In school year 1998–1999, early in the period of SMI implementation, USDA sponsored the second School Nutrition Dietary Assessment Study (SNDA-II) to determine how schools were progressing toward meeting the new standards. The main SNDA-II findings were that (1) meaningful progress had been made since school year 1991–1992 toward satisfying the new SMI standards for energy from fat and saturated fat in NSLP lunches served, but the fat content still exceeded recommended levels at most schools; (2) breakfasts served in the SBP already met most of the SMI standards; and (3) both NSLP and SBP meals served continued to provide one-third and one-fourth, respectively, of the 1989 RDAs for targeted nutrients, except for energy in SBP breakfasts, which was below the goal of one-fourth of the 1989 REA (Fox et al. 2001).

This chapter examines changes in the average food energy and nutrient composition of NSLP lunches and SBP breakfasts from school year 1998–1999, when SNDA-II data were collected, to school year 2004–2005, when the SNDA-III data collection took place. In particular, it provides important information on what progress schools have made during this

³ The purpose of the waiver is to provide school food authorities (SFAs) and schools with additional time to become experienced with this method of nutrient analysis, which accounts for the number and types of foods actually selected by students and is the preferred method for the nutrient analysis of school meals (Office of the Federal Register 2004).

period—an additional six years of SMI implementation—toward serving school meals that meet the SMI nutrient standards. Information on the rate of change in school meal nutrient content and shifts in the direction of change over time may be useful in planning future school nutrition policies and targeting educational and technical resources made available to schools.

The four main research questions motivating the analyses reported in this chapter are:

1. How has the percentage of schools serving NSLP lunches that meet the SMI nutrient standards and related nutrition benchmarks changed since school year 1998–1999, when the SNDA-II study was conducted?
2. What are the changes in the average energy and nutrient composition of NSLP lunches served between school years 1998–1999 and 2004–2005?
3. How has the percentage of schools offering students the opportunity to select a low-fat lunch (that is, an average lunch consistent with the *Dietary Guidelines* goal of no more than 30 percent of energy from total fat) changed since school year 1998–1999? What are the trends in the average energy and nutrient content of the lowest-percent-fat lunches available to students?
4. What are the changes in the percentage of schools that met the SMI standards and related benchmarks and the average energy and nutrient composition of SBP breakfasts served between school years 1998–1999 and 2004–2005?

Many factors may have contributed to changes in school meal nutrient content. Focused training of school foodservice staff, ongoing technical assistance, and regular State monitoring of compliance with nutrient standards (SMI reviews) have led to modifications in menu planning, food purchasing, and food preparation procedures used by school foodservice staff. There have also been changes in the availability and formulation of commercial products prepared specifically for school foodservice and in USDA commodity foods. Another possible factor is changes in students' preferences for the foods offered and, consequently, their food selection patterns. In addition, differences in the data collection and nutrient analysis methodologies used in the two studies may have influenced observed changes. Similarities and differences in study methodology are discussed in Section B.

A. SUMMARY OF FINDINGS

NSLP LUNCHES

- From 60 to 100 percent of schools served lunches that met or exceeded one-third of the 1989 REA/RDA for each specific SMI target nutrient—food energy, protein, vitamins A and C, calcium, and iron—in the 2004–2005 school year, except for energy and vitamin A in secondary schools. The proportion of schools serving NSLP lunches in school year 2004–2005 that satisfied, on average, the SMI standards for these nutrients was similar to school year 1998–1999.
- In school year 2004–2005, significantly more schools satisfied the SMI standard for energy from saturated fat in NSLP lunches than in school year 1998–1999 (increasing from 15 to 34 percent for elementary schools, and from 13 to 24 percent for secondary schools). The share of schools meeting the standard for energy from total fat (about one-quarter of elementary schools and one-eighth of secondary schools) did not change significantly.
- There was a statistically significant reduction in the percentage of secondary schools (from 65 to 40 percent) that served lunches consistent with the vitamin A standard from school year 1998–1999 to 2004–2005. Available food sources of vitamin A were similar (milk, vegetables, entrees), which may indicate that students' preferences or selection patterns had changed between the two time points.
- As in school year 1998–1999, both elementary and secondary schools served lunches with acceptable levels of cholesterol, on average, in school year 2004–2005. In contrast, the average sodium content of NSLP lunches served at both time points greatly exceeded the recommended maximum of 800 milligrams (mg).
- In school year 2004–2005, 93 percent of elementary schools and 86 percent of secondary schools *offered* students the opportunity to select lunches that were low in fat—that is, options for a complete lunch that provided, on average, no more than 30 percent of energy from total fat. Low-saturated-fat lunch options (containing an average of less than 10 percent of energy from saturated fat) were offered by 9 in 10 schools (92 percent) in school year 2004–2005.

SBP BREAKFASTS

- Except for vitamin C and iron, SBP breakfasts served in school year 2004–2005 were equally likely to provide one-fourth of the 1989 REA/RDA for energy and key nutrients as in school year 1998–1999. The proportion of elementary schools that met the vitamin C requirement was significantly lower (87 percent), and the proportion of secondary schools that satisfied the iron requirement was higher (78 percent) in school year 2004–2005.

- Between school years 1998–1999 and 2004–2005, there was a significant increase in the percentage of all schools that met the SMI standard for energy from saturated fat in SBP breakfasts served and, among elementary schools, in the percentage meeting the standard for energy from total fat. In 2004–2005, approximately two-thirds of all schools satisfied the *Dietary Guidelines* goal for saturated fat, and close to 9 in 10 elementary schools did so for total fat.
- In both school years 1998–1999 and 2004–2005, at least 90 percent of elementary schools and 76 percent of secondary schools served breakfasts that were consistent with recommended levels of cholesterol. There was no change in the share of schools serving less than the suggested maximum for sodium, although the average sodium content of SBP breakfasts served in secondary schools had increased by 149 milligrams (22 percent) since 1998–1999.

B. OVERVIEW OF DATA AND METHODS

1. Data Sources

The SNDA-III and SNDA-II Menu Surveys, completed by school foodservice managers in all schools participating in the respective studies, provided the data required to assess changes in the nutrient content of NSLP and SBP meals.⁴ In both studies, detailed information was recorded for all foods and beverages offered to students (excluding items that were available only on an a la carte basis) during a typical school week. For SNDA-II, most of the menu data collection took place between September and December 1998, with some schools completing the survey in spring 1999. As noted in previous chapters of this report, the SNDA-III menu data collection period spanned from January through June 2005.

For this comparison, during the design and implementation of SNDA-III, every attempt was made to minimize the potential effects of differences in sample selection, data collection, and data analysis. For example, the sample frames for both studies included only public schools participating in the NSLP, and sampling methods were comparable. The menu surveys used in

⁴ SNDA-II produced nationally representative estimates of the nutrient content of USDA meals served by public elementary, middle, and high schools in the 1998–1999 school year (Fox et al. 2001). A total of 1,075 schools (430 SFAs) provided menu data for SNDA-II.

both studies were primarily mail surveys, with technical assistance provided by telephone. Although the basic format of the menu survey did not differ, two enhancements to the SNDA-II forms were implemented for SNDA-III: (1) commonly offered items within the meal component categories were preprinted to reduce burden on the cafeteria managers and the likelihood of omitting foods offered, and (2) columns were added to allow flexibility in reporting data used to determine the number of portions of each menu item served to students in USDA-reimbursable meals. Ultimately, in both studies, project staff telephoned cafeteria managers in a number of schools to obtain “best estimates” of reimbursable versus a la carte servings data.

Both SNDA-II and SNDA-III used the same set of default portion sizes when data were missing or reported as “self-serve,” with one exception.⁵ Based on data from the 1994–1996, 1998 Continuing Survey of Food Intakes by Individuals, the default portion size for salad dressing was increased from three-quarters of a tablespoon to two tablespoons to better reflect the average portion consumed by school-age children. Consequently, an analysis of the SNDA-III data using the three-quarters of a tablespoon default was conducted to determine the effect of this difference on the comparisons reported in this chapter. Because the differences were minimal and did not affect conclusions about changes in the nutrient composition of school meals, results are reported as they were for Chapter VI—based on the two-tablespoon default for salad dressing.

USDA’s standard reference nutrient database (the most current versions available at each time point) was the main source of nutrient data for both the SNDA-II and SNDA-III studies. The nutrient database used in SNDA-II (Child Nutrition Database, Release 3) was specifically

⁵ Both studies used the same approach to coding self-serve salad bars. Procedures for coding menu data for SNDA-III are described in detail in Volume III of this report, *School Nutrition Dietary Assessment-III: Sampling and Data Collection Methods*, and procedures for SNDA-II are in Appendix E of the SNDA-II final report (Fox et al. 2001).

developed for use with Nutrient Standard Menu Planning software and also included standard USDA quantity recipes and nutrient information for many commercially prepared products used in school foodservice. Additional recipes prepared by the schools were entered and analyzed with the same database; nutrient information for commercial products not in the database was obtained from school foodservice personnel or manufacturers. The USDA Survey Net software and Food and Nutrient Database for Dietary Studies were used for SNDA-III. This system was developed for the analysis of dietary intake data and, therefore, did not include nutrient information for recipes and commercial products used by school foodservice personnel. Some modification of existing recipes in the database was possible—for example, substituting lower-fat ingredients for higher-fat ones. Nutrient information for the most commonly offered commercial products was obtained from manufacturers and imputed for others.⁶

Differences in coding procedures and the nutrient analysis software and databases used in SNDA-II and SNDA-III may have contributed to the observed differences (or lack thereof) reported here. Despite efforts to limit them, differences in data collection procedures and in the time of year in which data were collected may also have been factors.

2. Analysis Method

Most comparisons presented in this chapter are based on *weighted* nutrient analyses of school lunch and breakfast menus from SNDA-II and SNDA-III. As described in Chapter VI and Appendix C, a weighted analysis takes into account the number and types of foods selected by students, and provides an estimate of the average meal *served* to students. Daily values for the average meal served were averaged across the week to determine the overall school average.

⁶ The procedure for coding and estimating nutrients for commercially prepared items for SNDA-III is described in Volume III of this report, *School Nutrition Dietary Assessment-III: Sampling and Data Collection Methods*.

Weekly averages were then compared to the SMI nutrient standards for NSLP and SBP meals and to related nutrition benchmarks. For both SNDA-II and SNDA-III, RDA-based standards were weighted to reflect the actual grades (and associated ages of students) in each school.⁷

Changes in the nutrient content of school lunches and breakfasts were assessed for meals *as served*, for several reasons. A comparison of the average nutrient content of NSLP and SBP meals *served* to SMI standards was the primary focus of SNDA-II. In addition, despite the availability of a waiver, program regulations required that a weighted nutrient analysis be used by State agencies for SMI reviews and by schools planning menus with a nutrient-based system. Furthermore, because it was not possible to reanalyze the SNDA-II data for this report, the standard errors required for comparisons with SNDA-III data were obtained from the final SNDA-II study report and were available for the average nutrients in meals served but not for meals offered.

The statistical significance of differences between lunches and breakfasts served in school year 2004–2005 (SNDA-III) and school year 1998–1999 (SNDA-II) was determined, for selected comparisons, on the basis of two-tailed t-tests.⁸ The differences discussed in the text are significant at least at the .05 level. The data for middle and high schools were combined to make comparison with SNDA-II easier; thus, data are reported separately for elementary schools and all secondary schools.

⁷ Note that this approach differs from the procedure used in SMI reviews, which is based on the age/grade groups the SFA or school used to plan their menus, and may yield slightly different results for some schools. See Appendix C for further discussion of these methods.

⁸ Statistical tests were conducted on the assumption that the design effect for both surveys was 1.5, as no design effect information for SNDA-II was available. Where standard errors for SNDA-II estimates were missing, the standard errors for the comparable SNDA-III estimates were substituted. The result is likely to be a more conservative estimate of the actual standard errors, because the sample sizes were considerably larger for the SNDA-II study.

3. Standards Used to Assess Nutrient Content

Both SNDA-II and SNDA-III were conducted after the establishment of the 1995 SMI nutrient standards, which are based on the 1989 RDAs and the 1995 *Dietary Guidelines for Americans*. Thus, the nutrient content of the average lunch and breakfast served in each school is compared to the SMI nutrient standards, as well as to related nutrition benchmarks—the same benchmarks used to assess NSLP and SBP meals in Chapters VI and VII (Tables VI.1 and VII.1). The NSLP and SBP standards and related benchmarks are also shown in the relevant tables for easy reference. Changes in the dietary fiber content of schools meals and in nutrients that were not targeted by SMI could not be analyzed, because they were not assessed in SNDA-II.

The next section of this chapter (Section C) presents key findings from three analyses of changes between school years 1998–1999 and 2004–2005 in (1) the proportions of schools that served NSLP lunches that satisfied SMI nutrient standards and related benchmarks; (2) the mean amounts of energy and nutrients in lunches served; and (3) the distributions of energy from total fat and saturated fat, and the sodium content of the average lunch. Section D contains findings from analyses of the availability and nutrient content of the lowest-percent-fat and lowest-percent-saturated-fat lunches. Section E presents information on changes in the proportion of schools that served SBP breakfasts that satisfied SMI standards and the average energy and nutrient content of the breakfasts served between school years 1998–1999 and 2004–2005.

C. CHANGES IN THE ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES SERVED, SCHOOL YEAR 1998–1999 AND SCHOOL YEAR 2004–2005

To assess changes in the extent to which NSLP lunches served were consistent with SMI standards and related nutrition benchmarks, two types of comparisons of data from school year 2004–2005 and school year 1998–1999 were made. First, comparisons were made of the

percentages of individual schools in both school years that served NSLP lunches that met each of the SMI standards and benchmarks. Second, the mean energy and nutrient content of the average lunch served at each time point was compared. Differences in the estimates between time points are discussed by nutrient or group of nutrients in the subsections that follow.

1. Energy and Nutrient Content Relative to SMI Standards

The analysis of changes in energy and nutrient content of NSLP lunches served to students between school years 1998–1999 and 2004–2005 identified a statistically significant increase in the percentage of schools meeting the SMI standard for energy from saturated fat. However, the study detected no other substantive progress toward meeting SMI goals after an additional six years of SMI implementation.

Food Energy. There were no statistically significant differences in the proportions of elementary or secondary schools serving NSLP lunches that satisfied the SMI standard for food energy between school year 1998–1999 and school year 2004–2005 (Table VIII.1). Elementary schools were still considerably more likely than secondary schools to serve lunches that met the energy standard (60 versus 30 percent of schools). As Table VIII.2 shows, the mean energy content of the lunches served in secondary schools did increase slightly, from 30 percent of the 1989 REA in school year 1998–1999 to 31 percent of the REA in school year 2004–2005. While the change was relatively small, it was statistically significant and brought the average energy content of secondary school lunches served closer to the 33 percent of the REA standard.

TABLE VIII.1

PROPORTION OF SCHOOLS SERVING NSLP LUNCHES IN SY 1998–1999 AND SY 2004–2005 THAT SATISFIED SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS

NSLP Standard/ Recommendation	SY 2004–2005 (SNDA-III)		SY 1998–1999 (SNDA-II)		Difference (SY 2004– 2005 – SY 1998– 1999)		
	Mean	SE	Mean	SE	Mean	SE	
ELEMENTARY SCHOOLS							
Food energy (calories)	33% of 1989 REA	60	4.8	68	4.8	-8	6.7
Protein	33% of 1989 RDA	100	0.0	100	0.0	0	0.0
Vitamin A	33% of 1989 RDA	91	2.5	98	2.5	-7	3.5
Vitamin C	33% of 1989 RDA	75	4.6	86	4.6	-11	6.4
Calcium	33% of 1989 RDA	98	1.2	100	1.2	-2	1.7
Iron	33% of 1989 RDA	96	1.8	93	1.8	3	2.6
Percentage of energy from total fat	≤ 30%	25.6	4.44	21.0	4.44	4.8	6.26
Percentage of energy from saturated fat	< 10%	33.7	4.71	15.0	4.71	18.7*	6.62
Cholesterol	< 100 mg	99	0.6	99	0.6	<1	0.9
Sodium	< 800 mg	1	0.6	1	0.6	<1	0.9
Number of Schools		145		398			
SECONDARY SCHOOLS							
Food energy (calories)	33% of 1989 REA	30	4.4	20	4.4	10	6.2
Protein	33% of 1989 RDA	100	0.0	100	0.0	0	0.0
Vitamin A	33% of 1989 RDA	40	4.9	65	4.9	-25*	6.9
Vitamin C	33% of 1989 RDA	71	4.3	79	4.3	-8	6.1
Calcium	33% of 1989 RDA	82	3.1	86	3.1	-4	4.4
Iron	33% of 1989 RDA	61	4.5	60	4.5	1	6.3
Percentage of energy from total fat	≤ 30%	12.1	2.83	14.0	2.83	-1.9	3.68
Percentage of energy from saturated fat	< 10%	24.4	3.85	13.0	3.85	11.4*	5.42
Cholesterol	< 100 mg	100	0.5	96	0.5	3*	0.2
Sodium	< 800 mg	0	0.2	1	0.2	-1*	0.3
Number of Schools		252		677			

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP) and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 (Fox et al. 2001, Exhibits 3.5, 3.7 and A.4).

SY = school year; SE = standard error; SMI = School Meals Initiative for Healthy Children; REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance.

*Difference between SY 2004–2005 and SY 1998–1999 is significantly different from zero at the .05 level.

TABLE VIII.2

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES SERVED IN SY 1998–1999 AND SY 2004–2005
RELATIVE TO SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS

NSLP Standard/ Recommendation	SY 2004–2005 (SNDA-III)		SY 1998–1999 (SNDA-II)		Difference (SY 2004–2005 – SY 1998–1999)		
	Mean	SE	Mean	SE	Mean	SE	
ELEMENTARY SCHOOLS							
Mean Percentage of 1989 REA/RDA							
Food energy (calories)	33%	34	0.4	35	0.3	-1	0.5
Protein	33%	99	1.4	105	0.9	-6*	1.7
Vitamin A	33%	50	1.6	67	2.5	-17*	2.9
Vitamin C	33%	49	2.2	59	2.8	-10*	3.5
Calcium	33%	58	0.9	58	0.5	<1	1.0
Iron	33%	41	0.6	44	0.6	-3*	0.9
Mean Percentage of Energy From:							
Total fat	≤ 30%	32.9	0.41	33.1	0.30	<1	0.51
Saturated fat	< 10%	10.8	0.13	11.9	0.10	-1.1*	0.16
Mean Amount							
Cholesterol	< 100 mg	58	1.2	65	0.9	-7*	1.5
Sodium	< 800 mg	1,278	22.3	1,259	15.3	19	27.3
Number of Schools		145		398			
SECONDARY SCHOOLS							
Mean Percentage of 1989 REA/RDA							
Food energy (calories)	33%	31	0.4	30	0.2	1*	0.4
Protein	33%	62	0.7	64	0.4	-2*	0.8
Vitamin A	33%	34	1.1	43	1.1	-9*	1.5
Vitamin C	33%	48	2.0	54	1.5	-6*	2.5
Calcium	33%	39	0.5	40	0.3	-1	0.6
Iron	33%	35	0.4	35	0.3	<1	0.5
Mean Percentage of Energy From:							
Total fat	≤ 30%	35.5	0.42	34.5	0.20	1.0*	0.47
Saturated fat	< 10%	11.1	0.13	12.1	0.10	-1.1*	0.16
Mean Amount							
Cholesterol	< 100 mg	63	1.0	68	1.0	-5*	1.4
Sodium	< 800 mg	1,470	26.7	1,382	14.5	74*	30.3
Number of Schools		252		677			

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP) and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 (Fox et al. 2001, Exhibits A.1 and A.2).

SY = school year; SE = standard error; ;SMI = School Meals Initiative for Healthy Children; REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance.

*Difference between SY 2004–2005 and SY 1998–1999 is significantly different from zero at the .05 level.

Target Nutrients. Compared to school year 1998–1999, NSLP lunches served in 2004–2005 were generally as likely to satisfy the SMI standards for protein, vitamin C, calcium, and iron (Table VIII.1). The majority of both elementary and secondary schools (60 to 100 percent) served lunches that met the standards for these nutrients at both points in time. While statistically significant decreases in the mean percentage of RDA were observed for most of the target nutrients (Table VIII.2), this did not result in significantly fewer schools meeting the SMI standards. An exception is vitamin A, where 25 percent fewer secondary schools served lunches that met the standard for vitamin A in school year 2004–2005 than in school year 1998–1999. Not surprisingly, the mean percentage of 1989 RDA for vitamin A in lunches served by secondary schools decreased over the six-year period, from 43 to 34 percent of the RDA (Table VIII.2).

The main food sources of vitamin A in lunches *served* to students in school year 1998–1999 were vegetables (39 percent), low-fat or nonfat milk (29 percent), and combination entrees (20 percent; Fox et al. 2001). Comparable analyses have not been conducted for NSLP lunches as *served* in school year 2004–2005. The top contributors to the vitamin A content of lunches *offered* in secondary schools in the 2004–2005 school year were the same: milk (32 percent from low-fat or skim), vegetables (31 percent), and combination entrees (20 percent; Appendix D, Table D-VI.22). However, secondary school students may not have been as likely to select those items highest in vitamin A in 2004–2005. Differences in the nutrient databases used for the two SNDA studies may also be contributing to the apparent change in the vitamin A content of NSLP lunches served since school year 1998–1999.

Percentage of Energy from Total Fat and Saturated Fat. More than twice as many elementary schools in school year 2004–2005 as in school year 1998–1999 served an average NSLP lunch that met the SMI standard for energy from saturated fat (34 versus 15 percent; Table

VIII.1). A similarly large increase in the proportion of schools meeting the saturated fat standard was observed at the secondary school level (24 versus 13 percent). Despite these favorable and statistically significant changes in the saturated fat content of NSLP lunches served, most schools in 2004–2005 were still not meeting the *Dietary Guidelines*-based standards for energy from saturated fat or total fat.

On average, the amount of energy derived from saturated fat in lunches served decreased by one percentage point, from approximately 12 percent in school year 1998–1999 to 11 percent in school year 2004–2005 (Table VIII.2). The change in saturated fat was statistically significant for both elementary and secondary schools and is consistent with a reduction in the prevalence of whole milk on lunch menus *offered* during the same period (50 percent in school year 1998–1999 and 31 percent in school year 2004–005). In contrast, the average amount of energy derived from total fat in lunches served by secondary schools increased slightly (from 34.5 to 35.5 percent of energy) and was unchanged among elementary schools (33 percent at both time points).

2. Nutrient Content Relative to Other Dietary Benchmarks

As discussed previously in this report, schools participating in the NSLP are not required to serve lunches that meet specific quantitative nutrition standards for cholesterol or sodium but are encouraged to keep levels of these dietary components low in planned menus. Findings from SNDA-III indicate that, in school year 2004–2005, virtually all schools served NSLP lunches with acceptable levels of cholesterol (Table VIII.1). The average amount of cholesterol in lunches served in school year 1998–1999 was already well below the benchmark of no more than 100 mg, adapted from the National Research Council’s (NRC’s) 1989 recommendation for daily cholesterol intake of no more than 300 mg (Table VIII.2). Furthermore, statistically significant reductions in mean cholesterol levels occurred for both elementary and secondary schools.

The picture for sodium is quite different, as essentially no schools at either time point served NSLP lunches that were consistent with the recommended maximum level of sodium (one percent in both years; Table VIII.1). The mean sodium content of secondary school lunches was significantly higher in school year 2004–2005 than in school year 1998–1999 and nearly double the suggested maximum recommended by the NRC (1,470 mg versus 800 mg sodium; Table VIII.2). For elementary schools, there was no significant change in the sodium content of NSLP lunches served, but mean levels still exceeded one-third of the recommended daily intake (800 mg).

Salt (sodium chloride) used in food preparation, the frequent use of commercially prepared food items, and differences in the coding procedures and nutrient databases used to analyze the school menu data are among the factors that may have contributed to the increase in the sodium content of NSLP lunches. This study and previous national studies of the dietary intakes of schoolchildren have consistently found that sodium intakes exceed recommended levels (Gleason and Suitor 2001a). High sodium intakes are a problem for most subgroups of the U.S. population (Moshfegh et al. 2005).

3. Mean Energy and Nutrient Content

Changes from school year 1998–1999 to 2004–2005 in the average amounts of food energy (calories); total fat, saturated fat, and protein (in grams); and target vitamins and minerals in lunches served to students were generally consistent with the results of comparisons with SMI nutrient standards and related benchmarks (Table VIII.3). The statistically significant increase in the average energy content of NSLP lunches served in secondary schools (41 calories) was associated with small, but significant, increases in average total fat and carbohydrate. Secondary school lunches served in school year 1998–1999 contained, on average, 28 grams of fat and

TABLE VIII.3
MEAN FOOD ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES SERVED TO
STUDENTS IN SY 1998–1999 AND SY 2004–2005

	SY 2004–2005 (SNDA-III)		SY 1998–1999 (SNDA-II)		Difference ^a (SY 2004–2005 - SY 1998–1999)	
	Mean	SE	Mean	SE	Mean	SE
ELEMENTARY SCHOOLS						
Food energy (calories)	676	8.3	695	6.9	-19	10.8
Total fat (g)	25	0.5	26	0.3	-1	0.6
Saturated fat (g)	8	0.1	9	0.2	-1*	0.2
Carbohydrate (g)	88	1.3	89	1.1	-1	1.7
Protein (g)	28	0.3	29	0.2	-1*	0.4
Percentage of energy from total fat (%)	32.9	0.4	33.1	0.3	-0.2	0.5
Percentage of energy from saturated fat (%)	10.8	0.1	11.9	0.1	-1.1*	0.2
Vitamin A (mcg RE)	324	10.0	437	15.7	-113*	18.6
Vitamin C (mg)	22	1.0	27	1.3	-5*	1.6
Calcium (mg)	483	6.7	478	4.0	5	7.8
Iron (mg)	4.3	0.1	4.4	0.1	-0.1	0.1
Cholesterol (mg)	58	1.2	65	0.9	-7*	1.5
Sodium (mg)	1,278	22.3	1,259	15.3	19	27.3
Number of Schools	145		398			
SECONDARY SCHOOLS						
Food energy (calories)	765	9.9	724	5.5	41*	11.3
Total fat (g)	31	0.7	28	0.3	3*	0.7
Saturated fat (g)	9	0.2	10	0.1	-1*	0.2
Carbohydrate (g)	96	1.3	91	0.9	5*	1.6
Protein (g)	29	0.3	30	0.2	-1	0.4
Percentage of energy from total fat (%)	35.5	0.4	34.5	0.2	1.0*	0.5
Percentage of energy from saturated fat (%)	11.1	0.1	12.1	0.1	-1.1*	0.2
Vitamin A (mcg RE)	306	9.4	390	10.1	-84*	13.8
Vitamin C (mg)	26	1.1	29	0.8	-3*	1.3
Calcium (mg)	468	6.4	475	3.9	-7	7.5
Iron (mg)	4.7	0.1	4.7	0.0	0.0	0.1
Cholesterol (mg)	63	1.0	68	1.0	-5*	1.4
Sodium (mg)	1,470	26.5	1,382	14.5	88*	30.2
Number of Schools	252		677			

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP) and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 (Fox et al. 2001, Exhibit A.1).

SY = school year; SE = standard error; RE = Retinol equivalents

*Difference between SY 2004–2005 and SY 1998–1999 is significantly different from zero at the .05 level.

91 grams of carbohydrate, compared to 31 grams of fat and 96 grams of carbohydrate in the average lunch served in school year 2004–2005.

4. Distribution of Total Fat, Saturated Fat, and Sodium

Another way to measure progress toward satisfying the SMI standards for energy from fat and recommended levels of sodium is to compare the distributions of these dietary components in NSLP lunches served in school years 1998–1999 and 2004–2005. As Tables VIII.4 and VIII.5 show, for elementary and secondary schools, respectively, the distributions have shifted toward lower levels of energy from saturated fat. In addition to the larger share of schools that served lunches with less than 10 percent of energy from saturated fat, 7 percentage points more elementary schools and 15 percentage points more secondary schools served NSLP lunches that were approaching this benchmark (that is, the lunches provided between 10 and 12 percent of energy from saturated fat) in school year 2004–2005. Moreover, whereas 15 percent of both elementary and secondary schools in school year 1998–1999 served NSLP lunches with levels of saturated fat at the higher end of the distribution (in excess of 14 percent of energy), effectively no schools in school year 2004–2005 served lunches with this much energy from saturated fat.

Changes over time for energy from total fat differed somewhat by school level. The distribution of energy from total fat in lunches served in elementary schools was essentially the same in school years 1998–1999 and 2004–2005 (Table VIII.4). In secondary schools, the shift was, surprisingly, in the direction of more schools serving lunches with the higher percentages of energy derived from total fat (more than 34 percent) in school year 2004–2005 than in 1998–1999 (64 versus 52 percent of schools; Table VIII.5). This result suggests that, among secondary schools, mean total fat in NSLP lunches served increased proportionately more than mean energy over the six years between SNDA studies.

TABLE VIII.4

DISTRIBUTION OF THE TOTAL FAT, SATURATED FAT, AND SODIUM CONTENT OF
NSLP LUNCHES SERVED IN SY 1998–1999 AND SY 2004–2005
ELEMENTARY SCHOOLS

	Percentage of Schools		
	SY 2004–2005 (SNDA-III)	SY 1998–1999 (SNDA-II)	Difference (SY 2004–2005 – SY 1998–1999)
Percentage of Energy from Total Fat			
No more than 30%	26	21	5
30.1 – 34.0%	35	41	-6
34.1 – 38.0%	32	28	4
More than 38.0%	7	11	-4
Percentage of Energy from Saturated Fat			
Less than 10%	34	15	19*
10.1 – 12.0%	45	38	7
12.1 – 14.0%	20	31	-11
More than 14.0%	0	15	-15
Sodium			
800 mg or less	1	1	0
801 – 1,000 mg	8	8	0
More than 1,000 mg	91	92	-1
Number of Schools	145	398	

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP) and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 (Fox et al. 2001, Exhibits 3.7 and A.4).

Note: Shaded rows indicate differences that were tested for statistical significance and represent the targets defined by SMI standards, or, for sodium, one-third of the National Research Council recommendation for daily intake.

SY = school year; SMI = School Meals Initiative for Healthy Children.

*Difference between SY 2004–2005 and SY 1998–1999 is significantly different from zero at the .05 level.

TABLE VIII.5

DISTRIBUTION OF THE TOTAL FAT, SATURATED FAT, AND SODIUM CONTENT OF
NSLP LUNCHES SERVED IN SY 1998–1999 AND SY 2004–2005
SECONDARY SCHOOLS

	Percentage of Schools		
	SY 2004–2005 (SNDA-III)	SY 1998–1999 (SNDA-II)	Difference (SY 2004–2005 – SY 1998–1999)
Percentage of Energy from Total Fat			
No more than 30%	12	14	-2
30.1 – 34.0%	24	34	-10
34.1 – 38.0%	38	33	5
More than 38.0%	26	19	7
Percentage of Energy from Saturated Fat			
Less than 10%	24	13	11*
10.1 – 12.0%	51	36	15
12.1 – 14.0%	24	36	-12
More than 14.0%	1	15	-14
Sodium			
800 mg or less	0	1	-1*
801 – 1,000 mg	6	3	3
More than 1,000 mg	94	97	-3
Number of Schools	252	677	

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP) and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 (Fox et al. 2001, Exhibits 3.7 and A.4).

Note: Shaded rows indicate differences that were tested for statistical significance and represent the targets defined by SMI standards, or in the case of sodium, one-third of the National Research Council recommendation for daily intake.

SY = school year; SMI = School Meals Initiative for Healthy Children.

*Difference between SY 2004–2005 and SY 1998–1999 is significantly different from zero at the .05 level.

D. AVAILABILITY AND NUTRIENT CONTENT OF LOW-FAT AND LOW-SATURATED-FAT LUNCHES

Increasing students' access to lower-fat meals, especially lower-fat lunches, has been a particular focus of SMI. Even among schools where the *average* NSLP lunch is not consistent with the *Dietary Guidelines* goals of no more than 30 percent of energy from total fat and less than 10 percent of energy from saturated fat, students may be able to select lunches that meet these standards if low-fat or low-saturated-fat menu items are available. To assess the relative availability of low-fat lunches, defined as lunches containing no more than 30 percent of energy from total fat when averaged over a week, an analysis conducted in both SNDA-I and SNDA-II was replicated with the SNDA-III menu data.

The methodology used in this analysis is similar to the methodology used in the unweighted nutrient analyses of NSLP lunches (see Appendix C). First, the *lowest-percent-fat lunch* was constructed for each school by determining the lowest-fat menu items offered (based on the percentage of energy from total fat) from each of the main meal components that comprise a reimbursable lunch under food-based menu planning. Thus, the lowest-percent-fat lunch for a given day consisted of the lowest-percent-fat milk option, the lowest-percent-fat entree (meat/bread combination) or meat/meat alternate option, the lowest-percent-fat grain/bread option (if offered), and the two lowest-percent-fat fruit/vegetable options.⁹ Linked toppings and condiments were included in the analysis, but desserts and other optional menu items were excluded. Nutrient totals for the daily lowest-percent-fat options were then averaged across the week to determine the mean energy and nutrient content of the lowest-percent-fat lunches

⁹ The lowest-percent-fat meal also satisfied the minimum requirement for fluid milk, an entree, and at least one side item under nutrient-standard menu planning.

offered by each school. The same method was used to determine the energy and nutrient composition of the *lowest-percent-saturated fat-lunches*.

1. Lowest-Percent-Fat Lunches Offered

This section provides an estimate of the energy and nutrients students would receive, on average, if they consistently selected the lowest-percent-fat lunch offered and how these estimates have changed since school year 1998–1999. The average nutrient content of the lowest-percent-fat meal available in each school is first compared to the *Dietary Guidelines* goals for total fat and saturated fat, and to related dietary benchmarks from the National Research Council. Trends in the percentage of schools offering lowest-percent-fat lunches consistent with these benchmarks are discussed. In addition, the average energy and nutrient content of the lowest-percent-fat lunch option is contrasted with results of similar analyses for school year 1998–1999. Comparable data from the 1991–1992 school year (SNDA-I) are also provided in the tables.

Availability of Low-Fat Lunch Options. The SNDA-II study documented a dramatic increase from school years 1991–1992 to 1998–1999 in the share of public schools where students *had the opportunity* to select lunches that, over the course of a week, provided no more than 30 percent of energy from total fat. Data from SNDA-III indicate that this trend has continued among elementary schools, although the increase is smaller. In school year 2004–2005, 93 percent of elementary schools offered options for a low-fat lunch, an increase of another 11 percentage points since school year 1998–1999 (Table VIII.6). Despite the fact that a low-fat option was available in most schools, data on NSLP lunches served in school year 2004–2005 suggest that, on average, students in about three-quarters of elementary schools (74 percent) did not select low-fat meals (see Chapter VI, Table VI.7).

TABLE VIII.6

DISTRIBUTION OF FAT, CARBOHYDRATE, CHOLESTEROL, AND SODIUM IN AVERAGE LOWEST-
PERCENT-FAT LUNCHES OFFERED IN SY 2004–2005, SY 1998–1999, AND SY 1991–1992
ELEMENTARY SCHOOLS

	Percentage of Schools		
	SY 2004–2005 (SNDA-III)	SY 1998–1999 (SNDA-II)	SY 1991–1992 (SNDA-I)
Percentage of Energy from Total Fat			
No more than 30%	93	82	34
30.1 – 34.0%	5	14	32
34.1 – 38.0%	1	3	21
More than 38.0%	1	1	13
Percentage of Energy from Saturated Fat			
Less than 10%	85	65	16
10.1 – 12.0%	14	23	20
12.1 – 14.0%	1	8	31
More than 14.0%	0	4	32
Percentage of Energy from Carbohydrate			
Less than 45%	0	2	10
45-55%	19	33	72
More than 55%	81	66	18
Cholesterol			
Less than 100 mg	100	100	97
100 mg or more	<1	<1	3
Sodium			
800 mg or less	15	21	<1
801 – 1,000 mg	12	38	7
More than 1,000 mg	66	41	93
Number of Schools	145	398	260

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP); and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 and School Nutrition Dietary Assessment Study-I, menu data for public elementary schools, school year 1991–1992 (Fox et al. 2001, Exhibit 6.7).

Note: Shaded rows represent SMI standards (fat and saturated fat only) or National Research Council benchmark (for cholesterol and sodium, one-third of recommendation for daily intake).

SY = school year.

The percentage of elementary schools offering lowest-percent-fat lunches that were consistent with the *Dietary Guidelines* goal for saturated fat (less than 10 percent of energy) also increased between school year 1998–1999 and school year 2004–2005. Although not as striking as the fourfold increase between school years 1991–1992 and 1998–1999, another one-fifth (20 percentage points) of elementary schools offered the opportunity to select meals that would satisfy the SMI standard for energy from saturated fat, raising the 2004–2005 share to 85 percent.

In contrast to findings for elementary schools, the percentage of secondary schools that offered low-fat lunch options in school year 2004–2005 remained essentially the same as in school year 1998–1999 (86 versus 91 percent; Table VIII.7). Most secondary schools still offered students menu choices that would allow them to select a lunch that met the SMI standard for energy from total fat. In keeping with results for elementary schools, secondary schools also showed improvements in the saturated fat content of the lowest-percent-fat lunches offered. Between school years 1998–1999 and 2004–2005, the percentage of secondary schools that offered lowest-percent-fat at lunches that satisfied the saturated fat standard increased by 15 points (to 94 percent).

One change associated with further improvements in the fat content of NSLP menu choices is an increase in sodium. As Tables VIII.6 and VIII.7 show, the percentage of schools offering lowest-percent-fat lunches that also satisfied the NRC recommendation for sodium was about 6 percentage points *lower* in school year 2004–2005 than in school year 1998–1999 (15 versus 21 percent of elementary schools, 8 versus 14 percent of secondary schools). Although average sodium levels still represent improvements since school year 1991–1992 (Table VIII.8), it is of particular concern that the share of schools with lowest-percent-fat lunches at the highest sodium level (more than 1,000 mg) has increased since school year 1998–1999. Approximately

TABLE VIII.7

DISTRIBUTION OF FAT, CARBOHYDRATE, CHOLESTEROL, AND SODIUM IN AVERAGE LOWEST-
PERCENT-FAT LUNCHES OFFERED IN SY 2004–2005, SY 1998–1999, AND SY 1991–1992
SECONDARY SCHOOLS

	Percentage of Schools		
	SY 2004–2005 (SNDA-III)	SY 1998–1999 (SNDA-II)	SY 1991–1992 (SNDA-I)
Percentage of Energy from Total Fat			
No more than 30%	86	91	71
30.1 – 34.0%	12	6	15
34.1 – 38.0%	2	2	9
More than 38.0%	0	1	5
Percentage of Energy from Saturated Fat			
Less than 10%	94	79	47
10.1 – 12.0%	6	13	18
12.1 – 14.0%	1	5	25
More than 14.0%	0	3	11
Percentage of Energy from Carbohydrate			
Less than 45%	<1	2	4
45-55%	21	20	40
More than 55%	79	79	56
Cholesterol			
Less than 100 mg	97	99	97
100 mg or more	3	1	3
Sodium			
800 mg or less	8	14	1
801 – 1,000 mg	16	29	4
More than 1,000 mg	76	56	95
Number of Schools	252	677	234

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP); and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 and School Nutrition Dietary Assessment Study-I, menu data for public secondary (middle and high) schools, school year 1991–1992 (Fox et al. 2001, Exhibit 6.8).

Note: Shaded rows represent SMI standards (fat and saturated fat only) or National Research Council recommendation (for cholesterol and sodium, one-third of recommendation for daily intake).

SY = school year.

TABLE VIII.8

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF LOWEST-PERCENT-FAT LUNCHES OFFERED IN SY
2004–2005, SY 1998–1999, AND SY 1991–1992

	NSLP Standard/ Recommendation ^a	Mean Amount		
		SY 2004–2005 (SNDA-III)	SY 1998–1999 (SNDA-II)	SY 1991–1992 (SNDA-I)
ELEMENTARY SCHOOLS				
Food energy (calories)	664	631	576	645
Protein (g)	10	28	28	29
Vitamin A (mcg RE)	224	304	458	388
Vitamin C (mg)	15	33	35	29
Calcium (mg)	286	519	460	466
Iron (mg)	3.5	4.4	4.0	4.1
Percentage of energy from:				
Total fat (%)	≤ 30	23.4	25.0	31.8
Saturated fat (%)	< 10	8.2	9.2	12.6
Carbohydrate (%)	> 55 ^b	60.1	57.3	51.3
Cholesterol (mg)	< 100 ^b	48	50	68
Sodium (mg)	< 800 ^b	1,089	992	1,323
Number of Schools		145	398	260
SECONDARY SCHOOLS				
Food energy (calories)	825	675	591	693
Protein (g)	16	30	29	32
Vitamin A (mcg RE)	300	312	425	341
Vitamin C (mg)	18	35	44	39
Calcium (mg)	400	518	474	476
Iron (mg)	4.5	4.8	4.2	4.7
Percentage of energy from:				
Total fat (%)	≤ 30	22.4	21.8	27.0
Saturated fat (%)	< 10	7.5	8.1	10.5
Carbohydrate (%)	> 55 ^b	61.2	59.8	55.7
Cholesterol (mg)	< 100 ^b	51	49	65
Sodium (mg)	< 800 ^b	1,202	1,071	1,436
Number of Schools		252	677	234

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP); and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 and School Nutrition Dietary Assessment Study-I, menu data for public schools, school year 1991–1992 (Fox et al. 2001, Exhibits 6.9 and 6.10).

^a NSLP nutrient standards shown for reference are the minimums defined in program regulations for grades K-6 (elementary schools) and grades 7-12 (secondary schools), for the average NSLP lunch in each school.

^b National Research Council recommendation (for cholesterol and sodium, one-third of recommendation for daily intake), not NSLP standard.

SY = school year.

25 percentage points more of the lowest-percent-fat lunches available in elementary schools and 37 percentage points more in secondary schools provided the highest levels of sodium (Tables VIII.6 and VIII.7). In addition to the factors affecting the sodium content of school lunches discussed in Chapter VI, differences in the nutrient coding software and databases used in the SNDA studies may also have affected sodium results.

Energy and Nutrient Content of Lowest-Percent-Fat Lunches. One concern in modifying school meals to reduce their fat content is the possibility that other nutrients will be adversely affected. SNDA-II did not find any evidence that the overall nutrient content of lowest-percent-fat lunches was compromised by menu changes introduced between school years 1991–1992 and 1998–1999. However, average food energy did decrease by 11 percent (elementary schools) and 15 percent (secondary schools) during that time period. Table VIII.8 suggests that increases since 1998–1999 in the proportions of schools offering lowest-percent-fat lunches consistent with SMI standards for fat and saturated fat were associated with shifts in the nutrient content of these meals, most notably for energy, vitamin A, calcium, and sodium. Except for energy, however, average nutrient levels in the lowest-percent-fat lunches offered in both elementary and secondary schools remained above the minimum nutrient standards defined for NSLP lunches (for grades K-6 and grades 7-12, respectively).

The average lowest-percent-fat lunch offered in elementary schools in school year 2004–2005 provided 23.4 percent of energy from total fat and 8.2 percent of energy from saturated fat, reductions of 1.6 and 1.0 percentage points, respectively, since school year 1998–1999 (Table VIII.8). In contrast to the relationship between changes in fat and energy observed between school years 1991–1992 and 1998–1999, the mean energy content of the lowest-percent-fat lunch offered in school year 2004–2005 *increased* by 10 percent in elementary schools (from 576 to 631 calories). This may be explained in part by the large percentage of elementary school

lunch menus that included low-fat and/or skim milk (hence, the lowest-percent-fat milks included in this analysis) that were the higher-calorie flavored type. As discussed in Chapter VI (Table VI.12), 1% flavored milk was the top contributor to total food energy in lunches offered in school year 2004–2005. In secondary schools, the average energy content of lowest-percent-fat lunches increased by 14 percent from school year 1998–1999 (591 calories) to school year 2004–2005 (675 calories), despite relatively little change in the mean fat and saturated fat content (Table VIII.8). 1% flavored milk contributed less energy to lunches overall in secondary schools than in elementary schools; other sources of lower-fat calories may have been more available in the 2004–2005 school year.

The average vitamin A content of the lowest-percent-fat lunches offered in elementary schools was one-third (33 percent) lower in school year 2004–2005 than in school year 1998–1999. Similarly, an average reduction of 27 percent was observed for secondary schools. On the other hand, mean calcium levels were 13 percent (elementary schools) and 9 percent (secondary schools) *higher* in the lowest-percent-fat lunches available in school year 2004–2005. Because the magnitude of these changes seemed somewhat disproportionate to the reductions in fat content, they were investigated further.

As discussed in Chapter VI, milk and vegetables (primarily carrots) were the major contributors of vitamin A in NSLP lunches for both school types. There are several explanations for lower vitamin A levels in the lowest-percent-fat lunches relative to all lunches.¹⁰ However, reasons for the difference in lowest-percent-fat lunch values for vitamin A between school years

¹⁰ Because skim and low-fat milk are fortified, the relative contributions of vitamin A from the lowest-percent-fat milk and whole milk would not differ. However, if two fruits and/or fruit juices were offered, vegetables may not have been included in the lowest-percent-fat lunch. In addition, raw carrots served with a higher-fat dip and entree salads/salad bars with salad dressing or other higher-fat items were not as likely to be included in the lowest-percent-fat lunches.

are less clear. Vegetables contributed a smaller proportion of total vitamin A in lunches *offered* in school year 2004–2005 (33 percent; Table VI.12) than in lunches *served* in school year 1998–1999 (39 percent; Fox et al. 2001, Exhibit 3.13). However, differences in the nutrient databases used to analyze the menus in SNDA-II and SNDA-III may also have affected the vitamin A comparisons.

In school year 2004–2005, the lowest-percent-fat lunch option in elementary schools provided an average of 13 percent more calcium than similar lunches in school year 1998–1999. In contrast to energy and vitamin A, mean calcium levels in the lowest-percent-fat lunches (519 mg) and NSLP lunches overall (531 mg) were very similar. What did differ was the frequency of offering yogurt as a meat alternative—yogurt was offered in nine percent of lunch menus in school year 2004–2005 (Chapter V, Table V.4) and in fewer than five percent of menus in school year 1998–1999 (Fox et al. 2001). Because almost all yogurt offered was low-fat or fat-free, it was frequently included as the entree in the lowest-percent-fat lunches available in school year 2004–2005. Yogurt was offered somewhat less frequently among secondary schools (three to seven percent of menus; Table V.4); accordingly, the percentage increase in calcium—approximately nine percent—since school year 1998–1999 was smaller.

Consistent with the shifts in the distributions for sodium discussed above, the mean sodium content of lowest-percent-fat lunches increased between school years 1998–1999 and 2004–2005 (by 10 percent among elementary schools and 12 percent among secondary schools). Note, however, that mean sodium levels in school year 2004–2005 were substantially lower in the lowest-percent-fat lunches offered compared to all NSLP lunches (compare Tables VIII.8 and VI.2). For example, among elementary schools, the lowest-percent-fat lunches offered an average of 1,089 mg sodium—21 percent less than the mean sodium content of NSLP lunches overall (1,442 mg). This difference in sodium can be attributed in large part to condiments,

which were generally not included in the lowest-percent-fat lunches. The top three sources of sodium in elementary school lunches in school year 2004–2005 were condiments and spreads (nine percent), pizza (nine percent), and sandwiches with meat and cheese (seven percent).

2. Lowest-Percent-Saturated-Fat Lunches Offered

The analysis of lowest-percent-saturated-fat lunches offered in school year 2004–2005 was descriptive only—previous studies did not conduct this analysis, so trends are not discussed. Following the same order of presentation as the previous section, this section first describes the percentage of schools that offered the opportunity for students to select a low-saturated-fat lunch. A low-saturated-fat lunch is defined, for this study, as a lunch containing less than 10 percent of energy from saturated fat. The mean energy and nutrient content of the lowest-percent-saturated-fat lunch offered is also discussed.

Availability of Low-Saturated-Fat Lunches. In school year 2004–2005, at least 9 in 10 schools provided students with the opportunity to select a lunch that would, on average, satisfy the *Dietary Guidelines* standard of less than 10 percent of energy from saturated fat (Table VIII.9). In 8 out of 10 schools, the lowest-percent-saturated-fat lunches offered also satisfied the standard for energy from total fat. Elementary and secondary schools were about equally likely to offer the option of a low-saturated-fat lunch that would meet the fat and saturated fat standard. In elementary schools, *lowest-percent-saturated-fat* lunches were somewhat less likely to provide 30 percent of energy or less from total fat than the *lowest-percent-fat* lunch (79 versus 93 percent; Table VIII.6). Despite having the option of selecting low-fat and low-saturated-fat lunches consistent with the *Dietary Guidelines*, in less than a third of all schools did students do so (30 percent of all schools in school year 2004–2005 served NSLP lunches that met the total fat and saturated fat standards; Chapter VI, Table VI.6).

TABLE VIII.9

DISTRIBUTION OF FAT, CHOLESTEROL, AND SODIUM IN AVERAGE *LOWEST-PERCENT-SATURATED FAT* LUNCHES OFFERED IN SY 2004–2005

	Percentage of Schools		
	Elementary	Secondary	All Schools
Percentage of Energy from Total Fat			
No more than 30%	79	81	80
30.1 – 34.0%	16	15	16
34.1 – 38.0%	3	3	3
More than 38.0%	2	2	2
Percentage of Energy from Saturated Fat			
Less than 10%	90	96	92
10.1 – 12.0%	10	4	8
12.1 – 14.0%	0	1	0
More than 14.0%	0	0	0
Percentage of Energy from Carbohydrate			
Less than 45%	0	0	0
45-55%	27	24	26
More than 55%	73	76	74
Cholesterol			
Less than 100 mg	100	99	100
100 mg or more	0	1	0
Sodium			
800 mg or less	14	16	15
801 – 1,000 mg	33	25	30
More than 1,000 mg	53	59	55
Number of Schools	145	252	397

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Shaded rows represent SMI standards (fat and saturated fat only) or National Research Council recommendation (for cholesterol and sodium, one-third of recommendation for daily intake).

SY = school year.

Sodium remained high in lowest-percent-saturated-fat lunches. Only 15 percent of schools offered lowest-percent-saturated-fat lunches contained an average of less than 800 mg of sodium, with virtually no difference between elementary and secondary schools (Table VIII.9). Although mean sodium content was somewhat lower than in *lowest-percent-fat* lunches, the *lowest-percent-saturated-fat* lunch available in a little over half (55 percent) of all schools still provided more than 1,000 mg sodium.

Energy and Nutrient Content of Lowest-Percent-Saturated-Fat Lunches. Table VIII.10 shows the average amounts of energy and target nutrients in the lowest-percent-saturated-fat lunches available to students in school year 2004–2005. These lunches contained, on average, 7.6 percent of energy from saturated fat in elementary schools and 6.9 percent in secondary schools—even lower than the saturated fat content of lowest-percent-fat lunches (Table VIII.8). The mean percentages of energy from total fat in lowest-percent-saturated-fat lunches were 25 percent for elementary schools and 24 percent for secondary schools. Except perhaps for the 100 mg difference in mean sodium levels for secondary schools, results were almost identical for the mean energy and target nutrient content of lowest-percent-saturated-fat and lowest-percent-fat lunch options available to students.

Compared to NSLP lunches *selected* by students, the lowest-percent-fat and lowest-percent-saturated-fat lunches available in school year 2004–2005 provided, on average, fewer calories (secondary schools only); more carbohydrate as a percentage of total energy; the same or more protein, vitamin C, calcium, and iron; and similar amounts of vitamin A and cholesterol. The lowest-percent-fat/saturated fat lunches on average still contained more than the maximum recommended levels of sodium, but they came considerably closer to the recommendation than both the NSLP lunches schools offered and those that students chose in school year 2004–2005.

TABLE VIII.10

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF *LOWEST-PERCENT-SATURATED-FAT* LUNCHES OFFERED IN SY 2004–2005

	Mean Amount			
	NSLP Standard/ Recommendation ^a	Elementary Schools	NSLP Standard/ Recommendation ^a	Secondary Schools
Food energy (calories)	664	641	825	674
Protein (g)	10	27	16	29
Vitamin A (mcg RE)	224	290	300	300
Vitamin C (mg)	15	35	18	38
Calcium (mg)	286	483	400	472
Iron (mg)	3.5	4.3	4.5	4.6
Percentage of energy from				
Total fat (%)	≤ 30	25.3	≤ 30	24.2
Saturated fat (%)	< 10	7.6	< 10	6.9
Carbohydrate (%)	> 55 ^b	59	> 55 ^b	60
Cholesterol (mg)	< 100 ^b	45	< 100 ^b	52
Sodium (mg)	< 800 ^b	1034	< 800 ^b	1103
Number of Schools		145		252

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

^aNSLP nutrient standards shown for reference are the minimums defined in program regulations for grades K-6 (elementary schools) and grades 7-12 (secondary schools), for the average NSLP lunch in each school.

^bNational Research Council recommendation (for cholesterol and sodium, one-third of recommendation for daily intake), not NSLP standard.

SY = school year.

E. CHANGES IN THE ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS SERVED, SCHOOL YEAR 1998–1999 AND SCHOOL YEAR 2004–2005

This section presents data on changes in the proportion of schools that *served* SBP breakfasts that satisfied SMI standards and related benchmarks and the average energy and nutrient content of the breakfasts since school year 1998–1999, when SNDA-II was conducted. The approach used to compare the lunch menu data between the two SNDA studies was adopted for comparisons of SBP breakfasts, and the same caveats apply (see Section B above).

1. Energy and Nutrient Content Relative to SMI Standards

Food Energy. In school year 2004–2005, three times as many secondary schools than in school year 1998–1999 and approximately one and a half times as many elementary schools than in school year 1998–1999 served SBP breakfasts that satisfied the SMI standard for energy (Table VIII.11). The energy standard remained difficult to meet, as about one in three elementary schools and one in four secondary schools in 2004–2005 served breakfasts that contained, on average, at least one-fourth of the 1989 REA. Although the changes since SNDA-II were not statistically significant under the conservative testing assumptions used for this analysis, they are consistent for both school levels and may suggest movement in the direction of compliance with the energy standard in SBP breakfasts. As Table VIII.12 shows, the mean energy content of secondary school breakfasts served in school year 2004–2005 was significantly higher than in school year 1998–1999 (22 versus 20 percent of the REA).

Target Nutrients. As in school year 1998–1999, failure to meet the energy standard did not have an adverse effect on the share of schools serving SBP breakfasts that met or exceeded one-fourth of the 1989 RDA minimum for protein, vitamin A, calcium, or iron in school year 2004–2005 (Table VIII.11). Significantly fewer schools at the elementary level met the minimum

TABLE VIII.11

PROPORTION OF SCHOOLS SERVING SBP BREAKFASTS IN SY 1998–1999 AND SY 2004–2005 THAT SATISFIED SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS

SBP Standard/ Recommendation	SY 2004–2005 (SNDA-III)		SY 1998–1999 (SNDA-II)		Difference (SY 2004– 2005 – SY 1998–1999)		
	Mean	SE	Mean	SE	Mean	SE	
ELEMENTARY SCHOOLS							
Food energy (calories)	25% of 1989 REA	36	5.8	22	5.8	14	8.2
Protein	25% of 1989 RDA	98	1.7	100	1.7	-3	2.5
Vitamin A	25% of 1989 RDA	89	3.1	95	3.1	-6	4.3
Vitamin C	25% of 1989 RDA	87	3.7	98	3.7	-11*	5.2
Calcium	25% of 1989 RDA	96	2.1	99	2.1	-3	3.0
Iron	25% of 1989 RDA	95	2.2	93	2.2	2	3.1
Percentage of energy from total fat	≤ 30%	88	3.2	75	3.2	13*	4.5
Percentage of energy from saturated fat	< 10%	71	5.0	54	5.0	17*	7.0
Cholesterol	< 75 mg	95	1.8	90	1.8	5*	2.5
Sodium	< 600 mg	51	5.6	63	5.6	-12	8.0
Number of Schools		120		317			
SECONDARY SCHOOLS							
Food energy (calories)	25% of 1989 REA	24	6.8	8	6.8	16	9.6
Protein	25% of 1989 RDA	92	2.1	95	2.1	-3	2.9
Vitamin A	25% of 1989 RDA	58	5.1	48	5.1	10	7.3
Vitamin C	25% of 1989 RDA	92	2.3	95	2.3	-3	3.2
Calcium	25% of 1989 RDA	85	2.8	78	2.8	7	3.9
Iron	25% of 1989 RDA	78	3.7	57	3.7	21*	5.2
Percentage of energy from total fat	≤ 30%	67	5.2	64	5.2	3	7.4
Percentage of energy from saturated fat	< 10%	65	4.8	46	4.8	19*	6.8
Cholesterol	< 75 mg	82	3.5	76	3.5	6	5.0
Sodium	< 600 mg	31	4.4	42	4.4	-11	6.2
Number of Schools		211		487			

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP) and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 (Fox et al. 2001, Exhibits 3.5, 3.7 and A.4).

SY = school year; SE = standard error; SMI = School Meals Initiative for Healthy Children; REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance.

*Difference between SY 2004–2005 and SY 1998–1999 is significantly different from zero at the .05 level.

TABLE VIII.12

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS SERVED IN SY 1998–1999 AND SY 2004–2005
RELATIVE TO SMI NUTRIENT STANDARDS AND RELATED BENCHMARKS

SBP Standard/ Recommendation	SY 2004–2005 (SNDA-III)		SY 1998–1999 (SNDA-II)		Difference (SY 2004–2005 – SY 1998–1999)		
	Mean	SE	Mean	SE	Mean	SE	
ELEMENTARY SCHOOLS							
Mean Percentage of 1989 REA/RDA							
Food energy (calories)	25%	24	0.6	23	0.3	1	0.6
Protein	25%	54	1.3	52	0.7	2	1.5
Vitamin A	25%	36	0.9	39	0.7	-3*	1.1
Vitamin C	25%	63	4.0	81	2.5	-18*	4.7
Calcium	25%	45	1.0	43	0.6	2*	1.1
Iron	25%	41	1.1	37	0.7	4*	1.3
Mean Percentage of Energy From:							
Total fat	≤ 30%	24.8	0.5	26.5	0.4	-1.7*	0.6
Saturated fat	< 10%	8.9	0.2	10.1	0.2	-1.2*	0.3
Mean Amount							
Cholesterol	< 75 mg	37	1.6	43	2.9	-6	3.3
Sodium	< 600 mg	631	28.1	574	10.5	57	30.0
Number of Schools		120		317			
SECONDARY SCHOOLS							
Mean Percentage of 1989 REA/RDA							
Food energy (calories)	25%	22	0.7	20	0.3	2*	0.8
Protein	25%	36	0.8	34	0.5	2*	0.9
Vitamin A	25%	28	1.8	25	0.5	3	1.9
Vitamin C	25%	60	3.8	72	1.9	-12*	4.2
Calcium	25%	32	1.0	29	0.4	3*	1.1
Iron	25%	37	5.2	28	0.7	9	5.2
Mean Percentage of Energy From:							
Total fat	≤ 30%	27.8	0.6	28.3	0.4	-0.5	0.7
Saturated fat	< 10%	9.6	0.3	10.5	0.2	-0.9*	0.3
Mean Amount							
Cholesterol	< 75 mg	52	3.1	55	2.2	-3	3.8
Sodium	< 600 mg	821	39.4	672	12.8	149*	41.4
Number of Schools		211		487			

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP) and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 (Fox et al. 2001, Exhibits A.1 and A.2).

SY = school year; SE = standard error; SMI = School Meals Initiative for Healthy Children; REA = Recommended Energy Allowance; RDA = Recommended Dietary Allowance.

*Difference between SY 2004–2005 and SY 1998–1999 is significantly different from zero at the .05 level.

requirement for vitamin C in school year 2004–2005, although the great majority (87 percent) still served an average breakfast that satisfied the standard for vitamin C. The mean percentage of the RDA for vitamin C in elementary school breakfasts served in 2004–2005 remained well above 25 percent of 1989 RDA minimum (63 percent of the RDA; Table VIII.12).

At the secondary school level, an additional 21 percent of schools served SBP breakfasts that complied with the one-fourth RDA minimum requirement for iron (Table VIII.11). This change brought the share of schools meeting the iron standard in breakfasts served closer to that for elementary schools (78 and 95 percent, respectively). Data from SNDA-II for all schools combined indicated that grains and breads were the top contributor of iron in SBP breakfasts *served* in 1998–1999, especially cold cereals (38 percent of average iron served) and breakfast pastries (13 percent; Fox et al. 2001, Exhibit 4.13). An analysis of the food sources of iron *offered* in school year 2004–2005 found that the top contributors in secondary school breakfasts were also cold cereal (45 percent of total iron) and breakfast pastries (12 percent; Appendix E, Table E-VII.30).¹¹ It is possible that more of these items have been fortified with iron since SNDA-II. Alternatively, secondary school students may have been choosing them more often in the 2004–2005 school year.

Other than for vitamin C and iron, the observed changes in mean levels of targeted nutrients did not translate into statistically significant differences in the probability of satisfying the RDA-based SBP standards.

Percentage of Energy from Total Fat and Saturated Fat. There was a marked increase in the proportion of schools that met the SMI standard for saturated fat between school years 1998–

¹¹ Fruit juice (100% juice) was also an important source of iron, contributing about four percent to the mean iron content of breakfasts *served* in school year 1998–1999, compared to eight percent in breakfasts *offered* in 2004–2005.

1999 and 2004–2005 (Table VIII.11). Less than half of all secondary schools (46 percent) in 1998–1999 served an average breakfast that provided less than 10 percent of calories from saturated fat. By 2004–2005, approximately two-thirds (65 percent) met this standard. Similar results were observed for elementary schools, moving the percentage meeting the standard for energy from saturated fat from 54 to 71 percent. The differences in estimates at the two time points were statistically significant for both school types. In addition, the proportion of elementary schools that were serving SBP breakfasts with no more than 30 percent of energy from total fat increased from 75 to 88 percent between the 1998–1999 and 2004–2005 school years. Secondary school breakfasts, however, did not become more likely to satisfy the standard for total fat over the same six-year period.

Consistent with the improvements observed in compliance with *Dietary Guidelines* goals for energy from saturated fat, SBP breakfasts served in school year 2004–2005 contained, on average, significantly less energy from saturated fat than in school year 1998–1999 (Table VIII.12). The SNDA-III means of 8.9 percent of energy from saturated fat (elementary schools) and 9.6 percent (secondary schools) in breakfasts served were below the target of less than 10 percent. In addition, elementary school breakfasts experienced a statistically significant reduction in the mean percentage of energy from total fat (from 26.5 percent in school year 1998–1999 to 24.8 percent in school year 2004–2005).

One possible explanation for the change in the average amount of energy from saturated fat is the difference in the availability of whole milk in SBP breakfasts at the two time points. Similar to the finding for NSLP lunches, whole milk was *offered* considerably less often in breakfast menus in school year 2004–2005 (29 percent for all school types; Chapter V, Table V.4) than in school year 1998–1999, where almost half of all menus included whole milk

(49 percent; Fox et al. 2001, Exhibit 4.2).¹² However, as discussed later in this section, the decrease in energy from saturated fat may also reflect the relative amounts of food energy in SBP breakfasts served in school years 1998–1999 and 2004–2005.

2. Nutrient Content Relative to Other Dietary Benchmarks

In both school year 1998–1999 and school year 2004–2005, at least 9 in 10 elementary schools and three-fourths of secondary schools served SBP breakfasts that contained no more than one-fourth of the NRC recommendation for maximum daily intake of cholesterol (600 mg; Table VIII.11). At the same time, similar to findings for 1998–1999, just over half of elementary schools and one-third of secondary schools were serving breakfasts in school year 2004–2005 that contained the recommended amount of sodium. An increase from 90 to 95 percent of elementary schools that satisfied the recommended level of cholesterol was statistically significant; however, changes for sodium were not.

The mean sodium content of breakfasts served in secondary schools (821 mg) was significantly higher in school year 2004–2005 than in school year 1998–1999, increasing by an average of 149 mg, or about 22 percent (Table VIII.12). In elementary schools, the average sodium content of breakfasts served increased by 57 mg (10 percent). Although the difference between time points for elementary schools was not statistically significant, it was large enough to bring the average sodium in SBP breakfasts served above the recommended maximum of 600 mg (mean of 631 mg).

¹² Whole milk contributed 15 percent of the average saturated fat in breakfasts *served* in 1998-1999 (Fox et al. 2001) and 9 percent in breakfasts *offered* in 2004-2005 (Table E-VII.19).

3. Mean Energy and Nutrient Content

The comparison of mean food energy levels in SBP breakfasts served between school years 1998–1999 and 2004–2005 revealed an additional change of interest. As Table VIII.13 shows, the average energy content of secondary school breakfasts increased significantly and was accompanied by a disproportionately large increase in the average carbohydrate content of breakfasts served, relative to the increases in fat and protein. Given that the mean amount of saturated fat did not change over this period (and total fat increased), the apparent reduction in the percentage of energy from saturated fat is related in large part to the higher carbohydrate content of breakfasts served in school year 2004–2005. Likewise, the decrease in the percentage of energy from fat observed in elementary school breakfasts reflects an increase in the average amount of carbohydrate (and perhaps a small increase in the energy) provided by these meals.¹³ Major sources of carbohydrate in SBP breakfasts *offered* in school year 2004–2005 were cold cereal (14 percent); 100% fruit juice (14 percent); condiments and spreads, such as sugar, pancake syrup, and jelly (9 percent); and sweet rolls, doughnuts, and toaster pastries (8 percent). The percentage contribution of these foods to the average amount of carbohydrate *served* in 1998–1999 was strikingly similar (Fox et al. 2001).

One source of additional carbohydrate in SBP breakfasts is flavored milk. In elementary schools, for example, 15 percent more breakfast menus included some type of flavored milk in school year 2004–2005 than in 1998–1999 (not shown in tables). The change for secondary schools was similar. This may be one strategy schools have used to promote students' acceptance of lower-fat and skim milk.

¹³ The mean percentage of energy from carbohydrate in SBP breakfasts served by elementary schools was significantly higher in school year 2004–2005 than in school year 1998–1999 (63.7 versus 61.5 percent; not shown in tables).

TABLE VIII.13

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS SERVED
TO STUDENTS IN SY 1998–1999 AND SY 2004–2005

	SY 2004–2005 (SNDA-III)		SY 1998–1999 (SNDA-II)		Difference (SY 2004– 2005 - SY 1998–1999)	
	Mean	SE	Mean	SE	Mean	SE
ELEMENTARY SCHOOLS						
Food energy (calories)	465	11.5	447	5.7	18	12.8
Total fat (g)	13	0.5	13	0.3	0	0.6
Saturated fat (g)	5	0.2	5	0.1	0	0.2
Carbohydrate (g)	73	1.8	68	1.0	5*	2.0
Protein (g)	15	0.3	15	0.2	0	0.4
Percentage of energy from total fat (%)	24.8	0.5	26.5	0.4	-1.7*	0.6
Percentage of energy from saturated fat (%)	8.9	0.2	10.1	0.2	-1.2*	0.3
Vitamin A (mcg RE)	231	5.8	254	4.4	-23*	7.3
Vitamin C (mg)	29	1.8	37	1.1	-8*	2.1
Calcium (mg)	375	7.7	354	4.5	21*	8.9
Iron (mg)	4.2	0.1	3.8	0.1	0.4*	0.1
Cholesterol (mg)	37	1.6	43	2.9	-6	3.3
Sodium (mg)	631	28.1	574	10.5	57	30.0
Number of Schools	120		317			
SECONDARY SCHOOLS						
Food energy (calories)	545	17.0	483	6.3	62*	18.2
Total fat (g)	17	0.5	15	0.3	2*	0.6
Saturated fat (g)	6	0.2	6	0.1	0	0.2
Carbohydrate (g)	83	3.9	71	1.1	12*	4.0
Protein (g)	17	0.4	16	0.2	1*	0.4
Percentage of energy from total fat (%)	27.8	0.6	28.3	0.4	-0.5	0.7
Percentage of energy from saturated fat (%)	9.6	0.3	10.5	0.2	-0.9*	0.3
Vitamin A (mcg RE)	248	16.4	226	4.9	22	17.1
Vitamin C (mg)	32	1.9	39	1.0	-7*	2.2
Calcium (mg)	386	12.1	350	5.3	36*	13.2
Iron (mg)	5.0	0.7	3.8	0.1	1.2	0.7
Cholesterol (mg)	52	3.1	55	2.2	-3	3.8
Sodium (mg)	821	39.4	672	12.8	149*	41.4
Number of Schools	211		487			

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP) and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 (Fox et al. 2001, Exhibit B.1).

SY = school year; RE = Retinol equivalents.

*Difference between SY 2004–2005 and SY 1998–1999 is significantly different from zero at the .05 level.

4. Distribution of Total Fat, Saturated Fat, and Sodium

In elementary schools, the significant increase in the proportion of schools that served breakfasts with no more than 30 percent of energy from total fat was accompanied by a decrease in the proportion serving breakfasts with more than 34 percent of energy from fat (Table VIII.14). None of the breakfasts served in elementary schools in school year 2004–2005 contained more than 38 percent of energy from total fat (on average over a typical week). There was virtually no change between school year 1998–1999 and school year 2004–2005 in the distribution of energy from total fat in SBP breakfasts served in secondary schools (Table VIII.15).

Similar to findings for NSLP lunches, the positive change in the share of schools that served SBP breakfasts with less than 10 percent of energy from saturated fat between school years 1998–1999 and 2004–2005 was also observed across the distribution of values (Tables VIII.14 and VIII.15). By school year 2004–2005, very few schools served breakfasts with very high levels of saturated fat (more than 14 percent of energy). The opposite trend was observed for the sodium content of SBP breakfasts served in school year 2004–2005—that is, 13 percent more elementary schools and 23 percent more secondary schools served breakfasts with the highest levels of sodium than in school year 1998–1999.

TABLE VIII.14

DISTRIBUTION OF THE TOTAL FAT, SATURATED FAT, AND SODIUM CONTENT OF SBP
BREAKFASTS SERVED IN SY 1998–1999 AND SY 2004–2005
ELEMENTARY SCHOOLS

	Percentage of Schools		
	SY 2004–2005 (SNDA-III)	SY 1998–1999 (SNDA-II)	Difference (SY 2004–2005 – SY 1998–1999)
Percentage of Energy from Total Fat			
No more than 30%	88	75	13*
30.1 – 34.0%	8	15	-7
34.1 – 38.0%	4	8	-4
More than 38.0%	0	2	-2
Percentage of Energy from Saturated Fat			
Less than 10%	71	54	17*
10.1 – 12.0%	24	26	-2
12.1 – 14.0%	5	12	-7
More than 14.0%	1	8	-7
Sodium			
600 mg or less	51	63	-12
601 – 750 mg	28	28	0
More than 750 mg	22	9	13
Number of Schools	120	317	

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP) and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 (Fox et al. 2001, Exhibits 4.7 and B.4).

Note: Shaded rows indicate differences that were tested for statistical significance and represent the targets defined by SMI standards, or in the case of sodium, one-fourth of the National Research Council recommendation for daily intake.

SY = school year; SMI = School Meals Initiative for Healthy Children.

*Difference between SY 2004–2005 and SY 1998–1999 is significantly different from zero at the .05 level.

TABLE VIII.15

DISTRIBUTION OF THE TOTAL FAT, SATURATED FAT, AND SODIUM CONTENT OF SBP
BREAKFASTS SERVED IN SY 1998–1999 AND SY 2004–2005
SECONDARY SCHOOLS

	Percentage of Schools		
	SY 2004–2005 (SNDA-III)	SY 1998–1999 (SNDA-II)	Difference (SY 2004–2005 – SY 1998–1999)
Percentage of Energy from Total Fat			
No more than 30%	67	64	3
30.1 – 34.0%	20	21	-1
34.1 – 38.0%	9	8	1
More than 38.0%	4	7	-3
Percentage of Energy from Saturated Fat			
Less than 10%	65	46	19*
10.1 – 12.0%	22	30	-8
12.1 – 14.0%	8	14	-6
More than 14.0%	5	11	-6
Sodium			
600 mg or less	31	42	-11
601 – 750 mg	18	31	-13
More than 750 mg	51	28	23
Number of Schools	211	487	

Sources: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004–2005 (tabulations prepared by Mathematica Policy Research, Inc., weighted to be representative of all public schools offering the NSLP) and School Nutrition Dietary Assessment Study-II, Menu Survey, school year 1998–1999 (Fox et al. 2001, Exhibits 4.7 and B.4).

Note: Shaded rows indicate differences that were tested for statistical significance and represent the targets defined by SMI standards, or in the case of sodium, one-fourth of the National Research Council recommendation for daily intake.

SY = school year; SMI = School Meals Initiative for Healthy Children.

*Difference between SY 2004–2005 and SY 1998–1999 is significantly different from zero at the .05 level.

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APPENDIX A

**SUPPLEMENTAL TABLES ON SFA AND SCHOOL CHARACTERISTICS
(SUPPLEMENT TO CHAPTERS I TO IV)**

TABLE A-I.1

COMPARISON OF SFA CHARACTERISTICS OF SNDA-III AND PRELIMINARY SURVEY SAMPLE

	SNDA-III			Preliminary Survey	
	Number of SFAs (Unweighted)	Number of SFAs (Weighted)	Percentage of SFAs (Weighted)	No. of SFAs (Unweighted)	Percentage of SFAs (Weighted)
Enrollment					
5,000 or fewer	43	11,600	86.0	1,346	86.7
More than 5,000	86	1,900	14.0	711	13.3
Urbanicity					
Primarily serves as a central city of MSA	46	900	6.8	274	8.3
Serves as MSA but not primarily its central city	55	5,400	39.9	1,016	41.5
Does not serve as MSA	28	7,200	53.3	767	50.2
Child Poverty Rate					
Low (less than 20 percent)	83	9,200	67.7	1,514	71.8
Higher (20 percent or more)	43	4,400	32.3	543	28.2
FNS Region					
Northeast	12	1,600	12.2	263	12.0
Mid-Atlantic	15	2,000	14.8	257	10.2
Southeast	27	1,200	9.2	282	7.8
Midwest	22	3,100	23.1	405	24.4
Southwest	22	1,100	8.2	287	15.6
Mountain-Plains	11	3,200	23.4	272	16.8
West	21	1,200	9.2	291	13.2
Number of SFAs	129	13,500		2,057	

Source: School Nutrition Dietary Assessment-III, Preliminary Survey, school year 2003-2004. Tabulations for SNDA-III sample by Mathematica Policy Research, Inc.; tabulations for the Fax-back and Telephone Preliminary Survey sample are from Logan and Kling (2005), Tables B.1 – B.4. All tabulations are weighted to be representative of public SFAs nationally.

MSA = Metropolitan Statistical Area.

TABLE A-I.2

CHARACTERISTICS OF PUBLIC NSLP SCHOOLS, BY SCHOOL TYPE

	Elementary Schools	Middle Schools	High Schools
School Enrollment			
Small (less than 500 students)	55.8	41.2	39.2
Medium (500 - 999)	40.6	50.3	29.5
Large (1,000 or more)	3.6	8.5	31.3
Urbanicity			
Primarily MSA central city	33.9	32.2	25.6
MSA, not central city	37.6	38.9	25.0
Not in MSA	28.5	28.9	49.4
District Child Poverty Level			
Low (less than 20 percent in poverty)	63.9	67.6	56.8
Higher (20 percent or more in poverty)	36.2	32.4	43.2
FNS Region			
Mid-Atlantic	11.3	8.9	8.7
Midwest	20.2	15.1	19.3
Mountain-Plains	9.8	14.7	23.9
Northeast	11.1	9.6	7.1
Southeast	19.0	22.6	16.2
Southwest	16.0	16.1	12.9
Western	12.6	12.9	11.9

Source: School Nutrition Dietary Assessment-III Pre-visit data, school year 2004-2005. U.S. Department of Education, Common Core of Data 2002-2003; U.S. Census, school district file for district poverty rate for children ages 5 to 17.

Note: Weighted tabulations prepared by Mathematica Policy Research, Inc. are representative of public NSLP schools nationally.

TABLE A-II.1

DIVISION OF RESPONSIBILITIES IN SFAs WITH FOOD
SERVICE MANAGEMENT COMPANIES
(Percentage of SFAs)

	Mostly/All FSMC	Mostly/All SFA	Mostly/All Joint	Mixture
Administrative Functions ^a	26.5	29.3	21.4	22.8
Food Preparation and Service	55.5	30.9	12.3	1.3
Provide and Maintain Equipment and Facilities	6.4	73.0	18.2	2.4
Food Purchasing	67.4	11.6	12.7	8.4

Source: SNDA-III Preliminary Survey, Telephone Interview. Data are as reported in Logan and Kling (2005), Table B.19.

Note: N = 420 SFAs using FSMCs. Percentages add across rows.

FSMC = Food Service Management Company.

^aUnder federal regulations, SFAs retain the responsibility for determining children's eligibility for free or reduced-price meals, and for ensuring that claims for reimbursement include only reimbursable meals, and that FSMCs are only paid for allowable costs.

TABLE A-III.1

SFA POLICIES ON COMPETITIVE FOODS OFFERED IN SCHOOLS, BY POVERTY
(Percentage of SFAs)

	Poverty Levels		All SFAs
	Low (less than 20%)	High (20% or more)	
Brand-name or Chain Restaurant Foods			
Among All SFAs, Any Schools That Offer Foods from National or Regional Brand-name or Chain Restaurants	23.9	10.7	19.6
Number of SFAs Reporting	83	46	129
Any Schools in SFA Where These Items Are Eligible for Inclusion in Reimbursable Meals	19.5	1.7	14.4
Number of SFAs Reporting	83	46	129
Pouring Rights Contracts^a			
SFA or Schools Engage in Pouring Rights Contracts			
Yes, districtwide	20.5	10.2	17.2
Yes, some schools	9.6	5.1	8.2
Number of SFAs Reporting	83	46	129
Access to Competitive Food Venues			
Restricts Types of Soda, Soft Drinks, and Sweetened Fruit Beverages (less than 100% juice) Sold to Students in Schools or on School Grounds ^b			
Yes, districtwide ban or restriction	5.2	7.0	5.8
Yes, school level ban or restriction	10.9	29.9	17.0
No ban or restriction	50.0	58.3	52.7
Never has offered soda, soft drinks, or sweetened fruit beverages	33.9	4.9	24.5
Restricts Types of Food or Snacks Sold to Students in Schools or on School Grounds ^c			
Yes, districtwide ban or restriction	10.7	8.1	9.7
Yes, school level ban or restriction	16.1	21.4	18.2
No ban or restriction	73.2	70.5	72.1
Number of SFAs Reporting	83	46	129
Among SFAs that Sell Soda, Soft Drinks, or Sweetened Fruit Beverages, Limits When Students Can Purchase Them in Schools or on School Grounds ^c			
Yes, districtwide time restriction	31.5	0.2	18.8
Yes, school level time restriction	21.2	29.6	24.7
No time restriction	47.2	70.1	56.5
Number of SFAs Reporting	67	39	106
Number of SFAs	83	46	129

TABLE A-III.1 (continued)

Source: School Nutrition Dietary Assessment-III, Common Core of Data, Pre-visit Survey, SFA Director Survey, school year 2004-2005. Weighted tabulations prepared by Mathematica Policy Research, Inc.

Note: N = 129, one respondent did not answer the questions about if brand-name or chain restaurant food items are eligible inclusion in reimbursable meals, 17 did not answer the question about types of schools where branded food items can be included in reimbursable meals, three did not answer the question about limits from pouring rights contracts, five did not answer the question about income from pouring rights, two did not answer the question about an increase in vending machines, one did not answer the question about if vending machines were installed for the first time, one did not answer the question about other in-school sites selling beverages, and 23 did not answer the question about time limitations.

^aA “pouring rights” contract is an agreement between a beverage distributor and an organization (e.g., school) that allows the distributor to be the only entity selling beverages at a given location.

^bAside from USDA ban on selling soft drinks during school meals; includes vending machines.

^cAside from USDA restrictions; includes school stores or vending machines.

TABLE A-III.2

AVAILABILITY OF VENDING MACHINES IN SCHOOL OR ON SCHOOL GROUNDS,
BY URBANICITY AND POVERTY
(Percentage of Schools)

	Urbanicity			Poverty Level		All
	Primarily serves as a central city of MSA	Serves as MSA but not primarily its central city	Does not serve as MSA	Low (less than 20%)	High (20% or more)	
Vending Machines Available to Students	37.8	42.4	54.0	44.3	45.6	44.4
Number of Schools Reporting	153	159	77	240	149	389
Among Schools That Make Vending Machines Available to Students, Locations of Machines in School or on School Grounds ^a						
Food service area	46.6	52.3	40.3	45.8	46.3	45.9
Other indoor area(s)	59.8	63.2	76.3	69.2	64.6	67.6
Outside school buildings, on school grounds	19.9	19.3	8.0	11.1	21.6	15.0
Number of Schools Reporting	99	100	52	158	93	251
Among Schools with Vending Machines <i>Outside</i> Food Service Area:						
Beverages						
No Beverage Machines Outside Food Service Area	18.3	30.4	15.2	22.2	19.4	21.1
Times Students Can Use Beverage Machines (exclusive of milk, 100% juice, water) ^a	(n = 80)	(n = 75)	(n = 42)	(n = 124)	(n = 73)	(n = 247)
Before school	37.5	49.8	39.9	40.2	45.3	42.3
During school hours, before lunch	37.5	23.7	17.2	21.1	30.7	24.7
During lunch	40.6	36.3	23.0	35.4	26.1	31.8
After lunch, before end of last regular class	32.6	33.7	50.0	30.7	55.9	40.3
After last regular class	69.6	61.5	56.6	72.7	43.9	61.7
Anytime	3.1	0.0	0.0	0.0	2.2	.8
During recess or in between classes	1.9	3.3	2.6	4.2	0.0	2.6
At athletic event or during/after gym class	0.0	5.5	0.0	0.5	3.4	1.6
Other	0.0	0.7	0.0	0.4	0.0	0.2
Snacks						
No Snack Machines Outside Food Service Area	55.2	57.9	70.9	55.4	74.3	62.5

TABLE A-III.2 (continued)

	Urbanicity			Poverty Level		All
	Primarily serves as a central city of MSA	Serves as MSA but not primarily its central city	Does not serve as MSA	Low (less than 20%)	High (20% or more)	
Times Students Can Use <i>Snack</i> Machines^a	(n = 50)	(n = 50)	(n = 21)	(n = 83)	(n = 38)	(n = 121)
Before school	63.7	56.8	--	60.3	--	59.2
During school hours, before lunch	43.2	17.3	--	30.1	--	31.7
During lunch	47.4	51.8	--	49.6	--	48.4
After lunch, before end of last regular class	42.4	28.9	--	38.0	--	39.8
After last regular class	87.0	74.0	--	75.8	--	79.4
Anytime	2.2	0.0	--	0.0	--	0.7
During recess or in between classes	0.2	1.2	--	3.6	--	2.7
Number of Schools Reporting	99	97	51	154	93	247
<i>Beverages</i>						
No Beverage Machines Inside Food Service Area	24.8	31.9	34.9	34.0	27.0	31.3
Among Schools with Vending Machines <i>Inside</i> the Food Service Area:						
Times Students Can Use <i>Beverage</i> Machines (exclusive of milk, 100% juice, water)^a	(n = 30)	(n = 42)	(n = 21)	(n = 59)	(n = 23)	(n = 83)
Before school	--	29.8	--	37.8	--	46.9
During school hours, before lunch	--	23.6	--	30.7	--	25.5
During lunch	--	60.7	--	59.0	--	54.8
After lunch, before end of last regular class	--	41.2	--	42.8	--	34.5
After last regular class	--	53.0	--	55.3	--	63.4
Anytime	--	1.1	--	5.9	--	3.6
<i>Snacks</i>						
No Snack Machines Inside Food Service Area	54.6	45.3	69.9	46.0	74.1	56.1
Times Students Can Use <i>Snack</i> Machines^a	(n = 19)	(n = 32)	(n = 9)	(n = 46)	(n = 14)	(n = 61)
Before school	--	--	--	37.7	--	38.2
During school hours, before lunch	--	--	--	41.2	--	37.8
During lunch	--	--	--	59.9	--	63.5
After lunch, before end of last regular class	--	--	--	45.6	--	46.0
After last regular class	--	--	--	63.3	--	64.6
Anytime	--	--	--	6.2	--	5.0

TABLE A-III.2 (continued)

	Urbanicity			Poverty Level		All
	Primarily serves as a central city of MSA	Serves as MSA but not primarily its central city	Does not serve as MSA	Low (less than 20%)	High (20% or more)	
Number of Schools Reporting	42	62	21	84	39	127
Number of Schools	153	161	78	243	149	392

Source: School Nutrition Dietary Assessment-III, Food Service Manager Survey, Principal Survey, and Preliminary Survey, school year 2004-2005. Weighted tabulations prepared by Mathematica Policy Research, Inc. Principals reported on vending machines outside of the food service area, and food service managers reported on machines inside the food service area.

Note: N = 392 (three respondents did not answer the question about availability of vending machines, four did not answer the question about when students can access the beverage machines, and four did not answer the question about when students can access snack machines). Three schools from the overall sample (n = 395) are excluded from this table because we do not have poverty or urbanicity data for these schools.

Poverty data refer to the percentage of children in poverty in the SFA, from the 2000 Census.

^aMultiple answers allowed.

--Indicates sample sizes are too small for reliable estimates.

TABLE A-IV.1

NUMBER OF VENDING MACHINES AVAILABLE, BY SCHOOL ENROLLMENT
(Percentage of Schools)

	Enrollment			All Schools
	Small (less than 500 students)	Medium (from 500 to 1,000 students)	Large (more than 1,000 students)	
Total Number of Vending Machines				
No machines	56.0	48.3	16.2	49.1
1 to 3 machines	35.9	30.5	13.0	31.6
4 to 6 machines	2.4	8.7	24.5	7.0
7 to 10 machines	5.4	7.7	16.8	7.4
11 to 20 machines	0.0	3.4	10.5	2.4
21 to 30 machines	0.3	1.3	11.5	1.8
More than 30 machines	0.0	0.0	7.4	0.7
Number of Schools	81	112	89	282
Among Schools With Vending Machines, Mean Number of Machines				
	3	5	10	5
Number of Schools	40	74	80	194

Source: School Nutrition Dietary Assessment-III, Vending Machine Checklist, school year 2004-2005. Weighted tabulations prepared by Mathematica Policy Research, Inc.

Note: N = 287 (vending machine checklists were not available for five schools that were visited).

TABLE A-IV.2

NUMBER OF VENDING MACHINES AVAILABLE, BY WHETHER SCHOOL HAS
A POURING RIGHTS CONTRACT
(Percentage of Schools)

	Does Not Have a Pouring Rights Contracts	Has a Pouring Rights Contract	All Schools
Has Vending Machines Available to Students	21.8	100.0	52.3
Number of Schools	128	136	287
Total Number of Vending Machines			
No machines	78.8	2.5	49.1
1 to 3 machines	14.4	56.0	31.6
4 to 6 machines	4.1	12.9	7.0
7 to 10 machines	2.4	15.4	7.4
11 to 20 machines	0.2	6.5	2.4
21 to 30 machines	0.0	4.7	1.8
More than 30 machines	0.0	1.9	0.7
Number of Schools Reporting	127	132	282
Among Schools With Vending Machines, Mean Number of Machines	3	5	5
Number of Schools Reporting	41	131	194

Sources: School Nutrition Dietary Assessment-III, Principal Survey, Vending Machine Checklist, school year 2004-2005. Weighted tabulations prepared by Mathematica Policy Research, Inc.

Note: N = 287 (vending machine checklists were not available for five schools that were visited). In computing the percentage of schools with vending machines, data from the principal survey were used for these five schools.

TABLE A-IV.3

VENDING MACHINE ITEMS OFFERED IN OR NEAR CAFETERIA, BY SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Any Vending Machine Food or Beverage Items Offered in or Near Cafeteria	12.5	52.5	82.6	34.0
Number of Schools	100	93	94	287
Items Offered in Vending Machines in or Near the Cafeteria:				
Juice and Water	9.6	39.2	72.8	27.6
Juice (100% juice)	8.0	15.1	50.9	17.7
Water (spring, flavored, sparkling, mineral, seltzer)	9.6	32.4	66.5	25.1
Water (water with juice)	0.0	7.6	8.2	3.0
Other Beverages	8.9	40.3	74.2	27.6
Carbonated sweetened soft drink	0.8	17.9	34.8	10.7
Carbonated diet soft drink	0.8	10.2	25.6	7.4
Juice drinks (e.g., fruit blends, lemonade, punch)	7.4	35.3	59.8	22.9
Coffee	0.0	0.0	1.6	0.3
Tea	0.1	10.1	13.5	4.7
Hot chocolate	0.0	0.0	0.5	0.1
Yogurt drinks	0.0	0.0	3.8	0.7
Energy and sports drinks	6.9	16.6	53.7	17.9
Chocolate drinks	0.0	3.1	1.8	0.9
Non-carbonated diet beverage	0.0	0.0	0.0	0.0
Other	0.1	4.5	5.2	2.0
Dairy Foods and Beverages	0.0	11.4	17.7	5.6
Whole milk	0.0	0.3	6.1	1.2
Reduced fat (2%) white milk	0.0	0.3	3.2	0.7
Low fat (1%) white milk	0.0	1.6	2.0	0.7
Fat-free milk	0.0	0.0	0.0	0.0
Flavored milk	0.0	10.0	13.8	4.6
Yogurt	0.0	2.0	5.4	1.4
Cheese	0.0	3.3	8.7	2.3
Baked Goods-Desserts	0.0	16.6	30.1	9.0
Cake-type (brownies, cupcakes)	0.0	6.2	18.2	4.7
Cake-type (low-fat/reduced-fat brownies, cupcakes)	0.0	0.0	1.0	0.2
Cookies	0.0	15.7	27.3	8.3
Cookies (low-fat/reduced-fat)	0.0	1.6	3.2	0.9
Pastries (pies, turnovers)	0.0	9.7	21.9	6.1
Donuts/crispy rice bars	0.0	3.3	8.8	2.3
Other baked desserts	0.0	5.6	7.9	2.6
Bread or Grain Products	0.0	15.8	27.8	8.5
Regular bread (breads, rolls, bagels)	0.0	0.0	0.0	0.0
Other bread (biscuits, croissants, hot pretzels)	0.0	0.0	0.0	0.0

TABLE A-IV.3 (continued)

	Elementary Schools	Middle Schools	High Schools	All Schools
Muffins	0.0	0.0	1.7	0.3
Muffins (low-fat/reduced-fat)	0.0	0.0	0.0	0.0
Granola bars	0.0	4.6	12.5	3.3
Granola bars (low-fat/reduced-fat)	0.0	0.2	0.7	0.2
Pretzels	0.0	7.3	14.1	4.1
Crackers/cracker sandwiches (peanut butter)	0.0	7.9	14.4	4.3
Crackers/cracker sandwiches (cheese)	0.0	9.9	15.7	5.0
Cereal/cereal bars	0.0	4.8	11.1	3.1
Other crackers	0.0	2.6	0.8	0.7
Other	0.0	1.4	9.6	2.1
Frozen Desserts	0.8	8.1	7.9	3.6
Frozen non-dairy (fruit bars, popsicles)	0.8	4.2	2.9	1.9
Ice cream (bars, cups, sundaes)	0.8	8.0	7.3	3.4
Low-fat frozen desserts (frozen yogurt, ice milk, sherbet)	0.0	1.7	1.0	0.5
Milkshakes/smoothies	0.0	0.1	0.4	0.1
Fruits and Vegetables	0.0	2.2	5.5	1.5
Canned, cooked fruit	0.0	0.0	0.0	0.0
Fresh fruit	0.0	0.0	4.5	0.9
Fruit salad	0.0	0.0	0.0	0.0
Dried fruit	0.0	2.2	1.0	0.6
Vegetables, side salad	0.0	0.0	0.0	0.0
Other fresh vegetables	0.0	0.0	0.0	0.0
Snacks	0.0	17.3	35.9	10.3
Chips (corn, potato, puffed cheese, tortilla)	0.0	15.9	31.7	9.2
Chips (lower-fat/reduced-fat corn, potato, puffed cheese, tortilla)	0.0	7.2	7.2	2.8
Nuts and seeds (almonds, peanuts, sunflower seeds, trail mix)	0.0	8.1	19.3	5.3
Fruit roll-up	0.0	2.6	5.6	1.6
Popcorn	0.0	5.4	8.1	2.6
Meat snacks (jerky, pork rinds)	0.0	3.4	10.0	2.6
Candy with chocolate	0.0	10.1	22.8	6.4
Candy without chocolate	0.0	11.9	22.9	6.7
Energy bars	0.0	0.0	1.9	0.4
Gum	0.0	0.0	1.6	0.3
Mints	0.0	5.8	8.1	2.7
Other snacks	0.0	0.0	0.0	0.0
Number of Schools	99	90	93	282

Source: School Nutrition Dietary Assessment-III, Vending Machine Checklist, school year 2004-2005. Checklists were completed by interviewer-observers at schools visited for student data collection. Weighted tabulations prepared by Mathematica Policy Research, Inc.

Note: N = 287, although for 5 schools, vending machine checklists were not available. In computing the percentage of schools with vending machines, data from the principal survey were used for these 5 schools.

TABLE A-IV.4

VENDING MACHINE ITEMS OFFERED AWAY FROM CAFETERIA (ELSEWHERE IN SCHOOL
OR OUTSIDE OF SCHOOL BUILDING), BY SCHOOL TYPE
(Percentage of Schools)

	Elementary Schools	Middle Schools	High Schools	All Schools
Any Vending Machine Food or Beverage Items Offered Away from Cafeteria (Elsewhere in School or Outside of School Building)	22.1	70.8	86.9	44.2
Number of Schools	100	93	94	287
Items Offered in Vending Machines Away from Cafeteria:				
Juice and Water	9.4	47.6	43.0	23.2
Juice (100% juice)	4.3	12.3	16.7	8.2
Water (spring, flavored, sparkling, mineral, seltzer)	7.2	41.4	36.1	19.4
Water (water with juice)	3.6	3.7	9.6	4.8
Other Beverages	14.4	47.1	71.8	31.9
Carbonated sweetened soft drink	8.7	32.2	62.4	23.7
Carbonated diet soft drink	7.3	25.5	57.5	20.6
Juice drinks (e.g., fruit blends, lemonade, punch)	5.9	26.9	36.2	15.9
Coffee	0.0	0.0	0.0	0.0
Tea	1.3	5.3	8.0	3.3
Hot chocolate	0.0	0.0	1.2	0.2
Yogurt drinks	0.0	0.0	0.0	0.0
Energy and sports drinks	5.3	32.2	35.6	16.4
Chocolate drinks	0.2	0.0	0.0	0.1
Other	0.2	1.2	2.7	0.9
Dairy Foods and Beverages	0.0	1.4	2.1	0.7
Whole milk	0.0	0.0	0.9	0.2
Reduced fat (2%) white milk	0.0	0.0	0.8	0.2
Low fat (1%) white milk	0.0	0.0	0.8	0.2
Fat-free milk	0.0	0.0	0.0	0.0
Flavored milk	0.0	0.0	2.1	0.4
Yogurt	0.0	0.0	0.0	0.0
Cheese	0.0	1.4	0.0	0.3
Baked Goods-Desserts	0.0	18.3	34.6	10.3
Cake-type (brownies, cupcakes)	0.0	8.4	17.2	5.0
Cake-type (low-fat/reduced-fat brownies, cupcakes)	0.0	1.0	3.6	0.9
Cookies	0.0	15.2	29.3	8.6
Cookies (low-fat/reduced-fat)	0.0	7.0	4.2	2.2
Pastries (pies, turnovers)	0.0	9.7	25.4	6.8
Donuts/crispy rice bars	0.0	1.2	15.6	3.3
Other baked desserts	0.0	7.0	17.2	4.7
Bread or Grain Products	0.0	18.3	31.7	9.7
Regular bread (breads, rolls, bagels)	0.0	0.0	1.8	0.4
Other bread (biscuits, croissants, hot pretzels)	0.0	0.0	0.0	0.0
Muffins	0.0	0.0	1.7	0.3
Muffins (low-fat/reduced-fat)	0.0	0.0	0.2	0.0
Granola bars	0.0	7.0	5.0	2.3
Granola bars (low-fat/reduced-fat)	0.0	0.0	1.7	0.3

TABLE A-IV.4 (continued)

	Elementary Schools	Middle Schools	High Schools	All Schools
Pretzels	0.0	12.9	18.1	6.0
Crackers/cracker sandwiches (peanut butter)	0.0	12.8	13.1	5.0
Crackers/cracker sandwiches (cheese)	0.0	13.8	20.5	6.6
Cereal/cereal bars	0.0	12.3	10.3	4.4
Other crackers	0.0	4.4	0.0	0.8
Other	0.0	8.3	3.9	2.4
Frozen Desserts	0.0	0.0	2.1	0.4
Frozen non-dairy (fruit bars, popsicles)	0.0	0.0	1.3	0.3
Ice cream (bars, cups, sundaes)	0.0	0.0	1.3	0.3
Low-fat frozen desserts (frozen yogurt, ice milk, sherbet)	0.0	0.0	0.0	0.0
Milkshakes/smoothies	0.0	0.0	0.8	0.2
Fruits and Vegetables	0.0	8.2	2.9	2.1
Canned, cooked fruit	0.0	1.4	1.8	0.6
Fresh fruit	0.0	0.0	0.0	0.0
Fruit salad	0.0	0.0	0.0	0.0
Dried fruit	0.0	6.8	1.2	1.5
Vegetables, side salad	0.0	0.0	0.0	0.0
Other fresh vegetables	0.0	0.0	0.0	0.0
Snacks	0.0	19.4	35.7	10.7
Chips (corn, potato, puffed cheese, tortilla)	0.0	17.2	34.2	10.0
Chips (lower-fat/reduced-fat corn, potato, puffed cheese, tortilla)	0.0	12.0	6.4	3.5
Nuts and seeds (almonds, peanuts, sunflower seeds, trail mix)	0.0	14.7	21.6	7.0
Fruit roll-up	0.0	3.2	6.1	1.8
Popcorn	0.0	7.8	15.0	4.4
Meat snacks (jerky, pork rinds)	0.0	13.3	8.9	4.3
Candy with chocolate	0.0	15.0	32.6	9.2
Candy without chocolate	0.0	15.6	32.2	9.3
Energy bars	0.0	3.0	1.5	0.9
Gum	0.0	3.7	0.6	0.8
Other snacks	0.0	8.2	10.8	3.7
Number of Schools	99	90	93	282

Source: School Nutrition Dietary Assessment-III, Vending Machine Checklist, school year 2004-2005. Checklists were completed by interviewer-observers at schools visited for student data collection. Weighted tabulations prepared by Mathematica Policy Research, Inc.

Note: N = 287, although for 5 schools, vending machine checklists were not available. In computing the percentage of schools with vending machines, data from the principal survey were used for these 5 schools.

TABLE A-IV.5

A LA CARTE ITEMS OFFERED AT LUNCH, BY MENU PLANNING OPTION
(Percentage of Schools)

	Nutrient-Based	Traditional Food-Based	Enhanced Food-Based	All Schools
Offers a la Carte Items at Lunch	78.5	88.3	72.5	82.1
Offers a la Carte Items at Lunch, Excluding Schools that Only Offer Milk a la Carte	44.1	52.7	22.9	44.0
Number of Schools	84	134	69	287
Foods Offered a la Carte at Lunch				
Milk	60.7	76.6	68.5	70.2
Milk Only	33.8	35.6	49.1	37.9
Juice and Water	57.1	54.0	56.9	55.5
Juice (100% juice)	40.5	43.0	46.8	43.0
Juice (50% juice)	7.7	8.8	13.2	9.4
Water (spring, flavored, sparkling, mineral, seltzer)	37.6	41.4	31.3	38.2
Water (water with juices, sparkling water with juices)	5.7	4.4	5.3	5.0
Other Beverages	40.1	40.1	28.8	37.7
Carbonated sweetened soft drink	3.2	1.2	1.1	1.8
Carbonated diet soft drink	1.7	1.1	1.1	1.3
Coffee	1.5	3.1	1.7	2.3
Hot chocolate	3.1	2.5	4.0	3.0
Juice drinks (less than 50% juice, e.g., fruit blends, lemonade, punch)	25.0	28.2	16.2	24.8
Tea	5.4	11.4	10.2	9.4
Yogurt drinks	1.5	2.0	0.0	1.4
Energy and sports	25.5	23.5	19.9	23.4
Other beverages	0.3	1.6	1.8	1.3
Baked Goods/Dessert	41.2	39.8	42.7	40.8
Cake-type (brownies, cupcakes)	18.0	17.3	20.4	18.2
Cake-type (low-fat/reduced-fat brownies, cupcakes)	5.6	3.9	11.6	6.0
Cookies	31.6	34.0	38.4	34.2
Cookies (low-fat/reduced-fat)	6.6	8.3	10.1	8.2
Pastries (pies, turnovers)	12.9	10.5	10.5	11.2
Crispy rice bars	0.0	0.1	0.6	0.2
Other baked goods-desserts	15.1	12.5	15.8	14.0
Other baked goods-desserts (lower-fat/reduced fat)	3.2	3.8	5.5	4.0
Bread or Grain Products	30.0	32.8	36.1	32.6
Regular bread (breads, rolls, bagels)	13.0	19.1	30.2	19.6
Other bread (biscuits, croissants, hot pretzels)	12.2	12.5	15.9	13.1
Muffins	5.2	10.2	14.1	9.5
Tortillas	3.7	5.0	14.4	6.6
Crackers with cheese or peanut butter	0.3	0.9	1.3	0.8
Dry cereal	0.6	1.1	0.0	0.8

TABLE A-IV.5 (continued)

	Nutrient-Based	Traditional Food-Based	Enhanced Food-Based	All Schools
Other grain products (crackers, granola bars, pretzels)	24.6	23.0	24.5	23.8
Candy	7.2	6.1	6.0	6.4
With chocolate	7.2	4.8	3.1	5.2
Without chocolate	4.8	2.6	5.5	3.9
Frozen desserts	37.4	36.3	26.7	34.7
Frozen non-dairy (fruit bars, gelatin pops, popsicles)	21.4	21.1	10.6	19.0
Ice cream (bars, cups, sundaes)	28.4	31.7	19.7	28.2
Low-fat frozen desserts (frozen yogurt, ice milk, sherbet)	13.8	10.6	10.9	11.6
Milkshakes/smoothies	12.1	2.7	9.2	6.9
Fruit	21.7	29.9	40.7	29.7
Canned, cooked fruit	11.9	25.1	32.4	22.7
Fresh fruit	21.3	28.2	37.0	27.9
Fruit salad	9.6	10.4	6.3	9.3
Dried fruit	5.2	8.6	6.2	7.1
Meat and Meat Alternates Entrees				
Meat Entrees	22.3	33.3	34.3	30.2
Beef				
Hamburger or cheeseburger	13.8	28.5	24.0	23.2
Chili or burrito	8.7	15.9	17.2	14.0
Other beef	5.4	14.2	12.3	11.2
Poultry				
Chicken patty (breaded)	12.3	25.3	19.7	20.3
Chicken (other)	13.9	18.1	17.7	16.8
Turkey	10.0	17.4	21.4	16.0
Other Meat				
Hot dog (corn dog, franks and beans)	8.7	20.5	20.4	17.0
Cold cuts (bologna, salami, and other similar cuts)	8.9	18.7	25.0	17.1
Sausage or pork	6.3	16.1	9.9	11.9
Meat Alternates	14.4	23.9	32.9	23.0
Cheese sandwich	7.3	17.6	20.4	15.1
Other cheese	7.1	13.8	14.6	12.0
Beans or peas (chick peas, garbanzo beans, kidney beans, refried beans)	6.6	13.1	12.2	10.9
Eggs (hard cooked, egg salad, scrambled, fried)	1.7	2.4	16.4	5.1
Fish	5.4	13.7	17.2	11.9
Nuts and seeds (peanuts, peanut butter, sunflower seeds, other nuts)	7.5	14.7	20.2	13.7
Low-Fat Entrees	2.9	7.1	6.4	5.7
Mixed Dishes	25.6	47.3	32.8	37.8
Chef salad	13.8	14.7	24.2	16.4
Lasagna	3.6	9.9	15.0	9.1
Macaroni and cheese	7.0	17.0	15.7	13.7
Pizza (no meat)	15.0	23.2	21.2	20.3
Pizza (with meat)	16.8	25.3	27.8	23.3

TABLE A-IV.5 (continued)

	Nutrient-Based	Traditional Food-Based	Enhanced Food-Based	All Schools
Spaghetti	7.2	16.7	14.8	13.5
Soup with meat or beans (bean, chicken, clam chowder, minestrone)	4.7	14.7	17.3	12.2
Mexican food	11.8	19.6	15.5	16.4
Chinese food	5.8	7.6	10.4	7.6
Breakfast burrito/breakfast sandwich	0.0	0.1	0.0	0.1
Chili, with meat or meat alternate	0.9	0.1	0.0	0.3
Peanut butter and jelly sandwich	0.7	13.9	0.0	7.1
Sandwiches, unspecified	1.5	0.3	1.1	0.8
Prepared salads, unspecified	0.0	0.0	2.3	0.5
Salad bar	0.0	1.3	0.8	0.8
Miscellaneous sandwiches, with meat	2.4	2.0	2.7	2.3
Other mixed dishes	4.2	3.6	3.4	3.7
Vegetables	24.3	29.0	38.6	29.6
Fried potatoes (including pre-fried, oven baked, french fries, potato puffs)	22.0	23.8	22.9	23.1
Salad (tossed, potato, three bean, raw vegetables)	14.4	22.3	27.3	21.0
Vegetable (other cooked)	9.9	18.3	28.4	17.9
Vegetable (soup)	4.8	15.8	14.0	12.1
Snacks	40.8	43.2	42.4	42.3
Chips (corn, potato, puffed cheese, tortilla)	35.0	36.0	36.1	35.7
Nuts and seeds (almonds, peanuts, sunflower seeds, trail mix)	7.7	8.3	12.1	8.9
Popcorn	14.3	15.8	13.1	14.8
Fruit snacks (roll ups, shapes)	27.9	18.3	18.1	21.1
Meat snacks (jerky, pork rinds)	3.3	1.5	3.4	2.5
Energy bars	4.3	0.1	4.3	2.2
Other snacks	9.6	9.8	10.1	9.8
Yogurt				
Yogurt	16.4	12.2	13.5	13.7
Other a la Carte Items				
Nachos	1.5	3.6	0.3	2.3
Pickles	3.0	3.7	1.0	2.9
Pudding	1.8	2.6	0.0	1.8
Other a la carte items, fried	2.2	2.5	3.6	2.7
Other	29.3	41.4	11.8	31.7
Number of Schools	84	134	69	287

Source: School Nutrition Dietary Assessment-III, A La Carte Checklist, school year 2004-2005. Weighted tabulations prepared by Mathematica Policy Research, Inc.

Note: N = 287. There were 241 schools with a la carte offerings at lunch, 95 of which only offered milk a la carte at lunch.

TABLE A-IV.6

FOOD AND BEVERAGE ITEMS OFFERED FROM ALTERNATIVE FOOD SOURCES, BY
SCHOOL TYPE
(Percentage of Schools)

	Schools Stores	Snack Bars	Food Carts	Other Sources	Any Source
Has Alternative Source on Campus	9.1	8.3	6.7	15.0	26.1
Number of Schools Reporting	283	283	283	283	283
Items Offered through Alternative Food Sources:					
Juice or Water	2.6	3.8	3.3	4.9	11.7
Juice 100%	1.2	2.0	3.1	2.5	7.3
Water (spring, flavored, sparkling, mineral, seltzer)	2.5	3.6	1.6	3.6	8.5
Water (water with juices, sparkling water with juices)	0.2	0.9	0.1	0.4	1.2
Other Beverages	2.6	6.0	1.5	5.7	11.3
Carbonated sweetened soft drink	1.3	3.5	0.6	2.4	6.0
Carbonated diet soft drink	1.5	2.4	0.6	1.2	4.6
Non-carbonated diet drink	0.0	0.2	0.0	0.0	0.2
Juice drinks (less than 50% juice, e.g. fruit blends, lemonade, punch)	1.3	5.3	0.8	5.1	9.2
Coffee	0.4	1.3	0.4	0.9	2.2
Tea	0.5	1.2	0.5	0.7	2.3
Hot chocolate	0.3	0.8	0.4	0.4	1.6
Yogurt drinks	0.0	0.0	0.0	0.0	0.0
Energy and sports drinks	1.2	2.6	0.6	2.2	4.8
Other	0.3	0.6	0.3	0.3	1.3
Milk or Dairy Products	0.3	1.8	3.8	3.0	7.8
Whole milk	0.0	0.3	2.0	0.4	2.7
Reduced fat (2%) white milk	0.1	0.7	1.8	0.5	2.7
Low fat (1%) white milk	0.0	0.9	2.3	1.6	4.7
Fat-free milk	0.1	0.9	2.2	0.8	3.5
Flavored milk	0.1	1.2	3.4	2.5	6.7
Yogurt	0.2	0.2	0.2	0.9	1.6
Cheese	0.0	1.0	0.1	0.5	1.1
Baked Goods-Desserts	6.5	4.4	1.7	4.9	13.9
Cake-type (brownies, cupcakes)	2.7	3.3	1.1	2.1	7.4
Cake-type (low-fat/reduced-fat brownies, cupcakes)	0.7	0.5	0.1	0.1	1.3
Cookies	2.6	2.8	0.8	2.6	7.8
Cookies (low-fat/reduced-fat)	1.0	0.4	0.1	0.1	1.5
Pastries (pies, turnovers)	2.8	0.6	1.2	1.6	5.3
Other	1.2	1.2	0.0	1.3	3.2

TABLE A-IV.6 (continued)

	Schools Stores	Snack Bars	Food Carts	Other Sources	Any Source
Bread or Grain Product	4.4	3.8	3.8	5.0	13.6
Regular bread (breads, rolls, bagels)	0.1	1.0	2.3	0.7	3.8
Other bread (biscuits, croissants, hot pretzels)	0.2	0.7	0.4	0.3	1.3
Muffins	0.7	0.6	0.6	0.8	2.7
Muffins (low-fat/reduced-fat)	0.3	0.4	0.0	0.0	0.8
Granola bars	1.9	0.7	1.0	1.4	4.7
Granola bars (low-fat/reduced-fat)	0.6	0.4	0.1	0.0	1.1
Pretzels	3.0	1.5	0.6	1.9	5.9
Crackers/Cracker sandwiches (peanut butter)	1.2	2.1	0.7	2.0	5.6
Crackers/Cracker sandwiches (cheese)	2.7	2.0	0.5	2.5	7.2
Other crackers	0.8	0.1	0.1	1.1	1.7
Cereal/Cereal bars	2.1	0.5	0.9	2.0	5.5
Other	1.0	0.2	0.2	1.1	2.3
Frozen Desserts	1.4	1.2	0.4	1.5	4.0
Frozen non-dairy (fruit bars, popsicles)	0.9	0.4	0.1	0.3	1.6
Ice cream (bars, cups, sundaes)	1.2	1.2	0.3	1.5	3.9
Low-fat frozen desserts (frozen yogurt, ice milk, sherbet)	0.8	0.5	0.1	1.1	2.2
Milkshakes/smoothies	0.2	0.0	0.1	0.0	0.2
Fruit and Vegetables	0.4	2.2	2.7	2.4	6.1
Canned, cooked fruit	0.3	0.6	2.1	1.0	3.7
Fresh fruit	0.0	2.0	0.9	2.3	4.1
Fruit salad	0.1	0.3	0.0	0.0	0.4
Dried fruit	0.0	0.4	0.0	0.1	0.4
Vegetables, side salad	0.0	0.5	0.8	0.3	1.3
Other fresh vegetables	0.0	0.4	0.4	0.2	0.6
Snacks	6.8	6.8	3.2	10.0	19.2
Chips (corn, potato, puffed cheese, tortilla)	3.8	5.3	2.0	4.9	12.3
Chips (lower-fat/reduced-fat corn, potato, puffed cheese, tortilla)	1.5	1.2	0.5	0.7	3.3
Nuts and seeds (almonds, peanuts, sunflower seeds, trail mix)	1.8	2.2	0.3	2.3	4.5
Fruit roll-up	1.1	2.5	0.7	3.0	5.5
Popcorn	1.0	2.1	0.2	2.8	4.1
Meat snacks (jerky, pork rinds)	2.6	1.6	0.2	0.5	4.1
Candy with chocolate	2.6	3.7	0.4	4.3	8.0
Candy without chocolate	4.4	5.9	1.4	7.6	13.2
Energy bars	0.3	0.4	0.3	0.0	1.1
Gum	0.3	0.0	0.3	0.2	0.5
Mints	0.0	0.0	0.0	0.1	0.1
Other	1.0	1.6	0.5	0.8	3.1
Prepared/Pre-Prepared Entrees and Food	3.1	2.0	1.3	2.2	6.6
Hot dogs	0.1	1.2	0.4	0.7	1.5
Hamburgers or cheeseburgers	0.1	0.6	1.0	0.4	1.4
Veggie burgers	0.0	0.0	0.0	0.0	0.0
Grilled sandwiches	0.0	0.0	0.5	0.0	0.5

TABLE A-IV.6 (continued)

	Schools Stores	Snack Bars	Food Carts	Other Sources	Any Source
Cold sandwiches	0.0	0.6	0.8	0.4	1.3
Peanut butter and jelly sandwiches	0.4	0.0	0.0	1.0	1.0
Burritos	0.0	0.4	0.6	0.0	1.0
Tacos	0.0	0.0	0.5	0.0	0.5
Chili, meat (unspecified)	0.1	0.0	0.0	0.0	0.1
Other Mexican food	0.1	0.2	0.0	0.0	0.3
Chinese food	0.1	0.2	0.1	0.1	0.2
Meal-size salad	0.0	0.1	0.5	0.0	0.6
Pizza	0.3	1.4	1.0	1.0	2.9
Pasta	0.1	0.2	0.1	0.2	0.2
French fries	0.0	0.3	0.4	0.3	0.9
Onion rings	0.0	0.0	0.0	0.0	0.0
Mozzarella sticks	0.0	0.3	0.2	0.2	0.6
Other prepared foods, fried	0.0	0.1	0.0	0.0	0.1
Soup (including Raman)	0.4	0.3	0.1	0.2	0.5
Other	2.3	0.3	0.1	0.7	3.3
Number of Schools Reporting	283	283	283	283	283

Source: School Nutrition Dietary Assessment-III, Alternative Food Source Checklist, school year 2004-2005. Weighted tabulations prepared by Mathematica Policy Research, Inc.

Note: Sources include school stores, snack bars food carts, concession stands, cafes restaurants, after-school programs, fundraisers, and any similar venue.

APPENDIX B

**FOOD GROUP TABLES
(SUPPLEMENT TO CHAPTER V)**

Development of SNDA-III Food Grouping System

A food grouping system was developed to provide further insight into the various types of foods and beverages offered in reimbursable breakfast and lunch menus and reported consumed by children in the 24-dietary recalls (Appendix Table B-V.1). Major and minor food groups were created, similar to those used in the School Nutrition Dietary Assessment Study-II (SNDA-II). Each menu item was assigned to one of nine major food groups—milk, fruits, vegetables, combination entrees, meat/meat alternates, grains/breads, desserts, accompaniments (condiments, spreads, and toppings), and other menu items, such as snack items and juice drink (not 100% juice).

To further classify foods, the major food groups were expanded into 148 subgroups (minor food groups). The minor food groups were derived initially from the minor food groups used in SNDA-II, and then refined based on the foods and beverages actually reported in breakfast and lunch menus and dietary recalls. Vegetable food groups were modeled after the My Pyramid vegetable subgroups: dark green, deep yellow, legumes, starchy, and other (U.S. Department of Agriculture, Center for Nutrition Policy and Promotion 2005). Also taken into consideration during the development of the food grouping system was the desire to describe the frequency with which schools offered fresh produce and self-serve food bars. The major and minor food groups were assigned to all menu and dietary recall items using the USDA Food and Nutrient Database for Dietary Studies (FNDDS) food codes.

TABLE B-V.1
MAJOR AND MINOR FOOD GROUPS

Major	Minor	Examples	
Milk	Whole, unflavored	Whole milk with no added flavoring	
	Whole, flavored	Whole chocolate or strawberry milk	
	2%, unflavored	2% milk with no added flavoring	
	2%, flavored	2% chocolate or strawberry milk	
	1%, unflavored	1% milk with no added flavoring	
	1%, flavored	1% chocolate or strawberry milk	
	Skim, unflavored	Skim milk with no added flavoring	
	Skim, flavored	Nonfat chocolate or strawberry milk	
	Other milk beverages	Milkshakes, cocoa made with milk, powdered breakfast drink made with milk	
	Fruits	Fresh	Any fresh fruit including apples, oranges, bananas, strawberries, and self-serve fruit bars
Canned, sweetened		Any canned fruit in light, medium or heavy syrup, or juice-packed, including peaches, pears, fruit cocktail	
Canned, unsweetened		Any canned fruit water-packed or drained, including peaches, pears, fruit cocktail	
Frozen		Any frozen fruit, including strawberries, blueberries, peaches, cherries	
Dried		Any dried fruit, including raisins, cranberries	
Citrus fruit juice, 100%		Orange juice, grapefruit juice, orange-blend juice, including calcium fortified juice	
Non-citrus fruit juice, 100%		Apple juice, grape juice, juice blends, including vitamin C fortified juice	
Vegetables		Cooked, starchy	Potatoes, french fries, tater tots, corn, green peas
		Cooked, dark green	Cooked broccoli, spinach, collards, kale
		Cooked, deep yellow	Cooked carrots, sweet potatoes
	Cooked, other	String beans, cauliflower, asparagus, mixed vegetables, vegetable soups	
	Vegetable soups and vegetable casseroles	Tomato soup, broccoli cheese soup, vegetable noodle soup	

TABLE B-V.1 (continued)

Major	Minor	Examples
	Minor	Examples
	Legumes	Pinto beans, kidney beans, black beans, lentils, bean soups
	Raw, dark green	Raw spinach, romaine, broccoli
	Raw, deep yellow	Raw carrots
	Raw, other	Raw green or red peppers, iceberg lettuce, cabbage
Combination Entrees	Entree food bars	Self-serve salad bars, sandwich or deli bars, nacho or taco bars, pasta bars, potato bars
	Bag lunches/pre-plated meals	Pre-packaged meals, including Lunchables
	Hamburger, similar beef/pork sandwiches	Hamburgers, sloppy joes, beef steak sandwiches, and riblet sandwiches
	Cheeseburger, similar beef/pork sandwiches	Cheeseburgers, sloppy joes with cheese, beef steak and cheese sandwiches, meatball and cheese subs
	Hot dog, corn dog, similar sausage sandwiches	Hot dog on bun, corn dogs, and pancake-on-a-stick
	Sandwiches with breaded/fried meat, poultry, or fish	Chicken patty, chicken-fried steak, breaded beef or pork patty, and breaded fish patty sandwiches
	Sandwiches with plain meat, poultry, or fish	Turkey, ham, turkey ham, grilled chicken, roast beef, and salami sandwiches
	Sandwiches with mayonnaise-based poultry, egg, or tuna salads	Chicken, egg, and tuna salad sandwiches
	Sandwiches with only cheese	Grilled cheese, cheese sandwiches, Uncrustables
	Peanut butter sandwiches	Peanut butter and jelly sandwiches, Uncrustables
	Breakfast sandwiches	Sausage, egg, and cheese on bagel; chicken patty on a biscuit; croissant with ham and cheese
	Pizza with meat	Sausage, pepperoni, and breakfast pizzas
	Pizza without meat	Cheese pizzas and vegetable pizzas
	Pizza-type product with meat	Calzones with pepperoni and cheese
	Pizza-type product without meat	Pizza dippers, pizza sticks, pizza rolls, mozzarella sticks
Mixtures with pasta or noodle base	Spaghetti with sauce, lasagna, macaroni and cheese, ravioli	
Other mixtures with meat, grain, and/or vegetables	Chili, beef or chicken stir-fry, egg rolls, frozen meals, chili cheese fries, baked potato with cheese and meat	
Mexican-style entrees	Burritos, tacos, nachos, quesadillas, fajitas, enchiladas, taquitos, tamales	

TABLE B-V.1 (continued)

Major	Minor	Examples
	Entree salads	Chef salads, chicken caesar salad, taco salad, salads with tuna or chicken salad
Meat/Meat Alternates	Chicken and turkey, breaded/fried	Chicken nuggets, patties, fillets, tenders, poppers, and fried chicken
	Chicken and turkey, plain (not breaded/fried)	Chicken or turkey salad, grilled chicken strips, chicken fajita strips, and roasted chicken breast
	Fish and shellfish, breaded/fried	Fish sticks, nuggets or patties, and shrimp poppers
	Fish and shellfish, plain (not breaded/fried)	Tuna salad, salmon, cod, shrimp
	Meat, breaded/fried	Chicken fried steak, breaded beef patty
	Meat, plain (not breaded/fried)	Ground beef, pork chops, meatloaf, meatballs
	Sausage, frankfurters and cold cuts	Sausage patties/links, hot dogs, bologna, salami
	Other protein (cheese, eggs, beans, or meat substitutes)	Cheese slices, omelets, hard boiled eggs, cheese sauce
	Nuts, nut butters, seeds, trail mixes	Peanut butter, sunflower seeds, trail mixes, mixed nuts
	Yogurt	Fruited or plain yogurt, including nonfat and lowfat
Grains/Breads	White breads, rolls, bagels, and other plain breads	White bread, pita bread, bagels, English muffins, toast, dinner rolls
	Whole grain breads, rolls, bagels, and other plain breads	Wheat, whole wheat, oatmeal, and rye bread or rolls
	Cold cereal, sweetened ^a	Any type of sweetened cold cereal: Honey Nut Cheerios, Fruit Loops, Lucky Charms, Frosted Flakes
	Cold cereal, unsweetened	Any type of unsweetened cold cereal: Rice Krispies, Corn Flakes, Wheaties, Chex
	Hot cereal	Any type of cooked hot cereal, including oatmeal, grits, cream of wheat
	Crackers and pretzels (hard)	Saltines, oyster crackers, cheese-filled crackers, hard pretzels
	Biscuits, croissants, seasoned breadsticks, cornbread, and stuffing	Biscuits, croissants, cornbread, hush puppies, stuffing, dumplings, flavored bread sticks
	Corn/tortilla chips	Corn chips, tortilla chips, taco shells
	Bread or bread alternates with added fat	Buttered toast, bagel with cream cheese, garlic bread

TABLE B-V.1 (continued)

Major	Minor	Examples
	Muffins (excluding English muffins), sweet/quick breads	Blueberry muffins, chocolate chip muffins, banana or pumpkin bread
	Pancakes, waffles, French toast	Pancakes, waffles, French toast or French toast sticks
	Rice	White, yellow or brown rice, rice pilaf, rice with vegetables, flavored rice not included in a combination entree
	Pasta	Noodles, macaroni, and spaghetti not included in a combination entrée; pasta salad without meat; macaroni and cheese as a side dish
	Pastries ^b	Pop tarts, cinnamon or sweet rolls, coffee cake, Danishes, donuts
	Granola bars, fruit and grain bars ^b	Cereal bars with fruit filling, granola bars, Power bars
Desserts	Baked (grain-based) desserts	Cookies, cakes, brownies, pies
	Granola bars, fruit and grain bars	Granola bars, breakfast bars, Rice Krispies treats
	Desserts containing fruit item or fruit juice	Fruit juice bars, gelatin with fruit, fruit sorbet
	Dairy based desserts	Pudding, ice cream, ice cream bars, frozen yogurt, yogurt
	Other (non-fruit gelatin)	Gelatin without fruit, ice pops
Other	Candy	Chocolate bars, licorice, gum, fruit roll-ups, hard candies
	Juice drinks (not 100% juice)	Lemonade, grape juice, fruit punch, orange drinks
	Carbonated soda with caloric sweetener	Regular sodas, fruit-flavored sodas, cream sodas, root beer, ginger ale, tonic water
	Carbonated soda with non-caloric sweetener	Diet sodas, diet fruit-flavored sodas, and club soda
	Tea and coffee	Caffeinated/decaffeinated tea and coffee, including sweetened
	Bottled water, non-carbonated, unsweetened	Plain spring or mineral water
	Bottled water, non-carbonated, sweetened	Sugar-sweetened spring or mineral water, including flavored water
	Bottled water, non-carbonated, vitamin-fortified	Spring or mineral water, including sweetened and/or flavored, fortified with vitamins (Propel, Vitamin Water)

TABLE B-V.1 (continued)

Major	Minor	Examples
	Bottled water, non-carbonated, sugar-free	Spring or mineral water sweetened with diet sweetener, including flavored water
Accompaniments	Fat-free/low-fat condiments and toppings	Ketchup, barbecue sauce, mustard, syrup, jelly, salsa, pickles, vegetable items used as toppings
	Higher fat condiments and toppings	Mayonnaise, tartar sauce, butter, margarine, cheese sauce, chili, gravy, cream cheese, sour cream
	Fat-free/low-fat salad dressings	Fat-free, low-fat, reduced-calorie, or low-calorie ranch, Italian, and French dressing
	Regular salad dressings	Ranch, Italian, honey mustard, French, and caesar dressing
	Condiment or 'fixins' bar	Self-serve condiment, toppings, or 'fixins' bars

^aA cereal was classified as sweetened if it contained 21.3 grams of sugar or more per 100 gram serving—the current criterion for cereals allowed under the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

^bSweet rolls, donuts, toaster pastries, coffee cake, grain fruit bars, and granola bars included as a grain/bread at breakfast.

TABLE B-V.2

PERCENTAGE OF SCHOOLS THAT OFFERED SELF-SERVE FOOD BARS IN NSLP LUNCHES,
BY MENU-PLANNING METHOD

	Percentage of Schools in Which Food Bar Offered				
	Food Based			Nutrient Based	All Schools
	Traditional	Enhanced	All		
Any Self-Serve Food Bar					
At least once per week	28	25	27	25	27
Every day	14	17	15	24	18
Any Salad Bar					
At least once per week	25	20	23	23	23
Every day	11	12	11	23	15
Side Salad Bar					
At least once per week	5	12	7	21 ^γ	11
Every day	4	6 ^β	5	21 ^γ	9
Salad Bar as Entree					
At least once per week	21	10	17	2 ^γ	13
Every day	8	5	7	2 ^γ	5
Sandwich/Deli Bar					
At least once per week	5	5	5	3	4
Every day	3	4	3	3	3
Other Entree Food Bars^a					
At least once per week	3	3	3	5	4
Every day	2	1	2	2	2
Number of Schools	193	90	283	114	397

Source: School Nutrition Dietary Assessment-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

^aIncludes baked potato bars, nacho and taco bars, and Italian/pasta bars.

^αDifference between traditional and enhanced food-based is significantly different from zero at the .05 level.

^βDifference between enhanced food-based and nutrient-based is significantly different from zero at the .05 level.

^γDifference between traditional food-based and nutrient-based is significantly different from zero at the .05 level.

TABLE B-V.3

MOST COMMONLY OFFERED FOOD ITEMS IN NSLP LUNCHES,
BY MENU-PLANNING METHOD

	Percentage of Daily Menus in Which Item Was Offered				
	Food Based			Nutrient Based	All Schools
	Traditional	Enhanced	All		
Milk	100	100	100	100	100
1% fat	79	87	81	87	83
2% fat	63	54	60	51	58
Skim or nonfat	45	55	48	60	52
Whole	32	25	30	33	31
Flavored ^a	100	97	99	99	99
Vegetables	97	96	97	95	96
Vegetables, except french fries	87	86	87	90	88
Starchy	61	55	59	49 ^γ	56
French fries/similar potato products ^b	30	29	30	26	29
Corn	17	18	17	13	16
White potatoes	18 ^α	11	16	14	15
Green salads (non-entree)	33	35 ^β	33	51 ^γ	39
Lettuce salads	29	25	27	30	28
Side salad bar	4	10	6	21 ^γ	11
Deep yellow/dark green	25	24 ^β	25	38 ^γ	29
Carrots	18	16	18	26	20
Broccoli	6	4 ^β	5	9	7
Other vegetables	21	23	22	25	23
String beans	14	16	14	16	15
Mixed vegetables	5	6	5	7	6
Legumes (kidney or baked beans, bean soups)	11 ^α	4 ^β	9	11	10
Fruits and Juices	94	95	94	92	94
Canned fruit, sweetened	64	56	61	63	62
Peaches	21	19	20	20	20
Pears	16	13	15	16	16
Pineapple	16	15	15	15	15
Fruit cocktail	16 ^α	11	14	16	15
Fresh fruit	47	60	51	49	50
Apple	32	41	34	35	35
Orange	19	24	21	22	21
Banana	13	16	13	11	13
Fruit juice, 100%	29	30	29	36	31
Orange juice	21	25	22	22	22
Apple juice	15	16	16	18	16
Combination Entrees	91	92	91	95 ^γ	93
Sandwiches with plain meat or poultry	24	31	26	33	28
Peanut butter sandwiches	24	30	26	26	26
Entree salads (chef's salads)	25	24	25	23	24
Pizza with meat	20	24	21	24	22
Mexican-style entrees (burritos, tacos, nachos)	18	21	19	27 ^γ	21
Hamburgers, similar beef/pork sandwiches	23 ^α	15	21	15 ^γ	19
Pizza without meat	15	20	17	26 ^γ	19
Cheeseburgers, similar beef/pork sandwiches	13	17	14	23 ^γ	17
Hot dog, corn dog, similar sausage sandwiches	19	17	18	15	17
Sandwiches with breaded/fried meat, poultry, or fish	14	12 ^β	14	25 ^γ	17
Self-serve salad bars and other food bars	15	12	14	7 ^γ	12
Mixtures with a pasta or noodle base (spaghetti with meat sauce, macaroni and cheese, lasagna)	12	10	12	13	12

TABLE B-V.3 (continued)

	Percentage of Daily Menus in Which Item Was Offered				
	Food Based			Nutrient Based	All Schools
	Traditional	Enhanced	All		
Sandwiches with mayonnaise-based poultry or tuna salads	9	7	8	5	7
Sandwiches with cheese only	11 ^a	5	9	4 ^γ	7
Other mixtures with meat, grain, and/or vegetables	6	6	6	10	7
Bag lunches and pre-plated meals	5	5	5	5	5
Grains/Breads (not part of a combination entree)	71	66	69	66	68
Breads, rolls, bagels, and other plain breads	36	31	34	32	34
White	31	27	30	29	30
Whole grain	5	4	5	4	5
Crackers and pretzels	26	27	26	23	25
Bread or bread alternates with added fat	7	6	7	12	9
Rice	6	5	6	6	6
Corn/tortilla chips	4	8	5	7	6
Biscuits, croissants, cornbread	6	5	6	3 ^γ	5
Pasta	6	3	5	4	4
Meats/Meat Alternates (not part of a combination entree)	46	53	48	45	47
Breaded/fried chicken nuggets, patties, similar products	17	18	17	22	19
Plain (not breaded or fried) chicken and turkey	7 ^a	3	6	5	6
Meat (plain or breaded/fried beef, pork)	13	10	12	9 ^γ	11
Other (cheese, eggs, nuts)	8	16	11	7	10
Yogurt	3 ^a	15	7	10 ^γ	8
Other Menu Items	36	36 ^β	36	50 ^γ	40
Cookies, cakes, brownies	18	19	18	19	19
Dessert items that contain fruit or juice (fruit juice bars, fruited gelatin)	6	6	6	10	7
Juice drinks (not 100% juice)	4	7	5	12	7
Dairy-based desserts (ice cream, pudding)	7	7	7	7	7
Snack chips (popcorn, potato chips)	1	2	1	5	3
Number of Daily Menus	927	438	1,365	550	1,915
Number of Schools	193	90	283	114	397

Source: School Nutrition Dietary Assessment-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Notes: Table is limited to minor food groups offered in at least five percent of menus for one or more school type. Table does not account for individual food items offered as part of food bars, bag lunches, or pre-plated meals.

^aIncludes all flavored low-fat, skim, and whole milk.

^bIncludes oven-baked and deep-fried french fries and similar potato products.

^aDifference between traditional and enhanced food-based is significantly different from zero at the .05 level.

^βDifference between enhanced food-based and nutrient-based is significantly different from zero at the .05 level.

^γDifference between traditional food-based and nutrient-based is significantly different from zero at the .05 level.

TABLE B-V.4

PERCENTAGE OF SCHOOLS THAT OFFERED RAW VEGETABLES AND FRESH FRUITS IN NSLP LUNCHES, BY MENU-PLANNING METHOD^a

	Percentage of Schools in Which Item Was Offered				
	Food Based			Nutrient Based	All Schools
	Traditional	Enhanced	All		
Number of Days on Which Any Fresh Produce Was Offered					
None	1	2	1	0	1
1 to 2	16	22	18	21	19
3 to 4	33 ^α	14	26	11 ^γ	22
5	50	62	54	68	58
<i>Mean number of days fresh produce offered</i>	4	4	4	4	4
<i>Median number of days fresh produce offered</i>	5	5	5	5	5
Number of Days on Which Raw Vegetables were Offered^b					
None	4	5	4	6	5
1 to 2	27	35	29	25	28
3 to 4	30	21	27	14	24
5	39	38	39	55	44
<i>Mean number of days raw vegetables offered</i>	3	3	3	4	3
<i>Median number of days raw vegetables offered</i>	4	3	4	5	4
Number of Days on Which Fresh Fruits Were Offered^c					
None	27	15	23	18	22
1 to 2	24	29	26	39	30
3 to 4	23	20	22	15	20
5	25	36	29	28	29
<i>Mean number of days fresh fruits offered</i>	2	3	3	3	3
<i>Median number of days fresh fruits offered</i>	2	4	3	2	2
Number of Schools	155	78	233	96	329

Source: School Nutrition Dietary Assessment-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Differences between medians were not tested for statistical significance.

^aIncludes only schools that provided menu information for five days.

^bExcludes canned and frozen vegetables, vegetable juices, and fresh vegetables that were cooked.

^cExcludes canned, frozen, and dried fruits and fruit juices.

^αDifference between traditional and enhanced food-based is significantly different from zero at the .05 level.

^βDifference between enhanced food-based and nutrient-based is significantly different from zero at the .05 level.

^γDifference between traditional food-based and nutrient-based is significantly different from zero at the .05 level.

TABLE B-V.5

AMOUNT OF CHOICE AND VARIETY OFFERED IN SBP BREAKFASTS,
BY MENU-PLANNING METHOD

	Percentage of Daily Menus				
	Food Based			Nutrient Based	All Schools
	Traditional	Enhanced	All		
Number of Types of Milk Offered per Day					
No more than 1	13	25	16	19	17
2	29	27	29	30	29
3	35 ^α	18	30	30	30
4 to 6	23	30	25	22	24
<i>Median number of different items per day</i>	3	2	3	3	3
<i>Median number of different items per week^a</i>	3	3	3	3	3
Number of Fruits/Vegetables/100% Juices Offered per Day					
No more than 1	40	42	40	34	39
2	36	23	32	31	32
3	14	18	15	20	17
4 or more	10	17	12	15	13
<i>Median number of different items per day</i>	2	2	2	2	2
<i>Median number of different items per week^a</i>	3	4	3	3	3
Number of Separate Grains/Breads Offered per Day^b					
No more than 1	24	32 ^β	27	14	23
2	35	30 ^β	34	40	36
3	25	25	25	34	27
4	9	7	8	8	8
5 or more	7	6	7	4	6
<i>Median number of different items per day</i>	2	2	2	2	2
<i>Median number of different items per week^a</i>	5	5	5	6	5
Number of Separate Meats/Meat Alternates Offered per Day^b					
None	56	56 ^β	56	71 ^γ	60
1	33	31	32	26	31
2 or more	11	13 ^β	11	4 ^γ	9
<i>Median number of different items per day</i>	0	0	0	0	0
<i>Median number of different items per week^a</i>	1	2	1	2	2
Number of Combination Entrees Offered per Day					
None	65	61	64	64	64
1	27	29	27	31	29
2 or more	8	9	8	5	7
<i>Median number of different items per day</i>	0	0	0	0	0
<i>Median number of different items per week^a</i>	2	1	2	2	2

TABLE B-V.5 (continued)

	Percentage of Daily Menus				
	Food Based			Nutrient Based	All Schools
	Traditional	Enhanced	All		
Number of Side Items Offered per Day ^c					
No more than 2	n/a	n/a	n/a	5	n/a
3 to 4	n/a	n/a	n/a	30	n/a
5 to 6	n/a	n/a	n/a	39	n/a
7 or more	n/a	n/a	n/a	25	n/a
Median number of different items per day	n/a	n/a	n/a	5	n/a
Median number of different items per week ^a	n/a	n/a	n/a	12	n/a
Number of Daily Menus	787	364	1,151	454	1,605
Number of Schools	164	74	238	93	331

Source: School Nutrition Dietary Assessment-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Differences between medians were not tested for statistical significance.

^aIncludes only schools that provided menu information for five days.

^bNot included in combination entrees. All varieties of cold cereal counted as one grain/bread choice.

^cSide items apply to nutrient-based menu planning only and may include fruits, juices, vegetables, bread or other grain products, meat or meat alternatives, or other menu items. Under nutrient-standard menu planning, breakfasts offered must include milk and at least two sides.

^αDifference between traditional and enhanced food-based is significantly different from zero at the .05 level.

^βDifference between enhanced food-based and nutrient-based is significantly different from zero at the .05 level.

^γDifference between traditional food-based and nutrient-based is significantly different from zero at the .05 level.

n/a = not applicable.

TABLE B-V.6

MOST COMMONLY OFFERED FOOD ITEMS IN SBP BREAKFASTS,
BY MENU-PLANNING METHOD

	Percentage of Daily Menus in Which Item Was Offered				
	Food Based			Nutrient Based	All Schools
	Traditional	Enhanced	All		
Milk	100	100	100	98	99
1% fat	68	79	71	71	71
2% fat	59	53	57	53	56
Skim or nonfat	42	46	43	45	44
Whole unflavored	30	26	29	29	29
Flavored ^a	85	73	82	71	79
Fruits and Juices	100	97	99	98	99
Fruit Juice	90	79 ^β	87	91	88
100% citrus juice (orange)	76 ^α	60	71	72	72
100% non-citrus juice	63	57	62	66	63
Apple juice	53	48	52	61	55
Fruit juice blend	5	7	6	4	5
Fresh fruit	19 ^α	38	24	28	26
Apple	9	14	10	15	12
Banana	9	14	10	11	10
Orange	8	17	11	13	11
Canned fruit (peaches, pears)	11	16	13	16	14
Grains/Breads (not part of a combination entree)	94	93	94	97	95
Cold cereal	79	71	77	81	78
Sweetened	73	66	71	75	72
Unsweetened	26	26	26	29	27
Sweet rolls, donuts, toaster pastries	27	37	29	28	29
Buttered toast, bagels with cream cheese	19	19 ^β	19	35 ^γ	24
Breads, rolls, bagels, other plain breads	22	16 ^β	20	30	23
White	20	13	18	23	20
Whole grain	1	3	2	8 ^γ	4
Pancakes, waffles, French toast	20	18	20	18	19
Biscuits, croissants, cornbread	21	16	20	11 ^γ	17
Muffins (excludes English muffins), sweet/quick breads	16	12	15	14	15
Crackers (mainly grahams)	7	13	9	10	9
Grain and fruit cereal bars, granola bars	3	6	4	6	5
Meats/Meat Alternates (not part of a combination entree)	44	44 ^β	44	30 ^γ	40
Sausage	22	14	20	10 ^γ	17
Yogurt	13	22	16	10	14
Eggs	8	13 ^β	10	5	8
Cheese	7	3	6	1 ^γ	5
Breaded chicken patty/nuggets	5	2	4	1 ^γ	3

TABLE B-V.6 (continued)

	Percentage of Daily Menus in Which Item Was Offered				
	Food Based			Nutrient Based	All Schools
	Traditional	Enhanced	All		
Combination Entrees	35	38	36	35	35
Breakfast sandwiches ^b	13	15	14	11	13
Pizza (all types)	10	17	12	9	11
Sausage with pancake, corn dog, similar products	9	7	8	11	9
Mexican-style entrees (mainly burritos)	7	7	7	5	7
Number of Daily Menus	787	364	1,151	454	1,605
Number of Schools	164	74	238	93	331

Source: School Nutrition Dietary Assessment-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to minor food groups offered in at least five percent of menus for one or more school type.

^aIncludes flavored low-fat and skim milk. All whole milk was unflavored.

^bIncludes sandwiches with sausage, egg, cheese, ham or other types of meat on a biscuit, English muffin, bagel, or croissant.

^aDifference between traditional and enhanced food-based is significantly different from zero at the .05 level.

^bDifference between enhanced food-based and nutrient-based is significantly different from zero at the .05 level.

^cDifference between traditional food-based and nutrient-based is significantly different from zero at the .05 level.

APPENDIX C

**METHODS FOR ANALYSIS OF THE NUTRIENT CONTENT OF MEALS
OFFERED AND SERVED**

A major objective of the third School Nutrition Dietary Assessment Study (SNDA-III) was to assess the nutritional quality of meals provided to students through the National School Lunch Program (NSLP) and School Breakfast Program (SBP). In assessing the energy and nutrient content of NSLP and SBP meals, it was important to replicate as closely as possible the analysis procedures specified in USDA program regulations as well as methodologies adopted in previous studies.¹ NSLP regulations at the time of the study allowed for both *unweighted* and *weighted* nutrient analysis in planning menus and monitoring compliance with School Meals Initiative (SMI) nutrition standards (Office of the Federal Register 2004). Thus, the nutritional quality of NSLP and SBP meals was assessed in SNDA-III using both approaches to nutrient analyses. An *unweighted* nutrient analysis provides an approximation of the average meal *offered* to students. A *weighted* analysis produces an estimate of the average meal *served to* or *selected by* students.

Data to measure the food energy and nutrient content of USDA reimbursable meals offered and served were obtained from the Menu Survey data file. Variables for each daily menu included the type of meal (breakfast versus lunch), the total number of meals served, and, for each food and beverage, the USDA food code, food name, portion size, and number of reimbursable portions served. The USDA Food and Nutrient Database for Dietary Studies (FNDDS; version 1.0, 2004) provided the energy and nutrient values per serving. All nutrients and dietary components targeted by the SMI were analyzed: energy, protein, vitamins A and C, calcium, iron, total fat, saturated fat, cholesterol, sodium, and dietary fiber. Other nutrients included in the analysis were either those that had been analyzed in previous national studies of the NSLP and SBP or selected nutrients of interest for which Dietary Reference Intake standards

¹ While the first School Nutrition Dietary Assessment Study (SNDA-I) analyzed meals offered using an unweighted nutrient analysis (Burghardt et al. 1993a), the main findings from the School Nutrition Dietary Assessment Study-II (SNDA-II) pertained to meals served, which were based on a weighted nutrient analysis (Fox et al. 2001).

have been defined, including: carbohydrate, monounsaturated fat, polyunsaturated fat, linoleic acid, alpha-linolenic acid, vitamin E, vitamin B₆, vitamin B₁₂, folate, niacin, riboflavin, thiamin, magnesium, phosphorus, potassium, and zinc. All analyses were conducted separately for lunch and breakfast.

This appendix describes how the energy and nutrient content of NSLP and SBP meals was measured for the SNDA-III meals offered and served analyses presented in Chapters VI, VII, and VIII of this report. Section A reviews the methodology for determining the average nutrient content of meals as offered (unweighted nutrient analysis), including the variations adopted for schools that used one of the nutrient-based menu planning systems (Nutrient Standard Menu Planning or Assisted Nutrient Standard Menu Planning). Section B describes the methodology for analyzing the nutrient composition of meals as served to students (weighted nutrient analysis). Section C provides an illustrative example of the assumptions for the unweighted and weighted analysis of an NSLP lunch menu. The final section, Section D, describes how the average energy and nutrient content of each school's NSLP and SBP meals were compared to the SMI nutrition standards.

A. COMPUTING THE AVERAGE NUTRIENT CONTENT OF SCHOOL MEALS OFFERED

An *unweighted* nutrient analysis was used to assess the mean energy and nutrient composition of NSLP and SBP meals *offered* to students. Because of differences in the basic structure of the meals, the unweighted analysis procedures differed somewhat for schools using food-based versus nutrient-based menu planning systems,² and for breakfasts versus lunches. Each variation of the basic methodology is described in the sections that follow.

² For example, nutrient-based menu planning does not require that all meal components in the food-based meal pattern be offered.

1. Schools Using Food-Based Menu Planning

For schools using both the traditional and the enhanced food-based menu planning systems, the unweighted analysis assumed that every child takes one average serving, among the food choices offered, of each meal component.³ At **lunch**, this included the following:

- An average serving of milk
- One average entree or meat/meat alternate
- Two average servings of vegetables and/or fruit
- An average serving of grain or bread, if offered separately from entrees
- An average serving of desserts or other extra items (if offered)
- An average serving of unlinked condiments or spreads (if offered)

These assumptions, originally developed for SNDA-I, were adjusted for both SNDA-II and the current study to reflect the fact that many schools were offering students the opportunity to select more than two servings of fruits and vegetables at lunch, in keeping with the nutrition principles encouraged by the SMI. If data on the number of portions served (obtained for the weighted analysis) indicated that students were allowed to select more than two servings of fruits and vegetables, then the unweighted analysis for lunch assumed a proportionate increase in the number of servings from this meal component group (range of two to five fruit/vegetable servings per lunch).

For **breakfast**, the unweighted analysis assumed an average serving of milk; an average serving of fruit, juice, and/or vegetable; two average servings of grains/breads and/or meat/meat alternates; and an average serving of unlinked condiments/spreads (if offered).

³ Meal patterns for the two food-based menu planning systems require the same main meal components; differences relate only to the amounts of fruits and vegetables and grains/breads required.

In principle, computing an unweighted average is a fairly simple concept. However, when applied to school menus, the computation is preceded by a complex data preparation process. Weighting factors must be applied to appropriately account for multiple offerings within meal component groups, menu items offered together but reported separately (such as salad and salad dressings), and to avoid double-counting menu items that include foods from more than one meal component group (for example, salad bars that include both meat or meat alternates and vegetables). Computing the weighting factors for the unweighted nutrient analysis of NSLP lunches involved six steps:

- **Step 1: Assign meal component groups.** All menu items were assigned to one of the meal component groups used in the unweighted analysis. For schools using food-based menu planning, these included milk, fruits/vegetables, grains/breads, combination entrees, meat/meat alternates, desserts and other extras, salad dressings, toppings, and condiments and spreads).
- **Step 2: Assign weighting factors to major meal component groups.** Initially, equal weight was given to each option within a meal component group, using a base of 300 (representing 300 reimbursable meals).⁴ For example, if four types of milk were offered, each type was assigned a weight of 75. The base of 600 for fruit and vegetable items ($2 * 300$) was increased if the total number taken by students suggested that the school offered more than the minimum of two servings. For example, if a school served 150 reimbursable lunches and 450 fruit/vegetable servings, the base was increased to 900 ($3 * 300$). Thus, if the same school offered six different fruit/vegetable choices, each would be assigned a weight of 150 (900 divided by 6).
- **Step 3: Assign weighting factors to grains/breads served with meat/meat alternate or entree.** Menu items that were “linked” to (served with but reported separately from) other foods were assigned the same weight as the food they were served with. This usually included a grain or bread served with a meat/meat alternate or entree, such as a roll with chicken nuggets, rice with stir-fried beef, or crackers with chef’s salad. If it appeared that a grain/bread was “unlinked” (available to all students), its weight was determined assuming a total base weight of 300.
- **Step 4: Assign weights to salad dressings.** The weights assigned to salad dressings were based on the weights assigned to salads (excluding salad bars) so that the unweighted analysis would include one average serving of dressing for each salad. An

⁴ In SNDA-II, a base of 1,000 was used; however, current USDA guidance suggests using a base of 300 which is divisible by all numbers up to six (U.S. Department of Agriculture, Food and Nutrition Service n.d.).

average serving of salad dressing had already been included during the coding of salad bars.

- **Step 5: Assign weights to toppings and condiments/spreads.** Toppings were items like shredded cheese, chopped tomatoes, and salsa for tacos; or sour cream and bacon bits for baked potatoes. Toppings were linked in the data file to the items they were served with, but where it appeared that students were allowed to choose their toppings (different amounts of each topping were served), weights were assigned so that one average serving of toppings would be included in the analysis.

Condiments and spreads (butter, margarine, mayonnaise) that were linked to other menu items were assigned the weight already assigned to those items. For example, if taco sauce was included in a menu in which the three entrees (and their weights) were pizza (100), burrito (100), and ham sandwich (100), and the taco sauce was linked to the burrito, the weight for the taco sauce would be 100—the same weight as the burrito. When linkages were ambiguous, for example, ketchup and mustard offered on a menu with hamburgers, cheeseburgers, and French fries, the base weight for condiments of 300 would be evenly divided among the available options (two in this example).

- **Step 6: Adjust weights to account for salad bars, food bars, preplated meals, and bag lunches.** Weighting factors were adjusted to account for multi-component menu items to ensure that meal components would not be double counted in the unweighted analysis. For example, if a bag lunch included a sandwich, carrot sticks, and a brownie, it was coded as an entree and assigned a weight accordingly (Steps 1 and 2). However, since the bag lunch also included a fruit/vegetable and dessert serving, the weight assigned to the bag lunch was subtracted from the total weights for those meal component groups. The weights for individual fruit/vegetable and dessert items not part of the bag lunch, and any linked items, were then recalculated (Steps 2 through 5).⁵

An additional step was required in assigning weighting factors for SBP **breakfast** menus.

At breakfast, food-based meal pattern requirements call for two servings of grains/breads, two servings of meat/meat alternate, or one serving of each. Many schools offer single breakfast items that fulfill this requirement—usually two or more grains/breads or a combination of grain/bread and meat/meat alternate (for example, 2 oz. bagel, egg and cheese on English muffin, biscuit with sausage). Based on portion size, each multicomponent item was assigned a

⁵ Appendix E (Exhibit E.5) of the final report for SNDA-II provides an example of the adjustments described in Step 6 in Fox et al (2001).

meat/grain” serving equivalent (up to two). This ensured that weights were assigned to breakfast menus such that the “average” breakfast included two average servings of grain/bread and/or meat/meat alternate.⁶

2. Schools Using Nutrient-Based Menu Planning

Schools using a nutrient-based menu planning system are required to offer three items in a reimbursable **lunch**: milk, an entree, and at least one side (for example, fruits, vegetables, grains/breads, desserts). At **breakfast**, milk and at least two sides must be offered. Individual schools can decide how many sides a student can take, and some specify the particular groups of sides required or the maximum number of selections allowed per group.

For the unweighted analysis, assumptions about the number of sides offered were based on district-level policies for each school, including, where they applied, different assumptions for different groups of sides.⁷ Information on these policies was collected during brief follow-up telephone calls with relevant staff in School Food Authorities (SFAs) that used nutrient-standard menu planning. The majority of schools using nutrient-based menu planning limited the number of sides students could select (82 percent at lunch; 94 percent at breakfast). Fewer than 10 percent of the schools that set a maximum for the number of sides allowed also specified a maximum number per side type group (usually grain/breads, fruit/vegetables, or desserts).

After incorporating the school-specific information on the number and types of sides offered, the process for computing unweighted averages for schools using a nutrient-based menu

⁶ USDA menu planning guidance was used to define meat/grain equivalents (U.S. Department of Agriculture, Food and Nutrition Service 1998).

⁷ In contrast, the “modified approach” used in SNDA-II for the unweighted analysis of meals offered by schools using nutrient-based menu planning considered all non-milk/non-entree options as a single group of “sides.” This was consistent with USDA technical guidance at the time. Results of this analysis were presented in Appendices A and B of the SNDA-II final report (Fox et al 2001).

planning system was similar to that described in Steps 1 through 6 for schools using a food-based system. That is, weighting factors were assigned to choices within each relevant meal component group, with the appropriate adjustments made to prevent double-counting. For schools using nutrient-based menu planning, the average lunch as offered consisted of:

- An average serving of milk
- One average entree (usually a meat or meat alternative, alone or in combination with a grain/bread or fruit/vegetable)
- At least one average serving of a non-milk, non-entree item side (number of servings based on school policy)
- An average serving of unlinked condiments or spreads (if offered)

The average breakfast offered consisted of an average serving of milk, at least two average sides (which could include a “breakfast entree”; actual number of sides determined by school policy), and an average serving of unlinked condiments/spreads (if offered).

3. Computing Unweighted Nutrients

After all menu items were assigned weighting factors, food energy and nutrient values were computed for each item offered on daily menus (energy and nutrients in one portion multiplied by assigned weight). Nutrient values were totaled within each menu, and the resulting total was then divided by the base weight of 300. To obtain the overall mean nutrient content of the meals as offered, daily nutrient totals were averaged across the week (five days or, for some schools, three or four days).

B. COMPUTING THE AVERAGE NUTRIENT CONTENT OF SCHOOL MEALS SERVED

A *weighted* analysis takes into account the number and types of foods actually served to students, giving greater weight to the nutrient value of foods that students’ select more frequently. Weighted analysis requires information on the number of actual servings of each

menu item available in the reimbursable meals. It can be very difficult for schools to provide this information, in part because of the reimbursable items also sold a la carte and to adults. Thus, for this study, servings data were sometimes estimated by school food service staff. Details of the methods for collecting and processing these data for SNDA-III are provided in Volume III of this report, *School Nutrition Dietary Assessment Study-III: Sampling and Data Collection*.

The procedures for weighted nutrient analysis were the same regardless if the school used a food-based or nutrient-based menu planning system, for both breakfast and lunch menus. The Menu Survey data file included information on the total number of reimbursable meals served for each daily menu, the number of portions of each menu item included in those meals, and the nutrient content of one portion of each item. Computing a weighted average of the energy and nutrient content of a reimbursable meal involved three steps:

- **Step 1.** For each menu item, the total number of portions served to students was multiplied by the amount of energy and nutrients in one portion.
- **Step 2.** The total energy and nutrients served were then summed across all foods within a daily menu. For example, the total amount of vitamin A was calculated as the sum of vitamin A in 200 cartons of one percent milk, 50 cartons of skim milk, 250 chicken sandwiches, 100 slices of pizza, 150 salads, and so on.
- **Step 3.** The resulting sum was then divided by the total number of reimbursable meals served to determine the nutrient content of the average meal served to (or selected by) students.

As for the unweighted nutrient analysis, to determine the overall average for each school, daily energy and nutrient values were averaged across the week.

C. COMPARISON OF ASSUMPTIONS FOR WEIGHTED AND UNWEIGHTED NUTRIENT ANALYSES

Table C-VI.I illustrates weighting factors for a weighted and unweighted analysis of a sample NSLP lunch menu. For the weighted analysis, the actual number of portions served and the total number of reimbursable meals were used to create a “serving weight,” which

TABLE C-VI.1

EXAMPLE OF WEIGHTING FACTORS FOR UNWEIGHTED AND WEIGHTED
NUTRIENT ANALYSIS OF SAMPLE NSLP LUNCH MENU

	Weighted Analysis	Unweighted Analysis	
		Food-based Menu Planning ^a	Nutrient-based Menu Planning ^b
Number of Reimbursable Meals	550	300	300
	Number of Portions Served/Offered		
Menu Item			
1% milk (white)	255	100	100
Skim milk	25	100	100
2% chocolate milk	195	100	100
Hamburger	85	60	60
Taco	40	60	60
Pizza	250	60	60
Beef and bean burrito	50	60	60
Chicken patty sandwich	125	60	60
Orange juice	435	225	150
Canned peaches	295	225	150
French fries	525	225	150
Side salad	300	225	150
Dinner roll (not linked)	315	300	150
Nacho chips (linked to taco)	40	60	60
Brownie	350	300	150
Ketchup	225	100	100
Mustard	75	100	100
Butter (linked to roll)	250	300	150
Taco sauce	100	100	100
Italian dressing (linked to salad)	325	225	150

Note: Information on actual number of portions served for weighted analysis (serving weights) was provided by school food service managers. Weighting factors assumed for the unweighted analysis (offer weights) were assigned by MPR staff assuming an equal distribution across menu items within the same meal component group (milks, entrees, fruit/vegetables, breads/grains, desserts/other, and condiments).

^aOffer weights for fruit/vegetables were based on the assumption that students could take three servings of fruit/vegetables (number of fruit/vegetable portions actually served divided by total number of meals). Thus, the base number of meals for fruit/vegetable weights was 3 times 300, or 900 meals.

^bOffer weights assumed that students were allowed to take up to three sides, of any type, per meal. The base for computing weights for sides was then 3 times 300, or 900 meals. Sides included the fruit and vegetables, breads/grains, and desserts.

determined the nutrient contribution from each item on the menu. For the unweighted analysis, “offer weights” were calculated, as described above, and are shown for both a school that uses food-based menu planning and a school that uses nutrient-standard menu planning.

The unweighted analysis for both menu planning systems assumed one entree and one serving of milk for each student (even though the number of portions served indicates that not all students that received a reimbursable lunch took milk). Thus, offer weights were calculated as 60 for entrees and 100 for each type of milk (base of 300 divided by number of options offered).

For schools using food-based menu planning, as described in Section A, offer weights for fruits/vegetables depended on the number of servings students were allowed to take—in the case shown in Table C-VI.1, it was assumed to be three (1,555 fruit/vegetable portions served divided by 550 meals). The fruit/vegetable offer weight was calculated with a base of 300 meals, multiplied by the three allowed servings, and then divided by the four fruit/vegetable menu items offered (900 divided by four). A full weight of 300 was assigned to both the dinner roll and the brownie, as each was the only food offered within its respective meal component group (grain/bread and dessert/other, respectively). The nacho chips, butter, and Italian dressing were given the same offer weight as the item each was linked to. Finally, the offer weights for unlinked condiments/spreads were split evenly between the three condiments, ketchup, mustard, and taco sauce (300 divided by three).

The school using nutrient-based menu planning did not differentiate between types of sides, but did limit students to a maximum of three sides per lunch. Consequently, the offer weight for orange juice, peaches, French fries, side salad, dinner roll, and brownie was calculated as 300 multiplied by three sides per meal, divided by the six side options on the menu (900 divided by six). Foods linked to any of the sides, like the salad dressing and butter, all received the same

side offer weight of 150. The rules for assigning offer weights to unlinked condiments and spreads for the nutrient-based lunch were the same as the food-based lunch.

D. ASSESSING THE PERCENTAGE OF SCHOOLS MEETING SMI NUTRITION STANDARDS AND OTHER RELEVANT RECOMMENDATIONS

A key outcome for the analyses of NSLP and SBP meals offered and served was to assess the proportion of schools with average meals that satisfy the 1995 SMI nutrition standards. As described in Chapters VI and VII of this report (Tables VI.1 and VII.1), the SMI standards specify quantitative goals for: (1) food energy, protein, and key vitamins and minerals—which, at the time of this report, were based on the 1989 Recommended Dietary Allowances (RDAs); and (2) total fat and saturated fat, which incorporate the 1995 *Dietary Guidelines for Americans* recommendations. SMI regulations also encourage a “reduction” of sodium and cholesterol content and an “increase” in the dietary fiber content of NSLP and SBP meals. Thus, the weekly average energy and nutrient content of each school’s lunch and breakfast (where offered) menus were compared to SMI nutrition standards and to benchmarks for sodium, cholesterol, and fiber that have been used in previous national studies of school meals .

1. Energy and Target Nutrients

The SMI minimum requirements for energy and key nutrients in NSLP and SBP meals are 33 percent of RDA and 25 percent of RDA, respectively. One methodological issue that arises in assessing the percentage of schools whose average meals meet these standards is defining the specific RDA values to use for each school since the 1989 RDAs differ for children of different ages. SMI regulations and technical guidance provide RDA-based standards for menu planning and for State agencies conducting a nutrient analysis of school meals as part of an SMI review. For schools using *food-based menu planning*, separate RDA-based standards for NSLP lunches are provided for various meal pattern grade groups (K through 3, K through 6, 4 through 12, and

7 through 12).⁸ Schools using *nutrient-based menu planning* have the option of using the RDA-based standards provided for specific age or grade groups or customizing their standards to the ages of children in the school, using USDA-approved nutrient standard menu planning software. In assessing compliance with nutrition standards, SMI reviewers are required to use the standards for the same age/grade group(s) the SFA or school has used to plan their menus. This information, however, was not available for the analysis of meals offered and served in SNDA-III.

The RDA-based standards used in SNDA-III menu analyses were customized for each school, based on the range of grades participating in the NSLP and SBP. The resulting RDA standards for schools with grade spans that encompassed more than one RDA age/gender group (1 to 3 years, 4 to 6 years, 7 to 10 years, 11 to 14 years, and 15 to 18 years) reflect the proportion of each RDA age group in that school, with equal weight given to each group. For example, the RDA standard used for an elementary school comprised of students in kindergarten (mainly 5-year olds) through grade 5 (mainly 10-year olds) is a weighted average of the 1989 RDAs for the 4-to-6 and 7-to-10 age groups. The RDA standard for this school would be customized as follows: $[(\text{RDA for 4-to-6 year olds} * 2/6) + (\text{RDA for 7-to-10 year olds} * 4/6)]$.

The customized approach to establishing specific RDA-based standards for the SNDA-III menu analysis offers three important features: (1) it provides the most accurate assessment of how well the meals offered and served meet the nutritional needs of the children in the school;⁹

⁸ Since the age groups for which 1989 RDAs were established do not correspond exactly to USDA meal pattern grade groups, the RDA-based standards were derived by weighting the values for relevant age groups. For schools with a broad range of grades, regulations require that standards for at least two grade or age groups be used when planning and analyzing lunch menus. For breakfast, standards for all schools are based on RDAs for grades K through 12.

⁹ To this end, USDA menu planning guidance encourages schools using food-based menu planning to use the optional meal patterns/grade groups, and, for nutrient-based menu planning schools, to customize standards. The

(2) it allows all schools' menus to be assessed with a common method whereas the flexibility offered to SFAs and schools may lead to different conclusions about compliance with standards for the same menus; and (3) it provides the best comparison with results from SNDA-II. Still, it is important to recognize that the approach used here may yield slightly different results than those from an SMI review for an individual school.

To facilitate interpretation of results from analyses of the percentage of schools that offered/served meals that satisfied the RDA-based standards, the minimum standards for NSLP lunches for grade spans K through 6 and 7 through 12, and for SBP breakfasts, for K through 12, are shown in Table C-VI.2.¹⁰ These values approximate the RDA-based standards that would have been used by SMI reviewers for the vast majority of schools in the SNDA-III sample. Taking into account the flexibility allowed schools with only one grade outside the established ranges, about 90 percent of elementary schools fell into the K through 6 range, and 89 percent of middle schools and 100 percent of high schools had grades exclusively in the 7 to 12 range. Thus, the likelihood that results from SNDA-III and SMI review comparisons with RDA-based standards would differ is limited to only a small share of schools.

Note that under the current regulations, secondary schools are permitted to plan and serve breakfasts that meet less-stringent criteria than the customized RDA-based standards used in SNDA-III analyses. (The minimum RDA-based nutrition standards for the SBP are defined for

(continued)

SNDA-III approach is consistent with the method developed for customizing RDA standards using USDA-approved software systems for nutrient-based menu planning.

¹⁰ Specific standards for all age/grade groups using in NSLP menu planning can be found in program regulations or "Nutrient Analysis Protocols: How to Analyze Menus for USDA's School Meals Programs." (U.S. Department of Agriculture, Food and Nutrition Service n.d.)

TABLE C-VI.2

MINIMUM ENERGY AND NUTRIENT LEVELS FOR SCHOOL
LUNCHES AND BREAKFASTS ^a

Nutrient	NSLP Lunches		SBP Breakfasts
	Grades K-6	Grades 7-12	Grades K-12
Food energy (calories)	664	825	554
Protein (g)	10	16	10
Vitamin A (RE)	224	300	197
Vitamin C (mg)	15	18	13
Calcium (mg)	286	400	257
Iron (mg)	3.5	4.5	3.0

Source: SMI regulations for NSLP and SBP menus planned under the nutrient-standard or enhanced food-based menu planning systems (7 CFR Parts 210 and 220; Office of the Federal Register 2004). Required nutrient levels for menus planned under the traditional food-based system are specified for grades K-3 and 4-12 (not shown), with the grade 7-12 levels optional for lunch.

^aBased on one-third of the 1989 Recommended Dietary Allowances (RDAs) for specified grade groups at lunch and one-fourth of the 1989 RDA at breakfast (National Research Council 1989a).

RE = Retinol equivalent

all children in grades K through 12.) Supplemental analyses conducted for SNDA-II found that when minimum SBP nutrition standards were used as a benchmark, the percentage of secondary schools that met the RDA-based standards was greater and, for some nutrients, the percentage of elementary schools was lower than that observed using customized RDA standards (Fox et al., 2001; Exhibit B.3).

2. Fat and Saturated Fat

Assessing the proportion of schools with average meals that satisfy the SMI standards for fat and saturated fat was straightforward. The *Dietary Guidelines* goals of no more than 30 percent of energy from total fat and less than 10 percent of energy from saturated fat apply to all individuals over the age of two, so there was no need to “weight” the standards. Results of

SNDA-III analyses pertaining to energy from total fat and saturated fat are consistent with those that would be obtained from an SMI review.

3. Cholesterol, Sodium, and Dietary Fiber

In keeping with the previous SNDA studies, to facilitate understanding of the data on the sodium and cholesterol content of NSLP and SBP meals, weekly averages for each school were compared to one-third and one-fourth, respectively, of recommendations for daily intake of sodium and cholesterol from the National Research Council's 1989 *Diet and Health* report. To facilitate comparison to Gleason and Suitor (2001), the benchmark used to assess dietary fiber was based on the "age-plus-five gram" recommendation for fiber from the former American Health Foundation. Hence, like the RDA-based standards, the fiber recommendation was customized for each school based on the grade span of enrolled children.

APPENDIX D

**SUPPLEMENTAL TABULATIONS OF NUTRIENTS OFFERED AND SERVED IN
SCHOOL LUNCHES**

TABLE D-VI.1

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES *OFFERED*
TO STUDENTS IN ELEMENTARY SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	741	9.2	589	621	665	740	794	855	909
Macronutrients									
Total fat (g)	28	0.6	18	20	24	28	31	36	38
Saturated fat (g)	9	0.2	6	7	8	9	10	11	12
Monounsaturated fat (g)	10	0.2	7	7	8	10	11	13	14
Polyunsaturated fat (g)	7	0.2	4	4	5	7	8	9	11
Linoleic acid (g)	6	0.2	3	4	4	6	7	8	10
Alpha-linolenic acid (g)	0.7	0.03	0.3	0.4	0.5	0.7	0.9	1.0	1.2
Carbohydrate (g)	96	1.3	76	81	86	95	104	113	120
Protein (g)	30	0.4	25	26	27	29	32	34	36
Vitamins									
Vitamin A (mcg RE)	388	16.0	242	260	290	355	466	575	606
Vitamin A (mcg RAE)	294	8.5	214	225	241	277	331	402	413
Vitamin C (mg)	32	1.8	10	12	19	25	42	55	63
Vitamin E (mg AT)	2.5	0.08	1.5	1.7	2.0	2.3	3.0	3.4	3.7
Vitamin B ₆ (mg)	0.5	0.01	0.4	0.4	0.5	0.5	0.6	0.7	0.7
Vitamin B ₁₂ (mcg)	1.9	0.05	1.5	1.5	1.7	1.8	2.0	2.3	2.9
Folate (mcg)	126	2.4	92	98	110	122	145	153	172
Folate (mcg DFE)	160	3.1	116	125	137	155	180	201	213
Niacin (mg)	7	0.1	5	5	6	6	7	8	9
Riboflavin (mg)	0.9	0.01	0.8	0.8	0.9	0.9	1.0	1.0	1.1
Thiamin (mg)	0.5	0.01	0.4	0.4	0.5	0.5	0.6	0.7	0.7
Minerals									
Calcium (mg)	531	7.3	428	454	485	530	577	609	629
Iron (mg)	4.5	0.06	3.6	3.8	4.0	4.5	4.9	5.2	5.5
Magnesium (mg)	102	1.5	81	86	91	97	112	124	128
Phosphorus (mg)	571	7.0	466	491	538	563	604	647	683
Potassium (mg)	1124	15.3	902	944	1024	1101	1218	1364	1386
Sodium (mg)	1377	28.8	1003	1077	1201	1332	1531	1720	1858
Zinc (mg)	3.8	0.05	3.1	3.3	3.5	3.7	4.1	4.6	4.9
Other Components									
Cholesterol (mg)	62	1.5	40	43	51	60	67	82	93
Dietary fiber (g)	7	0.1	5	5	6	6	7	8	9
Dietary fiber (g/1000 kcal)	9	0.1	7	7	8	9	10	11	12
Percentage of Energy From:									
Total fat	33.6	0.41	27.5	28.3	30.5	33.5	36.8	38.2	40.4
Saturated fat	10.9	0.13	8.9	9.2	9.9	10.9	11.9	12.3	12.7
Monosaturated fat	12.0	0.17	9.7	10.3	10.7	12.0	13.0	13.8	14.9
Polyunsaturated fat	8.3	0.21	5.2	5.7	6.4	8.3	9.6	10.5	12.3
Linoleic acid	7.3	0.19	4.5	5.1	5.7	7.3	8.6	9.4	11.1
Alpha-linolenic acid	0.8	0.03	0.5	0.6	0.6	0.8	1.0	1.1	1.2
Carbohydrate	51.9	0.39	44.7	46.8	49.1	52.0	54.3	56.8	58.5
Protein	16.3	0.14	13.8	14.7	15.4	16.3	17.2	18.2	18.9
Number of Schools	145								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.2

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES OFFERED TO STUDENTS IN MIDDLE SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	816	16.6	606	669	708	803	914	998	1058
Macronutrients									
Total fat (g)	31	0.9	19	23	27	29	35	43	47
Saturated fat (g)	10	0.2	6	7	9	10	11	13	14
Monounsaturated fat (g)	11	0.3	7	8	10	11	13	15	17
Polyunsaturated fat (g)	8	0.3	4	5	6	8	9	12	12
Linoleic acid (g)	7	0.3	3	4	5	7	8	10	11
Alpha-linolenic acid (g)	0.8	0.04	0.4	0.5	0.7	0.8	1.0	1.3	1.4
Carbohydrate (g)	105	2.6	69	74	91	107	116	128	132
Protein (g)	32	0.5	26	28	29	32	34	37	38
Vitamins									
Vitamin A (mcg RE)	390	16.7	232	270	296	371	445	532	614
Vitamin A (mcg RAE)	300	9.5	200	233	240	290	339	378	420
Vitamin C (mg)	34	1.7	16	18	21	31	42	54	67
Vitamin E (mg AT)	2.8	0.09	1.7	1.9	2.3	2.6	3.1	4.1	4.5
Vitamin B ₆ (mg)	0.6	0.01	0.5	0.5	0.5	0.6	0.7	0.8	0.8
Vitamin B ₁₂ (mcg)	2.0	0.05	1.6	1.7	1.8	1.9	2.1	2.4	2.7
Folate (mcg)	142	3.4	106	111	123	137	159	179	187
Folate (mcg DFE)	180	4.4	131	137	153	173	199	223	242
Niacin (mg)	7	0.1	5	6	6	7	8	9	10
Riboflavin (mg)	1.0	0.01	0.8	0.8	0.9	1.0	1.0	1.1	1.1
Thiamin (mg)	0.6	0.02	0.4	0.4	0.5	0.6	0.7	0.7	0.8
Minerals									
Calcium (mg)	549	9.6	420	453	489	550	589	638	689
Iron (mg)	5.0	0.11	3.8	4.0	4.3	4.8	5.4	6.1	6.9
Magnesium (mg)	110	1.9	87	89	97	109	121	132	137
Phosphorus (mg)	606	9.8	487	505	548	604	654	714	737
Potassium (mg)	1249	27.5	913	984	1119	1235	1361	1498	1578
Sodium (mg)	1520	40.7	1058	1134	1293	1505	1678	1924	2047
Zinc (mg)	4.2	0.06	3.4	3.6	3.8	4.0	4.4	4.9	5.3
Other Components									
Cholesterol (mg)	70	2.0	44	49	58	66	80	94	101
Dietary fiber (g)	8	0.2	5	6	7	7	9	10	10
Dietary fiber (g/1000 kcal)	10	0.2	7	8	8	9	10	12	13
Percentage of Energy From:									
Total fat	34.3	0.65	27.2	27.9	31.0	33.8	37.2	40.9	42.1
Saturated fat	10.9	0.17	8.8	9.2	9.9	10.7	11.7	12.5	13.0
Monosaturated fat	12.4	0.29	9.8	10.0	10.8	12.1	13.4	15.3	16.2
Polyunsaturated fat	8.6	0.27	4.9	6.3	6.8	8.0	10.2	11.6	12.4
Linoleic acid	7.5	0.25	4.3	5.5	6.0	7.2	9.0	10.1	10.8
Alpha-linolenic acid	0.9	0.03	0.5	0.6	0.7	0.8	1.0	1.3	1.4
Carbohydrate	51.5	0.65	42.0	43.0	48.8	52.0	54.6	56.5	57.3
Protein	16.0	0.17	13.9	14.2	15.0	16.0	17.0	17.9	18.2
Number of Schools	126								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.3

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES OFFERED TO STUDENTS IN HIGH SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	857	17.3	657	704	744	838	910	1106	1153
Macronutrients									
Total fat (g)	33	0.8	22	24	28	32	36	45	49
Saturated fat (g)	10	0.3	7	8	9	9	11	14	15
Monounsaturated fat (g)	12	0.3	8	8	10	11	12	16	18
Polyunsaturated fat (g)	8	0.4	4	5	6	8	10	12	14
Linoleic acid (g)	7	0.3	4	4	5	7	8	11	12
Alpha-linolenic acid (g)	0.9	0.04	0.5	0.5	0.6	0.9	1.0	1.3	1.4
Carbohydrate (g)	111	2.6	79	83	99	110	115	139	151
Protein (g)	33	0.5	28	29	30	32	35	38	40
Vitamins									
Vitamin A (mcg RE)	387	20.1	255	260	294	334	452	554	602
Vitamin A (mcg RAE)	299	11.0	213	231	248	273	339	397	424
Vitamin C (mg)	39	3.5	16	19	25	32	43	62	101
Vitamin E (mg AT)	2.8	0.09	1.9	2.0	2.3	2.6	3.0	4.0	4.5
Vitamin B ₆ (mg)	0.6	0.02	0.5	0.5	0.6	0.6	0.7	0.8	0.9
Vitamin B ₁₂ (mcg)	2.0	0.05	1.6	1.7	1.8	2.0	2.2	2.4	2.6
Folate (mcg)	146	3.2	104	118	129	139	159	183	203
Folate (mcg DFE)	184	4.3	133	148	163	170	198	237	262
Niacin (mg)	8	0.2	6	6	7	7	8	9	10
Riboflavin (mg)	1.0	0.01	0.8	0.9	0.9	1.0	1.0	1.2	1.2
Thiamin (mg)	0.6	0.02	0.5	0.5	0.5	0.6	0.7	0.8	0.9
Minerals									
Calcium (mg)	547	12.7	461	477	490	530	582	651	702
Iron (mg)	5.2	0.11	3.9	4.1	4.5	5.1	5.6	6.2	6.7
Magnesium (mg)	113	2.2	89	94	99	109	121	138	144
Phosphorus (mg)	623	9.6	511	539	577	601	654	732	795
Potassium (mg)	1309	27.4	957	999	1181	1288	1400	1546	1737
Sodium (mg)	1588	37.0	1197	1271	1369	1561	1751	1970	2005
Zinc (mg)	4.3	0.06	3.5	3.6	3.8	4.3	4.6	4.9	5.2
Other Components									
Cholesterol (mg)	70	2.0	50	54	60	65	79	91	105
Dietary fiber (g)	8	0.2	6	6	7	8	9	10	10
Dietary fiber (g/1000 kcal)	9	0.2	7	8	8	9	10	11	12
Percentage of Energy From:									
Total fat	34.2	0.46	27.2	29.1	31.4	34.9	36.0	38.9	40.7
Saturated fat	10.6	0.13	9.0	9.4	9.8	10.3	11.4	11.8	12.5
Monosaturated fat	12.4	0.22	9.9	10.6	11.2	12.1	13.1	15.1	15.1
Polyunsaturated fat	8.7	0.32	5.3	5.8	7.1	8.4	10.2	11.2	12.2
Linoleic acid	7.6	0.28	4.5	5.0	6.2	7.5	9.1	9.8	10.6
Alpha-linolenic acid	0.9	0.04	0.6	0.6	0.7	0.9	1.1	1.2	1.4
Carbohydrate	51.8	0.50	45.3	45.8	50.2	51.9	54.2	56.6	58.7
Protein	15.8	0.17	13.5	14.0	14.9	15.7	16.9	17.7	17.8
Number of Schools	126								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.4

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES OFFERED TO STUDENTS IN ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	776	8.8	598	633	685	764	843	920	1005
Macronutrients									
Total fat (g)	29	0.5	19	21	25	29	33	38	44
Saturated fat (g)	9	0.2	6	7	8	9	10	12	12
Monounsaturated fat (g)	11	0.2	7	8	9	10	12	14	16
Polyunsaturated fat (g)	7	0.2	4	4	5	7	9	11	12
Linoleic acid (g)	7	0.2	3	4	5	6	8	10	11
Alpha-linolenic acid (g)	0.8	0.02	0.4	0.4	0.5	0.7	0.9	1.1	1.3
Carbohydrate (g)	100	1.3	76	81	88	99	110	122	129
Protein (g)	31	0.3	25	26	28	30	33	36	38
Vitamins									
Vitamin A (mcg RE)	388	14.3	244	261	294	355	460	560	613
Vitamin A (mcg RAE)	296	7.6	213	226	244	279	336	398	414
Vitamin C (mg)	34	1.3	11	14	20	29	43	56	68
Vitamin E (mg AT)	2.6	0.06	1.5	1.8	2.1	2.5	3.0	3.6	4.2
Vitamin B ₆ (mg)	0.6	0.01	0.4	0.4	0.5	0.6	0.6	0.7	0.8
Vitamin B ₁₂ (mcg)	2.0	0.05	1.5	1.6	1.7	1.9	2.1	2.4	2.8
Folate (mcg)	133	1.9	95	100	113	130	148	170	182
Folate (mcg DFE)	168	2.5	120	126	144	161	186	213	227
Niacin (mg)	7	0.1	5	5	6	7	8	9	9
Riboflavin (mg)	0.9	0.01	0.8	0.8	0.9	0.9	1.0	1.1	1.1
Thiamin (mg)	0.6	0.01	0.4	0.4	0.5	0.6	0.6	0.7	0.8
Minerals									
Calcium (mg)	537	6.5	432	457	488	532	582	623	658
Iron (mg)	4.7	0.06	3.7	3.8	4.1	4.6	5.1	5.7	6.1
Magnesium (mg)	105	1.2	84	88	94	102	115	127	134
Phosphorus (mg)	587	5.7	478	500	542	576	619	678	732
Potassium (mg)	1180	14.7	926	954	1046	1138	1290	1408	1497
Sodium (mg)	1442	26.2	1033	1114	1248	1395	1624	1804	1969
Zinc (mg)	4.0	0.04	3.2	3.4	3.6	3.9	4.3	4.7	5.0
Other Components									
Cholesterol (mg)	65	1.3	42	46	55	62	72	88	97
Dietary fiber (g)	7	0.1	5	5	6	7	8	9	10
Dietary fiber (g/1000 kcal)	9	0.1	7	7	8	9	10	11	12
Percentage of Energy From:									
Total fat	33.8	0.36	27.4	28.4	30.9	33.7	36.8	38.7	41.2
Saturated fat	10.8	0.11	8.9	9.3	9.8	10.8	11.7	12.5	12.8
Monosaturated fat	12.2	0.16	9.8	10.4	10.8	12.1	13.1	14.6	15.2
Polyunsaturated fat	8.4	0.18	5.3	5.8	6.7	8.2	9.8	10.8	12.4
Linoleic acid	7.4	0.16	4.5	5.1	5.8	7.3	8.7	9.7	10.9
Alpha-linolenic acid	0.9	0.02	0.5	0.6	0.7	0.8	1.0	1.1	1.3
Carbohydrate	51.8	0.37	44.5	46.3	49.2	52.0	54.4	56.6	58.5
Protein	16.1	0.11	13.8	14.3	15.2	16.1	17.0	17.9	18.8
Number of Schools	397								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.5

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES *SERVED*
TO STUDENTS IN ELEMENTARY SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	676	8.5	539	557	612	684	735	766	784
Macronutrients									
Total fat (g)	25	0.5	17	18	21	25	28	31	32
Saturated fat (g)	8	0.2	6	6	7	8	9	10	10
Monounsaturated fat (g)	9	0.2	7	7	8	9	11	12	12
Polyunsaturated fat (g)	6	0.2	3	4	4	6	7	8	8
Linoleic acid (g)	5	0.2	3	3	4	5	6	7	8
Alpha-linolenic acid (g)	0.6	0.02	0.3	0.4	0.4	0.6	0.7	0.9	1.0
Carbohydrate (g)	88	1.3	68	72	80	86	94	104	109
Protein (g)	28	0.3	23	24	26	27	29	32	32
Vitamins									
Vitamin A (mcg RE)	324	10.2	200	224	261	296	383	441	475
Vitamin A (mcg RAE)	259	5.8	175	199	228	245	297	325	342
Vitamin C (mg)	22	1.0	9	11	15	19	27	35	40
Vitamin E (mg AT)	2.1	0.05	1.4	1.5	1.7	2.1	2.4	2.7	2.9
Vitamin B ₆ (mg)	0.5	0.01	0.4	0.4	0.4	0.5	0.6	0.6	0.6
Vitamin B ₁₂ (mcg)	1.7	0.05	1.2	1.3	1.5	1.6	1.9	2.0	2.8
Folate (mcg)	108	2.1	79	85	92	106	119	136	140
Folate (mcg DFE)	138	2.8	101	109	117	135	151	172	181
Niacin (mg)	6	0.1	5	5	5	6	7	7	8
Riboflavin (mg)	0.8	0.01	0.7	0.7	0.8	0.8	0.9	0.9	1.0
Thiamin (mg)	0.5	0.01	0.4	0.4	0.4	0.5	0.5	0.6	0.6
Minerals									
Calcium (mg)	483	6.9	388	408	451	475	529	562	576
Iron (mg)	4.3	0.06	3.4	3.6	3.8	4.2	4.6	5.0	5.2
Magnesium (mg)	92	1.3	71	76	86	91	98	107	115
Phosphorus (mg)	534	6.6	428	458	489	533	570	615	627
Potassium (mg)	1030	16.7	772	845	924	1035	1115	1210	1253
Sodium (mg)	1278	23.0	971	1012	1135	1253	1420	1558	1597
Zinc (mg)	3.7	0.05	2.8	3.0	3.3	3.7	4.0	4.2	4.6
Other Components									
Cholesterol (mg)	58	1.3	40	43	50	56	63	74	81
Dietary fiber (g)	6	0.1	4	5	5	6	7	8	8
Dietary fiber (g/1000 kcal)	9	0.2	7	7	8	9	10	11	11
Percentage of Energy From:									
Total fat	32.9	0.44	26.7	27.8	29.8	33.0	35.5	37.5	38.7
Saturated fat	10.8	0.14	8.7	8.9	9.7	10.9	11.7	12.5	12.7
Monosaturated fat	12.1	0.16	9.8	10.2	11.1	12.1	13.2	14.0	14.4
Polyunsaturated fat	7.6	0.20	5.2	5.6	6.2	7.4	8.9	9.8	10.5
Linoleic acid	6.7	0.17	4.5	4.8	5.5	6.5	7.8	8.6	9.2
Alpha-linolenic acid	0.8	0.03	0.5	0.5	0.6	0.7	0.9	1.1	1.2
Carbohydrate	52.0	0.41	44.6	46.6	49.9	52.0	54.8	56.6	57.1
Protein	16.7	0.14	14.2	14.9	15.7	16.6	17.5	18.5	18.8
Number of Schools	145								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.6

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES *SERVED*
TO STUDENTS IN MIDDLE SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	743	14.9	543	583	649	729	829	931	952
Macronutrients									
Total fat (g)	29	1.0	19	20	23	28	34	40	43
Saturated fat (g)	9	0.3	6	7	8	9	11	12	13
Monounsaturated fat (g)	11	0.4	7	8	9	10	13	15	16
Polyunsaturated fat (g)	7	0.4	3	4	5	7	9	10	13
Linoleic acid (g)	6	0.3	3	4	4	6	8	9	11
Alpha-linolenic acid (g)	0.7	0.04	0.3	0.4	0.5	0.7	0.8	1.1	1.4
Carbohydrate (g)	93	1.7	69	74	83	93	101	117	121
Protein (g)	29	0.4	24	25	27	29	31	34	36
Vitamins									
Vitamin A (mcg RE)	299	12.5	170	195	227	277	329	420	476
Vitamin A (mcg RAE)	242	8.3	136	161	194	232	269	317	379
Vitamin C (mg)	24	1.3	10	13	16	21	29	36	53
Vitamin E (mg AT)	2.4	0.10	1.3	1.6	1.8	2.3	2.8	3.4	4.0
Vitamin B ₆ (mg)	0.6	0.01	0.4	0.4	0.5	0.6	0.6	0.7	0.7
Vitamin B ₁₂ (mcg)	1.7	0.05	1.1	1.3	1.5	1.7	1.8	2.0	2.6
Folate (mcg)	116	2.6	88	91	100	112	126	143	168
Folate (mcg DFE)	150	3.4	113	116	128	143	161	185	208
Niacin (mg)	7	0.2	5	5	6	7	7	8	9
Riboflavin (mg)	0.8	0.02	0.6	0.7	0.8	0.8	0.9	1.0	1.0
Thiamin (mg)	0.5	0.01	0.4	0.4	0.5	0.5	0.6	0.6	0.7
Minerals									
Calcium (mg)	469	9.8	322	359	416	461	522	573	586
Iron (mg)	4.6	0.08	3.6	3.8	4.2	4.5	4.9	5.5	5.9
Magnesium (mg)	97	2.0	71	80	88	94	105	121	125
Phosphorus (mg)	541	8.6	404	461	486	533	591	637	648
Potassium (mg)	1106	19.0	816	905	963	1099	1180	1344	1486
Sodium (mg)	1408	35.8	996	1039	1198	1369	1570	1715	2000
Zinc (mg)	3.8	0.06	3.0	3.2	3.4	3.8	4.1	4.6	4.8
Other Components									
Cholesterol (mg)	61	1.5	44	45	52	59	70	77	84
Dietary fiber (g)	7	0.2	4	5	6	7	7	9	9
Dietary fiber (g/1000 kcal)	9	0.2	7	7	8	9	10	11	12
Percentage of Energy From:									
Total fat	35.0	0.62	27.2	28.6	31.7	34.6	38.2	41.4	42.7
Saturated fat	11.1	0.17	9.1	9.3	9.8	10.9	12.3	12.9	13.3
Monosaturated fat	13.1	0.26	10.1	10.5	11.7	12.9	14.0	15.8	17.1
Polyunsaturated fat	8.3	0.28	5.1	5.7	6.7	8.0	9.8	11.4	12.5
Linoleic acid	7.3	0.26	4.5	5.0	5.9	7.0	8.6	10.0	11.1
Alpha-linolenic acid	0.9	0.03	0.4	0.6	0.7	0.8	1.0	1.2	1.4
Carbohydrate	50.5	0.57	43.4	44.6	47.3	50.2	53.7	56.7	57.9
Protein	16.0	0.18	13.4	13.7	14.7	15.8	16.9	18.0	18.8
Number of Schools	126								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.7

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES SERVED TO STUDENTS IN HIGH SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	787	12.9	546	624	706	794	831	913	985
Macronutrients									
Total fat (g)	32	0.9	20	23	26	31	35	40	45
Saturated fat (g)	10	0.2	7	7	9	9	10	12	13
Monounsaturated fat (g)	12	0.4	7	8	10	11	14	15	19
Polyunsaturated fat (g)	8	0.4	4	5	6	8	9	11	13
Linoleic acid (g)	7	0.3	4	4	5	7	8	10	12
Alpha-linolenic acid (g)	0.8	0.04	0.4	0.5	0.6	0.7	0.9	1.1	1.5
Carbohydrate (g)	98	1.9	66	78	87	96	105	117	122
Protein (g)	30	0.4	24	25	28	30	33	34	35
Vitamins									
Vitamin A (mcg RE)	312	14.4	186	220	240	286	341	412	573
Vitamin A (mcg RAE)	249	8.4	155	182	205	243	275	316	414
Vitamin C (mg)	27	1.8	13	14	19	23	31	39	55
Vitamin E (mg AT)	2.6	0.11	1.5	1.7	2.1	2.4	3.1	3.5	4.2
Vitamin B ₆ (mg)	0.6	0.01	0.4	0.5	0.5	0.6	0.6	0.7	0.8
Vitamin B ₁₂ (mcg)	1.8	0.07	1.1	1.3	1.5	1.8	2.0	2.1	2.6
Folate (mcg)	121	2.6	85	94	107	117	133	154	163
Folate (mcg DFE)	155	3.7	107	121	137	150	173	199	213
Niacin (mg)	7	0.2	5	6	6	7	8	8	9
Riboflavin (mg)	0.9	0.01	0.6	0.7	0.8	0.9	1.0	1.0	1.1
Thiamin (mg)	0.5	0.01	0.4	0.4	0.5	0.5	0.6	0.7	0.7
Minerals									
Calcium (mg)	467	8.6	336	347	414	466	506	565	605
Iron (mg)	4.7	0.08	3.6	3.7	4.2	4.8	5.2	5.7	5.9
Magnesium (mg)	100	1.6	76	82	90	100	109	119	127
Phosphorus (mg)	554	8.8	420	437	508	560	606	640	653
Potassium (mg)	1154	21.2	856	928	1022	1149	1225	1403	1496
Sodium (mg)	1529	33.7	1042	1169	1302	1515	1652	1898	2061
Zinc (mg)	3.9	0.06	2.9	3.1	3.5	4.0	4.2	4.6	4.7
Other Components									
Cholesterol (mg)	64	1.5	44	50	55	60	74	81	88
Dietary fiber (g)	7	0.2	4	5	6	7	8	8	9
Dietary fiber (g/1000 kcal)	9	0.2	7	7	8	9	9	10	11
Percentage of Energy From:									
Total fat	36.0	0.58	29.2	30.0	33.1	35.4	38.4	42.8	43.4
Saturated fat	11.0	0.17	9.2	9.4	10.3	10.8	11.8	12.8	12.9
Monosaturated fat	13.5	0.28	10.8	11.0	12.0	12.7	15.3	16.7	17.5
Polyunsaturated fat	8.9	0.27	5.7	6.1	7.1	8.9	10.0	11.7	13.1
Linoleic acid	7.8	0.25	4.9	5.3	6.2	7.6	8.8	10.2	11.4
Alpha-linolenic acid	0.9	0.03	0.5	0.6	0.7	0.9	1.1	1.2	1.5
Carbohydrate	49.9	0.66	41.4	42.6	47.6	50.5	53.0	54.8	56.1
Protein	15.6	0.16	13.0	13.5	14.6	15.5	16.8	17.4	17.9
Number of Schools	126								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.8

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES *SERVED*
TO STUDENTS IN ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	709	7.8	542	565	626	707	764	845	910
Macronutrients									
Total fat (g)	27	0.5	18	19	22	26	31	36	40
Saturated fat (g)	9	0.1	6	6	7	9	10	11	12
Monounsaturated fat (g)	10	0.2	7	7	8	10	11	13	15
Polyunsaturated fat (g)	6	0.2	4	4	5	6	8	10	10
Linoleic acid (g)	6	0.2	3	3	4	5	7	8	9
Alpha-linolenic acid (g)	0.7	0.02	0.3	0.4	0.5	0.6	0.8	1.0	1.1
Carbohydrate (g)	91	1.2	68	73	81	88	98	109	115
Protein (g)	28	0.3	23	24	26	28	30	33	34
Vitamins									
Vitamin A (mcg RE)	318	9.0	192	218	255	288	371	440	500
Vitamin A (mcg RAE)	254	5.3	167	184	220	245	289	323	344
Vitamin C (mg)	23	0.8	10	12	16	21	29	36	46
Vitamin E (mg AT)	2.3	0.05	1.4	1.5	1.8	2.1	2.5	3.2	3.5
Vitamin B ₆ (mg)	0.5	0.01	0.4	0.4	0.5	0.5	0.6	0.6	0.7
Vitamin B ₁₂ (mcg)	1.7	0.05	1.2	1.3	1.5	1.7	1.9	2.1	2.7
Folate (mcg)	112	1.7	82	88	97	109	123	139	148
Folate (mcg DFE)	143	2.3	102	112	123	140	158	176	193
Niacin (mg)	6	0.1	5	5	6	6	7	8	8
Riboflavin (mg)	0.8	0.01	0.7	0.7	0.8	0.8	0.9	1.0	1.0
Thiamin (mg)	0.5	0.01	0.4	0.4	0.4	0.5	0.6	0.6	0.7
Minerals									
Calcium (mg)	477	5.7	349	394	437	471	525	570	581
Iron (mg)	4.4	0.05	3.5	3.6	3.9	4.4	4.8	5.2	5.6
Magnesium (mg)	95	1.2	71	77	87	93	103	114	120
Phosphorus (mg)	539	5.6	428	456	495	538	583	628	640
Potassium (mg)	1067	14.4	795	867	942	1067	1159	1268	1381
Sodium (mg)	1348	21.5	976	1025	1159	1297	1520	1634	1784
Zinc (mg)	3.7	0.04	2.9	3.0	3.4	3.7	4.1	4.4	4.6
Other Components									
Cholesterol (mg)	60	1.1	41	44	51	58	66	77	85
Dietary fiber (g)	6	0.1	4	5	5	6	7	8	9
Dietary fiber (g/1000 kcal)	9	0.1	7	7	8	9	10	11	11
Percentage of Energy From:									
Total fat	33.9	0.38	27.4	28.1	30.8	33.8	36.6	39.0	41.8
Saturated fat	10.9	0.12	8.7	9.2	9.8	10.9	11.8	12.5	12.9
Monosaturated fat	12.6	0.16	10.0	10.4	11.4	12.4	13.4	14.9	16.0
Polyunsaturated fat	8.0	0.17	5.2	5.7	6.5	7.7	9.4	10.4	11.9
Linoleic acid	7.0	0.15	4.6	5.0	5.7	6.7	8.2	9.4	10.3
Alpha-linolenic acid	0.8	0.02	0.5	0.6	0.6	0.8	1.0	1.2	1.3
Carbohydrate	51.3	0.37	44.0	45.2	48.9	51.4	54.3	56.6	57.4
Protein	16.3	0.11	13.7	14.2	15.3	16.4	17.4	18.4	18.8
Number of Schools	397								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.9

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES OFFERED TO STUDENTS,
BY MENU PLANNING SYSTEM
ALL SCHOOLS

	Food-based			Nutrient-based (NSMP or ANSMP)
	Traditional	Enhanced	All	
Mean Amount				
Food Energy (Calories)	805	764	793	735
Macronutrients				
Total fat (g)	31	28	30	27
Saturated fat (g)	10	9	10	9
Monounsaturated fat (g)	11	10	11	10
Polyunsaturated fat (g)	8	7	8	7
Linoleic acid (g)	7	6	7	6
Alpha-linolenic acid (g)	0.8	0.7	0.8	0.7
Carbohydrate (g)	103	102	102	95
Protein (g)	32	30	31	30
Vitamins				
Vitamin A (mcg RE)	393	368	386	394
Vitamin A (mcg RAE)	299	285	295	300
Vitamin C (mg)	34	39	35	30
Vitamin E (mg AT)	2.7	2.7	2.7	2.5
Vitamin B ₆ (mg)	0.6	0.6	0.6	0.5
Vitamin B ₁₂ (mcg)	1.9	1.9	1.9	2.0
Folate (mcg)	136	133	135	128
Folate (mcg DFE)	172	168	171	162
Niacin (mg)	7	7	7	7
Riboflavin (mg)	1.0	0.9	0.9	0.9
Thiamin (mg)	0.6	0.6	0.6	0.5
Minerals				
Calcium (mg)	535	540	536	540
Iron (mg)	4.8	4.7	4.8	4.5
Magnesium (mg)	107	106	107	102
Phosphorus (mg)	593	588	591	576
Potassium (mg)	1201	1184	1196	1143
Sodium (mg)	1480	1425	1464	1389
Zinc (mg)	4.1	3.9	4.0	3.9
Other Dietary Components				
Cholesterol (mg)	69	62	67	59
Dietary fiber (g)	7	7	7	7
Dietary fiber (g/1000 kcal)	9	9	9	9
Mean Percentage of Energy From:				
Total fat	34.7	32.3	34.0	33.4
Saturated fat	11.0	10.4	10.8	10.7
Monounsaturated fat	12.5	11.6	12.2	12.0
Polyunsaturated fat	8.7	7.9	8.4	8.3
Linoleic acid	7.6	7.0	7.4	7.3
Alpha-linolenic acid	0.9	0.8	0.9	0.8
Carbohydrate	51.0	53.7	51.8	51.8
Protein	16.0	15.9	16.0	16.5
Number of Schools	193	90	283	114

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalents; RAE=Retinol activity equivalents

TABLE D-VI.10

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF NSLP LUNCHES *SERVED* TO STUDENTS,
BY MENU PLANNING SYSTEM
ALL SCHOOLS

	Food-based			Nutrient-based (NSMP or ANSMP)
	Traditional	Enhanced	All	
Mean Amount				
Food Energy (Calories)	719	674	705	717
Macronutrients				
Total fat (g)	28	25	27	27
Saturated fat (g)	9	8	9	9
Monounsaturated fat (g)	10	9	10	10
Polyunsaturated fat (g)	7	6	6	7
Linoleic acid (g)	6	5	6	6
Alpha-linolenic acid (g)	0.7	0.6	0.7	0.7
Carbohydrate (g)	90	88	90	93
Protein (g)	29	27	28	29
Vitamins				
Vitamin A (mcg RE)	318	306	314	326
Vitamin A (mcg RAE)	252	245	250	263
Vitamin C (mg)	23	25	24	22
Vitamin E (mg AT)	2.2	2.2	2.2	2.3
Vitamin B ₆ (mg)	0.5	0.5	0.5	0.5
Vitamin B ₁₂ (mcg)	1.7	1.7	1.7	1.8
Folate (mcg)	112	109	111	113
Folate (mcg DFE)	144	139	143	144
Niacin (mg)	7	6	6	6
Riboflavin (mg)	0.8	0.8	0.8	0.9
Thiamin (mg)	0.5	0.5	0.5	0.5
Minerals				
Calcium (mg)	471	472	471	493
Iron (mg)	4.5	4.3	4.4	4.4
Magnesium (mg)	94	92	94	97
Phosphorus (mg)	538	526	534	551
Potassium (mg)	1076	1038	1065	1072
Sodium (mg)	1373	1300	1351	1341
Zinc (mg)	3.8	3.5	3.7	3.8
Other Dietary Components				
Cholesterol (mg)	62	58	60	57
Dietary fiber (g)	6	6	6	6
Dietary fiber (g/1000 kcal)	9	9	9	9
Mean Percentage of Energy From:				
Total fat	34.7	32.5	34.1	33.3
Saturated fat	11.1	10.6	11.0	10.7
Monounsaturated fat	12.9	12.0	12.7	12.4
Polyunsaturated fat	8.2	7.5	8.0	8.0
Linoleic acid	7.2	6.6	7.1	7.0
Alpha-linolenic acid	0.9	0.8	0.8	0.8
Carbohydrate	50.5	52.7	51.1	51.8
Protein	16.3	16.3	16.3	16.4
Number of Schools	193	90	283	114

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalents; RAE=Retinol activity equivalents

TABLE D-VI.11

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES OFFERED
TO STUDENTS, IN SCHOOLS WITH A TRADITIONAL FOOD-BASED MENU PLANNING SYSTEM
ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	805	11.4	636	647	733	782	854	938	1049
Macronutrients									
Total fat (g)	31	0.7	21	23	27	31	35	41	46
Saturated fat (g)	10	0.2	7	8	8	9	11	12	14
Monounsaturated fat (g)	11	0.3	8	8	9	11	12	15	16
Polyunsaturated fat (g)	8	0.3	4	5	6	8	10	12	12
Linoleic acid (g)	7	0.3	3	4	5	7	8	10	11
Alpha-linolenic acid (g)	0.8	0.03	0.4	0.5	0.6	0.8	1.0	1.2	1.3
Carbohydrate (g)	103	1.5	79	85	89	101	112	123	129
Protein (g)	32	0.4	26	27	29	31	34	37	39
Vitamins									
Vitamin A (mcg RE)	393	19.0	244	261	294	364	472	565	616
Vitamin A (mcg RAE)	299	10.0	215	227	243	283	337	399	410
Vitamin C (mg)	34	2.0	12	16	21	31	41	54	64
Vitamin E (mg AT)	2.7	0.08	1.7	1.8	2.1	2.5	3.1	3.7	4.1
Vitamin B ₆ (mg)	0.6	0.01	0.4	0.5	0.5	0.6	0.7	0.7	0.8
Vitamin B ₁₂ (mcg)	1.9	0.04	1.5	1.6	1.7	1.9	2.1	2.3	2.5
Folate (mcg)	136	2.4	101	108	118	132	148	168	179
Folate (mcg DFE)	172	3.2	126	135	153	167	187	213	227
Niacin (mg)	7	0.1	5	6	6	7	8	9	9
Riboflavin (mg)	1.0	0.01	0.8	0.8	0.9	0.9	1.0	1.1	1.2
Thiamin (mg)	0.6	0.01	0.5	0.5	0.5	0.6	0.6	0.7	0.8
Minerals									
Calcium (mg)	535	8.8	437	462	477	529	581	622	640
Iron (mg)	4.8	0.08	3.8	3.9	4.3	4.7	5.2	5.8	6.5
Magnesium (mg)	107	1.8	84	88	94	107	119	129	139
Phosphorus (mg)	593	7.5	479	504	548	577	628	710	734
Potassium (mg)	1201	15.9	934	1003	1084	1161	1296	1449	1546
Sodium (mg)	1480	31.6	1049	1170	1275	1459	1639	1755	1979
Zinc (mg)	4.1	0.07	3.1	3.3	3.6	4.0	4.5	4.9	5.1
Other Components									
Cholesterol (mg)	69	2.0	42	48	59	64	80	90	104
Dietary fiber (g)	7	0.2	5	5	6	7	8	9	10
Dietary fiber (g/1000 kcal)	9	0.2	7	7	8	9	10	11	12
Percentage of Energy From:									
Total fat	34.7	0.45	27.9	29.0	31.9	34.8	36.9	39.7	41.4
Saturated fat	11.0	0.14	9.0	9.5	10.1	10.9	12.0	12.7	13.1
Monosaturated fat	12.5	0.16	9.9	10.6	11.2	12.6	13.3	14.8	15.4
Polyunsaturated fat	8.7	0.27	5.3	5.8	7.1	8.7	10.1	10.8	12.4
Linoleic acid	7.6	0.24	4.6	5.0	6.1	7.7	9.0	9.8	10.9
Alpha-linolenic acid	0.9	0.03	0.5	0.6	0.7	0.9	1.1	1.1	1.3
Carbohydrate	51.0	0.41	44.5	46.0	48.6	51.0	53.3	56.4	57.1
Protein	16.0	0.16	13.8	14.3	15.0	15.7	16.8	18.0	18.7
Number of Schools	193								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.12

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES OFFERED
TO STUDENTS, IN SCHOOLS WITH AN ENHANCED FOOD-BASED MENU PLANNING SYSTEM
ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	764	19.2	535	620	662	752	842	921	966
Macronutrients									
Total fat (g)	28	1.0	17	19	22	28	31	36	39
Saturated fat (g)	9	0.3	6	6	7	9	10	11	12
Monounsaturated fat (g)	10	0.4	6	7	8	10	11	13	14
Polyunsaturated fat (g)	7	0.4	4	4	5	7	8	9	12
Linoleic acid (g)	6	0.3	3	3	4	6	7	8	11
Alpha-linolenic acid (g)	0.7	0.04	0.3	0.3	0.5	0.6	0.8	1.0	1.1
Carbohydrate (g)	102	2.3	70	84	89	99	113	128	131
Protein (g)	30	0.7	23	26	27	29	33	36	37
Vitamins									
Vitamin A (mcg RE)	368	21.8	220	236	279	322	427	531	555
Vitamin A (mcg RAE)	285	12.2	185	206	236	261	332	366	394
Vitamin C (mg)	39	2.9	12	18	22	28	48	69	93
Vitamin E (mg AT)	2.7	0.15	1.5	1.7	2.2	2.5	3.1	4.0	4.6
Vitamin B ₆ (mg)	0.6	0.02	0.4	0.5	0.5	0.6	0.6	0.7	0.7
Vitamin B ₁₂ (mcg)	1.9	0.08	1.5	1.6	1.7	1.8	2.0	2.2	2.5
Folate (mcg)	133	3.5	99	100	111	131	147	170	182
Folate (mcg DFE)	168	4.4	125	127	138	161	184	212	237
Niacin (mg)	7	0.2	5	5	6	7	7	8	9
Riboflavin (mg)	0.9	0.02	0.7	0.8	0.9	0.9	1.0	1.1	1.2
Thiamin (mg)	0.6	0.01	0.4	0.4	0.5	0.6	0.6	0.7	0.8
Minerals									
Calcium (mg)	540	16.9	354	441	492	542	590	673	676
Iron (mg)	4.7	0.09	3.8	3.8	4.1	4.6	5.0	5.7	6.0
Magnesium (mg)	106	2.8	85	88	93	104	118	127	133
Phosphorus (mg)	588	15.8	443	499	542	582	618	692	732
Potassium (mg)	1184	27.0	956	1009	1056	1187	1286	1389	1465
Sodium (mg)	1425	42.9	1035	1083	1213	1386	1549	1863	1964
Zinc (mg)	3.9	0.08	3.1	3.3	3.6	3.7	4.2	4.7	4.7
Other Components									
Cholesterol (mg)	62	3.3	40	44	48	57	70	94	98
Dietary fiber (g)	7	0.2	5	5	6	7	8	9	9
Dietary fiber (g/1000 kcal)	9	0.3	7	8	8	9	11	12	12
Percentage of Energy From:									
Total fat	32.3	0.59	26.7	27.2	29.6	32.1	34.3	37.4	39.1
Saturated fat	10.4	0.20	8.7	9.0	9.4	10.3	11.4	11.8	12.3
Monosaturated fat	11.6	0.26	9.3	9.9	10.6	11.2	12.3	13.8	15.0
Polyunsaturated fat	7.9	0.35	4.9	5.2	6.1	7.6	9.2	11.2	12.6
Linoleic acid	7.0	0.33	4.1	4.5	5.4	6.8	8.3	10.5	11.4
Alpha-linolenic acid	0.8	0.04	0.4	0.4	0.6	0.7	0.9	1.1	1.2
Carbohydrate	53.7	0.45	47.9	49.4	51.5	53.5	55.7	57.7	59.5
Protein	15.9	0.20	13.2	13.9	14.7	16.1	17.0	17.6	18.2
Number of Schools	90								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.13

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES OFFERED
TO STUDENTS, IN SCHOOLS WITH A NUTRIENT-BASED MENU PLANNING SYSTEM
ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	735	15.2	591	606	672	710	791	850	916
Macronutrients									
Total fat (g)	27	0.8	18	21	24	28	31	33	37
Saturated fat (g)	9	0.2	6	7	8	9	10	10	12
Monounsaturated fat (g)	10	0.3	6	7	8	9	11	12	13
Polyunsaturated fat (g)	7	0.3	4	4	5	6	8	9	11
Linoleic acid (g)	6	0.3	4	4	5	6	7	8	10
Alpha-linolenic acid (g)	0.7	0.04	0.4	0.4	0.5	0.7	0.9	0.9	1.2
Carbohydrate (g)	95	2.9	73	76	83	92	105	110	118
Protein (g)	30	0.5	25	25	28	29	32	34	35
Vitamins									
Vitamin A (mcg RE)	394	31.2	271	277	304	354	407	572	625
Vitamin A (mcg RAE)	300	16.8	225	231	252	279	308	404	426
Vitamin C (mg)	30	2.1	9	11	17	26	37	53	62
Vitamin E (mg AT)	2.5	0.14	1.4	1.5	2.0	2.3	2.9	3.4	3.6
Vitamin B ₆ (mg)	0.5	0.02	0.4	0.4	0.5	0.5	0.6	0.7	0.8
Vitamin B ₁₂ (mcg)	2.0	0.13	1.5	1.6	1.7	1.9	2.0	3.0	3.2
Folate (mcg)	128	4.7	87	93	110	125	149	159	182
Folate (mcg DFE)	162	5.8	116	116	136	156	187	202	223
Niacin (mg)	7	0.2	5	5	6	6	7	8	9
Riboflavin (mg)	0.9	0.02	0.8	0.8	0.9	0.9	1.0	1.0	1.1
Thiamin (mg)	0.5	0.02	0.4	0.4	0.5	0.5	0.6	0.7	0.7
Minerals									
Calcium (mg)	540	10.9	448	457	498	530	580	605	633
Iron (mg)	4.5	0.12	3.4	3.7	4.0	4.4	5.0	5.3	5.8
Magnesium (mg)	102	2.3	83	86	91	97	112	120	129
Phosphorus (mg)	576	9.4	465	494	539	569	614	637	667
Potassium (mg)	1143	37.0	897	929	988	1088	1257	1403	1467
Sodium (mg)	1389	60.0	949	1097	1200	1338	1565	1802	1876
Zinc (mg)	3.9	0.06	3.3	3.4	3.6	3.8	4.1	4.5	4.6
Other Components									
Cholesterol (mg)	59	1.6	41	46	52	58	65	73	79
Dietary fiber (g)	7	0.2	5	5	5	6	7	9	10
Dietary fiber (g/1000 kcal)	9	0.2	6	7	8	9	10	11	11
Percentage of Energy From:									
Total fat	33.4	0.77	27.5	29.0	30.5	32.0	36.4	38.2	41.2
Saturated fat	10.7	0.23	8.7	9.3	9.9	10.6	11.5	12.3	12.6
Monosaturated fat	12.0	0.41	9.7	10.1	10.5	11.7	13.0	15.0	15.1
Polyunsaturated fat	8.3	0.31	6.0	6.1	6.7	8.2	9.5	10.4	12.0
Linoleic acid	7.3	0.27	5.2	5.3	5.8	7.3	8.5	9.4	10.4
Alpha-linolenic acid	0.8	0.04	0.5	0.6	0.7	0.8	1.0	1.2	1.4
Carbohydrate	51.8	0.91	43.8	45.0	49.1	52.5	54.5	56.8	58.9
Protein	16.5	0.21	13.9	14.9	15.9	16.4	17.2	18.0	18.9
Number of Schools	114								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.14

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES *SERVED*
TO STUDENTS, IN SCHOOLS WITH A TRADITIONAL FOOD-BASED MENU PLANNING SYSTEM
ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	719	9.4	551	594	664	726	771	814	887
Macronutrients									
Total fat (g)	28	0.6	19	21	24	28	31	36	38
Saturated fat (g)	9	0.2	6	7	8	9	10	11	12
Monounsaturated fat (g)	10	0.2	7	8	9	10	11	13	15
Polyunsaturated fat (g)	7	0.3	4	4	5	7	8	9	10
Linoleic acid (g)	6	0.2	3	4	5	6	7	8	9
Alpha-linolenic acid (g)	0.7	0.03	0.3	0.4	0.5	0.7	0.9	1.0	1.1
Carbohydrate (g)	90	1.6	69	76	82	88	98	108	112
Protein (g)	29	0.3	24	25	27	29	30	33	34
Vitamins									
Vitamin A (mcg RE)	318	11.1	197	218	254	288	378	432	475
Vitamin A (mcg RAE)	252	6.0	170	184	219	242	288	317	341
Vitamin C (mg)	23	1.1	9	13	16	22	29	36	39
Vitamin E (mg AT)	2.2	0.05	1.5	1.6	1.9	2.1	2.5	2.9	3.4
Vitamin B ₆ (mg)	0.5	0.01	0.4	0.4	0.5	0.5	0.6	0.6	0.7
Vitamin B ₁₂ (mcg)	1.7	0.04	1.2	1.3	1.6	1.7	1.9	2.0	2.1
Folate (mcg)	112	1.8	88	91	99	109	123	138	143
Folate (mcg DFE)	144	2.4	111	114	127	142	159	176	185
Niacin (mg)	7	0.1	5	5	6	7	7	8	8
Riboflavin (mg)	0.8	0.01	0.7	0.7	0.8	0.8	0.9	0.9	1.0
Thiamin (mg)	0.5	0.01	0.4	0.4	0.5	0.5	0.6	0.6	0.7
Minerals									
Calcium (mg)	471	6.8	359	395	442	464	511	554	579
Iron (mg)	4.5	0.06	3.6	3.7	4.0	4.4	4.8	5.2	5.5
Magnesium (mg)	94	1.2	75	81	88	93	101	110	117
Phosphorus (mg)	538	6.0	429	458	502	535	570	615	633
Potassium (mg)	1076	14.7	858	900	964	1073	1164	1246	1353
Sodium (mg)	1373	29.4	1004	1110	1217	1338	1544	1647	1783
Zinc (mg)	3.8	0.05	2.9	3.1	3.5	3.7	4.0	4.6	4.8
Other Components									
Cholesterol (mg)	62	1.4	45	48	55	60	67	77	85
Dietary fiber (g)	6	0.1	4	5	5	6	7	8	8
Dietary fiber (g/1000 kcal)	9	0.2	7	7	8	9	10	11	11
Percentage of Energy From:									
Total fat	34.7	0.48	27.4	29.4	31.9	35.0	36.7	39.7	42.3
Saturated fat	11.1	0.14	9.1	9.4	10.3	11.1	12.1	12.5	13.0
Monosaturated fat	12.9	0.16	10.3	11.2	12.0	12.7	13.5	15.2	16.1
Polyunsaturated fat	8.2	0.26	5.3	5.6	6.6	8.1	9.8	10.2	11.9
Linoleic acid	7.2	0.23	4.5	4.9	5.8	7.0	8.6	8.9	10.3
Alpha-linolenic acid	0.9	0.03	0.5	0.5	0.7	0.8	1.1	1.2	1.3
Carbohydrate	50.5	0.46	43.5	45.0	48.3	50.5	52.6	56.0	56.5
Protein	16.3	0.16	13.7	14.5	15.3	16.1	17.1	18.2	18.6
Number of Schools	193								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.15

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES *SERVED*
TO STUDENTS, IN SCHOOLS WITH AN ENHANCED FOOD-BASED MENU PLANNING SYSTEM
ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	674	15.1	535	553	584	649	729	794	884
Macronutrients									
Total fat (g)	25	0.9	17	18	20	23	29	32	38
Saturated fat (g)	8	0.3	5	6	7	8	9	10	11
Monounsaturated fat (g)	9	0.4	6	7	7	9	11	12	14
Polyunsaturated fat (g)	6	0.3	3	3	4	5	7	8	10
Linoleic acid (g)	5	0.2	3	3	4	5	6	7	9
Alpha-linolenic acid (g)	0.6	0.04	0.3	0.3	0.4	0.5	0.7	0.9	1.0
Carbohydrate (g)	88	1.8	70	72	78	86	95	106	112
Protein (g)	27	0.5	22	23	25	27	29	32	32
Vitamins									
Vitamin A (mcg RE)	306	15.3	169	198	247	276	365	445	483
Vitamin A (mcg RAE)	245	9.2	139	172	216	242	286	301	343
Vitamin C (mg)	25	1.7	12	13	16	23	29	41	50
Vitamin E (mg AT)	2.2	0.08	1.3	1.4	1.8	2.2	2.4	2.9	3.3
Vitamin B ₆ (mg)	0.5	0.02	0.4	0.4	0.4	0.5	0.6	0.6	0.7
Vitamin B ₁₂ (mcg)	1.7	0.10	1.2	1.3	1.5	1.6	1.8	2.1	2.5
Folate (mcg)	109	3.0	79	83	95	111	119	134	144
Folate (mcg DFE)	139	4.1	96	104	118	138	151	175	191
Niacin (mg)	6	0.2	4	5	5	6	7	7	8
Riboflavin (mg)	0.8	0.02	0.6	0.7	0.8	0.8	0.9	1.0	1.0
Thiamin (mg)	0.5	0.01	0.4	0.4	0.4	0.5	0.5	0.6	0.6
Minerals									
Calcium (mg)	472	14.7	323	344	425	481	531	557	581
Iron (mg)	4.3	0.10	3.5	3.5	3.7	4.2	4.6	5.0	5.2
Magnesium (mg)	92	2.3	68	73	83	91	101	105	123
Phosphorus (mg)	526	13.3	375	425	482	529	580	606	631
Potassium (mg)	1038	26.3	739	818	922	1042	1147	1232	1276
Sodium (mg)	1300	32.1	979	1006	1132	1282	1429	1548	1621
Zinc (mg)	3.5	0.08	2.8	2.9	3.1	3.4	3.8	4.1	4.3
Other Components									
Cholesterol (mg)	58	3.0	40	41	46	53	63	82	91
Dietary fiber (g)	6	0.2	4	4	5	6	7	8	9
Dietary fiber (g/1000 kcal)	9	0.3	7	7	8	9	10	12	12
Percentage of Energy From:									
Total fat	32.6	0.60	26.2	27.7	29.2	32.0	35.5	37.2	39.0
Saturated fat	10.6	0.21	8.5	9.0	9.7	10.7	11.5	12.4	12.9
Monosaturated fat	12.0	0.27	9.6	10.3	10.9	11.7	13.1	13.9	15.1
Polyunsaturated fat	7.5	0.27	4.9	5.1	6.1	7.3	8.3	9.7	11.7
Linoleic acid	6.6	0.24	4.3	4.4	5.4	6.4	7.2	8.6	10.2
Alpha-linolenic acid	0.8	0.04	0.4	0.4	0.6	0.7	0.9	1.0	1.2
Carbohydrate	52.7	0.51	47.3	47.9	50.2	52.7	55.2	56.6	56.8
Protein	16.3	0.22	13.8	14.2	14.9	16.4	17.6	18.4	18.8
Number of Schools	90								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.16

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES *SERVED*
TO STUDENTS, IN SCHOOLS WITH A NUTRIENT-BASED MENU PLANNING SYSTEM
ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	717	16.8	541	556	605	710	761	888	930
Macronutrients									
Total fat (g)	27	1.1	17	18	22	25	29	39	40
Saturated fat (g)	9	0.3	6	6	7	8	9	11	12
Monounsaturated fat (g)	10	0.5	6	7	8	9	11	15	15
Polyunsaturated fat (g)	7	0.4	4	4	5	6	7	10	13
Linoleic acid (g)	6	0.3	3	4	4	5	6	9	11
Alpha-linolenic acid (g)	0.7	0.03	0.4	0.4	0.5	0.6	0.7	0.9	1.4
Carbohydrate (g)	93	2.7	63	72	80	90	100	113	121
Protein (g)	29	0.6	23	25	26	28	32	34	34
Vitamins									
Vitamin A (mcg RE)	326	19.9	190	230	261	294	373	439	570
Vitamin A (mcg RAE)	263	12.1	167	197	228	248	289	338	422
Vitamin C (mg)	22	1.5	10	11	14	19	25	35	56
Vitamin E (mg AT)	2.3	0.13	1.4	1.5	1.7	2.1	2.6	3.4	3.8
Vitamin B ₆ (mg)	0.5	0.02	0.4	0.4	0.4	0.5	0.6	0.6	0.7
Vitamin B ₁₂ (mcg)	1.8	0.12	1.2	1.3	1.5	1.7	1.9	2.8	3.0
Folate (mcg)	113	4.4	78	84	92	106	126	139	164
Folate (mcg DFE)	144	5.5	101	105	116	137	161	177	205
Niacin (mg)	6	0.2	5	5	5	6	7	8	8
Riboflavin (mg)	0.9	0.02	0.7	0.7	0.8	0.9	1.0	1.0	1.1
Thiamin (mg)	0.5	0.02	0.3	0.4	0.4	0.5	0.5	0.6	0.7
Minerals									
Calcium (mg)	493	10.3	386	399	451	485	543	572	591
Iron (mg)	4.4	0.12	3.4	3.5	3.9	4.4	4.9	5.2	5.7
Magnesium (mg)	97	3.0	70	77	86	94	109	120	125
Phosphorus (mg)	551	11.2	443	467	487	544	607	632	640
Potassium (mg)	1072	37.7	755	813	921	1071	1152	1378	1487
Sodium (mg)	1341	47.6	961	979	1123	1252	1579	1697	1847
Zinc (mg)	3.8	0.09	2.8	3.0	3.3	3.8	4.2	4.4	4.6
Other Components									
Cholesterol (mg)	57	1.9	40	43	50	56	65	72	74
Dietary fiber (g)	6	0.2	4	5	5	6	7	8	9
Dietary fiber (g/1000 kcal)	9	0.2	6	7	8	9	10	10	11
Percentage of Energy From:									
Total fat	33.3	0.84	27.8	27.8	29.5	32.1	36.2	40.6	41.8
Saturated fat	10.7	0.28	8.5	8.7	9.3	10.5	11.7	12.6	12.8
Monosaturated fat	12.4	0.39	9.8	10.0	10.9	12.0	13.4	15.6	16.3
Polyunsaturated fat	8.0	0.28	5.8	5.9	6.5	7.4	8.4	10.7	12.8
Linoleic acid	7.0	0.26	5.0	5.2	5.7	6.4	7.4	9.5	11.2
Alpha-linolenic acid	0.8	0.03	0.6	0.6	0.6	0.7	0.9	1.1	1.4
Carbohydrate	51.8	0.90	44.2	44.7	49.2	52.7	55.3	56.9	57.9
Protein	16.4	0.19	13.2	14.1	15.6	16.7	17.5	18.6	18.8
Number of Schools	114								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE D-VI.17

FOOD SOURCES OF ENERGY IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Food Energy (calories)				
1	1% milk, flavored	6.6	5.1**	6.0
2	Pizza and pizza products	6.1	5.7	5.9
3	Peanut butter sandwiches	5.0	2.8*	4.2
4	White bread, rolls, bagels	4.1	4.2	4.1
5	Salad dressings	4.2	3.7	4.0
6	Condiments and spreads	3.7	4.1	3.9
7	Hamburgers, cheeseburgers	3.6	4.2	3.8
8	Entree salads, entree salad bars	3.2	4.3	3.6
9	Sandwiches with plain meat or poultry ^a	3.8	3.4	3.6
10	Cookies, cakes, brownies	3.4	3.8	3.5
11	French fries, similar potato products	2.6	4.8**	3.5
12	Mexican-style entrees	3.6	2.9	3.3
13	2% milk, unflavored	2.9	2.5	2.7
14	1% milk, unflavored	2.6	2.2	2.5
15	Hot dog, corn dog	2.3	2.4	2.3
16	Skim or nonfat milk, flavored	2.4	2.2	2.3
17	Breaded/fried meat or poultry sandwich	1.6	2.9**	2.1
18	Fruit juice, 100%	2.0	1.5	1.9
19	Breaded/fried chicken products	1.9	1.5	1.7
20	Lettuce salads, side salad bars	1.2	2.3	1.7
21	Mixtures with pasta or noodle base	1.8	1.4	1.6
22	Whole milk, unflavored	1.6	1.4	1.5
23	Entree food bars, bag/pre-plated lunches	0.8	2.5**	1.4
24	Crackers and pretzels	1.6	1.1	1.4
25	Rice, pasta	1.1	1.6*	1.3
26	Unbreaded poultry, meat, fish	1.2	1.3	1.2
27	Apples	1.1	1.3	1.2
28	Buttered toast, bagels with cream cheese	1.1	1.3	1.2
29	Peaches	1.0	1.1	1.1
30	White potatoes	1.0	1.1	1.0

TABLE D-VI.17 (continued)

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.18

FOOD SOURCES OF TOTAL FAT IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Total Fat				
1	Salad dressings	10.9	9.3	10.3
2	Condiments and spreads	6.7	8.0	7.2
3	Pizza and pizza products	6.6	6.2	6.5
4	Peanut butter sandwiches	7.4	4.3	6.1
5	Entree salads, entree salad bars	4.7	5.8	5.1
6	French fries, similar potato products	3.2	6.2**	4.4
7	Mexican-style entrees	4.5	3.7	4.2
8	Hamburgers, cheeseburgers	3.9	4.5	4.1
9	Sandwiches with plain meat or poultry ^a	3.8	3.4	3.6
10	Cookies, cakes, brownies	3.5	3.7	3.6
11	Hot dog, corn dog	3.3	3.5	3.4
12	2% milk, unflavored	3.0	2.6	2.8
13	1% milk, flavored	2.8	2.1**	2.6
14	Breaded/fried chicken products	2.7	2.0*	2.4
15	Lettuce salads, side salad bars	1.5	3.3	2.2
16	Breaded/fried meat or poultry sandwich	1.7	3.1**	2.2
17	Whole milk, unflavored	2.3	2.0	2.2
18	Unbreaded poultry, meat, or fish	1.7	1.9	1.8
19	White bread, rolls, bagels	1.6	1.9	1.7
20	Mixtures with pasta or noodle base	1.7	1.4	1.6
21	Entree food bars, bag/pre-plated lunches	0.8	2.6**	1.5
22	1% milk, unflavored	1.6	1.3	1.5
23	Cheese sandwiches	1.8	0.5**	1.3
24	Breaded/fried beef, pork, or fish	1.5	1.0	1.3
25	Buttered toast, bagels with cream cheese	1.2	1.3	1.2
26	Rice, pasta	0.9	1.4*	1.1
27	Corn/tortilla chips	1.1	0.9	1.0

TABLE D-VI.18 (continued)

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.19

FOOD SOURCES OF SATURATED FAT IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Saturated Fat				
1	Pizza and pizza products	8.0	7.9	7.9
2	Condiments and spreads	6.0	6.5	6.2
3	2% milk, unflavored	6.0	5.4	5.8
4	Entree salads, entree salad bars	5.2	6.6	5.8
5	Hamburgers, cheeseburgers	4.7	5.8	5.1
6	1% milk, flavored	5.6	4.3**	5.1
7	Salad dressings	5.0	4.5	4.8
8	Mexican-style entrees	5.3	4.1	4.8
9	Sandwiches with plain meat or poultry ^a	4.9	4.5	4.7
10	Whole milk, unflavored	4.0	3.7	3.9
11	Peanut butter sandwiches	4.5	2.7	3.8
12	Hot dog, corn dog	3.5	3.8	3.6
13	Cookies, cakes, brownies	3.0	3.3	3.1
14	1% milk, unflavored	3.3	2.8	3.1
15	French fries, similar potato products	2.0	4.2**	2.9
16	Mixtures with pasta or noodle base	2.0	1.7	1.9
17	Cheese sandwiches	2.6	0.8**	1.9
18	Unbreaded poultry, meat, or fish	1.7	2.0	1.8
19	Breaded/fried chicken products	1.7	1.4	1.6
20	Breaded/fried meat or poultry sandwich	1.2	2.3**	1.6
21	Entree food bars, bag/pre-plated lunches	0.8	2.7**	1.6
22	Lettuce salads, salad bars	0.8	2.0	1.3
23	White bread, rolls, bagels	1.2	1.4	1.3
24	2% milk, flavored	1.1	1.2	1.1
25	Breaded/fried beef, pork, or fish	1.2	0.8	1.0

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.20

FOOD SOURCES OF CARBOHYDRATE IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Carbohydrate				
1	1% milk, flavored	8.6	6.5**	7.8
2	White bread, rolls, bagels	5.7	5.7	5.7
3	Pizza and pizza products	5.2	4.9	5.1
4	Cookies, cakes, brownies	4.0	4.7	4.3
5	French fries, similar potato products	2.7	4.7**	3.5
6	Skim or nonfat milk, flavored	3.5	3.4	3.5
7	Fruit juice, 100%	3.8	2.9	3.4
8	Peanut butter sandwiches	4.0	2.1**	3.3
9	Sandwiches with plain meat or poultry ^a	2.9	2.5	2.7
10	Hamburgers, cheeseburgers	2.5	2.8	2.6
11	Condiments and spreads	2.6	2.3	2.5
12	Apples	2.2	2.7	2.4
13	Mexican-style entrees	2.5	2.1	2.4
14	1% milk, unflavored	2.4	2.0	2.3
15	Peaches	2.1	2.3	2.2
16	Entree salads, entree salad bars	1.8	2.5	2.1
17	2% milk, unflavored	2.1	1.8	2.0
18	Crackers and pretzels	2.1	1.5	1.8
19	Pears	1.7	1.8	1.7
20	Breaded/fried meat or poultry sandwich	1.2	2.3**	1.7
21	Hot dog, corn dog	1.5	1.7	1.6
22	Lettuce salads, side salad bars	1.3	1.9	1.6
23	Fruit cocktail	1.3	1.6	1.4
24	Rice, pasta	1.2	1.8*	1.4
25	Mixtures with pasta or noodle base	1.5	1.2	1.4
26	Juice drinks (not 100% juice)	1.2	1.7	1.4
27	Citrus fruit	1.3	1.4	1.4
28	White potatoes	1.3	1.4	1.4
29	Pineapple	1.4	1.3	1.4
30	Entree food bars, bag/pre-plated lunches	0.8	2.2**	1.4
31	Corn	1.2	1.6	1.3
32	Buttered toast, bagels with cream cheese	1.2	1.4	1.3
33	Bananas	1.2	1.3	1.2

TABLE D-VI.20 (continued)

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
34	Dairy-based desserts	1.2	1.3	1.2
35	Applesauce	1.3	1.1	1.2
36	Salad dressings	1.1	1.0	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.21
FOOD SOURCES OF PROTEIN IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Protein				
1	1% milk, flavored	8.2	6.4**	7.5
2	Pizza and pizza products	7.0	6.8	6.9
3	Hamburgers, cheeseburgers	6.1	7.3	6.6
4	Sandwiches with plain meat or poultry ^a	5.9	5.5	5.8
5	Entree salads, entree salad bars	4.8	6.8*	5.6
6	1% milk, unflavored	5.3	4.6	5.1
7	2% milk, unflavored	4.8	4.3	4.6
8	Mexican-style entrees	4.5	3.5	4.1
9	Peanut butter sandwiches	4.3	2.6	3.6
10	Skim or nonfat milk, flavored	3.5	3.5	3.5
11	White bread, rolls, bagels	3.4	3.3	3.3
12	Unbreaded poultry, meat, or fish	3.2	3.3	3.3
13	Breaded/fried chicken products	3.3	2.6	3.0
14	Breaded/fried meat or poultry sandwich	2.1	4.1**	2.9
15	Mixtures with pasta or noodle base	2.5	2.1	2.3
16	Hot dog, corn dog	2.2	2.3	2.2
17	Skim or nonfat milk, unflavored	2.1	2.4	2.2
18	Whole milk, unflavored	2.1	2.0	2.1
19	Condiments and spreads	1.7	1.9	1.8
20	Entree food bars, bag/pre-plated lunches	0.7	2.9**	1.5
21	French fries, similar potato products	0.9	1.7**	1.2
22	Breaded/fried beef, pork, or fish	1.3	0.9	1.2
23	Cookies, cakes, brownies	1.1	1.2	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.22

FOOD SOURCES OF VITAMIN A (RE) IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Vitamin A (RE)				
1	Carrots	18.2	14.9	17.0
2	1% milk, flavored	11.1	9.5	10.5
3	1% milk, unflavored	7.0	6.6	6.9
4	Entree salads, entree salad bars	5.1	8.2*	6.2
5	2% milk, unflavored	6.1	6.0	6.1
6	Pizza and pizza products	5.0	4.7	4.9
7	Skim or nonfat milk, flavored	4.5	4.8	4.6
8	Condiments and spreads	3.3	4.1*	3.6
9	Mixed vegetables	4.0	2.8	3.6
10	Lettuce salads, side salad bars	2.4	4.7**	3.2
11	Skim or nonfat milk, unflavored	2.9	3.7	3.2
12	Leafy greens	2.0	2.3	2.1
13	Other raw vegetables	1.9	1.8	1.9
14	Cookies, cakes, brownies	2.1	1.2	1.8
15	Whole milk, unflavored	1.4	1.5	1.5
16	Sandwiches with plain meat or poultry ^a	1.3	1.3	1.3
17	Peaches	1.1	1.5	1.3
18	Mixtures with pasta or noodle base	1.3	1.0	1.2
19	2% milk, flavored	1.1	1.3	1.2
20	Other food bars, bag/pre-plated lunches	0.8	1.8*	1.2
21	Yams, sweet potatoes	1.5	0.5	1.2

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.23

FOOD SOURCES OF VITAMIN A (RAE) IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Vitamin A (RAE)				
1	1% milk, flavored	14.6	12.4*	13.8
2	Carrots	12.1	9.8	11.2
3	1% milk, unflavored	9.2	8.6	9.0
4	2% milk, unflavored	8.0	7.8	7.9
5	Skim or nonfat milk, flavored	5.9	6.3	6.1
6	Pizza and pizza products	6.1	5.8	6.0
7	Entree salads, entree salad bars	4.2	6.6*	5.1
8	Skim or nonfat milk, unflavored	3.8	4.8	4.2
9	Condiments and spreads	3.3	4.2	3.7
10	Mixed vegetables	2.7	1.9	2.4
11	Lettuce salads, side salad bars	1.7	3.2*	2.3
12	Whole milk, unflavored	1.9	1.9	1.9
13	Cookies, cakes, brownies	1.9	1.4	1.7
14	2% milk, flavored	1.4	1.7	1.5
15	Sandwiches with plain meat or poultry ^a	1.5	1.5	1.5
16	Leafy greens	1.3	1.5	1.4
17	Other raw vegetables	1.3	1.3	1.3
18	Buttered toast, bagels with cream cheese	1.0	1.4	1.2
19	Mexican-style entrees	1.2	0.9	1.1
20	Mixtures with pasta or noodle base	1.2	0.9	1.1
21	Entree food bars, bag/pre-plated lunches	0.6	1.7**	1.0
22	Cheese sandwiches	1.3	0.5**	1.0

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.24

FOOD SOURCES OF VITAMIN C IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Vitamin C				
1	Fruit juice, 100%	24.3	20.8	22.9
2	Citrus fruit	16.3	17.5	16.8
3	Peaches	8.1	3.8	6.4
4	Juice drinks (not 100% juice)	4.5	5.0	4.7
5	Entree salads, entree salad bars	2.7	5.1*	3.6
6	Broccoli	3.9	3.1	3.6
7	Condiments and spreads	3.2	4.0	3.6
8	Lettuce salads, side salad bars	3.0	4.3	3.5
9	Pineapple	2.4	2.3	2.3
10	Apples	2.1	2.6	2.3
11	French fries, similar potato products	1.4	3.0**	2.0
12	Other raw vegetables	1.7	2.3	1.9
13	Fruit-based desserts	2.3	1.2*	1.9
14	White potatoes	1.7	2.0	1.8
15	1% milk, flavored	1.6	1.2*	1.5
16	Corn	1.2	1.7	1.4
17	Bananas	1.4	1.5	1.4
18	Hot dog, corn dog	1.2	1.5	1.3
19	Entree food bars, bag/pre-plated lunches	0.5	1.9**	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.25

FOOD SOURCES OF VITAMIN E IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Vitamin E				
1	Salad dressings	14.3	12.5	13.6
2	Peanut butter sandwiches	11.4	7.0	9.7
3	Condiments and spreads	8.2	9.3	8.6
4	Pizza and pizza products	5.1	4.9	5.0
5	Entree salads, entree salad bars	4.2	5.5	4.7
6	Lettuce salads, side salad bars	2.6	4.6	3.4
7	French fries, similar potato products	2.2	5.2**	3.4
8	Mexican-style entrees	3.2	2.8	3.0
9	Peaches	2.6	3.0	2.7
10	Mixtures with pasta or noodle base	2.6	2.2	2.5
11	Peanut butter, nuts, seeds, or trail mixes	2.9	0.9	2.1
12	Breaded/fried chicken products	2.4	1.7	2.1
13	Fruit cocktail	1.6	1.9	1.7
14	Carrots	1.8	1.3	1.6
15	Cookies, cakes, brownies	1.5	1.7	1.6
16	Breaded/fried meat or poultry sandwich	1.2	2.0**	1.5
17	Sandwiches with plain meat or poultry ^a	1.5	1.5	1.5
18	Corn/tortilla chips	1.6	1.2	1.4
19	Entree food bars, bag/pre-plated lunches	0.9	2.3**	1.4
20	Broccoli	1.3	1.2	1.3
21	Hamburgers, cheeseburgers	1.2	1.3	1.3
22	Rice, pasta	1.0	1.6**	1.3
23	Fruit juice, 100%	1.3	1.2	1.3
24	Apples	1.1	1.4	1.2
25	Unbreaded poultry, meat, or fish	1.1	1.4	1.2
26	White bread, rolls, bagels	1.2	1.2	1.2
27	Breaded/fried beef, pork, or fish	1.3	0.9	1.2
28	Other raw vegetables	1.1	1.2	1.1
29	Snack chips (popcorn, potato chips)	0.9	1.4	1.1
30	Buttered toast, bagels with cream cheese	0.9	1.2	1.0

TABLE D-VI.25 (continued)

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.26

FOOD SOURCES OF VITAMIN B₆ IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Vitamin B₆				
1	French fries, similar potato products	6.6	9.7**	7.9
2	1% milk, flavored	5.5	4.1**	4.9
3	Entree salads, entree salad bars	4.0	6.0*	4.8
4	Hamburgers, cheeseburgers	4.3	4.7	4.5
5	Pizza and pizza products	4.0	3.9	4.0
6	Sandwiches with plain meat or poultry ^a	4.0	3.4	3.8
7	Condiments and spreads	3.6	3.8	3.7
8	Bananas	3.5	3.7	3.6
9	Fruit juice, 100%	3.7	2.8	3.3
10	1% milk, unflavored	3.5	2.8	3.2
11	Peanut butter sandwiches	3.7	2.2	3.1
12	Mexican-style entrees	3.3	2.8	3.1
13	2% milk, unflavored	3.2	2.7	3.0
14	White potatoes	2.9	3.0	2.9
15	Unbreaded poultry, meat, or fish	2.7	2.7	2.7
16	Breaded/fried chicken products	2.6	2.0*	2.3
17	Skim or nonfat milk, flavored	2.2	2.1	2.1
18	Breaded/fried meat or poultry sandwich	1.6	2.9**	2.1
19	Lettuce salads, side salad bars	1.6	2.3	1.9
20	Hot dog, corn dog	1.7	1.7	1.7
21	Mixtures with pasta or noodle base	1.7	1.4	1.6
22	Entree food bars, bag/pre-plated lunches	0.6	2.7**	1.5
23	Skim or nonfat milk, unflavored	1.4	1.5	1.4
24	Whole milk, unflavored	1.4	1.3	1.4
25	Carrots	1.6	1.0*	1.3
26	Apples	1.1	1.4	1.2
27	White bread, rolls, bagels	1.2	1.2	1.2
28	Citrus fruit	1.2	1.2	1.2
29	Pineapple	1.2	1.1	1.1
30	Legumes	0.9	1.3	1.0
31	Rice, pasta	0.9	1.2	1.0
32	Breaded/fried beef, pork, or fish	1.1	0.8	1.0

TABLE D-VI.26 (continued)

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.27

FOOD SOURCES OF VITAMIN B₁₂ IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Vitamin B₁₂				
1	1% milk, flavored	14.7	12.0*	13.6
2	1% milk, unflavored	10.9	9.8	10.5
3	2% milk, unflavored	10.4	9.8	10.2
4	Skim or nonfat milk, flavored	8.0	8.2	8.1
5	Hamburgers, cheeseburgers	6.8	8.3	7.3
6	Sandwiches with breaded fish	6.5	4.9	5.9
7	Skim or nonfat milk, unflavored	5.1	6.3	5.6
8	Whole milk, unflavored	4.5	4.4	4.5
9	Pizza and pizza products	3.4	3.4	3.4
10	Entree salads, entree salad bars	2.7	4.0*	3.2
11	Mexican-style entrees	3.2	2.8	3.0
12	Unbreaded poultry, meat, or fish	2.8	3.2	3.0
13	Sandwiches with plain meat or poultry ^a	2.5	2.4	2.5
14	Hot dog, corn dog	1.7	2.0	1.8
15	Mixtures with pasta or noodle base	1.9	1.8	1.8
16	Breaded/fried meat or poultry sandwich	1.3	2.2**	1.7
17	2% milk, flavored	1.5	1.8	1.6
18	Breaded/fried beef, pork, or fish	1.4	1.1	1.3
19	Condiments and spreads	1.0	1.0	1.0

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

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TABLE D-VI.28

FOOD SOURCES OF FOLATE (DFE) IN NSLP LUNCHES *OFFERED*

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Folate (DFE)				
1	White bread, rolls, bagels	10.8	10.7	10.8
2	Pizza and pizza products	7.1	6.7	7.0
3	Hamburgers, cheeseburgers	5.4	6.1	5.7
4	Sandwiches with plain meat or poultry ^a	5.8	5.0	5.5
5	Peanut butter sandwiches	6.1	3.5*	5.1
6	Entree salads, entree salad bars	4.4	5.7	4.9
7	Mexican-style entrees	4.0	3.4	3.7
8	Breaded/fried meat or poultry sandwich	2.3	4.3**	3.1
9	Lettuce salads, side salad bars	2.5	3.7	3.0
10	Hot dog, corn dog	2.7	2.8	2.8
11	Rice, pasta	2.4	3.4*	2.8
12	Cookies, cakes, brownies	2.6	2.7	2.6
13	Mixtures with pasta or noodle base	2.7	2.2	2.5
14	Crackers and pretzels	2.9	1.9*	2.5
15	Buttered toast, bagels with cream cheese	2.3	2.7	2.5
16	Fruit juice, 100%	2.4	2.0	2.3
17	1% milk, flavored	2.3	1.7**	2.1
18	Citrus fruit	1.7	1.9	1.8
19	Corn	1.6	2.2	1.8
20	Entree food bars, bag/pre-plated lunches	0.9	2.9**	1.7
21	Legumes	1.3	1.8	1.5
22	1% milk, unflavored	1.4	1.2	1.3
23	2% milk, unflavored	1.3	1.1	1.2
24	Biscuits, croissants, cornbread	1.1	1.2	1.2
25	Condiments and spreads	1.1	1.2	1.1
26	Breaded/fried chicken products	1.2	1.0	1.1

TABLE D-VI.28 (continued)

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.29

FOOD SOURCES OF CALCIUM IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Calcium				
1	1% milk, flavored	16.4	13.8*	15.4
2	1% milk, unflavored	10.6	9.7	10.3
3	2% milk, unflavored	9.5	9.2	9.4
4	Pizza and pizza products	8.7	8.3	8.5
5	Skim or nonfat milk, flavored	6.8	7.2	7.0
6	Skim or nonfat milk, unflavored	4.3	5.4	4.7
7	Whole milk, unflavored	4.2	4.1	4.2
8	Sandwiches with plain meat or poultry ^a	3.4	3.4	3.4
9	Entree salads, entree salad bars	2.9	4.0	3.3
10	Mexican-style entrees	3.0	2.2	2.7
11	Hamburgers, cheeseburgers	2.1	2.9**	2.4
12	White bread, rolls, bagels	1.9	2.3	2.1
13	2% milk, flavored	1.6	2.0	1.8
14	Condiments and spreads	1.7	1.8	1.7
15	Cheese sandwiches	1.8	0.5**	1.4
16	Peanut butter sandwiches	1.6	1.0	1.4
17	Dairy-based desserts	1.1	1.3	1.2
18	Fruit juice, 100%	1.2	1.0	1.1
19	Yogurt	1.5	0.4*	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

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TABLE D-VI.30

FOOD SOURCES OF IRON IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Iron				
1	White bread, rolls, bagels	7.8	7.9	7.9
2	Pizza and pizza products	7.3	7.0	7.2
3	Hamburgers, cheeseburgers	6.6	7.5	7.0
4	Sandwiches with plain meat or poultry ^a	5.8	5.2	5.5
5	Peanut butter sandwiches	5.1	3.0*	4.2
6	Mexican-style entrees	4.6	3.7	4.2
7	Entree salads, entree salad bars	3.3	4.3	3.7
8	Cookies, cakes, brownies	3.1	3.5	3.3
9	Breaded/fried meat or poultry sandwich	2.2	4.1**	3.0
10	1% milk, flavored	3.2	2.5**	2.9
11	Condiments and spreads	2.7	2.8	2.8
12	Hot dog, corn dog	2.7	2.8	2.7
13	Mixtures with pasta or noodle base	2.8	2.2	2.6
14	Crackers and pretzels	2.8	2.1	2.5
15	Fruit juice, 100%	2.5	2.0	2.3
16	Breaded/fried chicken products	2.2	1.8	2.1
17	Unbreaded poultry, meat, or fish	1.8	1.9	1.8
18	Buttered toast, bagels with cream cheese	1.6	2.0	1.8
19	Entree food bars, bag/pre-plated lunches	0.9	3.0**	1.7
20	Legumes	1.6	1.8	1.7
21	French fries, similar potato products	1.3	2.2**	1.7
22	Rice, pasta	1.4	2.1*	1.6
23	Skim or nonfat milk, flavored	1.6	1.6	1.6
24	Lettuce salads, side salad bars	1.3	2.2	1.6
25	White potatoes	1.0	1.3	1.1
26	Corn	1.0	1.4	1.1
27	Whole grain breads and rolls	1.1	1.0	1.1
28	Peaches	1.0	1.2	1.1

TABLE D-VI.30 (continued)

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

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TABLE D-VI.31

FOOD SOURCES OF MAGNESIUM IN NSLP LUNCHES *OFFERED*

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Magnesium				
1	1% milk, flavored	9.0	7.1**	8.3
2	Peanut butter sandwiches	7.4	4.5	6.3
3	Skim or nonfat milk, flavored	5.0	5.0	5.0
4	Pizza and pizza products	5.1	4.8	5.0
5	1% milk, unflavored	5.0	4.3	4.8
6	2% milk, unflavored	4.6	4.1	4.4
7	French fries, similar potato products	2.9	4.9**	3.7
8	Entree salads, entree salad bars	3.0	4.3	3.5
9	Hamburgers, cheeseburgers	3.1	3.8	3.4
10	Mexican-style entrees	3.2	2.8	3.0
11	Condiments and spreads	2.6	3.0	2.8
12	Sandwiches with plain meat or poultry ^a	2.8	2.7	2.7
13	White bread, rolls, bagels	2.4	2.3	2.4
14	Fruit juice, 100%	2.5	2.0	2.3
15	Skim or nonfat milk, unflavored	2.0	2.3	2.1
16	Whole milk, unflavored	1.9	1.8	1.8
17	Legumes	1.6	2.2	1.8
18	Cookies, cakes, brownies	1.6	1.7	1.7
19	Lettuce salads, side salad bars	1.3	2.1	1.6
20	Mixtures with pasta or noodle base	1.6	1.4	1.5
21	Corn	1.3	1.8	1.5
22	White potatoes	1.4	1.6	1.5
23	Bananas	1.4	1.5	1.4
24	Pineapple	1.3	1.3	1.3
25	Entree food bars, bag/pre-plated lunches	0.7	2.3**	1.3
26	Breaded/fried meat or poultry sandwich	0.9	1.8**	1.2
27	Citrus fruit	1.1	1.1	1.1
28	Rice, pasta	0.9	1.3	1.1
29	Unbreaded poultry, meat, or fish	1.1	1.1	1.1
30	Breaded/fried chicken products	1.1	0.9	1.0

TABLE D-VI.31 (continued)

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

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**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.32

FOOD SOURCES OF PHOSPHORUS IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Phosphorus				
1	1% milk, flavored	13.2	10.6**	12.2
2	Pizza and pizza products	8.1	7.7	8.0
3	1% milk, unflavored	7.8	6.9	7.5
4	2% milk, unflavored	7.1	6.5	6.9
5	Skim or nonfat milk, flavored	5.6	5.7	5.6
6	Entree salads, entree salad bars	3.9	5.5	4.5
7	Sandwiches with plain meat or poultry ^a	4.0	3.8	3.9
8	Skim or nonfat milk, unflavored	3.2	3.9	3.5
9	Hamburgers, cheeseburgers	3.0	3.8	3.3
10	Mexican-style entrees	3.5	2.7	3.2
11	Whole milk, unflavored	3.1	2.9	3.1
12	Peanut butter sandwiches	3.0	1.8	2.5
13	Condiments and spreads	1.8	1.9	1.8
14	French fries, similar potato products	1.3	2.5**	1.8
15	White bread, rolls, bagels	1.7	1.8	1.8
16	Hot dog, corn dog	1.6	2.0	1.8
17	Mixtures with pasta or noodle base	1.5	1.4	1.5
18	2% milk, flavored	1.3	1.5	1.4
19	Unbreaded poultry, meat, or fish	1.4	1.5	1.4
20	Cookies, cakes, brownies	1.2	1.6	1.4
21	Breaded/fried chicken products	1.4	1.2	1.3
22	Breaded/fried meat or poultry sandwich	0.9	1.8**	1.3
23	Entree food bars, bag/pre-plated lunches	0.5	2.3**	1.2
24	Cheese sandwiches	1.5	0.4**	1.0

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

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TABLE D-VI.33

FOOD SOURCES OF POTASSIUM IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Potassium				
1	1% milk, flavored	10.9	8.3**	9.9
2	French fries, similar potato products	4.7	7.8**	6.0
3	1% milk, unflavored	6.2	5.2	5.8
4	2% milk, unflavored	5.7	5.0	5.4
5	Skim or nonfat milk, flavored	4.9	4.7	4.8
6	Fruit juice, 100%	4.3	3.4	4.0
7	Pizza and pizza products	4.1	3.8	4.0
8	Entree salads, entree salad bars	3.2	4.8*	3.8
9	Condiments and spreads	3.0	3.1	3.0
10	Hamburgers, cheeseburgers	2.7	3.2	2.9
11	Skim or nonfat milk, unflavored	2.5	2.9	2.7
12	White potatoes	2.5	2.7	2.6
13	Whole milk, unflavored	2.5	2.2	2.4
14	Sandwiches with plain meat or poultry ^a	2.3	2.1	2.2
15	Mexican-style entrees	2.3	1.8	2.1
16	Lettuce salads, side salad bars	1.7	2.6*	2.0
17	Peanut butter sandwiches	2.3	1.4	1.9
18	Citrus fruit	1.7	1.8	1.7
19	Bananas	1.6	1.7	1.7
20	Apples	1.4	1.8	1.6
21	Mixtures with pasta or noodle base	1.5	1.3	1.4
22	Legumes	1.2	1.6	1.4
23	Carrots	1.5	1.0*	1.3
24	Unbreaded poultry, meat, or fish	1.3	1.4	1.3
25	Corn	1.1	1.5	1.3
26	Peaches	1.2	1.3	1.2
27	2% milk, flavored	1.1	1.2	1.1
28	Entree food bars, bag/pre-plated lunches	0.5	2.0**	1.1
29	White bread, rolls, bagels	1.0	1.1	1.0

TABLE D-VI.33 (continued)

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

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^aIncludes sandwiches with or without cheese.

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TABLE D-VI.34

FOOD SOURCES OF SODIUM IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Sodium				
1	Condiments and spreads	9.0	9.6	9.2
2	Pizza and pizza products	8.6	8.3	8.5
3	Salad dressings	8.8	7.1	8.1
4	Sandwiches with plain meat or poultry ^a	6.8	5.9	6.4
5	Entree salads, entree salad bars	4.5	5.8	5.0
6	Hot dog, corn dog	4.1	4.3	4.1
7	White bread, rolls, bagels	3.8	3.9	3.8
8	Mexican-style entrees	3.9	2.8*	3.5
9	Hamburgers, cheeseburgers	3.0	3.7	3.3
10	Peanut butter sandwiches	3.5	2.0*	2.9
11	1% milk, flavored	3.1	2.4**	2.8
12	Mixtures with pasta or noodle base	2.9	2.5	2.7
13	Breaded/fried chicken products	2.5	2.0	2.3
14	Crackers and pretzels	2.1	1.8	2.0
15	French fries, similar potato products	1.6	2.4*	1.9
16	Rice, pasta	1.6	2.3*	1.9
17	Entree food bars, bag/pre-plated lunches	0.8	3.3**	1.8
18	Lettuce salads, side salad bars	1.1	2.7	1.7
19	Cheese sandwiches	2.1	0.6**	1.5
20	Unbreaded poultry, meat, or fish	1.4	1.6	1.5
21	Cookies, cakes, brownies	1.3	1.5	1.4
22	1% milk, unflavored	1.5	1.3	1.4
23	Breaded/fried meat or poultry sandwich	1.1	1.8**	1.4
24	White potatoes	1.2	1.5	1.3
25	Legumes	1.1	1.5	1.3
26	Buttered toast, bagels with cream cheese	1.1	1.4	1.3
27	2% milk, unflavored	1.3	1.1	1.2
28	Corn	1.0	1.3	1.1

TABLE D-VI.34 (continued)

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.35

FOOD SOURCES OF ZINC IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Zinc				
1	Hamburgers, cheeseburgers	8.4	10.1	9.0
2	1% milk, flavored	8.0	6.3**	7.3
3	Pizza and pizza products	6.8	6.6	6.7
4	Mexican-style entrees	5.5	4.6	5.1
5	1% milk, unflavored	5.1	4.5	4.9
6	Sandwiches with plain meat or poultry ^a	5.0	4.6	4.8
7	Entree salads, entree salad bars	4.1	5.7	4.7
8	2% milk, unflavored	4.8	4.4	4.6
9	Unbreaded poultry, meat, or fish	3.7	4.1	3.9
10	Skim or nonfat milk, flavored	3.8	3.8	3.8
11	Peanut butter sandwiches	3.7	2.3	3.1
12	Mixtures with pasta or noodle base	2.8	2.4	2.6
13	Hot dog, corn dog	2.2	2.6	2.4
14	Condiments and spreads	2.2	2.3	2.3
15	Skim or nonfat milk, unflavored	2.0	2.4	2.1
16	Legumes	2.0	2.3	2.1
17	White bread, rolls, bagels	2.1	2.1	2.1
18	Whole milk, unflavored	2.0	1.9	2.0
19	Entree food bars, bag/pre-plated lunches	0.6	2.8**	1.4
20	Breaded/fried meat or poultry sandwich	1.1	2.0**	1.4
21	French fries, similar potato products	1.0	1.7**	1.3
22	Breaded/fried beef, pork, or fish	1.4	1.1	1.2
23	Breaded/fried chicken products	1.3	1.1	1.2

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.36

FOOD SOURCES OF CHOLESTEROL IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Cholesterol				
1	Entree salads, entree salad bars	8.3	13.1*	10.2
2	Sandwiches with plain meat or poultry ^a	7.5	6.6	7.2
3	Hamburgers, cheeseburgers	6.6	7.7	7.1
4	Breaded/fried chicken products	6.0	4.7	5.5
5	2% milk, unflavored	5.6	4.9	5.3
6	Unbreaded poultry, meat, or fish	4.9	4.9	4.9
7	Mexican-style entrees	5.1	3.9	4.7
8	Breaded/fried meat or poultry sandwich	3.4	6.3**	4.6
9	Pizza and pizza products	4.2	4.2	4.2
10	1% milk, flavored	4.5	3.4**	4.0
11	Hot dog, corn dog	3.7	4.0	3.8
12	1% milk, unflavored	3.8	3.2	3.6
13	Mixtures with pasta or noodle base	4.1	2.7*	3.5
14	Condiments and spreads	3.3	3.1	3.2
15	Whole milk, unflavored	3.2	2.9	3.1
16	Cookies, cakes, brownies	2.7	2.7	2.7
17	Breaded/fried beef, pork, or fish	2.3	1.2*	1.9
18	Entree food bars, bag/pre-plated lunches	0.6	3.6**	1.8
19	Cheese sandwiches	1.7	0.5**	1.2
20	White bread, rolls, bagels	1.1	1.4	1.2
21	Other meat/meat alternates	1.6	0.3*	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE D-VI.37

FOOD SOURCES OF DIETARY FIBER IN NSLP LUNCHES OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Dietary Fiber				
1	Apples	5.6	6.5	6.0
2	French fries, similar potato products	4.1	6.4**	5.0
3	Peanut butter sandwiches	5.1	2.8*	4.2
4	Mexican-style entrees	4.4	3.5	4.0
5	Pizza and pizza products	4.0	3.7	3.9
6	Entree salads, entree salad bars	3.4	4.5	3.9
7	1% milk, flavored	4.2	3.1**	3.8
8	Citrus fruit	3.5	3.7	3.6
9	Legumes	2.9	4.1	3.4
10	White bread, rolls, bagels	3.5	3.2	3.4
11	Pears	3.1	3.0	3.0
12	Condiments and spreads	2.9	3.0	2.9
13	Peaches	2.7	2.8	2.8
14	Lettuce salads, side salad bars	2.3	3.3	2.7
15	Hamburgers, cheeseburgers	2.5	2.8	2.6
16	Sandwiches with plain meat or poultry ^a	2.3	2.2	2.3
17	Corn	1.9	2.5	2.1
18	Carrots	2.5	1.6**	2.1
19	Bananas	2.0	2.1	2.0
20	Cookies, cakes, brownies	1.8	1.8	1.8
21	Skim or nonfat milk, flavored	1.8	1.8	1.8
22	White potatoes	1.7	1.9	1.8
23	Hot dog, corn dog	1.7	1.6	1.7
24	Entree food bars, bag/pre-plated lunches	0.9	2.6**	1.6
25	Mixtures with pasta or noodle base	1.7	1.3	1.5
26	Fruit cocktail	1.4	1.5	1.5
27	String beans	1.5	1.4	1.4
28	Peas	1.5	1.3	1.4
29	Mixed vegetables	1.5	1.1	1.3
30	Applesauce	1.4	1.0	1.2
31	Breaded/fried meat or poultry sandwich	0.9	1.5**	1.2
32	Chili con carne	1.1	1.1	1.1
33	Other raw vegetables	1.2	1.0	1.1

TABLE D-VI.37 (continued)

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
34	Broccoli	1.1	1.0	1.1
35	Pineapple	1.1	1.0	1.1
36	Corn/tortilla chips	1.1	0.9	1.0

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with or without cheese.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

APPENDIX E

**SUPPLEMENTAL TABULATIONS OF NUTRIENTS OFFERED AND SERVED IN
SCHOOL BREAKFASTS**

TABLE E-VII.1

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS OFFERED TO STUDENTS
IN ELEMENTARY SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	463	7.6	359	375	417	458	497	537	596
Macronutrients									
Total fat (g)	12	0.4	7	8	10	12	14	16	20
Saturated fat (g)	4	0.1	2	3	3	4	5	6	6
Monounsaturated fat (g)	5	0.2	2	3	4	4	5	6	7
Polyunsaturated fat (g)	2	0.1	1	1	2	2	3	4	4
Linoleic acid (g)	2	0.1	1	1	2	2	2	3	4
Alpha-linolenic acid (g)	0.2	0.01	0.1	0.1	0.1	0.2	0.2	0.3	0.3
Carbohydrate (g)	75	1.6	52	59	65	74	82	93	96
Protein (g)	15	0.2	12	13	14	15	16	18	19
Vitamins									
Vitamin A (mcg RE)	251	7.5	165	187	217	244	277	311	341
Vitamin A (mcg RAE)	242	7.3	157	177	211	238	269	301	317
Vitamin C (mg)	30	1.5	11	13	22	27	38	49	55
Vitamin E (mg AT)	0.9	0.05	0.5	0.5	0.6	0.8	1.0	1.5	1.8
Vitamin B ₆ (mg)	0.5	0.01	0.3	0.4	0.4	0.5	0.6	0.6	0.7
Vitamin B ₁₂ (mcg)	1.9	0.04	1.4	1.5	1.7	1.8	2.2	2.3	2.4
Folate (mcg)	118	3.6	75	83	96	115	137	151	166
Folate (mcg DFE)	173	6.2	106	115	134	165	208	233	256
Niacin (mg)	5	0.1	3	3	4	5	5	6	7
Riboflavin (mg)	0.8	0.01	0.7	0.7	0.8	0.8	0.9	0.9	1.0
Thiamin (mg)	0.5	0.01	0.4	0.4	0.4	0.5	0.5	0.6	0.6
Minerals									
Calcium (mg)	409	6.6	340	348	372	395	450	491	504
Iron (mg)	4.3	0.12	2.8	3.0	3.5	4.1	4.8	5.8	6.3
Magnesium (mg)	63	1.2	49	51	55	60	70	78	82
Phosphorus (mg)	397	6.0	322	331	362	392	429	467	492
Potassium (mg)	711	8.9	593	621	659	703	760	805	849
Sodium (mg)	573	14.4	416	447	501	563	620	745	789
Zinc (mg)	3.0	0.09	1.9	2.1	2.4	2.9	3.5	4.0	4.2
Other Components									
Cholesterol (mg)	35	1.7	16	19	25	30	40	55	66
Dietary fiber (g)	3	0.1	1	2	2	2	3	4	4
Dietary fiber (g/1000 kcal)	6	0.2	4	4	4	5	7	8	9
Percentage of Energy From:									
Total fat	23.3	0.59	14.5	16.0	20.0	23.3	26.5	29.8	31.4
Saturated fat	8.6	0.24	5.6	5.9	7.1	8.4	9.9	11.5	12.0
Monosaturated fat	8.5	0.24	5.4	5.8	7.0	8.5	9.9	11.3	11.9
Polyunsaturated fat	4.4	0.15	2.4	2.7	3.5	4.4	4.9	5.9	6.7
Linoleic acid	4.0	0.14	2.2	2.4	3.1	3.9	4.5	5.3	6.2
Alpha-linolenic acid	0.4	0.01	0.2	0.2	0.3	0.4	0.4	0.5	0.6
Carbohydrate	64.9	0.68	53.9	56.4	60.6	65.1	69.1	72.6	74.2
Protein	13.5	0.15	11.1	11.5	12.5	13.4	14.2	15.0	16.1
Number of Schools	120								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.2

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS OFFERED TO STUDENTS IN MIDDLE SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	501	10.8	383	406	443	491	544	583	667
Macronutrients									
Total fat (g)	14	0.6	7	9	12	14	16	20	23
Saturated fat (g)	5	0.2	3	3	4	5	6	7	8
Monounsaturated fat (g)	5	0.2	3	3	4	5	6	8	9
Polyunsaturated fat (g)	3	0.2	1	1	2	3	3	4	5
Linoleic acid (g)	3	0.1	1	1	2	2	3	3	5
Alpha-linolenic acid (g)	0.2	0.01	0.1	0.1	0.2	0.2	0.3	0.3	0.4
Carbohydrate (g)	79	1.7	62	65	69	75	86	97	103
Protein (g)	16	0.4	13	13	14	16	17	19	21
Vitamins									
Vitamin A (mcg RE)	265	7.0	176	197	226	263	301	335	349
Vitamin A (mcg RAE)	257	6.9	170	190	221	254	293	326	339
Vitamin C (mg)	32	1.7	16	18	21	30	40	49	55
Vitamin E (mg AT)	1.0	0.07	0.5	0.6	0.7	0.9	1.1	1.4	2.0
Vitamin B ₆ (mg)	0.5	0.02	0.3	0.4	0.4	0.5	0.6	0.7	0.8
Vitamin B ₁₂ (mcg)	2.0	0.07	1.3	1.5	1.6	1.9	2.2	2.4	2.8
Folate (mcg)	130	5.7	79	89	101	121	152	184	200
Folate (mcg DFE)	191	9.6	105	126	141	177	228	285	293
Niacin (mg)	5	0.2	3	3	4	5	6	7	7
Riboflavin (mg)	0.9	0.02	0.7	0.7	0.8	0.9	0.9	1.0	1.1
Thiamin (mg)	0.5	0.01	0.4	0.4	0.4	0.5	0.6	0.7	0.7
Minerals									
Calcium (mg)	432	10.1	352	359	379	411	455	515	573
Iron (mg)	4.6	0.19	2.9	3.1	3.6	4.4	5.1	6.4	7.1
Magnesium (mg)	64	1.5	49	51	57	62	70	78	83
Phosphorus (mg)	416	8.3	341	348	378	407	434	476	502
Potassium (mg)	730	14.2	579	648	657	702	776	835	880
Sodium (mg)	629	18.5	447	461	526	600	708	764	877
Zinc (mg)	3.2	0.12	1.8	2.1	2.4	3.0	3.8	4.3	4.9
Other Components									
Cholesterol (mg)	40	2.2	14	22	29	36	46	60	70
Dietary fiber (g)	3	0.1	1	2	2	3	3	4	4
Dietary fiber (g/1000 kcal)	6	0.2	3	4	5	5	7	8	8
Percentage of Energy From:									
Total fat	25.1	0.71	16.5	18.7	21.7	24.5	28.2	31.9	33.5
Saturated fat	9.2	0.25	6.1	6.5	7.8	9.0	10.3	11.8	12.3
Monosaturated fat	9.2	0.31	6.0	6.4	7.8	9.1	10.9	11.8	13.1
Polyunsaturated fat	4.8	0.21	2.2	2.9	4.1	4.6	5.4	6.0	6.6
Linoleic acid	4.3	0.20	2.1	2.6	3.7	4.1	4.8	5.3	6.0
Alpha-linolenic acid	0.4	0.02	0.2	0.2	0.3	0.4	0.5	0.6	0.6
Carbohydrate	63.5	0.75	53.3	56.4	58.9	63.9	67.2	69.9	72.1
Protein	13.1	0.14	10.8	11.2	12.1	13.0	13.9	15.1	15.3
Number of Schools	109								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.3

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS OFFERED TO STUDENTS IN HIGH SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	519	13.8	421	434	455	502	559	640	689
Macronutrients									
Total fat (g)	15	0.7	10	11	12	13	18	21	23
Saturated fat (g)	5	0.3	4	4	4	5	6	8	9
Monounsaturated fat (g)	6	0.2	3	4	4	5	7	8	9
Polyunsaturated fat (g)	3	0.2	2	2	2	2	3	4	5
Linoleic acid (g)	3	0.1	1	2	2	2	3	4	4
Alpha-linolenic acid (g)	0.2	0.02	0.1	0.1	0.2	0.2	0.3	0.4	0.4
Carbohydrate (g)	81	2.0	62	66	74	77	88	98	105
Protein (g)	17	0.5	13	14	14	16	19	21	23
Vitamins									
Vitamin A (mcg RE)	265	7.0	201	208	235	245	290	342	361
Vitamin A (mcg RAE)	256	6.4	195	199	226	239	277	328	349
Vitamin C (mg)	37	2.9	16	20	27	32	47	55	76
Vitamin E (mg AT)	1.0	0.10	0.6	0.6	0.6	0.9	1.1	1.6	2.1
Vitamin B ₆ (mg)	0.5	0.02	0.3	0.4	0.4	0.5	0.6	0.7	0.8
Vitamin B ₁₂ (mcg)	1.9	0.08	1.4	1.5	1.6	1.8	2.2	2.3	2.7
Folate (mcg)	124	5.6	79	85	99	123	148	157	171
Folate (mcg DFE)	179	10.3	110	122	138	174	228	235	246
Niacin (mg)	5	0.2	3	3	4	5	5	6	7
Riboflavin (mg)	0.9	0.02	0.7	0.7	0.8	0.9	0.9	1.0	1.1
Thiamin (mg)	0.5	0.01	0.4	0.4	0.4	0.5	0.5	0.7	0.7
Minerals									
Calcium (mg)	431	11.5	357	373	373	414	471	532	537
Iron (mg)	4.5	0.19	2.8	2.9	3.4	4.4	4.9	6.1	6.7
Magnesium (mg)	67	1.5	51	54	58	64	72	80	90
Phosphorus (mg)	427	7.8	342	366	389	410	448	495	555
Potassium (mg)	780	13.0	649	661	703	761	823	916	984
Sodium (mg)	686	27.8	461	507	568	639	793	868	1050
Zinc (mg)	3.1	0.17	2.0	2.3	2.5	2.9	3.8	3.9	4.2
Other Components									
Cholesterol (mg)	46	4.4	19	22	26	34	57	81	105
Dietary fiber (g)	3	0.2	2	2	2	3	4	5	5
Dietary fiber (g/1000 kcal)	6	0.3	3	4	5	5	7	8	9
Percentage of Energy From:									
Total fat	25.6	0.60	18.8	20.6	22.3	24.4	27.6	32.5	34.7
Saturated fat	9.3	0.26	6.8	7.4	8.1	8.7	10.3	12.3	13.3
Monosaturated fat	9.5	0.24	6.6	7.1	8.1	9.4	10.2	12.7	13.3
Polyunsaturated fat	4.9	0.15	3.2	3.5	4.4	4.6	5.3	6.0	7.2
Linoleic acid	4.4	0.13	2.7	3.2	3.9	4.2	4.8	5.3	6.7
Alpha-linolenic acid	0.4	0.03	0.2	0.2	0.3	0.4	0.5	0.5	0.6
Carbohydrate	63.0	0.69	49.7	55.7	60.9	64.1	65.6	68.2	69.8
Protein	13.0	0.16	10.8	11.4	12.1	12.9	13.6	14.5	15.4
Number of Schools	102								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.4

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS OFFERED TO STUDENTS IN ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	480	7.0	370	388	432	463	515	579	625
Macronutrients									
Total fat (g)	13	0.3	7	8	11	12	15	19	21
Saturated fat (g)	5	0.1	3	3	4	5	5	6	8
Monounsaturated fat (g)	5	0.1	3	3	4	5	6	7	8
Polyunsaturated fat (g)	3	0.1	1	1	2	2	3	4	4
Linoleic acid (g)	2	0.1	1	1	2	2	3	3	4
Alpha-linolenic acid (g)	0.2	0.01	0.1	0.1	0.2	0.2	0.2	0.3	0.4
Carbohydrate (g)	77	1.3	54	62	67	75	84	94	101
Protein (g)	16	0.2	12	13	14	15	17	19	20
Vitamins									
Vitamin A (mcg RE)	256	5.7	169	197	224	245	287	323	358
Vitamin A (mcg RAE)	247	5.5	164	190	217	239	274	313	338
Vitamin C (mg)	32	1.2	11	16	23	28	41	49	59
Vitamin E (mg AT)	1.0	0.04	0.5	0.6	0.6	0.8	1.1	1.5	1.9
Vitamin B ₆ (mg)	0.5	0.01	0.3	0.4	0.4	0.5	0.6	0.7	0.8
Vitamin B ₁₂ (mcg)	1.9	0.04	1.4	1.5	1.7	1.9	2.2	2.3	2.5
Folate (mcg)	122	2.9	77	84	99	117	143	161	182
Folate (mcg DFE)	178	5.0	106	118	138	168	211	240	278
Niacin (mg)	5	0.1	3	3	4	5	5	6	7
Riboflavin (mg)	0.9	0.01	0.7	0.7	0.8	0.8	0.9	1.0	1.1
Thiamin (mg)	0.5	0.01	0.4	0.4	0.4	0.5	0.5	0.6	0.7
Minerals									
Calcium (mg)	417	5.9	341	354	373	405	453	501	528
Iron (mg)	4.4	0.11	2.8	3.0	3.5	4.3	4.9	6.0	6.4
Magnesium (mg)	64	1.0	50	52	56	62	70	78	84
Phosphorus (mg)	406	5.0	325	339	366	401	434	478	498
Potassium (mg)	727	8.6	600	625	663	713	770	842	873
Sodium (mg)	604	14.8	423	450	513	580	662	793	836
Zinc (mg)	3.0	0.08	1.9	2.1	2.4	2.9	3.6	4.1	4.2
Other Components									
Cholesterol (mg)	38	1.6	17	20	26	32	45	61	77
Dietary fiber (g)	3	0.1	1	2	2	3	3	4	4
Dietary fiber (g/1000 kcal)	6	0.2	4	4	4	5	7	8	9
Percentage of Energy From:									
Total fat	24.1	0.48	14.9	17.1	20.9	24.0	27.2	30.9	33.2
Saturated fat	8.9	0.19	5.8	6.2	7.5	8.6	10.0	11.9	12.4
Monosaturated fat	8.8	0.19	5.4	6.0	7.3	8.9	10.1	11.6	12.7
Polyunsaturated fat	4.6	0.12	2.5	2.9	3.7	4.5	5.2	6.0	6.9
Linoleic acid	4.1	0.11	2.2	2.6	3.4	4.1	4.6	5.3	6.2
Alpha-linolenic acid	0.4	0.01	0.2	0.2	0.3	0.4	0.5	0.5	0.6
Carbohydrate	64.3	0.55	53.6	56.4	60.6	64.8	68.2	72.0	73.6
Protein	13.3	0.12	10.9	11.4	12.3	13.1	14.1	14.9	15.9
Number of Schools	331								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.5

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS SERVED TO STUDENTS
IN ELEMENTARY SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	465	11.1	288	355	411	463	513	575	597
Macronutrients									
Total fat (g)	13	0.5	6	8	11	13	16	18	20
Saturated fat (g)	5	0.2	2	3	4	5	5	6	7
Monounsaturated fat (g)	5	0.2	2	3	4	5	6	7	8
Polyunsaturated fat (g)	3	0.1	1	1	2	2	3	3	4
Linoleic acid (g)	2	0.1	1	1	2	2	3	3	4
Alpha-linolenic acid (g)	0.2	0.01	0.1	0.1	0.2	0.2	0.3	0.3	0.3
Carbohydrate (g)	73	1.7	50	55	64	72	81	91	93
Protein (g)	15	0.3	11	12	13	15	17	18	19
Vitamins									
Vitamin A (mcg RE)	231	5.7	134	172	200	225	264	293	297
Vitamin A (mcg RAE)	222	5.0	130	160	192	219	256	284	292
Vitamin C (mg)	29	1.8	7	10	17	24	40	52	58
Vitamin E (mg AT)	0.9	0.04	0.4	0.5	0.6	0.8	0.9	1.3	1.4
Vitamin B ₆ (mg)	0.5	0.01	0.3	0.3	0.4	0.4	0.5	0.6	0.6
Vitamin B ₁₂ (mcg)	1.7	0.04	1.0	1.2	1.5	1.7	2.0	2.2	2.3
Folate (mcg)	112	3.6	61	75	88	108	132	154	158
Folate (mcg DFE)	165	5.8	90	103	126	160	194	232	239
Niacin (mg)	5	0.1	3	3	4	5	5	6	6
Riboflavin (mg)	0.8	0.01	0.5	0.6	0.7	0.8	0.9	0.9	0.9
Thiamin (mg)	0.5	0.01	0.3	0.4	0.4	0.5	0.5	0.6	0.6
Minerals									
Calcium (mg)	375	7.6	222	309	346	371	411	464	491
Iron (mg)	4.2	0.11	2.6	3.0	3.6	4.1	4.7	5.4	5.4
Magnesium (mg)	59	1.4	40	47	51	57	66	73	79
Phosphorus (mg)	387	9.2	240	313	335	381	434	494	506
Potassium (mg)	666	13.1	448	538	595	657	740	794	847
Sodium (mg)	631	27.7	365	426	518	600	711	839	981
Zinc (mg)	2.8	0.08	1.8	1.9	2.2	2.8	3.3	3.8	3.9
Other Components									
Cholesterol (mg)	37	1.8	15	20	26	33	46	61	70
Dietary fiber (g)	3	0.1	1	2	2	2	3	4	4
Dietary fiber (g/1000 kcal)	6	0.2	4	4	5	5	7	8	8
Percentage of Energy From:									
Total fat	24.8	0.52	17.5	18.4	22.1	25.4	27.5	30.3	32.7
Saturated fat	8.9	0.20	6.0	6.8	7.5	8.7	10.2	11.7	11.9
Monosaturated fat	9.3	0.23	6.1	6.4	7.8	9.4	10.8	11.7	13.0
Polyunsaturated fat	4.7	0.15	2.4	3.3	3.6	4.7	5.4	6.4	6.6
Linoleic acid	4.3	0.14	2.1	2.9	3.3	4.3	4.9	5.8	6.0
Alpha-linolenic acid	0.4	0.01	0.2	0.3	0.3	0.4	0.5	0.5	0.6
Carbohydrate	63.7	0.59	54.9	56.7	60.3	63.8	67.2	70.4	71.5
Protein	13.1	0.17	10.3	11.1	12.0	13.0	14.1	15.3	15.5
Number of Schools	120								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.6

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS OFFERED TO STUDENTS IN MIDDLE SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	526	29.0	301	378	427	503	555	650	746
Macronutrients									
Total fat (g)	16	0.8	8	10	13	15	18	22	26
Saturated fat (g)	6	0.3	3	3	4	5	6	7	9
Monounsaturated fat (g)	6	0.3	3	3	4	6	7	9	10
Polyunsaturated fat (g)	3	0.2	1	2	2	3	4	5	5
Linoleic acid (g)	3	0.2	1	1	2	3	3	4	4
Alpha-linolenic acid (g)	0.3	0.01	0.1	0.1	0.2	0.2	0.3	0.4	0.4
Carbohydrate (g)	81	7.0	50	56	65	74	84	93	108
Protein (g)	16	0.5	10	12	13	15	18	21	24
Vitamins									
Vitamin A (mcg RE)	254	31.3	138	143	174	216	260	311	410
Vitamin A (mcg RAE)	247	31.8	132	137	167	210	249	299	396
Vitamin C (mg)	32	3.3	10	13	18	26	40	50	56
Vitamin E (mg AT)	1.0	0.07	0.4	0.6	0.7	0.9	1.2	1.4	2.1
Vitamin B ₆ (mg)	0.6	0.14	0.2	0.3	0.3	0.4	0.5	0.6	0.8
Vitamin B ₁₂ (mcg)	2.0	0.43	0.8	0.9	1.2	1.5	1.8	2.4	2.9
Folate (mcg)	145	37.1	68	71	82	102	126	150	208
Folate (mcg DFE)	218	62.2	90	97	114	149	175	224	308
Niacin (mg)	6	1.4	3	3	4	4	5	6	8
Riboflavin (mg)	0.9	0.12	0.5	0.6	0.6	0.7	0.9	0.9	1.3
Thiamin (mg)	0.6	0.10	0.3	0.3	0.4	0.5	0.5	0.6	0.9
Minerals									
Calcium (mg)	387	22.5	236	254	306	356	406	499	669
Iron (mg)	5.4	1.36	2.6	2.7	3.2	4.0	4.5	5.8	8.3
Magnesium (mg)	62	4.7	39	43	48	56	63	76	94
Phosphorus (mg)	404	15.2	262	283	333	378	451	513	604
Potassium (mg)	670	20.4	422	500	559	645	759	800	935
Sodium (mg)	761	54.1	395	467	539	662	880	961	1166
Zinc (mg)	3.4	0.73	1.5	1.6	2.0	2.6	3.0	3.8	4.8
Other Components									
Cholesterol (mg)	45	3.0	12	19	28	40	52	78	97
Dietary fiber (g)	3	0.3	1	2	2	3	3	4	4
Dietary fiber (g/1000 kcal)	5	0.2	4	4	4	5	6	7	8
Percentage of Energy From:									
Total fat	27.5	0.92	17.3	20.7	24.1	27.4	31.1	34.0	37.8
Saturated fat	9.6	0.35	5.7	7.0	8.1	9.6	10.8	11.9	13.1
Monosaturated fat	10.5	0.41	6.2	6.9	8.5	10.3	12.7	14.3	14.7
Polyunsaturated fat	5.4	0.26	2.2	2.9	4.5	5.4	6.1	7.6	7.8
Linoleic acid	4.8	0.24	2.1	2.7	4.0	4.8	5.6	6.9	6.9
Alpha-linolenic acid	0.4	0.02	0.2	0.3	0.3	0.4	0.5	0.6	0.6
Carbohydrate	61.1	1.05	51.1	54.0	57.1	60.9	65.0	68.6	70.2
Protein	12.7	0.22	8.7	10.3	11.6	12.7	14.3	14.9	15.3
Number of Schools	109								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.7

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS SERVED TO STUDENTS IN HIGH SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	565	15.7	394	422	490	563	619	671	717
Macronutrients									
Total fat (g)	18	0.8	10	11	14	17	21	25	29
Saturated fat (g)	6	0.3	3	4	5	5	7	9	10
Monounsaturated fat (g)	7	0.3	4	4	5	7	8	10	12
Polyunsaturated fat (g)	3	0.2	2	2	3	3	4	5	6
Linoleic acid (g)	3	0.2	1	2	2	3	4	5	5
Alpha-linolenic acid (g)	0.3	0.02	0.1	0.2	0.2	0.2	0.3	0.4	0.5
Carbohydrate (g)	84	3.1	60	64	75	82	97	101	102
Protein (g)	18	0.5	12	13	15	17	19	22	24
Vitamins									
Vitamin A (mcg RE)	241	7.4	138	156	200	249	264	303	325
Vitamin A (mcg RAE)	233	7.4	131	152	191	241	255	295	314
Vitamin C (mg)	32	2.1	11	15	21	28	38	52	61
Vitamin E (mg AT)	1.1	0.07	0.6	0.7	0.8	1.0	1.2	1.5	1.9
Vitamin B ₆ (mg)	0.5	0.03	0.2	0.3	0.3	0.4	0.5	0.6	0.7
Vitamin B ₁₂ (mcg)	1.6	0.09	0.9	1.1	1.2	1.6	2.0	2.1	2.5
Folate (mcg)	122	7.9	68	83	98	113	161	168	173
Folate (mcg DFE)	177	14.0	95	118	136	160	231	260	262
Niacin (mg)	5	0.3	3	3	4	5	6	7	8
Riboflavin (mg)	0.8	0.03	0.5	0.6	0.7	0.8	0.9	1.0	1.1
Thiamin (mg)	0.5	0.02	0.4	0.4	0.5	0.5	0.6	0.7	0.8
Minerals									
Calcium (mg)	385	7.6	237	278	355	382	420	467	520
Iron (mg)	4.5	0.22	2.7	3.0	3.6	4.2	5.5	5.7	6.9
Magnesium (mg)	63	1.7	41	48	56	61	69	78	85
Phosphorus (mg)	444	15.5	278	334	382	432	513	533	582
Potassium (mg)	722	23.3	450	551	638	734	828	840	896
Sodium (mg)	884	52.3	486	506	615	844	1117	1153	1350
Zinc (mg)	2.9	0.20	1.6	1.9	2.4	2.6	3.6	4.0	4.5
Other Components									
Cholesterol (mg)	59	6.2	20	23	30	42	76	112	152
Dietary fiber (g)	3	0.1	2	2	2	3	3	4	4
Dietary fiber (g/1000 kcal)	5	0.2	4	4	5	5	6	7	8
Percentage of Energy From:									
Total fat	28.1	0.81	21.4	21.9	24.7	27.0	31.2	35.9	37.7
Saturated fat	9.5	0.36	7.1	7.4	7.8	9.3	10.4	13.0	14.1
Monosaturated fat	11.0	0.31	7.2	7.6	9.4	10.5	12.0	14.6	16.5
Polyunsaturated fat	5.4	0.21	3.4	4.0	4.8	5.1	6.1	7.4	7.8
Linoleic acid	4.9	0.18	3.0	3.5	4.4	4.6	5.5	6.8	6.9
Alpha-linolenic acid	0.4	0.03	0.3	0.3	0.3	0.4	0.5	0.6	0.7
Carbohydrate	60.6	1.04	48.0	50.1	58.3	61.3	65.4	66.0	67.8
Protein	12.6	0.28	10.5	10.6	11.2	12.4	13.5	14.7	16.1
Number of Schools	102								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.8

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS *SERVED*
TO STUDENTS IN ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	495	10.5	314	368	423	480	548	619	671
Macronutrients									
Total fat (g)	15	0.4	7	8	11	14	17	21	24
Saturated fat (g)	5	0.1	3	3	4	5	6	7	8
Monounsaturated fat (g)	6	0.2	2	3	4	5	7	8	9
Polyunsaturated fat (g)	3	0.1	1	2	2	3	3	4	5
Linoleic acid (g)	3	0.1	1	1	2	2	3	4	5
Alpha-linolenic acid (g)	0.2	0.01	0.1	0.1	0.2	0.2	0.3	0.3	0.4
Carbohydrate (g)	77	1.9	51	57	65	74	83	95	100
Protein (g)	16	0.3	11	12	13	15	17	20	21
Vitamins									
Vitamin A (mcg RE)	237	7.0	137	160	194	227	264	294	318
Vitamin A (mcg RAE)	229	6.9	132	152	187	222	255	286	306
Vitamin C (mg)	30	1.5	8	11	18	26	40	52	59
Vitamin E (mg AT)	0.9	0.04	0.4	0.5	0.7	0.8	1.1	1.4	1.7
Vitamin B ₆ (mg)	0.5	0.03	0.3	0.3	0.4	0.4	0.5	0.6	0.6
Vitamin B ₁₂ (mcg)	1.7	0.09	0.9	1.1	1.4	1.7	2.0	2.2	2.4
Folate (mcg)	120	7.3	65	75	88	108	133	159	168
Folate (mcg DFE)	177	12.3	92	104	125	159	194	239	259
Niacin (mg)	5	0.3	3	3	4	5	5	6	7
Riboflavin (mg)	0.8	0.02	0.5	0.6	0.7	0.8	0.9	0.9	1.0
Thiamin (mg)	0.5	0.02	0.3	0.4	0.4	0.5	0.5	0.6	0.6
Minerals									
Calcium (mg)	379	7.4	229	294	341	373	412	468	505
Iron (mg)	4.5	0.27	2.6	2.9	3.5	4.1	4.8	5.4	6.1
Magnesium (mg)	60	1.4	40	46	51	58	66	73	84
Phosphorus (mg)	401	8.8	272	308	341	388	450	514	532
Potassium (mg)	677	12.7	450	526	595	667	762	830	870
Sodium (mg)	701	28.5	377	447	529	637	793	1080	1154
Zinc (mg)	2.9	0.15	1.6	1.9	2.2	2.7	3.3	3.9	4.2
Other Components									
Cholesterol (mg)	43	1.9	15	20	27	36	49	72	92
Dietary fiber (g)	3	0.1	1	2	2	3	3	4	4
Dietary fiber (g/1000 kcal)	5	0.1	4	4	5	5	6	8	8
Percentage of Energy From:									
Total fat	25.9	0.45	17.5	19.1	22.8	25.8	28.8	32.1	34.8
Saturated fat	9.2	0.18	6.0	7.0	7.7	8.9	10.3	11.8	12.8
Monosaturated fat	9.8	0.19	6.1	6.8	8.2	9.8	11.3	13.0	14.0
Polyunsaturated fat	5.0	0.14	2.4	3.3	4.0	4.9	5.6	6.6	7.6
Linoleic acid	4.5	0.13	2.2	2.9	3.6	4.5	5.1	6.0	6.9
Alpha-linolenic acid	0.4	0.02	0.2	0.3	0.3	0.4	0.5	0.6	0.6
Carbohydrate	62.6	0.50	53.1	55.4	58.9	62.8	66.0	69.8	70.9
Protein	12.9	0.15	10.2	10.9	11.8	12.9	14.0	15.1	15.5
Number of Schools	331								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.9

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS *OFFERED* TO STUDENTS,
BY MENU PLANNING SYSTEM
ALL SCHOOLS

	Food-based			Nutrient-based (NSMP or ANSMP)
	Traditional	Enhanced	All	
Mean Amount				
Food Energy (Calories)	474	485	477	488
Macronutrients				
Total fat (g)	13	13	13	13
Saturated fat (g)	5	5	5	5
Monounsaturated fat (g)	5	5	5	5
Polyunsaturated fat (g)	3	2	2	3
Linoleic acid (g)	2	2	2	2
Alpha-linolenic acid (g)	0.2	0.2	0.2	0.2
Carbohydrate (g)	75	78	76	78
Protein (g)	16	16	16	16
Vitamins				
Vitamin A (mcg RE)	256	263	258	252
Vitamin A (mcg RAE)	248	251	249	244
Vitamin C (mg)	32	29	32	33
Vitamin E (mg AT)	0.9	1.0	1.0	0.9
Vitamin B ₆ (mg)	0.5	0.5	0.5	0.5
Vitamin B ₁₂ (mcg)	2.0	1.9	2.0	1.8
Folate (mcg)	124	119	123	119
Folate (mcg DFE)	181	174	179	173
Niacin (mg)	5	5	5	5
Riboflavin (mg)	0.8	0.9	0.9	0.9
Thiamin (mg)	0.5	0.5	0.5	0.5
Minerals				
Calcium (mg)	416	429	420	412
Iron (mg)	4.3	4.7	4.4	4.3
Magnesium (mg)	64	65	64	63
Phosphorus (mg)	403	415	406	406
Potassium (mg)	724	729	725	731
Sodium (mg)	608	587	602	609
Zinc (mg)	3.1	3.1	3.1	2.9
Other Dietary Components				
Cholesterol (mg)	35	39	36	42
Dietary fiber (g)	3	3	3	3
Dietary fiber (g/1000 kcal)	6	6	6	6
Mean Percentage of Energy From:				
Total fat	24.5	23.4	24.2	23.6
Saturated fat	8.9	8.9	8.9	8.7
Monounsaturated fat	9.1	8.5	8.9	8.6
Polyunsaturated fat	4.7	4.3	4.6	4.6
Linoleic acid	4.2	3.9	4.1	4.1
Alpha-linolenic acid	0.4	0.4	0.4	0.4
Carbohydrate	63.8	64.9	64.1	64.7
Protein	13.3	13.4	13.3	13.2
Number of Schools	164	74	238	93

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalents; RAE=Retinol activity equivalents

TABLE E-VII.10

MEAN FOOD ENERGY AND NUTRIENT CONTENT OF SBP BREAKFASTS *SERVED* TO STUDENTS,
BY MENU PLANNING SYSTEM
ALL SCHOOLS

	Food-based			Nutrient-based (NSMP or ANSMP)
	Traditional	Enhanced	All	
Mean Amount				
Food Energy (Calories)	497	502	498	486
Macronutrients				
Total fat (g)	15	14	15	14
Saturated fat (g)	5	5	5	5
Monounsaturated fat (g)	6	5	6	5
Polyunsaturated fat (g)	3	3	3	3
Linoleic acid (g)	3	2	2	3
Alpha-linolenic acid (g)	0.2	0.2	0.2	0.2
Carbohydrate (g)	76	80	77	76
Protein (g)	16	16	16	15
Vitamins				
Vitamin A (mcg RE)	231	270	242	226
Vitamin A (mcg RAE)	224	257	233	218
Vitamin C (mg)	29	31	30	30
Vitamin E (mg AT)	0.9	0.9	0.9	0.9
Vitamin B ₆ (mg)	0.5	0.6	0.5	0.4
Vitamin B ₁₂ (mcg)	1.7	2.0	1.8	1.6
Folate (mcg)	118	144	125	109
Folate (mcg DFE)	172	216	184	159
Niacin (mg)	5	6	5	5
Riboflavin (mg)	0.8	0.9	0.8	0.8
Thiamin (mg)	0.5	0.6	0.5	0.5
Minerals				
Calcium (mg)	381	397	385	364
Iron (mg)	4.3	5.5	4.6	4.2
Magnesium (mg)	60	63	61	58
Phosphorus (mg)	409	406	408	382
Potassium (mg)	683	681	682	662
Sodium (mg)	723	708	719	658
Zinc (mg)	2.9	3.4	3.0	2.6
Other Dietary Components				
Cholesterol (mg)	41	48	43	41
Dietary fiber (g)	3	3	3	3
Dietary fiber (g/1000 kcal)	5	6	6	5
Mean Percentage of Energy From:				
Total fat	26.5	24.8	26.0	25.6
Saturated fat	9.3	9.1	9.3	8.8
Monounsaturated fat	10.1	9.3	9.9	9.7
Polyunsaturated fat	5.0	4.5	4.9	5.2
Linoleic acid	4.5	4.1	4.4	4.7
Alpha-linolenic acid	0.4	0.4	0.4	0.4
Carbohydrate	62.0	63.7	62.5	62.9
Protein	12.9	13.0	12.9	12.8
Number of Schools	164	74	238	93

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalents; RAE=Retinol activity equivalents

TABLE E-VII.11

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS OFFERED TO STUDENTS IN SCHOOLS WITH A TRADITIONAL FOOD-BASED MENU PLANNING SYSTEM
ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	474	7.1	372	416	440	465	511	543	565
Macronutrients									
Total fat (g)	13	0.5	7	8	11	12	15	18	21
Saturated fat (g)	5	0.2	2	3	4	4	5	6	7
Monounsaturated fat (g)	5	0.2	3	3	4	5	6	7	8
Polyunsaturated fat (g)	3	0.1	1	2	2	2	3	4	4
Linoleic acid (g)	2	0.1	1	1	2	2	3	3	4
Alpha-linolenic acid (g)	0.2	0.01	0.1	0.1	0.1	0.2	0.2	0.3	0.3
Carbohydrate (g)	75	1.4	59	62	67	74	82	92	95
Protein (g)	16	0.2	12	13	15	15	16	18	19
Vitamins									
Vitamin A (mcg RE)	256	7.9	185	203	228	244	273	312	362
Vitamin A (mcg RAE)	248	7.9	175	193	221	238	264	299	352
Vitamin C (mg)	32	1.5	16	20	26	28	41	49	55
Vitamin E (mg AT)	0.9	0.06	0.6	0.6	0.6	0.8	1.1	1.4	1.8
Vitamin B ₆ (mg)	0.5	0.02	0.3	0.4	0.4	0.5	0.6	0.7	0.8
Vitamin B ₁₂ (mcg)	2.0	0.05	1.3	1.5	1.7	2.0	2.2	2.3	2.4
Folate (mcg)	124	4.6	76	86	102	120	150	156	174
Folate (mcg DFE)	181	8.3	105	121	141	173	225	238	261
Niacin (mg)	5	0.1	3	4	4	5	5	6	6
Riboflavin (mg)	0.8	0.01	0.7	0.7	0.8	0.9	0.9	0.9	1.1
Thiamin (mg)	0.5	0.01	0.4	0.4	0.4	0.5	0.5	0.6	0.6
Minerals									
Calcium (mg)	416	8.6	343	358	373	399	450	504	511
Iron (mg)	4.3	0.14	2.9	3.0	3.4	4.4	4.9	5.7	6.3
Magnesium (mg)	64	1.2	52	54	56	62	69	78	83
Phosphorus (mg)	403	5.1	346	354	372	403	426	459	468
Potassium (mg)	724	7.9	649	657	679	714	761	792	816
Sodium (mg)	608	22.9	448	472	527	590	645	794	796
Zinc (mg)	3.1	0.13	2.0	2.1	2.5	3.0	3.9	4.1	4.2
Other Components									
Cholesterol (mg)	35	2.0	17	21	25	30	40	57	68
Dietary fiber (g)	3	0.1	2	2	2	2	3	4	4
Dietary fiber (g/1000 kcal)	6	0.2	4	4	5	5	6	7	8
Percentage of Energy From:									
Total fat	24.5	0.71	14.6	18.2	21.6	24.0	27.5	31.0	34.7
Saturated fat	9.0	0.27	5.8	6.2	7.7	8.6	10.0	12.0	12.8
Monosaturated fat	9.1	0.29	5.4	6.1	7.6	9.3	10.0	11.8	13.2
Polyunsaturated fat	4.7	0.19	2.5	2.9	3.8	4.5	5.2	5.9	7.3
Linoleic acid	4.2	0.18	2.3	2.5	3.5	4.2	4.6	5.4	6.8
Alpha-linolenic acid	0.4	0.02	0.2	0.2	0.3	0.4	0.5	0.6	0.6
Carbohydrate	63.8	0.79	51.8	55.9	60.7	64.8	67.3	70.9	73.7
Protein	13.3	0.19	10.8	11.5	12.3	12.9	14.1	14.8	16.1
Number of Schools	164								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.12

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS OFFERED TO STUDENTS
IN SCHOOLS WITH AN ENHANCED FOOD-BASED MENU PLANNING SYSTEM
ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	485	13.1	371	403	443	469	510	583	664
Macronutrients									
Total fat (g)	13	0.8	6	7	9	12	15	19	21
Saturated fat (g)	5	0.3	2	3	3	5	6	7	8
Monounsaturated fat (g)	5	0.3	2	3	3	4	6	7	9
Polyunsaturated fat (g)	2	0.2	1	1	2	2	3	4	4
Linoleic acid (g)	2	0.2	1	1	2	2	3	3	4
Alpha-linolenic acid (g)	0.2	0.01	0.1	0.1	0.2	0.2	0.2	0.3	0.4
Carbohydrate (g)	78	2.1	59	65	70	79	84	91	99
Protein (g)	16	0.4	12	13	14	15	18	19	20
Vitamins									
Vitamin A (mcg RE)	263	10.2	186	201	224	251	306	326	358
Vitamin A (mcg RAE)	251	8.5	179	191	217	244	297	315	324
Vitamin C (mg)	29	2.1	8	12	20	27	37	46	49
Vitamin E (mg AT)	1.0	0.12	0.4	0.5	0.7	0.9	1.1	1.8	2.2
Vitamin B ₆ (mg)	0.5	0.02	0.3	0.4	0.4	0.5	0.6	0.6	0.8
Vitamin B ₁₂ (mcg)	1.9	0.06	1.5	1.5	1.7	1.9	2.1	2.3	2.3
Folate (mcg)	119	5.2	75	84	95	115	135	161	182
Folate (mcg DFE)	174	7.9	103	115	141	162	199	237	253
Niacin (mg)	5	0.2	3	3	4	5	5	6	7
Riboflavin (mg)	0.9	0.01	0.7	0.8	0.8	0.9	0.9	1.0	1.1
Thiamin (mg)	0.5	0.02	0.3	0.4	0.4	0.5	0.5	0.6	0.7
Minerals									
Calcium (mg)	429	10.0	345	357	390	422	455	494	518
Iron (mg)	4.7	0.27	3.0	3.4	3.6	4.1	5.5	6.7	7.4
Magnesium (mg)	65	1.9	49	52	56	64	72	78	84
Phosphorus (mg)	415	9.5	320	336	384	419	443	466	512
Potassium (mg)	729	15.8	565	616	669	731	773	854	870
Sodium (mg)	587	20.4	423	433	513	567	644	721	859
Zinc (mg)	3.1	0.12	2.0	2.3	2.6	3.0	3.6	4.0	4.5
Other Components									
Cholesterol (mg)	39	3.0	11	17	29	32	46	70	81
Dietary fiber (g)	3	0.2	2	2	2	3	4	4	4
Dietary fiber (g/1000 kcal)	6	0.3	4	4	5	6	8	9	9
Percentage of Energy From:									
Total fat	23.5	0.93	13.9	16.0	18.0	22.1	27.5	31.0	33.4
Saturated fat	8.9	0.40	5.2	6.0	7.0	8.7	10.7	11.9	12.4
Monosaturated fat	8.5	0.35	5.7	6.0	6.7	7.7	10.3	12.2	13.1
Polyunsaturated fat	4.3	0.20	2.3	2.5	3.4	4.1	4.9	5.5	6.2
Linoleic acid	3.9	0.20	2.1	2.3	3.0	3.7	4.5	5.1	5.7
Alpha-linolenic acid	0.4	0.02	0.2	0.2	0.3	0.4	0.4	0.5	0.5
Carbohydrate	64.9	1.12	53.2	54.0	59.0	65.6	69.8	72.7	74.7
Protein	13.4	0.30	11.0	11.2	11.8	13.3	14.4	15.8	16.1
Number of Schools	74								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.13

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS OFFERED TO STUDENTS
IN SCHOOLS WITH A NUTRIENT-BASED MENU PLANNING SYSTEM
ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	488	19.4	355	370	410	450	548	625	723
Macronutrients									
Total fat (g)	13	0.6	7	9	11	12	15	20	21
Saturated fat (g)	5	0.2	3	3	4	4	5	7	8
Monounsaturated fat (g)	5	0.2	2	3	4	5	5	7	8
Polyunsaturated fat (g)	3	0.2	1	1	2	2	3	4	4
Linoleic acid (g)	2	0.1	1	1	2	2	3	4	4
Alpha-linolenic acid (g)	0.2	0.01	0.1	0.1	0.2	0.2	0.3	0.3	0.4
Carbohydrate (g)	78	3.7	51	54	63	74	86	105	111
Protein (g)	16	0.5	12	13	14	14	18	20	23
Vitamins									
Vitamin A (mcg RE)	252	11.2	155	167	213	244	294	312	342
Vitamin A (mcg RAE)	244	10.8	148	161	204	238	286	302	324
Vitamin C (mg)	33	3.0	11	13	20	28	42	58	62
Vitamin E (mg AT)	0.9	0.07	0.4	0.5	0.6	0.8	1.0	1.5	1.6
Vitamin B ₆ (mg)	0.5	0.02	0.3	0.3	0.4	0.5	0.6	0.7	0.7
Vitamin B ₁₂ (mcg)	1.8	0.07	1.4	1.5	1.6	1.8	1.9	2.3	2.6
Folate (mcg)	119	4.6	67	81	92	112	136	171	183
Folate (mcg DFE)	173	7.2	99	112	130	158	208	248	287
Niacin (mg)	5	0.2	3	3	4	4	6	6	7
Riboflavin (mg)	0.9	0.02	0.7	0.7	0.8	0.8	0.9	1.0	1.1
Thiamin (mg)	0.5	0.02	0.4	0.4	0.4	0.5	0.6	0.6	0.7
Minerals									
Calcium (mg)	412	11.4	333	348	369	392	449	503	535
Iron (mg)	4.3	0.21	2.8	2.9	3.1	4.0	4.9	5.9	6.2
Magnesium (mg)	63	2.5	46	50	53	59	71	80	89
Phosphorus (mg)	406	13.0	311	324	348	382	457	497	549
Potassium (mg)	731	24.0	587	599	624	703	816	885	916
Sodium (mg)	609	26.9	412	449	467	530	729	823	971
Zinc (mg)	2.9	0.11	1.9	1.9	2.2	2.6	3.4	3.8	4.2
Other Components									
Cholesterol (mg)	42	3.4	17	20	27	35	49	71	79
Dietary fiber (g)	3	0.3	1	1	2	3	4	4	5
Dietary fiber (g/1000 kcal)	6	0.4	3	4	4	5	7	9	10
Percentage of Energy From:									
Total fat	23.6	0.81	14.5	18.2	20.9	23.9	26.5	28.8	31.0
Saturated fat	8.7	0.33	5.8	6.4	7.3	8.6	9.7	11.3	11.8
Monosaturated fat	8.6	0.32	4.9	6.3	7.5	8.9	10.1	10.9	11.5
Polyunsaturated fat	4.6	0.20	2.7	3.1	3.7	4.7	5.6	6.0	6.5
Linoleic acid	4.1	0.18	2.4	2.7	3.4	4.2	5.1	5.3	6.0
Alpha-linolenic acid	0.4	0.02	0.2	0.3	0.3	0.4	0.5	0.6	0.6
Carbohydrate	64.7	0.96	56.6	58.6	60.7	64.2	68.2	71.2	73.0
Protein	13.2	0.16	10.7	11.7	12.5	13.2	14.0	14.3	14.9
Number of Schools	93								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.14

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS *SERVED* TO STUDENTS
IN SCHOOLS WITH A TRADITIONAL FOOD-BASED MENU PLANNING SYSTEM
ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	497	16.3	333	387	432	485	564	618	654
Macronutrients									
Total fat (g)	15	0.6	7	9	12	15	18	20	24
Saturated fat (g)	5	0.2	3	3	4	5	6	7	8
Monounsaturated fat (g)	6	0.3	2	3	4	6	7	8	10
Polyunsaturated fat (g)	3	0.2	1	2	2	3	3	4	4
Linoleic acid (g)	3	0.2	1	1	2	2	3	4	4
Alpha-linolenic acid (g)	0.2	0.01	0.1	0.1	0.2	0.2	0.3	0.3	0.4
Carbohydrate (g)	76	2.8	53	58	65	75	87	95	99
Protein (g)	16	0.4	11	12	13	16	17	20	21
Vitamins									
Vitamin A (mcg RE)	231	5.6	139	157	199	231	262	291	317
Vitamin A (mcg RAE)	224	5.7	134	151	192	223	255	284	305
Vitamin C (mg)	29	1.7	8	13	21	26	39	49	54
Vitamin E (mg AT)	0.9	0.05	0.5	0.6	0.7	0.8	1.1	1.4	1.5
Vitamin B ₆ (mg)	0.5	0.02	0.3	0.3	0.4	0.4	0.6	0.6	0.6
Vitamin B ₁₂ (mcg)	1.7	0.06	1.0	1.2	1.4	1.8	2.0	2.3	2.4
Folate (mcg)	118	5.9	70	79	89	115	138	166	168
Folate (mcg DFE)	172	10.2	98	111	131	160	197	252	260
Niacin (mg)	5	0.2	3	4	4	5	6	6	7
Riboflavin (mg)	0.8	0.02	0.6	0.6	0.7	0.8	0.9	0.9	1.0
Thiamin (mg)	0.5	0.01	0.4	0.4	0.4	0.5	0.5	0.6	0.6
Minerals									
Calcium (mg)	381	7.6	256	311	350	373	406	471	495
Iron (mg)	4.3	0.17	2.8	3.0	3.6	4.1	5.0	5.6	5.7
Magnesium (mg)	60	1.6	45	47	51	58	66	73	83
Phosphorus (mg)	409	13.8	291	320	348	401	462	515	529
Potassium (mg)	683	18.4	507	548	613	667	766	820	851
Sodium (mg)	723	51.2	379	474	555	668	839	1141	1154
Zinc (mg)	2.9	0.14	1.7	1.9	2.3	2.8	3.6	4.1	4.3
Other Components									
Cholesterol (mg)	41	2.8	17	20	26	34	47	70	92
Dietary fiber (g)	3	0.1	2	2	2	3	3	4	4
Dietary fiber (g/1000 kcal)	5	0.1	4	4	5	5	6	7	8
Percentage of Energy From:									
Total fat	26.5	0.62	19.0	19.9	23.3	25.9	29.1	34.0	35.7
Saturated fat	9.4	0.29	6.7	7.3	7.8	8.9	10.5	12.0	13.1
Monosaturated fat	10.1	0.27	6.1	7.0	8.8	10.1	11.2	13.4	14.3
Polyunsaturated fat	5.0	0.19	2.7	3.5	4.1	4.8	5.5	6.5	7.2
Linoleic acid	4.5	0.17	2.4	3.1	3.7	4.4	4.9	5.8	6.6
Alpha-linolenic acid	0.4	0.02	0.2	0.3	0.3	0.4	0.5	0.6	0.6
Carbohydrate	62.0	0.70	51.8	54.4	58.1	62.3	65.5	69.5	70.1
Protein	12.9	0.22	10.6	11.1	11.6	12.7	13.8	15.1	15.5
Number of Schools	164								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.15

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS *SERVED* TO STUDENTS
IN SCHOOLS WITH AN ENHANCED FOOD-BASED MENU PLANNING SYSTEM
ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	502	32.8	237	329	408	470	502	698	797
Macronutrients									
Total fat (g)	14	1.1	4	6	11	13	15	19	23
Saturated fat (g)	5	0.4	1	3	4	5	6	7	9
Monounsaturated fat (g)	5	0.4	2	2	3	5	6	8	10
Polyunsaturated fat (g)	3	0.2	1	1	2	2	3	3	5
Linoleic acid (g)	2	0.2	1	1	1	2	3	3	4
Alpha-linolenic acid (g)	0.2	0.02	0.1	0.1	0.2	0.2	0.3	0.3	0.4
Carbohydrate (g)	80	6.7	47	51	65	72	80	89	123
Protein (g)	16	0.8	6	11	14	15	18	22	27
Vitamins									
Vitamin A (mcg RE)	270	30.8	122	160	183	221	289	388	453
Vitamin A (mcg RAE)	257	30.3	117	155	173	212	278	307	377
Vitamin C (mg)	31	4.0	8	8	16	26	43	54	62
Vitamin E (mg AT)	0.9	0.07	0.4	0.4	0.7	0.8	1.1	1.4	1.9
Vitamin B ₆ (mg)	0.6	0.13	0.3	0.3	0.4	0.4	0.5	0.6	0.8
Vitamin B ₁₂ (mcg)	2.0	0.41	0.9	1.0	1.4	1.5	1.9	2.3	2.7
Folate (mcg)	144	34.9	59	66	86	98	134	151	182
Folate (mcg DFE)	216	58.3	86	93	121	138	194	221	265
Niacin (mg)	6	1.3	3	3	3	4	5	6	8
Riboflavin (mg)	0.9	0.11	0.4	0.5	0.7	0.8	0.9	0.9	1.1
Thiamin (mg)	0.6	0.10	0.3	0.3	0.4	0.4	0.5	0.6	0.8
Minerals									
Calcium (mg)	397	26.5	162	226	343	381	436	496	578
Iron (mg)	5.5	1.30	2.5	2.6	3.4	3.9	4.7	6.0	7.7
Magnesium (mg)	63	4.9	27	45	49	58	66	78	86
Phosphorus (mg)	406	20.4	155	247	335	392	446	527	679
Potassium (mg)	681	29.3	326	447	577	683	768	858	963
Sodium (mg)	708	60.4	218	401	504	604	719	1035	1691
Zinc (mg)	3.4	0.69	1.5	1.8	2.1	2.7	3.1	3.7	4.5
Other Components									
Cholesterol (mg)	48	5.7	8	15	24	32	55	88	115
Dietary fiber (g)	3	0.3	1	2	2	3	3	4	6
Dietary fiber (g/1000 kcal)	6	0.4	4	4	5	6	7	9	9
Percentage of Energy From:									
Total fat	24.8	0.97	12.3	17.0	21.7	24.1	28.8	32.3	34.6
Saturated fat	9.1	0.42	3.8	5.9	7.2	8.9	10.6	12.2	13.4
Monosaturated fat	9.3	0.41	6.0	6.5	7.0	9.0	10.5	13.2	14.5
Polyunsaturated fat	4.5	0.23	2.1	2.4	3.4	4.7	5.6	6.0	6.3
Linoleic acid	4.1	0.20	1.9	2.1	3.1	4.2	5.0	5.4	5.8
Alpha-linolenic acid	0.4	0.02	0.2	0.2	0.3	0.4	0.5	0.5	0.5
Carbohydrate	63.7	1.17	49.4	53.9	58.9	63.5	66.9	72.6	76.7
Protein	13.0	0.34	9.0	9.9	11.7	13.2	14.5	15.4	16.1
Number of Schools	74								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.16

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS *SERVED* TO STUDENTS
IN SCHOOLS WITH A NUTRIENT-BASED MENU PLANNING SYSTEM
ALL SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	486	17.9	338	356	411	462	544	604	662
Macronutrients									
Total fat (g)	14	0.9	9	9	11	13	17	21	24
Saturated fat (g)	5	0.2	3	3	4	5	5	7	7
Monounsaturated fat (g)	5	0.4	3	3	4	5	7	9	9
Polyunsaturated fat (g)	3	0.2	1	2	2	3	3	5	6
Linoleic acid (g)	3	0.2	1	1	2	2	3	4	5
Alpha-linolenic acid (g)	0.2	0.02	0.1	0.1	0.2	0.2	0.3	0.4	0.4
Carbohydrate (g)	76	2.7	54	55	65	74	83	92	96
Protein (g)	15	0.5	11	12	13	15	17	18	21
Vitamins									
Vitamin A (mcg RE)	226	7.4	141	154	193	220	259	285	297
Vitamin A (mcg RAE)	218	7.3	135	148	187	214	247	279	292
Vitamin C (mg)	30	3.0	8	10	17	24	36	61	61
Vitamin E (mg AT)	0.9	0.05	0.5	0.6	0.7	0.9	1.0	1.3	1.5
Vitamin B ₆ (mg)	0.4	0.02	0.2	0.3	0.4	0.4	0.5	0.6	0.6
Vitamin B ₁₂ (mcg)	1.6	0.07	0.8	1.0	1.3	1.6	1.9	2.1	2.2
Folate (mcg)	109	4.4	62	75	90	106	126	139	156
Folate (mcg DFE)	159	6.9	83	101	124	158	186	206	229
Niacin (mg)	5	0.2	3	3	4	5	5	6	7
Riboflavin (mg)	0.8	0.02	0.5	0.6	0.7	0.8	0.9	0.9	1.0
Thiamin (mg)	0.5	0.02	0.3	0.4	0.4	0.5	0.5	0.6	0.6
Minerals									
Calcium (mg)	364	11.3	218	273	321	378	412	438	471
Iron (mg)	4.2	0.15	2.3	2.7	3.7	4.3	4.4	4.8	5.6
Magnesium (mg)	58	2.1	36	45	51	59	64	69	84
Phosphorus (mg)	382	12.8	234	291	321	381	434	461	502
Potassium (mg)	662	22.4	412	506	586	641	746	774	834
Sodium (mg)	658	32.3	411	451	511	625	756	938	956
Zinc (mg)	2.6	0.14	1.5	1.8	2.1	2.6	3.0	3.7	3.7
Other Components									
Cholesterol (mg)	41	2.2	14	20	30	39	47	53	77
Dietary fiber (g)	3	0.1	1	2	2	3	3	4	4
Dietary fiber (g/1000 kcal)	5	0.2	4	4	5	5	6	8	8
Percentage of Energy From:									
Total fat	25.6	0.85	17.5	19.2	22.2	25.9	28.2	31.2	32.6
Saturated fat	8.8	0.26	6.3	6.9	7.5	9.0	9.6	10.8	11.6
Monosaturated fat	9.7	0.38	6.0	6.4	8.2	9.8	11.3	12.0	13.0
Polyunsaturated fat	5.2	0.30	3.3	3.4	4.4	5.1	6.1	7.7	7.8
Linoleic acid	4.7	0.26	2.9	3.0	3.8	4.6	5.4	6.9	7.0
Alpha-linolenic acid	0.4	0.03	0.3	0.3	0.3	0.4	0.5	0.6	0.7
Carbohydrate	62.9	0.84	55.5	56.9	59.6	62.0	66.2	70.0	70.7
Protein	12.8	0.28	10.2	10.7	12.0	12.9	14.0	14.2	15.1
Number of Schools	93								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE E-VII.17

FOOD SOURCES OF ENERGY IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Food Energy (calories)				
1	Cold cereal	10.9	9.8	10.5
2	Fruit juice, 100%	9.3	9.2	9.3
3	Sweet rolls, donuts, toaster pastries	7.1	11.9**	9.0
4	Condiments and spreads	7.3	7.7	7.5
5	1% milk, flavored	7.4	7.5	7.4
6	2% milk, unflavored	5.5	5.7	5.6
7	1% milk, unflavored	6.1	4.0**	5.3
8	Skim or nonfat milk, flavored	3.6	4.0	3.8
9	Pancakes, waffles, French toast	3.9	2.9*	3.5
10	Muffins, sweet/quick breads	2.9	3.5	3.1
11	Buttered toast, bagels with cream cheese	3.4	2.5	3.1
12	Breakfast sandwiches ^a	2.3	3.5	2.8
13	Whole milk, unflavored	2.8	2.5	2.7
14	White bread, rolls, bagels	2.1	3.1	2.5
15	Biscuits, croissants, cornbread	2.2	2.4	2.2
16	Sausages, hot dogs, cold cuts	2.2	2.1	2.1
17	Pizza and pizza products	2.2	1.6	2.0
18	Hot dog, corn dog, sausage sandwiches ^b	1.8	1.7	1.8
19	Yogurt	1.9	1.2	1.7
20	Crackers and pretzels	2.1	0.7**	1.5
21	Skim or nonfat milk, unflavored	1.2	1.3	1.2

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

^bIncludes sausage wrapped in a pancake.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE E-VII.18

FOOD SOURCES OF TOTAL FAT IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Total Fat				
1	Sweet rolls, donuts, toaster pastries	10.6	16.4**	13.0
2	2% milk, unflavored	8.3	8.0	8.2
3	Condiments and spreads	6.1	9.9	7.7
4	Sausages, hot dogs, cold cuts	6.8	6.0	6.4
5	Breakfast sandwiches ^a	4.7	7.4	5.8
6	Whole milk, unflavored	5.9	4.8	5.4
7	Buttered toast, bagels with cream cheese	5.2	3.6	4.5
8	1% milk, unflavored	5.4	3.3**	4.5
9	1% milk, flavored	4.5	4.2	4.4
10	Cold cereal	4.2	3.7	4.0
11	Pancakes, waffles, French toast	4.6	3.1*	4.0
12	Hot dog, corn dog, sausage sandwiches ^b	4.1	3.3	3.8
13	Biscuits, croissants, cornbread	3.5	3.5	3.5
14	Muffins, sweet/quick breads	3.0	3.6	3.3
15	Pizza and pizza products	3.4	2.5	3.0
16	Peanut butter, nuts, seeds, trail mixes	2.5	1.0	1.9
17	Mexican-style entrees (mainly burritos)	1.3	2.3	1.7
18	Peanut butter sandwiches	2.0	1.0	1.6
19	Crackers and pretzels	1.9	0.5**	1.4
20	Eggs	1.2	1.2	1.2
21	Cheese	1.2	0.9	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

^bIncludes sausage wrapped in a pancake.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE E-VII.19

FOOD SOURCES OF SATURATED FAT IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Saturated Fat				
1	2% milk, unflavored	14.6	14.1	14.4
2	Whole milk, unflavored	9.3	7.6	8.6
3	Condiments and spreads	6.2	11.2	8.2
4	1% milk, unflavored	9.7	5.9**	8.1
5	1% milk, flavored	7.9	7.4	7.7
6	Sweet rolls, donuts, toaster pastries	5.7	8.7**	6.9
7	Sausages, hot dogs, cold cuts	6.1	5.4	5.8
8	Breakfast sandwiches ^a	4.3	7.1*	5.5
9	Pizza and pizza products	3.4	2.5	3.0
10	Hot dog, corn dog, sausage sandwiches ^b	3.0	2.4	2.7
11	Biscuits, croissants, cornbread	2.4	2.4	2.4
12	Buttered toast, bagels with cream cheese	2.9	1.8	2.4
13	Pancakes, waffles, French toast	2.8	1.8*	2.4
14	Cold cereal	2.5	2.2	2.4
15	Muffins, sweet/quick breads	2.0	2.6	2.3
16	Cheese	2.0	1.6	1.8
17	Mexican-style entrees (mainly burritos)	1.3	2.4	1.7
18	2% milk, flavored	1.4	1.6	1.5
19	Skim or nonfat milk, flavored	1.4	1.5	1.4
20	Yogurt	1.3	0.8	1.1
21	Eggs	1.1	1.1	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

^bIncludes sausage wrapped in a pancake.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE E-VII.20

FOOD SOURCES OF CARBOHYDRATE IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Carbohydrate				
1	Cold cereal	14.9	13.6	14.4
2	Fruit juice, 100%	13.8	14.0	13.9
3	Condiments and spreads	9.2	8.2	8.8
4	Sweet rolls, donuts, toaster pastries	6.5	11.3**	8.4
5	1% milk, flavored	7.6	7.9	7.7
6	Skim or nonfat milk, flavored	4.4	4.9	4.6
7	1% milk, unflavored	4.4	3.0**	3.9
8	Pancakes, waffles, French toast	3.7	3.0*	3.4
9	2% milk, unflavored	3.1	3.4	3.2
10	Muffins, sweet/quick breads	3.0	3.6	3.2
11	White bread, rolls, bagels	2.5	3.8	3.0
12	Buttered toast, bagels with cream cheese	2.8	2.2	2.6
13	Yogurt	2.2	1.5	1.9
14	Biscuits, croissants, cornbread	1.8	2.0	1.9
15	Crackers and pretzels	2.3	0.8*	1.7
16	Breakfast sandwiches ^a	1.2	1.7	1.4
17	Pizza and pizza products	1.5	1.1	1.4
18	Whole milk, unflavored	1.3	1.2	1.3
19	Bananas	1.2	1.3	1.2
20	Skim or nonfat milk, unflavored	1.0	1.2	1.1
21	Grain/fruit cereal bars, granola bars	1.0	1.1	1.0

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE E-VII.21

FOOD SOURCES OF PROTEIN IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Protein				
1	1% milk, unflavored	14.9	10.1**	13.0
2	2% milk, unflavored	11.0	11.9	11.3
3	1% milk, flavored	11.0	11.5	11.2
4	Skim or nonfat milk, flavored	6.4	7.4	6.8
5	Cold cereal	5.0	4.7	4.9
6	Whole milk, unflavored	4.6	4.2	4.4
7	Sausages, hot dogs, cold cuts	4.2	3.9	4.1
8	Sweet rolls, donuts, toaster pastries	3.1	5.1**	3.9
9	Skim or nonfat milk, unflavored	3.5	4.0	3.7
10	Breakfast sandwiches ^a	2.8	4.4	3.4
11	White bread, rolls, bagels	2.2	3.5	2.7
12	Pizza and pizza products	2.8	2.2	2.5
13	Pancakes, waffles, French toast	2.8	2.1*	2.5
14	Fruit juice, 100%	2.5	2.5	2.5
15	Yogurt	2.6	1.7	2.2
16	Buttered toast, bagels with cream cheese	2.4	1.8	2.2
17	Condiments and spreads	1.7	2.3	1.9
18	Muffins, sweet/quick breads	1.7	2.2	1.9
19	Hot dog, corn dog, sausage sandwiches ^b	1.8	1.7	1.8
20	Biscuits, croissants, cornbread	1.3	1.4	1.3
21	Mexican-style entrees (mainly burritos)	0.9	1.8	1.3
22	2% milk, flavored	1.1	1.3	1.2

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

^bIncludes sausage wrapped in a pancake.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE E-VII.22

FOOD SOURCES OF VITAMIN A (RE) IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Vitamin A (RE)				
1	Cold cereal	22.4	20.8	21.8
2	1% milk, unflavored	15.5	10.6**	13.6
3	1% milk, flavored	11.7	12.5	12.0
4	2% milk, unflavored	11.2	12.1	11.5
5	Skim or nonfat milk, flavored	6.5	7.5	6.9
6	Sweet rolls, donuts, toaster pastries	4.9	8.2**	6.2
7	Skim or nonfat milk, unflavored	3.8	4.4	4.1
8	Fruit juice, 100%	3.3	3.2	3.3
9	Condiments and spreads	1.5	4.0*	2.5
10	Buttered toast, bagels with cream cheese	2.6	2.1	2.4
11	Whole milk, unflavored	2.5	2.3	2.4
12	Grain/fruit cereal bars, granola bars	2.2	1.9	2.1
13	Pancakes, waffles, French toast	1.3	1.3	1.3
14	2% milk, flavored	1.1	1.4	1.2
15	Breakfast sandwiches ^a	0.8	1.4*	1.0

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE E-VII.23

FOOD SOURCES OF VITAMIN A (RAE) IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Vitamin A (RAE)				
1	Cold cereal	23.4	21.6	22.7
2	1% milk, unflavored	16.0	10.9**	14.0
3	1% milk, flavored	12.1	12.8	12.4
4	2% milk, unflavored	11.5	12.4	11.8
5	Skim or nonfat milk, flavored	6.8	7.7	7.1
6	Sweet rolls, donuts, toaster pastries	5.1	8.4**	6.4
7	Skim or nonfat milk, unflavored	4.0	4.6	4.2
8	Whole milk, unflavored	2.5	2.3	2.4
9	Condiments and spreads	1.5	3.9*	2.4
10	Buttered toast, bagels with cream cheese	2.6	2.0	2.4
11	Grain/fruit cereal bars, granola bars	2.3	2.0	2.2
12	Fruit juice, 100%	1.7	1.6	1.7
13	Pancakes, waffles, French toast	1.4	1.3	1.3
14	2% milk, flavored	1.1	1.4	1.2
15	Breakfast sandwiches ^a	0.8	1.4	1.0

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE E-VII.24

FOOD SOURCES OF VITAMIN C IN SBP BREAKFASTS *OFFERED*

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Vitamin C				
1	Fruit juice, 100%	72.4	68.3	70.8
2	Cold cereal	9.7	8.4	9.2
3	Citrus fruit	5.1	10.2*	7.1
4	Sweet rolls, donuts, toaster pastries	2.2	2.8	2.4
5	Juice drinks (not 100% juice)	2.2	2.5	2.3
6	Peaches	1.2	1.3	1.2
7	1% milk, flavored	1.2	1.2	1.2
8	Bananas	1.1	1.1	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE E-VII.25

FOOD SOURCES OF VITAMIN E IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Vitamin E				
1	Sweet rolls, donuts, toaster pastries	12.4	20.1**	15.5
2	Cold cereal	12.3	12.7	12.5
3	Fruit juice, 100%	11.4	10.7	11.1
4	Condiments and spreads	7.6	10.0	8.5
5	Peanut butter, nuts, seeds, trail mixes	6.4	2.6	4.9
6	Buttered toast, bagels with cream cheese	5.2	3.9	4.7
7	Pancakes, waffles, French toast	4.6	3.5	4.1
8	Breakfast sandwiches ^a	3.7	4.6	4.1
9	Muffins, sweet/quick breads	3.6	3.9	3.7
10	Hot dog, corn dog, sausage sandwiches ^b	3.4	2.9	3.2
11	Peanut butter sandwiches	3.7	1.9	3.0
12	Pizza and pizza products	2.4	1.3*	2.0
13	Sausages, hot dogs, cold cuts	1.8	1.6	1.7
14	2% milk, unflavored	1.7	1.7	1.7
15	Peaches	1.8	1.1	1.5
16	Whole milk, unflavored	1.4	1.2	1.4
17	Eggs	1.3	1.4	1.3
18	Grain/fruit cereal bars, granola bars	1.2	1.5	1.3
19	White bread, rolls, bagels	1.0	1.6	1.3
20	Mexican-style entrees (mainly burritos)	0.9	1.6	1.2
21	1% milk, flavored	1.1	1.1	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

^bIncludes sausage wrapped in a pancake.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE E-VII.26

FOOD SOURCES OF VITAMIN B₆ IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Vitamin B₆				
1	Cold cereal	43.9	42.5	43.4
2	Fruit juice, 100%	11.8	11.7	11.8
3	1% milk, unflavored	5.4	3.7**	4.8
4	Sweet rolls, donuts, toaster pastries	3.6	6.1**	4.6
5	2% milk, unflavored	4.1	4.5	4.2
6	1% milk, flavored	4.1	4.4	4.2
7	Bananas	2.9	3.1	3.0
8	Grain/fruit cereal bars, granola bars	2.7	2.6	2.7
9	Skim or nonfat milk, flavored	2.3	2.6	2.4
10	Sausages, hot dogs, cold cuts	2.1	2.0	2.1
11	Pancakes, waffles, French toast	1.8	1.8	1.8
12	Whole milk, unflavored	1.7	1.6	1.7
13	Skim or nonfat milk, unflavored	1.3	1.5	1.4
14	Breakfast sandwiches ^a	1.0	1.4	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE E-VII.27

FOOD SOURCES OF VITAMIN B₁₂ IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Vitamin B₁₂				
1	Cold cereal	33.2	32.5	32.9
2	1% milk, unflavored	15.4	10.7**	13.6
3	2% milk, unflavored	12.2	13.4	12.6
4	1% milk, flavored	9.9	10.6	10.2
5	Skim or nonfat milk, flavored	7.5	8.8	8.0
6	Whole milk, unflavored	5.0	4.7	4.9
7	Skim or nonfat milk, unflavored	4.4	5.2	4.7
8	Yogurt	2.2	1.5	1.9
9	Sausages, hot dogs, cold cuts	1.8	1.8	1.8
10	Muffins, sweet/quick breads	1.1	1.3	1.2
11	Pancakes, waffles, French toast	1.2	1.2	1.2
12	Breakfast sandwiches ^a	0.9	1.5	1.2
13	2% milk, flavored	1.0	1.3	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

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TABLE E-VII.28

FOOD SOURCES OF FOLATE (DFE) IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Folate (DFE)				
1	Cold cereal	56.1	52.9	54.9
2	Fruit juice, 100%	6.3	6.5	6.4
3	Sweet rolls, donuts, toaster pastries	4.9	8.1**	6.1
4	White bread, rolls, bagels	3.0	4.6	3.7
5	Muffins, sweet/quick breads	2.7	3.3	3.0
6	Buttered toast, bagels with cream cheese	3.2	2.4	2.9
7	Pancakes, waffles, French toast	2.7	2.0*	2.4
8	Biscuits, croissants, cornbread	2.2	2.4	2.3
9	1% milk, unflavored	1.9	1.3**	1.6
10	Pizza and pizza products	1.7	1.4	1.6
11	Breakfast sandwiches ^a	1.4	1.8	1.5
12	2% milk, unflavored	1.4	1.5	1.5
13	1% milk, flavored	1.4	1.5	1.5
14	Grain/fruit cereal bars, granola bars	1.0	1.1	1.0

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE E-VII.29

FOOD SOURCES OF CALCIUM IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Calcium				
1	1% milk, unflavored	19.6	13.4**	17.2
2	2% milk, unflavored	14.5	15.8	15.0
3	1% milk, flavored	14.5	15.4	14.9
4	Cold cereal	8.9	9.4	9.1
5	Skim or nonfat milk, flavored	8.4	9.7	8.9
6	Whole milk, unflavored	6.0	5.5	5.8
7	Skim or nonfat milk, unflavored	4.9	5.6	5.2
8	Fruit juice, 100%	3.6	4.5	4.0
9	Yogurt	3.3	2.2	2.9
10	Sweet rolls, donuts, toaster pastries	1.9	2.9**	2.3
11	Pizza and pizza products	1.9	1.4	1.7
12	2% milk, flavored	1.4	1.8	1.5
13	Breakfast sandwiches ^a	1.2	1.9	1.5
14	Pancakes, waffles, French toast	1.4	1.2	1.3
15	Muffins, sweet/quick breads	0.9	1.3	1.1
16	Buttered toast, bagels with cream cheese	1.1	0.9	1.0

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

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TABLE E-VII.30

FOOD SOURCES OF IRON IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Iron				
1	Cold cereal	47.4	44.7	46.4
2	Sweet rolls, donuts, toaster pastries	8.4	12.4**	9.9
3	Fruit juice, 100%	7.9	7.6	7.8
4	Pancakes, waffles, French toast	4.5	3.5	4.1
5	White bread, rolls, bagels	2.8	4.2	3.3
6	Buttered toast, bagels with cream cheese	3.0	2.3	2.7
7	1% milk, flavored	2.3	2.5	2.4
8	Muffins, sweet/quick breads	2.0	2.6	2.2
9	Breakfast sandwiches ^a	1.8	2.4	2.0
10	Biscuits, croissants, cornbread	1.8	1.9	1.8
11	Skim or nonfat milk, flavored	1.5	1.9	1.7
12	Pizza and pizza products	1.7	1.3	1.5
13	Crackers and pretzels	1.9	0.7*	1.5
14	Condiments and spreads	1.1	1.6*	1.3
15	Hot dog, corn dog, sausage sandwiches ^b	1.3	1.2	1.3
16	Hot cereal	1.4	0.8	1.2
17	Grain/fruit cereal bars, granola bars	1.1	1.2	1.2

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

^bIncludes sausage wrapped in a pancake.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

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TABLE E-VII.31

FOOD SOURCES OF MAGNESIUM IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Magnesium				
1	Fruit juice, 100%	11.9	12.2	12.0
2	1% milk, flavored	10.1	11.1	10.5
3	Cold cereal	11.0	9.6	10.4
4	1% milk, unflavored	11.7	8.2**	10.4
5	2% milk, unflavored	8.9	9.8	9.2
6	Skim or nonfat milk, flavored	7.4	9.3	8.1
7	Sweet rolls, donuts, toaster pastries	2.9	4.8**	3.6
8	Whole milk, unflavored	3.5	3.2	3.4
9	Skim or nonfat milk, unflavored	2.8	3.3	3.0
10	Condiments and spreads	2.1	2.3	2.2
11	Pancakes, waffles, French toast	2.2	1.8	2.1
12	Yogurt	2.1	1.4	1.9
13	White bread, rolls, bagels	1.5	2.4	1.8
14	Bananas	1.7	1.8	1.7
15	Muffins, sweet/quick breads	1.4	2.0	1.6
16	Buttered toast, bagels with cream cheese	1.7	1.3	1.6
17	Peanut butter, nuts, seeds, trail mixes	1.8	0.8	1.4
18	Breakfast sandwiches ^a	1.2	1.7	1.4
19	Pizza and pizza products	1.4	1.1	1.3
20	Peanut butter sandwiches	1.3	0.8	1.1
21	2% milk, flavored	1.0	1.3	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

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TABLE E-VII.32

FOOD SOURCES OF PHOSPHORUS IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Phosphorus				
1	1% milk, unflavored	16.2	11.0**	14.2
2	1% milk, flavored	13.1	13.9	13.4
3	2% milk, unflavored	12.1	13.1	12.5
4	Skim or nonfat milk, flavored	7.6	8.8	8.1
5	Cold cereal	7.0	6.6	6.9
6	Whole milk, unflavored	5.0	4.6	4.9
7	Skim or nonfat milk, unflavored	4.1	4.7	4.3
8	Pancakes, waffles, French toast	3.8	3.1	3.5
9	Sweet rolls, donuts, toaster pastries	2.7	4.4**	3.4
10	Biscuits, croissants, cornbread	2.7	3.0	2.8
11	Fruit juice, 100%	2.7	2.7	2.7
12	Breakfast sandwiches ^a	2.0	3.5*	2.6
13	Muffins, sweet/quick breads	2.2	2.8	2.5
14	Yogurt	2.7	1.8	2.3
15	Pizza and pizza products	2.0	1.6	1.9
16	Condiments and spreads	1.2	1.6	1.4
17	2% milk, flavored	1.3	1.6	1.4
18	Sausages, hot dogs, cold cuts	1.3	1.3	1.3
19	White bread, rolls, bagels	0.9	1.4	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

TABLE E-VII.33

FOOD SOURCES OF POTASSIUM IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Potassium				
1	Fruit juice, 100%	20.0	20.2	20.0
2	1% milk, unflavored	14.2	9.8**	12.5
3	1% milk, flavored	11.9	12.8	12.3
4	2% milk, unflavored	10.8	11.7	11.1
5	Skim or nonfat milk, flavored	7.2	8.6	7.7
6	Whole milk, unflavored	4.4	4.0	4.3
7	Skim or nonfat milk, unflavored	3.5	4.1	3.7
8	Cold cereal	3.6	3.2	3.5
9	Yogurt	2.4	1.6	2.1
10	Sweet rolls, donuts, toaster pastries	1.6	2.7**	2.0
11	Bananas	2.0	2.1	2.0
12	Condiments and spreads	1.5	2.1*	1.7
13	Sausages, hot dogs, cold cuts	1.3	1.3	1.3
14	2% milk, flavored	1.2	1.4	1.3
15	Breakfast sandwiches ^a	0.9	1.5	1.1
16	Citrus fruit	0.8	1.6*	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

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TABLE E-VII.34

FOOD SOURCES OF SODIUM IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Sodium				
1	Cold cereal	15.6	13.4	14.7
2	Sweet rolls, donuts, toaster pastries	6.1	9.5**	7.4
3	Pancakes, waffles, French toast	7.2	5.1*	6.3
4	Condiments and spreads	5.0	7.9**	6.2
5	Breakfast sandwiches ^a	4.8	7.4	5.8
6	Biscuits, croissants, cornbread	5.6	6.0	5.8
7	1% milk, flavored	5.1	5.1	5.1
8	Buttered toast, bagels with cream cheese	5.1	3.7	4.5
9	1% milk, unflavored	5.2	3.3**	4.4
10	Sausages, hot dogs, cold cuts	4.2	3.7	4.0
11	White bread, rolls, bagels	3.3	4.7	3.9
12	Muffins, sweet/quick breads	3.5	4.1	3.7
13	Pizza and pizza products	4.1	3.0	3.7
14	2% milk, unflavored	3.6	3.7	3.7
15	Hot dog, corn dog, sausage sandwiches ^b	2.6	2.4	2.5
16	Skim or nonfat milk, flavored	2.0	2.2	2.1
17	Crackers and pretzels	2.4	0.9*	1.8
18	Mexican-style entrees (mainly burritos)	1.2	2.2*	1.6
19	Whole milk, unflavored	1.5	1.3	1.4
20	Skim or nonfat milk, unflavored	1.2	1.3	1.2
21	Cheese	1.1	0.9	1.0

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

^bIncludes sausage wrapped in a pancake.

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TABLE E-VII.35

FOOD SOURCES OF ZINC IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Zinc				
1	Cold cereal	39.6	39.8	39.7
2	1% milk, unflavored	9.3	6.3**	8.2
3	2% milk, unflavored	7.2	7.8	7.4
4	1% milk, flavored	7.0	7.3	7.1
5	Skim or nonfat milk, flavored	4.5	5.3	4.8
6	Whole milk, unflavored	2.9	2.6	2.8
7	Sweet rolls, donuts, toaster pastries	2.0	3.2**	2.5
8	Skim or nonfat milk, unflavored	2.2	2.5	2.3
9	Sausages, hot dogs, cold cuts	2.4	2.2	2.3
10	Condiments and spreads	2.0	2.6	2.2
11	Yogurt	2.2	1.4	1.9
12	Breakfast sandwiches ^a	1.5	2.5	1.9
13	Fruit juice, 100%	1.6	1.6	1.6
14	Pizza and pizza products	1.7	1.3	1.5
15	Pancakes, waffles, French toast	1.5	1.1*	1.4
16	Grain/fruit cereal bars, granola bars	1.3	1.3	1.3
17	White bread, rolls, bagels	0.9	1.4	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

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TABLE E-VII.36

FOOD SOURCES OF CHOLESTEROL IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Cholesterol				
1	2% milk, unflavored	12.0	11.4	11.8
2	Eggs	11.4	11.8	11.6
3	Breakfast sandwiches ^a	9.9	13.5	11.4
4	1% milk, unflavored	9.9	5.9**	8.3
5	Sausages, hot dogs, cold cuts	7.7	6.5	7.2
6	Whole milk, unflavored	6.4	5.2	5.9
7	1% milk, flavored	5.6	5.1	5.4
8	Sweet rolls, donuts, toaster pastries	3.9	7.3**	5.4
9	Pancakes, waffles, French toast	6.9	3.1*	5.3
10	Mexican-style entrees (mainly burritos)	4.0	6.6	5.1
11	Muffins, sweet/quick breads	4.3	4.6	4.4
12	Condiments and spreads	2.8	5.4	3.9
13	Hot dog, corn dog, sausage sandwiches ^b	2.5	2.0	2.3
14	Pizza and pizza products	2.1	1.8	2.0
15	Skim or nonfat milk, flavored	1.6	1.6	1.6
16	Cheese	1.3	1.0	1.2
17	2% milk, flavored	1.1	1.2	1.1

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

^bIncludes sausage wrapped in a pancake.

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TABLE E-VII.37

FOOD SOURCES OF DIETARY FIBER IN SBP BREAKFASTS OFFERED

Rank	Food Group/Food(s)	Percentage Contribution to Average Amount Offered		
		Elementary Schools	Secondary Schools	All Schools
Dietary Fiber				
1	Cold cereal	21.7	18.6	20.5
2	Sweet rolls, donuts, toaster pastries	5.8	10.1**	7.5
3	1% milk, flavored	7.2	7.9	7.5
4	Fruit juice, 100%	5.5	5.3	5.4
5	Muffins, sweet/quick breads	4.5	5.2	4.8
6	Apples	3.9	5.4	4.5
7	Skim or nonfat milk, flavored	3.9	5.3	4.4
8	Bananas	3.8	4.0	3.9
9	Citrus fruit	2.6	5.6*	3.8
10	White bread, rolls, bagels	3.1	4.7	3.7
11	Buttered toast, bagels with cream cheese	3.9	2.9	3.5
12	Condiments and spreads	3.4	3.7	3.5
13	Pancakes, waffles, French toast	3.8	3.0	3.4
14	Biscuits, croissants, cornbread	1.9	1.9	1.9
15	Breakfast sandwiches ^a	1.6	1.9	1.7
16	Pizza and pizza products	2.0	1.4	1.7
17	Crackers and pretzels	2.3	0.8*	1.7
18	Pears	2.0	0.9	1.6
19	Peaches	1.6	1.1	1.4
20	Peanut butter, nuts, seeds, trail mixes	1.6	0.8	1.3
21	Hot cereal	1.6	0.7	1.3
22	Whole grain breads and rolls	1.3	1.0	1.2
23	Peanut butter sandwiches	1.3	0.7	1.1
24	Mexican-style entrees (mainly burritos)	0.8	1.4	1.1
25	Hot dog, corn dog, sausage sandwiches ^b	1.1	1.0	1.0

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

Note: Table is limited to foods contributing to at least one percent of nutrient for all schools. See Appendix Table B-V.1 for a detailed listing of food items included in each group.

^aIncludes sandwiches with sausage, egg, cheese, ham, or other types of meat on a biscuit, English muffin, bagel, or croissant.

^bIncludes sausage wrapped in a pancake.

*Difference between elementary schools and secondary schools is significantly different from zero at the .05 level.

**Difference between elementary schools and secondary schools is significantly different from zero at the .01 level.

APPENDIX F

**TABULATIONS FOR SECONDARY SCHOOLS: NUTRIENTS OFFERED AND
SERVED IN SCHOOL LUNCHEES AND BREAKFASTS**

TABLE F-VI.1

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES OFFERED
TO STUDENTS IN SECONDARY SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	837	14.4	646	680	733	827	913	1034	1117
Macronutrients									
Total fat (g)	32	0.7	22	23	27	31	36	44	48
Saturated fat (g)	10	0.2	7	8	9	10	11	13	14
Monounsaturated fat (g)	12	0.3	8	8	10	11	13	16	18
Polyunsaturated fat (g)	8	0.3	4	5	6	8	10	12	14
Linoleic acid (g)	7	0.2	4	4	5	7	8	11	12
Alpha-linolenic acid (g)	0.9	0.03	0.5	0.5	0.6	0.8	1.0	1.3	1.4
Carbohydrate (g)	108	2.3	74	82	96	108	116	129	144
Protein (g)	33	0.4	27	28	30	32	35	38	40
Vitamins									
Vitamin A (mcg RE)	389	16.5	249	268	295	340	449	545	614
Vitamin A (mcg RAE)	299	9.0	210	232	248	279	340	393	424
Vitamin C (mg)	37	2.1	17	19	24	32	43	59	71
Vitamin E (mg AT)	2.8	0.07	1.8	2.0	2.3	2.6	3.1	4.1	4.5
Vitamin B ₆ (mg)	0.6	0.01	0.5	0.5	0.6	0.6	0.7	0.8	0.8
Vitamin B ₁₂ (mcg)	2.0	0.04	1.6	1.7	1.8	1.9	2.2	2.4	2.7
Folate (mcg)	144	2.7	106	111	127	139	159	182	197
Folate (mcg DFE)	182	3.5	133	141	158	172	198	232	258
Niacin (mg)	7	0.1	6	6	7	7	8	9	10
Riboflavin (mg)	1.0	0.01	0.8	0.9	0.9	1.0	1.0	1.1	1.2
Thiamin (mg)	0.6	0.01	0.4	0.5	0.5	0.6	0.7	0.8	0.9
Minerals									
Calcium (mg)	548	8.3	433	465	490	541	589	639	694
Iron (mg)	5.1	0.09	3.9	4.1	4.4	4.9	5.5	6.1	6.9
Magnesium (mg)	112	1.7	88	92	98	109	121	133	142
Phosphorus (mg)	615	7.4	503	526	562	601	654	728	747
Potassium (mg)	1279	24.5	947	1005	1143	1261	1383	1543	1634
Sodium (mg)	1554	32.9	1127	1198	1347	1539	1745	1970	2032
Zinc (mg)	4.2	0.05	3.4	3.6	3.8	4.2	4.5	4.9	5.2
Other Components									
Cholesterol (mg)	70	1.6	48	52	58	65	80	92	101
Dietary fiber (g)	8	0.2	5	6	7	8	9	10	10
Dietary fiber (g/1000 kcal)	9	0.2	7	8	8	9	10	11	12
Percentage of Energy From:									
Total fat	34.2	0.47	27.2	28.8	31.2	34.0	36.9	39.5	41.7
Saturated fat	10.7	0.13	8.9	9.4	9.8	10.6	11.5	12.4	12.9
Monosaturated fat	12.4	0.23	9.9	10.4	11.1	12.1	13.4	15.1	16.0
Polyunsaturated fat	8.6	0.22	5.3	6.0	7.0	8.2	10.3	11.4	12.4
Linoleic acid	7.6	0.20	4.5	5.2	6.1	7.4	9.1	10.0	10.8
Alpha-linolenic acid	0.9	0.03	0.5	0.6	0.7	0.8	1.1	1.3	1.4
Carbohydrate	51.6	0.52	43.0	45.7	49.4	51.9	54.5	56.5	57.7
Protein	15.9	0.14	13.7	14.0	15.0	15.8	17.0	17.7	18.2
Number of Schools	252								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE F-VI.2

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN NSLP LUNCHES SERVED TO STUDENTS IN SECONDARY SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	765	11.4	545	598	685	757	831	926	968
Macronutrients									
Total fat (g)	31	0.8	19	21	26	29	35	40	44
Saturated fat (g)	9	0.2	6	7	8	9	11	12	13
Monounsaturated fat (g)	12	0.3	7	8	9	11	13	15	17
Polyunsaturated fat (g)	8	0.3	4	4	5	7	9	11	13
Linoleic acid (g)	7	0.3	3	4	5	6	8	9	12
Alpha-linolenic acid (g)	0.8	0.03	0.4	0.4	0.6	0.7	0.9	1.1	1.5
Carbohydrate (g)	96	1.5	69	75	85	94	104	117	122
Protein (g)	29	0.4	24	25	27	30	32	34	36
Vitamins									
Vitamin A (mcg RE)	306	12.2	182	200	237	287	339	419	569
Vitamin A (mcg RAE)	246	7.5	147	168	202	242	274	318	396
Vitamin C (mg)	26	1.2	11	13	17	22	31	39	55
Vitamin E (mg AT)	2.5	0.08	1.4	1.6	1.9	2.4	2.9	3.5	4.1
Vitamin B ₆ (mg)	0.6	0.01	0.4	0.5	0.5	0.6	0.6	0.7	0.8
Vitamin B ₁₂ (mcg)	1.8	0.05	1.1	1.3	1.5	1.7	1.9	2.1	2.6
Folate (mcg)	119	2.2	86	93	102	116	131	151	165
Folate (mcg DFE)	152	2.9	111	118	132	145	168	197	213
Niacin (mg)	7	0.1	5	5	6	7	8	8	9
Riboflavin (mg)	0.9	0.01	0.6	0.7	0.8	0.9	0.9	1.0	1.1
Thiamin (mg)	0.5	0.01	0.4	0.4	0.5	0.5	0.6	0.7	0.7
Minerals									
Calcium (mg)	468	7.3	326	357	416	466	522	572	588
Iron (mg)	4.7	0.07	3.6	3.8	4.2	4.6	5.0	5.6	5.9
Magnesium (mg)	99	1.5	74	80	88	98	107	120	126
Phosphorus (mg)	548	7.3	406	449	497	554	593	640	650
Potassium (mg)	1131	16.4	853	911	996	1132	1212	1393	1496
Sodium (mg)	1470	29.9	996	1106	1244	1415	1631	1835	2059
Zinc (mg)	3.9	0.05	2.9	3.1	3.5	3.8	4.2	4.6	4.8
Other Components									
Cholesterol (mg)	63	1.2	44	47	54	60	72	80	87
Dietary fiber (g)	7	0.1	4	5	6	7	8	9	9
Dietary fiber (g/1000 kcal)	9	0.1	7	7	8	9	9	11	11
Percentage of Energy From:									
Total fat	35.5	0.52	28.1	29.7	32.1	35.4	38.3	42.3	43.2
Saturated fat	11.1	0.15	9.1	9.4	10.0	10.9	12.0	12.8	13.1
Monosaturated fat	13.3	0.24	10.4	10.9	11.9	12.7	14.6	16.4	17.5
Polyunsaturated fat	8.6	0.23	5.5	5.8	6.9	8.2	10.0	11.6	12.9
Linoleic acid	7.6	0.21	4.8	5.1	6.1	7.2	8.8	10.2	11.4
Alpha-linolenic acid	0.9	0.03	0.5	0.6	0.7	0.9	1.1	1.2	1.5
Carbohydrate	50.2	0.53	41.6	44.0	47.6	50.3	53.2	56.0	57.4
Protein	15.8	0.13	13.2	13.7	14.7	15.7	16.8	17.9	18.6
Number of Schools	252								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE F-VII.1

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS OFFERED
TO STUDENTS IN SECONDARY SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	510	9.8	398	420	445	493	551	626	677
Macronutrients									
Total fat (g)	15	0.5	8	10	12	13	17	20	23
Saturated fat (g)	5	0.2	3	4	4	5	6	8	8
Monounsaturated fat (g)	5	0.2	3	3	4	5	6	8	9
Polyunsaturated fat (g)	3	0.1	1	2	2	3	3	4	5
Linoleic acid (g)	3	0.1	1	2	2	2	3	4	4
Alpha-linolenic acid (g)	0.2	0.01	0.1	0.1	0.2	0.2	0.3	0.4	0.4
Carbohydrate (g)	80	1.6	62	66	71	76	88	97	104
Protein (g)	16	0.3	13	13	15	16	18	20	22
Vitamins									
Vitamin A (mcg RE)	265	5.7	194	204	231	247	300	342	361
Vitamin A (mcg RAE)	257	5.4	187	196	223	239	292	328	347
Vitamin C (mg)	35	1.6	16	18	25	30	44	53	65
Vitamin E (mg AT)	1.0	0.06	0.6	0.6	0.6	0.9	1.1	1.5	2.1
Vitamin B ₆ (mg)	0.5	0.01	0.3	0.4	0.4	0.5	0.6	0.7	0.8
Vitamin B ₁₂ (mcg)	2.0	0.05	1.4	1.5	1.6	1.9	2.2	2.3	2.7
Folate (mcg)	128	3.7	79	86	99	123	150	181	187
Folate (mcg DFE)	185	6.2	110	123	139	175	228	256	287
Niacin (mg)	5	0.1	3	3	4	5	5	7	7
Riboflavin (mg)	0.9	0.01	0.7	0.7	0.8	0.9	0.9	1.0	1.1
Thiamin (mg)	0.5	0.01	0.4	0.4	0.4	0.5	0.6	0.7	0.7
Minerals									
Calcium (mg)	431	8.2	354	361	377	413	463	531	564
Iron (mg)	4.6	0.14	2.8	3.0	3.6	4.4	5.1	6.3	6.9
Magnesium (mg)	66	1.3	51	54	57	64	71	78	84
Phosphorus (mg)	422	6.6	344	354	382	410	436	492	532
Potassium (mg)	754	12.0	636	651	684	743	794	896	930
Sodium (mg)	657	18.6	451	473	546	618	751	817	1008
Zinc (mg)	3.1	0.09	2.0	2.3	2.5	2.9	3.8	4.2	4.4
Other Components									
Cholesterol (mg)	43	2.4	19	22	27	36	51	79	93
Dietary fiber (g)	3	0.1	2	2	2	3	3	4	5
Dietary fiber (g/1000 kcal)	6	0.2	3	4	5	5	7	8	9
Percentage of Energy From:									
Total fat	25.3	0.50	17.5	19.4	22.2	24.5	28.0	32.2	34.5
Saturated fat	9.2	0.20	6.3	6.9	8.0	8.8	10.3	12.0	12.7
Monosaturated fat	9.4	0.21	6.3	6.9	7.9	9.3	10.5	12.3	13.3
Polyunsaturated fat	4.8	0.13	2.6	3.3	4.1	4.6	5.4	6.0	7.0
Linoleic acid	4.4	0.12	2.3	2.9	3.7	4.2	4.8	5.3	6.3
Alpha-linolenic acid	0.4	0.02	0.2	0.3	0.3	0.4	0.5	0.6	0.6
Carbohydrate	63.2	0.55	52.8	56.3	59.6	64.1	66.8	69.2	71.7
Protein	13.0	0.12	10.8	11.2	12.1	12.9	13.8	14.7	15.4
Number of Schools	221								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent

TABLE -F-VII.2

MEAN AND DISTRIBUTION OF FOOD ENERGY AND NUTRIENTS IN SBP BREAKFASTS SERVED
TO STUDENTS IN SECONDARY SCHOOLS

	Mean	SE	Percentiles						
			5th	10th	25th	50th	75th	90th	95th
Food Energy (Calories)	545	16.9	348	397	452	526	602	671	723
Macronutrients									
Total fat (g)	17	0.6	8	11	13	16	19	24	28
Saturated fat (g)	6	0.2	3	3	4	5	6	8	10
Monounsaturated fat (g)	7	0.3	3	4	5	6	8	9	11
Polyunsaturated fat (g)	3	0.2	1	2	2	3	4	5	6
Linoleic acid (g)	3	0.2	1	2	2	3	4	4	5
Alpha-linolenic acid (g)	0.3	0.02	0.1	0.1	0.2	0.2	0.3	0.4	0.5
Carbohydrate (g)	83	3.7	53	59	68	77	91	100	106
Protein (g)	17	0.4	11	12	14	17	18	22	24
Vitamins									
Vitamin A (mcg RE)	248	16.2	138	149	184	231	262	304	363
Vitamin A (mcg RAE)	240	16.4	132	144	177	222	255	298	356
Vitamin C (mg)	32	2.1	11	14	20	28	40	51	59
Vitamin E (mg AT)	1.0	0.05	0.5	0.6	0.8	0.9	1.2	1.5	2.0
Vitamin B ₆ (mg)	0.5	0.07	0.2	0.3	0.3	0.4	0.5	0.6	0.7
Vitamin B ₁₂ (mcg)	1.8	0.23	0.9	1.0	1.2	1.5	1.9	2.3	2.6
Folate (mcg)	134	19.2	68	73	88	109	133	168	176
Folate (mcg DFE)	198	32.2	93	104	124	156	190	259	262
Niacin (mg)	6	0.7	3	3	4	5	6	7	8
Riboflavin (mg)	0.8	0.06	0.5	0.6	0.7	0.8	0.9	0.9	1.1
Thiamin (mg)	0.6	0.05	0.3	0.4	0.4	0.5	0.6	0.6	0.8
Minerals									
Calcium (mg)	386	12.8	238	267	322	373	412	476	565
Iron (mg)	5.0	0.71	2.6	2.7	3.5	4.1	4.9	5.7	7.5
Magnesium (mg)	62	2.6	40	45	52	59	67	78	91
Phosphorus (mg)	424	12.0	272	290	360	404	490	526	597
Potassium (mg)	695	17.1	444	505	592	691	777	839	961
Sodium (mg)	821	39.8	440	487	566	759	955	1143	1338
Zinc (mg)	3.1	0.38	1.5	1.7	2.1	2.6	3.3	4.1	4.5
Other Components									
Cholesterol (mg)	52	3.4	14	21	30	41	60	92	123
Dietary fiber (g)	3	0.2	2	2	2	3	3	4	4
Dietary fiber (g/1000 kcal)	5	0.1	4	4	4	5	6	7	8
Percentage of Energy From:									
Total fat	27.8	0.67	19.4	21.7	24.6	27.4	31.2	34.5	37.8
Saturated fat	9.6	0.27	6.5	7.2	7.8	9.4	10.7	12.3	14.1
Monosaturated fat	10.7	0.28	6.7	7.4	8.9	10.4	12.4	14.3	15.4
Polyunsaturated fat	5.4	0.21	2.5	3.7	4.6	5.3	6.1	7.6	7.8
Linoleic acid	4.9	0.18	2.3	3.3	4.1	4.7	5.6	6.9	7.0
Alpha-linolenic acid	0.4	0.02	0.2	0.3	0.3	0.4	0.5	0.6	0.7
Carbohydrate	60.8	0.76	49.0	52.9	57.2	61.0	65.4	67.2	70.0
Protein	12.6	0.19	9.6	10.5	11.3	12.5	13.6	14.8	15.4
Number of Schools	221								

Source: School Nutrition Dietary Assessment Study-III, Menu Survey, school year 2004-2005. Tabulations prepared by Mathematica Policy Research, Inc. are weighted to be representative of all public schools offering the NSLP.

AT=Alpha-tocopherol; DFE=Dietary folate equivalents; RE=Retinol equivalent; RAE=Retinol activity equivalent