

# Acknowledgments

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# Chapter One

## Introduction

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The National School Lunch Program (NSLP), administered by the Food and Nutrition Service (FNS) of the U.S. Department of Agriculture (USDA), has been providing meals to the Nation's school children since 1946. The School Breakfast Program (SBP) has been in full operation since the early 1970s. Over the years, research has shown that meals offered in both the NSLP and SBP have provided children with the calories, vitamins, and minerals needed to sustain health and promote normal growth. However, in the early 1990s, the first *School Nutrition Dietary Assessment Study* (SNDA-I) found that the amount of fat, saturated fat, and sodium provided in school lunches was not consistent with current public health recommendations.

Since the time the SNDA-I study revealed that school lunches were not consistent with the *Dietary Guidelines*, FNS and its State and local partners in the school meals programs have been working on many fronts to address this problem. These efforts have included changes in menu planning requirements, enhanced training and technical assistance for school food service managers and personnel, and changes in the types and amounts of commodity foods offered to schools. In school year (SY) 1998–99, FNS sponsored the second *School Nutrition Dietary Assessment Study* (SNDA-II) to provide an updated picture of the nutrient profile of NSLP and SBP meals. The study also provides current information about menu planning practices used in the school meals programs and about related program operations issues. The SNDA-II study was completed by Abt Associates Inc. under contract to FNS. This report summarizes study findings.

### The National School Lunch and School Breakfast Programs

The National School Lunch Act of 1946 established the NSLP “to safeguard the health and well-being of the Nation's children and to encourage the domestic consumption of nutritious agricultural commodities and other foods” (P.L. 79-396). All public and private nonprofit schools are eligible to participate in both the NSLP and the SBP, as are public or licensed residential child care institutions. Currently, the NSLP operates in more than 84,000 public schools and 12,000 private nonprofit schools and residential child care institutions (USDA, FNS 2000).

Any child in a participating school is eligible to purchase a school lunch. Students from low-income families are eligible to purchase lunch at a reduced price or to receive a free lunch. In SY 1998–99, more than 4.5 billion school lunches were served (USDA, FNS 2000). On an average day, more than 27 million children received an NSLP lunch; more than half of these lunches were provided free or at a reduced price to children from low-income families.

The SBP began in the mid-1960s when the Child Nutrition Act of 1966 (P.L. 89-642) established a pilot project to support the provision of breakfast to children living in “poor areas and areas where children [had] to travel a great distance to school.” The SBP was officially authorized as a permanent program in

1975, and the target population was expanded to include "all schools where [the program] is needed to provide adequate nutrition for all children in attendance" (P.L. 94-105).

Currently, the SBP operates in approximately three-quarters of the public schools that offer the NSLP, most commonly in schools that serve large numbers of economically disadvantaged children. In SY 1998–99, more than 1.2 billion breakfasts were served (USDA/FNS 2000). On any given day, roughly seven million children received an SBP breakfast. More than three-quarters of these meals were provided free of charge.

School Food Authorities (SFAs) that participate in the NSLP and SBP receive two types of Federal assistance: donated commodities (tied to the NSLP) and cash reimbursements (received for both the NSLP and SBP). Entitlement to commodities is based on an established per-meal flat rate applied to the number of reimbursable lunches served the previous year. Subject to availability, SFAs are also eligible to receive bonus commodities in amounts that can be used without waste. The type and amount of bonus commodities available vary from year to year depending on purchasing decisions made by USDA.

Cash reimbursements for NSLP and SBP meals are based on the number of meals served to students, established per-meal reimbursement rates, and the poverty level of participating students. SFAs receive a base payment for each meal served, with substantially higher rates paid for meals served free or at a reduced price to income-eligible students. Schools may receive additional reimbursements if more than 60 percent of the meals they serve are provided free or at a reduced price. Children's household size and income determine eligibility for free and reduced-price meal benefits. Currently, students eligible for free meals are those from families with incomes at or below 130 percent of poverty. Students from families with incomes between 130 and 185 percent of poverty are eligible for reduced-price meals. These students may be required to contribute an additional amount of their own money for school meals, but Federal regulations set a maximum price (\$0.40 for lunch and \$0.30 for breakfast in SY 1998–99) that is well below the rate paid by students who are not eligible for reduced-price meal benefits.

### **Nutrition Standards for School Meals**

To be eligible for Federal subsidies, meals served in the NSLP and SBP must meet defined nutrition standards. For many years, the goal of the NSLP has been to provide approximately one-third of children's daily nutritional needs, as defined by the *Recommended Dietary Allowances* (RDAs) (National Research Council 1989b). To ensure that this goal is met, NSLP regulations have always included food-based menu planning guidelines. These guidelines, originally known as the "Type A meal pattern," define specific types of food that must be included in planned meals as well as minimum acceptable portion sizes. Specific nutrition standards for SBP breakfasts were defined only recently, although program regulations have always included a meal pattern. The meal pattern was designed to ensure that breakfasts would provide approximately 20 to 25 percent of children's daily nutritional needs.

Most prior research has shown that, with few exceptions, the NSLP and SBP have been successful in meeting these nutrition goals (Wellisch 1983; St. Pierre 1992; and Burghardt 1993). However, the most recent nationally representative study of school meals — the first *School Nutrition Dietary Assessment Study* (SNDA-I), which was published in 1993 — focused attention on another aspect of nutritional quality (Burghardt 1993). SNDA-I found that, in SY 1991-92, NSLP meals were not consistent with goals for fat and saturated fat intake specified in the *Dietary Guidelines for Americans* (U.S. Departments

of Health and Human Services and Agriculture 1990).<sup>1</sup> At the time the SNDA-I study was conducted, schools were not required to offer meals that were consistent with the *Dietary Guidelines*.

### The School Meals Initiative for Healthy Children

Shortly after SNDA-I revealed that school lunches were not consistent with the *Dietary Guidelines* for fat and saturated fat intake, USDA began developing an initiative to address this problem. A series of public hearings was held and interested parties were invited to submit written comments. In 1995, the Department launched the School Meals Initiative for Healthy Children (SMI). SMI is designed to improve the nutritional quality of school meals by providing schools with educational and technical resources that can be used to assist food service personnel in preparing nutritious and appealing meals and to encourage children to eat more healthful meals.

Key components of SMI include new nutrition standards for school meals and added flexibility in the procedures used to plan and monitor school menus. The new nutrition standards maintain the long-standing goals of providing, on average, one-third of students' daily nutrition needs at lunch and one-fourth at breakfast. In addition, the standards include goals for fat and saturated fat content that are consistent with *Dietary Guidelines* recommendations (Exhibit 1.1).

## Exhibit 1.1

### Nutrition Standards Defined in Current NSLP and SBP Regulations

Nutrient	Standard
<b>Calories and nutrients with established Recommended Dietary Allowances (RDAs):<sup>1</sup></b>	
Calories, protein, vitamin A, vitamin C, calcium, and iron	<b>Breakfast:</b> One-fourth of the RDA <b>Lunch:</b> One-third of the RDA
<b>Nutrients included in the <i>Dietary Guidelines for Americans</i>:<sup>2</sup></b>	
	<b>Breakfast and Lunch:</b>
Total fat	≤ 30% of total calories
Saturated fat	< 10% of total calories

<sup>1</sup> National Research Council (1989). *Recommended Dietary Allowances*, 10th edition. Washington, DC: National Academy Press.

<sup>2</sup> U.S. Departments of Health and Human Services and Agriculture (1990). *Nutrition and Your Health: Dietary Guidelines for Americans*, 3rd edition. Washington, DC: U.S. Government Printing Office. [Standards are based on the 1990 version of the *Dietary Guidelines*].

1 FNS had previously examined the sodium and fat content of school meals using data from the *National Evaluation of School Nutrition Programs (NESNP)*, which was completed in 1980 (Fraker 1988). The analysis used data on students' dietary intake over a 24-hour period and compared NSLP participants with students who skipped lunch and students who ate alternative lunches.



The initial SMI proposal, issued in June 1994, replaced the traditional food-based menu planning guidelines (meal pattern) with an alternative computer-based menu planning system, known as Nutrient Standard Menu Planning (NSMP) or Assisted Nutrient Standard Menu Planning (ANSMP). The proposal also required that school meals be consistent with the *Dietary Guidelines* no later than the beginning of SY 1998–99. An extended time line was built into the proposed regulation because comments received during public hearings and in response to an initial Federal Register notice indicated that some SFAs would need a considerable amount of time to implement NSMP or ANSMP and to develop menus consistent with the *Dietary Guidelines*.

In November 1994, as part of the reauthorization of the Child Nutrition programs, Congress enacted The Healthy Meals for Healthy Americans Act (P.L. 103-448). This law was important for two reasons. First, it was the first time that legislation required that school meals be consistent with the *Dietary Guidelines*. Second, the law precipitated two important changes in USDA's initial SMI proposal. It required that USDA develop a food-based menu planning system, similar to the traditional meal pattern, that schools could use in lieu of NSMP or ANSMP. The law also shortened the time line for incorporating the *Dietary Guidelines*, requiring that all SFAs be in compliance by the first day of SY 1996-97 (two years earlier than USDA had suggested), unless a waiver was granted by the cognizant State agency. Finally, the law permitted schools, under certain circumstances, to no longer offer whole milk (prior to this legislation, schools were required to offer whole milk).

Menu planning options were further expanded in May 1996, when The Healthy Meals for Children Act mandated that USDA allow SFAs to continue to use the traditional NSLP and SBP menu planning systems (i.e., the meal patterns that were in effect prior to the SMI rule), or to use “any reasonable approach” in planning menus that satisfy the nutrient standards defined under SMI.

The regulatory requirement that school meals be consistent with the *Dietary Guidelines* has been incorporated into FNS’ strategic plan. The current goal is that all schools will satisfy these standards by 2005.

### **Current Menu Planning Options**

As summarized in the preceding discussion, current program regulations provide schools with five different menu planning options: (1) the traditional food-based menu planning system; (2) an enhanced food-based menu planning system; (3) NSMP; (4) ANSMP; and (5) any other reasonable approach.

The traditional food-based menu planning system requires that lunches offered to students include five food items: fluid milk (as a beverage), one serving of meat or meat alternate, a minimum of one serving of a bread or grain product, and two servings of fruit and/or vegetables. The system also defines minimum required portion sizes for children in different grades. The enhanced food-based menu planning system is very similar to the traditional food-based system but requires more servings of bread and grain products over the course of a week and larger servings of fruits and vegetables.

NSMP and ANSMP require use of a computerized nutrient analysis system to plan menus. SFAs must select one of several USDA-approved NSMP software programs. ANSMP allows SFAs to arrange or contract for NSMP implementation (i.e., menu development and nutrient analysis) through an external source such as a State agency, a consortium of SFAs, or a consultant. The only food-based menu

planning requirements imposed under NSMP or ANSMP, for lunch, are that milk be offered as a beverage and that at least one entree and one side dish be offered. Within these broad guidelines, menu planners are free to use whatever portions and combinations of food they wish to meet the nutrition standards. Thus, in theory, NSMP and ANSMP provide more flexibility in menu planning than the two food-based systems while, at the same time, providing a greater degree of assurance that meals served to students meet nutrition standards.

Finally, schools may use any other reasonable approach to menu planning, which may include specific modifications to the food-based menu planning guidelines (outlined in program regulations) as well as more major modifications to any of the available menu planning systems. State agencies may establish guidelines for using a modified approach to menu planning and may require that SFAs receive prior approval before implementing such a system.

SFAs that elect to use either of the food-based systems (the traditional food-based menu planning system or the enhanced food-based system defined in the final SMI rule) or an alternative approach to menu planning are not required to analyze the nutrient content of planned menus. They are, however, expected to meet the nutrition standards defined under SMI. All school districts must undergo a mandatory SMI review every five years. As part of this process, State agency staff must analyze a representative weekly menu and compare results of the analysis to the nutrition standards.

### **Weighted and Unweighted Nutrient Analyses (Meals as Served versus Meals as Offered)**

Current NSLP and SBP menu planning requirements and monitoring standards are built around use of a weighted nutrient analysis of meals served over the course of a week.<sup>2</sup> A *weighted* nutrient analysis incorporates information about student selection patterns and does not assume that every student takes one serving of every type of food offered. In the analysis, greater weight is given to the foods that are served/selected more frequently. This approach provides a picture of the *average meal served* to or *selected* by students. The nutrient analysis software systems approved by FNS for use in implementing NSMP or ANSMP (or for use by States in monitoring SFAs using other menu planning options) perform weighted nutrient analyses. To complete an analysis, users must specify not only the types of foods offered and the associated portion sizes, but the total number of reimbursable meals served and the number of servings of each food served in those meals.

In contrast, an *unweighted* nutrient analysis does not consider the relative frequency with which different types of food are served/selected. The analysis constitutes a simple average of all foods offered. An unweighted nutrient analysis provides a picture of the *average meal offered* to students. The principal difference between the two analytic approaches is that a weighted analysis reflects student choices, a factor which school food service programs may influence but can not control.

Prior to SMI, assessments of the nutrient content of school meals were typically based on an unweighted analysis. The SNDA-I study used an unweighted nutrient analysis. In this study, both weighted and unweighted analyses were conducted. To permit comparisons between the SNDA-I and SNDA-II

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2 The CN Reauthorization Act of 1998 (P.L. 105-336) waived the weighted analysis requirement through September 2003 for school districts that obtain a waiver from their State agency.

studies, the methodology used in this study for the unweighted analysis was modeled after the approach used in SNDA-I.

## Overview of the SNDA-II Study

The primary goal of the SNDA-II study was to provide information on how schools are progressing, in the early stages of SMI, toward meeting SMI standards. The study also provides current information about menu planning practices used in school food service programs and about related program operations issues.

The study produced national cross-sectional estimates of the nutrient composition of USDA meals served in elementary and secondary schools in SY 1998-99. The study focused exclusively on public schools, which account for roughly 90 percent of all institutional NSLP participants. The study design included separate nationally representative probability samples of public SFAs, public elementary schools, public middle schools, and public high schools participating in the NSLP. Study results are generalizable to public SFAs and public schools nationwide but not to the entire NSLP. For ease of presentation, the unrestricted terms “school” and “SFA” are used throughout this report in exhibit titles and most text discussions. Chapter titles and selected section titles, exhibit footnotes, and discussions remind the reader that the study focused on public schools.

FNS defined nine research objectives for the SNDA-II study:

- Determine the average nutrient composition of USDA meals currently served to students during a typical school week in elementary and secondary schools.
- Determine whether the average nutrient composition of meals differs depending on the menu planning option used.
- Determine the current availability and nutrient content of low-fat meals (meals that provide no more than 30 percent of calories from fat).
- Determine the major food sources of calories and key nutrients in breakfast and lunch meals.
- Examine the number of food choices offered to students participating in the NSLP and/or SBP on a daily basis.
- Examine the variety of foods offered in NSLP lunches and SBP breakfasts and identify foods that are offered most frequently.
- Determine the type of alternative food sources available to students who do not eat the NSLP lunch or SBP breakfast or bring food from home, and the types of food offered through these channels.
- Determine the changes in the nutrient composition of NSLP and SBP meals since SY 1991–92, when the SNDA-I study was conducted.

- Determine whether conclusions about the nutrient composition of school meals differs depending on whether the nutrient analysis is weighted or unweighted.

The data collection approach specified by FNS was a mail survey of cafeteria managers and a telephone survey of SFA directors. The mail survey of cafeteria managers was the primary data collection vehicle and is the source of most of the data included in this report. The telephone survey of SFA directors provided supplementary information on district characteristics and selected school-level characteristics (e.g., enrollment, number of students approved for free and reduced-price meals, and menu planning practices).

The following paragraphs provide a brief overview of the study's design and data collection approach. Appendix D provides detailed information on the design of the study sample, recruitment of SFAs and schools, data collection activities, and the final disposition of the various samples.

## **Respondents and Data Collection Instruments**

Data were collected from cafeteria managers in sampled schools (or other respondents designated by SFA directors) and from SFA directors. Cafeteria managers were asked to complete a written menu survey that provided information on the foods offered to students as well as the number of servings of each food that was actually served to students. Cafeteria managers also provided information on local school food service operations, including the availability of *a la carte* foods and other non-USDA meal options. SFA directors were interviewed by telephone and provided information on menu planning practices, enrollment, numbers of students approved for free and reduced-price meals, and district-level food service operations.

A total of 1,075 cafeteria managers completed the menu survey and 430 SFA directors completed the telephone interview. Response rates among cafeteria managers and SFA directors who agreed to participate in the study were 87.8 percent for the menu survey and 90.1 percent for the SFA director interview. Detailed information on sample design, response rates, and calculation of sample weights is provided in Appendix D.

### ***Mail Survey of Cafeteria Managers***

Cafeteria managers were asked to complete a menu survey which requested detailed information on all foods offered during a specified five-day period (referred to as the target week).<sup>3</sup> Target weeks were initially spread between late September and mid-December 1998. However, because some schools were unable to complete the survey during that time period, data collection was extended through May 1999 for schools that needed additional time. All respondents provided data for lunches served during a single week. Respondents whose schools participated in the SBP were also asked to provide information for breakfasts served during the same week.

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3 To obtain a reasonable assessment of nutrient content, it is necessary to examine meals offered over a period of time rather than a single meal. The National Research Council (NRC) recommends that group feeding programs plan menus so that nutrient standards are met over a five- to 10-day period. A sample five-day period, equivalent to a full week in most school districts, is routinely used in USDA-sponsored evaluations of Child Nutrition programs. SMI requirements specify that analyses be based on a typical school week, ranging from three to seven days.

Respondents were asked to list all *reimbursable* menu items offered and to provide a complete description of each item, including manufacturer and brand names and, where available, product codes. For items not included in the nutrient data base used in the analysis, respondents were asked to provide labels, summaries of product nutrition information, and/or manufacturers' names and addresses. Complete recipes were requested for all items that were prepared by combining two or more foods or ingredients.

In addition to item descriptions and recipes, respondents were asked to describe the portions served including, if applicable, different portions for different grade/age groups. Finally, respondents were asked to report, for each menu item, the total number of portions served in *reimbursable meals* (i.e., exclusive of portions sold *a la carte* and portions sold to teachers or other adults).

Because SNDA-II data were to be compared to data from SNDA-I, every effort was made to make the data collection approach as comparable as possible to the approach used in SNDA-I. With the exception of meal production information (i.e., information on the number of portions served), the data elements collected in the two studies were identical. The format of menu survey materials was enhanced, however, to address difficulties encountered during SNDA-I.<sup>4</sup> The menu survey was presented in an easy-to-use booklet format with a separate section for each day of the week and separate sections for breakfast and lunch. Respondents also received a user-friendly instruction manual and several supporting response aids that offered guidance on describing foods and providing food package labels. Survey materials were designed with colored paper, colored ink, tabs, and lamination so that materials were attractive, organized, and easy to understand. In addition to response aids, a toll-free technical assistance number was provided and respondents were encouraged to call with any questions.

Survey materials were mailed to respondents at least two weeks prior to the start of the target week. SFA directors were encouraged to bring all school-level respondents together to review materials, plan for the data collection, and avoid unnecessary duplication of effort. Each cafeteria manager received at least two follow-up contacts — one the week before the target week and one early in the target week — to ensure receipt and completion of survey materials and to provide technical assistance as needed.

In addition to the menu survey, respondents were asked to complete three other brief instruments, all of which were bound into the same data collection booklet as the menu survey and were addressed in the accompanying instruction manual. These instruments included:

- **Daily Meal Counts Form:** A form used to record the number of reimbursable meals served each day during the target week, by reimbursement category (free, reduced-price, paid).
- **Meal Service Questionnaire:** A brief survey that obtained information about local school food service operations, including prices charged for reduced- and full-price meals, types of meal service offered (e.g., hot meals, salad bars, etc.), and availability of vending machines and other alternative sources of food.

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4 In SNDA-I approximately 40 percent of participating schools provided information through a mail survey. Data for the remaining 60 percent of schools were collected by field staff using the same forms used in the mail survey.

- *A la Carte* Foods Checklist: A simple checklist of items potentially offered on an *a la carte* basis. Respondents were asked to complete the checklist one day (randomly assigned) during the target week. The form used was provided by FNS and was identical to the one used in SNDA-I.

Because some respondents completed only the menu survey or only some of these additional instruments, the number of respondents for each instrument varied and response rates were somewhat lower than for the menu survey (see Appendix D).

### ***Telephone Interview of SFA Directors***

SFA directors were interviewed by telephone between September 1998 and March 1999. A few directors who proved to be extremely difficult to reach completed the interview by mail during the summer or fall of 1999. The interview took approximately 20 minutes to complete and collected information for sampled schools in the SFA as well as for the district as a whole. Topics covered for the sampled schools included enrollment, number of students approved for free and reduced-price meals, menu planning practices, access to and use of a computer for nutrient analysis, use of USDA technical assistance materials, and use of foods from commercial vendors (e.g., McDonald's, Taco Bell, Pizza Hut and others). Topics addressed at the district level included use of food service management companies (FSMCs) and food purchasing cooperatives and methods used to set prices for reimbursable meals and *a la carte* foods.

### **Standards Used to Evaluate Nutrient Content**

Two sets of standards were used to evaluate the nutrient content of NSLP and SBP meals (Exhibit 1.2). The first set is comprised of SMI nutrition standards, as defined in current NSLP and SBP regulations. These include standards for calories and target nutrients for which RDAs have been established (protein, vitamin A, vitamin C, calcium, and iron) as well as for the percentage of calories from fat and saturated fat.<sup>5</sup>

A second set of standards, based on recommendations in the National Research Council's (NRC) *Diet and Health* report, was defined for nutrients and food components that are analyzed by NSMP software but are not quantified in SMI nutrition standards (National Research Council 1989a). These include the percentage of calories from carbohydrate as well as total cholesterol and sodium content.<sup>6</sup> NRC recommendations for sodium and cholesterol define suggested maximums for daily intake. For this report, these daily standards were adapted to create meal-specific recommendations. Recommendations for lunch reflect one-third of the suggested daily maximum and recommendations for breakfast reflect one-fourth of the daily maximum. *It is important to recognize that schools are not required to meet these additional standards. They are used in this report solely to facilitate understanding of the data.*

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5 The RDAs are currently being replaced with new standards — Dietary Reference Intakes (DRIs). These standards were not used in this analysis because they have not yet been incorporated into NSLP or SBP regulations.

6 NSMP software also analyzes fiber. These data were not included in this report, however, because neither the *Dietary Guidelines* nor the NRC's *Diet and Health* report provide a quantitative recommendation for fiber intake.

## Exhibit 1.2

### Nutrition Standards Used in Evaluating School Meals

Nutrient	Standard
<b>Nutrition Standards Defined in NSLP and SBP Regulations</b>	
<b>Calories and nutrients with established Recommended Dietary Allowances (RDAs)<sup>1</sup>:</b>	
Calories, protein, vitamin A, vitamin C, calcium, and iron	<b>Breakfast:</b> One-fourth of the RDA <b>Lunch:</b> One-third of the RDA
<b>Nutrients included in the <i>Dietary Guidelines for Americans</i><sup>2</sup>:</b>	
	<b>Breakfast and Lunch:</b>
Total fat	≤ 30% of total calories
Saturated fat	< 10% of total calories
<b>National Research Council <i>Diet and Health</i> Recommendations<sup>3</sup></b>	
Carbohydrate	<b>Breakfast and Lunch:</b> > 55% of total calories
Cholesterol	<b>Breakfast:</b> ≤ 75 mg <b>Lunch:</b> ≤ 100 mg
Sodium	<b>Breakfast:</b> ≤ 600 mg <b>Lunch:</b> ≤ 800 mg

<sup>1</sup> National Research Council (1989). *Recommended Dietary Allowances*, 10th edition. Washington, DC: National Academy Press.

<sup>2</sup> U.S. Departments of Health and Human Services and Agriculture (1990). *Nutrition and Your Health: Dietary Guidelines for Americans*, 3rd edition. Washington, DC: U.S. Government Printing Office.

<sup>3</sup> National Research Council (1989). *Diet and Health*. Washington, DC: National Academy Press. Standards used for cholesterol and sodium are adapted from recommendations for maximum daily intake.

### Comparison with SNDA-I Data

The SNDA-I study collected data in SY 1991–92. SNDA-II provides an updated picture of the nutrient content of school meals offered in SY 1998–99. It was not possible, however, to directly compare SNDA-I and SNDA-II data for several reasons. First, SNDA-I was based on an *unweighted nutrient analysis* (reflecting the average meal offered to students) and SNDA-II used a *weighted analysis* (reflecting the average meal served to students). Second, SNDA-I included both public and private schools while SNDA-II was limited to public schools. Third, because recent changes in program regulations had to be incorporated into the SNDA-II analysis, SNDA-I and SNDA-II handled comparisons to RDA standards in different ways. SNDA-I compared mean nutrient values for meals offered in each school type to all age- and gender-appropriate RDAs. Current regulations define minimum nutrition standards for meals served to children in various grade groups and encourage schools

to define their own standards based on the age range of enrolled students. SNDA-II used RDA standards based on the grade configuration of each school.

To permit a comparison of SNDA-I and SNDA-II data, both data sets had to be reanalyzed. SNDA-I data were reanalyzed limiting the sample to public schools. SNDA-II data were reanalyzed using an unweighted nutrient analysis modeled after the analysis completed in SNDA-I. (Data that would be needed to complete a weighted analysis of the SNDA-I data are not available.) The methodology used in the unweighted analysis of SNDA-II data was comparable to the methodology used in SNDA-I, with the exception of slight modifications made to reflect current program emphasis on increased use of breads, grains, and fruits and vegetables. The methodology used in both weighted and unweighted nutrient analyses is described in detail in Appendix E.

Finally, to obtain a uniform basis of comparison for calories and RDA nutrients, both SNDA-I and SNDA-II data were compared to minimum standards defined for elementary schools (grades K-6) and secondary schools (grades 7-12) in current program regulations (Exhibit 1.3). Minimum standards for breakfast are defined for grades K-12 and cover all types of schools. An optional set of standards for grades 7-12 has also been defined.<sup>7</sup>

Differences noted between SNDA-I (SY 1991–92) and SNDA-II (SY 1998–99) can not be attributed to any one factor. Factors that may contribute to observed differences include changes in the food supply over time (e.g., the introduction of new products and changes in product formulations in both USDA commodity foods and foods available in the quantity food service market), as well as changes in menu planning, food purchasing, and food preparation practices of school food service personnel. Differences in data collection methodology (data for all schools in SNDA-II were collected via a mail survey while data for more than half of the SNDA-I schools were collected on site) and/or in the nutrient data bases used in the two studies may also contribute to observed differences.

## Organization of this Report

The remaining six chapters in this report present the following information:

- Chapter Two describes characteristics of school food service program operations.
- Chapters Three and Four describe, respectively, the average nutrient content of lunches and breakfasts served in school meals programs in SY 1998-99.
- Chapter Five compares results of weighted and unweighted analyses.
- Chapter Six compares results of the current study with findings from the SNDA-I study.

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7 Program regulations define slightly different grade groups for the traditional food-based menu planning system (K-3 and 4-12), based on the groupings used in that system's meal pattern. However, schools are permitted to use the nutrition standards defined for grades K-6 and 7-12.



### Exhibit 1.3

#### Minimum Nutrition Standards Defined in Current NSLP and SBP Regulations

<b>Grade Groupings</b>		
<b>Lunch</b>	<b>Grades K-6</b>	<b>Grades 7-12</b>
Calories	664	825
Protein (gm)	10	16
Vitamin A (mcg RE)	224	300
Vitamin C (mg)	15	18
Calcium (mg)	286	400
Iron (mg)	3.5	4.5
<b>Breakfast</b>	<b>Grades K-12 (minimum)</b>	<b>Grades 7-12 (optional)</b>
Calories	554	618
Protein (gm)	10	12
Vitamin A (mcg RE)	197	225
Vitamin C (mg)	13	14
Calcium (mg)	257	300
Iron (mg)	3.0	3.4

Note: Standards used for other nutrients are identical for both SNDA-I and SNDA-II and are based on NSLP/SBP standards (percent of calories from fat and saturated fat) and NRC recommendations (percent of calories from carbohydrate, total cholesterol, and total sodium).

Appendices provide supplementary exhibits (Appendices A and B) as well as detailed information on study implementation (Appendix C); study design, response rates, and sample weights (Appendix D); and methodologies used in analyzing the menu survey data (Appendix E).

# Chapter Two

## Characteristics of Food Service Programs in Public NSLP Schools

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This chapter describes selected characteristics of school food service programs in public schools that offered the NSLP in SY 1998–99. Topics covered include the availability of the SBP and other breakfast programs, the percentage of students approved for free and reduced-price meal benefits, student participation rates, meal prices, menu planning practices, types of meals offered and alternative sources of food available to students who do not eat NSLP or SBP meals.

The data summarized in this chapter come from two different sources: the telephone interview of SFA directors — which provided information on both SFA- and school-level characteristics — and non-menu-survey portions of the mail survey of cafeteria managers (see Appendix C). A total of 430 SFA directors completed the telephone interview. These completed interviews provided information for a total of 1,109 schools. In addition, non-menu-survey portions of the mail survey were completed by 1,036 cafeteria managers. Both of these data sets were weighted to produce estimates that are nationally representative for public elementary schools, middle schools, and high schools that participated in the NSLP in SY 1998–99 (see Appendix D). Footnotes at the bottom of each exhibit clearly identify the data source(s). Unweighted sample sizes vary depending on the data source(s) used in the exhibit.

### School-Level Participation in the SBP

According to FNS administrative data, approximately 54 percent of public NSLP schools offered the SBP in SY 1991–92 — the time at which data were collected for the first SNDA study (USDA, FNS 1992). In the intervening years, school participation in the SBP has increased dramatically. Data from the present study indicate that more than three quarters of all public NSLP schools offered the SBP in SY 1998–99 (Exhibit 2.1). Participation was slightly higher among elementary schools than middle schools or high schools (78% vs. 75% and 73%, respectively).

Ten percent of schools offered a non-USDA breakfast program or a morning snack program. These non-USDA programs were more common in high schools (19%) than in middle schools (11%) or elementary schools (7%). Overall, 20 percent of public NSLP schools offered neither the SBP nor any other breakfast or morning snack program.

### Percentage of Students Approved for Meal Benefits

Participation in the NSLP and SBP is open to all students in participating schools. Students from low-income families are eligible to receive meals free of charge or at a reduced price. In SY 1998–99,

**Exhibit 2.1**

**Types of Breakfast Programs Offered by Public NSLP Schools**

	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
<b>Type of Breakfast Program</b>	<b>Percentage of Schools</b>			
USDA School Breakfast Program	78%	75%	73%	76%
Non-USDA program <sup>1</sup>	7	11	19	10
No breakfast program	21	21	19	20
Number of Schools (Unweighted)	385	325	326	1,036

<sup>1</sup> Includes morning snack programs or any non-USDA programs that provide food to students in the morning after they arrive at school.

Note: Percentages do not sum to 100 because some schools reported offering both the SBP and a morning snack program.

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.

one-third of students enrolled in public NSLP schools were approved for free meal benefits (Exhibit 2.2). Another eight percent were approved for reduced-price meals. The percentage of students approved for free and reduced-price meal benefits was higher in elementary schools (45%) than in middle schools (38%) or high schools (30%).

Among schools that offered the SBP, the percentage of students approved for free meal benefits was consistently greater than for NSLP schools overall. In SBP schools, 38 percent of students were approved for free meal benefits. The percentage of students approved for reduced-price benefits — nine percent — was comparable to the rate for all NSLP schools. As noted for all NSLP schools, the relative rate of approval for free or reduced-price meal benefits in SBP schools was greater in elementary schools (50%) than in middle schools (43%) or high schools (35%).

## **Participation in the NSLP and SBP**

On an average day during the target week for the study, approximately 60 percent of all students in NSLP schools received an NSLP lunch (Exhibit 2.3). Participation varied by type of school, with participation being highest in elementary schools — 67 percent, on average — and lowest in high schools (39%). Participation also varied by receipt of meal benefits. Students approved to receive free lunches participated at a higher rate (80% overall) than either students approved to receive reduced-price lunches (69%) or students who paid full price (48%). Within each meal benefit category, elementary school students participated at higher rates than middle school or high school students.

Overall rates of student participation were notably lower for the SBP; however, the patterns of participation — the highest rates being in elementary schools and among students approved for free meal benefits and lowest rates being in high schools and among students who pay full price — were similar to the NSLP. In schools offering the SBP, 22 percent of all students received an SBP breakfast on an average day during the target week. Participation was considerably higher (39%) among students approved for free meals. This was especially true in elementary schools where, on average, 44 percent of students approved for free meals received an SBP breakfast.

### **Distribution of Free, Reduced-Price and Paid Meals**

During a typical week in SY 1998–99, 42 percent of reimbursable lunches served in public NSLP schools were served free of charge (Exhibit 2.4). Nine percent were served to students approved for reduced-price meals and the remaining 49 percent were served to students who paid full price. The distribution of meals served in the SBP was substantially different. The vast majority of breakfasts (71% overall) were served free of charge and only one in five breakfasts was served at full price.

**Exhibit 2.2**

**Approval for NSLP and SBP Meal Benefits**

<b>Program/Type of Meal Benefit</b>	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
	<b>Average Percentage of Students</b>			
<b>NSLP</b>				
Approved for free meals	36%	30%	24%	33%
Approved for reduced-price meals	9	8	6	8
Not approved for meal benefits <sup>1</sup>	55	62	70	59
Number of Schools (Unweighted)	409	349	351	1,109
<b>SBP</b>				
Approved for free meals	41%	35%	29%	38%
Approved for reduced-price meals	9	8	6	9
Not approved for meal benefits <sup>1</sup>	49	57	65	53
Number of Schools (Unweighted)	332	258	263	853

<sup>1</sup> Students pay full price for NSLP or SBP meals.

Source: Weighted tabulations of data from a telephone interview with public SFA directors, Fall 1998 - Spring 1999.

**Exhibit 2.3**

**Student Participation in the NSLP and SBP During the Target Week**

<b>Program/Benefit Eligibility Category</b>	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
	<b>Average Student Participation Rates</b>			
<b>NSLP</b>				
All students	67%	52%	39%	60%
Students approved for free lunches	86	75	62	80
Students approved for reduced-price lunches	76	63	52	69
Students not approved for meal benefits <sup>1</sup>	56	39	31	48
Number of Schools (Unweighted)	375	316	319	1,010
<b>SBP</b>				
All students	26%	16%	11%	22%
Students approved for free breakfasts	44	32	25	39
Students approved for reduced-price breakfasts	24	14	12	20
Students not approved for meal benefits <sup>1</sup>	10	5	4	8
Number of Schools (Unweighted)	309	236	241	786

<sup>1</sup> Students pay full price for NSLP or SBP meals.

Notes: Student participation rates reflect the average percentage of students in each category who actually received an NSLP or SBP meal during the target week. Calculations are based on the average number of meals served during the target week, enrollment, and the number of students approved for free or reduced-price meals.

Source: Weighted tabulations of data from telephone interviews with public SFA directors (enrollment and number of students approved for meal benefits) and a mail survey of public school cafeteria managers (number and type of meals served during the target week), Fall 1998 - Spring 1999. Exhibit includes only schools that appeared in both data sets.

**Exhibit 2.4**

**Distribution of Free, Reduced-Price and Full-Price Meals During the Target Week**

	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
<b>Program/Type of Meal</b>	<b>Average Percentage of Daily Meals</b>			
<b>NSLP</b>				
Free lunches	42%	44%	39%	42%
Reduced-price lunches	10	10	7	9
Full-price lunches	49	47	53	49
Number of Schools (Unweighted)	385	325	326	1,036
<b>SBP</b>				
Free breakfasts	71%	74%	68%	71%
Reduced-price breakfasts	9	8	8	9
Full-price breakfasts	20	17	25	20
Number of Schools (Unweighted)	317	245	246	808

Note: Due to rounding, percentages may not sum to 100.

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.

## Meal Prices

SFA directors were asked about strategies used to set prices for USDA-reimbursable meals. Two specific strategies — actual pricing method and food cost percentage markup — were asked about directly. SFA directors were also asked to describe any other pricing methods they used. Sixty percent of SFA directors reported using an actual pricing method to determine prices charged for reimbursable meals (Exhibit 2.5). Actual pricing involves determination of all costs incurred in preparing meals, including both food costs and labor costs. Use of a food cost percentage markup was much less common, reported by only 16 percent of SFA directors.

Five percent of SFA directors reported using other pricing methods. The only single method reported by more than one percent of respondents (2%), however, was a market comparison, or setting prices based on what schools in surrounding districts are charging. Roughly 15 percent of SFA directors were unable to answer questions about meal pricing strategies.<sup>1</sup> Reasons for lack of knowledge included lack of involvement (e.g., prices are set by school board or food service management company) and being new to the job.

SFA directors were also asked whether meal price adjustments were implemented only when needed to offset financial losses. Responses indicate that about half of the SFAs offering the NSLP followed such a policy in SY 1998–99. Another 40 percent of SFAs did not limit price adjustments in this way. The policy for resetting meal prices was unclear in 10 percent of SFAs.

### NSLP Meal Prices

Federal regulations stipulate that schools may charge no more than \$0.40 for a reduced-price lunch. No limitations are set on prices for full-price meals. In SY 1998–99, the average price for a reduced-price lunch was \$0.38, with no variation by type of school (Exhibit 2.6). A small number of schools (a total of 18 in the unweighted sample) served lunches free of charge to students approved for reduced-price meals.<sup>2</sup> Among schools that charged for reduced-price lunches, the minimum price was \$0.18 and the maximum was the federally set maximum of \$0.40.<sup>3</sup> Because the federally set maximum for a reduced-price lunch has not changed over the years, the average price charged for a reduced-price lunch has remained essentially constant since the SNDA-I study.

The average price charged for a standard full-price lunch in SY 1998–99, across all school types, was \$1.35. Average prices were \$0.14 higher in middle schools and high schools than in elementary schools (\$1.44 versus \$1.30). A few schools (three in the unweighted sample) served lunches free of charge to all

- 
- 1 A small number of SFA directors were able to definitively answer no to the question about use of a percentage markup, but were not sure about use of an actual pricing method.
  - 2 Under a special assistance certification and reimbursement provision (provision 2) (7CFR245.9), schools may elect to serve meals free of charge to all students provided that non-Federal resources are used to cover the cost of meals served to ineligible children. Schools operating under this provision are not required to certify students for meal benefits for up to three years after an initial assessment and claim reimbursement based on approved claiming percentages.
  - 3 When zeros are excluded from calculation of average prices, means are roughly \$0.01 higher.



**Exhibit 2.5**

**Methods Used to Set Prices for USDA-Reimbursable Meals**

<b>Methods</b>	<b>Percentage of SFAs</b>
<b>Actual pricing method<sup>1</sup></b>	
Yes	60%
No	26
Don't know	15
<b>Food cost percentage markup<sup>2</sup></b>	
Yes	16
No	70
Don't know	13
<b>Reset prices only to offset financial loss</b>	
Yes	51
No	40
Don't know	10
Number of SFAs (Unweighted)	430

<sup>1</sup> Prices are determined by considering all costs of buying, producing, and serving meals.

<sup>2</sup> Prices are determined by adding the same percentage markup to every food item.

Notes: One percent of SFAs provide all meals free of charge.  
Sections may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from a telephone interview with public SFA directors, Fall 1998 - Spring 1999.

## Exhibit 2.6

### Average Prices for Reduced-Price and Full-Price Lunches

Type of Lunch	Elementary Schools	Middle Schools	High Schools	All Schools
<b>Price for Reduced-Price Lunches</b>				
Mean	\$0.38	\$0.38	\$0.38	\$0.38
Minimum (excluding zeroes)	0.18	0.20	0.18	0.18
Maximum	0.40	0.40	0.40	0.40
<b>Price for Standard Full-Price Lunch</b>				
Mean	\$1.30	\$1.44	\$1.44	\$1.35
Minimum (excluding zeroes)	0.50	0.65	0.50	0.50
Maximum	2.10	2.35	2.35	2.35
Number of Schools (Unweighted)	369	317	320	1,006

Notes: Data based on schools that reported serving reduced-price or paid lunches (some schools served only free lunches) and provided information on meal prices.

Two percent of schools served lunches free of charge to students who were approved for reduced-price meal benefits. Less than one percent of schools served lunches free of charge to all students. Such meals were reported as reduced-price or full-price, in keeping with program regulations, but the price charged to students was reported as zero.

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.

students, including students who were not eligible for free or reduced-price meal benefits.<sup>4</sup> Excluding these schools, the minimum price for a standard full-price lunch was \$0.50 and the maximum was \$2.35.<sup>5</sup> Overall, prices charged for full-price lunches have increased about 18 percent since SY 1991–92 (\$1.35 vs. \$1.14).

A large majority of cafeteria managers (87%) reported use of a single price for full-price lunches (Exhibit 2.7). However, eight percent of cafeteria managers reported offering some full-price lunches at a price *higher* than the standard price and six percent reported offering some full-price lunches at a price *lower* than the standard price. Use of alternative prices for full-price lunches was most common in high schools.

Among schools that reported use of higher prices for some full-price lunches, the most common reason was use of a higher price for older students; however, this policy was largely limited to elementary schools. Among high schools, higher prices were most commonly used for special entrees, special sandwiches or pizza. In addition, some high schools and middle schools charged higher prices for salad bars or other food bars and for larger portions. Relative to the basic or standard full-price lunch, the average price increment for higher-priced lunches was \$0.17 for elementary schools, \$0.39 for middle schools, and \$0.56 for high schools.

The principal reason for use of a lower price for some full-price lunches was, in all types of schools, use of weekly or monthly discounts. On average, lower-priced lunches cost \$0.13 less than a standard full-price lunch. The size of the price differential varied by school type and ranged from -\$0.11 for elementary schools to -\$0.18 for high schools.

### **Relationship Between Meal Price and Participation Rates Among Full-Price Students**

Exhibit 2.8 shows NSLP participation rates among students not approved for free or reduced-price meal benefits (i.e., students who pay full price) based on the standard price charged for a full-price lunch. As shown, participation rates in all types of schools were inversely related to meal price. The decrease in participation with increase in meal price was most pronounced in elementary schools, where there was a 23-percentage-point difference in average full-price participation in schools with the lowest and highest meal prices. The differences for middle and high schools were 14 and 18 percentage points, respectively.

While these data document a negative relationship between meal price and student participation, they do not prove that higher meal prices, in and of themselves, *cause* lower rates of participation among students who pay full price for NSLP meals. Many other factors, including the type of community (rural, urban, suburban), geographic location, the relative wealth of the community, student acceptance of NSLP meals, and the availability of *a la carte* foods or meals may affect both student participation rates and meal prices.

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4 Under a special assistance certification and reimbursement provision (provision 2) (7CFR245.9), schools may elect to serve meals free of charge to all students provided that non-Federal resources are used to cover the cost of meals served to ineligible children. Schools operating under this provision are not required to certify students for meal benefits for up to three years after an initial assessment and claim reimbursement based on approved claiming percentages.

5 When zeros are excluded from calculation of average prices, means are roughly \$0.01 higher.

**Exhibit 2.7**

**Use of Multiple Prices for Full-Price Lunches**

	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
	<b>Percentage of Schools</b>			
<b>Use of Multiple Prices for Full-Price Lunches</b>				
Use one price for all full-price lunches	87%	91%	81%	87%
Use one or more higher prices	8	5	10	8
Use one or more lower prices	5	4	9	6
<b>Reasons for Higher Prices<sup>1</sup></b>				
Special entree, sandwich, or pizza	1	29	42	14
Salad bar or other food bar	7	31	26	14
Larger portions	13	34	21	17
Higher prices for higher grades	59	21	0	40
Other	21	5	23	19
<i>Mean difference in price</i>	+\$0.17	+\$0.39	+\$0.56	+\$0.29
<b>Reasons for Lower Prices<sup>1</sup></b>				
Monthly/weekly discounts	75	93	63	74
Lower prices for lower grades	9	2	19	11
Other	16	5	25	17
<i>Mean difference in price</i>	-\$0.11	-\$0.08	-\$0.18	-\$0.13
Number of Schools (Unweighted)	369	317	320	1,006

<sup>1</sup> Base sample includes only schools that reported using higher (or lower) meal prices. Due to small sample sizes, results must be interpreted with caution.

Notes: Exhibit includes only schools that reported serving full-price meals and provided information on meal prices.

Column sections may not sum to 100 percent because of rounding and because respondents could provide more than one reason for higher/lower prices.

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.

## Exhibit 2.8

### Relationship Between Meal Price and Student Participation Rates for Full-Price Lunches

<b>School Level/Price of Full-Price Lunch</b>	<b>Average Full-Price Student Participation Rate</b>
<b>Elementary Schools</b>	
\$1.05 or less	65%
\$1.10 - \$1.25	64
\$1.30 - \$1.45	57
\$1.50 - \$2.10	42
Number of Schools (Unweighted)	343
<b>Middle Schools</b>	
\$1.20 or less	46%
\$1.25 - \$1.45	48
\$1.50 - \$1.55	33
\$1.60 - \$2.35	32
Number of Schools (Unweighted)	288
<b>High Schools</b>	
\$1.20 or less	39%
\$1.25 - \$1.45	34
\$1.50 - \$1.55	30
\$1.60 - \$2.35	21
Number of Schools (Unweighted)	300
<b>All Schools</b>	
\$1.20 or less	61%
\$1.25 - \$1.45	53
\$1.50 - \$1.55	40
\$1.60 - \$2.35	32
Number of Schools (Unweighted)	931

Source: Weighted tabulations of data from a telephone interview with public SFA directors (participation rates) and a mail survey of public school cafeteria managers (meal prices), Fall 1998 - Spring 1999. Exhibit includes only schools that appeared in both data sets.

## SBP Meal Prices

Federal regulations set the maximum price for a reduced-price breakfast at \$0.30. In SY 1998–99, the average price charged for a reduced-price breakfast was \$0.28, with little variation across school types (Exhibit 2.9). Four percent of SBP schools (24 schools in the unweighted sample) reportedly served breakfasts free of charge to students approved for reduced-price meals.<sup>6</sup> Among schools that charged for reduced-price breakfasts, the minimum price was \$0.05 and the maximum was \$0.30. The average price charged for a reduced-price breakfast has remained virtually unchanged since SY 1991–92.

The average price charged for a full-price breakfast was \$0.72 overall, with the average for elementary schools being somewhat lower (\$0.70) and the average for middle and high schools somewhat higher (\$0.75–\$0.76). One percent of SBP schools (eight schools in the unweighted sample) served breakfasts free of charge to all students, including those not eligible for meal benefits.<sup>6</sup> Excluding these schools, the minimum charge for a full-price breakfast was \$0.25 and the maximum was \$1.55.

In comparison to prices charged in SY 1991–92, the average price for a full-price breakfast in SY 1998–99 was about 20 percent higher (\$0.72 vs. \$0.60). The relative size of the increase was greatest for middle schools and high schools (27%–32%) and lowest for elementary schools (15%).

Use of multiple prices for full-price breakfasts was rare, reported by less than one percent of all schools.

## Menu Planning Practices

As discussed in Chapter One, USDA has focused considerable attention in recent years on the nutritional quality of meals served in the NSLP and SBP. The Department’s commitment to incorporating the *Dietary Guidelines for Americans* has been accompanied by a concerted effort to expand menu planning options and to provide schools with technical assistance and needed resources. The SNDA-II study included a series of questions designed to provide Department officials with an up-to-date picture (SY 1998–99) of menu planning practices in NSLP schools. This section summarizes findings from these questions.

### Responsibility for Menu Planning

In almost two-thirds (64%) of all NSLP schools, lunch menus were planned entirely at the district level (Exhibit 2.10). In another 20 percent of schools, school-level staff members were responsible for planning their own lunch menus. Lunch menus for the remaining 16 percent of schools were planned at an associated off-site kitchen (i.e., a base or central kitchen that services the school [6%], a combination of SFA, school and/or off-site kitchen staff [7%], or some other source, including, but not limited to, food service management companies [FSMCs] [3%]).

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6 Under a special assistance certification and reimbursement provision (provision 2) (7CFR245.9), schools may elect to serve meals free of charge to all students provided that non-Federal resources are used to cover the cost of meals served to ineligible children. Schools operating under this provision are not required to certify students for meal benefits for up to three years after an initial assessment and claim reimbursement based on approved claiming percentages.

## Exhibit 2.9

### SBP Meal Prices

Type of Breakfast	Elementary Schools	Middle Schools	High Schools	All Schools
<b>Price for Reduced-Price Breakfast</b>				
Mean	\$0.28	\$0.27	\$0.27	\$0.28
Minimum (excluding zeros)	0.05	0.05	0.05	0.05
Maximum	0.30	0.30	0.30	0.30
<b>Price for Full-Price Breakfast</b>				
Mean	\$0.70	\$0.76	\$0.75	\$0.72
Minimum (excluding zeros)	0.25	0.25	0.25	0.25
Maximum	1.54	1.55	1.55	1.55
Number of Schools (Unweighted)	293	232	234	759

Notes: Exhibit includes only schools that reported serving reduced-price or full-price breakfasts (some schools served only free breakfasts) and that provided data on meal prices.

Four percent of schools served breakfasts free of charge to students who are certified for reduced-price meal benefits. One percent served breakfasts free of charge to all students, including those who are not certified for free meal benefits. Such meals were reported as reduced-price or full-price, in keeping with program regulations, but the price charged to students was zero.

Approximately one percent of schools reported using more than one price for full-price breakfasts.

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.

The prevalence of fully centralized district-level menu planning varied slightly by type of school. Specifically, the proportion of high schools in which lunch menus were planned entirely at the district level was somewhat lower than for middle schools or elementary schools (60% versus 64% and 69%, respectively). In more than one-third of NSLP high schools, lunch menus were planned entirely at the school level (29%) or through a collaborative effort by SFA, school and/or off-site kitchen staff (8%). The same was true for only about 25 percent of elementary schools and middle schools. The general pattern of menu planning responsibility was similar for breakfast menus.

### **Availability and Use of Menu Planning Resources**

SFA directors were asked about the use of specific menu planning resources available from USDA and about the availability and use of other resources at the State and local level. USDA has provided all SFAs with two sets of recipes that are specifically designed to promote consistency with the *Dietary Guidelines for Americans*. This includes an updated version of a long-standing resource — *USDA’s Quantity Recipes for School Food Service* — as well as *USDA’s New School Lunch and Breakfast Recipes . . . A Tool Kit for Healthy School Meals*, a resource developed under USDA’s Team Nutrition initiative. The data indicate that schools are using both of these resources (Exhibit 2.11). According to SFA directors, SY 1998–99 menus planned for roughly nine out of 10 NSLP schools used the updated *Quantity Recipes for School Food Service*. In addition, menus for more than three-quarters of all schools were planned using the *Tool Kit for Healthy School Meals*. There was little variation in reported use of these resources across school types.

More than 90 percent of all schools used nutrition information provided by their State’s Child Nutrition (CN) agency in planning SY 1998–99 menus (Exhibit 2.11). SFA directors for the six percent of schools where such information was not utilized indicated that the State CN office had not provided nutrition information.

Menu planners in about two-thirds of all schools had access to a computer-based system for menu planning (Exhibit 2.11). Menu planners in half of all schools used a computerized system to analyze the nutrient content of menus. As discussed in a subsequent section, use of a computerized system to analyze nutrient content of planned menus was not limited to schools where NSMP or ANSMP were in use. Menu planners for non-NSMP/ANSMP schools may be using nutrient analysis software to monitor the nutrient content of menus planned using one of the food-based menu planning options (menu planning options used in NSLP schools are discussed in the next section).

Finally, 58 percent of all NSLP schools used a nutrition specialist to plan menus in SY 1998–99. Thirty-one percent of schools reported using a nutritionist who was not a registered dietitian; 15 percent used a registered dietitian; and 12 percent reported using both a nutritionist and a registered dietitian.

### **Menu Planning Options Selected by Schools**

As described in Chapter One, five different menu planning options are available to schools participating in the NSLP: the traditional food-based menu planning system, the enhanced food-based system, NSMP, ANSMP and “any reasonable approach.”



**Exhibit 2.10**

**Responsibility for Menu Planning**

<b>Menu Type/Locus of Responsibility</b>	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
	<b>Percentage of Schools</b>			
<b>Lunch Menus</b>				
SFA	64%	69%	60%	64%
School	19	14	29	20
Off-site kitchen	8	6	1	6
Combination of above	6	10	8	7
Other/food service management company	3	2	2	3
<b>Number of Schools (Unweighted)</b>	<b>409</b>	<b>349</b>	<b>351</b>	<b>1,109</b>
<b>Breakfast Menus</b>				
SFA	65%	71%	58%	65%
School	20	13	31	21
Off-site kitchen	6	4	1	5
Combination of above	8	10	8	8
Other/food service management company	2	2	1	2
<b>Number of Schools (Unweighted)</b>	<b>332</b>	<b>258</b>	<b>263</b>	<b>853</b>

Note: Columns may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from a telephone interview with public SFA directors, Fall 1998 - Spring 1999.

**Exhibit 2.11**

**Availability and Use of Menu Planning Resources**

Menu Planning Resource	Elementary Schools	Middle Schools	High Schools	All Schools
	Percentage of Schools			
<b>USDA Recipes</b>				
Updated <i>Quantity Recipes for School Food Service</i>	89%	89%	91%	89%
New School Lunch and Breakfast Recipes from <i>A Tool Kit for Healthy School Meals</i>	76	77	79	77
<b>Nutrition Information Provided by State Child Nutrition Agency</b>				
Available and used for menu planning	95	93	92	94
Not available	5	7	8	6
<b>Computer-Based Menu Planning System</b>				
Available	65	69	68	66
Used for nutrient analysis	51	52	48	51
<b>Nutrition Specialist Employed to Plan Menus</b>				
None	43	41	43	42
Nutritionist (not R.D.)	30	32	31	31
Registered dietitian (R.D.)	15	15	17	15
Both nutritionist and R.D.	13	12	9	12
Number of Schools (Unweighted)	409	349	351	1,109

Note: Column sections may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from a telephone interview with public SFA directors, Fall 1998 - Spring 1999.

In SY 1998–99, the food-based menu planning systems were, by far, more common than any of the other menu planning options. Of these, the traditional food-based system — used by 41 percent of all schools — was the leading choice (Exhibit 2.12). Another 28 percent of schools used the enhanced food-based system, bringing the total percentage of schools that used a food-based menu planning approach to 69 percent.

The nutrient-based menu planning options were used by 27 percent of all schools. Most of these schools used NSMP. Use of ANSMP was rare — only three percent of all schools reported this option. A small proportion of schools (4%) reported using some other approach to menu planning. These included state-designed systems (Mississippi, West Virginia, California) or some variation on one of the food-based meal patterns.

It is important to note that reported use of NSMP or ANSMP does not necessarily imply that the computer-based menu planning system was fully implemented at the time data were collected. Previous research has indicated that implementation of NSMP can be a lengthy and challenging process. In a USDA-sponsored demonstration of NSMP, 16 SFAs took anywhere from three to 33 months to implement NSMP, with an average time line of 19 months (Fox 1998).<sup>7</sup>

To gain some insight into characteristics that might influence the choice of menu planning system, data on menu planning options were cross-tabulated with data on selected school characteristics (Exhibit 2.13). In reviewing these data, it is important to recognize several limitations. First, unweighted sample sizes for some cells are small (less than 50 cases). Because of the extremely small sample of ANSMP sites (23 schools in the entire sample), data for NSMP and ANSMP have been combined. Data for the schools that used “other reasonable approaches” are reported separately, for the sake of completeness, but should be interpreted with extreme caution because of the small sample size (38 schools). Second, several of the tabulated characteristics are highly correlated with one another. For example, urban schools tend to have a higher percentage of low-income students than either rural or suburban schools. Thus, the available data do not permit an analysis of causal relationships.

Despite these limitations, the data reveal some interesting patterns regarding the use of the various menu planning options, as summarized below.

- Choice of menu planning system varied by region. Compared to the national distribution of menu planning systems, use of NSMP/ANSMP was disproportionately higher and use of the traditional food-based menu planning system was disproportionately lower in the Mountain Plains and Western regions. In contrast, schools in the Southwest region overwhelmingly used the traditional food-based system. These trends were noted in a majority of states in each region.
- Use of alternative menu planning approaches was most common in the Western region. Many of these schools were in California and may have been using the state-developed *SHAPE* program, an early version of NSMP.

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7 Because another USDA-sponsored study was collecting data on SMI implementation at the time the SNDA-II data were being collected, SNDA-II instruments did not include detailed questions about the process of NSMP/ANSMP implementation.

**Exhibit 2.12**

**Menu Planning Options Used for NSLP Menus**

<b>Menu Planning Option</b>	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
	<b>Percentage of Schools</b>			
Traditional food-based meal pattern	41%	41%	40%	41%
Enhanced food-based menu system	28	30	29	28
Nutrient Standard Menu Planning (NSMP)	25	24	24	24
Assisted Nutrient Standard Menu Planning (ANSMP)	3	2	3	3
Other approach	4	3	5	4
Number of Schools (Unweighted)	409	349	351	1,109

Note: Columns may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from a telephone interview with public SFA directors, Fall 1998 - Spring 1999.

**Exhibit 2.13**

**Menu Planning Options by Selected School Characteristics**

<b>Characteristic</b>	<b>NSMP/ ANSMP</b>	<b>Enhanced Food-Based</b>	<b>Traditional Food-Based</b>	<b>Other</b>	<b>All Options</b>
	<b>Percentage of Schools</b>				
<b>All Schools</b>	27%	28%	41%	4%	100%
<b>FNS Region</b>					
Mid-Atlantic	17	34	49	<1	100
Mountain Plains	49	35	14	2	100
Midwest	20	35	41	4	100
Northeast	35	20	44	1	100
Southeast	19	34	41	6	100
Southwest	20	6	74	0	100
Western	37	29	23	11	100
<b>Community Type</b>					
Urban	33	26	40	2	100
Suburban	23	32	41	4	100
Rural	30	23	41	6	100
<b>Percent of Students Approved for Free Meals</b>					
25 percent or less	29	34	36	1	100
26-50 percent	28	20	45	7	100
51-74 percent	22	28	44	7	100
75 percent or more	20	25	50	5	100
<i>Mean percentage</i>	30	30	36	42	33
<b>Menu Planner Has Access to a Computer-Based System</b>					
Yes	37	25	34	4	100
No <sup>1</sup>	9	34	53	4	100
<b>Registered Dietitian or Nutritionist Plans Menus</b>					
Yes	27	29	40	4	100
No	27	27	41	4	100

**Exhibit 2.13**  
(continued)

	<b>NSMP/ ANSMP</b>	<b>Enhanced Food-Based</b>	<b>Traditional Food-Based</b>	<b>Other</b>	<b>All Options</b>
<b>Characteristic</b>	<b>Percentage of Schools</b>				
<b>Uses Food Service Management Company</b>					
Yes	51	15	34	1	100
No	24	30	42	5	100
<b>Number of Schools (Unweighted)</b>	294	333	444	38	1,109

<sup>1</sup> The nine percent of NSMP/ANSMP schools that reported that menu planners did not have access to a computer were either using ANSMP or were schools in districts that use decentralized menu planning and centralized nutrient analysis. SFA directors who provided information indicated that these menu planners did not have access to a computer at the local level and that nutrient analysis was done at the district level.

Note: No statistical tests were performed to assess the significance of observed differences.  
Rows may not sum to exactly 100 percent because of rounding.

Source: Weighted tabulations of data from a telephone interview with public SFA directors and a mail survey of public school cafeteria managers (data on meal counts needed to calculate participation rates), Fall 1998 - Spring 1999.

- Choice of menu planning system varied somewhat by type of community. Among urban schools, use of NSMP and ANSMP was higher than the national average. The same is true of the enhanced food-based system among suburban schools. Use of the enhanced food-based system was disproportionately lower among rural schools.
- Choice of menu planning system varied by relative level of affluence. Use of the traditional menu planning system was disproportionately higher and use of NSMP/ANSMP was disproportionately lower among the lowest-income schools — those with 75 percent or more of students approved for free or reduced-price meals. The most affluent schools — those with no more than 25 percent of students approved for free-meal benefits — used the enhanced food-based menu system more frequently than schools with smaller concentrations of low-income students.
- Use of NSMP/ANSMP was notably greater among schools that had access to a computer system (at the time data were collected) than among schools that did not have such access. However, access to a computer system did not guarantee use of NSMP/ANSMP. More than 60 percent of schools with reported access to a computerized menu planning system were *not* using NSMP/ANSMP.
- The use of a registered dietitian or nutritionist to plan menus had no apparent association with menu planning option.
- Schools that used FSMCs (12 percent of all schools) used NSMP/ANSMP more often than schools that did not use FSMCs.

### **Nutrient Analysis Procedures In Schools Using NSMP and ANSMP**

For schools in which menus were planned using NSMP or ANSMP, SFA directors provided additional information on selected aspects of the procedures used in conducting nutrient analyses. Information was obtained on the use of combined analyses for breakfast and lunch menus, use of weighted nutrient analyses, the source of data for weighted nutrient analyses and the age/grade groupings used in defining reference nutrient standards.

#### ***Analysis of Breakfast and Lunch Menus***

Federal regulations permit schools implementing NSMP or ANSMP to analyze the nutrient content of lunch and breakfast menus separately or to combine them. The rationale for allowing a combined analysis is that the *Dietary Guidelines* are intended to apply to total daily consumption rather than to individual meals. Regardless, schools are required to weight the nutrient contribution from each meal according to levels of participation in each program.

In SY 1998–99, schools that conducted analyses of both breakfast and lunch menus were more likely to analyze each meal separately than to complete a combined analysis (Exhibit 2.14). Among schools using NSMP or ANSMP, 44 percent completed separate analyses for breakfast and lunch menus and 28 percent completed a combined analysis (Exhibit 2.14). The combined analysis was most common in middle schools (42%) and least common in elementary schools (25%).

**Exhibit 2.14**

**Menu Analysis Procedures Adopted by Schools Using NSMP or ANSMP**

<b>Menu Analysis Procedure</b>	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
	<b>Percentage of NSMP/ANSMP Schools</b>			
<b>Analysis of Breakfast and Lunch Menus</b>				
Analyze breakfast and lunch separately	43%	44%	50%	44%
Complete one combined analysis for breakfast and lunch	25	42	30	28
Analyze lunch only	25	13	18	22
Analyze breakfast only	7	1	1	5
<b>Use Weighted Nutrient Analysis</b>				
Yes	72%	75%	78%	74%
No	28	25	22	26
<b>Source of Data Used for Weighted Nutrient Analysis<sup>1</sup></b>				
Projected servings	67%	64%	69%	67%
Both actual and projected servings	31	21	19	27
Actual servings	3	15	11	6
<b>Number of Schools (Unweighted)</b>	<b>113</b>	<b>92</b>	<b>89</b>	<b>294</b>

<sup>1</sup> Base sample includes only schools that perform a weighted nutrient analysis.

Notes: Exhibit includes only schools that use NSMP or ANSMP.

Column sections may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from telephone interviews with public SFA directors, Fall 1998 - Spring 1999.



### ***Use of Weighted Nutrient Analysis***

NSMP and ANSMP are designed around use of a weighted nutrient analysis. A *weighted analysis* takes into account the number and types of foods actually served to students, giving greater weight to the foods that are served more frequently. As such, results of a weighted nutrient analysis provide a picture of the *average meal served* to or *selected* by students. Regulations require that all schools maintain meal production records to provide the information on food selection patterns needed for a weighted analysis.

An *unweighted analysis* does not consider student selection patterns. The analysis constitutes a simple average of all foods offered to students. An unweighted nutrient analysis provides an assessment of the *average meal offered* to students. Prior to SMI, assessments of the nutrient content of school meals were typically based on unweighted analyses.

During the time data were being collected for this study, regulations were changed to permit use of an unweighted analysis, through SY 2003, for SFAs or schools that obtain a waiver from their State agency (P.L. 105-336). Because this change was implemented after the study was underway, data on the use of waivers were not collected.

In SY 1998–99, roughly three-quarters of the schools reporting use of NSMP or ANSMP were using weighted analyses (Exhibit 2.14). The remainder were conducting unweighted analyses, presumably under a waiver from their State agency. Schools may have been using unweighted rather than weighted analyses because they were still in early stages of NSMP/ANSMP implementation.

Schools are using a variety of approaches to incorporate information on student food selection patterns into their weighted nutrient analyses. Two-thirds of the NSMP/ANSMP schools that performed weighted analysis reported that their analyses were based on projections of the numbers of servings of each food to be served. Another 27 percent of schools reported using projections as well as actual production information (i.e., records of the number of portions actually served). This practice was more common in elementary schools (31%) than in either middle schools (21%) or high schools (19%). Finally, a relatively small percentage of schools (6% overall) indicated that their weighted analyses were based entirely on actual meal production data. This approach was largely used by middle schools and high schools and was rarely used in elementary schools.

### ***Age/Grade Grouping Used in Nutrient Analysis***

Schools using NSMP or ANSMP are afforded several options for developing lunch and breakfast menus that meet minimum nutrient requirements for students of different ages. The nutrition standards against which planned menus are compared (nutrient content averaged over a week) may be based on one of the following:

- **USDA-defined age groups:** 3-6 years; 7-10 years; 11-13 years; and 14 years and older.
- **USDA-defined grade groups:** preschool; kindergarten (K) to grade 6; and grades 7-12.
- **Customized age or grade groups that match the configuration of the school.** USDA guidance suggests that elementary schools with large age/grade spans perform more than one analysis, breaking the analysis at or around grade 6.

The age or grade group defined by a school dictates the calorie and nutrition standards for meals served in that school (Appendix E describes how NSMP software calculates customized RDAs).

Based on SFA director reports, more than 80 percent of all schools using NSMP or ANSMP in SY 1998–99 used grade groups rather than age groups to define nutrition standards (Exhibit 2.15). Moreover, most schools used customized grade or age groups rather than one of the USDA-defined groups. This was true for elementary schools, middle schools, and high schools.

Among elementary schools using NSMP or ANSMP, one-fifth used the USDA-defined grade group of grades K-6 to define nutrition standards. Another seven percent used the USDA-defined age group of ages 7-10. The remaining 73 percent of elementary schools used a customized grade or age group. The most common was the slightly narrower grade group of K-5 (29%). Twenty percent of elementary schools used some other grade span that more closely matched their own grade configuration and nine percent used a customized age span. A total of three percent of elementary schools reported analyzing menus using more than one age or grade group to accurately reflect differing nutritional needs of older and younger students.

The most common age/grade grouping used in analyzing middle school menus was the customized grouping of grades 6-8 (52%). This is consistent with the most common middle school grade configuration. The customized grouping of grades 7 and 8 was a distant second, reported by 16 percent of all middle schools using NSMP or ANSMP. None of the middle schools in the sample reported using the USDA-defined grade grouping of grades 7-12. Eleven percent of middle schools used the USDA-defined age group of ages 11-13.

Finally, among high schools using NSMP or ANSMP, the most common age/grade group used in analyzing menus was the customized grouping of grades 9-12. This grouping, used by roughly six out of ten NSMP/ANSMP high schools, is consistent with the most common grade configuration for high schools. The USDA-defined group of grades 7-12 was used in 15 percent of high schools. Twelve percent of high schools used the USDA-defined age group of 14 years and older.

## **Incorporating the *Dietary Guidelines for Americans* into School Meals and Perceived Impacts on Acceptability and Food Waste**

Since 1995 and the launch of SMI, all SFAs have been expected to make changes, as needed, in menu planning, food purchasing, and food preparation practices to promote consistency with the *Dietary Guidelines*. Cafeteria managers have varying levels of responsibility for designing and implementing these changes, depending on how an SFA is organized, i.e., the level of local vs. centralized planning and decision making. Regardless of their level of direct involvement in planning, cafeteria managers are on the front lines in implementing change and thereby have a unique perspective on how well any given change is accepted by students.

According to cafeteria managers, 87 percent of all NSLP schools had made some changes in lunch menus prior to or during SY 1998–99 in order to incorporate the *Dietary Guidelines for Americans* (Exhibit

**Exhibit 2.15**

**Grade/Age Groupings Used by NSMP and ANSMP Schools  
in Conducting Nutrient Analyses**

<b>School Level/Groupings Used</b>	<b>Percentage of NSMP/ANSMP Schools</b>
<b>Elementary Schools</b>	
<b>Type of Grouping Used</b>	
Grade groups	82%
Age groups	18
<b>Specific Grade/Age Groups Used</b>	
Grades K - 5	29
Grades K - 6 <sup>1</sup>	20
Other grade span	20
Other age span	9
Ages 7 - 10 <sup>1</sup>	7
Grades 1 - 6	6
Two different age groups <sup>2</sup>	2
Two different grade groups <sup>2</sup>	1
One analysis for grades K-8, K-12, or other large grade span	8
<hr/>	
Number of Schools (Unweighted)	113
<hr/>	
<b>Middle Schools</b>	
<b>Type of Grouping Used</b>	
Grade groups	76%
Age groups	24
<b>Specific Grade/Age Groups Used</b>	
Grades 6 - 8	52
Grades 7 - 8	16
Ages 11 - 13 <sup>1</sup>	11
Other grade span	8

**Exhibit 2.15**  
(continued)

<b>School Level/Groupings Used</b>	<b>Percentage of NSMP/ANSMP Schools</b>
<b>Middle Schools (con't)</b>	
Ages 11 - 14	6
Other age span	5
Ages 14 and above <sup>1</sup>	2
Grades 7 - 12 <sup>1</sup>	0
<hr/>	
Number of Schools (Unweighted)	92
<hr/>	
<b>High Schools</b>	
<b>Type of Grouping Used</b>	
Grade groups	84%
Age groups	16
<b>Specific Grade/Age Groups Used</b>	
Grades 9 - 12	59
Grades 7 - 12 <sup>1</sup>	15
Ages 14 and above <sup>1</sup>	12
Other grade span	5
Grades 10 - 12	4
Other age span	4
<hr/>	
Number of Schools (Unweighted)	89
<hr/>	

<sup>1</sup> USDA-defined grade/age grouping.

<sup>2</sup> School completes two separate analyses for younger and older elementary school children.

Notes: Exhibit includes only schools that used NSMP or ANSMP to plan menus.

Column sections may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from telephone interviews with public SFA directors, Fall 1998 - Spring 1999.

2.16). Managers in schools where such changes had been made were asked whether the changes had influenced the acceptability of school lunches.

Results indicate that, in more than eight out of ten schools, attempts to incorporate the *Dietary Guidelines* into lunch menus had neutral or positive impacts on meal acceptability. Forty-three percent of managers in schools where changes had been made to incorporate the *Dietary Guidelines* reported that students liked the new lunches *about the same as* the old lunches. A roughly equivalent proportion (39%) indicated that students liked the new lunches *somewhat better* or *much better* than the old lunches. A much smaller percentage of managers (14%) believed that incorporation of the *Dietary Guidelines* reduced meal acceptability.

The general pattern of responses was comparable across school types. However, compared to elementary school and middle school managers, fewer high school managers reported a positive effect (35% versus 39-40%) and a greater percentage reported no effect or a negative effect (61% versus 55-56%).

Exhibit 2.17 tabulates responses by menu planning option. Results were generally comparable to those reported above and indicate a neutral to positive effect in most schools regardless of the menu planning method used. However, managers in schools using the traditional food-based menu planning system were more likely than other managers to report that the *Dietary Guidelines* had reduced the acceptability of school lunches. Twenty percent of managers in schools using the traditional food-based system believed that students liked the new lunches *somewhat less* or *much less* than the old lunches, compared to 11 percent of managers in schools using the enhanced food-based system or one of the two nutrient-based menu planning options. This result may indicate that it is more difficult to incorporate the *Dietary Guidelines* successfully using the traditional food-based menu planning system. It may also reflect a somewhat more negative attitude toward change among managers who are continuing to use the traditional system.

Cafeteria managers were also asked specifically about the impact of *Dietary Guidelines* changes on the amount of food wasted at lunch. With the exception of cooked vegetables (other than French fries), neutral or *positive* effects (i.e., that students were wasting less food than they had before menus were changed to incorporate the *Dietary Guidelines*) were reported by roughly 85 to 90 percent of managers (Exhibit 2.18). Moreover, for every food group queried, 25 to 40 percent of cafeteria managers, overall, reported reduced food waste.

In general, fewer than ten percent of cafeteria managers reported that students were wasting more food than they had wasted prior to implementation of *Dietary Guidelines* changes. An exception to this rule was noted for cooked vegetables (other than French fries). Nineteen percent of managers reported increased food waste of cooked vegetables.

For some food groups, perceptions about the impact of *Dietary Guidelines* changes on food waste at lunch varied by type of school. Middle school and high school managers reported an increase in the amount of milk wasted more often than elementary school managers. In contrast, elementary school managers reported increased waste of main dishes and breads and decreased waste of desserts more often than middle school managers or high school managers.

**Exhibit 2.16**

**Percentage of Schools Reporting Changes in Lunch Menus to Incorporate the *Dietary Guidelines for Americans* and Perceived Effect on Meal Acceptability**

	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
<b>Percentage of Schools</b>				
<b>Changes Made in Lunch Menus to Incorporate the <i>Dietary Guidelines for Americans</i></b>				
Yes	86%	87%	87%	87%
No	14	13	13	14
Number of Schools (Unweighted)	385	325	326	1,036
<b>Perceived Effect of Changes on Acceptability of Lunches<sup>1</sup></b>				
Students like new lunches <i>much better</i> than old lunches	16%	14%	13%	15%
Students like new lunches <i>somewhat better</i> than old lunches	23	26	22	23
Students like new lunches <i>about the same</i> as old lunches	42	42	44	43
Students like new lunches <i>somewhat less</i> than old lunches	13	11	14	13
Students like new lunches <i>much less</i> than old lunches	1	2	3	1
Don't know	5	5	4	5
Number of Schools (Unweighted)	330	280	285	895

<sup>1</sup> Base sample includes only schools where the respondent indicated that changes had been made in lunch menus to incorporate the *Dietary Guidelines for Americans*.

Note: Columns may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.

**Exhibit 2.17**

**Percentage of Schools Reporting Changes in Lunch Menus to Incorporate the *Dietary Guidelines for Americans*, by Menu Planning Option, and Perceived Effect on Meal Acceptability**

	<b>NSMP/ ANSMP</b>	<b>Enhanced Food-Based</b>	<b>Traditional Food-Based</b>	<b>All Schools</b>
<b>Percentage of Schools</b>				
<b>Changes Made in Lunch Menus to Incorporate the <i>Dietary Guidelines for Americans</i></b>				
Yes	86%	90%	83%	87%
No	14	10	17	14
Number of Schools (Unweighted)	268	314	418	1,036
<b>Perceived Effect of Changes on Acceptability of Lunches<sup>1</sup></b>				
Students like new lunches <i>much better</i> than old lunches	19%	18%	7%	15%
Students like new lunches <i>somewhat better</i> than old lunches	24	22	26	24
Students like new lunches <i>about the same</i> as old lunches	42	45	40	43
Students like new lunches <i>somewhat less</i> than old lunches	10	9	18	13
Students like new lunches <i>much less</i> than old lunches	1	2	2	1
Don't know	4	4	7	5
Number of Schools (Unweighted)	238	279	345	895

<sup>1</sup> Base sample includes only schools in which changes had been made in lunch menus to incorporate the *Dietary Guidelines for Americans*.

Note: Columns may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.

**Exhibit 2.18**

**Perceived Effect of Changes in Lunch Menus on Levels of Food Waste**

	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
<b>Food/Perception of Change in Waste</b>	<b>Percentage of Schools</b>			
<b>Milk</b>				
Students waste more	2%	7%	5%	3%
Students waste less	24	28	24	25
No change	68	58	66	66
Don't know	6	7	5	6
<b>Main Dish/Entree</b>				
Students waste more	10	6	5	8
Students waste less	37	39	33	36
No change	50	48	57	51
Don't know	4	8	6	5
<b>Bread or Bread Alternate</b>				
Students waste more	9	5	5	7
Students waste less	38	40	31	37
No change	51	49	53	52
Don't know	3	6	5	4
<b>Salad/Raw Vegetables</b>				
Students waste more	12	11	7	11
Students waste less	36	36	35	36
No change	48	46	54	49
Don't know	5	7	4	5
<b>Cooked Vegetables (other than French fries)</b>				
Students waste more	18	19	20	19
Students waste less	25	28	23	25
No change	53	47	52	52
Don't know	4	6	4	4
<b>Fruit</b>				
Students waste more	6	7	7	7
Students waste less	42	41	32	40
No change	49	46	58	50
Don't know	2	7	4	3
<b>Desserts</b>				
Students waste more	3	2	1	2
Students waste less	38	30	34	36
No change	54	55	56	54
Don't know	6	13	9	8
Number of Schools (Unweighted)	330	280	285	895

Notes: Exhibit includes only schools in which changes had been made in lunch menus to incorporate the *Dietary Guidelines for Americans*.

Column sections may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.



## Breakfast Menus

A comparable series of questions was asked for breakfast menus. Two-thirds of cafeteria managers in SBP schools reported that changes had been made in breakfast menus to incorporate the *Dietary Guidelines* (Exhibit 2.19). The fact that the prevalence of menu change was lower for breakfasts than for lunches (66% versus 87% [Exhibit 2.17]) is not surprising — the first SNDA study found that breakfasts offered in SY 1991-92 were substantially more consistent with *Dietary Guidelines* recommendations than lunches.

According to cafeteria managers, *Dietary Guidelines* changes in breakfast menus were even less likely to have a negative impact on meal acceptability than changes in lunch menus. Fewer than six percent of managers in schools with revised breakfast menus reported a negative impact compared to 14 percent of managers in schools with revised lunch menus. The perception that modified breakfasts were *somewhat less* acceptable or *much less* acceptable than previous breakfasts was largely concentrated among high school managers (12% versus 3-4%).

In addition, a marked positive impact (i.e., the perception that students liked new breakfasts *much better* than old breakfasts) was more commonly reported for modified breakfast menus (25%) than for modified lunch menus (15%). This response was most common among elementary school managers.

Cafeteria managers' perceptions about the impact of changes in breakfast menus on levels of food waste are tabulated in Exhibit 2.20. Results are consistent with findings reported in the previous discussion of changes in lunch menus. For every food group queried, 31 to 45 percent of cafeteria managers reported that students were wasting less food than they had before menus were changed to incorporate the *Dietary Guidelines*. Reports of increased waste were rare.

There were some variations in perceptions about the impact of *Dietary Guidelines* changes on food waste at breakfast across school types. These were largely consistent with those described in the preceding discussion of effects on food waste at lunch.

## Types of Meal Service Offered

Schools participating in the NSLP offered students a variety of different types of lunch meals in SY 1998-99 (Exhibit 2.21). Virtually all schools offered a hot meal at least once per week and 88 percent of schools offered a hot meal every day. Cold meals, such as sandwiches and salad plates, were offered at least once per week in more than two-thirds of all schools. Almost half of all schools (47%) offered a cold meal every day of the week. More than three-quarters of all schools offered hot sandwiches, such as hamburgers or hot dogs, or pizza at least once per week. Roughly one-third of all schools offered a hot sandwich or pizza every day of the week. Salad bars and other food bars were notably less common, offered in only 27 percent of all schools. Schools that did offer such bars tended to offer one every day of the week. Finally, more than half of all schools (59%) offered at least some items that were *not part of the USDA reimbursable meal* on an *a la carte* basis. Again, schools that offered such *a la carte* foods almost always offered them every day of the week.

**Exhibit 2.19**

**Percentage of Schools Reporting Changes in Breakfast Menus to Incorporate the *Dietary Guidelines for Americans* and Perceived Effect on Meal Acceptability**

	Elementary Schools	Middle Schools	High Schools	All Schools
Percentage of Schools				
<b>Changes Made in Breakfast Menus to Incorporate the <i>Dietary Guidelines for Americans</i></b>				
Yes	67%	71%	60%	66%
No	34	30	41	34
Number of Schools (Unweighted)	317	245	246	808
<b>Perceived Effect of Changes on Acceptability of Breakfasts<sup>1</sup></b>				
Students like new breakfasts <i>much better</i> than old breakfasts	27%	21%	19%	25%
Students like new breakfasts <i>somewhat better</i> than old breakfasts	13	26	20	16
Students like new breakfasts <i>about the same</i> as old breakfasts	49	48	47	49
Students like new breakfasts <i>somewhat less</i> than old breakfasts	4	3	10	5
Students like new breakfasts <i>much less</i> than old breakfasts	0	<1	2	<1
Don't know	7	2	2	5
Number of Schools (Unweighted)	199	160	151	510

<sup>1</sup> Base sample includes only schools where the SBP is offered and the respondent indicated that changes had been made in breakfast menus to incorporate the *Dietary Guidelines for Americans*.

Note: Columns may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.

**Exhibit 2.20**

**Perceived Effect of Changes in Breakfast Menus on Levels of Food Waste**

	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
<b>Food/Perception of Change in Waste</b>	<b>Percentage of Schools</b>			
<b>Milk</b>				
Students waste more	3%	12%	8%	5%
Students waste less	29	32	35	31
No change	66	53	52	61
Don't know	2	4	5	3
<b>Main Dish/Entree</b>				
Students waste more	3	3	3	3
Students waste less	43	52	43	45
No change	52	41	48	49
Don't know	2	4	6	3
<b>Bread or Bread Alternate</b>				
Students waste more	5	3	4	5
Students waste less	43	46	34	42
No change	50	47	57	50
Don't know	2	4	5	3
<b>Fruit</b>				
Students waste more	8	5	4	7
Students waste less	36	29	30	34
No change	50	52	60	52
Don't know	6	14	6	7
<b>Juice</b>				
Students waste more	3	2	3	3
Students waste less	42	47	33	41
No change	54	47	60	54
Don't know	2	4	5	3
<b>Number of Schools (Unweighted)</b>	<b>199</b>	<b>160</b>	<b>151</b>	<b>510</b>

Notes: Exhibit includes only schools where the SBP is offered and changes were made in breakfast menus to comply with the *Dietary Guidelines for Americans*.

Column sections may not sum to 100 percent because of rounding.

Source: Weighted tabulations of a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.

**Exhibit 2.21**

**Types of Meal Service Offered at Lunch**

<b>Type of Meal Service/Frequency</b>	<b>Elementary</b>	<b>Middle</b>	<b>High</b>	<b>All</b>
	<b>Schools</b>	<b>Schools</b>	<b>Schools</b>	<b>Schools</b>
	<b>Percentage of Schools</b>			
<b>Hot Meal</b>				
Every day	87%	92%	89%	88%
3-4 times per week	8	2	8	7
1-2 times per week	4	2	2	3
Not offered	1	4	1	1
<b>Cold Meal, Such as Sandwich or Salad Plate</b>				
Every day	39	52	68	47
3-4 times per week	4	9	5	5
1-2 times per week	20	17	9	17
Not offered	38	21	17	31
<b>Hot Sandwich, Such as Hamburger, Hot Dog, or Pizza</b>				
Every day	20	53	63	34
3-4 times per week	17	16	13	16
1-2 times per week	32	17	12	26
Not offered	31	14	12	24
<b>Salad Bar or Other Food Bar</b>				
Every day	12	27	49	21
3-4 times per week	3	2	4	3
1-2 times per week	2	5	5	3
Not offered	83	66	42	73
<b>A la Carte Items Not Part of USDA Reimbursable Lunch<sup>1</sup></b>				
Every day	41	77	73	53
3-4 times per week	1	0	2	1
1-2 times per week	5	1	1	4
Not offered	52	22	23	41
<b>Number of Schools (Unweighted)</b>	<b>385</b>	<b>325</b>	<b>326</b>	<b>1,036</b>

<sup>1</sup> Percentages reported for *a la carte* sales in this exhibit are not consistent with those reported in Exhibit 2.23 because this exhibit reports only availability of *a la carte* items that are *not part of USDA-reimbursable lunch*. Exhibit 2.23 reports on all *a la carte* sales (i. e., sales associated with the purchase of foods that are offered strictly *a la carte* as well as the purchase of one or more foods offered in USDA-reimbursable meals *a la carte*).

Note: Column sections may not sum to 100 percent because of rounding.

Source: Weighted tabulations of a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.

The availability and frequency of various meal service options varied across school types.<sup>8</sup> Options other than a traditional hot meal were notably more common in middle schools and high schools than in elementary schools. In addition, middle schools and high schools were more likely to offer these alternative meal options every day of the week. This was especially true for *a la carte* items not included in reimbursable meals. In more than half of all elementary schools, such items were never offered. In contrast, roughly three-quarters of middle schools and high schools offered some items on a strictly *a la carte* basis every day of the week.

### **Breakfast Menus**

Almost all schools participating in the SBP offered both hot and cold breakfasts (Exhibit 2.22). Ninety-one percent of SBP schools offered a cold breakfast one or more days per week and the same percentage offered a hot breakfast one or more days per week. More than half of all schools (56%) offered a cold breakfast every day. A somewhat lower percentage (50%) offered a hot breakfast every day, such as hot cereal, pancakes or waffles, eggs or a breakfast sandwich.

*A la carte* foods were much less common at breakfast than at lunch. Only about a quarter of all schools offered breakfast foods on a strictly *a la carte* basis (i.e., foods that were not offered as part of the reimbursable breakfast and had to be purchased separately.) (Roughly 60 percent of all schools offered items on a strictly *a la carte* basis at lunch.)

There were some differences in breakfast offerings in different types of schools. Middle schools and high schools offered hot breakfasts more often than elementary schools and were more likely to offer both types of breakfasts every day of the week. Middle schools and high schools were also more likely to offer *a la carte* breakfast items. *A la carte* breakfast items were most commonly offered in high schools.<sup>9</sup>

## **Alternatives to NSLP and SBP Meals**

Students who do not purchase or receive NSLP or SBP meals have several alternatives for obtaining a lunch or breakfast from other sources. In addition to bringing food from home or, in the case of breakfast, eating a meal before coming to school, possible options include:

- purchasing components of the USDA-reimbursable meal (but not enough to qualify as a meal) or *a la carte* items from the cafeteria;
- buying food from a school store, snack bar or vending machine; and
- leaving school to buy food or go home for lunch.

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8 Chapter Three provides detailed information on the number and types of food offered in NSLP meals during a typical school week.

9 Chapter Four provides detailed information on the number and types of food offered in SBP meals during a typical school week.

**Exhibit 2.22**

**Types of Meal Service Available at Breakfast**

<b>Type of Meal Service/Frequency</b>	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
	<b>Percentage of Schools</b>			
<b>Cold Breakfast</b>				
Every day	52%	62%	67%	56%
3-4 times per week	14	9	6	11
1-2 times per week	29	18	12	24
Not offered	6	12	15	9
<b>Hot Breakfast</b>				
Every day	43	64	65	50
3-4 times per week	31	20	18	27
1-2 times per week	15	12	10	14
Not offered	11	5	7	9
<b>A la Carte Items not Part of USDA Reimbursable Breakfasts<sup>1</sup></b>				
Every day	14	34	58	25
3-4 times per week	0	0	2	0
1-2 times per week	1	1	2	1
Not offered	85	64	39	74
<b>Number of Schools (Unweighted)</b>	<b>317</b>	<b>245</b>	<b>246</b>	<b>808</b>

<sup>1</sup> Percentages reported for *a la carte* sales in this exhibit are not consistent with those reported in Exhibit 2.23 because this exhibit reports only availability of *a la carte* items that are *not part of USDA-reimbursable breakfast*. Exhibit 2.23 reports on all *a la carte* sales (i. e., sales associated with the purchase of foods that are offered strictly *a la carte* as well as the purchase of one or more foods offered in USDA-reimbursable meals *a la carte*).

Note: Column sections may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.

This section presents data on the incidence of these alternatives at schools participating in the NSLP. It also describes the types of foods available *a la carte* and the specific items offered. Finally, it describes the weekly *a la carte* revenue generated by NSLP schools.

### **Options Other than USDA-Reimbursable Meals**

The most common option available for students who do not purchase a USDA-reimbursable meal is purchase of items *a la carte*.<sup>10</sup> This option, which includes items offered strictly *a la carte* as well as *a la carte* purchase of individual components of the USDA-reimbursable meal, was available at lunch in more than nine out of ten NSLP schools (Exhibit 2.23). As discussed in a subsequent section, this option is sometimes limited to *a la carte* purchase of milk, juice and/or dessert to accompany a meal brought from home.

Students were much less likely to have the option to purchase *a la carte* foods at breakfast. This is especially true at the elementary school level, where only 27 percent of schools offered foods *a la carte* at breakfast. Availability of *a la carte* breakfast foods was greater at the middle and high school levels — 48 percent and 60 percent, respectively — but was still substantially lower than lunch.

Vending machines that were available to students during school hours provided an alternative source of food or beverages in one-third of all NSLP schools. Roughly a quarter of all schools reported vending machines located in or near the cafeteria. Nineteen percent of schools offered food or beverages through school stores, snack bars or canteens, and student fundraisers provided an alternative source of food in a small percentage (3%) of schools. Eleven percent of NSLP schools provided maximum access to alternative sources of food by permitting students to leave school grounds for lunch.

Vending machines and school stores were much more common in middle schools (55%) and high schools (76%) than in elementary schools (15%). Vending machines, in particular, were most prevalent at the high school level. In addition, the ability to leave school for lunch was largely limited to high schools (29% versus 6-8% for middle schools).

### **Foods Offered *a la Carte***

As noted above, more than nine out of ten NSLP schools offered *a la carte* foods at lunch and 36 percent of schools offered *a la carte* foods at breakfast. Beverages, most often milk, were sold in all schools that offered *a la carte* foods (Exhibit 2.24).<sup>11</sup> With the exception of milk, virtually all *a la carte* items were more commonly offered at the middle and high school levels. This reflects the fact that *a la carte* sales in some elementary schools were limited to milk or other items (juice, dessert items) to accompany a meal brought from home. Thirty-nine percent of elementary schools reported *a la carte* programs that were limited to these items. The same was true for only eight percent of middle schools and six percent of high schools.

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10 Students always have the option to bring food from home. This study did not collect information on food from home; however, the SNDA-I study found that 18% of students brought food from home.

11 The checklist used to gather information on *a la carte* offerings (see Appendix C) did not differentiate between foods offered at breakfast and foods offered at lunch.

**Exhibit 2.23**

**Non-USDA Food Options Available During School Hours**

<b>Non-USDA Food Option</b>	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
	<b>Percentage of Schools</b>			
<i>A la carte</i> foods at lunch	90%	98%	94%	92%
<i>A la carte</i> foods at breakfast <sup>1</sup>	27	48	60	36
Vending machines anywhere in school	15	55	76	33
Vending machines in or near cafeteria <sup>2</sup>	7	38	63	23
Vending machines in different part of school	11	37	54	23
School store, snack bar, or canteen	9	35	41	19
Morning snack program/other non-USDA breakfast	7	11	19	10
Opportunity to leave school grounds for lunch	8	6	29	11
Student sales/fundraisers	2	5	7	3
Number of Schools (Unweighted)	385	325	326	1,036

<sup>1</sup> Base sample includes only schools that offer the SBP.

<sup>2</sup> Among schools that have vending machines anywhere in the school, 49 percent of elementary schools, 69 percent of middle schools, and 83 percent of high schools have machines that are located in or near the cafeteria.

Notes: Schools may have vending machines in both locations.

Percentages reported for *a la carte* foods at breakfast and lunch include all *a la carte* sales (i. e., the option to purchase one or more foods offered in USDA-reimbursable meals *a la carte* as well as foods that are offered strictly *a la carte*). Percentages are not consistent with those shown in Exhibits 2.21 and 2.22 because those exhibits report only availability of *a la carte* items that are *not part of USDA-reimbursable meals*.

Source: Weighted tabulations of a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999.



Exhibit 2.24

Availability of *a la Carte* Food Items at Breakfast and/or Lunch

Food Group/Food	Elementary Schools	Middle Schools	High Schools	All Schools
	Percentage of Schools			
<b>Any <i>a la carte</i> Food</b>	<b>90%</b>	<b>98%</b>	<b>94%</b>	<b>92%</b>
<b>Limited <i>a la carte</i> Offerings</b>				
Milk only	28	6	4	20
Milk and juice and/or dessert only	11	2	2	8
<b>Beverages</b>	<b>90</b>	<b>98</b>	<b>94</b>	<b>92</b>
Milk	90	98	94	92
Juice (50-100%)	34	59	67	44
Juice drinks	16	53	61	30
Mineral water or other bottled water	12	38	51	23
Tea	9	19	37	16
Milkshake or malt	1	15	13	6
Carbonated soft drinks	1	8	16	5
Coffee	3	3	15	5
Hot chocolate	2	5	19	5
Non-carbonated soft drinks	2	8	4	3
<b>Baked Goods/Desserts</b>	<b>35</b>	<b>72</b>	<b>76</b>	<b>49</b>
Cookies	28	62	68	41
Cakes, cupcakes, brownies	15	42	58	27
Pastries (pies, turnovers)	3	14	25	9
Other baked goods/desserts	11	30	38	19
<b>Bread or Grain Products</b>	<b>29</b>	<b>65</b>	<b>77</b>	<b>44</b>
Crackers, granola bars, pretzels, and similar grain products	21	48	64	33
Bread, rolls, bagels	15	42	58	27
Biscuits, croissants, hot pretzels	9	25	39	17
Muffins	2	16	25	8
Tortillas	4	7	14	6
Cereal (ready-to-eat)	1	1	1	1
Rice or pasta	1	< 1	2	1
<b>Candy</b>	<b>2</b>	<b>15</b>	<b>24</b>	<b>8</b>
<b>Frozen Desserts</b>	<b>30</b>	<b>58</b>	<b>62</b>	<b>41</b>
Ice cream bars, scoops, sundaes	26	53	57	36
Frozen fruit juice bars, popsicles	8	23	24	13
Lowfat frozen yogurt, ice milk, sherbet	10	18	19	13
<b>Fruit</b>	<b>25</b>	<b>53</b>	<b>70</b>	<b>38</b>
Fresh fruit	20	45	63	32
Canned/cooked fruit	14	28	40	21
Fruit salad	1	4	8	3

**Exhibit 2.24**  
(continued)

<b>Food Group/Food</b>	<b>Elementary</b>	<b>Middle</b>	<b>High Schools</b>	<b>All</b>
	<b>Schools</b>	<b>Schools</b>		<b>Schools</b>
	<b>Percentage of Schools</b>			
<b>Meat and Meat Alternates/Entrees</b>	<b>34</b>	<b>78</b>	<b>80</b>	<b>50</b>
<i>Beef</i>	11	42	59	25
Hamburgers or cheeseburgers	4	28	42	15
Other beef	6	14	25	11
Chili or burritos	3	17	25	9
<i>Poultry</i>	8	34	52	20
Chicken patty	3	17	33	11
Other chicken	2	17	27	9
Turkey	3	13	20	8
<i>Other Meat</i>	13	35	50	23
Cold cuts	7	21	35	14
Sausage or pork	3	13	21	8
Hot dog, corn dog, franks and beans	3	13	17	7
<i>Meat Alternates</i>	14	42	50	26
Cheese (not in sandwich)	4	24	28	12
Peanut butter, peanuts, sunflower seeds, other nuts	7	17	21	11
Eggs	4	7	15	7
Fish	5	7	11	6
Cheese sandwich	2	8	16	6
Beans or peas (legumes)	1	4	13	4
<i>Mixed Dishes</i>	22	67	73	39
Pizza (with meat)	7	45	46	20
Chef salad or other salad plate	10	21	32	15
Pizza (without meat)	4	24	35	13
Mexican food	2	17	28	9
Soup with meat or beans	5	12	20	9
Macaroni and cheese	3	8	4	4
Spaghetti, lasagna, ravioli, stuffed shells	3	11	11	5
Other sandwiches	1	4	7	3
Chinese food	< 1	2	5	1
Other mixed dishes	1	< 1	1	1
<b>Vegetables</b>	<b>23</b>	<b>60</b>	<b>72</b>	<b>38</b>
Fried potatoes (pre-fried, oven baked, French fries)	13	40	61	27
Salads	11	35	50	22
Vegetables, other cooked	11	26	36	18
Vegetable soup	4	6	14	6
Pickles	1	3	1	1

**Exhibit 2.24**  
(continued)

	Elementary Schools	Middle Schools	High Schools	All Schools
<b>Food Group/Food</b>	<b>Percentage of Schools</b>			
<b>Snacks</b>	<b>24</b>	<b>63</b>	<b>71</b>	<b>39</b>
Chips	16	57	69	32
Other snacks	15	37	42	24
Popcorn	9	20	29	14
Nuts and seeds, trail mix	3	10	14	6
<b>Yogurt</b>	<b>9</b>	<b>24</b>	<b>40</b>	<b>17</b>
Number of Schools (Unweighted)	385	325	326	1,036

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers, Fall 1998 - Spring 1999. Based on *A la Carte Checklist*; see Appendix C.

Aside from milk, the most common *a la carte* offerings were juice (44% of schools), cookies (41%), ice cream (36%), grain products such as crackers, granola bars, and pretzels (33%), fresh fruit and snack chips (32% each), juice drinks (30%), bread, rolls, and bagels (27%), baked desserts such as cakes, cupcakes and brownies (27%), and fried potatoes (27%).

### **Average Weekly *a la Carte* Revenue**

On average, *a la carte* sales in NSLP schools generated \$913 per 1,000 students during a typical week in SY 1998–99 (Exhibit 2.25).<sup>12</sup> There was considerable variation in *a la carte* revenue across school types. Average weekly sales for elementary schools (\$375) was about one-fifth that of middle schools (\$1,760) and high schools (\$1,985).

*A la carte* revenue was also affected by the nature of the *a la carte* sales in the school. Schools that sold non-USDA foods strictly *a la carte* took in roughly four times more *a la carte* revenue per week than schools in which *a la carte* sales were limited to purchase of individual components of the USDA-reimbursable meal (\$1,276 per 1,000 students versus \$325 per 1,000 students).

In addition, the relative poverty level of the student population, measured by the percentage of students approved for free and reduced-price meals, was inversely related to weekly *a la carte* revenue. Weekly *a la carte* revenue in schools with relatively few low-income students (25 percent or less) was more than four times that of schools with high concentrations (75 percent or more) of low-income students (\$1,282 versus \$300). This pattern is also reflected in the variation in *a la carte* revenue seen in schools that did and did not offer the SBP and, to a lesser extent, in schools that did and did not serve suburban populations. Schools that offered the SBP and urban and rural schools tended to have higher concentrations of low-income students than schools that did not offer the SBP and suburban schools.

Weekly *a la carte* revenue was inversely related to overall NSLP participation rates (Exhibit 2.26). A comparison of average weekly *a la carte* sales for quartiles of overall NSLP participation shows that revenue ranged from a low of \$383 among schools where mean daily NSLP participation was 73 percent or more to \$2,135 among schools where participation rates were less than 36 percent. This negative relationship was consistent across all school types.

### **Pricing Methods Used for *a la Carte* Foods**

SFA directors were asked about strategies used to set prices for *a la carte* foods. Three specific strategies — group pricing, actual pricing, and food cost percentage markup — were asked about directly. According to SFA directors, the method most often used to price *a la carte* foods was group pricing or the practice of assigning a standard price to all similar foods (e.g., all snack chips, all beverages, or all cookies). (See Exhibit 2.27.) Almost three-quarters of directors in SFAs where *a la carte* sales were reported indicated that this pricing method was used. A roughly equivalent percentage of SFA directors (71%) reported use of an actual pricing method. Actual pricing may be used to

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12 Cafeteria managers reported their total *a la carte* food sales for a typical week (the target week for the menu survey). Responses were standardized per 1,000 students based on SFA directors' reports of total student enrollment in the sampled schools.

**Exhibit 2.25**

**Average *a la Carte* Sales by Selected School Characteristics**

<b>Characteristic</b>	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
	<b>Weekly <i>a la Carte</i> Sales per 1,000 Students</b>			
<b>All Schools</b>	\$375	\$1,760	\$1,985	\$913
<b>Type of <i>a la Carte</i> Program</b>				
Non-USDA items available	\$554	\$1,939	\$2,164	\$1,276
USDA-reimbursable items only	217	861	922	325
<b>Percent of Students Approved for Free Lunches</b>				
25 percent or less	\$475	\$2,150	\$2,387	\$1,282
26-50 percent	297	1,123	1,422	612
51-74 percent	371	2,547	818	682
75 percent or more	234	655	444	300
<b>USDA Programs Offered</b>				
NSLP only	\$521	\$2,094	\$2,503	\$1,261
NSLP and SBP	338	1,663	\$1,789	815
<b>Community Type</b>				
Urban	\$225	\$1,933	\$1,895	\$822
Suburban	437	1,832	2,139	1,036
Rural	404	1,187	1,760	756
<b>Number of Schools (Unweighted)</b>	<b>323</b>	<b>288</b>	<b>290</b>	<b>901</b>

Note: Exhibit includes only schools for which the cafeteria manager provided information on weekly *a la carte* revenue and the SFA director completed his/her interview.

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers (weekly *a la carte* revenue) and a telephone interview with public SFA directors, Fall 1998 - Spring 1999.

**Exhibit 2.26**

**NSLP Student Participation Rate and Weekly *a la Carte* Sales**

<b>Overall NSLP Participation Rate</b>	<b>Average Weekly <i>a la Carte</i> Sales per 1,000 Students</b>
<b>Elementary Schools</b>	
Less than 57%	\$456
57 - 70%	491
71 - 81%	280
82 - 100%	367
Number of Schools (Unweighted)	305
<b>Middle Schools</b>	
Less than 38%	\$2,894
38 - 55%	1,929
56 - 71%	1,150
72 - 100%	826
Number of Schools (Unweighted)	285
<b>High Schools</b>	
Less than 21%	\$2,422
21 - 35%	2,346
36 - 54%	2,218
55 - 100%	1,031
Number of Schools (Unweighted)	284
<b>All Schools</b>	
Less than 36%	\$2,135
36 - 55%	1,141
56 - 72%	682
73 - 100%	383
Number of Schools (Unweighted)	874

Notes: Based on distribution of participation rates, by quartile, for each school type.

Exhibit includes only schools that offered *a la carte* foods and for which information on both participation rates and weekly *a la carte* revenue was available.

Source: Weighted tabulations of data from a mail survey of public school cafeteria managers (weekly *a la carte* revenue and meal counts needed to calculate participation rates) and telephone interviews with public SFA directors (enrollment and numbers of students approved for free and reduced-price meal benefits), Fall 1998 - Spring 1999.

## Exhibit 2.27

### Methods Used to Set Prices for *a la Carte* Foods

Methods	Percentage of SFAs
Group pricing <sup>1</sup>	73%
Actual pricing method <sup>2</sup>	71
Food cost percentage markup <sup>3</sup>	44
Other	8
Number of SFAs (Unweighted)	370

<sup>1</sup> The same price is assigned to all similar foods, for example, all vegetables are sold at the same price per portion and all similar-sized cookies are sold at the same price.

<sup>2</sup> Prices are determined by considering all costs of buying, producing, and serving the food.

<sup>3</sup> Prices are determined by adding the same percentage markup to every food item.

Notes: Exhibit includes only SFAs that reported use of *a la carte* foods in one or more schools.

SFAs may use more than one pricing method for *a la carte* foods.

Source: Weighted tabulations of data from a telephone interview with public SFA directors, Fall 1998 - Spring 1999.

determine the most appropriate group price. Use of a standard markup was much less common, used in fewer than half of the SFAs in which *a la carte* sales were reported.

## Use of Foods from Commercial Vendors

NSLP schools may offer foods from national fast-food vendors such as McDonald's, Pizza Hut, Domino's, Subway, and Taco Bell, or from similar local vendors. These commercial or "branded" foods may be served as part of a USDA-reimbursable meal, as an *a la carte* item or both. Foods are generally delivered to schools prepared and ready to serve.

In SY 1998–99, fewer than two of every ten NSLP schools used foods from commercial vendors at lunch (Exhibit 2.28).<sup>13</sup> Middle schools and high schools used branded foods more often than elementary schools (30-31% of middle schools and high schools versus 13% of elementary schools). Schools that did use branded foods were somewhat more likely to include these foods in reimbursable meals than to restrict them to *a la carte* purchases (13% versus 5%). The general pattern of use of commercially vended foods was similar for breakfast and lunch. No differences were detected in the use of branded foods among schools using different menu planning options or between schools that did and did not use FSMCs.

SFA directors for almost half of the schools that served branded foods as part of a reimbursable lunch reported that one or more of the food items required a modification or reformulation to meet USDA's requirements for reimbursement (data not shown).

## Use of Food Service Management Companies

In SY 1998–99, school food service programs in most SFAs (88 percent) were managed by the local school district (data not shown). The remaining 12 percent of SFAs contracted with a food service management company (FSMC) to operate one or more aspects of the food service program in one or more schools.

Functions contracted to FSMCs may be performed solely by the FSMC or be shared between the FSMC and the SFA. In addition, SFAs may retain sole responsibility for selected aspects of the food service operation. Directors in SFAs where FSMCs were used were asked to delineate the division of labor between SFA and FSMC staff for a variety of food service tasks. Results are tabulated in Exhibit 2.29.

In SY 1998–99, FSMCs were most often assigned full responsibility for menu planning and food purchasing. Approximately 70 percent of SFAs that contracted with FSMCs fully delegated these

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13 This percentage is somewhat higher than but consistent with results obtained in a nationally representative survey of cafeteria managers conducted by the GAO in SY 1995-96. That study found that 13 percent of schools offered branded foods. The recent School Food Purchase Study reported that 40 percent of *school districts* used branded foods in SY 1996-97. Because SNDA-II data were collected at the *school level* and SFPS data were collected at the *district level*, direct comparisons of the two studies cannot be made.



**Exhibit 2.28**

**Use of Foods from Commercial Vendors<sup>1</sup>**

	<b>Elementary Schools</b>	<b>Middle Schools</b>	<b>High Schools</b>	<b>All Schools</b>
<b>Meal/Use of Food From Commercial Vendors</b>	<b>Percentage of Schools</b>			
<b>Lunch</b>				
Not used	87%	70%	69%	81%
Used for both reimbursable and <i>a la carte</i> lunches	2	11	14	6
Used for <i>a la carte</i> lunches only	1	13	12	5
Used for reimbursable lunches; <i>a la carte</i> lunches not offered	5	2	3	4
Used for reimbursable lunches but not for <i>a la carte</i> lunches	3	4	1	3
<b>Number of Schools (Unweighted)</b>	<b>409</b>	<b>349</b>	<b>351</b>	<b>1,109</b>
<b>Breakfast</b>				
Not used	88%	71%	71%	83%
Used for both reimbursable and <i>a la carte</i> breakfasts	1	11	11	5
Used for <i>a la carte</i> breakfasts only	1	15	13	5
Used for reimbursable breakfasts; <i>a la carte</i> breakfasts not offered	6	2	3	5
Used for reimbursable breakfasts but not for <i>a la carte</i> breakfasts	2	2	1	2
<b>Number of Schools (Unweighted)</b>	<b>332</b>	<b>258</b>	<b>263</b>	<b>853</b>

<sup>1</sup> Includes vendors such as McDonald's, Pizza Hut, Domino's, Subway, Taco Bell, and similar local vendors.

Note: Columns may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from telephone interviews with public SFA directors, Fall 1998 - Spring 1999.

**Exhibit 2.29**

**Division of Responsibility in SFAs that Use Food Service Management Companies**

<b>Locus of Responsibility for Major Food Service Tasks</b>	<b>Percentage of SFAs</b>
<i>Preparing reimbursement claims</i>	
SFA	35%
FSMC	21
Shared	44
<i>Accounting and financial recordkeeping</i>	
SFA	18
FSMC	22
Shared	59
<i>Planning menus</i>	
SFA	21
FSMC	71
Shared	8
<i>Preparing USDA-reimbursable breakfasts</i>	
SFA	22
FSMC	39
Shared	6
Not applicable <sup>2</sup>	33
<i>Serving USDA-reimbursable breakfasts</i>	
SFA	29
FSMC	32
Shared	7
Not applicable <sup>1</sup>	33
<i>Preparing USDA-reimbursable lunches</i>	
SFA	39
FSMC	47
Shared	14
<i>Serving USDA-reimbursable lunches</i>	
SFA	52
FSMC	36
Shared	12
<i>Providing a la carte service</i>	
SFA	35
FSMC	40
Shared	20
Not applicable <sup>2</sup>	5

**Exhibit 2.29**  
(continued)

<b>Locus of Responsibility for Major Food Service Tasks</b>	<b>Percentage of SFAs</b>
<i>Providing equipment for food preparation</i>	
SFA	55%
FSMC	9
Shared	36
<i>Cafeteria cleanup</i>	
SFA	63
FSMC	10
Shared	27
<i>Purchasing food</i>	
SFA	22
FSMC	69
Shared	9
<i>Making arrangements for using donated commodities</i>	
SFA	20
FSMC	54
Shared	26
<i>Selling lunch tickets and collecting lunch money</i>	
SFA	47
FSMC	37
Shared	16
<b>Number of SFAs (Unweighted)</b>	
	<b>51</b>

<sup>1</sup> Includes SFAs that use a food service management company but do not serve USDA-reimbursable breakfasts.

<sup>2</sup> Includes SFAs that use a food service management company but do not offer *a la carte* meal service.

Note: Exhibit includes only SFAs that use a food service management company—12 percent of all SFAs.  
Column sections may not sum to 100 percent because of rounding.

Source: Weighted tabulations of data from a telephone interview with public SFA directors, Fall 1998 - Spring 1999.

functions. A related function that was commonly contracted to FSMCs was dealing with the commodity donation program. In more than half of SFAs with FSMCs, contractors were solely responsible for making arrangements for using donated commodity foods in NSLP and SBP meals.

Management companies were also involved in food preparation and service. FSMCs had sole responsibility for preparing USDA-reimbursable lunches and breakfasts in 47 and 39 percent of SFAs, respectively.

Functions over which SFAs were most likely to retain full responsibility included serving lunch, after-meal cafeteria cleanup, providing the equipment required for food preparation, and selling lunch tickets and collecting money. Cafeteria cleanup was more commonly shared by FSMCs and SFAs than delegated to the management company; a similar distribution of responsibility was evident for the provision of food service equipment. FSMCs were exclusively responsible for these functions in ten percent or less of SFAs.

Finally, FSMCs were involved in accounting and financial recordkeeping; however, in about 60 percent of SFAs that used a management company, this function was shared. Most SFAs remained involved in the preparation of reimbursement claims for the NSLP and SBP. Forty-four percent of SFAs shared responsibility for this task and 35 percent maintained sole responsibility.



# Chapter Three

## Characteristics of Lunches Served in Public NSLP Schools

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This chapter presents information on the average nutrient content of lunches served in public NSLP schools during SY 1998–99. Information is also provided on the types of food offered, the number of options available to students selecting a lunch, and the characteristics of meals served to students. Data are presented separately for elementary schools and secondary schools.<sup>1</sup> In addition, information is provided on differences in the average nutrient content of lunches—by menu planning option and by relative fat content of meals served.

It is important to note that the data presented in this chapter are not directly comparable to data from the SNDA-I study. As described below, the results presented in this chapter are based on a weighted nutrient analysis. The SNDA-I study used an unweighted analysis. A comparison of SNDA-I and SNDA-II data, incorporating comparable analysis of SNDA-II data, is presented in Chapter Six.

### Overview of the Analysis

The data presented in this chapter are based on a *weighted* nutrient analysis of lunch menus and meal production data. A weighted analysis differs from an unweighted analysis in that it takes into consideration not only the foods offered to students but the number and types of foods that students actually include in the meals they select. As such, a weighted analysis provides a picture of the *average meal served to or selected by* participating students and, short of tracking food waste and actual food consumption, the best available measure of the nutritional quality of actual school meals. Program regulations require use of a weighted nutrient analysis in monitoring lunch menus and, for schools using a computer-based menu planning system, in planning lunch menus.<sup>2</sup>

All analyses were completed using a customized version of NUTRIKIDS software (LunchByte Systems Inc.) and the third release of USDA’s Child Nutrition nutrient database (CN-3).<sup>3</sup> For each daily menu, a weighted average was computed for calories and all target nutrients. Daily averages were then totaled

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- 1 Results for middle schools and high schools were comparable, so data were combined to facilitate presentation and discussion. Major exhibits summarizing information on nutrient content of meals are presented separately for middle schools and high schools in Appendix A. Noteworthy differences between results for middle schools and high schools are mentioned in the text.
  - 2 The CN Reauthorization Act of 1998 waived this requirement through September 2003, for school districts that obtain a waiver from their State agency.
  - 3 Errors identified in the CN-3 database after its release were corrected in the version of the database used in this analysis.

and the weekly average was determined.<sup>4</sup> Weekly averages were compared to two sets of nutrition standards (see Chapter One):

- **Nutrient standards defined in NSLP regulations:** the percentage of the RDA provided for calories, protein, vitamins A and C, calcium, iron, and the percentage of calories from total fat and saturated fat.
- **National Research Council (NRC) recommendations:** nutrients for which NSLP standards have not been defined — the percentage of calories from carbohydrate and total cholesterol and sodium content.

## Number and Types of Food Offered and Served to Students

Nutrient content of NSLP meals is driven by the mix of foods offered and served to students. Therefore, before considering data on the average nutrient content of school lunches, it is useful to have some background information on the characteristics of the menus offered to students as well as on students' general food selection patterns.

### Number of Options Offered Within NSLP Meal Component Categories

Exhibit 3.1 provides information on the relative level of choice offered to students electing to eat an NSLP meal. The exhibit shows the percentage of *daily NSLP menus* that offered various numbers of options within major menu item categories.<sup>5</sup> As shown, nearly all NSLP menus provided students with the opportunity to select a specific type of milk: more than 95 percent of all daily NSLP menus included two or more types of milk. The median number of milk options, both on a daily basis and across a week, was three. This pattern was generally consistent for elementary and secondary schools, however, secondary schools offered somewhat more choice than elementary schools.

With regard to entrees, including combination entrees as well as meats/meat alternates offered separately, there was a notable difference between menus offered in elementary schools and those offered in secondary schools. More than one-third of elementary school menus included only one entree. Such fixed menus were much less common in secondary schools: only 15 percent of secondary school menus were limited to one entree. At the other end of the spectrum, only five percent of elementary school menus included six or more entree choices, compared to 32 percent of secondary school menus.

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4 Nutrient standards set forth in program regulations are defined as benchmarks for average nutrient content figured across a week, rather than for each daily menu. Eleven percent of schools provided fewer than five days of menu data, primarily because of scheduled or unscheduled closings. Ten percent provided data for four days, and one percent provided data for three days. The denominator used in determining the weekly average for a given school was the number of days of data provided.

5 The menu item categories used to describe NSLP menus throughout this chapter are built around the meal component categories used in the food-based menu planning systems. Although schools using NSMP and ANSMP are not required to offer the same meal components specified in food-based menu planning systems, menus offered in these schools are generally consistent with the basic elements of the food-based meal patterns. Thus, the basic meal components still provide a useful framework for describing NSLP menus.

**Exhibit 3.1**

**Choice and Variety in Lunch Menus**

	Elementary Schools	Secondary Schools	All Schools
<b>Percentage of Daily Lunch Menus</b>			
<b>Number of Types of Milk Offered per Day</b>			
1	4%	2%	4%
2	35	30	34
3	36	38	36
4 or more	25	30	27
<i>Median items per day</i>	3	3	3
<i>Median number of different items per week<sup>1</sup></i>	3	3	3
<b>Number of Entrees Offered per Day<sup>2</sup></b>			
1	35%	15%	28%
2-3	44	34	40
4-5	17	19	18
6 or more	5	32	14
<i>Median items per day</i>	2	4	3
<i>Median number of different items per week<sup>1</sup></i>	8	10	10
<b>Number of Fruits/Juices/Vegetables Offered per Day<sup>3</sup></b>			
No more than 2	43%	25%	37%
3-4	38	36	37
5-7	17	26	21
8 or more	2	13	6
<i>Median items per day</i>	3	4	3
<i>Median number of different items per week<sup>1</sup></i>	12	12	12
<b>Number of Separate Grains/Breads Offered per Day<sup>4</sup></b>			
None	45%	41%	44%
1	42	40	41
2	11	15	13
3 or more	1	5	3
<i>Median items per day</i>	1	1	1
<i>Median number of different items per week<sup>1</sup></i>	3	3	3



**Exhibit 3.1**  
(continued)

	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
<b>Percentage of Daily Lunch Menus</b>			
<b>Number of Desserts Offered per Day</b>			
None	66%	62%	64%
1	30	33	31
2 or more	4	5	5
<i>Median items per day</i>	0	0	0
<i>Median number of different items per week<sup>1</sup></i>	2	2	2
Number of Daily Menus (Unweighted)	1,948	3,304	5,252
Number of Schools (Unweighted)	398	677	1,075

<sup>1</sup> Includes only schools that provided menu information for five days.

<sup>2</sup> Includes meats and meat alternates as well as combination entrees.

<sup>3</sup> Fruits and vegetables not included in combination entrees.

<sup>4</sup> Grains or breads not included in combination entrees.

Note: Column sections may not sum to 100 percent due to rounding.

Source: Weighted tabulations of menu data for one week between September 1998 and May 1999.

The median number of daily entree choices in elementary school menus was two, compared to four for secondary schools. The median number of different entrees offered over the course of a week was eight for elementary schools and 10 for secondary schools. These data indicate that schools tended to repeat some entrees during the week.

A similar pattern was noted for fruit and vegetable choices. Roughly two-thirds of all NSLP menus offered more than the two fruit and/or vegetable choices required under the food-based menu planning systems. More than one-quarter of all menus included five or more fruit and/or vegetable choices. The availability of choice among fruits and vegetables and the number of options offered were both greater in secondary school menus than in elementary school menus.

Overall, the median number of different fruit and vegetable choices offered was three per day and 12 per week, indicating that both elementary schools and secondary schools offered some fruits and vegetables more than once during a typical school week.

In both elementary schools and secondary schools, roughly forty percent of daily menus offered bread or bread alternates only in combination entrees (e.g., bread in sandwiches, crusts on pizza, pasta in spaghetti or lasagna). Roughly the same percentage offered one separate bread or bread alternate. A more extensive array of choices in this group was relatively rare. Only 16 percent of all daily menus included two or more separate breads or bread alternates.

Finally, desserts were offered in 36 percent of all daily menus. Desserts were offered with about the same frequency in elementary and secondary school menus.

### **Foods Most Frequently Included in NSLP Menus**

To obtain more detailed information on the types of foods offered in NSLP meals, menu items were classified into one of seven major food groups — milk; juices and juice; vegetables; combination entrees; separate meats/meat alternates (not part of a combination entree); separate grains/breads (not part of a combination entree); and other menu items (foods not “counted” toward any of the requirements in the food-based meal patterns). Foods were further classified into one of 81 different minor food groups. (The full food classification scheme is shown in Exhibit E.6.) Exhibit 3.2 shows the percentage of daily menus in which each minor food group appeared. For ease of presentation, the exhibit is limited to minor food groups that were offered in at least five percent of daily menus for any school type.

Noteworthy findings are summarized below:

- The type of milk most frequently offered in NSLP menus was flavored 1% milk. More than two-thirds of all daily lunch menus included flavored 1% milk. The next most commonly offered milks were 1%, whole, and 2%, all unflavored.
- Canned fruit was offered more often than either fresh fruit or juice. Canned fruit was offered in more than half of all daily menus in both elementary and secondary schools. Fresh fruit was offered in 41 percent of all menus. Secondary school menus included fresh fruit more often than elementary school menus (50% versus 36%).

**Exhibit 3.2**

**Foods Most Commonly Offered in Lunch Menus**

	Elementary Schools	Secondary Schools	All Schools
<b>Percentage of Daily Menus in Which Item Was Offered</b>			
<b>Milk</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
1% flavored	65	71	67
1% unflavored	52	54	53
Whole unflavored	50	50	50
2% unflavored	49	50	49
Skim unflavored <sup>1</sup>	35	42	37
Skim flavored <sup>1</sup>	16	20	17
2% flavored	14	7	11
<b>Fruits and Juices</b>	<b>87%</b>	<b>88%</b>	<b>88%</b>
Canned fruit	56	54	56
Fresh fruit	36	50	41
Full-strength citrus juice	13	17	14
Full-strength non-citrus juice	13	15	14
Frozen fruit or juice	7	5	6
<b>Vegetables</b>	<b>94%</b>	<b>98%</b>	<b>95%</b>
Cooked vegetables (other than potatoes and French fries)	41	49	44
Green salads (other than entree salads)	28	44	33
Oven-fried French fries/potato products	18	30	22
Potatoes other than French fries or similar potato products	21	26	22
Raw vegetables other than green salads or lettuce and/or tomato	14	18	16
Lettuce and/or tomato <sup>2</sup>	7	13	9
Legumes	8	9	8
Deep-fried French fries/potato products	3	15	7
Other (non-green) salads	6	8	7
Other vegetable items (soups, mixed casseroles)	4	8	5
<b>Combination Entrees</b>	<b>90%</b>	<b>96%</b>	<b>92%</b>
Sandwiches made with cheese and/or cold cuts	20	38	26
Hamburgers and similar beef/pork sandwiches	16	32	22
Peanut butter sandwiches	25	14	21
Mexican-style entrees	15	26	19

**Exhibit 3.2**  
(continued)

	Elementary Schools	Secondary Schools	All Schools
Percentage of Daily Menus in Which Item Was Offered			
<b>Combination Entrees</b>			
(continued)			
Pizza with meat	11%	33%	19%
Chef's salad and other salad plates	16	24	19
Pizza without meat	12	24	16
Hot dogs/corn dogs/similar sausage products	15	18	16
Cheeseburgers and similar beef/pork sandwiches	8	29	15
Pasta-based dishes	13	16	14
Sandwiches made with lean meat or poultry (no cheese)	8	22	13
Sandwiches made with breaded and/or fried meat/poultry/fish (no cheese)	8	21	12
Salad bars	5	21	11
Other mixed dishes/combinations	9	12	10
Sandwiches made with mayonnaise-based salads (no cheese)	7	11	8
Other food bars/bag lunches	6	10	8
<b>Meats/Meat Alternates (not part of a combination entree)</b>	<b>31%</b>	<b>37%</b>	<b>33%</b>
Breaded chicken nuggets/patties/similar products	11	16	13
Other breaded or fried meat/poultry/fish	8	10	9
Plain (not breaded or fried) meat/poultry/fish	7	9	8
<b>Grains/Breads (not part of a combination entree)</b>	<b>55%</b>	<b>60%</b>	<b>56%</b>
Bread, rolls, bagels, other plain breads	29	35	31
Crackers/hard pretzels	11	14	12
Rice	6	9	7
Biscuits, cornbread, croissants, other higher-fat breads/bread alternates	8	10	9
Pasta	4	5	4

**Exhibit 3.2**  
(continued)

	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
<b>Percentage of Daily Menus in Which Item Was Offered</b>			
<b>Other Menu Items</b>	<b>42%</b>	<b>48%</b>	<b>44%</b>
Baked desserts	19	19	19
Other desserts (non-fruited gelatin, pudding, ice cream)	12	13	12
Fruit drinks/ades	7	10	8
Dessert items that include fruit or juice	5	9	7
Snack chips	5	5	5
Number of Daily Menus (Unweighted)	1,948	3,304	5,252
Number of Schools (Unweighted)	398	677	1,075

<sup>1</sup> Includes ½ percent milk.

<sup>2</sup> Lettuce and/or tomato offered as a vegetable choice for all students. Excludes lettuce and tomato included in prepared sandwiches or offered with other prepared entrees.

Notes: Exhibit is limited to items that appeared in at least five percent of menus for at least one type of school.  
See Exhibit E.6 for a detailed listing of items included in each group.

Source: Weighted tabulations of menu data for one week between September 1998 and May 1999.

- Cooked vegetables, excluding French fries and other types of potatoes, were the type of vegetable offered most often (44% of all daily menus), followed by green salads (33%), and oven-fried French fries (22%), and potatoes other than French fries or similar potato products (22%). Green salads were offered more often in secondary school menus than in elementary school menus (44% versus 28%). The top five vegetables in NSLP menus were rounded out by raw vegetables (excluding green salads and lettuce and tomato) (16%).
- Deep-fried French fries were rare, overall, appearing in only seven percent of all daily menus. Use of deep-fried French fries was concentrated in secondary schools (15% versus 3%).
- There were notable differences between elementary and secondary school menus in the types of entrees offered most frequently. In elementary schools, the most frequently offered entrees were peanut butter sandwiches (25%), sandwiches made with cheese and/or cold cuts (20%); hamburgers and similar beef/pork sandwiches (excluding cheeseburgers) (16%); Chef’s salad and other salad plates (16%); Mexican-style entrees such as tacos, burritos, and nachos (15%); and hot dogs, corndogs, and similar sausage products (15%). In secondary schools, the leading entree offerings were sandwiches made with cheese and/or cold cuts (38%); pizza with meat (33%); hamburgers and similar beef/pork sandwiches (32%); cheeseburgers and similar sandwiches with cheese (29%); and Mexican-style entrees (26%).
- About one in every four elementary school lunch menus included a peanut butter sandwich and about one in every three secondary school lunch menus included a sandwich made with cheese and/or cold cuts, a hamburger or pizza with meat.
- Menus in both elementary and secondary schools most often offered combination entrees as opposed to separate meats/meat alternates. When separate meats were offered, the most common were breaded chicken nuggets, patties and similar products and other types of breaded or fried meat, poultry, or fish.
- More than half of all daily menus offered grains or bread that were not included in a combination entree. These were most often bread or rolls.
- More than 40 percent of all daily lunch menus offered items other than those included in the traditional meal component categories. Roughly one in five lunch menus included a baked dessert such as cookies, cake or brownies. Twelve percent included other desserts such as ice cream, gelatin (without fruit), or pudding. Eight percent of daily lunch menus included fruit drinks (not 100% juice) and five percent included snack chips.

### **Characteristics of Lunches Actually Served to Students**

In addition to having the ability to select specific foods within a general menu item category, students participating in the NSLP have varying levels of flexibility regarding the minimum number of foods or items they are required to take when selecting a meal. A program rule known as “Offer versus Serve” (OVS) is mandated for students in senior high schools and optional, at the discretion of the local school district, for students below the senior high level. Under OVS, students in schools that are using either the

traditional or enhanced food-based systems to plan menus have the option to refuse up to two of the five food items that must be offered for lunch — milk, meat/meat alternate, bread/bread alternate (meat and bread are generally offered in combination entrees), and two servings of fruit, vegetables or full-strength juice. Students in schools that are operating under NSMP or ANSMP must select an entree and may decline additional item(s), depending on the total number of items offered.

The fact that students have more than a little latitude in determining what is included in their NSLP meals is a key driver in the recent movement toward use of weighted nutrient analyses. As Exhibit 3.3 illustrates, students do employ these freedoms. While milk was offered in every NSLP menu, nine percent of the lunches served to students did not include a milk. Milk was more commonly omitted in lunches served in secondary schools (16%) than in lunches served in elementary schools (6%).

More than 20 percent of NSLP meals served to students did not include the minimum two servings of fruit, vegetables or full-strength juice suggested in both the traditional and enhanced food-based menu planning systems. Selection of lunches that included two or more servings of fruit, vegetables, or juice occurred with somewhat greater frequency in elementary schools than in secondary schools (80% versus 74%). Finally, when an additional grain or bread product was available (other than those included in combination entrees or served with specific menu items), these items were omitted in about a quarter of the lunches served in elementary schools and more than a third of the lunches served in secondary schools.

## Average Nutrient Content of Lunches Served to Students

This section presents data on the average nutrient content of lunches served to students in SY 1998–99. The nutrient content of the average lunch, as served, is compared to the NSLP nutrient standards and NRC recommendations described in Chapter One:

- **Nutrient Content Relative to RDAs.** Mean contribution to RDAs for calories, protein, vitamin A, vitamin C, calcium, and iron is evaluated in light of the defined nutrient standard for lunch (33% of the RDA).
- **Percentage of Calories from Total Fat and Saturated Fat.** The mean percentage of calories provided by each type of fat is compared to defined NSLP standards for total fat ( $\leq 30\%$ ) and saturated fat ( $< 10\%$ ).
- **Cholesterol, Sodium, and Carbohydrate Content.** Mean cholesterol and sodium content are compared to NRC recommendations. The standards used reflect one-third of the NRC's recommended maximum daily intake. The mean percentage of calories from carbohydrate is compared to the NRC recommendation ( $> 55\%$ ).

**Exhibit 3.3**

**Characteristics of Lunches Served to Students**

<b>Characteristic</b>	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
	<b>Average Percentage of Lunches Served to Students</b>		
<b>All Lunches</b>			
Included milk	94%	84%	91%
Included combination entree or meat alternate	100	100	100
Included two or more fruits and/or vegetables <sup>1</sup>	80	74	78
Included separate grain/bread (when offered) <sup>2</sup>	76	65	72
Included dessert (when offered)	83	63	76
Number of Daily Menus (Unweighted)	1,948	3,304	5,252
Number of Schools (Unweighted)	398	677	1,075

<sup>1</sup> Fruits and vegetables not included in combination entrees.

<sup>2</sup> Grains or breads not included in combination entrees or offered with specific menu item.

Source: Weighted tabulations of menu and meal production data for one week between September 1998 and May 1999.



## Mean Nutrient Content Relative to RDAs

With the exception of calories in secondary school lunches, NSLP lunches served to students in SY 1998–99 met or exceeded the standard of one-third of the RDA for calories and all target nutrients (Exhibit 3.4).<sup>6</sup>

On average, lunches served to students were nutrient-dense. Elementary school lunches, for example, provided an average of about 35 percent of the RDA for calories while providing more than 100 percent of the RDA for protein, more than 50 percent of the RDAs for vitamin A, vitamin C, and calcium, and 44 percent of the RDA for iron.

The pattern was similar for secondary school lunches; however, the relative contribution to students' daily nutrient needs — always above the 33 percent RDA benchmark — was consistently lower. The only nutrition standard that the average secondary school lunch did not satisfy was the standard for calories. Lunches served to students in secondary schools provided, on average, 30 percent of the RDA for calories, compared to the standard of 33 percent.

### *Percentage of Schools Meeting RDA Standards*

In addition to examining the mean nutrient content of lunches served to students, in comparison to the one-third-RDA standard, the analysis assessed the percentage of individual schools that met standards for calories and target nutrients. The data indicate that satisfying the calorie standard, for secondary schools especially, poses the greatest challenge to schools. More than two-thirds (68%) of elementary schools met the one-third RDA standard for calories; however, the same was true for only 20 percent of secondary schools (Exhibit 3.5). The dramatic difference between elementary schools and secondary schools is likely attributable to both the greater calorie needs of older students and the fact, as discussed above, that secondary school students were more likely than elementary school students to omit components of the offered NSLP meal (see Exhibit 3.3).

Lunches served to students in all schools met the one-third RDA benchmark for protein, which, as shown in Exhibit 3.4, was provided at levels above 100 percent of the full RDA in the average elementary school lunch and close to two-thirds of the RDA in the average secondary school lunch.<sup>7</sup> Lunches served in all or nearly all elementary schools satisfied the RDA standards for vitamin A, calcium, and iron. The only nutrient for which an appreciable number of elementary schools fell short of the one-third-RDA benchmark was vitamin C. The average lunch served in about 15 percent of elementary schools provided less than one-third of the RDA for vitamin C.

With the exception of protein, secondary schools were less likely than elementary schools to serve lunches that, on average, provided one-third or more of the RDA (Exhibit 3.5). As noted above, factors that may contribute to this pattern include greater nutrient needs of older students coupled with an increased tendency to omit components of the offered NSLP lunch. The average lunch served in roughly 15 to 20 percent of secondary schools provided less than one-third of the RDAs for vitamin C and/or

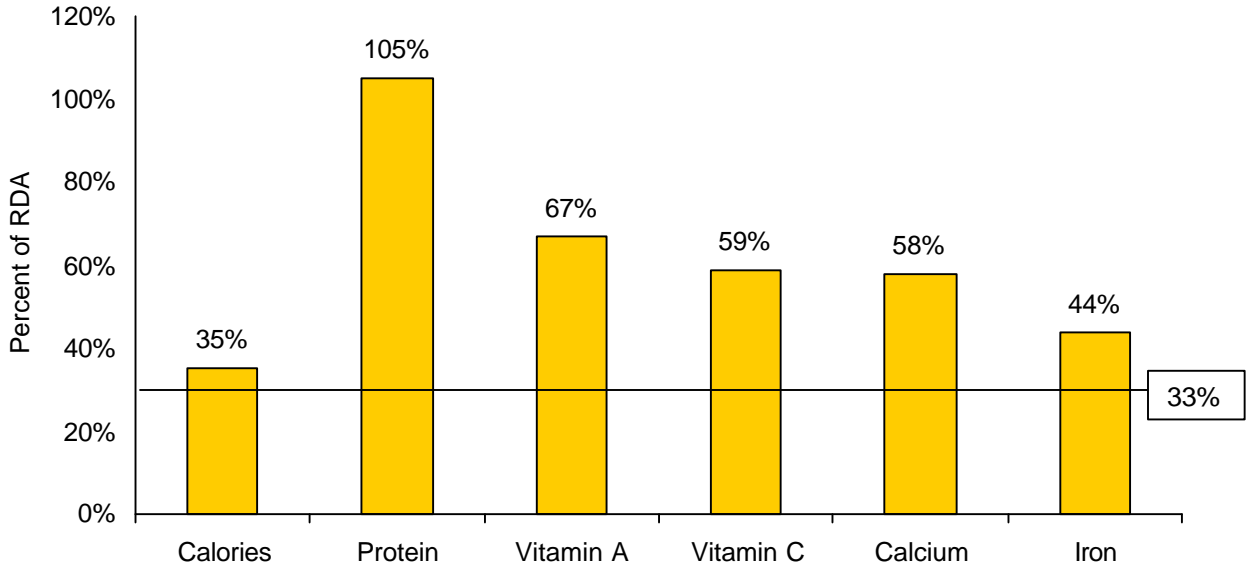
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6 Data on actual mean calorie and nutrient content of lunches, as served, are presented in Exhibit A.1.

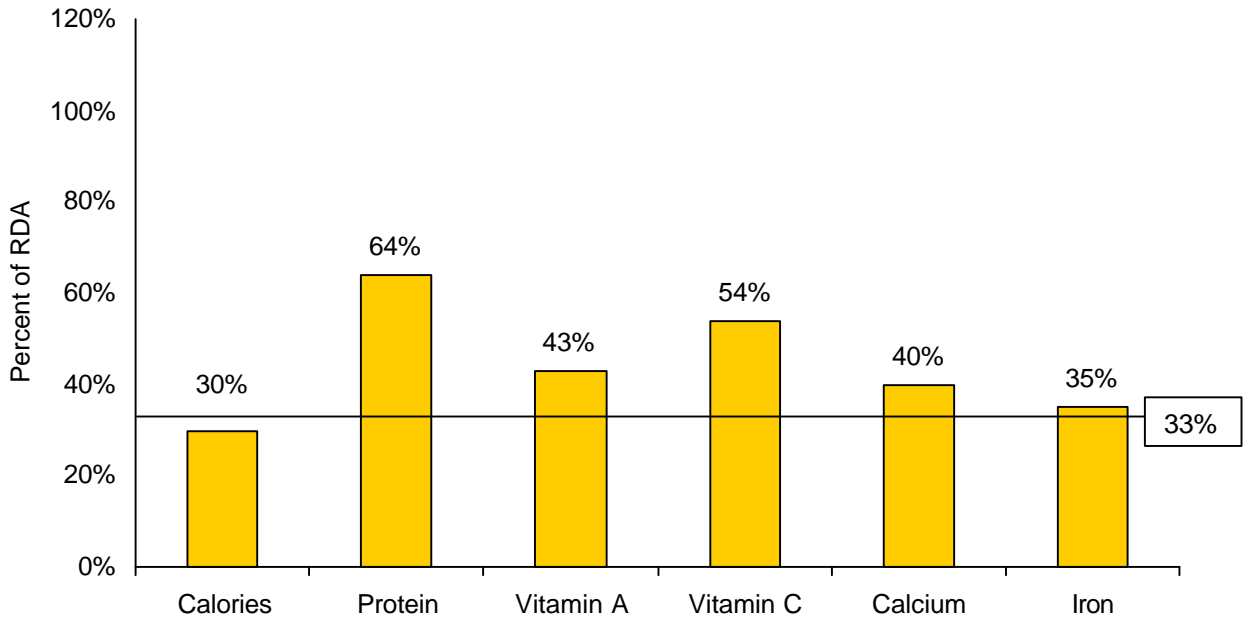
7 This is in keeping with characteristics of the American diet, which typically provides several times the RDA for protein.

**Exhibit 3.4 Lunches Served to Students in SY 1998-99 Provided More than One-Third of the RDA, With the Exception of Calories in Secondary Schools**

**Elementary School Lunches**



**Secondary School Lunches**



**Exhibit 3.5**

**Percentage of Schools in Which the Average Lunch  
Served to Students Provided One-Third or More of the RDA**

	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
	<b>Percentage of Schools</b>		
Calories	68%	20%	51%
Protein	100	100	100
Vitamin A	98	65	87
Vitamin C	86	79	84
Calcium	100	86	95
Iron	93	60	82
Number of Schools (Unweighted)	398	677	1,075

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

calcium. The most limited nutrients in secondary school lunches were vitamin A and iron. On average, lunches served in about a third of all secondary schools fell short of the NSLP standard for vitamin A. Lunches served in 40 percent of secondary schools fell short of the standard for iron.

### **Percentage of Calories from Total Fat and Saturated Fat**

On average, lunches served to students in SY 1998–99 did not meet defined NSLP standards for the percentage of calories from total fat or saturated fat (Exhibit 3.6). Lunches served in elementary schools came somewhat closer to meeting the standard for calories from total fat than lunches served in secondary schools. On average, lunches served in elementary schools provided 33 percent of calories from fat (compared to the standard of no more than 30%). Lunches served in secondary schools provided approximately 35 percent of calories from fat.

Lunches served in both elementary and secondary schools exceeded the NSLP standard for calories from saturated fat. The average lunch served in both types of schools provided about 12 percent of calories from saturated fat, compared to the standard of less than 10 percent.

### ***Percentage of Schools Meeting Standards for Fat and Saturated Fat***

Although overall means for calories from fat and saturated fat exceeded established NSLP standards, the lunches served in some individual schools did meet these standards. Lunches served in 21 percent of all elementary schools provided no more than 30 percent of calories from fat (Exhibit 3.7). The percentage was 33 percent lower for secondary schools, at 14 percent. Lunches served in 15 percent of elementary schools and 13 percent of secondary schools met the standard for calories from saturated fat (less than 10%).

### **Cholesterol, Sodium and Carbohydrate Content**

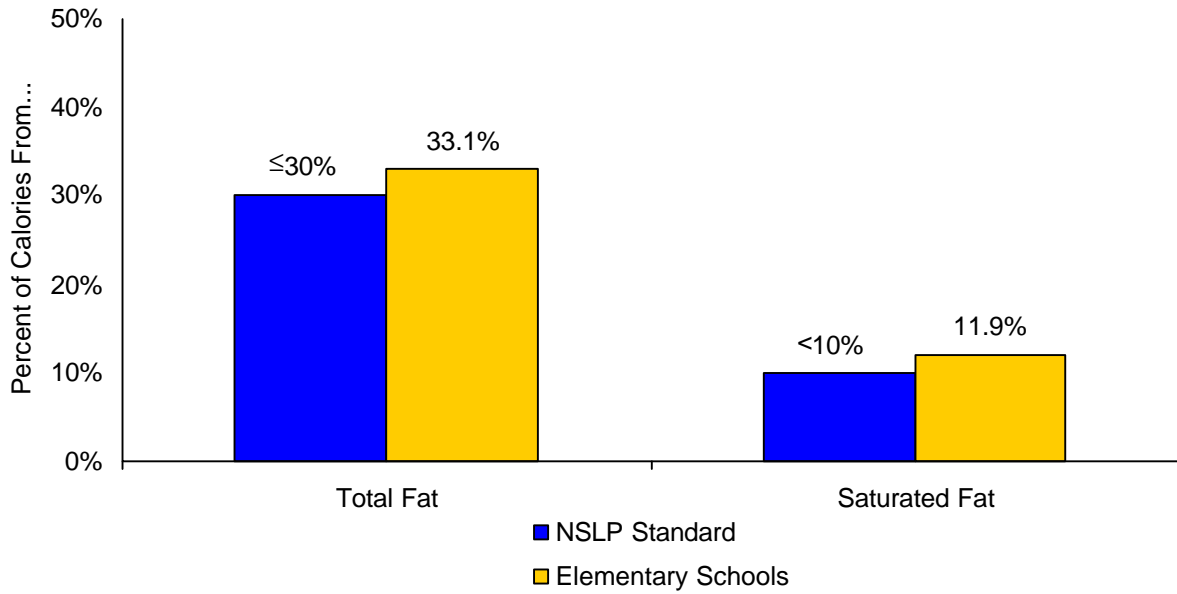
On average, lunches served in SY 1998–99 in both elementary schools and secondary schools satisfied the NRC recommendation of no more than 100 mg of cholesterol (equivalent to one-third of the NRC’s recommended daily maximum). (See Exhibit 3.8.) Indeed, lunches served in 98 percent of all schools met this standard (Exhibit A.4).

In contrast, the mean sodium content of lunches served in both elementary schools and secondary schools exceeded the NRC recommendation (no more than 800 mg) by a substantial margin. The mean sodium content of lunches served in elementary schools was approximately 57 percent higher than the recommended level (1,259 mg versus  $\leq 800$  mg). Lunches served in secondary schools exceeded the recommended level by 73 percent (1,382 mg versus  $\leq 800$  mg). As the mean values suggest, lack of conformity with the NRC recommendation for sodium content was widespread. Overall, lunches served in only about one percent of all schools were consistent with this recommendation (Exhibit A.4). Almost all of the schools that met this recommendation were elementary schools.

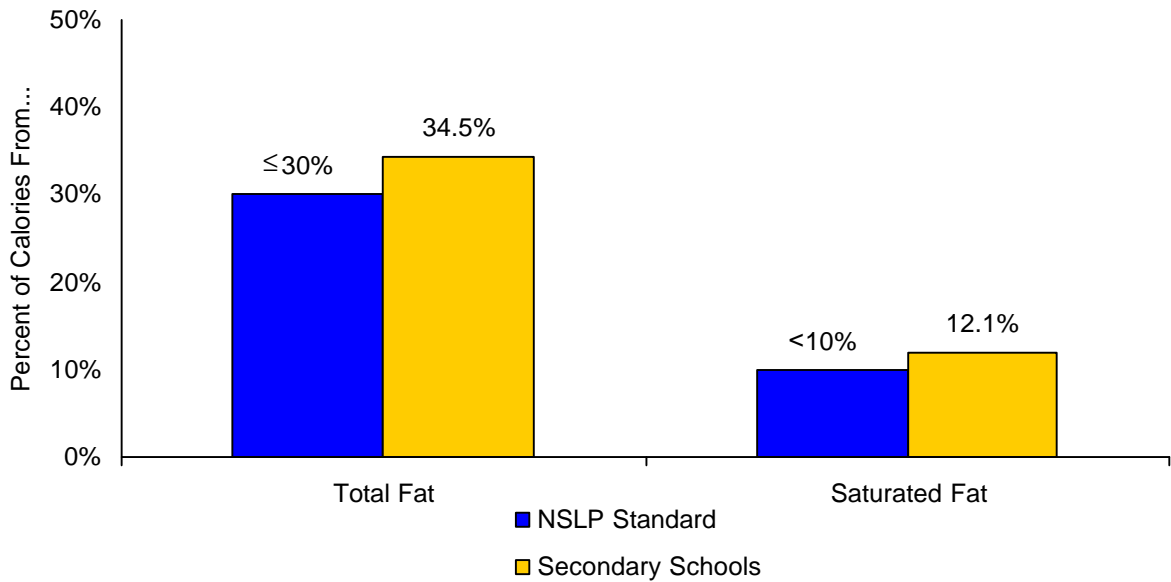
In comparison to the NRC recommendation that more than 55 percent of all calories come from carbohydrate, lunches served in both elementary schools and secondary schools were low in carbohydrate calories (Exhibit 3.8). Lunches served in both types of schools provided, on average, roughly 50 percent of calories from carbohydrate. This is not unexpected, given the percentage of calories from fat — it is difficult to meet the recommendation for calories from carbohydrate without meeting the standard for

**Exhibit 3.6 Lunches Served to Students in SY1998-99 Did Not Meet NSLP Standards for Calories From Fat and Saturated Fat**

### Elementary School Lunches



### Secondary School Lunches



**Exhibit 3.7**

**Distribution of the Percentage of Calories from Total Fat, Saturated Fat,  
and Carbohydrate in Average Lunches Served to Students**

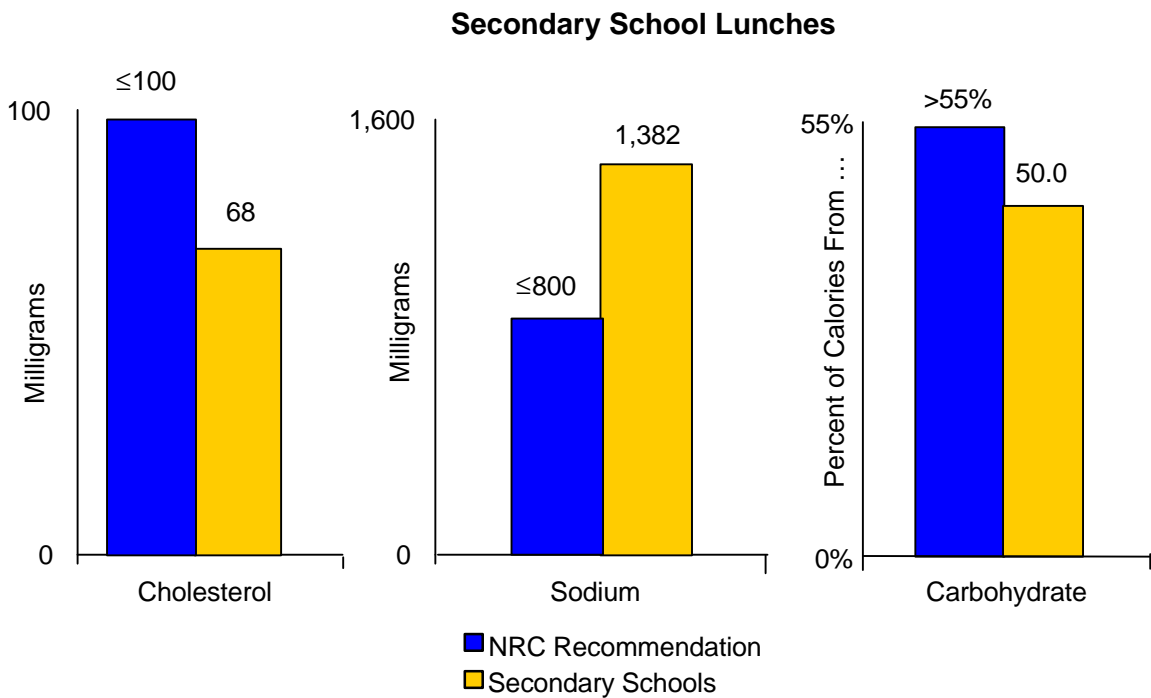
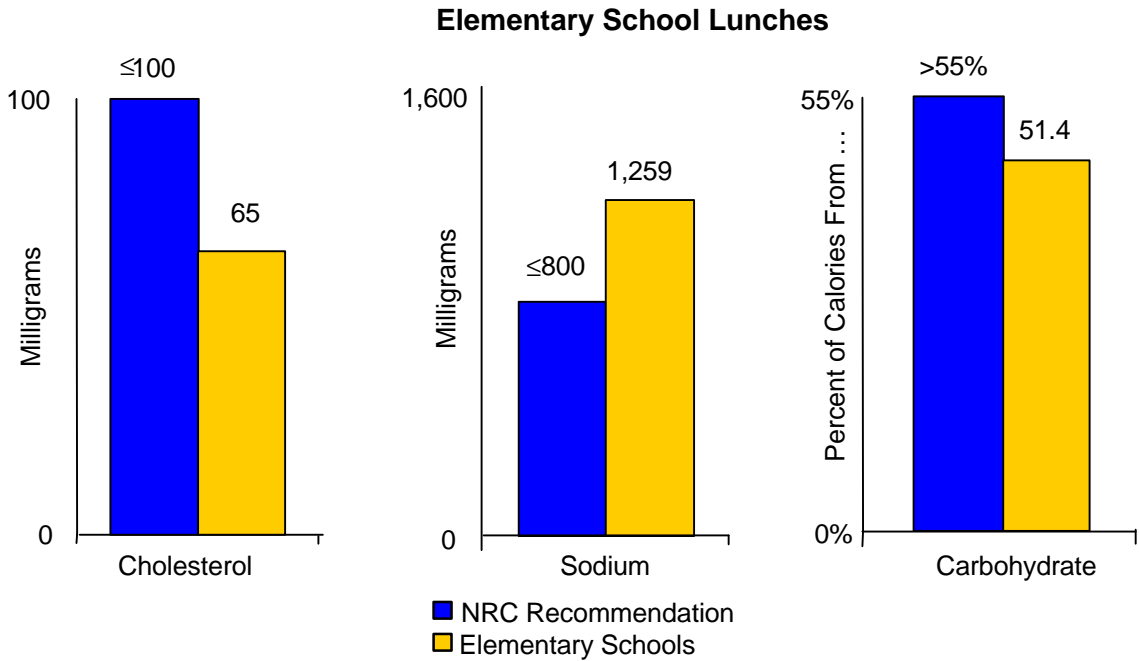
	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
	<b>Percentage of Schools</b>		
<b>Percentage of Calories from Fat</b>			
No more than 30%	21%	14%	19%
30.1-34.0%	41	34	39
34.1-36.0%	16	18	16
36.1-38.0%	12	15	13
38.1-40.0%	6	10	7
More than 40.0%	5	9	6
<b>Percentage of Calories from Saturated Fat</b>			
Less than 10%	15%	13%	15%
10.1-12.0%	38	36	37
12.1-14.0%	31	36	33
14.1-16.0%	13	13	13
More than 16.0%	2	2	2
<b>Percentage of Calories from Carbohydrate</b>			
Less than 45%	7%	12%	9%
45-55%	76	74	75
More than 55%	18	14	17
<b>Number of Schools (Unweighted)</b>	<b>398</b>	<b>677</b>	<b>1,075</b>

Notes: Highlighted rows show NSLP standard (fat and saturated fat) or NRC recommendation (carbohydrate).

Column sections may not sum to 100 percent due to rounding.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit 3.8 Lunches Served to Students Met the NRC Recommendation for Cholesterol but Did Not Meet Recommendations for Sodium or Calories From Carbohydrate**



calories from fat. Only 18 percent of elementary schools and 14 percent of secondary schools served lunches that were consistent with this recommendation (Exhibit 3.7).

## Average Nutrient Content of Lunches Served to Students, by Menu Planning Method

As described in previous chapters, schools have a variety of menu planning options from which to choose: the traditional food-based menu planning system, the enhanced food-based menu planning system, NSMP, ANSMP and “any reasonable approach.” To determine whether the choice of menu planning system influenced the nutrient content of lunches served to students, the mean nutrient content of lunches served in SY 1998–99 were compared on the basis of the menu planning system used. Because ANSMP was used in very few schools (a total of 20 schools in the unweighted sample), NSMP and ANSMP schools were combined for purposes of this analysis. Schools that reported using an alternative menu planning system (i.e., “any reasonable approach” — 36 schools in the unweighted sample) were not included in the comparisons.

Statistical significance of differences between menu planning systems was tested using two-tailed *t*-tests. Two comparisons were made: lunches served in schools using the traditional food-based menu planning system were compared to lunches served in schools using NSMP or ANSMP and to lunches served in schools using the enhanced food-based menu planning system. Because of the large number of *t*-tests that were conducted simultaneously, a conservative cutoff was used to define statistical significance, thereby decreasing the likelihood of reporting chance findings. Only differences that were statistically significant at the one percent level ( $p < .01$ ) or better are reported.

With regard to meals served in schools that reported using NSMP or ANSMP, it is important to recognize that these computer-based menu planning systems may not have been fully implemented at the time data were collected. Previous research has indicated that implementation of NSMP can be a lengthy and challenging process. In a USDA-sponsored demonstration of NSMP, 16 SFAs took anywhere from three to 33 months to implement NSMP, with an average time line of 19 months (Fox 1998). Because no information is available on the status of NSMP/ANSMP implementation at the time data were collected, the comparisons discussed in the following paragraphs should be interpreted as lower-bound estimates of differences between NSMP/ANSMP and the traditional food-based menu planning system. Moreover, the absence of differences cannot be interpreted as indicative of no effect in fully implemented NSMP/ANSMP schools.

The data revealed relatively few differences in the average nutrient content of meals served in schools using the various menu planning options.<sup>8</sup> Among elementary schools, lunches served in NSMP/ANSMP schools provided 34 percent of the RDA for calories compared to 36 percent of the RDA for schools that used the traditional food-based menu planning system (Exhibit 3.9). Lunches served in both types of schools satisfied the one-third RDA standard for calories. In addition, lunches served in elementary schools that used the enhanced food-based menu planning system provided, on a percentage

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8 Results for all schools combined and for middle schools and high schools separately are shown in Appendix A.



### Exhibit 3.9

#### Mean Nutrient Profile of Lunches Served, by Menu Planning System, Compared to Nutrition Standards for NSLP Lunches and NRC Recommendations *Elementary Schools*

	Menu Planning System				
	Standard/ Recommendation	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
<b>Mean Percentage of RDA</b>					
Total Calories	33%	36%	34%*	36%	35%
Protein	33%	107	102	106	105
Vitamin A	33%	67	63	72	67
Vitamin C	33%	61	56	60	59
Calcium	33%	58	57	58	58
Iron	33%	45	42	44	44
<b>Mean Percentage of Calories</b>					
Total Fat	≤ 30%	33.8%	32.5%	32.6%	33.1%
Saturated Fat	< 10%	12.4	11.7	11.5†	11.9
Carbohydrate	> 55% <sup>1</sup>	50.8	51.9	51.8	51.4
<b>Mean Amount</b>					
Cholesterol (mg)	≤ 100 <sup>1</sup>	67	63	63	65
Sodium (mg)	≤ 800 <sup>1</sup>	1,294	1,228	1,255	1,259
<b>Number of Schools (Unweighted)</b>		155	108	122	398

<sup>1</sup> NRC recommendation, not NSLP standard.

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (7 schools).

Data for 13 schools that reported use of some other menu-planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

\* Difference between means for traditional food-based system and NSMP/ANSMP is statistically significant at the .01 level.

† Difference between means for traditional and enhanced food-based systems is statistically significant at the .01 level.

Source: Weighted nutrient analysis of meal and menu production data for one week between September 1998 and May 1999.

basis, fewer calories from saturated fat than lunches served in schools that used the traditional food-based system. However, both estimates rounded to 12 percent so lunches served in both types of schools failed to meet the NSLP standard of less than 10 percent of calories from saturated fat.

Among secondary schools, lunches served in schools that used the traditional food-based menu planning system provided, on a percentage basis, more calories from fat (35% versus 34%) and saturated fat (13% versus 12%), and fewer calories from carbohydrate (49% versus 51%), than lunches served in schools that used the enhanced food-based system (Exhibit 3.10). Although none of these differences affect conclusions about whether the average lunch met specific standards, the differences in means for the percentage of calories from fat, saturated fat and carbohydrate are worth noting because they moved schools in the enhanced food-based system group closer to the respective standards.

The percentage of schools deemed to have met the various NSLP standards and NRC recommendations used in this analysis was also compared on the basis of menu planning method (Exhibits A.5 and A.6). The only significant difference detected was for calories among elementary schools. Elementary schools that used the traditional food-based menu planning system were more likely than elementary schools that used NSMP/ANSMP to meet the one-third RDA standard for calories (78% versus 55%). None of the differences for other nutrition standards were significant for elementary schools and no significant differences were noted for secondary schools. Thus, the type of menu planning system used did not significantly affect the likelihood that an individual school would meet the various nutrition standards.

## Characteristics of Low-Fat and Higher-Fat Lunches

USDA is committed to lowering the fat content of school meals without reducing the amounts of other key nutrients provided to students. To address this concern, an analysis was undertaken to examine the impact of lower levels of fat on the overall nutrient profile of lunches served to students. The analysis also examined, in a general way, variations in menu offerings among schools in which the lunches served to students provided different levels of fat.

Schools were stratified into one of four groups based on the average percentage of calories from fat in lunches served to students:

- **Schools with low-fat lunches:** Mean percentage of calories from fat was less than or equal to 30 percent (the NSLP standard);
- **Schools with moderate-fat lunches:** Mean percentage of calories from fat ranged from more than 30 percent to 35 percent;
- **Schools with high-fat lunches:** Mean percentage of calories from fat ranged from more than 35 percent to 38 percent;
- **Schools with highest-fat lunches:** Mean percentage of calories from fat was more than 38 percent.

**Exhibit 3.10**

**Mean Nutrient Profile of Lunches Served, by Menu Planning System,  
Compared to Nutrition Standards for NSLP Lunches and NRC Recommendations  
Secondary Schools**

	Menu Planning System				
	Standard/ Recommendation	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
<b>Mean Percentage of RDA</b>					
Total Calories	33%	30%	30%	30%	30%
Protein	33%	64	63	64	64
Vitamin A	33%	42	41	48	43
Vitamin C	33%	52	56	55	54
Calcium	33%	40	40	40	40
Iron	33%	35	35	34	35
<b>Mean Percentage of Calories</b>					
Total Fat	≤ 30%	35.3%	34.2%	33.5% †	34.5%
Saturated Fat	< 10%	12.5	12.0	11.7 †	12.1
Carbohydrate	> 55% <sup>1</sup>	49.0	50.3	51.1 ††	50.0
<b>Mean Amount</b>					
Cholesterol (mg)	≤ 100 <sup>1</sup>	71	65	67	68
Sodium (mg)	≤ 800 <sup>1</sup>	1,374	1,392	1,392	1,382
Number of Schools (Unweighted)		282	175	197	677

<sup>1</sup> NRC recommendation, not NSLP standard.

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (13 schools).

Data for 23 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

† Difference between the traditional and enhanced food-based systems is statistically significant at the .01 level.

†† Difference between the traditional and enhanced food-based systems is statistically significant at the .001 level.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

Nineteen percent of all schools satisfied the NSLP standard of providing no more than 30 percent of calories from fat (Exhibit 3.7) and were thus included in the low-fat group. The largest group, the moderate-fat group, included 39 percent of all schools. Another 29 percent of schools fell into the high-fat group and 13 percent of schools were in the highest-fat group.

### **Average Nutrient Content of Lunches by Relative Fat Content**

With regard to calories and the key RDA nutrients, nutrient profiles for the average lunch offered in each type of school were very consistent. In virtually all cases, means for key nutrients met or exceeded the one-third RDA standard defined for NSLP meals (Exhibit 3.11). The only instance in which the one-third RDA standard for calories was not met was for schools in the high-fat group (32.4%). These data indicate that decreased levels of fat in school lunches was not associated with notable decreases in the availability of calories or key nutrients.

In fact, decreased levels of fat appear to be associated with other positive changes in school meals, namely, a smaller percentage of calories from saturated fat and a greater percentage of calories from carbohydrate. Among schools in the low-fat group, the overall mean for the percentage of calories from saturated fat (10%) was very close to the NSLP standard of less than 10 percent.

### **Foods Most Commonly Offered**

Exhibit 3.12 shows the relative frequency with which various food items were included in the menus offered by schools in the four relative-fat-content groups. The tabulations reflect the percentage of schools that offered the specific food or food group *at least once per week*. This analysis is meant to be descriptive — no statistical tests have been performed on the data. Because of small sample sizes for some of the individual cells, readers should be cautious not to over-interpret the data. Patterns observed in the data provide some insight into menu planning practices that may influence the level of fat in school lunches but should not be interpreted as fully predictive. The percentage of calories from fat in the average meal served to students is influenced by the full array of menu offerings, and by students' food selection patterns, rather than by the availability of a single item or group of items.

Below, notable differences between menu offerings in schools in the low-fat and highest-fat groups are summarized. Patterns observed for the moderate- and high-fat groups may or may not follow suit. Disparities reflect the fact that the relationship between menu offerings and relative fat content is not a simple linear relationship. The more consistent the relationship between a specific menu characteristic and relative fat content, the more important the characteristic is likely to be in determining the ultimate percentage of calories provided by fat.

- **Milk:** Schools in the low-fat group offered flavored milk that was made from 1% milk more often than schools in the highest-fat group. In addition, schools in the low-fat group offered whole milk and flavored milk made from 2% milk less often than schools in the highest-fat group. Schools in the low-fat group also offered flavored milk made with skim milk more often than schools in the highest-fat group.
- **Fruit and Juice:** Schools in the low-fat group offered fresh fruit more often than schools in the highest-fat group.

**Exhibit 3.11**

**In Comparison to Higher-Fat Lunches, Low-Fat Lunches Provided  
Comparable Amounts of Calories and Key Nutrients**

	Standard/ Recommendation	Relative Amount of Fat in Average Lunch, as Served <sup>1</sup>			
		Low	Moderate	High	Highest
<b>Mean Percentage of RDA</b>					
Total Calories	33%	34%	34%	32%	33%
Protein	33%	94	93	86	83
Vitamin A	33%	65	60	56	52
Vitamin C	33%	70	57	54	48
Calcium	33%	53	52	50	49
Iron	33%	43	42	38	36
<b>Mean Percentage of Calories from...</b>					
Total Fat	≤ 30%	28.2%	32.7%	36.4%	40.5%
Saturated Fat	< 10%	10.0	11.8	13.0	14.4
Carbohydrate	> 55% <sup>2</sup>	56.4	51.7	47.9	44.4
<b>Mean Amount</b>					
Cholesterol (mg)	≤ 100 <sup>2</sup>	57	66	68	76
Sodium (mg)	≤ 800 <sup>2</sup>	1,275	1,300	1,293	1,363
Number of Schools (Unweighted)		206	527	200	142

<sup>1</sup> Low-fat is defined as no more than 30 percent of calories from fat; moderate-fat as more than 30 percent up to 35 percent; high-fat as more than 35 percent up to 38 percent; and highest-fat as more than 38 percent. Schools in the low-fat group met the NSLP standard for the percentage of calories from fat.

<sup>2</sup> NRC recommendation, not NSLP standard.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

Exhibit 3.12

Schools that Served Low-Fat Lunches Tended to Offer Certain Foods More Often than Schools that Served the Highest-Fat Lunches

	Relative Amount of Fat in Average Lunch, as Served <sup>1</sup>			
	Low	Moderate	High	Highest
	Percentage of Schools Offering Item at Least Once per Week			
<b>Milk</b>				
1% flavored	77%	70%	62%	65%
1% unflavored	55	49	59	58
2% unflavored	47	56	40	45
Whole unflavored	37	52	53	61
Skim unflavored <sup>2</sup>	32	39	47	26
Skim flavored <sup>2</sup>	24	19	17	14
2% flavored	<1	12	21	14
<b>Fruits and Juices</b>				
Canned fruit	94	92	89	88
Fresh fruit	80	76	76	55
Full-strength citrus juice	24	23	18	22
Full-strength non-citrus juice	21	24	21	25
Frozen fruit or juice	20	23	21	19
<b>Vegetables</b>				
Cooked vegetables (other than potatoes and French fries)	96	89	84	83
Potatoes other than French fries or similar potato products	71	67	71	70
Oven-fried French fries/potato products	63	58	63	63
Green salads (other than entree salads)	54	75	75	75
Raw vegetables other than green salads or lettuce and/or tomato	44	47	45	41
Legumes	21	38	25	37
Other vegetable items (soups, mixed casseroles)	21	17	21	18
Lettuce and/or tomato <sup>3</sup>	14	23	22	29
Other (non-green) salads	14	25	27	22
Deep-fried French fries/potato products	8	12	20	28
<b>Combination Entrees</b>				
Sandwiches made with cheese and/or cold cuts	60	55	77	59
Pasta-based dishes	59	60	46	45
Hamburgers and similar beef/pork sandwiches	55	57	61	50

**Exhibit 3.12**  
(continued)

	<b>Relative Amount of Fat in Average Lunch, as Served<sup>1</sup></b>			
	<b>Low</b>	<b>Moderate</b>	<b>High</b>	<b>Highest</b>
<b>Combination Entrees (continued)</b>				
Mexican-style entrees	52%	53%	58%	71%
Pizza without meat	46	47	44	28
Pizza with meat	43	47	53	61
Hot dogs/corn dogs/similar sausage products	42	51	53	72
Sandwiches made with breaded and/or fried meat/poultry/fish (no cheese)	38	40	49	28
Sandwiches made with lean meat or poultry (no cheese)	35	32	36	26
Other mixed dishes/combinations	31	35	34	29
Peanut butter sandwiches	30	25	47	24
Food bars (other than salad bars)/bag lunches	22	9	11	9
Cheeseburgers and similar beef/pork sandwiches	21	32	56	46
Chef's salad or other salad plate	19	27	36	19
Sandwiches made with mayonnaise-based salads (no cheese)	12	17	27	14
Salad bars	7	10	21	18
Breakfast sandwiches	6	5	3	6
<b>Meats/Meat Alternates (not part of a combination entree)</b>				
Breaded chicken nuggets/patties/similar products	43	43	49	55
Other breaded or fried meat/poultry/fish	24	31	47	43
Plain (not breaded or fried) meat/poultry/fish	36	29	25	32
Meat/poultry/fish with mayonnaise or gravy	13	11	15	11
Yogurt	3	5	4	4
Sausage	1	3	5	10
<b>Grains/Breads (not part of a combination entree)</b>				
Bread, rolls, bagels, other plain breads	75	71	67	65
Crackers/hard pretzels	41	32	24	27
Pre-buttered bread/rolls	13	20	11	10
Rice	25	28	26	25
Biscuits, cornbread, croissants, other higher-fat breads/bread alternates	30	37	23	33
Pastries/muffins	14	15	9	4
Pasta	9	17	16	22
Pancakes/waffles/French toast	7	2	0	1

**Exhibit 3.12**  
(continued)

	<b>Relative Amount of Fat in Average Lunch, as Served<sup>1</sup></b>			
	<b>Low</b>	<b>Moderate</b>	<b>High</b>	<b>Highest</b>
<b>Desserts</b>				
Baked desserts	57%	61%	49%	52%
Other desserts (non-fruited gelatin, pudding, ice cream)	45	45	22	26
Dessert items that include fruit or juice	30	26	15	21
<b>Other Menu Items</b>				
Snack chips	14	9	16	14
Soups	13	10	4	7
Fruit drinks/ades	11	6	14	7
<b>Condiments, Salad Dressings, and Spreads</b>				
Nonfat/lowfat condiments	92	93	98	94
Nonfat/lowfat salad dressings	38	38	36	17
Higher-fat condiments	33	50	62	53
Higher-fat spreads	31	24	37	24
Nonfat/lowfat spreads	29	16	14	5
Regular salad dressings	26	58	61	68
Number of Daily Menus (Unweighted)	1,010	2,585	966	691
Number of Schools (Unweighted)	206	527	200	142

<sup>1</sup> Low-fat is defined as 30 percent or less of total calories from fat; moderate-fat as more than 30 percent up to 35 percent; high-fat as more than 35 percent up to 38 percent; and highest-fat as more than 38 percent. Schools in the low-fat group met the NSLP standard for the percentage of calories from fat.

<sup>2</sup> Includes 1/2 percent milk.

<sup>3</sup> Lettuce and/or tomato offered as a vegetable choice for all students. Excludes lettuce and tomato included in prepared sandwiches or offered with other prepared entrees.

Note: See Exhibit E.6 for a detailed listing of items included in each group.

Source: Weighted tabulations of menu and meal production data for one week between September 1998 and May 1999.



- **Vegetables:** Schools in the highest-fat group offered cooked vegetables other than potatoes and French fries less often than schools in the low-fat group. Schools in the highest-fat group also offered deep-fried French fries much more often than schools in the low-fat group. Schools in the low-fat group offered legumes (most often baked beans or refried beans) and green salads (most often accompanied by dressings) less often than schools in the highest-fat group.
- **Combination Entrees and Separate Meats/Meat Alternates:** In comparison to schools in the highest-fat group, schools in the low-fat group offered the following items less often — Mexican-style entrees; pizza with meat; hot dogs, corn dogs and similar sausage products; cheeseburgers; salad bars; and all types of breaded or fried meat, fish and poultry. At the same time, schools in the low-fat group offered pasta-based dishes; pizza without meat; and food bars and bag lunches more often than schools in the highest-fat group.
- **Separate Breads/Grains:** In comparison to the highest-fat group, schools in the low-fat group tended to offer bread/bread alternates outside of combination entrees more often. These items may have been available to all students or offered with a particular combination entree or meat/meat alternate and were most often lower-fat bread options, e.g., plain bread and rolls and crackers or hard pretzels. Schools in the highest-fat group offered pasta-based side dishes (most often macaroni and cheese) more often than schools in the low-fat group.
- **Desserts:** Schools in the low-fat group offered all types of dessert more often than schools in the highest-fat group. This finding may seem counterintuitive but, depending on the characteristics of the menu and the dessert, desserts can decrease the percentage of calories provided by fat by increasing carbohydrate calories.
- **Condiments, Salad Dressings and Spreads:** Schools in the low-fat group offered nonfat and lowfat salad dressings and spreads more often than schools in the highest-fat group. At the same time, schools in the highest-fat group offered regular salad dressings and higher-fat condiments more often than schools in the low-fat group.

## Sources of Calories and Nutrients in NSLP Lunches as Served

To provide information on the food sources of calories and key nutrients in NSLP lunches, menu items were classified into one of six major food groups — milk; fruit, juice and vegetables; combination entrees; separate meats/meat alternates (not part of a combination entree); separate grains/breads (not part of a combination entree); and other menu items. These major food groups were expanded to 26 minor food groups. The percentage contribution of each major and minor food group to the calorie and nutrient content of the average lunch (as served) was then computed. Results are shown in Exhibit 3.13 and major findings are summarized below.

**Exhibit 3.13**

**Sources of Calories and Nutrients in NSLP Lunches as Served**

<b>Food Group/Food(s)</b>	<b>Calories</b>	<b>Protein</b>	<b>Carbohydrate</b>	<b>Fat</b>	<b>Saturated Fat</b>	<b>Sodium</b>
	<b>Percentage Contribution to Average Amount Served</b>					
<b>Milk</b>	<b>17.8%</b>	<b>24.0%</b>	<b>20.7%</b>	<b>10.4%</b>	<b>18.2%</b>	<b>9.1%</b>
Whole milk	1.6	2.0	1.0	2.3	4.0	0.7
Lowfat/nonfat milks	16.2	22.0	19.7	8.1	14.1	8.5
<b>Fruits, Juices, Vegetables</b>	<b>16.6</b>	<b>7.2</b>	<b>25.0</b>	<b>10.5</b>	<b>8.0</b>	<b>11.8</b>
Fruit/juice	6.0	1.1	11.9	0.7	0.5	0.3
Vegetables	10.6	6.1	13.1	9.8	7.5	11.5
<b>Combination Entrees</b>	<b>39.8</b>	<b>50.5</b>	<b>29.4</b>	<b>48.4</b>	<b>51.5</b>	<b>48.7</b>
Hamburgers, cheeseburgers	7.2	10.2	4.6	9.3	10.6	6.9
Hot dogs, corn dogs, sausage products	2.7	2.5	1.9	4.0	3.7	4.3
Pizza	9.6	11.7	7.6	11.3	13.2	12.2
Other sandwiches	8.8	11.2	6.7	10.4	10.1	12.5
Chef's salad, salad bars, other food bars	2.6	3.2	1.9	3.3	3.3	3.4
Mixed dishes <sup>1</sup>	8.8	11.7	6.7	10.2	10.7	9.5
<b>Meat/Meat Alternates (not part of a combination entree)</b>	<b>5.4</b>	<b>8.9</b>	<b>1.9</b>	<b>8.5</b>	<b>6.6</b>	<b>6.2</b>
Breaded/fried meat, poultry, fish <sup>2</sup>	4.2	6.2	1.6	6.7	5.0	4.4
Other meats/meat alternates	1.2	2.7	0.3	1.7	1.6	1.9
<b>Grains/Breads (not part of a combination entree)</b>	<b>8.2</b>	<b>5.1</b>	<b>10.6</b>	<b>5.8</b>	<b>3.9</b>	<b>7.7</b>
Bread, rolls, bagels, other plain breads	3.9	2.7	5.4	2.1	1.2	3.3
Biscuits, cornbread, croissants, other higher-fat breads	1.9	1.1	2.1	1.9	1.2	2.0
Crackers/hard pretzels	0.6	0.3	0.8	0.4	0.2	0.8
Pastries/muffins	0.6	0.3	0.8	0.5	0.3	0.4
Pasta/rice	1.1	0.7	1.3	0.9	0.8	1.3
Pancakes, waffles, French toast	0.1	0.1	0.1	0.1	0.0	0.1

**Exhibit 3.13**  
(continued)

Food Group/Food(s)	Calories	Protein	Carbohydrate	Fat	Saturated Fat	Sodium
	Percentage Contribution to Average Amount Served					
<b>Other Menu Items</b>	<b>12.3</b>	<b>4.3</b>	<b>12.5</b>	<b>16.4</b>	<b>11.8</b>	<b>16.4</b>
Desserts	5.8	2.0	7.4	5.4	5.0	2.7
Snack Chips	0.4	0.1	0.3	0.6	0.4	0.3
Fruit drinks/ades	0.5	0.0	1.0	0.0	0.0	0.1
Miscellaneous	1.1	1.2	0.7	1.5	2.1	2.8
Nonfat/lowfat condiments and spreads	1.5	0.6	2.5	0.9	0.3	7.9
Nonfat/lowfat salad dressings	0.4	0.1	0.3	0.6	0.3	1.0
Higher-fat condiments and spreads	1.5	0.2	0.1	4.4	2.2	0.7
Regular salad dressings	1.1	0.0	0.2	2.9	1.4	1.0

**Exhibit 3.13**  
(continued)

Food Group/Food(s)	Cholesterol	Vitamin A	Vitamin C	Calcium	Iron
	Percentage Contribution to Average Amount Served				
<b>Milk</b>	<b>14.6%</b>	<b>30.0%</b>	<b>7.2%</b>	<b>53.9%</b>	<b>8.6%</b>
Whole milk	3.7	1.4	0.6	4.6	0.2
Lowfat/nonfat milk	10.8	28.6	6.6	49.3	8.4
<b>Fruits, Vegetables, Juices</b>	<b>2.1</b>	<b>41.4</b>	<b>66.8</b>	<b>5.6</b>	<b>16.8</b>
Fruit/juice	0.1	2.6	37.4	1.6	4.3
Vegetables	2.0	38.8	29.5	4.0	12.5
<b>Combination Entrees</b>	<b>57.6</b>	<b>20.0</b>	<b>13.1</b>	<b>31.9</b>	<b>49.5</b>
Hamburgers, cheeseburgers, similar sandwiches	12.1	1.5	0.8	4.2	10.4
Hot dogs, corn dogs, sausage products	4.2	0.2	0.2	0.9	3.2
Pizza	8.8	5.6	1.4	13.0	11.1
Other sandwiches	13.4	2.5	0.7	6.1	10.1
Chef's salad, salad bars, other food bars	5.2	4.9	3.4	2.1	2.9
Mixed dishes <sup>1</sup>	13.9	5.2	6.4	5.6	11.9
<b>Meat/Meat Alternates (not part of a combination entree)</b>	<b>14.2</b>	<b>0.8</b>	<b>0.4</b>	<b>1.0</b>	<b>4.9</b>
Breaded/fried meat, poultry, fish <sup>2</sup>	10.2	0.5	0.2	0.7	3.6
Other meats/meat alternates	4.0	0.3	0.3	0.3	1.4
<b>Grains/Breads (not part of a combination entree)</b>	<b>2.3</b>	<b>1.4</b>	<b>0.9</b>	<b>3.4</b>	<b>12.1</b>
Bread, rolls, bagels, other plain breads	0.2	0.1	0.0	1.6	6.6
Biscuits, cornbread, croissants, other higher-fat breads	0.9	0.5	0.1	0.9	2.4
Crackers/hard pretzels	0.0	0.0	0.0	0.1	1.0
Pastries/muffins	0.4	0.1	0.0	0.2	0.8
Pasta/rice	0.6	0.7	0.7	0.6	1.3
Pancakes, waffles, French toast	0.1	0.0	0.0	0.0	0.1

**Exhibit 3.13**  
(continued)

<b>Food Group/Food(s)</b>	<b>Cholesterol</b>	<b>Vitamin A</b>	<b>Vitamin C</b>	<b>Calcium</b>	<b>Iron</b>
	<b>Percentage Contribution to Average Amount Served</b>				
<b>Other Menu Items</b>	<b>9.2</b>	<b>6.4</b>	<b>11.6</b>	<b>4.3</b>	<b>8.1</b>
Desserts	4.2	2.5	2.2	1.9	4.0
Snack chips	0.0	0.0	0.3	0.1	0.2
Fruit drinks/ades	0.0	0.1	4.8	0.2	0.2
Miscellaneous	1.8	1.1	1.1	1.3	1.1
Nonfat/lowfat condiments and spreads	0.2	1.5	3.0	0.6	2.2
Nonfat/lowfat salad dressings	0.2	0.1	0.0	0.1	0.0
Higher-fat condiments and spreads	1.4	0.9	0.0	0.1	0.2
Regular salad dressings	1.3	0.2	0.0	0.1	0.1

<sup>1</sup> Includes Mexican-style entrees, pasta-based entrees, and other mixtures (e.g., Shepherd's pie, chili, quiche).

<sup>2</sup> Includes meat/fish/poultry that is breaded, fried and/or prepared with gravy or mayonnaise.

Notes: See Exhibit E.6 for a detailed listing of items included in each group.

Columns may not sum to 100 percent due to rounding.

## **Calories**

The major source of calories in NSLP lunches served in SY1998-99 was combination entrees, which provided about 40 percent of total calories. Major contributors included pizza; sandwiches; mixed dishes; and hamburgers, cheeseburgers, and similar beef/pork sandwiches. Milk, primarily in the form of lowfat milks, made the second largest contribution to total calories (18%). Fruit, juice and vegetables contributed 17 percent of total calories and other menu items, including desserts, salad dressings, condiments, spreads, and other extras contributed more than 10 percent of total calories. Most of the calories in the latter group came from desserts (6%) and high-fat salad dressings, condiments and spreads (3%).

## **Carbohydrate**

Combination entrees were also the leading source of carbohydrate in school lunches (29%). Leading carbohydrate contributors in this group included pizza, sandwiches and mixed dishes. Fruits, juice and vegetables were the second leading source of carbohydrate in school lunches (25%). Roughly equivalent proportions of the total were contributed by fruit and juice and by vegetables. The third major contributor of carbohydrate in school lunches was milk (21%).

## **Total Fat**

Almost half of the fat in school lunches served in SY1998-99 came from combination entrees. Major contributors included pizza, sandwiches and mixed dishes. Other menu items (items that don't contribute to meeting meal pattern requirements) contributed roughly 16 percent of the fat in the average school lunch. Most of this fat was concentrated in high-fat salad dressings, condiments and spreads (7%) and in desserts (5%). Fruit, vegetables and juice — as a group — contributed about 11 percent of total fat. Virtually all of this fat came from vegetables. Additional analyses (not shown) documented that most of this fat was contributed by French fries and other processed potato products.

## **Saturated Fat**

More than two-thirds of the saturated fat in school lunches was contributed by combination entrees (52%) and by milk (18%). Other menu items contributed 12 percent of the saturated fat. Major contributors included high-fat salad dressings, condiments and spreads (4%) and desserts (5%). Separate meats and meat alternates, which were offered relatively infrequently (see Exhibit 3.2), contributed about seven percent of the saturated fat.

## **Sodium**

Together, combination entrees (49%) and lowfat salad dressings, condiments (including ketchup, mustard, and pickles) and spreads (9%) accounted for 58 percent of the sodium in the average school lunch. Condiments, spreads and salad dressings alone (all types) contributed 11 percent of the total sodium. Fruit, juice and vegetables were the third major source of sodium, contributing about 12 percent of the total. Virtually all of the sodium from this group came from vegetables.

## **Cholesterol**

The leading source of cholesterol in NSLP lunches served in SY 1998-99 was combination entrees, which contributed close to 60 percent of the cholesterol in the average lunch. Major contributors included mixed dishes; sandwiches; and hamburgers, cheeseburgers, and similar beef/pork sandwiches. Milk and meats and meat alternates (primarily breaded or fried meat, poultry or fish) each contributed about 14 percent of the cholesterol in the average lunch.

## **Vitamin A**

Fruit, juice and vegetables were the major source of vitamin A in school lunches (41%). The majority of this vitamin A came from vegetables. Milk was the second leading contributor of vitamin A, supplying 30 percent of the total. Combination entrees contributed 20 percent of the vitamin A. Major contributors in this group included pizza, mixed dishes, and Chef's salads, salad bars and other food bars.

## **Vitamin C**

Fruit, juice and vegetables were also the primary source of vitamin C in school lunches (67%). Thirty-seven percent of the vitamin C was contributed by fruit and juice and 30 percent was contributed by vegetables. Fruit drinks and ades contributed about five percent of the vitamin C.

## **Calcium**

Milk provided more than half of the calcium in the average school lunch. Combination entrees provided almost a third of the calcium, primarily from pizza, sandwiches and mixed dishes.

## **Iron**

Half of the iron in the average school lunch was contributed by combination entrees. Fruit, vegetables and juice contributed another 17 percent of the total iron, with the majority (13%) coming from vegetables. Separate grains and breads contributed 12 percent of the total iron.

# Chapter Four

## Characteristics of Breakfasts Served in Public SBP Schools

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This chapter presents information on the average nutrient content of breakfasts served in public SBP schools during SY 1998–99. Information is also provided on the types of food offered, the number of options available to students selecting a breakfast, and the characteristics of breakfasts served to students. In addition, information is provided on variation in nutrient content by menu planning system and by relative fat content.

The general approach to data analysis and reporting in this chapter is identical to that used in the preceding chapter on the characteristics of school lunches. The data presented are based on a weighted nutrient analysis and are therefore not directly comparable to data from the SNDA-I study (which are based on an unweighted analysis). A comparison of SNDA-I and SNDA-II data, completed using comparable analytic techniques for the two data sets, is presented in Chapter Six.

### Number and Types of Food Offered and Served to Students

This section provides background information on the characteristics of the breakfast menus offered to students as well as on students' general food selection patterns.

#### Number of Options Offered Within SBP Meal Component Categories

Information on the relative amount of choice available to students selecting an SBP breakfast is summarized in Exhibit 4.1. The exhibit shows the percentage of *daily SBP menus* that offered various numbers of options within major menu item categories.<sup>1</sup> More than eight out of 10 daily SBP menus provided students with the opportunity to select a specific type of milk; the remainder offered only one type of milk. This pattern is noticeably different from that observed for NSLP lunches, where 96 percent of all daily menus offered at least two milk choices (see Chapter Three). The primary reason for this difference is that fewer schools offered flavored milk at breakfast.

More than half of all SBP menus offered a choice of fruit, juice or vegetable (more than one). Secondary school menus tended to have more options in this category than elementary school menus. Sixteen percent of daily secondary school menus included four or more fruit, juice or vegetable options, compared to 10 percent of elementary school menus. Almost half of all elementary school menus were limited to

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1 Schools that are not using the traditional or enhanced food-based menu planning systems are not required to offer specific food items. Menus offered in these schools are generally consistent with the basic elements of the food-based meal pattern, however, so the basic meal component categories still provide a useful framework for describing SBP menus.



**Exhibit 4.1**

**Choice and Variety in Breakfast Menus**

	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
<b>Percentage of Daily Breakfast Menus</b>			
<b>Number of Types of Milk Offered per Day</b>			
1	18%	17%	18%
2	42	32	38
3	30	32	31
4 or more	10	19	13
<i>Median items per day</i>	2	3	3
<i>Median number of different items per week<sup>1</sup></i>	2	3	3
<b>Number of Fruits/Juices/Vegetables Offered per Day</b>			
1	49%	40%	46%
2	21	23	21
3	20	21	20
4 or more	10	16	12
<i>Median items per day</i>	2	2	2
<i>Median number of different items per week<sup>1</sup></i>	3	3	3
<b>Number of Combination Entrees Offered per Day</b>			
None	71%	55%	66%
1	27	33	29
2 or more	3	12	6
<i>Median items per day</i>	0	0	0
<i>Median number of different items per week<sup>1</sup></i>	1	1	1
<b>Number of Separate Breads/Grains Offered per Day<sup>2</sup></b>			
None	7%	7%	7%
1	26	22	25
2	37	26	33
3	22	21	21
4-5	7	16	10
6 or more	2	8	4
<i>Median items per day</i>	2	2	2
<i>Median number of different items per week<sup>1</sup></i>	6	6	6

**Exhibit 4.1**  
(continued)

	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
<b>Percentage of Daily Breakfast Menus</b>			
<b>Number of Separate Meat/Meat Alternates Offered per Day<sup>2</sup></b>			
None	74%	68%	72%
1	24	25	24
2 or more	3	7	4
<i>Median items per day</i>	0	0	0
<i>Median number of different items per week<sup>1</sup></i>	1	1	1
Number of Daily Menus (Unweighted)	1,551	2,371	3,922
Number of Schools (Unweighted)	317	487	804

<sup>1</sup> Includes only schools that provided menu information for five days.

<sup>2</sup> Not included in combination entrees. All cold cereals counted as one choice.

Source: Weighted tabulations of menu data for one week between September 1998 and May 1999.

one fruit, juice or vegetable choice, compared to 40 percent of secondary school menus. For all schools, the median number of fruit, juice or vegetable choices offered per day was two. Across a week, schools offered a median of three different items in this category, indicating that some items were offered more than once per week.

Breakfast menus differed from lunch menus in that combination entrees were not the norm. As shown in Exhibit 4.1, more than 70 percent of all elementary school menus and more than half of all secondary school menus included no combination entrees. When entrees were offered, there was generally only one such item available. However, 12 percent of secondary school menus did offer two or more combination entrees.

The main focal point of most breakfast menus was breads and bread alternates (e.g., toast, bagels, cereal, pastries, muffins, pancakes or waffles). More than two-thirds of all daily breakfast menus included two or more bread or grain products (all types of cold cereal were considered one choice). More than a third of all menus included three or more choices. Secondary school menus offered the greatest number of options in this category; 24 percent of all daily breakfast menus in secondary schools included four or more breads or bread alternates.

Across all schools, the median number of daily bread/bread alternate choices was two and the median number of different items offered across the week was six. In considering these data, it is important to bear in mind that students were often expected to select two bread or grain items (e.g., cereal and toast) to satisfy requirements for a reimbursable meal.

Seventy-two percent of all daily breakfast menus included no meat or meat alternate items (other than those that might have been included in a combination entree). When such items were offered, there was generally only one option available.

### **Foods Most Frequently Included in SBP Menus**

To obtain more detailed information on the types of food offered in SBP meals, menu items were classified into one of six major food groups — milk; fruits, juice and vegetables; grains and breads; meats/meat alternates; combination entrees; and other menu items (foods not “counted” toward component requirements in food-based meal patterns). Foods were further classified into 28 minor food groups.

Exhibit 4.2 shows the percentage of daily menus in which each major and minor food group was offered. The exhibit is limited to minor food groups that were offered in at least five percent of daily menus for either type of school. Major findings are summarized below:

- The type of milk most frequently offered in SBP menus, in both elementary schools and secondary schools, was unflavored 1% milk. (The leading milk option in lunch menus was flavored 1% milk). The next most commonly offered milks were whole milk, 2% (unflavored) milk and flavored 1% milk.

Exhibit 4.2

Foods Most Commonly Offered in Breakfast Menus

	Elementary Schools	Secondary Schools	All Schools
Percentage of Daily Menus in Which Item Was Offered			
<b>Milk</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
1% unflavored	55	56	56
Whole unflavored	49	48	49
2% unflavored	46	45	46
1% flavored	42	53	46
Skim unflavored <sup>1</sup>	23	29	25
Skim flavored <sup>1</sup>	8	16	11
2% flavored	8	4	7
<b>Fruits, Juices and Vegetables</b>	<b>99%</b>	<b>99%</b>	<b>99%</b>
Full-strength citrus juices	65	81	71
Full-strength non-citrus juices	56	56	56
Fresh fruit	16	19	17
Canned fruit	17	11	15
Potatoes (all types)	3	6	4
<b>Grains/Breads (not part of a combination entree)</b>	<b>93%</b>	<b>93%</b>	<b>93%</b>
Cold cereal	70	71	70
Bread, rolls, bagels, other plain breads	18	30	22
Donuts, Danish, other pastry	28	37	31
Pancakes, waffles, French toast	19	22	20
Muffins, sweet/quick breads, cereal bars	16	19	17
Buttered toast, bagels with cream cheese	22	17	20
Biscuits, cornbread, croissants	8	14	10
Crackers <sup>2</sup>	10	7	9
<b>Meats/Meat Alternates (not part of a combination entree)</b>	<b>26%</b>	<b>32%</b>	<b>28%</b>
Sausage	10	15	12
Eggs	5	6	6
Yogurt	4	7	5
Cheese	5	2	4

**Exhibit 4.2**  
(continued)

	Elementary Schools	Secondary Schools	All Schools
<b>Percentage of Daily Menus in Which Item Was Offered</b>			
<b>Combination Entrees</b>	<b>29%</b>	<b>45%</b>	<b>34%</b>
Breakfast sandwiches	14	26	18
Pizza (all types)	8	13	10
Mexican-style entree	2	7	4
Sausage with pancake and similar products	4	6	5
<b>Other Menu Items<sup>3</sup></b>	<b>2%</b>	<b>6%</b>	<b>4%</b>
Fruit drinks/ades	1	5	2
Number of Daily Menus (Unweighted)	1,551	2,311	3,922
Number of Schools (Unweighted)	317	487	804

Notes: Exhibit is limited to items that appeared in at least five percent of menus for at least one type of school.  
See Exhibit E.6 for a detailed listing of items included in each group.

<sup>1</sup> Includes ½ percent milk.

<sup>2</sup> Generally graham crackers or saltines that could be coupled with peanut butter or cheese.

<sup>3</sup> Foods that do not contribute to satisfying the meal patterns for the traditional or enhanced food-based menu-planning systems.

Source: Weighted tabulations of menu data for one week between September 1998 and May 1999.

Flavored milks were offered more often in secondary schools than in elementary schools. Fifty-eight percent of breakfast menus in elementary schools included one or more types of flavored milk compared to about 73 percent of secondary school menus.<sup>2</sup>

- The most common offerings in the fruit, juice and vegetable category was juice. Citrus juice was offered more frequently than non-citrus juice. Sixty-five percent of all elementary school menus and 81 percent of all secondary school menus included one or more citrus juices. Just over half of all menus included non-citrus juice.
- Fruit was offered in breakfast menus much less frequently than juice. Fresh fruit was offered in fewer than 20 percent of all menus. The same is true for canned fruit. Potatoes were offered in fewer than five percent of all menus, most commonly at the secondary school level.
- Cold breakfast cereals were a mainstay of breakfast menus, appearing in roughly seven out of 10 menus in both elementary and secondary schools. Other breads and grains were offered with much less frequency. More than one in five breakfast menus included bread or toast, bagels, English muffins or other plain breads. About 30 percent included pastries such as Danish, doughnuts, sweet rolls, and the like. Pancakes and waffles were used in roughly one out of five breakfast menus.
- Meats and meat alternates were infrequently offered as a discrete menu item (rather than as part of a combination entree). Separate meats or meat alternates were included in only 28 percent of all breakfast menus. Secondary school menus included meats and meat alternates more often than elementary school menus. Sausage was the meat offered most frequently.
- Combination entrees were more common in secondary school menus than in elementary school menus (45% versus 29%). In all cases, the most common type of entree offered was a breakfast sandwich similar to those served in fast food restaurants (e.g., eggs with some combination of cheese and/or bacon, sausage, or ham on an English muffin, bagel, or biscuit). Other combination entrees that appeared in at least five percent of daily menus were pizza (10%) and pancake-wrapped sausages or similar products (5%).
- The only additional menu item used with any frequency in breakfast menus was fruit drinks. These were used primarily in secondary school menus and used in fewer than five percent of all menus.

### **Characteristics of Breakfasts Actually Served to Students**

In addition to having the ability to select specific foods within a meal component category, students participating in the SBP have varying levels of flexibility regarding the minimum number of foods or items they are required to take when selecting a meal. In general, however, students have fewer options in this regard than they do at lunch. In the SBP, unlike the NSLP, the “Offer-versus-Serve” (OVS) option (see Chapter Three) is *not* mandatory for secondary schools. OVS is optional, at the discretion of the local school district, at all school levels.

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2 Reported percentages were derived by summing figures for all types of flavored milk. Although percentages for individual minor food groups are generally not mutually exclusive, in this case they are because schools rarely offer more than one type of flavored milk.

When OVS is implemented in schools using the traditional or enhanced food-based menu planning systems, students may refuse one of the four food items that must be offered (milk; fruit, juice or vegetable; two servings of grain/bread, or meat/meat alternate or one of each). In schools using NSMP or ANSMP, which are required to offer at least three menu items (one of which must be milk), students may decline a maximum of one of the offered menu items.

As Exhibit 4.3 illustrates, the makeup of breakfasts served to students did vary from the full complement of foods included in the traditional and enhanced meal patterns. While milk was offered in every SBP menu, about 10 percent of the breakfasts served to students on an average day did not include milk. Milk was more commonly omitted in breakfasts served in secondary schools than in breakfasts served in elementary schools (14% versus 8%). This pattern is essentially identical to that observed for lunches (Chapter Three).

On average, 88 percent of students who had an opportunity to include a serving of fruit, juice or vegetable in their SBP breakfast did so. The vast majority of breakfasts served to students included two or more servings of bread or grain and/or meat/meat alternate. However, a small percentage of breakfasts did not. It is important to note that students do not necessarily have to select two menu items to obtain two servings of bread/grain and/or meat/meat alternate. Many bread products are of sufficient size or weight to qualify for two servings of bread/grain, e.g., a full bagel or full English muffin. The same is true for most breakfast sandwiches and other combination entrees.

## Average Nutrient Content of Breakfasts Served to Students

This section presents data on the average nutrient content of breakfasts served to students in SY 1998–99 in comparison to defined SBP nutrient standards and NRC recommendations. The discussion is divided into three sections as outlined below.

- **Nutrient Content Relative to RDAs.** Mean contribution to RDAs for calories, protein, vitamin A, vitamin C, calcium, and iron is evaluated in light of the defined nutrient standard for breakfast (25% of the RDA).
- **Percentage of Calories from Total Fat and Saturated Fat.** The mean percentage of calories provided by each type of fat is compared to defined SBP standards for total fat ( $\leq 30\%$ ) and saturated fat ( $< 10\%$ ).
- **Cholesterol, Sodium, and Carbohydrate Content.** Mean cholesterol and sodium content are compared to NRC recommendations. The standards used reflect one-fourth of the NRC's recommended maximum daily intake. The mean percentage of calories from carbohydrate is compared to the NRC recommendation ( $> 55\%$ ).

**Exhibit 4.3**

**Characteristics of Breakfasts Served to Students**

<b>Characteristic</b>	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
	<b>Average Percentage of Breakfasts Served to Students</b>		
<b>All Breakfasts</b>			
Included milk	92%	86%	90%
Included at least one fruit, juice, or vegetable (when offered)	89	86	88
Included two servings of bread, two servings of meat, or one of each	97	99	98
Number of Daily Menus (Unweighted)	1,551	2,311	3,922
Number of Schools (Unweighted)	317	487	804

Source: Weighted tabulations of menu and meal production data for one week between September 1998 and May 1999.



## Mean Nutrient Content Relative to RDAs

SBP breakfasts served in SY 1998–99 met or exceeded the SBP standard of one-fourth of the RDA for all target nutrients (Exhibit 4.4).<sup>3</sup> Average calorie levels fell below the one-fourth RDA benchmark, however, ranging from 20 percent of the RDA for secondary school breakfasts to 23 percent for elementary school breakfasts.

Breakfasts were nutrient-dense, although not quite as dense as lunches. This is not unexpected given the more limited array of foods offered in breakfast menus. Elementary school breakfasts provided an average of 23 percent of the RDA for calories while providing more than 35 percent of the RDAs for all key nutrients. Breakfasts served to secondary school students provided 20 percent of the RDA for calories and 25 percent or more of the RDA for all key nutrients. SBP breakfasts were especially rich in Vitamin C, providing 81 percent of the RDA for elementary school students and 72 percent of the RDA for secondary school students.

### *Percentage of Schools Meeting RDA Standards*

Data on the percentage of schools that satisfied the one-fourth RDA standard for calories and targeted nutrients underscore the fact that the calorie standard was difficult to meet. Overall, the average breakfast served in more than 80 percent of all schools provided less than one-fourth of students' daily energy needs (i.e., fewer than 20 percent of all schools met the SBP standard for calories). (See Exhibit 4.5.) The difficulty was most pronounced in secondary schools, where students' calorie needs are greatest. The percentage of secondary schools in which the average breakfast served to students satisfied the SBP standard for calories (8%) was about a third that of elementary schools (22%).

Breakfasts served in almost all schools (more than 90%) met the one-fourth RDA benchmark for protein, vitamin C, and calcium. Fewer secondary schools than elementary schools met the standard for calcium (78% versus 99%). This is consistent with the finding, noted in Exhibit 4.3, that secondary school students were more likely to select a breakfast that did not include milk.

A smaller percentage of schools (about 80%) satisfied the SBP standards for vitamin A and iron, both of which tend to occur in concentrated amounts in a relatively limited number of foods. Again, the percentage of secondary schools that satisfied these standards was substantially lower than the percentage of elementary schools (Exhibit 4.5). Mean levels of these nutrients were roughly comparable across all school types (Exhibit B.1); however, the RDAs for middle school and high school students are greater.

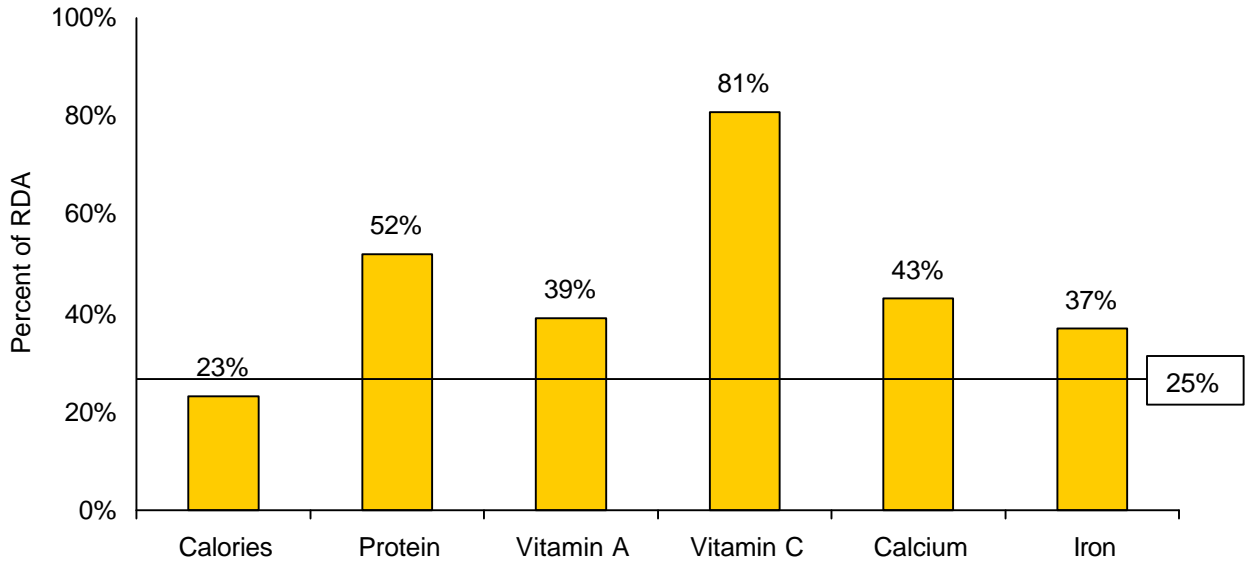
It should also be noted that the RDA-based standards used in this analysis are based on the grade span of the children enrolled in each school (see Appendix E), a standard that provides the most accurate assessment of how well the meals served meet students' nutritional needs. Under the regulations, secondary schools are permitted to serve breakfasts that meet less-stringent criteria (i.e., nutrition standards defined for all children in grades K-12). Using these standards, which are, by definition, lower than standards based solely on RDAs for older (secondary school) students, the percentage of secondary

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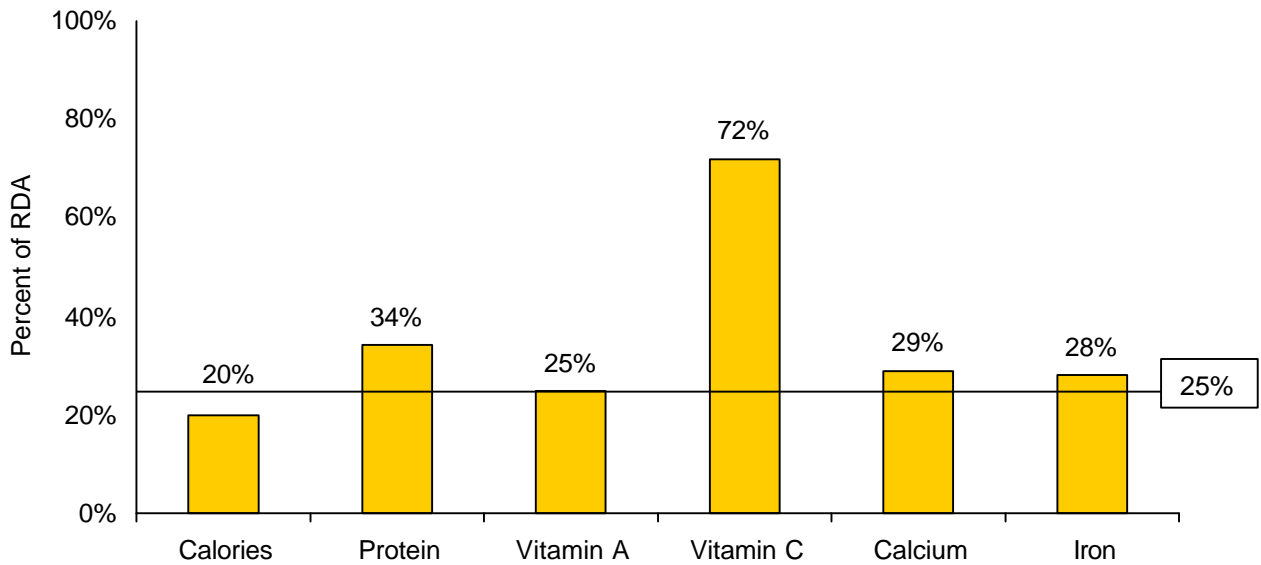
3 Data on actual energy and nutrient content of breakfasts served are presented in Exhibit B.1.

**Exhibit 4.4** Breakfasts Served to Students in SY 1998-99 Provided at Least One-Fourth of the RDA, With the Exception of Calories

**Elementary School Breakfasts**



**Secondary School Breakfasts**



**Exhibit 4.5**

**Percentage of Schools in Which the Average Breakfast  
Served to Students Provided One-Fourth or More of the RDA**

	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
	<b>Percentage of Schools</b>		
Total calories	22%	8%	17%
Protein	100	95	98
Vitamin A	95	48	79
Vitamin C	98	95	97
Calcium	99	78	92
Iron	93	57	81
Number of Schools (Unweighted)	317	487	804

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

schools deemed to have met the various RDA standards is greater and the percentage of elementary schools is lower (see Exhibit B.3).

### **Percentage of Calories from Total Fat and Saturated Fat**

On average, breakfasts served in SY 1998–99 in both elementary and secondary schools met the SBP standard for the percentage of calories from total fat (Exhibit 4.6). In addition, average breakfasts came close to meeting the SBP standard for calories from saturated fat. The average breakfast served to SBP participants provided between 27 percent (elementary schools) and 28 percent (secondary schools) of calories from fat (compared to the standard of no more than 30%). Breakfasts provided roughly 10 percent of calories from saturated fat (compared to the standard of less than 10%).

### ***Percentage of Schools Meeting Standards for Fat and Saturated Fat***

On average, breakfasts served in 71 percent of all schools met the SBP standard for the percentage of calories from fat (Exhibit 4.7). Elementary schools met the standard more often than secondary schools (75% versus 64%). The average percentage of calories from fat exceeded 34 percent in about 10 percent of elementary schools and 15 percent of secondary schools.

Although overall means exceeded the SBP standard for the percentage of calories from saturated fat (Exhibit 4.6), some individual schools did meet this standard. This was true, in fact, for more than half of all schools. Breakfasts served in elementary schools met the standard for calories from saturated fat more often than breakfasts served in secondary schools (54% versus 46%).

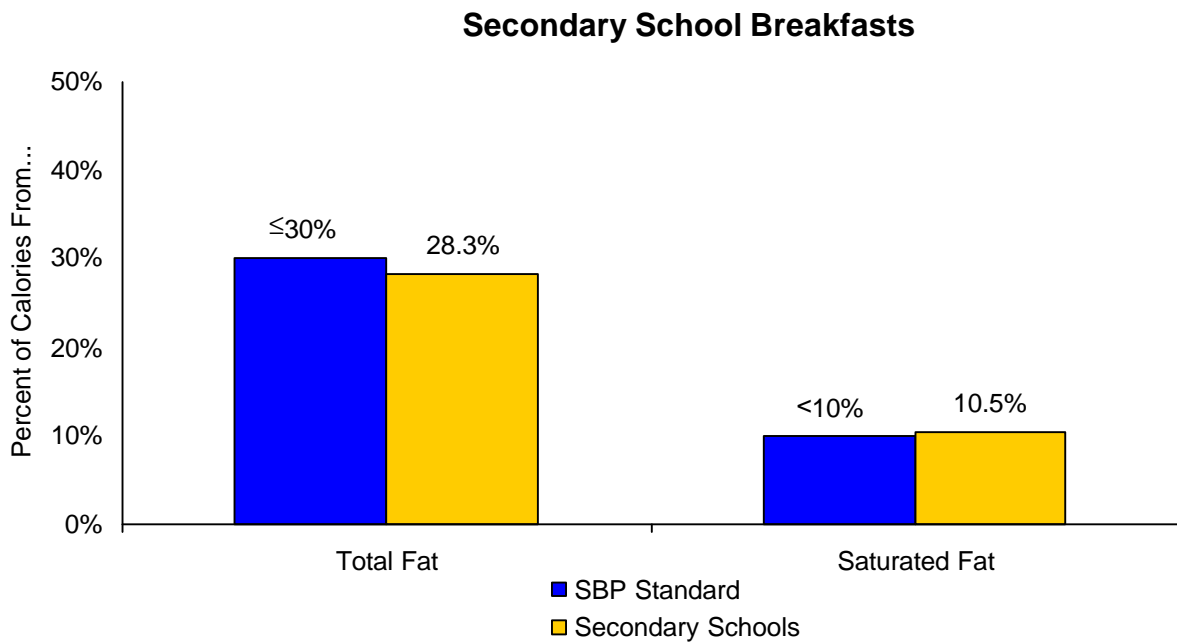
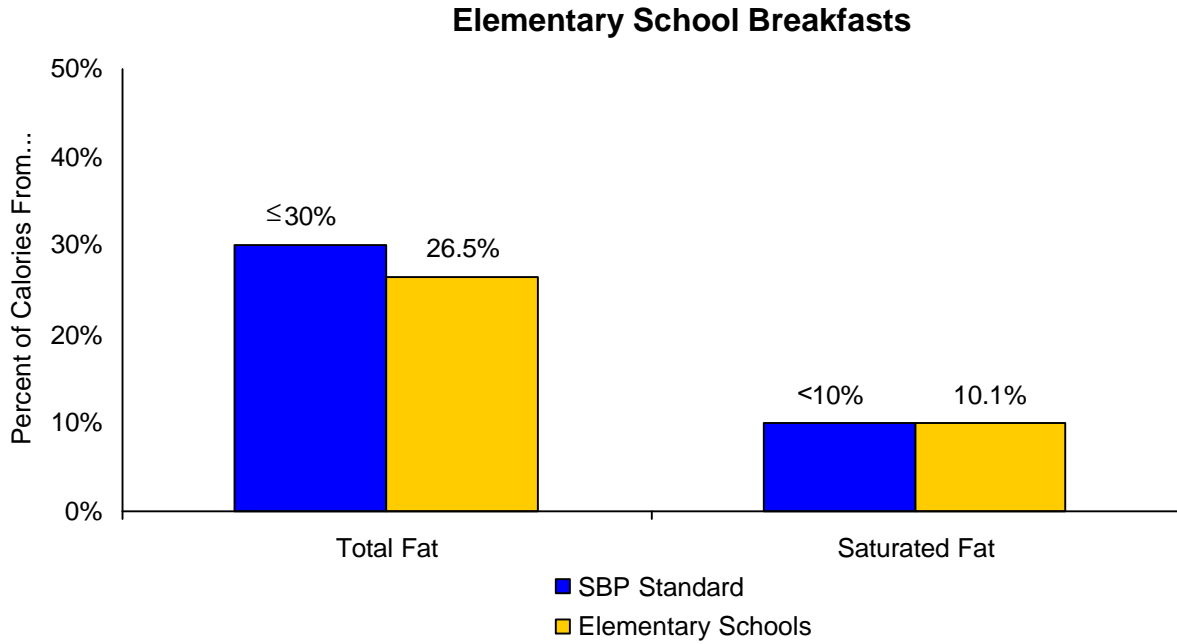
### **Cholesterol, Sodium and Carbohydrate Content**

On average, breakfasts served in SY 1998–99 in both elementary schools and secondary schools provided less than 75 mg of cholesterol, a level that is consistent with the NRC recommendation of no more than 75 mg (or no more than one-quarter of the suggested maximum daily intake). (See Exhibit 4.8.) Eighty-five percent of all schools met this standard (Exhibit B.4).

The average breakfast served in elementary schools also satisfied the NRC recommendation for sodium (574 mg versus no more than 600 mg). Breakfasts served in secondary schools came close to meeting the NRC recommendation for sodium (672 mg). Only 42 percent of secondary schools met the NRC recommendation for sodium content, compared to 63 percent of elementary schools (Exhibit B.4).

Finally, breakfasts provided, on average, 59 percent (secondary schools) to 62 percent (elementary schools) of calories from carbohydrate. This compares favorably to the NRC recommendations of more than 55 percent of calories. Roughly eight out of 10 SBP schools met the NRC recommendation for calories from carbohydrate (Exhibit 4.7).

**Exhibit 4.6** Breakfasts Served to Students in SY 1998-99 Met the SBP Standard for Calories From Fat and Almost Met the Standard for Calories From Saturated Fat



**Exhibit 4.7**

**Distribution of the Percentage of Calories from Total Fat, Saturated Fat, and Carbohydrate in Average Breakfasts Served to Students**

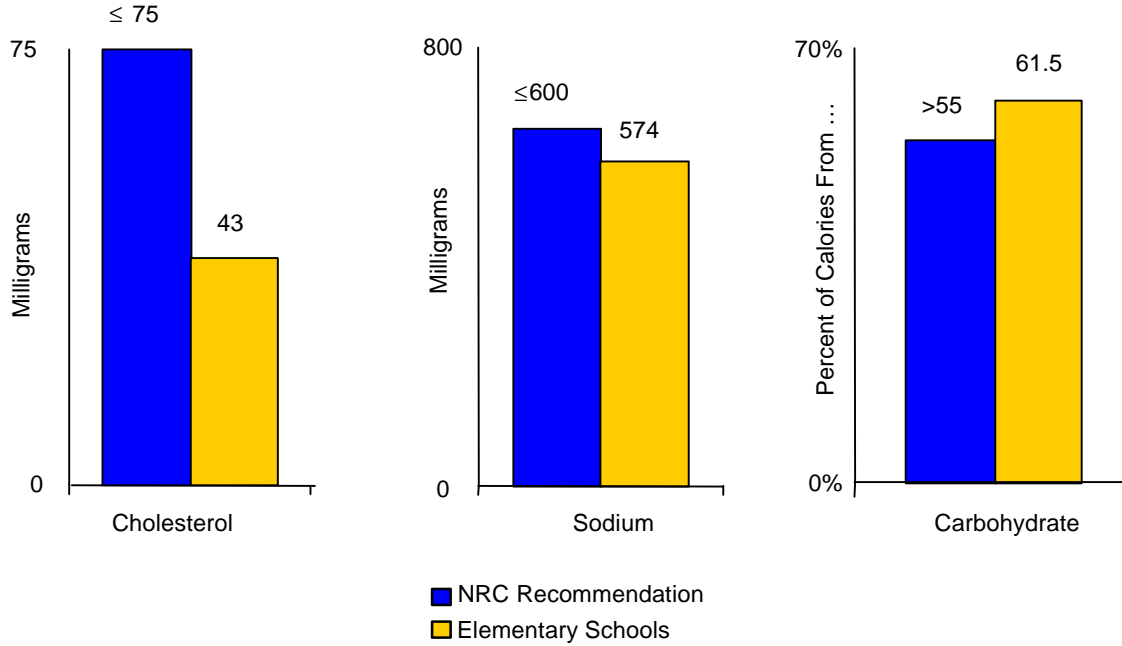
	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
	<b>Percentage of Schools</b>		
<b>Percentage of Calories from Fat</b>			
No more than 30%	75%	64%	71%
30.1-34.0%	15	21	17
34.1-36.0%	4	3	4
36.1-38.0%	4	5	4
38.1-40.0%	1	3	2
More than 40%	<1	4	2
<b>Percentage of Calories from Saturated Fat</b>			
Less than 10%	54%	46%	52%
10.1-12.0%	26	30	27
12.1-14.0%	12	14	13
14.1-16.0%	4	8	5
More than 16%	4	3	3
<b>Percentage of Calories from Carbohydrate</b>			
Less than 45%	1	2	1
45.0-55.0%	18	25	20
More than 55%	82	72	79
<b>Number of Schools (Unweighted)</b>	317	487	804

Note: Highlighted rows show SBP standard (fat and saturated fat) or NRC recommendation (carbohydrate).

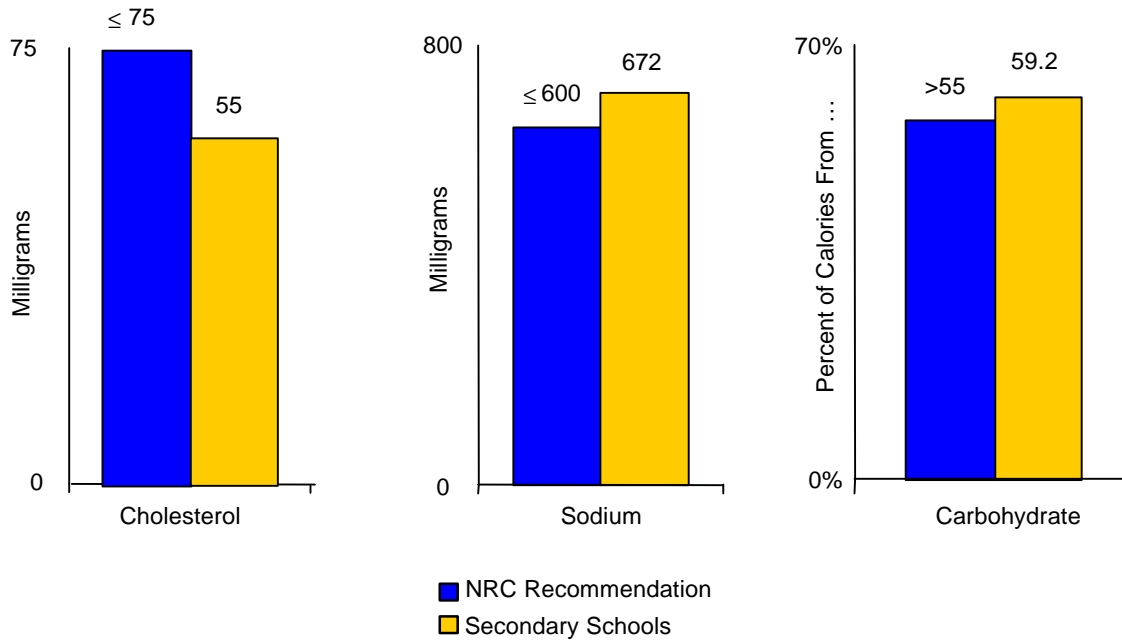
Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit 4.8** Breakfasts Served to Students Met NRC Recommendations for Cholesterol and Calories from Carbohydrate but Did Not Consistently Meet the Recommendation for Sodium

**Elementary School Breakfasts**



**Secondary School Breakfasts**



## Average Nutrient Content of Breakfasts Served to Students, by Menu Planning Method

To determine whether the choice of menu planning system influences the nutritional quality of breakfasts served to students, mean nutrient content of breakfasts served in SY 1998–99 was compared on the basis of the menu planning system used. Because ANSMP was used in very few schools (a total of 15 schools in the unweighted sample), NSMP and ANSMP schools were combined for purposes of this analysis. Schools that reported using an alternative menu planning system (31 schools in the unweighted sample) were not included in the comparisons. Statistical significance of differences between menu planning systems was tested using two-tailed *t*-tests. Two comparisons were made: breakfasts served in schools using the traditional food-based menu planning system were compared to (a) breakfasts served in schools using NSMP or ANSMP and (b) breakfasts served in schools using the enhanced food-based menu planning system.

As noted in Chapter Three, readers are cautioned to recognize that NSMP/ANSMP systems may not have been fully operational at the time data were collected.<sup>4</sup> Previous research has shown that implementing NSMP can be a lengthy and complicated process, taking anywhere from three to 33 months (Fox 1998). Thus, differences observed between the traditional food-based menu planning system and NSMP/ANSMP should be interpreted as lower-bound estimates. Moreover, the absence of differences cannot be interpreted as indicative of no effect in fully implemented NSMP/ANSMP schools.

Exhibits 4.9 and 4.10 present information on the mean nutrient content of breakfasts served in schools using the various menu planning options. Breakfasts served in schools that used NSMP/ANSMP derived significantly fewer calories from saturated fat than breakfasts served in schools that used the traditional food-based menu planning system. Breakfasts served in schools that used NSMP/ANSMP were consistent with the SBP standard of less than 10 percent of calories from saturated fat. In contrast, breakfasts served in schools that used the traditional food-based menu planning system derived roughly 11 percent of calories from saturated fat, a level which exceeds the SBP standard.

In comparison to breakfasts served in schools that used the traditional food-based menu planning system, NSMP/ANSMP schools also provided a smaller percentage of the RDA for calories (elementary schools only), a smaller percentage of calories from fat, a greater percentage of calories from carbohydrate (secondary schools only), and less sodium (elementary schools only). With two exceptions, however, breakfasts served in both groups of schools met most of the relevant standards. The first exception is that neither group of schools met the one-fourth RDA standard for calories. The other exception involves the sodium content of elementary school breakfasts. The average sodium content of breakfasts served in NSMP/ANSMP schools (528 mg) met the NRC recommendation of no more than 600 mg, while the average for schools that used the traditional food-based menu planning system (605 mg) was slightly higher than the recommended level.

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4 Because another USDA-sponsored study was collecting detailed information on SMI implementation at the same time as SNDA-II data were collected, detailed questions about implementation of the various menu planning options were not collected in this study.



**Exhibit 4.9**

**Mean Nutrient Profile of Breakfasts Served, by Menu Planning System,  
Compared to Nutrition Standards for SBP Breakfasts and NRC Recommendations  
Elementary Schools**

	Menu Planning System				
	Standard/ Recommendation	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
<b>Mean Percentage of RDA</b>					
Total Calories	25%	23%	21%**	23%	23%
Protein	25%	54	49	54	52
Vitamin A	25%	38	40	38	39
Vitamin C	25%	81	81	84	81
Calcium	25%	43	41	44	43
Iron	25%	37	38	38	37
<b>Mean Percentage of Calories from...</b>					
Total Fat	≤ 30%	27.6%	24.4%*	26.8%	26.5%
Saturated Fat	< 10%	10.7	9.1**	10.2	10.1
Carbohydrate	> 55% <sup>1</sup>	60.3	63.6	61.1	61.5
<b>Mean Amount</b>					
Cholesterol (mg)	≤ 75 <sup>1</sup>	51	36	38	43
Sodium (mg)	≤ 600 <sup>1</sup>	605	528*	578	574
Number of Schools (Unweighted)		128	83	93	317

<sup>1</sup> NRC recommendation, not SBP standard.

Notes: Data for NSMP and ANSMP were combined because of extremely small sample size for ANSMP (5 schools).  
Data for 13 schools that reported use of some other menu-planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

\* Difference between the traditional food-based system and NSMP/ANSMP is statistically significant at the .01 level.

\*\* Difference between the traditional food-based system and NSMP/ANSMP is statistically significant at the .001 level.

Source: Weighted nutrient analysis of meal and menu production data for one week between September 1998 and May 1999.

**Exhibit 4.10**

**Mean Nutrient Profile of Breakfasts Served, by Menu Planning System,  
Compared to Nutrition Standards for SBP Breakfasts and NRC Recommendations  
Secondary Schools**

	Menu Planning System				
	Standard/ Recommendation	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
<b>Mean Percentage of RDA</b>					
Total Calories	25%	20%	20%	19%	20%
Protein	25%	35	34	33	34
Vitamin A	25%	25	27	24	25
Vitamin C	25%	73	69	74	72
Calcium	25%	30	29	29	29
Iron	25%	28	31	25	28
<b>Mean Percentage of Calories from...</b>					
Total Fat	≤ 30%	29.8%	26.6%*	27.6%	28.3%
Saturated Fat	< 10%	11.2	9.7*	9.9	10.5
Carbohydrate	> 55% <sup>1</sup>	57.4	61.1*	59.9	59.2
<b>Mean Amount</b>					
Cholesterol (mg)	≤ 75 <sup>1</sup>	59	53	52	55
Sodium (mg)	≤ 600 <sup>1</sup>	696	679	636	672
Number of Schools (Unweighted)		220	121	128	487

<sup>1</sup> NRC recommendation, not SBP standard.

Notes: Data for NSMP and ANSMP were combined because of extremely small sample size for ANSMP (10 schools).

Data for 18 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

\* Difference between the traditional food-based system and NSMP/ANSMP is statistically significant at the .01 level.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

Of the statistically significant differences between NSMP/ANSMP schools and traditional food-based system schools reported above, two differences affected conclusions about the extent to which breakfasts satisfied SBP nutrient standards or NRC recommendations. Specifically, breakfasts served in NSMP/ANSMP schools met the SBP standard for the percentage of calories from saturated fat while breakfasts served in traditional food-based system schools did not. This was true for both elementary and secondary schools. In addition, as described above, the difference in mean sodium content among elementary schools affected conclusions about the relevant NRC recommendation.

Data on the percentage of schools that met the various standards and recommendations suggest that schools using NSMP or ANSMP have a distinct advantage over schools using the traditional food-based system in meeting the SBP standard for calories from saturated fat. Among elementary schools, the percentage of NSMP/ANSMP schools that met the SBP standard for calories from saturated fat was significantly greater than the percentage of traditional food-based system schools (Exhibit B.5). The same trend was noted among secondary schools; however, the difference did not reach statistical significance (Exhibit B.6).

## Characteristics of Low-Fat and Higher-Fat Breakfasts

USDA is committed to lowering the fat content of school meals without adversely affecting the amounts of other key nutrients offered to students. To determine whether this objective is being met, an analysis was undertaken to examine the effect of lower fat levels on the overall nutrient profile of breakfasts served to students.

Schools were stratified into two groups based on the average percentage of calories from fat in breakfasts served to students:

- **Schools with low-fat breakfasts:** Mean percentage of calories from fat was less than or equal to 30 percent (the SBP standard);
- **Schools with higher-fat breakfasts:** Mean percentage of calories from fat was more than 30 percent.

As discussed previously, the breakfasts served to students in 71 percent of all schools provided, on average, no more than 30 percent of calories from fat. Thus, 71 percent of all schools were included in the low-fat group. The remaining 29 percent of schools were included in the higher-fat group. Creation of additional categorizations did not make sense because the number of schools was so small and the sample was clustered between 31 and 34 percent of calories from fat (see Exhibit 4.7).

The discussion that follows describes the average nutrient content of breakfasts served in schools that did and did not meet the SBP standard for the percentage of calories from fat. Information is also provided on general differences in the types of food offered in the two types of schools.

## Average Nutrient Content

With regard to calories and the target RDA nutrients, nutrient profiles for the two groups of schools were very similar (Exhibit 4.11). For all key nutrients, the average breakfast served in schools that served both low-fat and higher-fat breakfasts exceeded the one-fourth RDA standard defined for SBP meals. However, in keeping with the pattern reported previously, the mean calorie content of both groups of breakfasts fell short of the one-fourth RDA benchmark. These data indicate that decreased levels of fat in school breakfasts did not lead to notable decreases in the availability of calories or key nutrients.

Moreover, the data indicate that decreased levels of fat led to other positive changes in school breakfasts without compromising the overall nutrient profile. The average breakfast served in schools in the low-fat group provided a smaller percentage of calories from saturated fat and a greater percentage of calories from carbohydrate than the average breakfasts served in schools in the higher-fat group. In fact, the average breakfast served in schools in the low-fat group met the SBP standard for calories from saturated fat as well as NRC recommendations for calories from carbohydrate and total sodium content. The average breakfast served in schools that offered higher-fat breakfasts met none of these standards.

## Foods Most Commonly Offered

Exhibit 4.12 shows the relative frequency with which various food items were included in the menus offered by schools that served low-fat and higher-fat breakfasts. The exhibit shows the percentage of schools that offered each item *at least once per week*. Notable differences are summarized below. As noted in the introduction to the comparable analysis for NSLP meals (see Chapter Three), this analysis is meant to be descriptive and no statistical tests have been performed on the data. Because of small sample sizes for some of the individual cells, readers should be cautious not to over-interpret the data. Patterns observed in the data provide some insight into menu planning practices that may influence the level of fat in school breakfasts but should not be interpreted as fully predictive. The percentage of calories from fat in the average meal served to students is influenced by the full array of menu offerings rather than a single item or group of items.

Notable differences between menus offered in the low-fat and higher-fat groups are summarized below:

- **Milk:** Schools in the low-fat group offered whole milk less often and 1% milk (both flavored and unflavored) more often than schools in the higher-fat group.
- **Fruits, Juice and Vegetables:** Schools in the low-fat group offered fresh fruit, canned fruit and potatoes more often than schools in the higher-fat group.
- **Breads/Bread Alternates:** Schools in the low-fat group offered pancakes and waffles, plain bread and rolls, muffins and crackers more often than schools in the higher-fat group. In contrast, schools in the higher-fat group offered higher-fat breads such as biscuits, cornbread and croissants more often than schools in the low-fat group.
- **Meats/Meat Alternates:** Schools in the higher-fat group offered sausage, eggs and cheese more often than schools in the low-fat group. Schools in the low-fat group offered yogurt more often than schools in the higher-fat group.

**Exhibit 4.11**

**Compared to Higher-Fat Breakfasts, Low-Fat Breakfasts Provided  
Comparable Amounts of Calories and Key Nutrients**

	Standard/ Recommendation	Relative Amount of Fat in Average Breakfast, as Served <sup>1</sup>	
		Low	Higher
<b>Mean Percentage of RDA</b>			
Total Calories	25%	21%	22%
Protein	25%	45	49
Vitamin A	25%	35	33
Vitamin C	25%	80	74
Calcium	25%	38	39
Iron	25%	35	32
<b>Mean Percentage of Calories from...</b>			
Total Fat	≤ 30%	24.2%	34.1%
Saturated Fat	< 10%	9.1	12.9
Carbohydrate	> 55% <sup>2</sup>	63.9	52.8
<b>Mean Amount</b>			
Cholesterol (mg)	≤ 75 <sup>2</sup>	41	62
Sodium (mg)	≤ 600 <sup>2</sup>	569	700
Number of Schools (Unweighted)		549	255

<sup>1</sup> Low-fat is defined as no more than 30 percent of total calories from fat. Schools in this group met the SBP standard for percentage of calories from fat. All schools not included in the low-fat group are included in the higher-fat group.

<sup>2</sup> NRC recommendation, not SBP standard.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit 4.12**

**Schools That Served Low-Fat Breakfasts Tended to Offer Certain Foods More Often than Schools That Served Higher-Fat Breakfasts**

	Relative Amount of Fat in Average Breakfast, as Served <sup>1</sup>	
	Low	Higher
Percentage of Schools Offering Item at Least Once per Week		
<b>Milk</b>		
1% unflavored	58%	53%
1% flavored	49	44
2% unflavored	47	47
Whole unflavored	46	59
Skim unflavored <sup>1</sup>	26	30
Skim flavored <sup>1</sup>	11	11
2% flavored	6	10
<b>Fruits, Juices, Vegetables</b>		
Full-strength citrus juices	86	86
Full-strength non-citrus juices	70	75
Fresh fruit	33	24
Canned fruit	32	25
Potatoes (all types)	12	8
<b>Grains/Breads (not part of a combination entree)</b>		
Cold cereal	94	93
Pancakes, waffles, French toast	69	47
Donuts, Danish, other pastry	64	69
Bread, rolls, bagels, other plain breads	42	34
Muffins, sweet/quick breads, cereal bars	46	35
Buttered toast, bagels with cream cheese	36	40
Biscuits, cornbread, croissants	25	37
Crackers <sup>2</sup>	20	8
Hot cereal	12	19
<b>Meats/Meat Alternates (not part of a combination entree)</b>		
Sausage	31	43
Eggs	23	29
Yogurt	12	7
Lean meat/poultry/fish	11	13
Cheese	7	12
Peanut Butter	5	5

**Exhibit 4.12**  
(continued)

	Relative Amount of Fat in Average Breakfast, as Served <sup>1</sup>	
	Low	Higher
Percentage of Schools Offering Item at Least Once per Week		
<b>Combination Entrees</b>		
Breakfast sandwiches	45	49
Pizza (all types)	30	38
Sausage with pancake and similar products	19	22
Mexican-style entree	15	9
<b>Condiments and Spreads</b>		
Nonfat/lowfat spreads	74	64
Higher-fat spreads	29	30
Nonfat/lowfat condiments	9	11
Number of Daily Menus (Unweighted)	2,683	1,239
Number of Schools (Unweighted)	549	255

<sup>1</sup> Low-fat is defined as no more than 30 percent of total calories from fat. Schools in this group met the SBP standard for percentage of calories from fat. All schools not included in the low-fat group are included in the higher-fat group.

<sup>2</sup> Generally graham crackers or saltines that could be coupled with peanut butter or cheese.

Note: See Exhibit E.6 for a detailed listing of items included in each group.

Source: Weighted tabulations of menu and meal production data for one week between September 1998 and May 1999.

- **Combination Entrees:** Compared to schools in the low-fat group, schools in the higher-fat group offered most types of combination entrees somewhat more frequently.

## Sources of Calories and Nutrients in SBP Breakfasts as Selected

To provide information on the food sources of calories and key nutrients in SBP breakfasts, the percentage contribution to the calorie and nutrient content of the average breakfast was computed for six major food groups: milk; fruits, vegetables and juice; grains and breads (not part of a combination entree); meat and meat alternates (not part of a combination entree); entrees; and other menu items (items not “counted” toward food-based meal patterns). These major food groups were expanded to 25 minor food groups. Results are shown in Exhibit 4.13 and major findings are summarized below.

### Calories

The major source of calories in SBP breakfasts served in SY 1998-99 was grain and bread products, which provided 37 percent of total calories. Major contributors included donuts, Danish and other pastries; cold cereals; and pancakes, waffles, and French toast. Milk was the second leading source of calories in school breakfasts, providing about one-quarter of the calories in an average breakfast. Fruits, juice and vegetables contributed 12 percent of breakfast calories and combination entrees contributed another 13 percent.

### Carbohydrate

Grains and breads were also the leading source of carbohydrate in school breakfasts (41%). Leading carbohydrate contributors in this group included cold cereals and donuts, Danish and other pastries. Milk and, as a group, fruit, juice and vegetables each contributed about 20 percent of the carbohydrate in the average school breakfast. Within the category of fruits, juice and vegetables, most of the carbohydrate came from juice.

### Total Fat

More than 35 percent of the fat in school breakfasts came from grain and bread products. Donuts, Danish and other pastries were the major contributors of fat in this group (13%). Pancakes, waffles, and French toast; buttered bread and rolls; biscuits, cornbread and croissants; and muffins and sweet breads contributed smaller amounts of fat (4-5% each). Milk contributed 26 percent of the fat in the average breakfast and combination entrees contributed another 21 percent.

### Saturated Fat

Forty-two percent of the saturated fat in school breakfasts came from milk. Grain and bread products contributed 22 percent of the saturated fat, primarily from donuts, Danish and other pastries. Combination entrees contributed 20 percent of the saturated fat in the average breakfast.



**Exhibit 4.13**

**Sources of Calories and Nutrients in SBP Breakfasts As Served**

<b>Food Group/Food(s)</b>	<b>Calories</b>	<b>Protein</b>	<b>Carbohydrate</b>	<b>Fat</b>	<b>Saturated Fat</b>	<b>Sodium</b>
	<b>Percentage Contribution to Average Amount Served</b>					
<b>Milk</b>	<b>25.9%</b>	<b>47.9%</b>	<b>21.1%</b>	<b>25.5%</b>	<b>42.4%</b>	<b>19.3%</b>
Whole milk	5.1	8.1	2.5	9.0	15.0	3.0
Lowfat/nonfat milk <sup>1</sup>	20.9	39.8	18.6	16.5	27.4	16.3
<b>Fruits, Juices, Vegetables</b>	<b>12.0</b>	<b>3.5</b>	<b>19.5</b>	<b>0.8</b>	<b>0.4</b>	<b>0.6</b>
Fruits or vegetables	2.6	0.6	4.4	0.3	0.2	0.1
Juice	9.4	2.8	15.1	0.5	0.2	0.4
<b>Grains/Breads (not part of a combination entree)</b>	<b>37.1</b>	<b>22.3</b>	<b>41.1</b>	<b>35.6</b>	<b>21.5</b>	<b>44.4</b>
Bread, rolls, bagels, other plain breads	3.2	3.3	4.0	1.0	0.6	4.5
Buttered toast, bagels with cream cheese	3.0	2.1	2.7	4.3	2.9	4.0
Biscuits, cornbread, croissants	2.9	1.8	2.6	4.1	2.6	5.9
Cold cereal	8.3	3.8	12.3	2.3	1.3	11.1
Hot cereal	0.5	0.4	0.5	0.3	0.2	0.7
Crackers	0.9	0.5	1.1	0.8	0.5	0.9
Donuts, Danish, other pastries	9.9	4.9	9.4	12.9	8.0	7.4
Muffins, sweet/quick breads	3.3	1.5	3.3	4.0	2.2	2.6
Pancakes, waffles, French toast	5.1	4.1	5.1	5.2	3.2	7.4
<b>Meat/Meat Alternates (not part of a combination entree)</b>	<b>4.8</b>	<b>9.0</b>	<b>1.0</b>	<b>10.8</b>	<b>10.7</b>	<b>8.2</b>
Eggs	1.0	2.1	0.1	2.2	1.8	1.3
Yogurt	0.5	0.6	0.6	0.1	0.2	0.2
Peanut butter	0.4	0.5	0.1	1.0	0.5	0.2
Sausage	1.9	3.6	0.1	5.1	5.1	3.3
Cheese	0.5	1.0	0.0	1.3	2.1	1.3
Other	0.5	1.3	0.1	1.1	0.9	2.0

**Exhibit 4.13**  
(continued)

	<b>Calories</b>	<b>Protein</b>	<b>Carbohydrate</b>	<b>Fat</b>	<b>Saturated Fat</b>	<b>Sodium</b>
<b>Food Group/Food(s)</b>	<b>Percentage Contribution to Average Amount Served</b>					
<b>Combination Entrees</b>	<b>12.8%</b>	<b>16.0%</b>	<b>8.0%</b>	<b>21.2%</b>	<b>19.5%</b>	<b>23.1%</b>
Breakfast sandwiches	6.8	8.8	3.9	11.9	11.5	13.2
Other combination entrees	6.0	7.2	4.1	9.4	8.0	9.9
<b>Other Menu Items</b>	<b>7.4</b>	<b>1.4</b>	<b>9.3</b>	<b>6.6</b>	<b>5.5</b>	<b>4.4</b>
Fruit drinks/ades	0.2	0.0	0.3	0.0	0.0	0.0
Lowfat/nonfat condiments and spreads	4.7	0.1	8.1	0.2	0.1	1.2
Higher-fat condiments and spreads	1.2	0.5	0.1	4.2	3.6	1.0
Other	1.3	0.7	0.9	2.3	1.8	2.1

**Exhibit 4.13**  
(continued)

	<b>Cholesterol</b>	<b>Vitamin A</b>	<b>Vitamin C</b>	<b>Calcium</b>	<b>Iron</b>
<b>Food Group/Food(s)</b>	<b>Percentage Contribution to Average Amount Served</b>				
<b>Milk</b>	<b>28.8%</b>	<b>48.9%</b>	<b>5.6%</b>	<b>75.4%</b>	<b>6.5%</b>
Whole milk	11.0	4.8	0.9	12.8	0.5
Low-fat milk <sup>1</sup>	17.9	44.1	4.7	62.6	6.0
<b>Fruits, Juices, Vegetables</b>	<b>0.0</b>	<b>3.1</b>	<b>76.8</b>	<b>3.0</b>	<b>5.4</b>
Fruits or vegetables	0.0	1.2	6.0	0.6	1.4
Juice	0.0	1.9	70.8	2.4	4.1
<b>Grains/Breads (not part of a combination entree)</b>	<b>16.3</b>	<b>38.3</b>	<b>14.7</b>	<b>10.9</b>	<b>73.1</b>
Bread, rolls, bagels, other plain breads	0.1	0.0	0.0	1.1	5.9
Buttered toast, bagels with cream cheese	0.7	1.9	0.0	1.1	3.1
Biscuits, cornbread, croissants	0.2	0.4	0.1	1.3	2.9
Cold cereal	0.0	27.7	12.0	1.6	37.9
Hot cereal	0.0	0.3	0.0	0.1	0.7
Crackers	0.0	0.1	0.0	0.1	1.0
Donuts, Danish, other pastries	3.5	5.9	2.4	3.2	13.0
Muffins, sweet/quick breads	3.7	0.5	0.1	0.6	3.5
Pancakes, waffles, French toast	8.2	1.4	0.0	1.8	5.2
<b>Meat/Meat Alternates (not part of a combination entree)</b>	<b>28.9</b>	<b>2.7</b>	<b>0.4</b>	<b>3.0</b>	<b>2.6</b>
Eggs	20.0	1.9	0.0	0.7	0.9
Yogurt	0.2	0.1	0.1	0.9	0.1
Peanut butter	0.0	0.0	0.0	0.1	0.2
Sausage	5.6	0.1	0.1	0.2	0.9
Cheese	1.1	0.7	0.0	1.2	0.1
Other	1.6	0.0	0.1	0.0	0.4

**Exhibit 4.13**  
(continued)

	<b>Cholesterol</b>	<b>Vitamin A</b>	<b>Vitamin C</b>	<b>Calcium</b>	<b>Iron</b>
<b>Food Group/Food(s)</b>	<b>Percentage Contribution to Average Amount Served</b>				
<b>Combination Entrees</b>	<b>24.4%</b>	<b>4.6%</b>	<b>0.6%</b>	<b>7.2%</b>	<b>10.9%</b>
Breakfast sandwiches	15.0	2.4	0.1	3.7	5.5
Other combination entrees	9.4	2.3	0.5	3.5	5.3
<b>Other Menu Items</b>	<b>1.8</b>	<b>2.4</b>	<b>2.0</b>	<b>0.6</b>	<b>1.5</b>
Fruit drinks/ades	0.0	0.0	1.3	0.0	0.1
Lowfat/nonfat condiments and spreads	0.1	0.2	0.1	0.2	0.5
Higher-fat condiments and spreads	1.2	2.0	0.0	0.2	0.2
Other	0.5	0.1	0.5	0.2	0.7
Number of Daily Menus (Unweighted)			3,922		
Number of Schools (Unweighted)			804		

<sup>1</sup> Includes 1% and 2% milks.

Notes: See Exhibit E.6 for a detailed listing of items included in each group.  
Columns may not sum to 100 percent because of rounding.

## **Sodium**

Grain and bread products contributed more than 40 percent of the sodium in school breakfasts. Major contributors within this group included cold cereals; pancakes, waffles, and French toast; and donuts, Danish, and other pastries. Combination entrees contributed almost a quarter of the sodium in the average breakfast and milk contributed another 19 percent.

## **Cholesterol**

Leading sources of cholesterol in the average breakfast, as served, included milk (29%), meat/meat alternates (29%), and combination entrees (24%). Breakfast sandwiches, which generally included eggs, and eggs offered on their own, contributed, respectively, 15 percent and 20 percent of the cholesterol in the average breakfast.

## **Vitamin A**

Milk provided almost half of the vitamin A in school breakfasts. Grain and bread products, primarily cold cereals, contributed 28 percent of the vitamin A.

## **Vitamin C**

Fruits, juice and vegetables were the major source of vitamin C in school breakfasts (77%). The majority of this vitamin C was contributed by juice. Grain and bread products contributed 15 percent of the vitamin C in the average breakfast. Virtually all of the vitamin C from this group was contributed by cold cereals.

## **Calcium**

Milk provided about three-quarters of the calcium in the average school breakfast, as served. Grain and bread products provided 11 percent of the calcium, with contributions widely dispersed across the various minor food groups in this category.

## **Iron**

Almost three-quarters of the iron in the average breakfast came from grain and bread products. Cold cereals contributed the majority of this iron (38%), followed by donuts, Danish and other pastries (13%); plain bread, rolls, and bagels (6%); and pancakes, waffles, and French toast (5%). Combination entrees provided 11 percent of the iron in school breakfasts. Milk and the fruit/juice/vegetable groups each contributed about six percent of the total iron.

# Chapter Five

## Comparison of Weighted and Unweighted Nutrient Analyses

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Current NSLP and SBP menu planning requirements and monitoring standards are built around use of a weighted nutrient analysis (although the CN Reauthorization Act of 1998 waived the requirement through SY 2003 for school districts that obtain a waiver). There is a great deal of interest among both policy makers and school food service professionals in differences between the two analytic approaches. This chapter presents comparisons of weighted and unweighted analyses of the menu and meal production information provided by schools that participated in the SNDA-II study.<sup>1</sup> Data for school lunches are presented first, followed by data for school breakfasts.

To reiterate, a *weighted* nutrient analysis incorporates information about student selection patterns and does not assume that every student takes one serving of every type of food offered. This approach provides a picture of the *average meal served* to or *selected* by students. In contrast, an *unweighted* nutrient analysis represents a simple average of all foods offered to students, assuming that students take a serving of each type of food offered to them. For schools using the food-based menu planning systems, this would include, for lunch, an average serving of: milk, entree, separate grain/bread (if offered), dessert or other additional item (if offered), and condiments, as well as two average servings of fruit, juice and/or vegetables. For schools using NSMP or ANSMP, this would include one average serving of milk, an average entree, and one or more average servings of side dishes, depending on how the daily menu is structured. An *unweighted* nutrient analysis provides a picture of the *average meal offered* to students.

The methodology used in computing unweighted nutrient averages was based on the approach used in the SNDA-I study and earlier studies of the NSLP and SBP. The basic algorithm is built around the food-based meal patterns, as described above (a detailed description of the methodology is included in Appendix E). To permit comparisons with data from SNDA-I (summarized in the next chapter), this methodology had to be used. Because the assumptions included in the methodology do not reflect how NSMP/ANSMP menus are structured and marketed to students, a separate analysis was completed in which the unweighted analysis for NSMP/ANSMP sites was modified to reflect the basic differences in menu structure discussed above. Incorporation of the revised unweighted analysis for NSMP/ANSMP sites had no material effect on the results.

Because the use of a modified approach to the unweighted analysis for NSMP/ANSMP schools had no impact on the findings but had a substantial potential for causing confusion for readers of this report (different unweighted analysis results would be presented in this chapter and the next (SNDA-I versus SNDA-II) chapter), a decision was made to use only one version of the unweighted analysis — the version that essentially replicated the SNDA-I methodology — in this report. The interested reader may

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<sup>1</sup> The meal production data are used only in the weighted analysis.

find supplementary exhibits that present results of the analyses that incorporated a modified unweighted analysis for NSMP/ANSMP sites in Appendices A (Exhibits A.14 - A.17) and B (Exhibits B.14 - B.17).

## School Lunches

This section compares results of weighted and unweighted analyses of school lunches along two dimensions: overall means compared to NSLP standards and NRC recommendations and the percentage of schools considered to have met the various standards and recommendations.

### Mean Nutrient Content Relative to RDAs

For both elementary and secondary school lunches, the unweighted nutrient analysis resulted in greater estimated RDA contributions than the weighted nutrient analysis (Exhibit 5.1). The size of the disparity between weighted and unweighted means was consistently greater for secondary school lunches. For both types of schools, differences between weighted and unweighted means were greatest for vitamins A and C and smallest for iron and protein. All of the differences noted were statistically significant at the .001 level.

The finding that unweighted estimates of calorie and nutrient content tend to be greater than weighted estimates is consistent with differences between the two analytic methodologies. By definition, an unweighted analysis includes an average serving of every type of menu item offered, whereas a weighted analysis includes only foods actually served to students. Therefore, one would expect an unweighted analysis to produce greater mean estimates of calories and nutrients unless students consistently took at least one serving of each type of food offered to them. As reported in Chapter Three, the meal production data provided by cafeteria managers (and used in the weighted analysis) indicate that many students *did not* take a serving of each type of food offered to them at lunch.

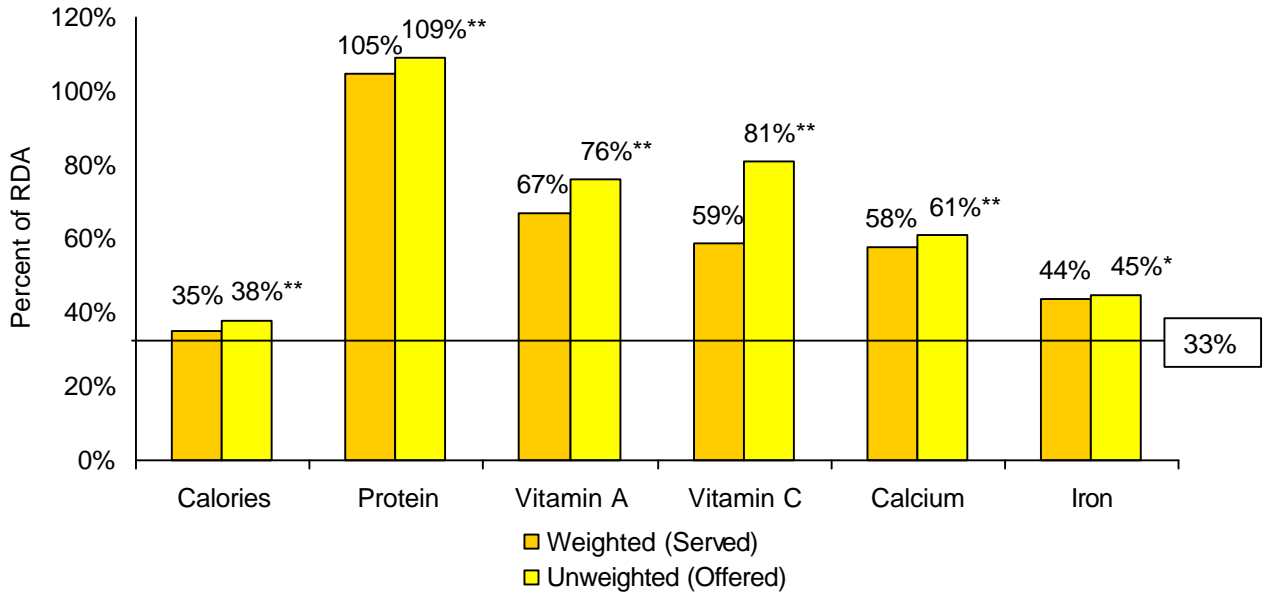
In addition, the fact that differences between weighted and unweighted estimates were greater for secondary school lunches than elementary school lunches suggests that secondary school students were more likely than elementary school students to omit one or more of the items offered. This is also consistent with data reported in Chapter Three.

While acknowledging numerical differences in results of the two analytic approaches, and the statistical significance of these differences, it is important to recognize that both methods led to virtually identical conclusions about whether school lunches, on average, met defined standards for calories and RDA nutrients. The conclusion differs only for calories in secondary school lunches. When a weighted analysis was used, the average secondary school lunch provided 30 percent of the RDA for calories. When an unweighted analysis was used, the average secondary school lunch met the NSLP standard of providing 33 percent of the RDA for calories.

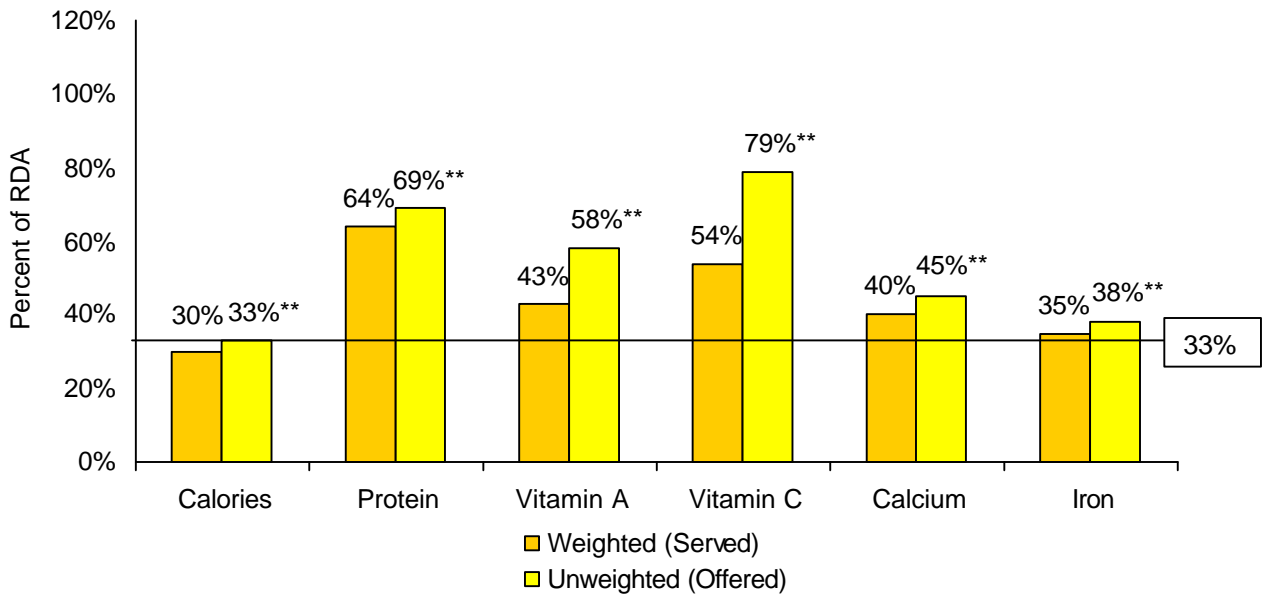
Thus, whether the analysis is based on the average lunch served to/selected by students (weighted analysis) or the average lunch offered to students (unweighted analysis), the data indicate that, in SY 1998–99, the average school lunch met all of the established RDA standards except, when a weighted analysis is used, calories in secondary school lunches.

**Exhibit 5.1 Estimates of Calorie and Nutrient Content of the Average Lunch Were Different for Weighted and Unweighted Analyses but Conclusions About the One-Third RDA Standard Were Similar**

**Elementary School Lunches**



**Secondary School Lunches**



\* Difference is statistically significant at the .01 level.

\*\* Difference is statistically significant at the .001 level.



### **Mean Percentage of Calories from Total Fat and Saturated Fat**

For elementary school lunches, the two analyses resulted in virtually identical estimates of the percentage of calories provided by fat (Exhibit 5.2). Among secondary schools, the weighted analysis resulted in a slightly greater estimate of the percentage of calories from fat than the unweighted analysis (35% versus 34%). The difference between these two estimates was statistically significant.

Weighted and unweighted estimates of the percentage of calories provided by saturated fat were identical for elementary school lunches. For secondary school lunches, the estimate from the weighted analysis was slightly greater than the estimate from the unweighted analysis, however, both estimates rounded to 12 percent. This difference was also statistically significant.

Despite the statistical significance of the differences cited above, conclusions about whether school lunches met defined NSLP standards for fat and saturated fat were identical for the two analysis methods. Whether the analysis was based on the average lunch served to students (weighted analysis) or the average lunch offered to students (unweighted analysis), the data indicate that, in SY 1998–99, the average school lunch did not meet established NSLP standards for the percentage of calories from fat or saturated fat.

### **Cholesterol, Sodium, and Carbohydrate Content**

For both elementary and secondary school lunches, the unweighted analysis produced somewhat greater mean estimates of cholesterol and sodium content than the weighted analysis (Exhibit 5.3). In addition, the unweighted analysis of secondary school lunches produced a greater mean estimate of the percentage of calories from carbohydrate than the weighted analysis. For elementary school lunches, differences were statistically significant for cholesterol and sodium. For secondary school lunches, differences were statistically significant for all three measures.

Again, however, differences did not affect overall conclusions about whether the average school lunch offered (unweighted analysis) or served (weighted analysis) in SY 1998–99 met NRC recommendations. Both weighted and unweighted analyses found that school lunches met the NRC recommendation for cholesterol but did not meet NRC recommendations for sodium or the percentage of calories from carbohydrate.

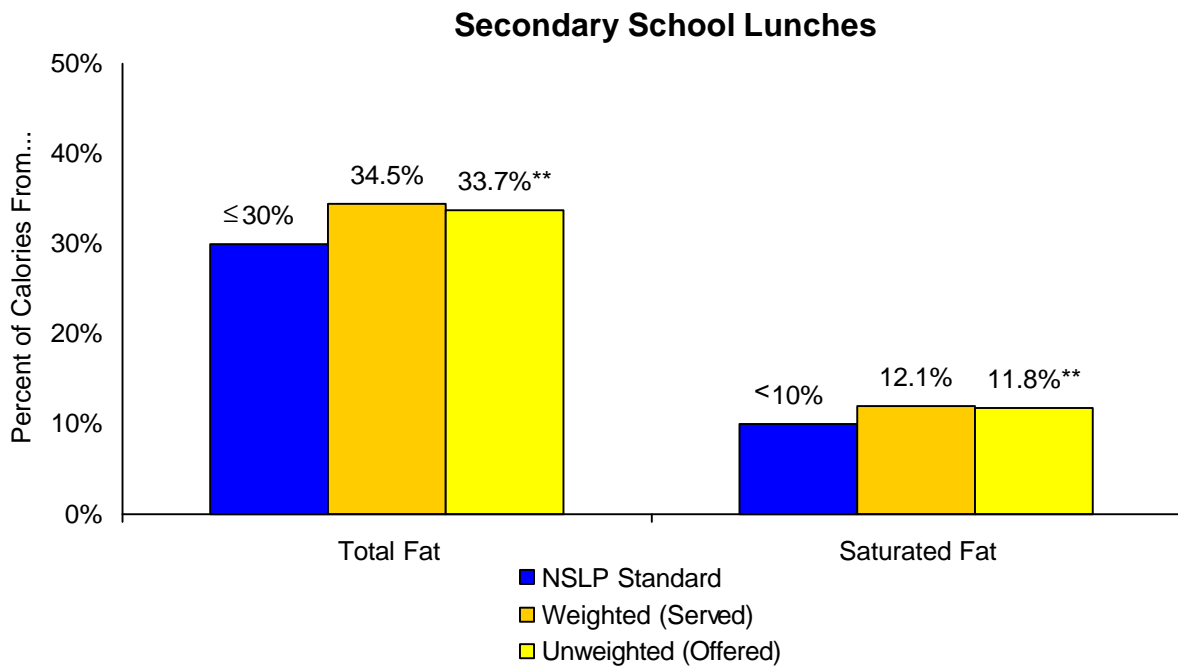
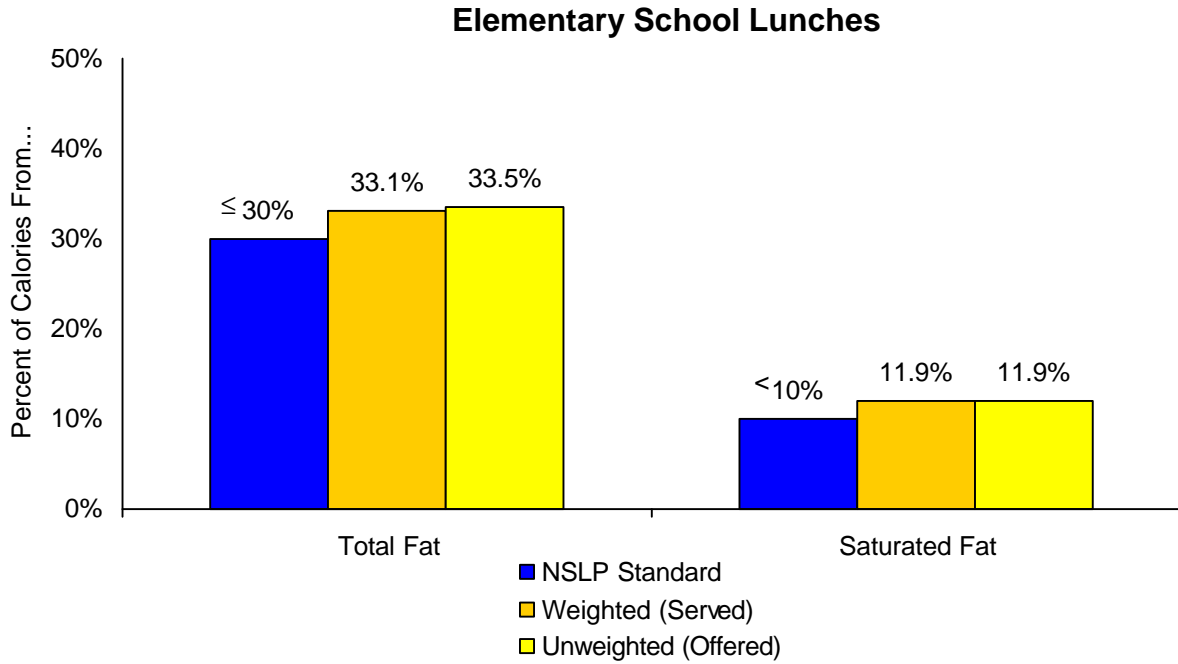
### **Percentage of Schools That Met Nutrient Standards and Recommendations**

Another way of assessing differences between the two analysis methods is to compare the percentage of schools that each method would classify as having met the various NSLP standards and NRC recommendations. Looking at the data this way reveals that the choice of analytic approach can have a significant impact on whether or not an individual school meets a specific nutrition standard. This is particularly true for secondary schools.

#### ***NSLP Standards for Calories and Key Nutrients***

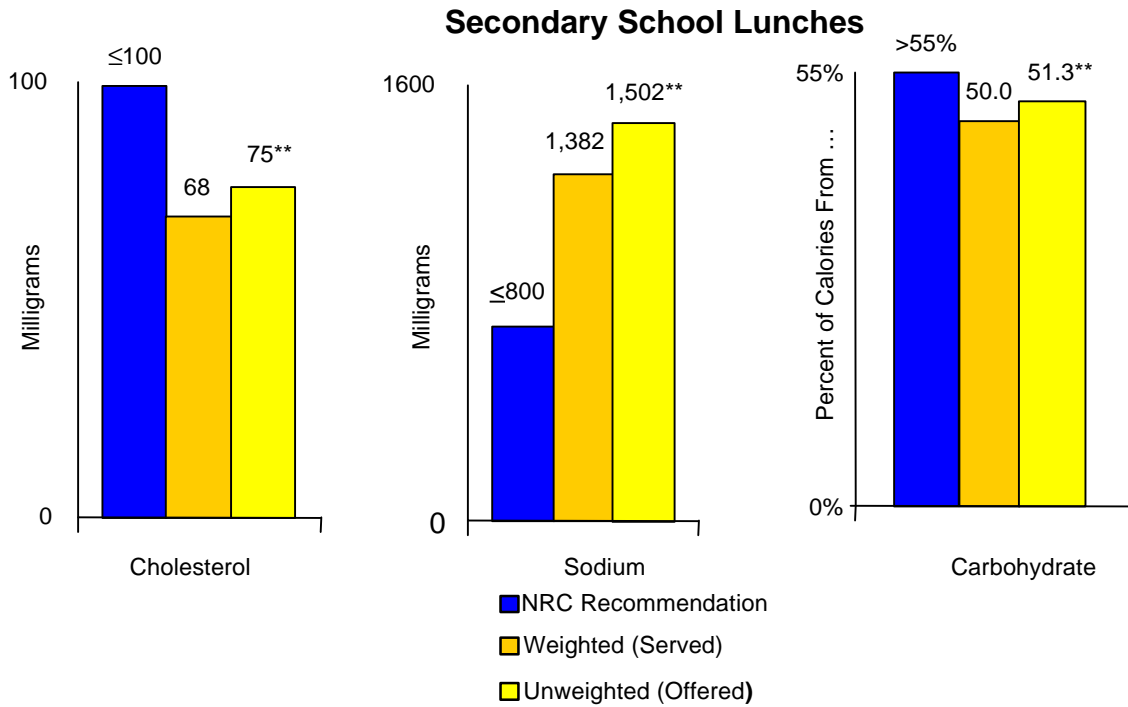
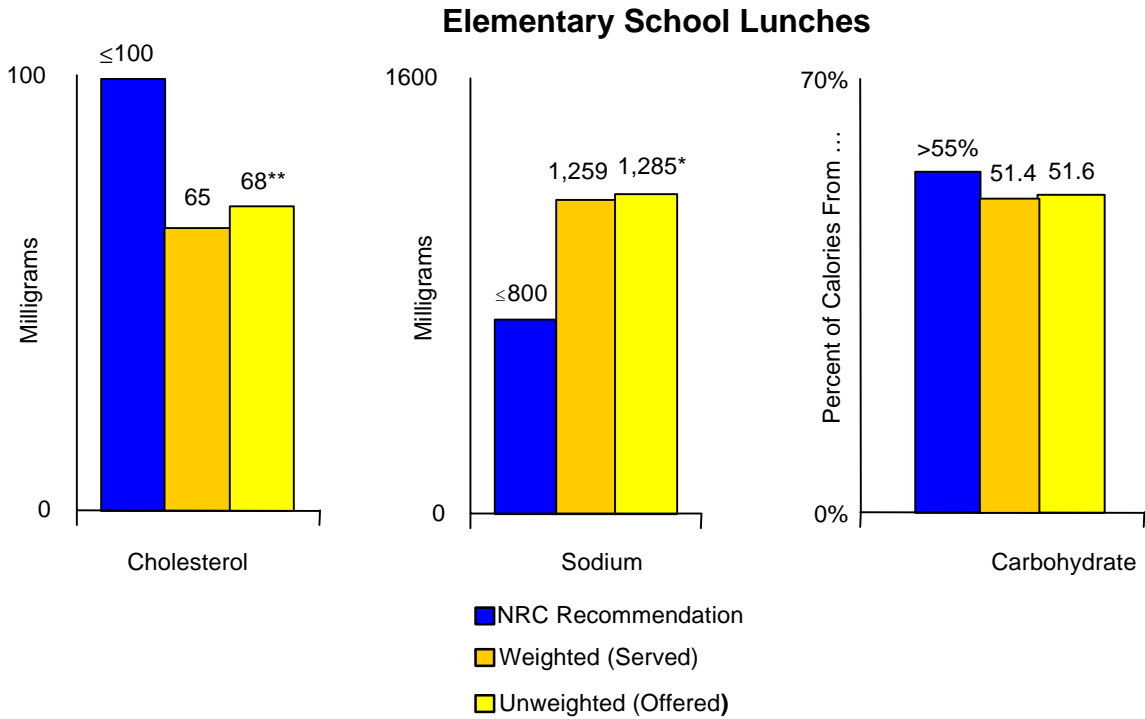
Among elementary schools, the only measures for which the two analytic approaches yielded results that were significantly different (with regard to the percentage of schools classified as having met NSLP standards) were calories and vitamin C (Exhibit 5.4). When a weighted analysis was used, the percentage

**Exhibit 5.2** Estimates of the Percentage of Calories from Fat and Saturated Fat in Lunches Were Similar for Weighted and Unweighted Analyses



\*\* Difference is statistically significant at the .001 level.

**Exhibit 5.3 Estimates of Cholesterol and Sodium Content Were Different for Weighted and Unweighted Analyses but Conclusions About Whether Lunches Met NRC Recommendations Were Identical**



\* Difference is statistically significant at the .01 level

\*\* Difference is statistically significant at the .001 level.

### Exhibit 5.4

#### Percentage of Schools That Satisfied NSLP Standards and NRC Recommendations for Lunch Based on Weighted and Unweighted Analyses *Elementary Schools*

Standard/Recommendation	Weighted (Served)  Percentage of Schools	Unweighted (Offered)	Percent Difference (Weighted vs. Unweighted)
<b>Defined NSLP Standards</b>			
Calories	68%	82%	-17% **
Protein	100	100	0
Vitamin A	98	99	-1
Vitamin C	86	94	-3**
Calcium	100	100	0
Iron	93	96	-4
Percentage of Calories from Fat	21	18	+17
Percentage of Calories from Saturated Fat	15	15	0
<b>NRC Recommendations</b>			
Percentage of Calories from Carbohydrate	18	20	-14
Cholesterol	99	95	+4
Sodium	1	1	0
Number of Schools (Unweighted)	398		

\*\* Difference between weighted and unweighted analyses is statistically significant at the .001 level.

Source: Menu and meal production data for one week between September 1998 and May 1999.

of elementary schools that met the one-third RDA standard for calories was 17 percent lower than when a weighted analysis was used (68% versus 82%). The percentage of elementary schools that met the RDA standard for vitamin C was nine percent lower (86% versus 94%) when a weighted analysis was used.

The disparity between results of weighted and unweighted analyses was greater among secondary schools (Exhibit 5.5). Statistically significant differences were noted for calories and all RDA nutrients except protein. In all cases, the unweighted analysis classified a larger percentage of schools as having met the standard than did the weighted analysis. The relative size of the differences ranged from 14 percent (calcium) to 56 percent (calories). Results were most divergent for calories. Using an unweighted analysis, 45 percent of secondary schools met the one-third RDA standard. Using a weighted analysis, the percentage of schools meeting the standard was more than 50 percent lower, at 45 percent.

#### ***NSLP Standards for the Percentage of Calories from Fat and Saturated Fat***

For elementary schools, there were no statistically significant differences between weighted and unweighted analyses in conclusions about the percentage of schools that met NSLP standards for the percentage of calories from fat or saturated fat (Exhibit 5.4). Among secondary schools, however, differences between results of weighted and unweighted analyses were statistically significant for the percentage of schools judged to have met the standard for calories from fat (Exhibit 5.5). The difference favored the unweighted analysis. That is, the unweighted analysis was more likely than the weighted analysis to classify a school as having met the standard of providing no more than 30 percent of calories from fat. Using a weighted analysis, the percentage of secondary schools that met the NSLP standard for calories from fat was 33 percent lower than when an unweighted analysis was used (14% versus 21%)

#### ***NRC Recommendations for Cholesterol, Sodium and Calories from Carbohydrate***

Results of the two analyses were virtually identical for sodium for both elementary schools and secondary schools (Exhibit 5.4 and 5.5) — virtually no schools met the standard for sodium, regardless of the analytic approach used. Among elementary schools, there were no significant differences between weighted and unweighted analyses in the percentage of schools deemed to have met NRC recommendations for cholesterol or the percentage of calories from carbohydrate. Among secondary schools, however, differences were statistically significant for both of these measures. The result for calories from carbohydrate followed expectations — more schools were judged to have met the recommendation when an unweighted analysis was used. The result for cholesterol was different from the pattern noted for all other nutrients, however. The percentage of schools deemed to have met the NRC recommendation for cholesterol was greater (rather than smaller) when a weighted analysis was used.

#### **Factors Influencing Estimates of Relative Fat Content**

Exploratory analyses were carried out to identify factors that may contribute to differences in this key indicator of nutritional quality in results of weighted and unweighted analyses. Twenty-five individual daily menus were selected at random from those with the most widely divergent results for weighted and unweighted analyses. The menus and associated meal production data were examined to determine whether specific types of situations (e.g., types of food offered or student selection patterns) were associated with greater estimates of the percentage of calories provided by fat for either one analytic approach or the other.

**Exhibit 5.5**

**Percentage of Schools That Satisfied NSLP Standards and NRC Recommendations  
for Lunch Based on Weighted and Unweighted Analyses  
Secondary Schools**

<b>Standard/Recommendation</b>	<b>Weighted (Served)</b>	<b>Unweighted (Offered)</b>	<b>Percent Difference (Weighted vs. Unweighted)</b>
	<b>Percentage of Schools</b>		
<b>Defined NSLP Standards</b>			
Calories	20%	45%	-56% **
Protein	100	100	0
Vitamin A	65	90	-28**
Vitamin C	79	94	-16**
Calcium	86	100	-14**
Iron	60	71	-15**
Percentage of Calories from Fat	14	21	-33**
Percentage of Calories from Saturated Fat	13	16	-19
<b>NRC Recommendations</b>			
Percentage of Calories from Carbohydrate	14	22	-36**
Cholesterol	96	90	+7**
Sodium	<1	<1	0
Number of Schools (Unweighted)	677		

\*\* Difference between weighted and unweighted analyses is statistically significant at the .001 level.

Source: Menu and meal production data for one week between September 1998 and May 1999.

Menus that resulted in *greater estimates of the percentage of calories from fat when a weighted analysis was used* had one or more of the characteristics identified below. In the discussions that follows, an attempt has been made to explain why these characteristics would tend to contribute to greater estimates of the percentage of calories from fat when the nutrient analysis is weighted and lower estimates when the analysis is unweighted.

- *Availability of separate grain/bread items or other high-carbohydrate items (e.g., fruit drinks) that the majority of students did not select.* An unweighted analysis would assume that all meals included an average of serving of these foods, thereby increasing calories from carbohydrate and diluting the percentage of calories provided by fat.
- *A minority of students, often 50 percent or fewer, selected milk of any kind (secondary school menus only).* An unweighted analysis would assume that all meals included an average of serving of milk. Milk, by virtue of its carbohydrate content, tends to increase calories from carbohydrate and dilute the percentage of calories provided by fat.
- *A majority of students selected the highest-fat entree options.* The fat content of the average entree included in an unweighted analysis would be diluted (lower than the cumulative fat contribution of the entrees considered in the weighted analysis) because it gives equal consideration to the high-fat and low-fat entrees, even though the latter were actually selected by few students.
- *French fries were offered as one vegetable option and were selected by a majority of students.* In an unweighted analysis, the fat contribution of the French fries would be diluted because the French fries would be averaged in with all other available fruits, juices and vegetables which, on the whole, tend to be substantially lower in fat than French fries.

In contrast, menus that resulted in *greater estimates of the percentage of calories from fat when an unweighted analysis was used* had one or more of the following characteristics:

- *Salad dressing was offered for a side salad and/or entree salad that was actually selected by a minority of students.* If few students select the salad, the fat contributed by the salad dressing has very little effect on the results of a weighted nutrient analysis. In an unweighted analysis, however, salads are averaged in with all other options (fruits and vegetables in the case of side salads and entrees in the case of entree salads) and it is assumed that salad dressing is served with each salad.
- *The highest-fat entree option(s) were selected by a minority of students.* This is the reverse of the entree selection issue discussed above (where students tended to select the highest-fat entree options more (rather than less) often than lower-fat options). In this case, the fat content of the average entree considered in the analysis will be greater for the unweighted analysis than for the weighted analysis.
- *Higher-fat milk options were offered (e.g., whole milk or 2% milk), but were selected by a minority of students.* If higher-fat milks are offered but rarely selected, the average milk

considered in the unweighted analysis will always be higher in fat (because all milks are considered equally) than the average milk in the weighted analysis.

- *A high-fat condiment was offered with a non-entree menu item that was selected by a minority of students (e.g., butter with a roll).* The effect of this situation is similar to the salad and salad dressing situation discussed above. The unweighted analysis will assume that every meal included the roll, *with butter* (or, if more than one additional grain/bread product is offered, an average of the roll with butter and all other options). In contrast, the butter will contribute to the weighted analysis only in relation to the number of meals in which it was included.
- *A high-fat item offered as an optional additional item (e.g., clam chowder, macaroni salad) was actually selected by a minority of students.* The effect of this situation is similar to that described for salads with dressing and rolls with butter.

## School Breakfasts

This section compares results of weighted and unweighted analyses of school breakfasts along the same two dimensions used in the preceding analysis of school lunches: overall means compared to SBP standards and NRC recommendations and the percentage of schools considered to have met the various standards and recommendations.

### Mean Nutrient Content Relative to RDAs

For most nutrients, the unweighted nutrient analysis of breakfast menus resulted in significantly greater estimated contributions to the RDAs than the weighted nutrient analysis (Exhibit 5.6). Differences between weighted and unweighted means were greatest for vitamin A (with the weighted mean for secondary schools just meeting the one-fourth RDA standard) and iron and smallest for calories and protein.

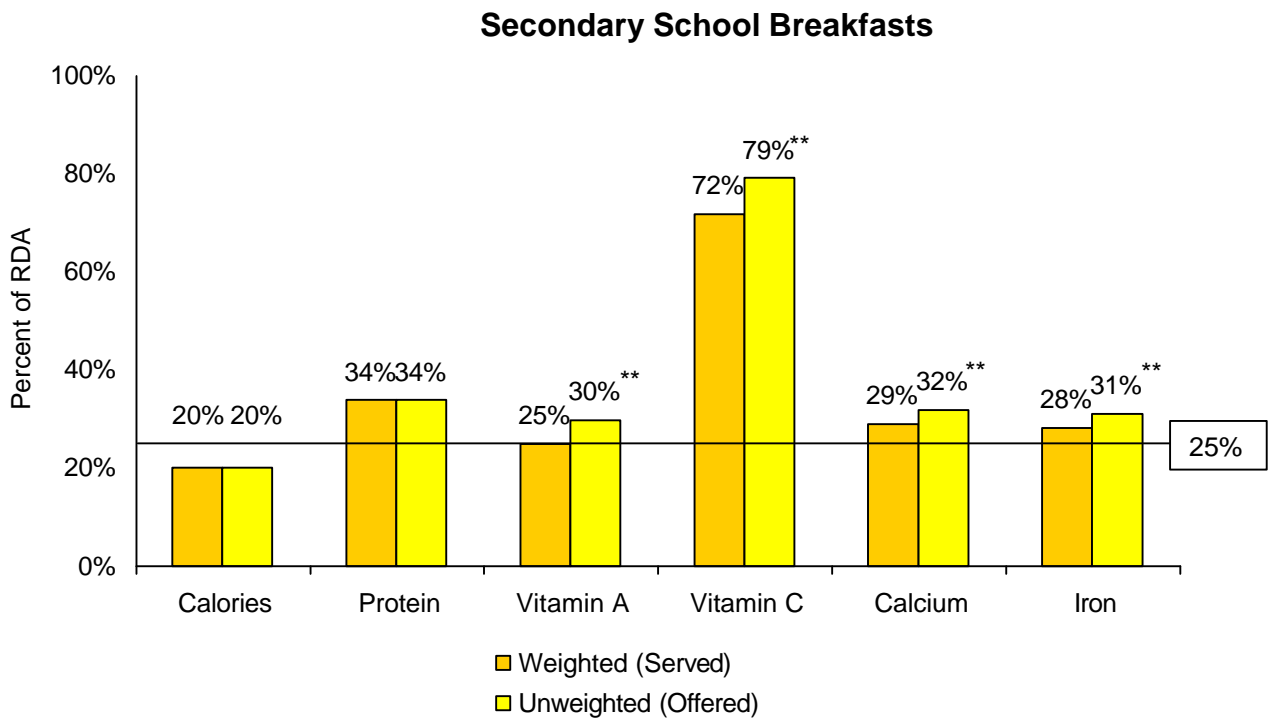
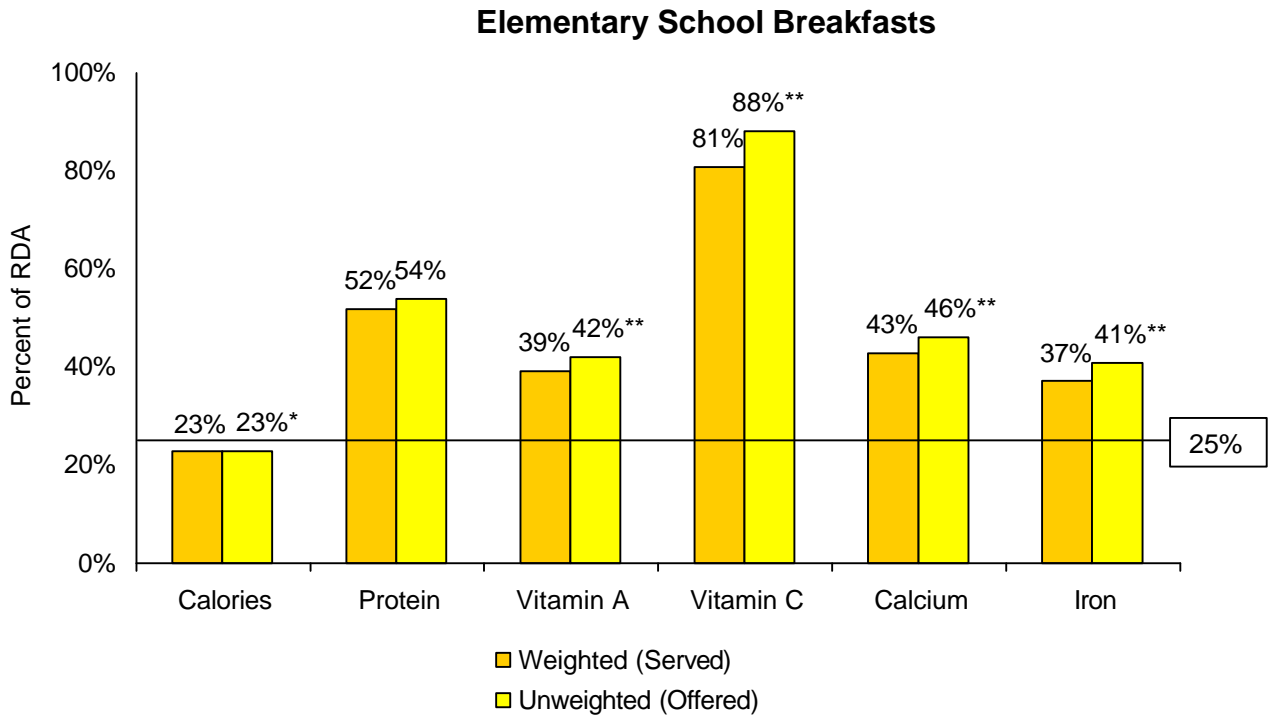
With the exception of calories, where estimated means for both analyses fell short of the one-fourth RDA standard, means for both weighted and unweighted analyses met or exceeded the SBP standard. Thus, general conclusions about the importance of differences between the two methods are similar to those reached for the comparison of weighted and unweighted analysis of lunch menus. Whether the analysis is based on the average breakfast served to students (weighted analysis) or the average breakfast offered (unweighted analysis), the data indicate that, in SY 1998–99, the average school breakfast met all of the established RDA standards except for calories.

### Mean Percentage of Calories from Total Fat and Saturated Fat

For both elementary school and secondary school breakfasts, the weighted analysis resulted in a slightly greater estimate of the percentage of calories provided by total fat and by saturated fat than the unweighted analysis (Exhibit 5.7). However, the only difference that was statistically significant and affected conclusions about whether SBP meals met program standards was the difference in the percentage of calories provided by saturated fat in secondary school breakfasts. When a weighted



**Exhibit 5.6** Estimates of Calorie and Nutrient Content of the Average Breakfast Were Different for Weighted and Unweighted Analyses but Conclusions About the One-Fourth RDA Standard Were Similar

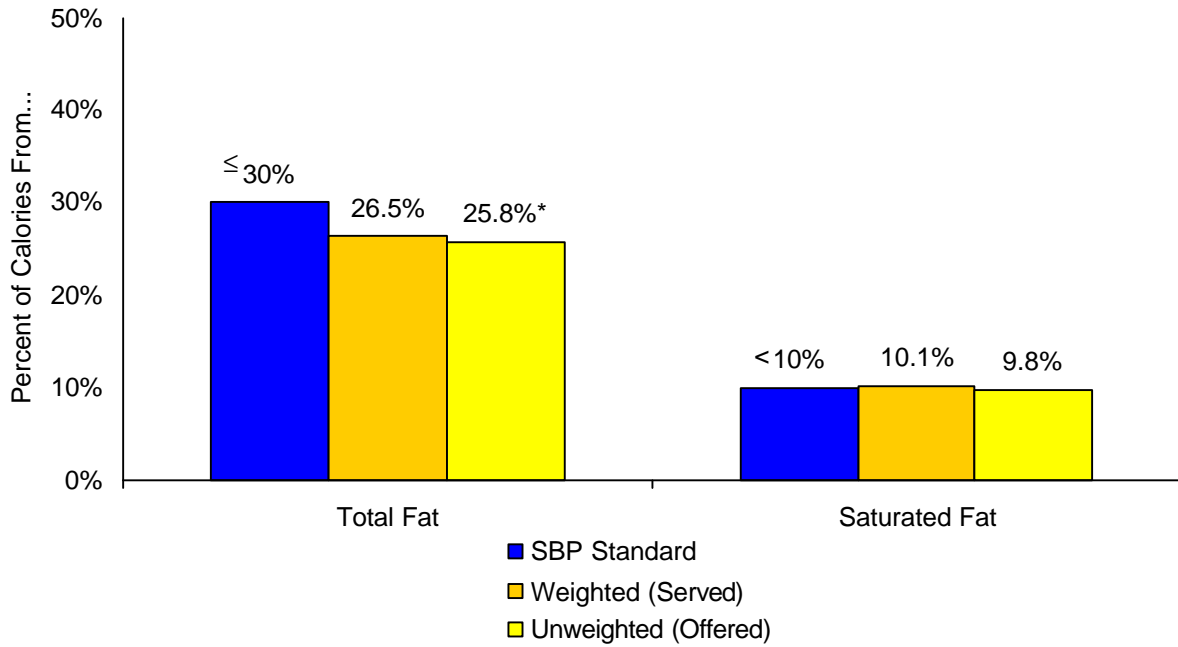


\* Difference is statistically significant at the .01 level.

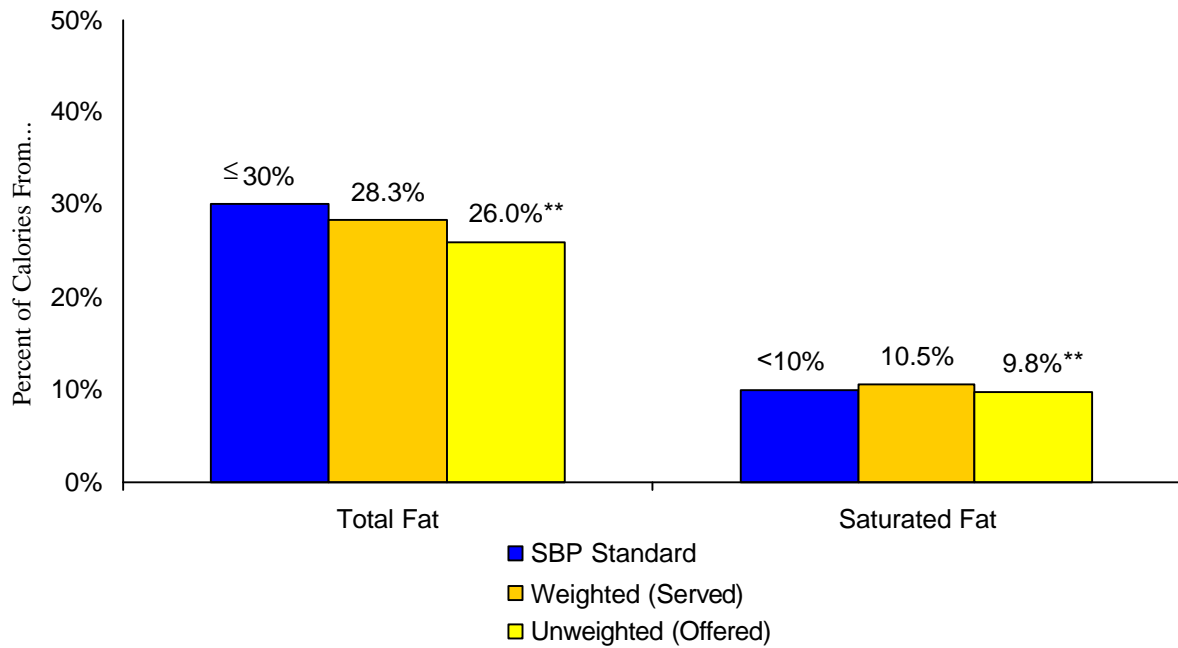
\*\* Difference is statistically significant at the .001 level.

**Exhibit 5.7** Estimates of the Percentage of Calories from Fat and Saturated Fat in Breakfasts Were Similar for Weighted and Unweighted Analyses

**Elementary School Breakfasts**



**Secondary School Breakfasts**



\* Difference is statistically significant at the .01 level.

\*\* Difference is statistically significant at the .001 level.

analysis was used, the mean percentage of calories from saturated fat in secondary school breakfasts just exceeded the program standard (10.5% of calories compared to the standard of less than 10%). When an unweighted analysis was used, the mean was just below 10 percent (9.8%) and was therefore consistent with the standard.

### **Cholesterol, Sodium and Carbohydrate Content**

The weighted analysis produced greater mean estimates of cholesterol and sodium content than the unweighted analysis (Exhibit 5.8). In contrast, the unweighted analysis resulted in greater mean estimates of the percentage of calories provided by carbohydrate. With the exception of cholesterol and sodium for elementary school breakfasts, all of the differences were statistically significant. However, most did not affect conclusions about whether the average school breakfast met NRC recommendations. Regardless of the analysis method used, the average school breakfast in SY 1998–99 met the NRC recommendation for cholesterol (equivalent to one-fourth of the recommended maximum daily intake) as well as the NRC recommendation for the percentage of calories from carbohydrate. With regard to sodium content, both analyses found that breakfasts in elementary schools satisfied the NRC recommendation. Secondary school breakfasts exceeded the recommendation when a weighted analysis was used but essentially met the recommendation when an unweighted analysis was used.

### **Percentage of Schools That Met Nutrient Standards and Recommendations**

Exhibits 5.9 and 5.10 summarize the percentage of elementary and secondary schools that met SBP standards and NRC recommendations when weighted and unweighted analyses were used. The following sections discuss results for the various nutrition standards and recommendations examined in this report.

#### ***SBP Standards for Calories and Key Nutrients***

Among elementary schools, differences between the two analysis methods in the percentage of schools considered to have met SBP standards for calories and RDA nutrients were apparent but none were statistically significant. Among secondary schools, differences were statistically significant for calories and all RDA nutrients except Vitamin C. With the exception of calories, the unweighted analysis was more likely than the weighted analysis to classify a school as having met the one-fourth RDA standard.

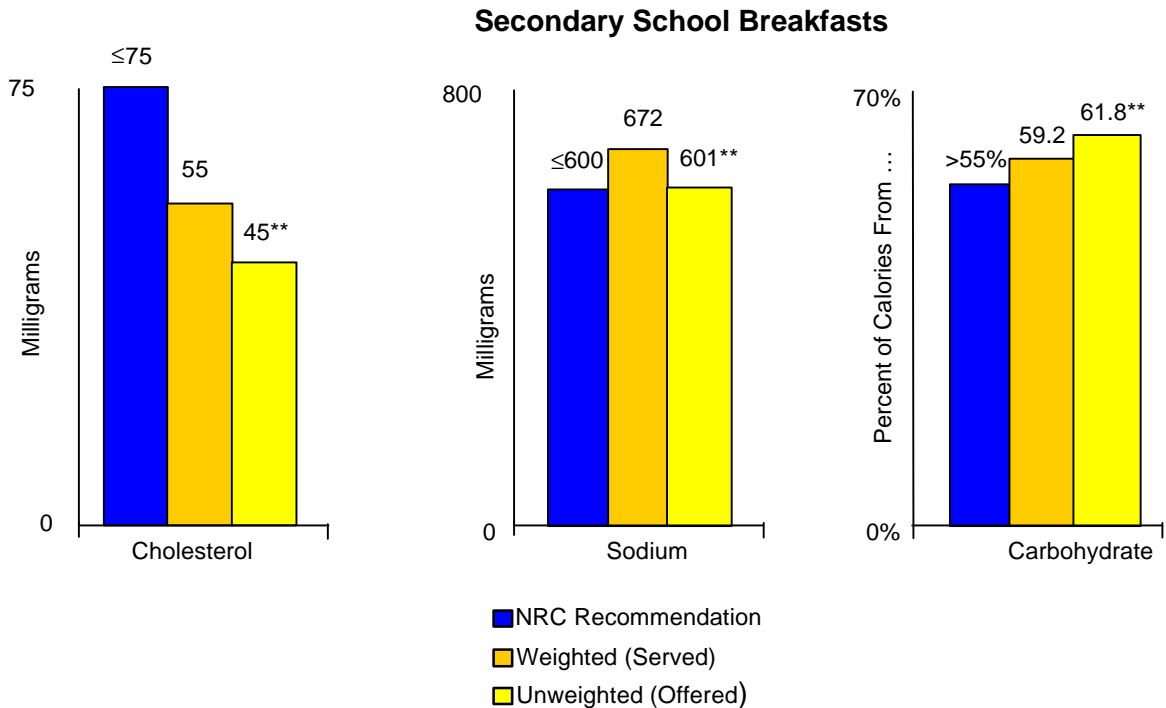
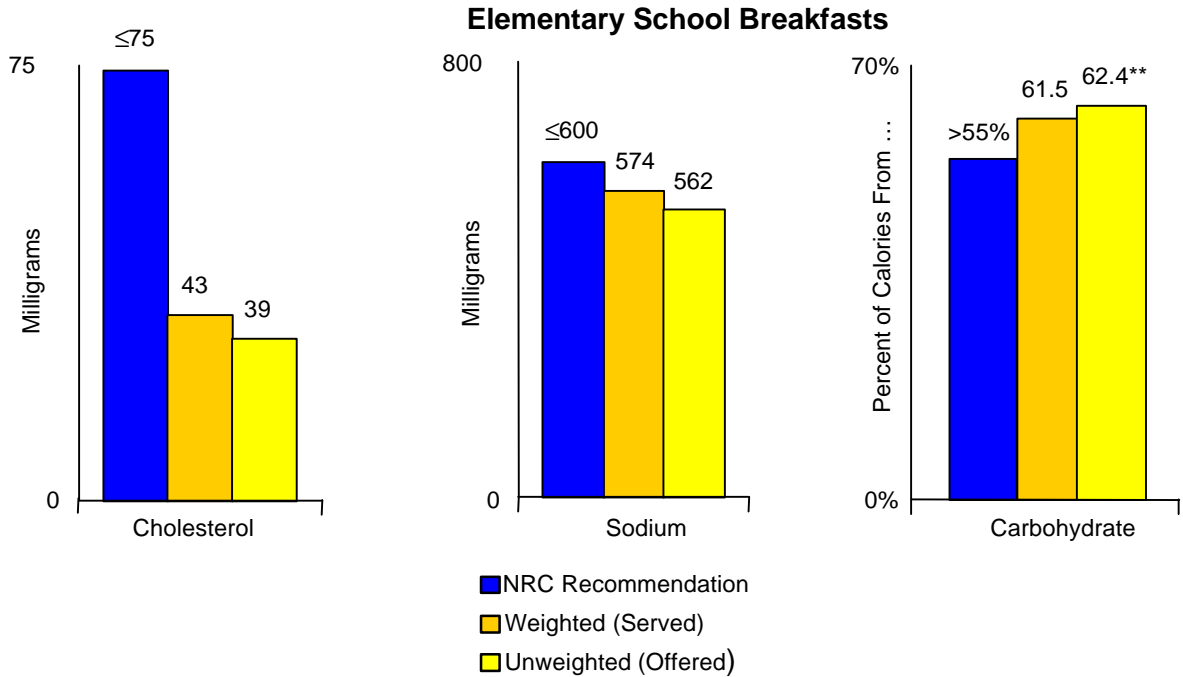
#### ***SBP Standards for the Percentage of Calories from Fat and Saturated Fat***

No significant differences were observed for elementary schools (Exhibit 5.9), but significant differences were observed for secondary schools (Exhibit 5.10). Specifically, the unweighted analysis classified significantly more secondary schools as having met SBP standards for calories from fat and calories from saturated fat than did the weighted analysis. Compared to results of the unweighted analysis, the weighted analysis considered 15-16 percent fewer secondary schools to be in line with the standards for calories from fat and saturated fat.

#### ***NRC Recommendations for Cholesterol, Sodium, and Calories from Carbohydrate***

In comparison to the unweighted analysis, the weighted analysis classified significantly fewer schools as having met NRC recommendations for cholesterol and the percentage of calories from carbohydrate (Exhibits 5.9 and 5.10). This was true for both elementary schools and secondary schools, but the difference was most pronounced among secondary schools. In addition, among secondary schools, significantly fewer schools met the NRC recommendation for sodium when a weighted analysis was used.

**Exhibit 5.8** Estimates of Cholesterol and Sodium Content Were Different for Weighted and Unweighted Analyses but Conclusions About Whether Breakfasts Met NRC Recommendations Were Generally Similar



\*\* Difference is statistically significant at the .001 level.

**Exhibit 5.9**

**Percentage of Schools That Satisfied SBP Standards and NRC Recommendations  
for Breakfast Based on Weighted and Unweighted Analyses  
Elementary Schools**

<b>Standard/Recommendation</b>	<b>Weighted (Served)</b>	<b>Unweighted (Offered)</b>	<b>Percent Difference (Weighted vs. Unweighted)</b>
	<b>Percentage of Schools</b>		
<b>Defined SBP Standards</b>			
Calories	22%	24%	-8%
Protein	100	100	0
Vitamin A	95	99	-4
Vitamin C	98	98	0
Calcium	99	100	-1
Iron	93	90	+3
Percentage of Calories from Fat	75	79	-5
Percentage of Calories from Saturated Fat	54	60	-10
<b>NRC Recommendations</b>			
Percentage of Calories from Carbohydrate	82	90	-9*
Cholesterol	90	96	-6**
Sodium	63	69	-9
Number of Schools (Unweighted)	317		

\* Difference between weighted and unweighted analyses is statistically significant at the .01 level.

\*\* Difference between weighted and unweighted analyses is statistically significant at the .001 level.

Source: Menu and meal production data for one week between September 1998 and May 1999.

**Exhibit 5.10**

**Percentage of Schools That Satisfied SBP Standards and NRC Recommendations  
for Breakfast Based on Weighted and Unweighted Analyses  
Secondary Schools**

Standard/Recommendation	Weighted (Served)	Unweighted (Offered)	Percent Difference (Weighted vs. Unweighted)
	Percentage of Schools		
<b>Defined SBP Standards</b>			
Calories	8%	3%	+167%**
Protein	95	100	-5**
Vitamin A	48	72	-33**
Vitamin C	95	99	-4
Calcium	78	100	-22**
Iron	57	68	-16*
Percentage of Calories from Fat	64	76	-16**
Percentage of Calories from Saturated Fat	46	54	-15*
<b>NRC Recommendations</b>			
Percentage of Calories from Carbohydrate	72	88	-18**
Cholesterol	76	91	-16**
Sodium	42	57	-26**
Number of Schools (Unweighted)	487		

\* Difference between weighted and unweighted analyses is statistically significant at the .01 level.

\*\* Difference between weighted and unweighted analyses is statistically significant at the .001 level.

Source: Menu and meal production data for one week between September 1998 and May 1999.

## Factors Influencing Estimates of Relative Fat Content

Exploratory analyses were carried out to identify factors that may contribute to differences in conclusions about relative fat content when weighted and unweighted analyses are used. Twenty-five individual daily menus were selected at random from those with the most widely divergent results for weighted and unweighted analyses and menus and meal production data were examined. Observations made during this review and potential impacts on weighted and unweighted nutrient analyses are summarized below.

Menus that resulted in *greater estimates of the percentage of calories from fat when a weighted analysis was used* had one or more of the following characteristics in common:

- *Most students selected the highest-fat breakfast option(s).* Most often the contrast between options was stark (e.g., breakfast sausage or a breakfast sandwich versus cold cereals). The impact of this stark a difference is obvious. If a majority of students select the highest-fat breakfast option(s), the mean fat content is likely to be higher under a weighted analysis than an unweighted analysis. This is especially true when the lowfat options are very low in fat (e.g., hot or cold cereals, plain breads).
- *Whole milk was offered and selected by a majority of students.* Given that the array of foods offered for breakfast is limited in comparison to lunch, milk tends to have more influence on breakfast analyses. If whole milk is available and selected most often, the contribution of the fat in the whole milk to the overall nutrient average will be greater for the weighted analysis than the unweighted analysis (which will consider, equally, all other — and lower-fat — milk choices).

Menus that resulted in *greater estimates of the percentage of calories from fat when an unweighted analysis was used* had one or more of the following characteristics:

- *A minority of students selected the highest-fat menu option(s) (e.g., cream cheese, peanut butter, pastries).* This is the converse of the situation described above, where a majority of students selected the highest-fat options. Situations where students tend toward the lower-fat options or menus do not include high-fat items such as cream cheese and peanut butter lead to more favorable results under a weighted analysis. This is true because the unweighted analysis weights all available options equally and assumes that all optional items (e.g., cream cheese) are taken.
- *Whole milk was offered but was selected by a minority of students.* This is the converse of the milk situation described above. If whole milk is offered but not frequently selected, the contribution of the fat in the whole milk to the nutrient analysis will always be greater in an unweighted analysis.





# Chapter Six

## Changes in Nutrient Content of School Meals Offered Since SY 1991–92

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This chapter compares the nutrient content of school meals offered in SY 1998–99 to those offered in SY 1991–92 when the last national study of school meals programs (the first School Nutrition Dietary Assessment Study (SNDA-I)) was completed. Differences noted between SNDA-I (SY 1991–92) and SNDA-II (SY 1998–99) can not be attributed to any one factor. Factors that may contribute to observed differences include changes in the food supply over time (e.g., the introduction of new products and changes in product formulations in both USDA commodity foods and foods available in the quantity food service market); as well as changes in menu planning, food purchasing, and food preparation practices of school food service personnel. Differences in data collection methodology (data for all schools in SNDA-II were collected via a mail survey while data for more than half of the SNDA-I schools were collected on site) and/or in the nutrient databases used in the two studies may also contribute to the observed differences.<sup>1,2</sup> Every precaution was taken to minimize the potential influence of differences in data collection methodology and analysis.

### Overview of the Analysis

The data presented in this chapter are based on *unweighted* nutrient analyses of lunch and breakfast menus. An unweighted analysis was used because SNDA-I was based on an unweighted nutrient analysis and did not collect the information needed to complete a weighted analysis. Thus, the only way to compare SNDA-I and SNDA-II data was to re-analyze the SNDA-II data using an unweighted analysis.

As noted in the preceding chapter, an unweighted analysis is based solely on the foods *offered* to students. It does not take into consideration the number and types of foods actually included in the meals served to students. As such, an unweighted analysis provides a picture of the *average meal offered* to students. At the time the SNDA-I study was completed, this was the standard approach used to evaluate the nutrient content of school meals.

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- 1 For nutrient analysis, both studies essentially used USDA's standard reference nutrient database (the most current version available at each point in time), supplemented with information on commercial products used in school food service. In SNDA-I, the Nutrition Data System (NDS) software was used to enter data on foods and portions offered. However, for purposes of the nutrient analysis, NDS entries were linked to items in USDA's standard reference database. For commercial products not in the database, a special NDS recipe calculation function was used, in conjunction with food product nutrition information, to create nutrient values. The nutrient data base used in SNDA-II (the third release of the Child Nutrition data base (CN-3) developed for NSMP software) was developed using USDA's standard reference database. Commercial products not included in the database were added using product nutrition information.
  - 2 Another potential source of differences between the two data sets is change over time in database values for the same food(s) because of improved or enhanced analytic techniques (e.g., incorporation of updated data on nutrient X or nutrient Y). Given the limited and basic set of nutrients examined in this analysis, however, it is unlikely that this source contributed substantially to the differences observed.

In SNDA-I, the traditional meal pattern provided the framework for the unweighted analysis. The nutrient content of the “average lunch offered” in each school was determined by summing the nutrients in an average serving of milk; two average servings of fruit/vegetables; an average entree; an average additional grain/bread alternate serving (if offered); an average dessert or other non-creditable menu item (if offered); and an average serving of condiments. Non-creditable items did not “count” toward satisfying any of the component requirements of the traditional meal pattern.

To obtain a basis for comparison, SNDA-II data were reanalyzed, following the analytic approach outlined above, to produce unweighted estimates of the average nutrient content of school meals. An exception was made to account for the fact that, in SY 1998–99, many schools encouraged students to take more than two fruit/vegetable servings. If the meal production data provided for the weighted analysis indicated that, on average, students took more than two servings of fruit and/or vegetables, the algorithm used to determine the nutrients in the average lunch was adjusted to include three or, in rare cases, four servings of fruit/vegetables.<sup>3</sup> A detailed description of the methodology used in the unweighted analysis is included in Appendix E.

Finally, because SNDA-II was limited to public schools, SNDA-I data were reanalyzed with the sample restricted to public schools. Data for middle schools and high schools were combined to produce estimates for secondary schools.

## **Average Nutrient Content of Lunches Offered in Public Schools: SY 1998–99 and SY 1991–92**

This section presents data on the average nutrient content of lunches offered at the two points in time. For calories and RDA nutrients, exhibits present actual means rather than the percentage of the RDA provided. This is done because SNDA-I and SNDA-II used markedly different approaches to assess the percentage of the RDA provided in school meals. SNDA-I compared the average calorie and nutrient content of meals offered for a given school type to all potentially relevant RDAs. For example, the mean nutrient content of elementary school meals was compared to RDAs for three different age/sex groups: 7-10 year olds, 11-14 year old females and 11-14 year old males. In keeping with current program regulations, the SNDA-II analysis compared weekly nutrient averages for each individual school to a customized, weighted RDA that was based on the ages of students attending the school (see Appendix E).

To overcome these differences in approach and to present information in a manner that is consistent with the context in which school meal programs are operating today, both SNDA-I and SNDA-II data were compared to minimum nutrient standards defined in current NSLP regulations. Thus, the mean nutrient content of lunches offered in elementary schools was compared to minimum nutrient standards defined

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3 As described in Chapter Three and Appendix E, an alternative approach to the unweighted analysis was also implemented for NSMP/ANSMP sites, which do not follow a food-based meal pattern. Because incorporation of these alternative data had no material effect on the outcome of the analysis, a decision was made to use the unweighted analysis modeled after SNDA-I for all schools. This not only simplifies presentation and discussion of the data, it maintains comparability between the two studies.

for schools with kindergarten (K) through grade 6. Lunches offered in secondary schools (middle schools and high schools) were compared to minimum nutrient standards defined for schools with grades 7 through 12.

Data on the mean percentage of calories from fat, saturated fat and carbohydrate, as well as mean cholesterol and sodium content, were handled the same way in this chapter as in previous chapters. Indeed, SNDA-I and SNDA-II used identical standards and recommendations to assess these nutrients. The only difference is that at the time SNDA-I data were collected, standards for the percentage of calories from fat and saturated fat had not been officially adopted as standards for the NSLP and SBP.

The statistical significance of differences between meals offered in SY 1998–99 and SY 1991–92 was assessed using two-tailed *t*-tests (independent samples). Because of the large number of *t*-tests that were conducted simultaneously, a conservative cutoff was used to define statistical significance, thereby decreasing the likelihood of reporting chance findings. Only differences that were statistically significant at the .01 level or better are reported.

### **Mean Calorie and Nutrient Content Relative to Minimum Nutrition Standards**

Exhibit 6.1 shows the mean calorie and nutrient content of elementary and secondary school lunches offered in SY 1998–99 and SY 1991–92. As a point of reference, minimum standards defined for NSLP meals served in schools with grades K through 6 (elementary schools) and 7-12 (secondary schools) are shown in the shaded column.

As the data indicate, the average elementary school lunch offered in both SY 1991–92 and SY 1998–99 exceeded defined minimum standards for calories, protein, vitamin A, vitamin C, calcium, and iron. The average lunch offered in SY 1998–99 included significantly more of all targeted nutrients except protein.

With the exception of calories, findings were similar for lunches offered in secondary schools (Exhibit 6.1). In both SY 1991–92 and SY 1998–99, lunches offered in secondary schools fell below the defined minimum calorie level but exceeded minimums for all RDA nutrients. The average secondary school lunch offered in SY 1998–99 provided, with the exception of protein, significantly more of all target nutrients than the average secondary school lunch offered in SY 1991–92.

Because lunches offered at both points in time exceeded the defined minimum standards, the relative importance of the fact that lunches offered in SY 1998–99 provided significantly greater amounts of all key nutrients appears to be minimal. However, as data presented in the following sections demonstrate, the fact that the overall calorie and nutrient content of school lunches was maintained between SY 1991–92 and SY 1998–99, as several other characteristics of the lunches changed, is noteworthy.

### **Percentage of Calories from Total Fat and Saturated Fat**

On average, neither lunches offered in SY 1998–99 nor SY 1991–92 met NSLP standards for the percentage of calories from fat or saturated fat (Exhibit 6.2). This was true for both elementary schools and secondary schools. In both cases, however, lunches offered in SY 1998–99 derived a significantly smaller percentage of calories from fat and saturated fat than lunches offered in SY 1991–92.

**Exhibit 6.1**

**Mean Calorie and Nutrient Content of Lunches Offered in SY 1991-92 and SY 1998-99  
Compared to Current NSLP Standards**

	<b>NSLP Standard</b>	<b>SY 1998-99<sup>1</sup> (Offered)</b>	<b>SY 1991-92<sup>2</sup> (Offered)</b>	<b>Percentage Change (SY 1998-99 vs. SY 1991-92)</b>
<b>Elementary Schools</b>				
<b>Mean Amount</b>				
Total Calories	664	738	715	+3%
Protein (gm)	10	30	30	0
Vitamin A (mcg RE)	224	491	397	+24**
Vitamin C (mg)	15	37	28	+32**
Calcium (mg)	286	505	483	+5**
Iron (mg)	3.5	4.6	4.1	+12**
Number of Schools (Unweighted)		398	260	
<b>Secondary Schools</b>				
<b>Mean Amount</b>				
Total Calories	825	798	820	-3%
Protein (gm)	16	33	33	0
Vitamin A (mcg RE)	300	519	418	+24**
Vitamin C (mg)	18	42	34	+24**
Calcium (mg)	400	542	518	+5**
Iron (mg)	4.5	5.0	4.8	+4*
Number of Schools (Unweighted)		677	234	

<sup>1</sup> Data from the present study—the second School Nutrition Dietary Assessment Study (SNDA-II).

<sup>2</sup> Data for all public schools in the first School Nutrition Dietary Assessment Study (SNDA-I).

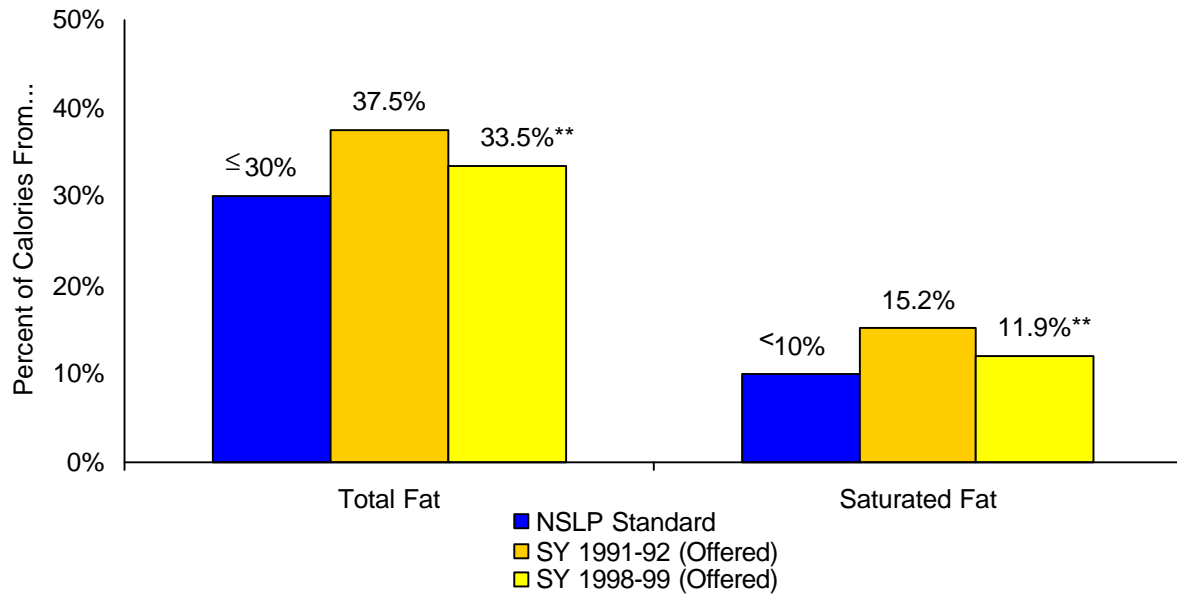
Note: NSLP standards reflect minimums defined in current program regulations for grades K-6 (elementary schools) and 7-12 (secondary schools).

\* Difference between SY 1998-99 and SY 1991-92 is statistically significant at the .01 level.

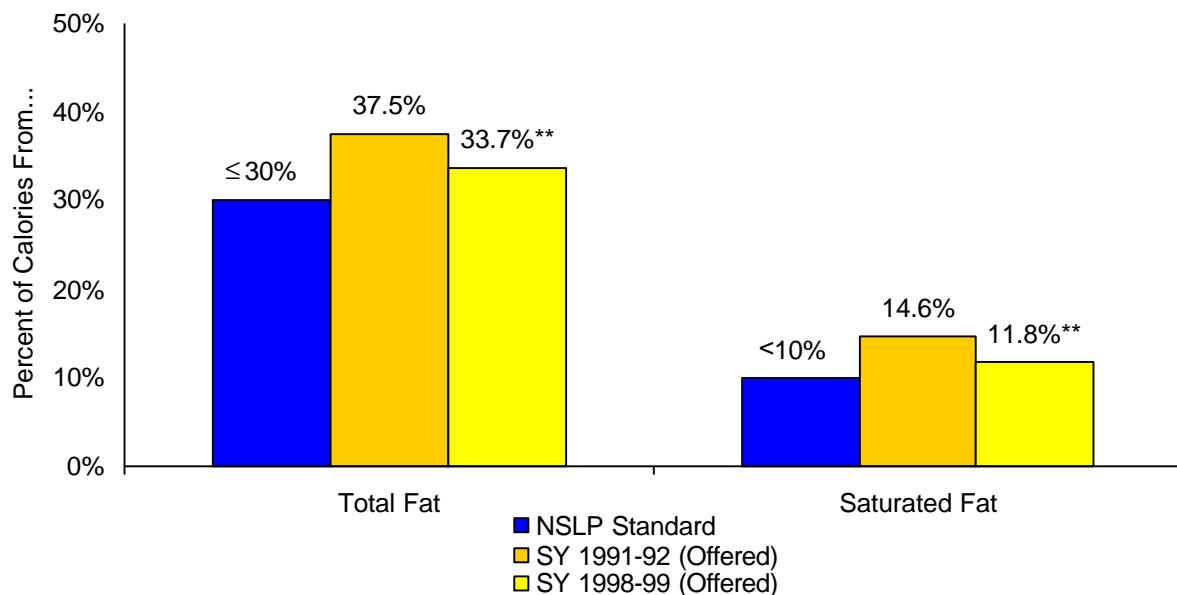
\*\* Difference between SY 1998-99 and SY 1991-92 is statistically significant at the .001 level.

**Exhibit 6.2 Between SY 1991-92 and SY 1998-99 There Was a Significant Trend Toward Lower Levels of Fat and Saturated Fat in School Lunches, as Offered**

**Elementary School Lunches**



**Secondary School Lunches**



\*\* Difference is statistically significant at the .001 level.

Note: NSLP standards for the percentage of calories from fat and saturated fat were not in effect during SY 1991-92.

Specifically, the average percentage of calories from fat decreased from 38 percent in SY 1991–92 to 34 percent in SY 1998–99, a decrease of roughly 10 percent. The average percentage of calories from saturated fat decreased from about 15 percent to about 12 percent, a decrease of roughly 20 percent. These differences demonstrate that between SY 1991–92 and SY 1998–99 there was a meaningful and statistically significant trend toward lower levels of fat and saturated fat in school lunches, relative to calorie content.

Thus, the evidence suggests that public NSLP schools are making good progress toward meeting USDA’s strategic goal of satisfying the SMI standards for calories from fat and saturated fat by the year 2005. While the available data indicate that there is more work to be done, it is important to realize that concentrated efforts in this area did not begin until the implementation of the School Meals Initiative (SMI) in 1995. Schools may not have begun implementing changes designed to lower the fat and saturated fat content of school meals until SY 1996–97 or later. Consequently, the available data should be viewed as indicative of roughly two to three years of reform efforts (SY 1995–96 or SY 1996–97 through the beginning of SY 1998–99) rather than a full seven years of effort (the time elapsed since SNDA-I).

Finally, as noted in the preceding discussion of RDA nutrients, it is important to note that these improvements in fat and saturated fat content were achieved without a negative impact on either the calorie or nutrient content of lunches offered to students.

#### ***Percentage of Schools Meeting Standards for Fat and Saturated Fat***

Although overall means for calories from fat and saturated fat in lunches offered in both SY 1991–92 and SY 1998–99 did not meet NSLP standards for these nutrients, lunches offered in some individual schools in SY 1998–99 did meet these standards. This represents a dramatic departure from what was observed in SY 1991–92. In SY 1991–92, only one percent of all schools offered lunches that provided no more than 30 percent of calories from fat. In SY 1998–99, this figure was substantially higher — 18 percent of elementary schools and 21 percent of secondary schools (Exhibit 6.3).

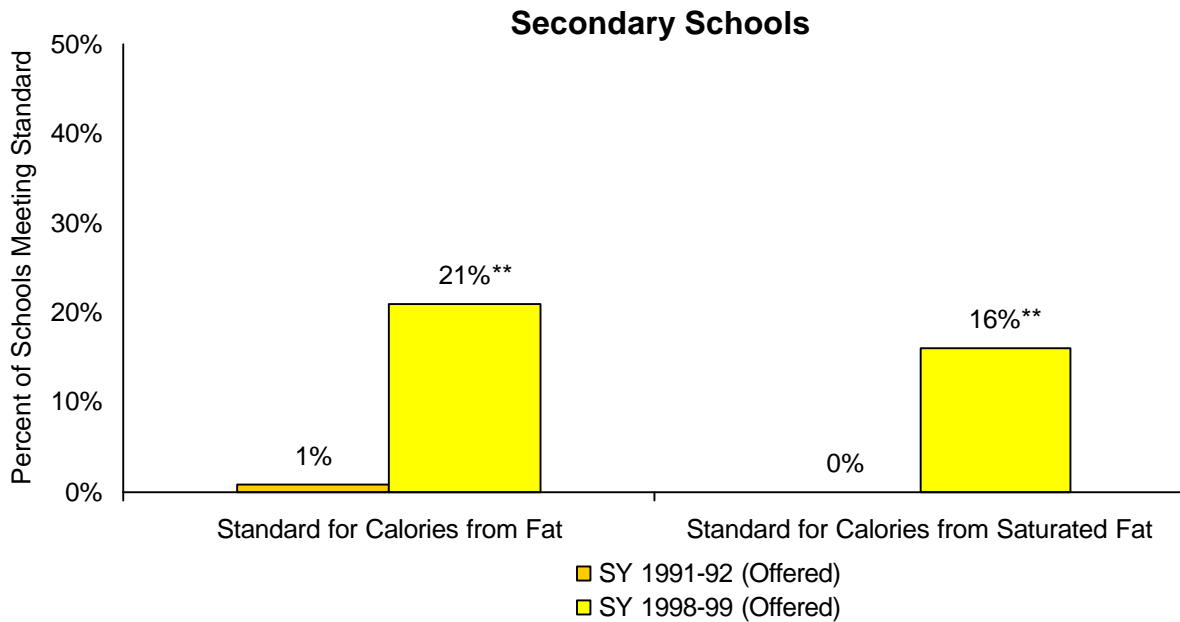
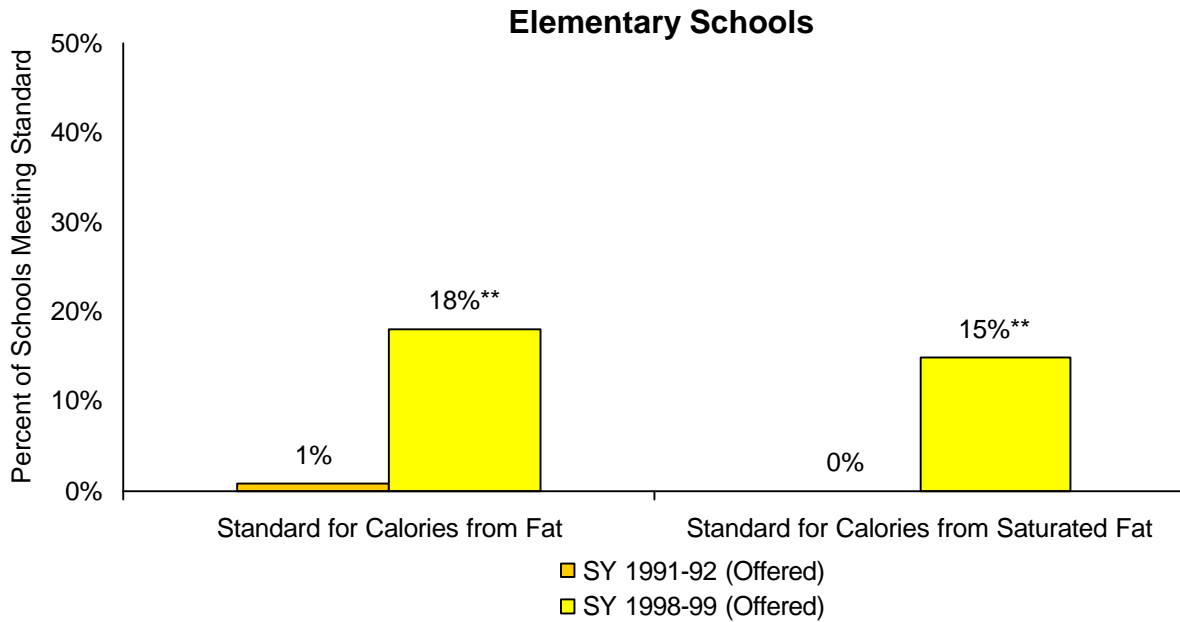
The increase in the number of schools meeting the standard for saturated fat is equally noteworthy. In SY 1991–92, no schools satisfied this standard. In SY 1998–99, 15 percent of elementary schools and 16 percent of secondary schools met the standard

#### **Cholesterol, Sodium and Carbohydrate Content**

On average, lunches offered in SY 1991–92 and SY 1998–99 in both elementary schools and secondary schools satisfied the NRC recommendation of providing no more than 100 mg of cholesterol (Exhibit 6.4). Means for SY 1998–99 were significantly lower; however, this difference has little substantive importance because means for both years met the NRC recommendation.

In contrast, the mean sodium content of lunches offered, in both years and in both types of schools, exceeded the NRC recommendation for maximum sodium intake (no more than 800 mg, or one-third of the suggested maximum daily intake of 2,400 mg) by a substantial margin. Mean sodium content of elementary school lunches offered in SY 1991–92 and SY 1998–99 were 61 percent (SY 1998–99) to 75 percent (SY 1991–92) higher than the recommended maximum. Means for secondary school lunches were substantially higher, approaching or exceeding double the recommended amount. Lunches offered

**Exhibit 6.3 For Lunches as Offered, the Percentage of Schools That Met Standards for Total Fat and Saturated Fat Has Increased Substantially Since SY 1991-92**

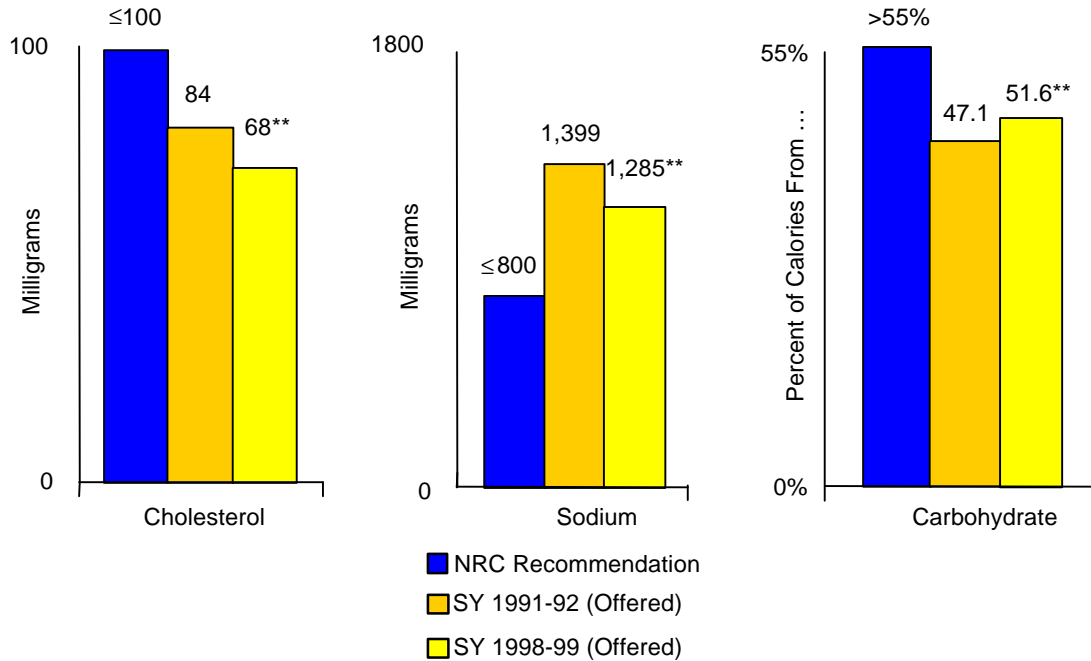


\*\* Difference is statistically significant at the .001 level.

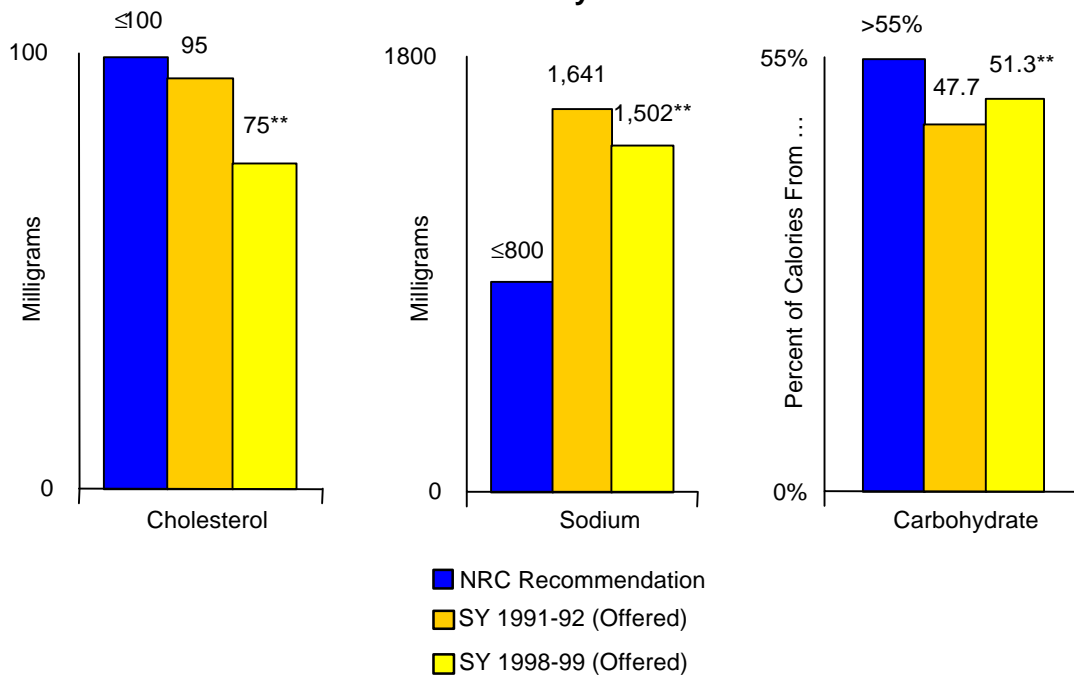
Note: NSLP standards for the percentage of calories from fat and saturated fat were not in effect during SY 1991-92.

**Exhibit 6.4 Lunches Offered in SY 1998-99 Were Significantly Lower in Cholesterol and Sodium and Higher in Calories from Carbohydrate than Lunches Offered in SY 1991-92**

**Elementary School Lunches**



**Secondary School Lunches**



\*\* Difference is statistically significant at the .001 level.



in both elementary schools and secondary schools in SY 1998–99 were significantly lower in sodium than lunches offered in SY 1991–92. The differences were relatively small, however, and did little to bring the overall means within range of the recommended level.

Finally, lunches offered in both SY 1991–92 and SY 1998–99 provided fewer calories from carbohydrate, on a percentage basis, than recommended by the NRC.

### **Distribution of Fat, Carbohydrate, Cholesterol and Sodium Content**

Exhibits 6.5 and 6.6 show the distribution of fat, carbohydrate, cholesterol, and sodium in lunches offered in SY 1998–99 and SY 1991–92 in, respectively, elementary schools and secondary schools. As shown, not only has the percentage of schools meeting the various NSLP standards and recommendations increased over time, the relevant distributions have shifted toward lower levels of fat and saturated fat, relative to calorie content, as well as toward greater levels of carbohydrate.

Change over time was most modest for sodium. In SY 1998–99, the percentage of schools meeting the NRC recommendation for sodium content was only one percent for elementary schools and less than one percent for secondary schools. It is important to recognize that, while schools are now required to meet defined standards for calories from fat and saturated fat (which inevitably influences the percentage of calories provided by carbohydrate), schools are not required to meet a specific standard for sodium content.

### **Availability and Nutrient Content of Low-Fat Lunch Options**

Even when the “average lunch offered” exceeds the standard of providing no more than 30 percent of calories from fat, it is possible that individual students could select meals that meet this standard if they chose menu items that were low in fat. This section discusses the percentage of schools that offered choices that, when averaged over a school week, provided no more than 30 percent of calories from fat and how this percentage has changed over time. Data are also presented on the average nutrient content of these low-fat lunch options.

The methodology used in this analysis replicates the methodology used in the SNDA-I study and is comparable to the methodology used in the basic unweighted nutrient analysis. Rather than summing the nutrients included in the “average” choices, however, this analysis included only the lowest-fat choices (based on the percentage of calories from fat). Thus, the lowest-fat lunch consisted of the lowest-percent-fat milk option, the lowest-percent-fat entree option, and the two lowest-percent-fat fruit/vegetable options. Desserts and other non-creditable items were not included in the analysis because they are not required components of a reimbursable meal. Results of the analysis provide an estimate of the nutrients students would receive, on average, if they consistently selected the lowest-fat items available in each meal component category.

## Exhibit 6.5

### Distribution of Fat, Carbohydrate, Cholesterol and Sodium in Lunches Offered in SY 1991-92 and SY 1998-99 *Elementary Schools*

	SY 1998-99 <sup>1</sup> (Offered)	SY 1991-92 <sup>2</sup> (Offered)
<b>Percentage of Calories from Fat</b>		
No more than 30%	18%	1%
30.1-34.0%	41	13
34.1-38.0%	31	43
More than 38.0	11	44
<b>Percentage of Calories from Saturated Fat</b>		
Less than 10%	15	0
10.1-12.0%	39	5
12.1-14.0%	33	19
14.1-16.0%	10	42
More than 16.0%	3	34
<b>Percentage of Calories from Carbohydrate</b>		
Less than 45%	6	21
45-55%	74	78
More than 55%	20	1
<b>Cholesterol</b>		
100 mg. or less	95	84
101-133 mg.	5	16
More than 133 mg.	1	<1
<b>Sodium</b>		
800 mg. or less	1	0
801-1,000 mg.	5	4
More than 1,000 mg.	94	96
Number of Schools (Unweighted)	398	260

<sup>1</sup> Data from the present study—the second School Nutrition Dietary Assessment Study (SNDA-II).

<sup>2</sup> Data for all public elementary schools in the first School Nutrition Dietary Assessment Study (SNDA-I).

Notes: Highlighted rows show NSLP standard (fat and saturated fat) or NRC recommendation (carbohydrate, cholesterol, and sodium).

NSLP standards for the percentage of calories from fat and saturated fat were not in effect during SY 1991-92.

## Exhibit 6.6

### Distribution of Fat, Carbohydrate, Cholesterol, and Sodium in Lunches Offered in SY 1991-92 and SY 1998-99 Secondary Schools

	SY 1998-99 <sup>1</sup> (Offered)	SY 1991-92 <sup>2</sup> (Offered)
<b>Percentage of Calories from Fat</b>		
No more than 30%	21%	1%
30.1-34.0%	31	22
34.1-38.0%	32	34
More than 38.0	16	42
<b>Percentage of Calories from Saturated Fat</b>		
Less than 10%	16	0
10.1-12.0%	41	4
12.1-14.0%	33	32
14.1-16.0%	8	46
More than 16%	3	17
<b>Percentage of Calories from Carbohydrate</b>		
Less than 45%	10	28
45-55%	68	68
More than 55 Percent	22	4
<b>Cholesterol</b>		
100 mg. or less	90	65
101-133 mg.	10	29
More than 133 mg.	1	6
<b>Sodium</b>		
800 mg. or less	<1	0
801-1,000 mg.	1	<1
More than 1,000 mg.	99	100
Number of Schools (Unweighted)	677	234

<sup>1</sup> Data from the present study—the second School Nutrition Dietary Assessment Study (SNDA-II).

<sup>2</sup> Data for all public secondary (middle and high) schools in the first School Nutrition Dietary Assessment Study (SNDA-I).

Notes: Highlighted rows show NSLP standard (fat and saturated fat) or NRC recommendation (carbohydrate, cholesterol, and sodium).

NSLP standards for the percentage of calories from fat and saturated fat were not in effect during SY 1991-92.

## Availability of Low-Fat Lunch Options

In SY 1991–92, 34 percent of all elementary schools offered options for a complete meal that, when averaged over a week, provided no more than 30 percent of calories from fat (Exhibit 6.7). In SY 1998–99, the percentage of elementary schools meeting this criterion was almost 2.5 times greater — 82 percent.

The percentage of secondary schools offering meal options that provided no more than 30 percent of calories from fat over the course of the week also increased between SY 1991–92 and SY 1998–99. The relative magnitude of the increase was substantially smaller, however, because more secondary schools than elementary schools met the criterion in SY 1991–92 (Exhibit 6.8). The percentage of secondary schools offering low-fat meal options in SY 1991–92 that provided no more than 30 percent of calories from fat was 71 percent. The comparable figure for SY 1998–99 was 91 percent, a 28 percent increase.

These data indicate that, even though overall means for the percentage of calories from fat in meals offered to students continued to exceed the program goal in SY 1998–99, students in 82 percent of all elementary schools and 91 percent of all secondary schools *had the opportunity* to select meals that met this goal. We know from the data presented in Chapter Three that, on average, students did not select such meals. Nonetheless, it is important to recognize that the options were available.

In addition to satisfying the NSLP goal for calories from saturated fat, the lowest-percent-fat meals offer other nutritional benefits. For example, in SY 1998–99, the lowest-percent-fat meals offered in 65 percent of elementary schools and 79 percent of secondary schools were consistent with the NSLP standard for calories from saturated fat (Exhibits 6.7 and 6.8). The lowest-percent-fat meals offered in two-thirds of elementary schools and 79 percent of secondary schools satisfied the NRC recommendation for calories from carbohydrate. In addition, the lowest-percent-fat lunches offered in 21 percent of elementary schools and 14 percent of secondary schools satisfied the NRC recommendation for sodium.

## Mean Nutrient Content of Low-Fat Lunch Options

Lower levels of fat, saturated fat, and sodium in the lowest-percent-fat meals were achieved without compromising the overall nutrient contribution of school lunches. As Exhibit 6.9 illustrates, the lowest-percent-fat lunches offered in elementary schools in both SY 1991–92 and SY 1998–99 met the minimum nutrition standards defined for lunches offered in grades K-6 for protein, vitamin A, vitamin C, calcium and iron. With the exception of iron in SY 1998–99, which fell just short of the benchmark, the same was true for the lowest-percent-fat meals offered in secondary schools (Exhibit 6.10).

The lowest-percent-fat meals offered in both SY 1991–92 and SY 1998–99, in both elementary schools and secondary schools, were, however, low in calories compared to the defined minimum standards. This was especially true for the lowest-percent-fat meals offered in SY 1998–99, where the mean calorie content was 11 percent (elementary schools) to 15 percent lower than the lowest-percent-fat meals offered in SY 1991–92. The fact that the lowest-fat meals were relatively low in calories is not surprising. Often (but not always), the lowest-fat option is also the lowest in calories. In addition, the analysis intentionally excludes desserts and other extras because these items can be high in fat. (As shown in Exhibit 3.13, desserts contribute five percent of the fat in the average school lunch, as served.)

**Exhibit 6.7**

**Distribution of Fat, Carbohydrate, Cholesterol, and Sodium  
in Lowest-Percent-Fat Lunches Offered in SY 1991-92 and SY 1998-99  
Elementary Schools**

	SY 1998-99 <sup>1</sup> (Offered)	SY 1991-92 <sup>2</sup> (Offered)
<b>Percentage of Calories from Fat</b>		
No more than 30%	82%	34%
30.1-34.0%	14	32
34.1-38.0%	3	21
More than 38.0	1	13
<b>Percentage of Calories from Saturated Fat</b>		
Less than 10%	65	16
10.1-12.0%	23	20
12.1-14.0%	8	31
14.1-16.0%	2	24
More than 16.0%	2	8
<b>Percentage of Calories from Carbohydrate</b>		
Less than 45%	2	10
45-55%	33	72
More than 55%	66	18
<b>Cholesterol</b>		
100 mg. or less	100	97
101-133 mg.	<1	3
More than 133 mg.	0	0
<b>Sodium</b>		
800 mg. or less	21	<1
801-1,000 mg.	38	7
More than 1,000 mg.	41	93
Number of Schools (Unweighted)	398	260

<sup>1</sup> Data from the present study—the second School Nutrition Dietary Assessment Study (SNDA-II).

<sup>2</sup> Data for all public elementary schools in the first School Nutrition Dietary Assessment Study (SNDA-I).

Notes: Highlighted rows show NSLP standard (fat and saturated fat) or NRC recommendation (carbohydrate, cholesterol, and sodium).

NSLP standards for the percentage of calories from fat and saturated fat were not in effect during SY 1991-92.

## Exhibit 6.8

### Distribution of Fat, Carbohydrate, Cholesterol, and Sodium in Lowest-Percent-Fat Lunches Offered in SY 1991-92 and SY 1998-99 Secondary Schools

	SY 1998-99 <sup>1</sup> (Offered)	SY 1991-92 <sup>2</sup> (Offered)
<b>Percentage of Calories from Fat</b>		
No more than 30%	91%	71%
30.1-34.0%	6	15
34.1-38.0%	2	9
More than 38.0	1	5
<b>Percentage of Calories from Saturated Fat</b>		
Less than 10%	79	47
10.1-12.0%	13	18
12.1-14.0%	5	25
14.1-16.0%	2	9
More than 16%	1	2
<b>Percentage of Calories from Carbohydrate</b>		
Less than 45%	2	4
45-55%	20	40
More than 55 Percent	79	56
<b>Cholesterol</b>		
100 mg. or less	99	97
101-133 mg.	1	1
More than 133 mg.	<1	2
<b>Sodium</b>		
800 mg. or less	14	1
801-1,000 mg.	29	4
More than 1,000 mg.	56	95
Number of Schools (Unweighted)	677	234

<sup>1</sup> Data from the present study—the second School Nutrition Dietary Assessment Study (SNDA-II).

<sup>2</sup> Data for all public secondary (middle and high) schools in the first School Nutrition Dietary Assessment Study (SNDA-I).

Notes: Highlighted rows show NSLP standard (fat and saturated fat) or NRC recommendation (carbohydrate, cholesterol, and sodium).

NSLP standards for the percentage of calories from fat and saturated fat were not in effect during SY 1991-92.

## Exhibit 6.9

### Mean Nutrient Profile of Lowest-Percent-Fat Lunches Offered in SY 1991-92 and SY 1998-99 Compared to Minimum NSLP Standards and NRC Recommendations: *Elementary Schools*

	Standard/ Recommendation	SY 1998-99 <sup>1</sup> (Offered)	SY 1991-92 <sup>2</sup> (Offered)	Percent Change (SY 1998-99 vs. (SY 1991-92)
<b>Mean Amount</b>				
Total Calories	664	576	645	-11%**
Protein (gm)	10	28	29	-3%**
Vitamin A (mcg RE)	224	458	388	+18
Vitamin C (mg)	15	35	29	+21
Calcium (mg)	286	460	466	-1
Iron (mg)	3.5	4.0	4.1	-2
<b>Mean Percentage of Calories from...</b>				
Fat (%)	≤ 30%	25.0	31.8	-21%**
Saturated Fat (%)	< 10%	9.2	12.6	-27%**
Carbohydrate (%)	> 55% <sup>3</sup>	57.3	51.3	+12%**
<b>Mean Amount</b>				
Cholesterol (mg)	≤ 100 <sup>3</sup>	50	68	-28%**
Sodium (mg)	≤ 800 <sup>3</sup>	992	1,323	-25%**
Number of Schools (Unweighted)		398	260	

<sup>1</sup> Data from the present study—the Second School Nutrition Dietary Assessment Study (SNDA-II).

<sup>2</sup> Data for all public elementary schools in the first School Nutrition Dietary Assessment Study (SNDA-I).

<sup>3</sup> NRC recommendation, not NSLP standard.

Note: NSLP nutrient standards are based on minimums defined in program regulations for grades K-6.

\*\* Difference between SY 1998-99 and SY 1991-92 is statistically significant at the .001 level.

**Exhibit 6.10**

**Mean Nutrient Profile of Lowest-Percent-Fat Lunches Offered in SY 1991-92 and SY 1998-99  
Compared to Minimum NSLP Standards and NRC Recommendations:  
Secondary Schools**

	<b>Standard/ Recommendation</b>	<b>SY 1998-99<sup>1</sup> (Offered)</b>	<b>SY 1991-92<sup>2</sup> (Offered)</b>	<b>Percent Change (SY 1998-99 vs. SY 1991-92)</b>
<b>Mean Amount</b>				
Total Calories	825	591	693	-15%**
Protein (gm)	16	29	32	-9%**
Vitamin A (mcg RE)	300	425	341	+25%**
Vitamin C (mg)	18	44	39	+13
Calcium (mg)	400	474	476	<1
Iron (mg)	4.5	4.2	4.7	-11%**
<b>Mean Percentage of Calories from...</b>				
Fat (%)	≤ 30%	21.8	27.0	-19%**
Saturated Fat (%)	< 10%	8.1	10.5	-23%**
Carbohydrate (%)	> 55% <sup>3</sup>	59.8	55.7	+7%**
<b>Mean Amount</b>				
Cholesterol (mg)	≤ 100 <sup>3</sup>	49	65	-25%**
Sodium (mg)	≤ 800 <sup>3</sup>	1,071	1,436	-25%**
Number of Schools (Unweighted)		677	234	

<sup>1</sup> Data from the present study—the second School Nutrition Dietary Assessment Study (SNDA-II).

<sup>2</sup> Data for all public secondary (middle and high) schools in the first School Nutrition Dietary Assessment Study (SNDA-I).

<sup>3</sup> NRC recommendation, not NSLP standard.

Note: NSLP nutrient standards are based on minimums defined in program regulations for grades 7-12.

\*\* Difference between SY 1998-99 and SY 1991-92 is statistically significant at the .001 level.



The calorie content of the lowest-fat lunches could be increased by adding additional servings of fruits, vegetables or breads, or by adding a low-fat, high-carbohydrate dessert choice (e.g., gelatin, animal crackers, fruit dessert, low-fat baked good).

Among elementary schools, the lowest-percent-fat lunches offered in SY 1998–99 satisfied NSLP standards for calories from fat and saturated fat and well as calories from carbohydrate (Exhibit 6.9). Comparable lunches offered in elementary schools in SY 1991–92 came close to these goals but did not meet them. Among secondary schools (Exhibit 6.10), the lowest-percent-fat lunches offered at both points in time satisfied NSLP standards for calories from fat as well as the NRC recommendation for calories from carbohydrate. The lowest-percent-fat lunch offered in secondary schools SY 1998–99 also satisfied the NSLP standard for calories from saturated fat (less than 10%). The average lunch offered in SY 1991–92 just exceeded this standard (10.5%).

Finally, the lowest-percent-fat lunches offered at both points in time and in both elementary and secondary schools were consistent with the NRC recommendation for cholesterol (Exhibits 6.9 and 6.10). Lunches offered at both points in time and in both types of schools exceeded the NRC recommendation for sodium. The lowest-fat-lunches offered in SY 1998–99 were significantly lower in sodium than the lunches offered in SY 1991–92. Nonetheless, on average, the lowest-percent-fat meals offered in SY 1998-99 continued to exceed the NRC recommendation for sodium by about 25 percent.

## **Average Nutrient Content of Breakfasts Offered in Public Schools: SY 1998-99 and SY 1991-92**

This section presents data on the average nutrient content of breakfasts offered in SY 1991–92 and SY 1998–99. In SNDA-I, the nutrient content of the average breakfast offered in each school was determined by summing the nutrients in an average serving of milk; an average serving of fruit, juice or vegetable; and two average servings of grains/breads and/or meats/meat alternates. The same approach was used in generating unweighted averages for the SNDA-II data (see Appendix E).

### **Mean Calorie and Nutrient Content Relative to Minimum Nutrition Standards**

Exhibit 6.11 shows the mean calorie and nutrient content of elementary school breakfasts offered in SY 1991–92 and SY 1998–99. Minimum nutrition standards defined for SBP breakfasts (which are applicable to all schools, grades K-12), are shown in the shaded column. For secondary schools, optional nutrition standards for grades 7-12 are also shown.

The average breakfast offered in elementary schools in both SY 1999–92 and SY 1998–99 met minimum nutrition standards defined in current program regulations but fell short of the minimum calorie level. The relatively low calorie level did not, however, have an adverse effect on overall nutrient contribution of SBP breakfasts. In fact, elementary school breakfasts offered at both points in time provided, on average, more than the minimum required amounts of protein, vitamin A, vitamin C, calcium, and iron.

Elementary school breakfasts offered in SY 1998–99 provided significantly more vitamin C and significantly less protein and calcium than breakfasts offered in SY 1991–92. The observed differences

### Exhibit 6.11

#### Mean Calorie and Nutrient Content of Breakfasts Offered in SY 1991-92 and SY 1998-99 Compared to Current SBP Standards

	SBP Standard	SY 1998-99 <sup>1</sup> (Offered)	SY 1991-92 <sup>2</sup> (Offered)	Percentage Change (SY 1998-99 vs. SY 1991-92)	
<b>Elementary Schools</b>					
	<b>Grades K-12 (Minimum)</b>				
<b>Mean Amount</b>					
Total Calories	554	462	480	-4%	
Protein (gm)	10	15	16	-6**	
Vitamin A (mcg RE)	197	278	290	-4	
Vitamin C (mg)	13	40	33	+21**	
Calcium (mg)	257	378	398	-5**	
Iron (mg)	3.0	4.2	3.8	+11	
Number of Schools (Unweighted)		317	166		
<b>Secondary Schools</b>					
	<b>Grades K-12 (Minimum)</b>		<b>Grades 7-12 (Optional)</b>		
<b>Mean Amount</b>					
Total Calories	554	618	483	537	-10%**
Protein (gm)	10	12	16	17	-6*
Vitamin A (mcg RE)	197	225	265	293	-10
Vitamin C (mg)	13	14	42	37	+14*
Calcium (mg)	257	300	386	409	-6**
Iron (mg)	3.0	3.4	4.1	4.1	0
Number of Schools (Unweighted)		487	121		

<sup>1</sup> Data from the present study — the second School Nutrition Dietary Assessment Study (SNDA-II).

<sup>2</sup> Data for all public schools in the first School Nutrition Dietary Assessment Study (SNDA-I).

Note: SBP standards reflect minimums defined in current program regulations for grades K-12 and an optional set of standards for grades 7-12.

\* Difference between SY 1998-99 and SY 1991-92 is statistically significant at the .01 level.

\*\* Difference between SY 1998-99 and SY 1991-92 is statistically significant at the .001 level.

are inconsequential, however, because elementary school breakfasts offered at both points in time provided, on average, more than the minimum required amount of all key nutrients.

Among secondary schools, breakfasts offered in both SY 1991–92 and SY 1998–99 provided fewer calories than either the minimum defined for grades K-12 or the optimal level suggested for grades 7-12 (Exhibit 6.11). This was especially true for breakfasts offered in SY 1998-99. The mean calorie content of secondary school breakfasts offered in SY 1998–99 was about 10 percent lower than breakfasts offered in SY 1991–92. In spite of lower-than-desired calorie levels, secondary school breakfasts offered at both points in time more than satisfied the required minimum standards for all targeted nutrients as well as the more stringent optional standards.

Secondary school breakfasts offered in SY 1998–99 provided significantly more vitamin C and significantly less protein and calcium than breakfasts offered in SY 1991–92. Again, however, the relative importance of differences in mean nutrient content is inconsequential because breakfasts offered at both points in time more than satisfied the suggested standards.

### **Percentage of Calories from Total Fat and Saturated Fat**

On average, breakfasts offered in both elementary schools and secondary schools in SY 1991–92 came close to meeting the standard for the percentage of calories from fat but exceeded the standard for the percentage of calories from saturated fat by a substantial margin (Exhibit 6.12). Breakfasts offered in SY 1998–99 provided a significantly smaller percentage of calories from fat and saturated fat and, as a consequence, the average breakfast, as offered, was consistent with SBP standards for these nutrients.

#### ***Percentage of Schools Meeting Standards for Fat and Saturated Fat***

There was a marked increase in the number of schools that met SBP standards for total fat and saturated fat between SY 1991–92 and SY 1998–99 (Exhibit 6.13). In SY 1991–92, fewer than half of all public schools offered breakfasts that provided no more than 30 percent of calories from fat. The picture in SY 1998–99 was dramatically different. In SY 1998–99, more than three-quarters of elementary schools and secondary schools met the standard for calories from fat. This represents an overall increase of 62 percent (secondary schools) to 84 percent (elementary schools) in the proportion of schools meeting the SBP standard for calories from fat.

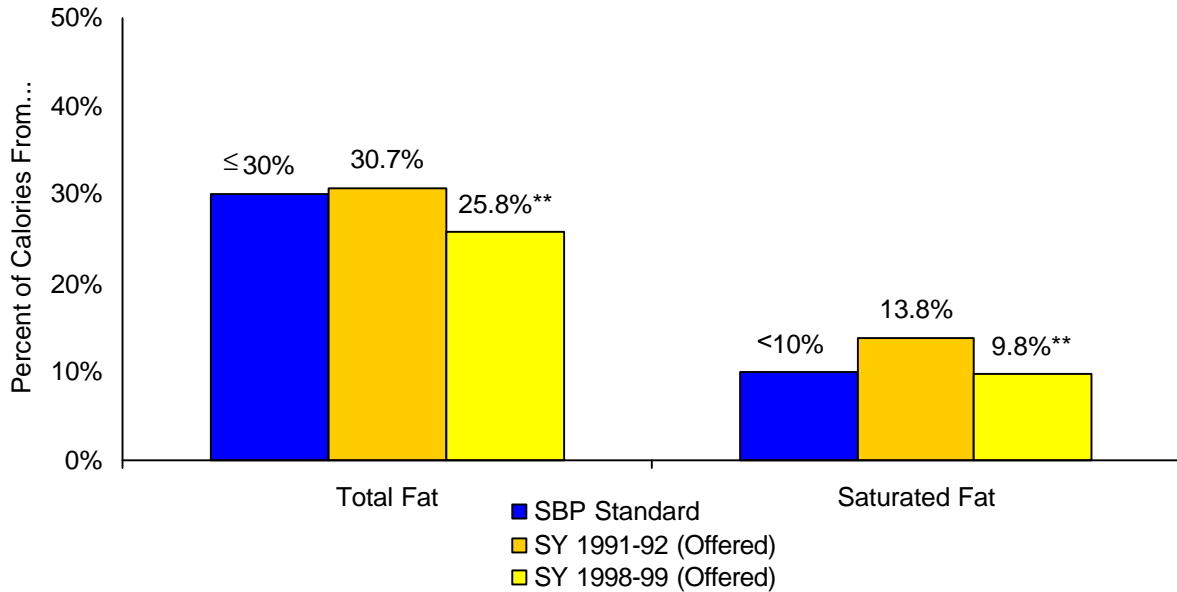
The increase in the number of schools meeting the standard for saturated fat was even more dramatic. In SY 1991–92, fewer than seven percent of schools satisfied this standard. In SY 1998–99, well over half of all schools met the standard.

### **Cholesterol, Sodium and Carbohydrate Content**

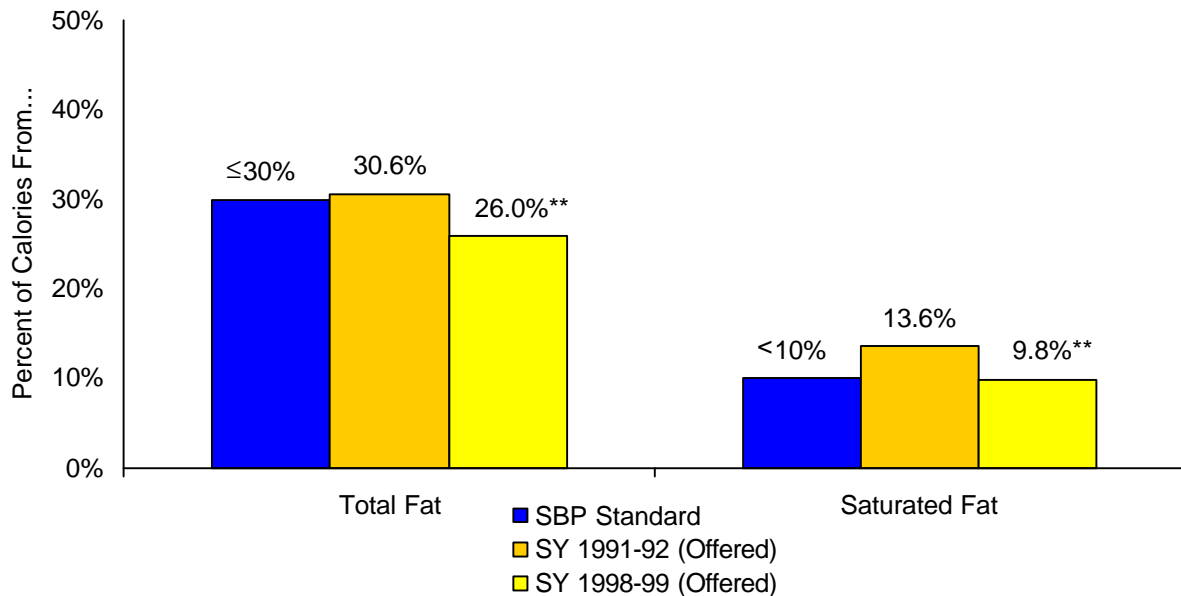
In both elementary schools and secondary schools, breakfasts offered in both SY 1991–92 and SY 1998–99 were consistent with NRC recommendations for cholesterol content and for the percentage of calories from carbohydrate (Exhibit 6.14). Breakfasts offered in SY 1998–99 were significantly lower in cholesterol and higher in calories from carbohydrate than breakfasts offered in SY 1991–92; however, these differences did not affect conclusions about whether NRC recommendations were met.

**Exhibit 6.12 Between SY 1991-92 and SY 1998-99 There Was a Significant Decrease in the Relative Fat and Saturated Fat Content of School Breakfasts, as Offered**

**Elementary School Breakfasts**



**Secondary School Breakfasts**

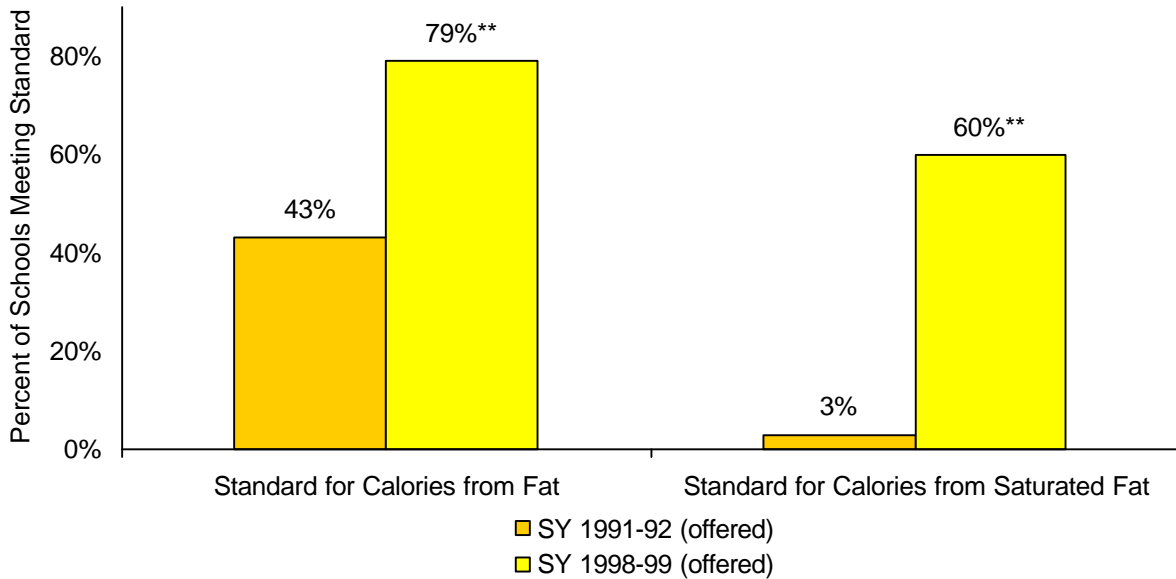


\*\* Difference is statistically significant at the .001 level.

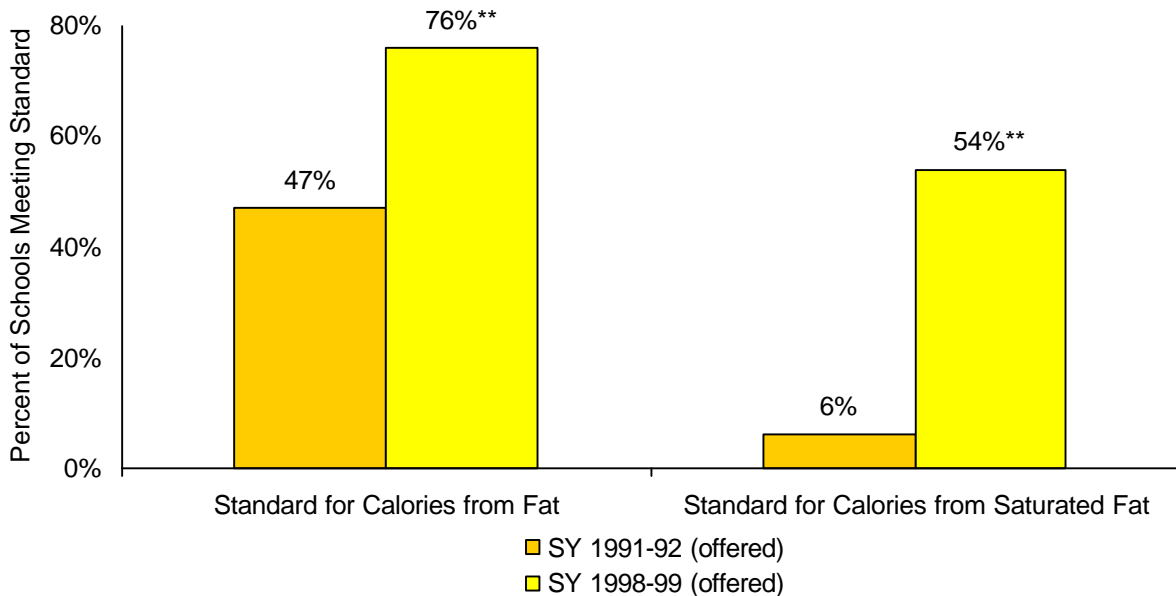
Note: SBP standards for the percentage of calories from fat and saturated fat were not in effect during SY 1991-92.

**Exhibit 6.13 For Breakfasts as Offered, the Percentage of Schools That Met Standards for Total Fat and Saturated Fat Has Increased Substantially Since SY 1991-92**

**Elementary Schools**



**Secondary Schools**

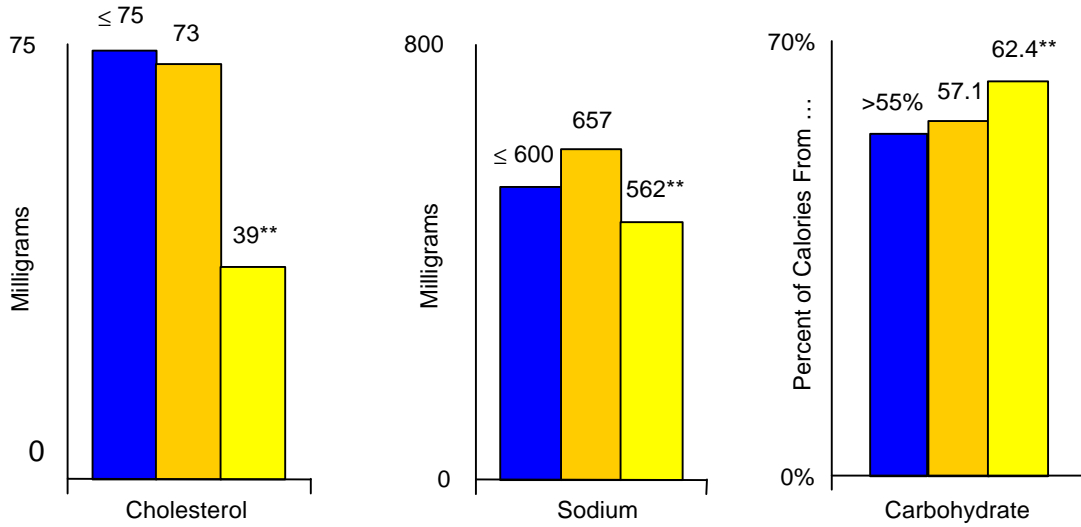


\*\* Difference is statistically significant at the .001 level.

Note: SBP standards for the percentage of calories from fat and saturated fat were not in effect during SY 1991-92.

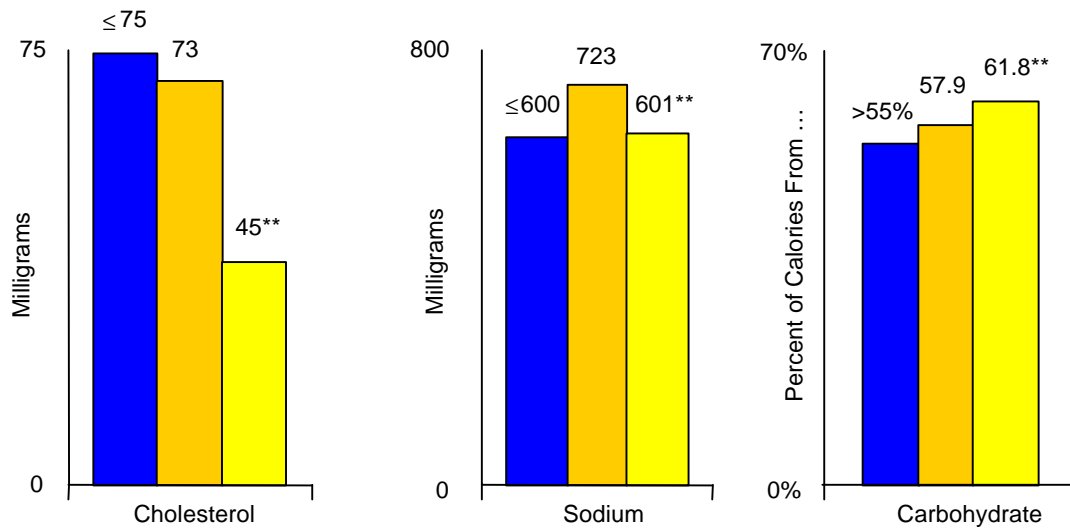
**Exhibit 6.14 Breakfasts Offered in SY 1998-99 Were Significantly Lower in Cholesterol and Sodium and Higher in Calories from Carbohydrate than Breakfasts Offered in SY 1991-92**

**Elementary School Breakfasts**



■ NRC Recommendation  
 ■ SY 1991-92 (Offered)  
 ■ SY 1998-99 (Offered)

**Secondary School Breakfasts**



■ NRC Recommendation  
 ■ SY 1991-92 (Offered)  
 ■ SY 1998-99 (Offered)

\*\* Difference is statistically significant at the .001 level.

In SY 1991–92, breakfasts offered in both elementary schools and secondary schools exceeded the recommended level of sodium. In SY 1998–99, mean sodium content of breakfasts offered in both types of schools was significantly lower. The average breakfast offered in elementary schools satisfied the NRC recommendation for sodium and the average breakfast offered in secondary schools came very close to meeting the recommendation.





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**Appendix A**  
**Supplementary Exhibits: Nutrient Content of NSLP**  
**Lunches**

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**Exhibit A.1**

**Mean Calorie and Nutrient Content of Average Lunches Served to Students in SY 1998–99**

	Elementary Schools		Secondary Schools		Middle Schools		High Schools		All Schools	
	Mean Amount (S.E.)									
Total Calories	695	(6.9)	724	(5.5)	712	(6.7)	735	(7.4)	705	(5.3)
Total Fat (gm)	26	(0.3)	28	(0.3)	27	(0.4)	28	(0.4)	26	(0.3)
Saturated Fat (gm)	9	(0.2)	10	(0.1)	10	(0.1)	10	(0.2)	9	(0.1)
Carbohydrate (gm)	89	(1.1)	91	(0.9)	90	(1.2)	92	(1.1)	90	(0.9)
Protein (gm)	29	(0.2)	30	(0.2)	30	(0.2)	31	(0.2)	30	(0.2)
Percentage of Calories from:										
Fat (%)	33.1	(0.3)	34.5	(0.2)	34.3	(0.3)	34.6	(0.3)	33.6	(0.2)
Saturated Fat (%)	11.9	(0.1)	12.1	(0.1)	12.1	(0.1)	12.2	(0.1)	12.0	(0.1)
Carbohydrate (%)	51.4	(0.3)	50.0	(0.3)	50.3	(0.3)	49.7	(0.3)	50.9	(0.2)
Vitamin A (mcg RE)	437	(15.7)	390	(10.1)	391	(15.2)	388	(10.2)	420	(11.5)
Vitamin C (mg)	27	(1.3)	29	(0.8)	29	(1.1)	30	(1.0)	28	(1.0)
Calcium (mg)	478	(4.0)	475	(3.9)	472	(4.9)	478	(5.3)	477	(3.1)
Iron (mg)	4.4	(0.1)	4.7	(0.0)	4.6	(0.1)	4.8	(0.1)	4.5	(0.0)
Cholesterol (mg)	65	(0.9)	68	(1.0)	66	(1.3)	69	(1.0)	66	(0.8)
Sodium (mg)	1,259	(15.3)	1,382	(14.5)	1,346	(16.4)	1,418	(19.5)	1,303	(11.7)
Number of Schools (Unweighted)	398		677		339		338		1,075	

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.2**

**Mean Percentage of Recommended Dietary Allowances Provided in Average Lunches Served to Students in SY 1998–99**

	<b>Elementary Schools</b>		<b>Secondary Schools</b>		<b>Middle Schools</b>		<b>High Schools</b>		<b>All Schools</b>	
	<b>Mean (S.E.)</b>									
Total Calories	35%	(0.3)	30%	(0.2)	30%	(0.3)	29%	(0.3)	33%	(0.3)
Protein	105	(0.9)	64	(0.4)	66	(0.5)	62	(0.5)	91	(0.9)
Vitamin A (mcg RE)	67	(2.5)	43	(1.1)	44	(1.7)	43	(1.1)	59	(1.8)
Vitamin C (mg)	59	(2.8)	54	(1.5)	57	(2.2)	52	(1.7)	58	(2.1)
Calcium (mg)	58	(0.5)	40	(0.3)	40	(0.4)	40	(0.4)	52	(0.5)
Iron (mg)	44	(0.6)	35	(0.3)	34	(0.4)	35	(0.4)	41	(0.5)
Number of Schools (Unweighted)	398		677		339		338		1,075	

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.3**

**Percentage of Schools in Which the Average Lunch Served to Students Met the  
Minimum Nutrition Standards Defined in Current NSLP Regulations**

	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
	<b>Percentage of Schools</b>		
Calories	60%	15%	44%
Protein	100	100	100
Vitamin A	98	64	86
Vitamin C	86	78	83
Calcium	100	85	95
Iron	87	58	77
Number of Schools (Unweighted)	398	677	1,075

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.4**

**Distribution of Cholesterol and Sodium in Average Lunches  
Served to Students in SY 1998–99**

	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
	<b>Percentage of Schools</b>		
<b>Cholesterol</b>			
≤100.0 mg	99%	96%	98%
>100.0 mg	1	4	2
<b>Sodium</b>			
≤800.0 mg	1%	<1%	<1%
800.1-1,000.0 mg	8	3	6
>1,000.0 mg	92	97	94
<b>Number of Schools (Unweighted)</b>	<b>398</b>	<b>677</b>	<b>1,075</b>

Notes: Highlighted rows show NRC recommendations (equivalent to one-third of recommended maximum daily intake for cholesterol and sodium).

Column sections may not sum to 100 percent due to rounding.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.



**Exhibit A.5**

**Percentage of Schools That Satisfied NSLP Standards and NRC Recommendations  
for Lunch, by Menu Planning System  
Elementary Schools**

	Menu Planning System			
	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
	Percentage of Schools			
<b>Defined NSLP Standards</b>				
Calories	78%	55%*	70%	68%
Protein	100	100	100	100
Vitamin A	98	100	97	98
Vitamin C	84	88	87	86
Calcium	100	100	100	100
Iron	95	96	90	93
Percentage of Calories from Total Fat	20	20	25	21
Percentage of Calories from Saturated Fat	13	18	17	15
<b>NRC Recommendations</b>				
Percentage of Calories from Carbohydrate	16	24	16	18
Cholesterol	98	99	99	99
Sodium	<1	<1	2	1
Number of Schools (Unweighted)	155	108	122	398

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (7 schools).

Data for 13 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

\* Difference between the traditional food-based system and NSMP/ANSMP is statistically significant at the .01 level.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.6**

**Percentage of Schools That Satisfied NSLP Standards and NRC Recommendations  
for Lunch, by Menu Planning System  
Secondary Schools**

	Menu Planning System			
	Traditional Food-Based	NSMP/ANSMP	Enhanced Food-Based	All Systems
	Percentage of Schools			
<b>Defined NSLP Standards</b>				
Calories	17%	24%	18%	20%
Protein	100	100	100	100
Vitamin A	62	59	73	65
Vitamin C	72	84	82	79
Calcium	87	81	91	86
Iron	61	60	58	60
Percentage of Calories from Total Fat	11	15	18	14
Percentage of Calories from Saturated Fat	8	15	19	13
<b>NRC Recommendations</b>				
Percentage of Calories from Carbohydrate	11	14	20	14
Cholesterol	93	100	97	96
Sodium	<1	<1	0	<1
Number of Schools (Unweighted)	282	175	197	677

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (13 schools).

Data for 23 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

None of the differences between the traditional food-based system and NSMP/ANSMP or between the traditional and enhanced food-based systems is statistically significant.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.7**

**Mean Nutrient Profile of Average Lunches Served in SY 1998–99, by Menu Planning System,  
Compared to NSLP Standards and NRC Recommendations  
All Schools**

	Menu Planning System				
	Standard/ Recommendation	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
<b>Mean Percentage of RDA</b>					
Total Calories	33%	34%	33%	34%	33%
Protein	33%	92	88	91	91
Vitamin A	33%	59	55	63	59
Vitamin C	33%	58	56	58	58
Calcium	33%	52	51	52	52
Iron	33%	42	40	40	41
<b>Mean Percentage of Calories from...</b>					
Total Fat	≤ 30%	34.3%	33.1%	32.9% <sup>†</sup>	33.6%
Saturated Fat	< 10%	12.5	11.8	11.6 <sup>††</sup>	12.0
Carbohydrate	> 55% <sup>1</sup>	50.2	51.3	51.5	50.9
<b>Mean Amount</b>					
Cholesterol (mg)	≤ 100 <sup>1</sup>	68	63	65	66
Sodium (mg)	≤ 800 <sup>1</sup>	1,321	1,286	1,303	1,303
Number of Schools (Unweighted)		437	283	319	1,075

<sup>1</sup> NRC recommendation, not NSLP standard.

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (20 schools).

Data for 36 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the “All Systems” column.

<sup>†</sup> Difference between means for the traditional and enhanced food-based systems is statistically significant at the .01 level.

<sup>††</sup> Difference between means for the traditional and enhanced food-based systems is statistically significant at the .001 level.

Source: Weighted nutrient analysis of meal and menu production data for one week between September 1998 and May 1999.

**Exhibit A.8**

**Percentage of Schools That Satisfied NSLP Standards and NRC Recommendations  
for Lunch, by Menu Planning System  
*All Schools***

	Menu Planning System			
	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
	Percentage of Schools			
<b>Defined NSLP Standards</b>				
Calories	57%	44%	52%	51%
Protein	100	100	100	100
Vitamin A	86	85	89	87
Vitamin C	80	87	85	84
Calcium	95	93	97	95
Iron	83	83	79	82
Percentage of Calories from Total Fat	17	18	23	19
Percentage of Calories from Saturated Fat	12	17	18	15
<b>NRC Recommendations</b>				
Percentage of Calories from Carbohydrate	14	21	17	17
Cholesterol	97	100	98	98
Sodium	<1	<1	1	1
Number of Schools (Unweighted)	437	283	319	1,075

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (20 schools).

Data for 36 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

None of the differences between the traditional food-based system and NSMP/ANSMP or between the traditional and enhanced food-based systems is statistically significant.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.9**

**Mean Nutrient Profile of Average Lunches Served in SY 1998–99, by Menu Planning System,  
Compared to NSLP Standards and NRC Recommendations  
Middle Schools**

	Menu Planning System				
	Standard/ Recommendation	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
<b>Mean Percentage of RDA</b>					
Total Calories	33%	31%	30%	31%	30%
Protein	33%	67	64	66	66
Vitamin A	33%	43	40	49	44
Vitamin C	33%	57	55	59	57
Calcium	33%	40	39	40	40
Iron	33%	35	34	34	34
<b>Mean Percentage of Calories from...</b>					
Total Fat	≤ 30%	35.0%	34.3%	33.1% <sup>†</sup>	34.3%
Saturated Fat	< 10%	12.5	12.0	11.6 <sup>†</sup>	12.1
Carbohydrate	> 55% <sup>1</sup>	49.3	50.3	51.7 <sup>†</sup>	50.3
<b>Mean Amount</b>					
Cholesterol (mg)	≤ 100 <sup>1</sup>	70	62	66	66
Sodium (mg)	≤ 800 <sup>1</sup>	1,339	1,332	1,382	1,346
Number of Schools (Unweighted)		140	90	98	339

<sup>1</sup> NRC recommendation, not NSLP standard.

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (6 schools).

Data for 11 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the “All Systems” column.

<sup>†</sup> Difference between traditional and enhanced food-based systems is statistically significant at the .01 level.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.10**

**Percentage of Schools That Satisfied NSLP Standards and NRC Recommendations  
for Lunch, by Menu Planning System  
Middle Schools**

	Menu Planning System			
	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
Percentage of Schools				
<b>Defined NSLP Standards</b>				
Calories	23%	23%	24%	23%
Protein	100	100	100	100
Vitamin A	65	48	72	62
Vitamin C	79	88	85	84
Calcium	86	82	91	87
Iron	58	56	55	56
Percentage of Calories from Total Fat	9	15	22	14
Percentage of Calories from Saturated Fat	7	12	21	13
<b>NRC Recommendations</b>				
Percentage of Calories from Carbohydrate	11	11	25	15
Cholesterol	91	100	97	95
Sodium	0	0	0	0
Number of Schools (Unweighted)	140	90	98	339

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (6 schools).

Data for 11 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

None of the differences between the traditional food-based system and NSMP/ANSMP or between the traditional and enhanced food-based systems is statistically significant.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.11**

**Mean Nutrient Profile of Average Lunches Served in SY 1998–99, by Menu Planning System,  
Compared to NSLP Standards and NRC Recommendations  
*High Schools***

	Menu Planning System				
	Standard/ Recommendation	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
<b>Mean Percentage of RDA</b>					
Total Calories	33%	29%	30%	29%	29%
Protein	33%	62	62	61	62
Vitamin A	33%	41	43	47	43
Vitamin C	33%	48	58	51	52
Calcium	33%	39	41	41	40
Iron	33%	36	36	35	35
<b>Mean Percentage of Calories from...</b>					
Total Fat	≤ 30%	35.5%	34.1%	33.9%	34.6%
Saturated Fat	< 10%	12.5	12.0	11.9	12.2
Carbohydrate	> 55% <sup>1</sup>	48.7	50.4	50.4	49.7
<b>Mean Amount</b>					
Cholesterol (mg)	≤ 100 <sup>1</sup>	72	67	67	69
Sodium (mg)	≤ 800 <sup>1</sup>	1,407	1,449	1,403	1,418
Number of Schools (Unweighted)		142	85	99	338

<sup>1</sup> NRC recommendation, not NSLP standard.

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (7 schools).

Data for 12 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the “All Systems” column.

None of the differences between the traditional food-based system and NSMP/ANSMP or between the traditional and enhanced food-based systems is statistically significant.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.12**

**Percentage of Schools That Satisfied NSLP Standards and NRC Recommendations  
for Lunch, by Menu Planning System  
*High Schools***

	<b>Menu Planning System</b>			
	<b>Traditional Food-Based</b>	<b>NSMP/ ANSMP</b>	<b>Enhanced Food-Based</b>	<b>All Systems</b>
	<b>Percentage of Schools</b>			
<b>Defined NSLP Standards</b>				
Calories	11%	26%	13%	16%
Protein	100	100	100	100
Vitamin A	60	70	74	67
Vitamin C	65	81	78	74
Calcium	87	80	91	85
Iron	64	63	61	64
Percentage of Calories from Total Fat	13	16	14	14
Percentage of Calories from Saturated Fat	10	18	17	14
<b>NRC Recommendations</b>				
Percentage of Calories from Carbohydrate	10	18	15	13
Cholesterol	96	99	97	97
Sodium	<1	1	0	<1
Number of Schools (Unweighted)	142	85	99	338

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (7 schools).

Data for 12 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

None of the differences between the traditional food-based system and NSMP/ANSMP or between the traditional and enhanced food-based systems is statistically significant.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.



**Exhibit A.13**

**Percentage of Schools That Satisfied NSLP Standards and NRC Recommendations  
for Lunch, by Relative Fat Content of Average Lunch Served**

Standard/Recommendation	Relative Amount of Fat in Average Lunch, as Served <sup>1</sup>			
	Low	Moderate	High	Highest
	Percentage of Schools			
<b>Defined NSLP Standards</b>				
Calories	52%	55%	39%	55%
Protein	100	100	100	100
Vitamin A	91	89	84	75
Vitamin C	89	88	74	74
Calcium	97	96	95	90
Iron	94	86	69	68
Percentage of Calories from Total Fat	100	0	0	0
Percentage of Calories from Saturated Fat	53	9	1	0
<b>NRC Recommendations</b>				
Percentage of Calories from Carbohydrate	71	7	0	0
Cholesterol	100	99	97	93
Sodium	2	<1	0	<1
Number of Schools (Unweighted)	206	527	200	142

<sup>1</sup> Low-fat is defined as no more than 30 percent of calories from fat; moderate-fat as more than 30 percent up to 35 percent; high-fat as more than 35 percent up to 38 percent; and highest-fat as more than 38 percent. Schools in the low-fat group met the NSLP standard for percentage of calories from fat.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.14**

**Mean Nutrient and Calorie Content of Lunches,  
Using Alternative Methodology for Unweighted Analysis  
Elementary Schools**

	Standard/ Recommendation	Weighted (Served)	Unweighted (Offered)	Percent Difference (Weighted vs. Unweighted)
		Mean	Mean	Mean
<b>Mean Percentage of RDA</b>				
Calories	33%	35%	38%	-8%**
Protein	33%	105	109	-4**
Vitamin A	33%	67	75	-11**
Vitamin C	33%	59	80	-26**
Calcium	33%	58	61	-5**
Iron	33%	44	45	-2*
<b>Mean Percentage of Calories from...</b>				
Total Fat	≤ 30%	33.1%	33.5%	-1
Saturated Fat	< 10%	11.9	11.9	0
Carbohydrate	> 55% <sup>1</sup>	51.4	51.5	0
<b>Mean Amount</b>				
Cholesterol (mg)	≤ 100 <sup>1</sup>	65	68	-4**
Sodium (mg)	≤ 800 <sup>1</sup>	1,259	1,287	-2*
Number of Schools (Unweighted)		398		

<sup>1</sup> NRC recommendation, not NSLP standard.

\* Difference between weighted and unweighted analyses is statistically significant at the .01 level.

\*\* Difference between weighted and unweighted analyses is statistically significant at the .001 level.

Source: Weighted and unweighted nutrient analyses of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.15**

**Percentage of Schools That Satisfied NSLP Standards and NRC Recommendations  
for Lunch Based on Weighted and Unweighted Analyses,  
Using Alternative Methodology for Unweighted Analysis  
*Elementary Schools***

<b>Standard/Recommendation</b>	<b>Weighted (Served)</b>	<b>Unweighted (Offered)</b>	<b>Percent Difference (Weighted vs. Unweighted)</b>
	<b>Percentage of Schools</b>		
<b>Defined NSLP Standards</b>			
Calories	68%	82%	-17% **
Protein	100	100	0
Vitamin A	98	99	-1
Vitamin C	86	94	-9**
Calcium	100	100	0
Iron	93	96	-3
Percentage of Calories from Fat	21	16	+31
Percentage of Calories from Saturated Fat	15	14	+7
<b>NRC Recommendations</b>			
Percentage of Calories from Carbohydrate	18	19	-5
Cholesterol	99	94	+5
Sodium	1	1	0
Number of Schools (Unweighted)		398	

\*\* Difference between weighted and unweighted analyses is statistically significant at the .001 level.

Source: Menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.16**

**Mean Nutrient and Calorie Content of Lunches,  
Using Alternative Methodology for Unweighted Analysis  
Secondary Schools**

		Weighted (Served)	Unweighted (Offered)	Percent Difference (Weighted vs. Unweighted)
	Standard/ Recommendation	Mean		Mean
<b>Mean Percentage of RDA</b>				
Calories	33%	30%	33%	-9**
Protein	33%	64	69	-7**
Vitamin A	33%	43	57	-25**
Vitamin C	33%	54	78	-31**
Calcium	33%	40	45	-11**
Iron	33%	35	37	-5**
<b>Mean Percentage of Calories from...</b>				
Total Fat	≤ 30%	34.5%	33.9%	+2**
Saturated Fat	< 10%	12.1	11.9	+2**
Carbohydrate	> 55% <sup>1</sup>	50.0	51.1	-2**
<b>Mean Amount</b>				
Cholesterol (mg)	≤ 100 <sup>1</sup>	68	76	-11**
Sodium (mg)	≤ 800 <sup>1</sup>	1,382	1,501	-8**
Number of Schools (Unweighted)		677		

<sup>1</sup> NRC recommendation, not NSLP standard.

\* Difference between weighted and unweighted analyses is statistically significant at the .01 level.

\*\* Difference between weighted and unweighted analyses is statistically significant at the .001 level.

Source: Weighted and unweighted nutrient analyses of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit A.17**

**Percentage of Schools That Satisfied NSLP Standards and NRC Recommendations  
for Lunch Based on Weighted and Unweighted Analyses,  
Using Alternative Methodology for Unweighted Analysis  
Secondary Schools**

<b>Standard/Recommendation</b>	<b>Weighted (Served) Percentage of Schools</b>	<b>Unweighted (Offered) Percentage of Schools</b>	<b>Percent Difference (Weighted vs. Unweighted)</b>
<b>Defined NSLP Standards</b>			
Calories	20%	45%	-56% **
Protein	100	100	0
Vitamin A	65	90	-28**
Vitamin C	79	93	-15**
Calcium	86	100	-14**
Iron	60	70	-14**
Percentage of Calories from Fat	14	19	-26**
Percentage of Calories from Saturated Fat	13	15	-13
<b>NRC Recommendations</b>			
Percentage of Calories from Carbohydrate	14	21	-33**
Cholesterol	96	90	+7**
Sodium	<1	<1	0
Number of Schools (Unweighted)	677		

\*\* Difference between weighted and unweighted analyses is statistically significant at the .001 level.

Source: Menu and meal production data for one week between September 1998 and May 1999.



**Appendix B**  
**Supplementary Exhibits: Nutrient Content of SBP**  
**Breakfasts**

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**Exhibit B.1**

**Mean Calorie and Nutrient Content of Average Breakfasts Served to Students in SY 1998-99**

	Elementary Schools		Secondary Schools		Middle Schools		High Schools		All Schools	
	Mean Amount (S.E.)									
Total Calories	447	(5.7)	483	(6.3)	465	(7.4)	501	(7.6)	459	(4.9)
Total Fat (gm)	13	(0.3)	15	(0.3)	14	(0.4)	16	(0.4)	14	(0.3)
Saturated Fat (gm)	5	(0.1)	6	(0.1)	5	(0.1)	6	(0.2)	5	(0.1)
Carbohydrate (gm)	68	(1.0)	71	(1.1)	70	(1.3)	73	(1.3)	69	(0.8)
Protein (gm)	15	(0.2)	16	(0.2)	16	(0.2)	17	(0.3)	15	(0.2)
Percentage of Calories from:										
Fat (%)	26.5	(0.4)	28.3	(0.4)	27.4	(0.5)	29.1	(0.5)	27.1	(0.3)
Saturated Fat (%)	10.1	(0.2)	10.5	(0.2)	10.1	(0.2)	10.8	(0.3)	10.2	(0.2)
Carbohydrate (%)	61.5	(0.5)	59.2	(0.5)	60.2	(0.6)	58.2	(0.6)	60.7	(0.4)
Vitamin A (mcg RE)	254	(4.4)	226	(4.9)	227	(6.0)	225	(5.7)	244	(3.9)
Vitamin C (mg)	37	(1.1)	39	(1.0)	39	(1.1)	38	(1.4)	38	(0.9)
Calcium (mg)	354	(4.5)	350	(5.3)	346	(6.0)	355	(6.6)	353	(3.9)
Iron (mg)	3.8	(0.1)	3.8	(0.1)	3.7	(0.1)	3.9	(0.1)	3.8	(0.1)
Cholesterol (mg)	43	(2.9)	55	(2.2)	50	(2.6)	59	(3.0)	47	(2.2)
Sodium (mg)	574	(10.5)	672	(12.8)	621	(12.7)	723	(17.9)	607	(9.5)
Number of Schools (Unweighted)	317		487		245		242		804	

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit B.2**

**Mean Percentage of Recommended Dietary Allowances in Average Breakfasts Served to Students in SY 1998-99**

	<b>Elementary Schools</b>		<b>Secondary Schools</b>		<b>Middle Schools</b>		<b>High Schools</b>		<b>All Schools</b>	
	<b>Mean (S.E.)</b>									
Total Calories	23%	(0.3)	20%	(0.3)	20%	(0.3)	20%	(0.3)	22%	(0.2)
Protein	52	(0.7)	34	(0.5)	35	(0.5)	34	(0.6)	46	(0.6)
Vitamin A	39	(0.7)	25	(0.5)	25	(0.7)	25	(0.6)	34	(0.6)
Vitamin C	81	(2.5)	72	(1.9)	78	(2.2)	67	(2.4)	78	(1.9)
Calcium	43	(0.6)	29	(0.4)	29	(0.5)	30	(0.5)	38	(0.5)
Iron	37	(0.7)	28	(0.7)	28	(0.9)	29	(0.8)	34	(0.6)
Number of Schools (Unweighted)	317		487		245		242		804	

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit B.3**

**Percentage of Schools in Which the Average Breakfast Served to Students Met the Nutrition Standards Defined in Current SBP Regulations**

	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>	
	<b>Minimum Standard</b>	<b>Minimum Standard</b>	<b>Optional Standard</b>	
	<b>Minimum Standard</b>	<b>Optional Standard</b>	<b>Minimum Standard</b>	
	<b>Percentage of Schools</b>			
Total calories	8%	20%	8%	12%
Protein	98	100	93	98
Vitamin A	85	60	47	77
Vitamin C	96	97	94	96
Calcium	94	90	78	93
Iron	78	72	57	76
<b>Number of Schools (Unweighted)</b>	<b>317</b>	<b>487</b>	<b>804</b>	

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit B.4**

**Distribution of Cholesterol and Sodium in Average Breakfasts  
Served to Students in SY 1998–99**

	<b>Elementary Schools</b>	<b>Secondary Schools</b>	<b>All Schools</b>
<b>Percentage of Schools</b>			
<b>Cholesterol</b>			
≤75.0 mg	90%	76%	85%
75.1-100.0 mg	5	16	9
>100.0 mg	5	9	6
<b>Sodium</b>			
≤600.0 mg	63%	42%	56%
600.1-750.0 mg	28	31	29
>750.0 mg	9	28	15
<b>Number of Schools (Unweighted)</b>	<b>317</b>	<b>487</b>	<b>804</b>

Notes: Highlighted rows show NRC recommendations (equivalent to one-fourth of recommended maximum daily intake for cholesterol and sodium).

Columns may not sum to 100 percent due to rounding.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit B.5**

**Percentage of Schools That Satisfied SBP Standards and NRC Recommendations  
for Breakfast, by Menu Planning System  
*Elementary Schools***

	<b>Menu Planning System</b>			
	<b>Traditional Food-Based</b>	<b>NSMP/ ANSMP</b>	<b>Enhanced Food-Based</b>	<b>All Systems</b>
	<b>Percentage of Schools</b>			
<b>Defined SBP Standards</b>				
Calories	23%	11%	30%	22%
Protein	100	100	100	100
Vitamin A	96	94	93	95
Vitamin C	97	98	100	98
Calcium	99	100	100	99
Iron	96	91	90	93
Percentage of Calories from Total Fat	70	82	72	75
Percentage of Calories from Saturated Fat	39	74**	59	54
<b>NRC Recommendations</b>				
Percentage of Calories from Carbohydrate	77	85	83	82
Cholesterol	86	93	92	90
Sodium	59	73	61	63
Number of Schools (Unweighted)	128	83	93	317

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (4 schools).

Data for 13 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

\*\* Difference between the traditional food-based system and NSMP/ANSMP is statistically significant at the .001 level.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit B.6**

**Percentage of Schools That Satisfied SBP Standards and NRC Recommendations  
for Breakfast, by Menu Planning System  
Secondary Schools**

	Menu Planning System			
	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
	Percentage of Schools			
<b>Defined SBP Standards</b>				
Calories	7%	12%	6%	8%
Protein	97	93	93	95
Vitamin A	45	55	40	48
Vitamin C	97	92	94	95
Calcium	83	70	76	78
Iron	53	73*	46	57
Percentage of Calories from Total Fat	55	69	71	64
Percentage of Calories from Saturated Fat	36	54	56	46
<b>NRC Recommendations</b>				
Percentage of Calories from Carbohydrate	67	74	78	72
Cholesterol	71	79	78	76
Sodium	33	46	49	42
Number of Schools (Unweighted)	220	121	128	487

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (10 schools).

Data for 18 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

\* Difference between the traditional food-based system and NSMP/ANSMP is statistically significant at the .01 level.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit B.7**

**Mean Nutrient Profile of Average Breakfasts Served in SY 1998-99, by Menu Planning System,  
Compared to SBP Standards and NRC Recommendations  
All Schools**

	Menu Planning System				
	Standard/ Recommendation	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
<b>Mean Percentage of RDA</b>					
Total Calories	25%	22%	21%*	22%	22%
Protein	25%	48	44	47	46
Vitamin A	25%	34	35	33	34
Vitamin C	25%	78	77	81	78
Calcium	25%	38	37	39	38
Iron	25%	34	36	33	34
<b>Mean Percentage of Calories from...</b>					
Total Fat	≤ 30%	28.4%	25.2%**	27.1%	27.1%
Saturated Fat	< 10%	10.9	9.3**	10.1	10.2
Carbohydrate	> 55% <sup>1</sup>	59.3	62.7*	60.7	60.7
<b>Mean Amount</b>					
Cholesterol (mg)	≤ 75 <sup>1</sup>	54	42	42	47
Sodium (mg)	≤ 600 <sup>1</sup>	636	578	597	607
Number of Schools (Unweighted)		348	204	221	804

<sup>1</sup>NRC recommendation, not SBP standard.

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (15 schools).

Data for 31 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

\*\* Difference between the traditional food-based system and NSMP/ANSMP is statistically significant at the .001 level.

\* Difference between the traditional food-based system and NSMP/ANSMP is statistically significant at the .01 level.

Source: Weighted nutrient analysis of meal and menu production data for one week between September 1998 and May 1999.

**Exhibit B.8**

**Percentage of Schools That Satisfied SBP Standards and NRC Recommendations  
for Breakfast, by Menu Planning System  
All Schools**

	Menu Planning System			
	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
	Percentage of Schools			
<b>Defined SBP Standards</b>				
Calories	18%	12%	22%	17%
Protein	99	98	98	98
Vitamin A	79	81	75	79
Vitamin C	97	96	98	97
Calcium	93	90	92	92
Iron	82	85	75	81
Percentage of Calories from Total Fat	65	77	72	71
Percentage of Calories from Saturated Fat	38	67**	58 <sup>†</sup>	52
<b>NRC Recommendations</b>				
Percentage of Calories from Carbohydrate	73	82	81	79
Cholesterol	81	88	87	85
Sodium	50	63	57	56
Number of Schools (Unweighted)	348	204	221	804

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (13 schools).

Data for 31 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

\*\* Difference between the traditional food-based system and NSMP/ANSMP is statistically significant at the .001 level.

<sup>†</sup> Difference between the traditional and enhanced food-based systems is statistically significant at the .01 level.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.



**Exhibit B.9**

**Mean Nutrient Profile of Average Breakfasts Served in SY 1998-99, by Menu Planning System,  
Compared to SBP Standards and NRC Recommendations  
Middle Schools**

	Menu Planning System				
	Standard/ Recommendation	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
<b>Mean Percentage of RDA</b>					
Total Calories	25%	21%	20%	19%	20%
Protein	25%	36	34	33	35
Vitamin A	25%	25	27	24	25
Vitamin C	25%	79	77	78	78
Calcium	25%	30	29	28	29
Iron	25%	27	32	24	28
<b>Mean Percentage of Calories from...</b>					
Total Fat	≤ 30%	29.0%	25.0%*	27.5%	27.4%
Saturated Fat	< 10%	10.8	9.2*	10.0	10.1
Carbohydrate	> 55% <sup>1</sup>	58.5	62.8*	60.1	60.2
<b>Mean Amount</b>					
Cholesterol (mg)	≤ 75 <sup>1</sup>	55	49	45	50
Sodium (mg)	≤ 600 <sup>1</sup>	655	595	596	621
Number of Schools (Unweighted)		111	62	63	245

<sup>1</sup> NRC recommendation, not SBP standard.

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (4 schools).

Data for 9 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

\* Difference between the traditional food-based system and NSMP/ANSMP is statistically significant at the .01 level.

Source: Weighted nutrient analysis of meal and menu production data for one week between September 1998 and May 1999.

**Exhibit B.10**

**Percentage of Schools That Satisfied SBP Standards and NRC Recommendations  
for Breakfast, by Menu Planning System  
Middle Schools**

	Menu Planning System			
	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
Percentage of Schools				
<b>Defined SBP Standards</b>				
Total Calories	9%	7%	7%	8%
Protein	97	92	98	96
Vitamin A	48	53	37	48
Vitamin C	99	97	96	98
Calcium	82	73	70	77
Iron	53	72	38	54
Percentage of Calories from Total Fat	62	81	73	71
Percentage of Calories from Saturated Fat	41	69*	55	52
<b>NRC Recommendations</b>				
Percentage of Calories from Carbohydrate	73	84	81	79
Cholesterol	75	85	86	81
Sodium	39	64	63	53
Number of Schools (Unweighted)	111	62	63	245

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (4 schools).

Data for 9 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the “All Systems” column.

\* Difference between the traditional food-based system and NSMP/ANSMP is statistically significant at the .01 level.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit B.11**

**Mean Nutrient Profile of Average Breakfasts Served in SY 1998-99, by Menu Planning System,  
Compared to SBP Standards and NRC Recommendations  
High Schools**

	Menu Planning System				
	Standard/ Recommendation	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
<b>Mean Percentage of RDA</b>					
Total Calories	25%	20%	20%	20%	20%
Protein	25%	35	34	33	34
Vitamin A	25%	24	26	24	25
Vitamin C	25%	67	61	70	67
Calcium	25%	30	29	30	30
Iron	25%	28	31	26	29
<b>Mean Percentage of Calories from...</b>					
Total Fat	≤ 30%	30.7%	28.2%	27.7%	29.1%
Saturated Fat	< 10%	11.7	10.3	9.9 <sup>††</sup>	10.8
Carbohydrate	> 55% <sup>1</sup>	56.3	59.2	59.7	58.2
<b>Mean Amount</b>					
Cholesterol (mg)	≤ 75 <sup>1</sup>	62	57	58	59
Sodium (mg)	≤ 600 <sup>1</sup>	736	767	675	723
Number of Schools		109	59	65	242

<sup>1</sup> NRC recommendation, not SBP standard.

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (5 schools).  
Data for 9 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the “All Systems” column.

<sup>††</sup> Difference between the traditional and enhanced food-based systems is statistically significant at the .001 level.

Source: Weighted nutrient analysis of meal and menu production data for one week between September 1998 and May 1999.

**Exhibit B.12**

**Percentage of Schools That Satisfied SBP Standards and NRC Recommendations  
for Breakfast, by Menu Planning System  
High Schools**

	Menu Planning System			
	Traditional Food-Based	NSMP/ ANSMP	Enhanced Food-Based	All Systems
	Percentage of Schools			
<b>Defined SBP Standards</b>				
Calories	5%	16%	5%	8%
Protein	97	95	88	94
Vitamin A	41	57	43	47
Vitamin C	95	86	91	92
Calcium	84	68	82	79
Iron	53	75	53	59
Percentage of Calories from Total Fat	47	55	69	57
Percentage of Calories from Saturated Fat	30	39	56	40
<b>NRC Recommendations</b>				
Percentage of Calories from Carbohydrate	61	63	75	66
Cholesterol	67	73	69	70
Sodium	26	26	36	30
Number of Schools (Unweighted)	109	59	65	242

Notes: Data for NSMP and ANSMP were combined because of small sample size for ANSMP (5 schools).

Data for 9 schools that reported use of some other menu planning system are not presented separately because of small sample size. These schools are included in the "All Systems" column.

None of the differences between the traditional food-based system and NSMP/ANSMP or between the traditional and enhanced food-based systems is statistically significant.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit B.13**

**Percentage of Schools That Satisfied SBP Standards and NRC Recommendations  
for Breakfast, by Relative Fat Content of Average Breakfast Served**

<b>Standard/Recommendation</b>	<b>Relative Amount of Fat in Average Breakfast, as Served<sup>1</sup></b>	
	<b>Low</b>	<b>Higher</b>
	<b>Percentage of Schools</b>	
<b>Defined SBP Standards</b>		
Calories	15%	23%
Protein	98	99
Vitamin A	83	69
Vitamin C	97	96
Calcium	93	90
Iron	83	76
Percentage of Calories from Total Fat	100	0
Percentage of Calories from Saturated Fat	69	8
<b>NRC Recommendations</b>		
Percentage of Calories from Carbohydrate	98	31
Cholesterol	91	72
Sodium	65	33
Number of Schools (Unweighted)	549	255

<sup>1</sup> Low-fat is defined as no more than 30 percent of calories from fat. Schools in this group met the SBP standard for percentage of calories from fat. All schools not included in the low-fat group are included in the higher-fat group.

Source: Weighted nutrient analysis of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit B.14**

**Mean Nutrient and Calorie Content of Breakfasts,  
Using Alternative Methodology for Unweighted Analysis  
Elementary Schools**

	Standard/ Recommendation	Weighted (Served)	Unweighted (Offered)	Percent Difference (Weighted vs. Unweighted)
		Mean		
<b>Mean Percentage of RDA</b>				
Total Calories	25%	23%	23%	0%
Protein	25%	52	53	-2
Vitamin A	25%	39	41	-5**
Vitamin C	25%	81	81	0
Calcium	25%	43	45	-4**
Iron	25%	37	38	-3
<b>Mean Percentage of Calories from</b>				
Total Fat	≤ 30%	26.5%	26.0%	+2
Saturated Fat	<10%	10.1	10.0	+1
Carbohydrate	> 55% <sup>1</sup>	61.5	61.8	<1
<b>Mean Amount</b>				
Cholesterol (mg)	≤ 75 <sup>1</sup>	43	39	+10
Sodium (mg)	≤ 600 <sup>1</sup>	574	551	+4*
Number of Schools (Unweighted)		317		

<sup>1</sup> NRC recommendation, not SBP standard.

\* Difference between weighted and unweighted results is statistically significant at the .01 level.

\*\* Difference between weighted and unweighted results is statistically significant at the .001 level.

Source: Weighted and unweighted nutrient analyses of menu and meal production data for one week between September 1998 and May 1999.

**Exhibit B.15**

**Percentage of Schools That Satisfied SBP Standards and NRC Recommendations  
for Breakfast Based on Weighted and Unweighted Analyses,  
Using Alternative Methodology for Unweighted Analysis  
*Elementary Schools***

<b>Standard/Recommendation</b>	<b>Weighted (Served)</b>	<b>Unweighted (Offered)</b>	<b>Percent Difference (Weighted vs. Unweighted)</b>
	<b>Percentage of Schools</b>		
<b>Defined SBP Standards</b>			
Calories	22%	19%	-8%
Protein	100	100	0
Vitamin A	95	99	-4
Vitamin C	98	98	0
Calcium	99	100	-1
Iron	93	87	+3
Percentage of Calories from Fat	75	77	-5
Percentage of Calories from Saturated Fat	54	53	-10
<b>NRC Recommendations</b>			
Percentage of Calories from Carbohydrate	82	90	-9*
Cholesterol	90	95	-6*
Sodium	63	69	-9
Number of Schools (Unweighted)	317		

\* Difference between weighted and unweighted analyses is statistically significant at the .01 level.

Source: Menu and meal production data for one week between September 1998 and May 1999.

**Exhibit B.16**

**Mean Nutrient and Calorie Content of Breakfasts,  
Using Alternative Methodology for Unweighted Analysis  
Secondary Schools**

	Standard/ Recommendation	Weighted (Served)	Unweighted (Offered)	Percent Difference (Weighted vs. Unweighted)
		Mean		
<b>Mean Percentage of RDA</b>				
Total Calories	25%	20%	20%	0%
Protein	25%	34	34	0
Vitamin A	25%	25	29	-14**
Vitamin C	25%	72	71	+1
Calcium	25%	29	32	-9**
Iron	25%	28	30	-7*
<b>Mean Percentage of Calories from</b>				
Total Fat	≤ 30%	28.3%	26.4%	+7**
Saturated Fat	<10%	10.5	10.0	+5**
Carbohydrate	> 55% <sup>1</sup>	59.2	61.0	-3**
<b>Mean Amount</b>				
Cholesterol (mg)	≤ 75 <sup>1</sup>	55	47	+17**
Sodium (mg)	≤ 600 <sup>1</sup>	672	607	+11**
Number of Schools (Unweighted)		487		

<sup>1</sup> NRC recommendation, not SBP standard.

\* Difference between weighted and unweighted results is statistically significant at the .01 level.

\*\* Difference between weighted and unweighted results is statistically significant at the .001 level.

Source: Weighted and unweighted nutrient analyses of menu and meal production data for one week between September 1998 and May 1999.



**Exhibit B.17**

**Percentage of Schools That Satisfied SBP Standards and NRC Recommendations  
for Breakfast Based on Weighted and Unweighted Analyses,  
Using Alternative Methodology for Unweighted Analysis  
Secondary Schools**

<b>Standard/Recommendation</b>	<b>Weighted (Served)</b>	<b>Unweighted (Offered)</b>	<b>Percent Difference (Weighted vs. Unweighted)</b>
	<b>Percentage of Schools</b>		
<b>Defined SBP Standards</b>			
Calories	8%	4%	+167%
Protein	95	99	-5**
Vitamin A	48	69	-33**
Vitamin C	95	98	-4
Calcium	78	100	-22**
Iron	57	65	-16
Percentage of Calories from Fat	64	75	-16**
Percentage of Calories from Saturated Fat	46	51	-15
<b>NRC Recommendations</b>			
Percentage of Calories from Carbohydrate	72	84	-18**
Cholesterol	76	89	-16**
Sodium	42	55	-26**
Number of Schools (Unweighted)	487		

\*\* Difference between weighted and unweighted analyses is statistically significant at the .001 level.

Source: Menu and meal production data for one week between September 1998 and May 1999.



# Appendix C

## Study Implementation

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This appendix describes the protocols and instruments used to collect data for the SNDA-II study. Two different survey efforts were used to collect data: a telephone interview of SFA directors and a mail survey of cafeteria managers. The two surveys were implemented concurrently. The following paragraphs describe the survey instruments, the data collection schedule, and the procedures used to encourage participation and submission of complete data. Copies of all instruments are included at the back of this appendix.

### Data Collection Schedule and Instruments

Data collection began in September 1998. The initial plan called for data collection to be completed by the end of December 1998. However, because many schools were unable to participate in the study or to complete data collection requirements during this time frame, the data collection period was extended and ran through May 1999.

Data collection instruments were carefully designed and went through two rounds of pretesting to ensure that instruments and protocols facilitated the uniform reporting of data and minimized response burden. In addition, survey materials used to collect information on meals served in school food service programs were designed to be comparable to those used in the first SNDA study (SNDA-I) so that nutrient analysis results for the two studies could be compared.

#### Telephone Interview of SFA Directors

The SFA director interview was used to collect basic descriptive information about school food service operations. Information was collected about operations at the SFA level as well as about selected characteristics of the specific schools participating in the study. Items included in the interview covered participation in the SBP and NSLP, enrollment, numbers of students approved for free and reduced-price meal benefits, menu planning practices, selected food purchasing practices, strategies used in setting prices for reimbursable meals and *a la carte* foods, use of foods from commercial vendors, and use of food service management companies.

The interview included 26 questions, most of which were asked about each sampled school, and took an average of 19 minutes to complete. Interviewers in Abt's telephone survey center in Amherst, Massachusetts conducted the interviews using computer-assisted personal interview (CAPI) technology.

Appointments for the interview were scheduled with SFA directors when they were contacted by phone, approximately six weeks before data collection was to begin, to remind them about the study and the upcoming data collection. This telephone contact was also used to schedule a target week for the mail survey of cafeteria managers, as described in a subsequent section. As a followup, respondents received

a letter that confirmed the date and time of the appointment. The letter also included a hard copy of the few survey items that required data from administrative records. SFA directors were encouraged to record needed information on the hard copy form prior to the interview. This included, for each of the selected schools in the district, information on enrollment, average daily attendance, numbers of students not eligible to participate in breakfast or lunch programs, and numbers of students approved for free and reduced-price meals.

Respondents who missed the scheduled appointment or were not able to complete it at the appointed time were recontacted until the interview was completed. Respondents who failed to complete the interview after 30 or more contact attempts were referred to the project director for followup. No respondent was considered a final refusal until the project director was unsuccessful in contacting him or her and/or in securing participation.

### **Mail Survey of Cafeteria Managers**

Cafeteria managers in sampled schools (or other respondents designated by the SFA director) were asked to complete a self-administered survey that included a number of different data collection instruments and forms. The primary focus of the survey was to collect detailed information on breakfasts and lunches served during a specified five-day period, referred to as the target week. For this reason, all survey forms were bound together into a booklet which was referred to as the menu survey. In turn, the menu survey booklet was packaged with other materials and response aids designed to facilitate collection of uniform data, reduce confusion, and minimize response burden.

Menu survey packets contained all materials needed by cafeteria managers to record required information on the foods and beverages served to students during the target week. In addition to data collection forms, the packet included an instruction manual that provided detailed guidelines for completing each form as well as sample completed forms and three laminated reference guides. The reference guides provided instructions on how to describe foods adequately and completely, how to collect package labels, and how to organize data collection activities each day of the target week. Zip-loc bags were provided for storing collected package labels. Each packet was presented in a large accordion folder with labeled pockets designed to assist respondents in locating and organizing materials. Color-coded forms, color printing, tabs, and other special formatting features were used to create an attractive, user-friendly package.

#### ***Menu Survey Forms***

The menu survey booklet included several different forms designed to collect specific types of information about meals served during the target week.

- The **Everyday Reimbursable Foods Form** was used to describe foods and beverages offered to students as part of a USDA-reimbursable meal every day (i.e., each day of the target week). This form alleviated the need for respondents to record these foods multiple times on forms used to collect information on daily offerings (see below). Separate forms were completed for breakfast and for lunch.

The form was designed to collect detailed information needed to complete an accurate nutrient analysis, including complete descriptions of each food item (e.g., full and brand names, method of cooking, use of salt and/or added fat); the grades served; the portion size,

including, if applicable, different portions for different grades; and the number of portions served in *reimbursable* meals. Respondents were cautioned to record *only* foods included in USDA-reimbursable meals (i.e., to exclude foods offered only *a la carte* or served only to adults) and, for foods served in both reimbursable meals and as an *a la carte* item, to exclude *a la carte* servings when reporting the number of portions served.

- A **Daily Menu Form** was used, each day, to describe foods and beverages offered as part of a reimbursable meal, with the exception of those items already recorded on the Everyday Reimbursable Foods Form. A separate Daily Menu Form was completed each day. Separate forms were completed for breakfast and lunch. The information recorded on the Daily Menu Form was identical to the Everyday Reimbursable Foods Form.
- The **Recipe Form** was used to list and describe ingredients, yield, and preparation information for items identified as “recipes” on the Daily Menu Forms or the Everyday Reimbursable Foods Form — that is, foods prepared from scratch or by combining two or more foods or ingredients. To minimize burden and promote submission of complete data, cafeteria managers were encouraged to attach copies of recipes in lieu of re-copying recipes onto recipe forms.
- Respondents were asked to provide package labels for most foods and to ensure that the label included nutrition information or, at a minimum, a list of ingredients and a portion size. The **Nutrition Information Form** was used to record product nutrition information or manufacturer’s contact information when package labels with nutrition information could not be provided (i.e., label did not include nutrition information, label was difficult to remove, or label was not available).

#### ***Other Data Collection Forms Included in the Menu Survey Booklet***

Three other data collection instruments were included in the menu survey booklet. These instruments were clearly separated from the menu survey forms by labeled tabs. Instructions for completing each form were provided in the instruction manual.

- The **Daily Meal Counts Form** was used to report the number of USDA-reimbursable breakfasts and lunches served, by reimbursement category, each day of the target week. The form also requested information on total *a la carte* sales (breakfast and lunch combined) for the target week.
- The ***A la Carte* Foods Checklist** was used to identify foods and beverages offered *a la carte*. Respondents simply checked off foods and beverages that were available for *a la carte* purchase on one specific day during the target week. Space was also provided for respondents to write in items that did not appear on the checklist. Each school was randomly assigned an “*a la carte* day” on which this form was to be completed. The form was identical to the one used in SNDA-I.
- The **Meal Service Questionnaire** was a separate self-administered questionnaire that gathered descriptive information on characteristics of food service programs in each participating school. Information was collected on the prices charged for full- and reduced-price meals, the types of meal service offered, alternative sources of food available to students, implementation of menu changes to address the *Dietary Guidelines for Americans*, and the perceived impact of these changes on meal acceptability. The

questionnaire included 19 items. Respondents were told they could complete the questionnaire any time prior to or during the target week.

The estimated response burden for completing the entire menu survey booklet (including the Daily Meal Counts Form, the Meal Service Questionnaire, and the *A la Carte* Foods Checklist) was approximately 8-10 hours, depending on the complexity of the menu.

### **Procedures Used to Implement the Menu Survey**

A number of procedures were used to promote cooperation with the menu survey, to ensure that respondents understood how to fill out survey forms, and to assist respondents, however necessary, in completing all survey materials.

As noted previously, each SFA was assigned a specific target week for the menu survey. All participating schools in an SFA were expected to complete the menu survey during the same week. SFAs were randomly assigned to a specific target week with two potential backups. Final decisions about target week dates for each SFA were made with the SFA director.

Reminder calls were made to all SFA directors and cafeteria managers approximately three weeks before the target week. Target week dates were confirmed and rescheduled if necessary. SFA directors were advised about the expected delivery date of menu survey packets and were encouraged to review data collection requirements with cafeteria managers prior to the target week (materials arrived at least two weeks before the target week). Finally, both SFA directors and cafeteria managers were informed about the availability of technical assistance and were provided with a toll-free number. (The toll-free number was also prominently displayed in several places in the menu survey materials).

After this initial reminder, several followup contacts were made with cafeteria managers and SFA directors, as described below.

- One week prior to the target week, specially trained technical assistance staff called SFA directors to confirm receipt of survey materials, encourage review of materials with cafeteria managers if this had not yet taken place, answer questions regarding the materials or the study in general, and reconfirm the SFA's commitment to participating in the study.
- On Tuesday of the target week, technical assistance staff called cafeteria managers to confirm that they had begun the menu survey and to provide clarification and guidance as needed. Because this call was placed after cafeteria managers had completed one day of the menu survey, technical assistance staff were able to provide valuable assistance.

In addition to answering questions posed by cafeteria managers, technical assistance staff reviewed general data collection requirements as well as specific issues identified as particularly problematic during the pretests, such as how to handle milk counts, separating *a la carte* servings from reimbursable servings, when to complete a Recipe Form, and when and how to use Nutrition Information Forms. Additional review points were added as the study progressed and knowledge accumulated about other potentially problematic issues.

Cafeteria managers were encouraged to call the toll-free telephone number at any time during or after the target week and were asked to return completed survey materials no later than one week after the target week.

- Two weeks after the target week, project staff contacted cafeteria managers who had not returned completed survey materials. If the survey had not been completed, a new target week was assigned and, if necessary, another set of survey materials was shipped.

Subsequent calls were made, approximately every other week or in other intervals surrounding target dates for completion identified by respondents, to assess progress on completion of survey materials. Because many schools needed a substantial amount of time to complete the materials, considerable leeway was given to schools that appeared to be sincerely interested in cooperating. SFA directors were asked to intervene after lengthy delays in schools where managers appeared to be less interested in cooperating.

- Cafeteria managers who were particularly reluctant were referred to the project director for followup. These managers were contacted by phone and every attempt was made to facilitate the school's participation in the study. In some cases, cafeteria managers were permitted to send local food production records, computer printouts, or SMI audit reports that provided most of the information needed. Missing information was collected via followup telephone calls. In other cases, intensive technical assistance was provided. This intensive assistance ran the gamut from daily telephone support to situations where Abt staff actually completed portions of the survey forms for respondents. In the latter case, respondents sent copies of their menus to Abt and Abt returned partially completed menu survey booklets along with a detailed list of questions to be answered and supporting information to be provided. Respondents were free to provide outstanding information in whatever format was most convenient; Abt staff integrated information and made call-backs as needed.

No respondent was considered a final refusal until the project director was unsuccessful in securing his or her participation or until it was clear that long-promised materials were never going to arrive.

After the data collection period was officially over, letters of thanks and personalized certificates of appreciation from USDA were sent to all cafeteria managers who completed the menu survey and to associated SFA directors.

Detailed information on how menu survey materials were used to assess the nutrient content of school meals is provided in Appendix E.