

VII. STUDENT PARTICIPATION IN THE NATIONAL SCHOOL LUNCH AND SCHOOL BREAKFAST PROGRAMS

A student participates in the National School Lunch Program (NSLP) or School Breakfast Program (SBP) when he or she gets a school meal for which the local School Food Authority receives federal reimbursement. The decision to eat a school meal, to eat a meal from some other source, or to eat no meal at all is a complex one, which students and parents share. Personal and family characteristics and preferences, as well as program features and characteristics of the meal service, may affect the decision to participate in the NSLP and SBP. In addition, students from families whose incomes are below certain thresholds are eligible to receive free or reduced-price meals, and families also decide whether to apply for this benefit.

The study addressed three sets of questions about participation in the NSLP and SBP:

- What proportion of students get an NSLP lunch, and what proportion obtain lunch from other sources, including their homes, non-NSLP school lunches, and off-campus locations? What proportion get an SBP breakfast, and what proportion obtain breakfast from other sources? Does having a school breakfast program increase the likelihood that a student will eat breakfast?
- How does participation in the NSLP and SBP differ by income level and by whether the student is certified for a free or reduced-price meal?
- What personal characteristics, programmatic factors, or meal-service characteristics are associated with higher or lower rates of participation in the NSLP and SBP?

In addition to discussing findings on these questions, this chapter presents information on the perceptions of parents and students about the NSLP and the reasons why some decided not to participate in it.

Section A briefly summarizes the findings. Sections B and C present detailed findings on participation in the NSLP and SBP, respectively.

A. SUMMARY OF FINDINGS

1. Participation in the NSLP

Ninety-two percent of students attend schools that participate in the NSLP. On a typical school day, 56 percent of the students who attend a school with the NSLP select an NSLP lunch. Participation rates differ markedly by family income and by certification for a free or reduced-price meal; nearly 80 percent of students certified for a free meal, more than 70 percent of those certified for a reduced-price meal, and less than 50 percent of those who pay full price participated on the school day surveyed. Between 16 percent and 25 percent of those whose family incomes make them eligible for free or reduced-price meals are not certified. The participation rate of the low-income children who pay full price is very similar to the participation rate of children whose family incomes are greater than 185 percent of the poverty level.

The analysis identified several sets of factors affecting the likelihood that a student will select an NSLP lunch.

- Schools offering lower-fat meals (less than 32 percent of food energy from fat) tend to have lower participation rates than do other schools. This finding indicates that efforts to bring the average fat content of school lunches in line with the Dietary Guideline goal may alter the types of foods offered and preparation to a degree that affects student participation adversely.
- Students who are certified for free or reduced-price meals are more likely than students who pay full price to select an NSLP lunch. Moreover, the amount of the full price affects participation levels; higher participation rates were observed in schools with lower full prices.
- An open-campus policy significantly reduces participation.
- Female students are less likely than male students to participate, and older students are less likely than younger students to do so.
- Students in urban and suburban schools are less likely than students in rural schools to participate, even after controlling for differences in the availability of alternatives to the NSLP lunch (a la carte service and an open campus).
- Students in the Southeast, Southwest, and Mountain states are more likely than students in the Northeast and West to participate.

2. Perceptions About the Program

Parents generally hold favorable impressions of the school lunch program. Most parents believe that school lunches are convenient, economical, and nutritious, but fewer reported that their children like the lunches. Both parents and students cited students' dislike of the food as the most common reason for not getting the school lunch. Very small percentages of students cited administrative features of the program, such as cost of the meal or stigma, as reasons for nonparticipation. Parents' reasons for not applying for free or reduced-price meals pertained primarily to their perceived ineligibility. Relatively few parents mentioned administrative requirements as reasons for not applying. However, about 20 percent of parents whose children were eligible for a free or reduced-price meal on the basis of the family's income reported that they preferred to pay full price.

3. Prevalence of Eating Breakfast

Approximately 88 percent of students eat breakfast on a given school day. The proportion that eats breakfast is higher among younger students and males than among older students and females. The availability of the SBP did *not* affect the likelihood that a student would eat breakfast.

4. Participation in the SBP

Ten percent of all students nationwide ate an SBP breakfast on the day covered by the students' 24-hour dietary recall. Just over one-half attend a school that offers the SBP; the participation rate among students for whom the SBP is available is 19 percent. The analysis identified several sets of factors that are associated with higher or lower rates of participation in the SBP.

- Students certified for free and reduced-price meals are more likely to select an SBP breakfast than are students who are not certified, and who must pay full price. However, the amount of the full price does not appear to be a factor.
- Male students are more likely than female students to participate, and younger students are more likely than older students to do so.
- Membership in a low-income family affects the probability of selecting an SBP breakfast independently from certification for free or reduced-price meals. That is, low-income

students who are not certified and, therefore, pay full price are more likely than higher-income students to participate.

- African American and Hispanic students are more likely than white, non-Hispanic students to participate.
- Students in urban and suburban schools are less likely than students in rural schools to participate, even after differences in the availability of alternatives to the SBP breakfast, such as a la carte service and open-campus policies, are controlled for.

B. PARTICIPATION IN THE NATIONAL SCHOOL LUNCH PROGRAM

1. Sources of Lunch

"Lunch" is defined in the analysis to include all foods that a student ate during the lunch period at his or her school. Thus, the identification of "lunch" does not depend on a student's identifying an eating occasion as "lunch." In principle, a student is an NSLP participant if he or she selects a meal for which the school claims reimbursement under U.S. Department of Agriculture (USDA) rules. NSLP participants were identified operationally in the analysis as students who reported obtaining their meals from the school cafeteria and selecting at least three items that were credited toward satisfying the NSLP meal-pattern requirement.¹ The meals of students who ate non-NSLP lunches were classified according to the source that provided the greatest amount of food energy consumed at lunch.

Nationwide, the NSLP is available to 92 percent of all students. Overall, on a typical school day, 56 percent of students attending schools that offer an NSLP lunch eat the school lunch (Table VII.1). Thirty-eight percent eat a non-NSLP lunch, and 7 percent do not eat lunch.

Students who get a non-NSLP lunch obtain their meals from a variety of sources. Seven percent of students obtain a la carte lunch items from the school cafeteria (but choose fewer than three foods that count toward satisfying the NSLP meal-pattern requirement). Another 2 percent obtain lunch from a vending machine or school store. Thus, 9 percent obtain lunch in school, but from a source

¹A complete discussion of the rationale for this decision and its implications is provided in Appendix B.

other than a reimbursable NSLP lunch. Eighteen percent bring lunch from home. Another 1 percent obtain food from a source outside of school, but eat their lunch at school, and 1 percent receive food from a friend or from some other source. Eight percent of students eat lunch away from school--4 percent in a restaurant, and 4 percent at home.

Differences across age and gender groups follow expected patterns. Younger students are more likely than older students to eat the NSLP lunch, are more likely to eat a meal brought from home, and are less likely to skip lunch. Students in the oldest age group are more likely than those in the younger age groups to eat at a restaurant (11 percent to 14 percent, compared with 1 percent to 2 percent of the younger students) and are more likely to eat lunches obtained from vending machines.

The behavior of 15- to 18-year-old female students illustrates the extent to which the NSLP "competes" with alternative sources of food both within and outside the schools, and must work to attract participation. Just over one-third of 15- to 18-year-old girls eat an NSLP lunch. Fifty-three percent eat a non-NSLP lunch, and 12 percent eat no lunch. Of those eating a non-NSLP lunch, 18 percent obtained their food from a source in school (a la carte, 12 percent, and vending machine or school store, 6 percent); 12 percent purchased food outside of school (restaurant, 11 percent, and store, 1 percent); 19 percent ate food from home (12 percent brought food, and 7 percent ate at home); and the rest obtained food from a friend or some other source.

2. NSLP Participation, by Income and Meal-Price Eligibility Status

A student is eligible to receive free school meals if his or her family income is 130 percent or less of the poverty level and is eligible to receive reduced-price meals if family income is between 130 and 185 percent of the poverty level. To receive these benefits, the student's parent must submit an application, and the student must be certified by school officials.

Table VII.2 shows the distribution of students attending schools offering NSLP meals, by family income and by meal-price certification status. Twenty-seven percent of students are certified for a free meal, 5 percent are certified for a reduced-price meal, and 66 percent pay full price; the

TABLE VII.1

SOURCES OF LUNCH AT NSLP SCHOOLS, BY AGE AND GENDER
(Percentage of Students)

Source of Lunch	6- to 10- Year-Old Students	11- to 14-Year-Old Students		15- to 18-Year-Old Students		All Students
		Female	Male	Female	Male	
NSLP School Lunch	66	48	61	35	46	56
Non-NSLP Lunch	30	46	32	53	45	38
Meals Eaten at School						
A la carte	4	14	8	12	9	8
Vending machine or school store	0	3	1	6	5	2
Brought from home	22	21	16	12	7	18
Bought from off-campus restaurant/store	0	1	<1	1	1	1
Someone gave food/other	<1	2	2	3	3	1
Meals Eaten at Restaurant	1	2	2	11	14	4
Meals Eaten at Home	3	4	4	7	7	4
No Lunch Eaten	4	6	7	12	9	7
Sample Size (Unweighted)	1,274	503	539	397	406	3,119

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

NOTE: Sample is limited to students at schools offering the NSLP.

TABLE VII.2

NSLP PARTICIPATION RATES, BY FAMILY INCOME AND
MEAL-PRICE CERTIFICATION STATUS

Family Income and Meal-Price Certification	Percentage of All Students in Each Family Income and Meal-Price Certification Group	Participation Rate of Students in Each Family Income and Meal-Price Certification Group ^a
Family Income 185 Percent of Poverty Level or Less		
Certified for Free Meal	27	79
Certified for Reduced-Price Meal	5	71
Pay Full Price	11	45
Certification Unknown	1	-- ^b
Total	44	69
Family Income More than 185 Percent of Poverty Level		
Pay Full Price	45	45
Family Income Unknown		
Pay Full Price	10	47
Certification Unknown	1	-- ^b
Total	11	46
All Students		
Total	100	56
Sample Size (Unweighted)	3,120	--

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

NOTE: The estimation sample is limited to students at schools offering the NSLP.

^aFigures on participation rates differ from the figures presented in Table III.2 because of sampling error and because students who were absent from school are excluded from the base for calculating the participation rate shown here.

^bFigures are not presented because sample sizes are too small to support reliable estimates.

certification status of 2 percent was unknown, because data were missing.² Family-income data collected for the study indicate that 44 percent of families of students attending schools that participate in the NSLP have incomes at or below 185 percent of the poverty level, and that 45 percent have incomes above the poverty level; the incomes of 11 percent of families were not known, due to survey nonresponse. Family incomes are likely to have been understated in the survey.³

Available data indicate that between 16 percent and 25 percent of students who appear to be eligible on the basis of their family income are not certified to receive free or reduced-price meals. The survey data indicate that an estimated 11 percent of students are not certified but are members of families whose incomes are less than 185 percent of the poverty level, whereas 44 percent of students are from families with incomes in this range. Thus, it appears that as many as 25 percent of students who are eligible for free or reduced-price meals are not certified to receive such meals. This figure is most likely an upper bound on the percentage of students who are eligible on the basis of family income but are not certified for free or reduced price meals. Food and Nutrition Service administrative data indicate that approximately 16 percent of eligible students are not certified. According to these administrative estimates, 44 percent of students are from families that are eligible, and 37 percent are certified for free or reduced-price meals. Thus, according to these data,

²Estimates based on administrative data indicate that 31 percent of students are certified for free meals, and 6 percent are certified for reduced-price meals. The discrepancy between the study data and the administrative data has not been resolved.

³Income data were collected by means of a mail survey, with telephone follow-up, for students in grades 3 through 12, and by means of in-person interviews with the parents of students in grades 1 and 2. The parents were asked to identify the range in which their current income fell. Relative to data collection that requests detailed information on various sources of income, this type of simple global estimate is likely to underestimate total income. Thus, the study data might possibly overstate the proportion of the population whose income is less than 185 percent of the poverty level. Direct comparisons of poverty rates in the School Nutrition Dietary Assessment study sample and in the 1990 census confirm that the study sample understates family income and overstates the proportion of students who are from low-income families. Approximately 22 percent of students in the study sample are from families with incomes at or below poverty, according to the School Nutrition Dietary Assessment study data; 17 percent of children between the ages of 5 and 17 years are in families with incomes at or below poverty, according to the 1990 census.

84 percent of eligible students are certified ($37/44 = .84$), and 16 percent of eligible students are not certified.

Participation rates in the NSLP are considerably higher among students who are certified for free or reduced-price meals than among those who are not certified (Table VII.2). On a typical school day, 79 percent of students certified for a free meal and 71 percent of students certified for a reduced-price meal participate in the NSLP. In comparison, only 45 percent of students who pay full price participate on a typical school day.

These data indicate that 11 percent of students who are eligible for free or reduced-price meals obtain the meal, but pay the full price.⁴ This figure is most likely an upper bound on the true percentage, given the tendency of survey respondents to under-report income.⁵ However, data presented in Table VII.7 and discussed in subsection B.4 provide corroborating evidence that a substantial percentage of families whose incomes make them eligible to participate do not receive free or reduced-price school meals. Forty-five percent of parents classified as income eligible on the basis of their response to the survey and reporting that they had not applied for free or reduced-price meals cited a factor other than income as the reason for not applying. Twenty percent reported that they were willing and able to pay full price, and 10 percent cited administrative reasons.⁶

3. Factors Affecting Participation in the NSLP

A number of factors may influence participation rates in the NSLP, including the price of the meal, the student's meal-price status, whether offer versus serve (OVS) is used, the range of

⁴One-fourth of eligible students are not certified to receive free or reduced-price meals; of these, 45 percent selected an NSLP lunch.

⁵Although the School Nutrition Dietary Assessment study Household Questionnaire replicated the income questions on the certification application for free/reduced-price lunches, some parents may have reported lower incomes on the questionnaire (or incomes lower than what they would have reported on the application form).

⁶The other 15 percent either reported that their children preferred other lunch options or gave another reason.

alternative sources of lunch, the characteristics of NSLP meals, characteristics of the school's meal service, the students' personal characteristics and characteristics of his or her family, and the location of the community. Statistical techniques were used to estimate the effect of various factors on participation, while controlling for the influence of other factors. (A full description of the procedures used to estimate these effects is presented in Appendix B.)

Table VII.3 summarizes the results of this analysis. The table displays predicted NSLP participation rates under alternative assumptions about student and meal characteristics. Each row of the table displays a "base" and an "alternative" assumption about a given meal or student characteristic, the predicted participation rates under each base and alternative assumption, and the difference between the predicted rates. The difference indicates the effect on the participation rate of the change from the "base" characteristic to the "alternative" characteristic. Columns 1 and 3 in the first set of rows under "Key Programmatic Variables" indicate, for example, that 48 percent of students who are not certified for a free or reduced-price lunch, and who must pay a full lunch price of \$1.20, are predicted to participate, when other factors are controlled for. Columns 2 and 4 indicate that, if the same group of students were to pay a full lunch price of \$0.80, their predicted participation rate would be 52 percent. Thus, while holding all other factors constant, a reduction of \$0.40 in the full price of a lunch would increase participation by 4 percentage points. This estimated effect of full price on program participation is relatively small: a 50 percent reduction in price (from \$1.20 to \$0.80) is associated with only an 8 percent increase in the participation rate (from 48 percent to 52 percent). However, the effect is statistically significant.

Table VII.3 presents several important findings. Certification for free or reduced-price lunches increases NSLP participation. Thus, the predicted participation rate of students who pay full price is 48 percent, whereas the predicted participation rates of students who are certified for free and reduced-price meals are 69 percent and 75 percent, respectively; both differences from the predicted

TABLE VII.3

PREDICTED NSLP PARTICIPATION RATES UNDER ALTERNATIVE ASSUMPTIONS
ABOUT STUDENT AND PROGRAM CHARACTERISTICS

Base Assumption	Alternative Assumption	Predicted Participation Rate Under Base Assumption	Predicted Participation Rate Under Alternative Assumption	Difference
Student and Program Characteristics Equal to Sample Means				
	--	56 %	-- %	--
Key Programmatic Variables				
Price = \$1.20; Student Not Certified	Price = \$0.80; Student Not Certified	48	52	4 *
Price = \$1.20; Student Not Certified	Price = \$1.60; Student Not Certified	48	44	-4 *
Student Not Certified	Student Certified for Reduced-Price Meals	48	69	21 *
Student Not Certified	Student Certified for Free Meals	48	75	27 *
School Does Not Offer OVS	School Offers OVS	53	57	4
Alternatives to NSLP Lunch				
School Has Closed Campus School Does Not Serve a la Carte Items	School Has Open Campus School Serves a la Carte Items	58	49	-9 *
School Does Not Have Vending Machines or Store	School Has Vending Machines or Store	58	55	-3
School Does Not Have Vending Machines or Store	School Has Vending Machines or Store	57	56	-1
Average Fat Content of Meal Offered Over Week				
More than 40 Percent	Less than 32 Percent	56	48	-8 *
More than 40 Percent	32-35 Percent	56	54	-2
More than 40 Percent	36-40 Percent	56	58	2
Characteristics of Meal Service				
Elementary School Student Has no Play Period After Lunch	Elementary School Student Has Play Period After Lunch	61	62	1
Elementary School Student Has no Play Period After Lunch	Student in Middle or High School	61	50	-11 **
Serving Capacity--Low ^a	Serving Capacity--Medium ^a	56	57	1
Serving Capacity--Low ^a	Serving Capacity--High ^a	56	60	4

TABLE VII.3 (continued)

Base Assumption	Alternative Assumption	Predicted Participation Rate Under Base Assumption	Predicted Participation Rate Under Alternative Assumption	Difference
Personal and Family Characteristics				
Age-6-10 Years	Age-11-14 Years	57 %	58 %	1
Age-6-10 Years	Age-15-18 Years	57	53	-4
Male	Female	60	52	-8 **
White	African American	56	60	4
White	Hispanic	56	58	2
White	Other Race ^b	56	66	10 *
Family Income too High to Qualify for Free or Reduced-Price Meals	Family Income Low Enough to Qualify for Free or Reduced-Price Meals	56	56	<1
Mother Not in Household	Mother in Household	56	56	<1
Mother Not Employed	Mother Employed	57	56	-1
Family Size-1-2	Family Size-3-4	56	56	-1
Family Size-1-2	Family Size-5-7	56	57	1
Family Size-1-2	Family Size-More than 7	56	60	4
Location and Region				
Rural	Urban	64	52	-12 *
Rural	Suburban	64	55	-9 *
New England	Mid-Atlantic	51	50	-1
New England	Southeast	51	64	13 *
New England	Midwest	51	53	2
New England	Southwest	51	63	12 *
New England	Mountain	51	63	12 **
New England	West	51	47	-4

SOURCE: Tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

NOTE: The estimation sample is limited to students at schools offering the NSLP. Probit analysis was used to estimate the model. Predicted participation rates are calculated by (1) computing for each student the predicted probability of NSLP participation under the base assumption and under the alternative assumption, and (2) averaging these predicted probabilities across students. Table entries show the effect of changing from the "base assumption" to the "alternative assumption" while holding constant all of the other characteristics that might vary across the two groups. Because the predicted participation controls for variation in other characteristics, a group's predicted participation rate may differ from its actual participation rate.

^aThe index of serving capacity is the number of cash registers per minute of lunch per student in the school. A high value reflects a greater capacity to serve students and shorter average time waiting in line.

^bIncludes persons identified as Asians, Native Americans, or Pacific Islanders, or for whom information on race was missing.

OVS = offer versus serve.

*/** indicates the difference is statistically significant at the 95/99 percent confidence level with a two-tailed test.

full-price participation rate are statistically significant.⁷ The use of OVS does not have a significant effect on participation.

The set of options available as alternatives to an NSLP lunch strongly influences the likelihood of participation. In particular, permitting students to leave school in order to eat lunch at a commercial establishment reduces the participation rate by 9 percentage points (from 58 percent to 49 percent). Neither the availability of a la carte items in the school cafeteria nor the availability of vending machines affects the participation rate significantly.

The average fat content of the meals offered in the school is related to the rate of participation in the NSLP. In particular, predicted participation rates are substantially lower in schools serving meals that provide an average of less than 32 percent of food energy from fat than in schools serving higher-fat lunches. The predicted participation rate is 48 percent in schools serving lunches that provide, over one week, an average of less than 32 percent of energy from fat; the predicted rate is 54 percent at schools in which fat provides 32 percent to 35 percent of food energy, 58 percent in schools in which fat provides an average of 36 percent to 40 percent of food energy, and 56 percent in schools in which fat provides an average of more than 40 percent of food energy. The difference in predicted participation rates across the fat-level groups is statistically significant only for the lowest-fat group. That is, there is essentially no difference in participation rates among the groups in which school lunches provide more than 32 percent of food energy from fat.

These findings have two important implications with respect to efforts to meet the Dietary Guideline goal for the percentage of calories from fat in NSLP lunches. First, the analysis in Chapter V showed that several different modifications in menu planning, food purchasing, and food preparation were required in order to bring the average fat content close to the Dietary Guideline goal. The relationship between participation rates and the average percentage of food energy from fat in NSLP lunches suggests that taking all or most of the several steps necessary to bring total fat

⁷These estimates differ slightly from the estimates shown in Table VII.2 because of the effects of controlling for other influences on participation rates.

content in line with the Dietary Guideline goal may affect the acceptability of the lunches adversely. Participation is significantly lower in schools that have taken these dietary measures than in otherwise similar schools offering meals in which the percentage of food energy from fat is higher than 32 percent.

Second, despite the adverse consequences of offering very-low-fat meals, it may be possible to reduce the average fat content of lunches to well below the nationwide average of 38 percent of food energy *without* adversely affecting participation in the NSLP. Participation rates are similar in schools whose lunches provide a moderate percentage of food energy from fat (32 percent to 35 percent) and in those whose meals provide a high or very-high percentage of food energy from fat. This finding suggests that taking *some* of the steps necessary to meet the Dietary Guideline goal will not affect participation, but that taking all of the steps might do so.

In light of the policy importance of this finding, considerable analysis was conducted to determine whether the finding is sensitive to specific decisions made in conducting the analysis presented in Table VII.3. These sensitivity analyses are described in Appendix B. The basic finding—that a negative relationship exists between the participation rate and whether the average percentage of food energy from fat is less than 32 percent—persists even when the sample and model specification are changed. The results of these sensitivity tests suggest the negative relationship exists and is not the result of chance or of the particular model specification chosen.

Offering a play period after lunch does not affect the participation of elementary school students below the seventh grade. The availability in the cafeteria of a greater number of cash registers per student, which reduces the average waiting time, has a small, but not statistically significant, effect on participation.

Gender and age/grade are the only personal characteristics associated with participation in the NSLP. Male students are more likely than female students to participate (60 percent predicted participation rate, versus 52 percent, respectively). Although age itself is not significantly related to

participation, the predicted participation rate among students in grades 7 and higher is 11 percentage points lower than the predicted participation rate among students in grades 6 and lower. Students belonging to a racial group other than white, African American, or Hispanic are more likely than members of those groups to participate. Finally, after controlling for the effects of other factors, income level, family size, whether the student resides with his or her mother, and the mother's employment status are not significantly associated with participation in the NSLP.

Predicted participation rates differ considerably by location and region of the country. Students in urban and suburban schools are less likely than students in rural schools to select an NSLP lunch (52 percent and 55 percent, respectively, compared with 64 percent of rural students). Predicted participation rates are lower in the West (47 percent), Mid-Atlantic states (50 percent), New England (51 percent), and Midwest (53 percent) than in the Southwest (63 percent), Mountain states (63 percent), and Southeast (64 percent).

4. Parents' and Students' Perceptions About the NSLP

The study asked parents and students to give their perceptions about the NSLP. Nonparticipants were asked why they did not participate in the program.

a. Opinions About the Program and Reasons for Not Getting the School Lunch

Parents generally have favorable impressions of the NSLP. Nearly all parents feel that school lunches are convenient, economical, and nutritious, but fewer stated that their children like the lunches (Table VII.4). Nearly three-fourths "agreed strongly" with the statement, "school lunches are convenient," and more than one-half "agreed strongly" that "school lunches are economical." Slightly more than one-third "agreed strongly" with the statement, "the school lunch provides a nutritious meal," and another 51 percent "agreed somewhat" with this statement. However, only 17 percent "agreed strongly" with the statement, "children like the school lunch," and only 44 percent "agreed somewhat" with the statement.

TABLE VII.4

PARENTS' PERCEPTIONS ABOUT THE NSLP
(Percentage of Parents Agreeing with Each Statement)

Response Categories	Statement			
	The School Lunch Provides Nutritious Meals	Children Like the School Lunch	School Lunches Are Convenient	School Lunches Are Economical
Strongly Agree	34	17	73	53
Agree Somewhat	51	44	23	34
Disagree Somewhat	10	23	2	9
Disagree Strongly	4	14	1	4
Don't Know/No Opinion/Did Not Respond	1	<1	<1	1
Sample Size (Unweighted)	2,642	2,778	2,842	2,791

SOURCE: Weighted tabulations from parent questionnaires, School Nutrition Dietary Assessment study.

Parents were asked about the participation of their children in the school lunch program. Parents who reported that their children did not get the school lunch every day were asked why the children did not do so. Three-fourths of these parents gave dislike of the food on all days (17 percent) or on some days (47 percent) or their child's preference for meals from home (12 percent) as the reason (Table VII.5). Five percent gave some other reason related to food needs or preference: 4 percent stated that the child thought the food was different from the food served at home, and 1 percent cited some special food need (for example, the child has food allergies or is a vegetarian). Two percent stated that their child did not like the cafeteria, and 3 percent gave cost as the reason. The remaining 9 percent of parents stated that the school did not have a lunch program (4 percent) or gave either some other reason or no reason (5 percent).

Students who reported that they had not eaten the school lunch on the survey day were asked the reasons why they did not eat it.⁸ Most students gave reasons related to their food preferences, rather than to factors pertaining to the operation of their school's lunch program (Table VII.6). Forty-two percent stated that they do not like cafeteria food, and 26 percent stated that they ate a lunch brought from home, ate at home, or went out for lunch. Twelve percent said that they did not eat lunch or were not hungry. The remaining 20 percent gave a variety of reasons reflecting concerns about operational features of the program—too expensive (7 percent); did not know about the lunch program or believed he or she was ineligible (4 percent); had no time, wanted to play, had other things to do (3 percent); did not like eating in the cafeteria (2 percent); and other (4 percent).

b. Reasons for Not Applying for Free or Reduced-Price Meals

Parents who reported that they did not apply for free or reduced-price meals were asked the most important reason for not doing so (Table VII.7). Parents whose reported incomes made their

⁸The question was asked only of students who had already had their lunch period at the time of the interview and who had not eaten the school lunch. Because many students were interviewed in the morning before lunch, this sample is small.

TABLE VII.5

PARENTS' PERCEPTIONS ABOUT WHY THEIR CHILD DOES NOT EAT
THE SCHOOL LUNCH EVERY DAY

Response Category	Percentage Citing Category as Most Important Reason
My Child Never Likes the Food the School Serves ^a	17
My Child Does Not Like the Food Served on Certain Days ^a	47
My Child Does Not Like to Get the School Lunch Because (His/Her) Friends Do Not Get the School Lunch ^a	5
My Child Prefers to Eat a Lunch Brought from Home ^a	12
My Child Thinks the Food Is Different from the Food Served at Home ^a	4
Child Has Food-Related Special Need ^{b,c}	1
Child Does Not Like Cafeteria ^b	2
Cost ^b	3
School Does Not Have Lunch Program ^b	4
Other Reasons or No Reason Given ^b	5
Sample Size (Unweighted)	1,179

SOURCE: Weighted tabulations from parent questionnaires, School Nutrition Dietary Assessment study.

^aResponse category was provided to the respondents.

^bResponse category was developed on the basis of an open-ended response given under "other reason."

^cIncludes food allergy, picky eater, vegetarian, not enough to eat.

TABLE VII.6

REASONS WHY STUDENTS HAD NOT EATEN THE SCHOOL LUNCH
ON THE INTERVIEW DAY

Response Category	Percentage of Sample Citing Each Reason
Does Not Like the Food	42
Ate at Home or from Home or Went Out to Lunch	26
Does Not Eat Lunch, Not Hungry	12
Too Expensive	7
Did Not Know About Program, Believed Was Ineligible	4
No Time, Wanted to Play, Other Things	3
Does Not Like Cafeteria	2
Other	4
Sample Size (Unweighted)	204

SOURCE: Weighted tabulations of data from interviews with students in grades 3 through 12, School Nutrition Dietary Assessment study.

NOTE: Only students who had already had their lunch period on the day of their Dietary Intake Interview and who stated that they did not get the school lunch were included in the sample.

TABLE VII.7

PARENTS' REASONS FOR NOT APPLYING FOR FREE
OR REDUCED-PRICE SCHOOL MEALS

Reason	Eligible for Free or Reduced-Price Meals Based on Reported Family Income and Household Size	Not Eligible for Free or Reduced-Price Meals Based on Reported Family Income and Household Size	Eligibility Status Unknown	Total
Eligibility				
Believed Were Ineligible	55	80	71	75
Food Preferences				
Preferred Meals from Home	5	3	8	4
Poor Food Quality	4	1	1	2
Total	9	4	9	5
Administrative				
Never Received Application	5	<1	1	1
Not Aware of Free Meals	3	2	2	2
Application Too Difficult	2	<1	0	<1
Total	10	2	3	4
Pride/Stigma				
Did Not Want to Apply	1	<1	2	1
Prefer to Pay Full Price	11	7	8	8
Stigma/Pride	4	<1	1	1
Don't Need Free Meals	4	2	3	3
Total	20	10	14	12
Other Type of Reason				
Program Not Available	5	3	3	3
Other	<1	1	1	1
Total	5	4	4	4
Sample Size (Unweighted)	336	1,480	169	1,985

SOURCE: Weighted tabulations from parent questionnaires, School Nutrition Dietary Assessment study.

NOTE: The sample is restricted to respondents who stated that they did not apply for free or reduced-price meals.

children eligible for free or reduced-price meals comprised about 17 percent of the total sample that gave reasons for not applying. The responses of this group are especially important to policy makers (first column in Table VII.7). Fifty-five percent of eligible respondents stated that they were ineligible or believed themselves ineligible for free or reduced-price meals.⁹ Of the remaining eligible respondents, 9 percent cited food preferences, and 10 percent cited an administrative reason (never received an application, not aware of the program, or application was too difficult). Twenty percent cited a reason suggesting that pride, concern about stigma, or a simple preference not to receive a subsidy was their reason for not applying. Finally, about 5 percent stated that the program was not available or gave some other reason for not applying.

C. PARTICIPATION IN THE SCHOOL BREAKFAST PROGRAM

1. Sources of Breakfast

"Breakfast" was defined in this analysis to include all foods eaten from the time that a student awakens in the morning until 45 minutes after the start of school, provided that the total food energy intake from those foods is at least 50 calories. This minimum ensures that a cup of coffee or tea is not counted as "breakfast." All foods consumed during this period are counted as breakfast, rather than only foods at a meal identified by the student as "breakfast," in order to avoid the possibility that students' differing perceptions of what constitutes breakfast could affect the analysis.

SBP participants are defined as students who obtain from the school cafeteria foods that include at least two items contributing toward the SBP meal-pattern requirement.¹⁰ The source of meals

⁹As noted previously, responses to the income question on the survey of parents appear to understate income somewhat. For this group, which appears to be eligible, but whose members stated that they were not eligible, or that they believed themselves to be ineligible, it is impossible to determine whether the parents' perceptions or the survey data more accurately estimate eligibility.

¹⁰Students who eat breakfast at OVS schools are not differentiated from those at non-OVS schools. Although USDA rules indicate that students must select three items that contribute toward the SBP meal-pattern requirement at OVS schools, and four items at non-OVS schools, the available data did not allow an accurate application of the rules. For example, situations in which a single item (for example, french toast) contributed only one meal component could not be distinguished from
(continued...)

of students who did not obtain an SBP breakfast was classified according to the source providing the greatest amount of total food energy consumed at breakfast.

Table VII.8 shows the sources of breakfast of all students nationwide and of students attending schools that offer an SBP breakfast. Nationwide, 10 percent of students overall select an SBP breakfast, and 80 percent select a non-SBP breakfast. The majority of non-SBP breakfasts are breakfasts eaten at home (69 percent). Seven percent are obtained at school, and 5 percent are eaten at a restaurant or come from some other source. Eleven percent of students do not eat breakfast. At schools offering the SBP, 19 percent of students eat an SBP breakfast, 70 percent eat a non-SBP breakfast, and 12 percent eat no breakfast.

2. SBP Participation, by Income and Meal-Price Eligibility Status

Overall, approximately one-half of students nationwide attend schools that participate in the SBP. Schools participating in the SBP have a higher percentage of students who are eligible for free or reduced-price meals (family income of 185 percent of the poverty level or less) than do all schools participating in the NSLP (54 percent versus 44 percent, respectively—see Table VII.9 for the percentage eligible in SBP schools, and Table VII.2 for the percentage eligible in all NSLP schools). In addition, 36 percent of students attending schools offering the SBP are certified to receive free meals, and 6 percent are certified to receive reduced-price meals (both figures are higher than the corresponding figures for NSLP schools). Thus, the SBP is more prevalent in schools that serve a larger proportion of low-income students than the national average. It is also noteworthy that 11 percent of students attending SBP schools are from families whose incomes are less than 185 percent of the poverty level, but the students are not certified for free or reduced-price meals.

¹⁰(...continued)

situations in which, due to the quantity of bread and/or eggs in the recipe, it contributed two components. Nor could the analysis determine when a single bread item actually constituted two servings of bread.

TABLE VII.8
SOURCES OF BREAKFAST
 (Percentage of Students)

Sources of Breakfast	All Students	Students at Schools Offering SBP
SBP Breakfast	10	19
Non-SBP Breakfast	80	70
Meal Eaten at School	7	6
Meal Eaten at Home	69	59
Meal Eaten at Restaurant/Other	5	5
No Breakfast Eaten	11	12
Sample Size (Unweighted)	3,344	1,730

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

NOTE: The sample of "All Students" includes students at schools offering the SBP and students at schools not offering the SBP. The sample of "Students at Schools Offering the SBP" is limited to students at schools offering the SBP.

As shown in Table VII.9, the SBP participation rate is highest among students who are *certified* for free meals. Forty percent of students who attend a school that offers SBP and who are certified for free meals obtain an SBP breakfast on a typical school day; 18 percent of students who are certified for reduced-price meals select the breakfast. Interestingly, 9 percent of students who are not certified for free or reduced-price meals, but who come from low-income families, apparently pay full price to obtain an SBP breakfast. Overall, 31 percent of students from families with incomes below 185 percent of the poverty level obtain an SBP breakfast on a typical school day.

As the second column of the table shows, only 4 percent of children who attend schools offering SBP and who come from families with incomes above 185 percent of the poverty level participate in the SBP on a typical school day. Interestingly, of those who pay full price, participation is higher among low-income students than among non-low-income students, although this difference is not statistically significant. Indeed, about 90 percent of SBP breakfasts are consumed by low-income students.¹¹

3. Factors Affecting Breakfast Eating and Participation in the SBP

The SBP may affect the nutrient intake of students in two ways. First, it potentially could increase the likelihood that a student will eat breakfast. As an increasing number of parents work, fewer parents have time to prepare breakfast at home. The SBP offers an alternative that may allow some students to eat breakfast who would not have done so otherwise. Second, the SBP potentially could increase the nutrient intake of students who eat breakfast, by providing more food, a more

¹¹Thirty percent of all students at schools offering the SBP are from families with incomes above 185 percent of the poverty level. The participation rate of this group is 4 percent. Thus, 1.5 percent of all students at schools offering SBP meals are not low-income students and eat the school breakfast. Overall, 18.5 percent of the population gets the SBP meal. Thus, it follows that 8 percent (1.5/18.5) of those eating school meals are not low-income students. If students whose family incomes are unknown are included in the non-low-income group, the percentage of SBP meals consumed by non-low-income students is increased to 11 percent.

TABLE VII.9

SBP PARTICIPATION RATES, BY FAMILY INCOME AND
MEAL-PRICE CERTIFICATION STATUS

Family Income and Meal-Price Certification	Percentage of All Students in Each Family Income and Meal-Price Certification Group	Participation Rate of Students in Each Family Income and Meal-Price Certification Group
Family Income 185 Percent of Poverty Level or Less		
Certified for Free Meal	36	40
Certified for Reduced-Price Meal	6	18
Pay Full Price	11	9
Certification Unknown	1	-- ^a
Total	54	31
Family Income More than 185 Percent of Poverty Level		
Pay Full Price	37	4
Family Income Unknown		
Pay Full Price	9	4
Certification Unknown	<1	-- ^a
Total	10	5
Sample Size (Unweighted)	1,730	--

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

NOTE: The estimation sample is limited to students at schools offering the SBP.

^aFigures are not presented because sample sizes are too small to support reliable estimates.

balanced meal, or both. This section analyzes the factors that affect whether students eat breakfast, and, given that they do so, whether they select an SBP breakfast or a non-SBP breakfast.¹²

a. Breakfast Eating

The data indicate that availability of the SBP does not affect whether a student eats breakfast. The predicted percentage of students who eat breakfast is virtually the same regardless of whether a school offers the SBP (87 percent), even after the potentially confounding effects of the other characteristics of students at SBP schools, such as income, are taken into account (Table VII.10). The finding was confirmed when the sample was restricted to students from low-income households (tabulations not shown).

The probability of eating breakfast is related to three key student characteristics. First, older students are less likely than younger students to eat breakfast. After controlling for other characteristics, 94 percent of 6- to 10-year-old students are predicted to eat breakfast, compared with 87 percent of 11- to 14-year-old students, and with 77 percent of 15- to 18-year-old students. Second, female students are less likely than male students to eat breakfast (86 percent versus 89 percent). Third, low-income students (those who are eligible on the basis of family income for free or reduced-price meals) are less likely than non-low-income students to eat breakfast (85 percent versus 88 percent). Location (urban, suburban, rural) and region of the country do not influence the probability of eating breakfast.

b. Factors Affecting Student Selection of an SBP Breakfast

As shown in Table VII.11, the main program-related variable that affects whether a student selects an SBP breakfast is meal-price certification status. Twenty-seven percent of students who are certified to receive free meals are predicted to participate in the SBP, compared with 11 percent of

¹²The analytical approach to these two issues is the same as that used to analyze the factors affecting participation in the NSLP. Appendix B provides details of this approach.

TABLE VII.10

PREDICTED RATES OF EATING BREAKFAST UNDER ALTERNATIVE ASSUMPTIONS
ABOUT STUDENT AND PROGRAM CHARACTERISTICS

Base Assumption	Alternative Assumption	Predicted Rate of Eating Breakfast Under Base Assumption	Predicted Rate of Eating Breakfast Under Alternative Assumption	Difference
Student Characteristics Equal to Sample Means	-	87 %	- %	-
Key Programmatic Variables				
School Does Not Offer SBP	School Offers SBP	87	87	0
School Does Not Offer SBP	School Offers Other Breakfast Program	87	88	1
Personal and Family Characteristics				
Age-6-10 Years	Age-11-14 Years	94	87	-7 *
Age-6-10 Years	Age-15-18 Years	94	77	-17 *
Male	Female	89	86	-3 *
White	African American	87	87	0
White	Hispanic	87	86	-1
White	Other Race	87	88	1
Family Income too High to Qualify for Free or Reduced-Price Meals	Family Income Low Enough to Qualify for Free or Reduced-Price Meals	88	85	-3 *
Mother Not in Household	Mother in Household	85	87	2
Mother Not Employed	Mother Employed	89	86	-3
Family Size-1-2	Family Size-3-4	89	87	-2
Family Size-1-2	Family Size-5-7	89	87	-2
Family Size-1-2	Family Size-More than 7	89	91	2
Location and Region				
Rural	Urban	87	87	0
Rural	Suburban	87	88	1
New England	Mid-Atlantic	86	88	2
New England	Southeast	86	89	3
New England	Midwest	86	87	1
New England	Southwest	86	87	1
New England	Mountain	86	88	2
New England	West	86	88	2

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

NOTE: The estimation sample includes students at all schools. Probit analysis was used to estimate the model. Predicted rates of eating breakfast are calculated by (1) computing for each student the predicted probability of eating breakfast under the base assumption and under the alternative assumption, and (2) averaging these predicted probabilities across students.

*/** indicates the difference is statistically significant at the 95/99 percent confidence level with a two-tailed test.

TABLE VII.11

PREDICTED SBP PARTICIPATION RATES UNDER ALTERNATIVE ASSUMPTIONS
ABOUT STUDENT AND PROGRAM CHARACTERISTICS

Base Assumption	Alternative Assumption	Predicted Participation Rate Under Base Assumption	Predicted Participation Rate Under Alternative Assumption	Difference
Student and Program Characteristics Equal to Sample Means				
	--	19 %	-- %	--
Key Programmatic Variables				
Student Not Certified	Student Certified for Reduced-Price Meals	11	10	-1
Student Not Certified	Student Certified for Free Meals	11	27	16 *
School Does Not Offer OVS	School Offers OVS	19	19	0
Price = \$0.60; Student Not Certified	Price = \$0.40; Student Not Certified	11	14	4
Price = \$0.60; Student Not Certified	Price = \$0.80; Student Not Certified	11	8	-3
Alternatives to SBP Breakfast				
School Does Not Serve a la Carte Items for Breakfast	School Serves a la Carte Items for Breakfast	19	20	1
School Does Not Have Vending Machines or Store	School Has Vending Machines or Store	20	16	-4
Characteristics of SBP Meal				
Average Fat Content Less than 25 percent	Average Fat Content 25-30 percent	20	18	-2
Less than 25 percent	31-35 percent	20	23	3
Less than 25 percent	More than 35 percent	20	16	-4
Breakfast Does Not Include Meat	Breakfast Includes Meat	17	20	3
Personal and Family Characteristics				
Age-6-10 Years	Age-11-14 Years	25	14	-11
Age-6-10 Years	Age-15-18 Years	25	10	-15 *
Male	Female	21	17	-4 *
White	African American	15	28	13 *
White	Hispanic	15	21	5
White	Other Race	15	19	4

TABLE VII.11 (continued)

Base Assumption	Alternative Assumption	Predicted Participation Rate Under Base Assumption	Predicted Participation Rate Under Alternative Assumption	Difference
Family Income Too High to Qualify for Free or Reduced-Price Meals	Family Income Low Enough to Qualify for Free or Reduced-Price Meals	11 %	22 %	11 *
Mother Not in Household	Mother in Household	21	19	-2
Mother Not Employed	Mother Employed	20	18	-2
Family Size--1-2	Family Size--3-4	23	18	-5
Family Size--1-2	Family Size--5-7	23	19	-4
Family Size--1-2	Family Size--More than 7	23	20	-3
Location and Region				
Rural	Urban	26	16	-10 *
Rural	Suburban	26	18	-8 *
New England	Mid-Atlantic	16	14	-2
New England	Southeast	16	23	7
New England	Midwest	16	15	-1
New England	Southwest	16	18	2
New England	Mountain	16	22	6
New England	West	16	17	1

SOURCE: Weighted tabulations of data collected from dietary intake interviews with students, School Nutrition Dietary Assessment study.

NOTE: Probit analysis was used to estimate the model. Estimates are based on the subsample of students attending schools that offer the SBP. Predicted rates of participation in SBP are calculated by (1) computing for each student the predicted probability of SBP participation under the base assumption and under the alternative assumption, and (2) averaging these predicted probabilities across students. Table entries show the effect of changing from the "base assumption" to the "alternative assumption" while holding constant all the other characteristics that might vary across the two groups. Because the predicted participation controls for variation in other characteristics, a group's predicted participation rate may differ from the same group's actual participation rate.

OVS = offer versus serve.

*/** indicates the difference is statistically significant at the 95/99 percent confidence level with a two-tailed test.

students paying full price. This 16 percentage point difference is statistically significant. However, certification for reduced-price meals has no effect on the predicted SBP participation rate. For students who pay full price, the price of breakfast is negatively related to SBP participation, as one would expect; 14 percent of those who pay \$0.40 for breakfast are predicted to select an SBP breakfast, compared with 11 percent of those who pay \$0.60, and with 8 percent of those who pay \$0.80.¹³

The availability of alternative sources of breakfast in school, such as a la carte service and vending machines, does not affect SBP participation.

The meal characteristics examined do not affect SBP participation. Students who are offered a high-fat breakfast (more than 35 percent of food energy from fat) are somewhat less likely to participate in the SBP, and those who are offered meat are somewhat more likely to participate; however, neither of these effects is statistically significant.

Several personal and family characteristics affect SBP participation. As with the probability of eating breakfast, the probability of SBP participation is higher among younger students than older students, and higher among male students than female students. Twenty-five percent of 6- to 10-year-old students are predicted to select an SBP breakfast, compared with only 10 percent of 15- to 18-year old students. African American students are substantially more likely than white, non-Hispanic students to eat an SBP breakfast. After income, family status, and location are controlled for, the predicted SBP participation rate of African American students is a statistically significant 13 percentage points higher than the rate of white, non-Hispanic students.

Students whose family incomes make them eligible for free or reduced-price meals are more likely than higher-income students to select an SBP breakfast—22 percent, compared with 11 percent of higher-income students. This finding is surprising, given that certification status is controlled for, and that certification for a free breakfast itself has a large, positive effect on participation. The

¹³The effects of price are statistically significant at the 90 percent confidence level, but not at the 95 percent confidence level.

finding indicates that, even among students who must pay full price for breakfast, students from low-income families are more likely than those from families with higher incomes to select an SBP breakfast.

SBP participation does not vary greatly by the region of the country. In contrast to the findings for the NSLP, regional differences in SBP participation are relatively small and are not statistically significant. However, participation rates in urban and suburban locations are a statistically significant 8 to 10 percentage points lower than those in rural areas (after the effects of other factors are controlled for).

VIII. DIETARY INTAKES OF NATIONAL SCHOOL LUNCH PROGRAM AND SCHOOL BREAKFAST PROGRAM PARTICIPANTS

This chapter presents data on the dietary intakes of students who participate in the National School Lunch Program (NSLP) and School Breakfast Program (SBP).¹ The data answer the following questions:

- What nutrients are consumed by students who eat NSLP lunches and SBP breakfasts? How do nutrients consumed compare with program targets of one-third of the Recommended Dietary Allowances (RDA) for lunch and one-fourth of the RDA for breakfast? How do they compare with guidelines derived from recommendations in the *Dietary Guidelines for Americans* and recommendations by the National Research Council (NRC)?
- What are average intakes of program participants over 24 hours, and how do 24-hour intakes compare with targets and goals? Do these intakes differ by age and gender or by income groups?
- How much food is wasted at lunch? Does use of offer versus serve (OVS) at schools below the secondary level affect the nutrient content of the NSLP lunches as consumed?

The next section summarizes the findings on these questions. The sections that follow present details on the intakes of NSLP and SBP participants, respectively.

A. SUMMARY OF FINDINGS ON NUTRIENT INTAKES

1. Lunch Intakes of NSLP Participants

NSLP participants' mean intakes at lunch of most nutrients are at least one-third of the RDA. NSLP participants also consume more than the Dietary Guideline goals for fat and saturated fat, and more than one-third of the NRC's daily recommendation for sodium. Their lunch intake of cholesterol is just one-third of the NRC's daily recommendation for cholesterol. In general, the

¹The intakes of participants and nonparticipants are compared in the companion report, "The School Nutrition Dietary Assessment Study: Dietary Intakes of Program Participants and Nonparticipants" (Devaney et al. 1993).

patterns of NSLP participants' mean dietary intakes at lunch are similar across age and gender groups, as well as across income groups.

2. 24-Hour Intakes of NSLP Participants

NSLP participants' mean intakes over 24 hours of food energy, protein, and all vitamins and minerals are greater than the RDA. Average 24-hour intakes of fat, saturated fat, and sodium exceed the Dietary Guideline goals and NRC recommendations, although, proportionately, they are lower than lunch intakes. As with lunch intakes, 24-hour intakes of NSLP participants follow similar patterns in all age and gender groups, and in all income groups.

3. Waste and the Effect of OVS on Lunch Intakes

Overall, NSLP participants waste approximately 12 percent of the food energy that they are served. Waste of individual nutrients ranges from 10 percent to 15 percent. Younger students and adolescent females waste more food than do older students and adolescent males, respectively.

The use of OVS does not affect the average nutrient content of the NSLP lunch as consumed. Although students at OVS schools are less likely than students of similar age at non-OVS schools to select milk, they also waste less food. The overall nutrient intakes at lunch of students at OVS and non-OVS schools do not differ.

4. Breakfast Intakes of SBP Participants

SBP participants' mean intakes at breakfast exceed one-fourth of the RDA for nearly all nutrients. Their mean percentage of food energy from fat is just slightly higher than the Dietary Guideline goal. However, their breakfast intake of saturated fat exceeds the Dietary Guideline goal, and their intakes of cholesterol and sodium exceed one-fourth of the NRC daily recommendation for these dietary components.

5. 24-Hour Intakes of SBP Participants

SBP participants' mean intakes over 24 hours exceed the RDA for nearly all nutrients. The mean percentages of their food energy from fat and saturated fat over 24 hours exceed the Dietary Guideline goals, and their mean intakes of cholesterol and sodium exceed NRC recommendations.

B. INTAKES OF NSLP PARTICIPANTS

This section presents data on NSLP participants' intakes at lunch and over 24 hours. Subsection B.3 describes plate waste and the effects of OVS.

1. Lunch Intakes

As described in Chapter VII, NSLP participants were identified as those students who reported obtaining foods from their school cafeteria and reported selecting foods that contributed to at least three of the five required meal-pattern components. NSLP participants may have consumed foods and beverages during their lunch period that were not part of the NSLP lunch--for example, ice cream purchased a la carte or soda obtained from a vending machine. NSLP participants' lunch intakes presented in this section include the nutrients and other dietary components obtained from *all* foods and beverages consumed during the lunch period at the student's school; the estimates are not restricted to items in the NSLP lunch.

NSLP participants' mean intake of all nutrients is at least one-third of the daily RDA. Table VIII.1 shows mean intakes of each nutrient, by all NSLP participants, and by each age/gender group. For all NSLP participants, the mean intakes of food energy, vitamin A, vitamin B6, iron, and zinc are approximately one-third of the RDA. The mean intake of protein is nearly the total RDA, and the intake of vitamin B12 is more than 100 percent of the RDA. Participants' mean intakes at lunch of all other nutrients considered--vitamin C, thiamin, riboflavin, niacin, folate, calcium, phosphorus, and magnesium--are between 40 percent and 60 percent of the RDA.

TABLE VIII.1

DIETARY INTAKES AT LUNCH OF NSLP PARTICIPANTS, BY AGE AND GENDER

Dietary Component	Target at Lunch	6- to 10-Year-Old Students	11- to 14-Year-Old Students		15- to 18-Year-Old Students		All NSLP Participants
			Female	Male	Female	Male	
Macronutrients							
Food Energy (Percentage of the RDA)	33	34	31	34	40	35	34
Protein (Percentage of the RDA)	33	101	58	78	77	69	86
Percentage of Food Energy from:							
Fat	No more than 30 percent	36	37	39	38	38	37
Saturated fat	Less than 10 percent	14	14	15	14	14	14
Carbohydrate	More than 55 percent	48	48	46	48	48	48
Vitamins (Percentage of the RDA)							
Vitamin A	33	37	30	29	30	30	33
Vitamin C	33	59	39	55	89	74	60
Thiamin	33	47	41	45	57	47	47
Riboflavin	33	58	50	55	58	52	55
Niacin	33	49	41	47	53	46	48
Vitamin B6	33	33	32	34	40	36	34
Folate	33	66	40	50	42	46	56
Vitamin B12	33	126	72	104	85	111	110
Minerals (Percentage of the RDA)							
Calcium	33	49	33	40	33	46	43
Iron	33	38	24	39	32	47	37
Phosphorus	33	59	40	50	45	57	54
Magnesium	33	52	29	38	31	30	43
Zinc	33	38	29	32	38	36	35
Other Dietary Components (Intake)							
Cholesterol (mg)	No more than 100 mg	78	71	95	100	104	85
Sodium (mg)	No more than 800 mg	1,313	1,310	1,668	1,822	2,119	1,501
Sample Size (Unweighted)	--	846	246	327	138	187	1,744

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

mg = milligrams.

Most age and gender groups consume mean energy of approximately one-third of the daily RDA. Female NSLP participants 11 to 14 years old consume mean energy at lunch of 31 percent of the RDA.² The mean lunch energy intake of 15- to 18-year-old female participants is 40 percent of the RDA.³ Mean lunch intakes of protein by all age and gender groups exceed one-half of the RDA.

Some subgroups consume slightly less than one-third of the daily RDA of some vitamins and minerals. Female participants 11 to 14 years old have low mean intakes of iron (24 percent of the RDA), magnesium (29 percent), and zinc (29 percent). The mean intake of this age/gender group is somewhat less than one-third of the RDA for vitamin A (30 percent), and for vitamin B6 (32 percent). In fact, for most nutrients, female NSLP participants 11 to 14 years old have lower intakes relative to the RDA than do students in other age groups. The pattern of low intakes of adolescent females relative to their RDA is similar to the patterns observed in other studies of children.

For the other age and gender groups, only the mean intakes of vitamin A and magnesium are substantially less than one-third of the daily RDA. Indeed, all groups, except children 6- to 10-years old, have mean intakes of vitamin A of approximately 30 percent. In addition, mean intakes of magnesium are less than one-third of the RDA for female and male students 15- to 18-years old (31 percent and 30 percent, respectively).

NSLP participants' mean lunch intakes of fat, saturated fat, and sodium exceed the Dietary Guidelines goals and the NRC recommendations. NSLP lunches provide an average of 37 percent of food energy from fat, compared with the Dietary Guideline goal of 30 percent or less. Saturated fat provides an average of 14 percent of the food energy of NSLP lunches, compared with the Dietary Guideline goal of less than 10 percent. The mean intake of sodium is 1,500 mg, which is 63 percent of the maximum recommended by the NRC, and nearly twice the reference standard for lunch. The mean percentage of food energy from carbohydrate is 48 percent (the NRC

²The 95 percent confidence interval is 29 percent to 33 percent.

³Because the sample for this subgroup was very small, this estimate has a 95 percent confidence interval of 30 percent to 50 percent.

recommendation is more than 55 percent). The mean cholesterol intake of 85 mg is significantly less than the reference standard of 100 mg, (The NRC recommends that daily cholesterol intake not exceed 300 mg.)

NSLP lunches *as offered* and *as consumed* are very similar in average fat and sodium content. Fat provides 38 percent of the energy in lunches as offered, compared with 37 percent in lunches as consumed. Lunches offered and consumed both provide 1,500 mg of sodium. This finding, which indicates that students' food choices closely reflect foods offered, was not necessarily expected, given the wide variety of lunch choices available in most schools.

The patterns of fat and carbohydrate intake by all age and gender groups are very similar, although adolescents consume a slightly larger percentage of food energy from total fat than do 6- to 10-year-old students. Because age-specific targets for sodium and cholesterol have not been developed, these components are expressed in their natural units. The intake of sodium and cholesterol increases with age.

The mean lunch intakes of NSLP participants from different income levels are very similar. A goal of the NSLP is to make a nutritious lunch available to all students, regardless of their ability to pay. Thus, one would expect the pattern of nutrient intakes to be similar for students at different income levels (Table VIII.2). One interesting exception, however, is that the percentage of food energy from fat is lowest for students whose family incomes are below the poverty level (36 percent), and are highest for students whose family incomes exceed 185 percent of the poverty level (38 percent). This difference across the income groups is statistically significant. All other differences in mean intakes across the income groups are small and not statistically significant.

2. 24-Hour Intakes

Over 24 hours, NSLP participants' mean intakes of food energy, protein, and all vitamins and minerals exceed the daily RDA. The mean 24-hour intake of food energy is 115 percent of the RDA (Table VIII.3). Thus, although NSLP participants consume approximately one-third of the RDA at

TABLE VIII.2

DIETARY INTAKES AT LUNCH OF NSLP PARTICIPANTS, BY POVERTY STATUS OF FAMILY

Dietary Component	Target at Lunch	Family Income			All NSLP Participants
		Below Poverty Level	100 to 185 Percent of Poverty Level	More than 185 Percent of Poverty Level	
Macronutrients					
Food Energy (Percentage of the RDA)	33	33	34	35	34
Protein (Percentage of the RDA)	33	88	88	85	86
Percentage of Food Energy from:					
Fat	No more than 30 percent	36	37	38	37
Saturated fat	Less than 10 percent	14	15	14	14
Carbohydrate	More than 55 percent	49	48	47	48
Vitamins (Percentage of the RDA)					
Vitamin A	33	35	31	34	33
Vitamin C	33	59	62	59	60
Thiamin	33	46	47	47	47
Riboflavin	33	56	55	55	55
Niacin	33	46	47	49	48
Vitamin B6	33	33	34	35	34
Folate	33	59	55	55	56
Vitamin B12	33	115	113	107	110
Minerals (Percentage of the RDA)					
Calcium	33	45	43	43	43
Iron	33	36	37	38	37
Phosphorus	33	54	54	54	54
Magnesium	33	44	44	42	43
Zinc	33	35	37	35	35
Other Dietary Components (Intake)					
Cholesterol (mg)	No more than 100 mg	78	84	88	85
Sodium (mg)	No more than 800 mg	1,417	1,492	1,561	1,501
Sample Size (Unweighted)	--	459	282	782	1,744

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

NOTE: Students for whom data on family income are missing are omitted from the income subgroup tabulations, but are included in the tabulations for all NSLP participants.

mg = milligrams.

TABLE VIII.3

DIETARY INTAKES OF NSLP PARTICIPANTS, AT LUNCH AND OVER 24 HOURS

Dietary Component	Target at Lunch	Target Over 24 Hours	NSLP Participants: Intake	
			At Lunch	Over 24 Hours
Macronutrients				
Food Energy (Percentage of the RDA)	33	100	34	115
Protein (Percentage of the RDA)	33	100	86	268
Percentage of Food Energy from:				
Fat	≤ 30 percent	≤ 30 percent	37	35
Saturated fat	< 10 percent	< 10 percent	14	13
Carbohydrate	> 55 percent	> 55 percent	48	51
Vitamins (Percentage of the RDA)				
Vitamin A	33	100	33	134
Vitamin C	33	100	60	274
Thiamin	33	100	47	182
Riboflavin	33	100	55	195
Niacin	33	100	48	170
Vitamin B6	33	100	34	136
Folate	33	100	56	251
Vitamin B12	33	100	110	371
Minerals (Percentage of the RDA)				
Calcium	33	100	43	126
Iron	33	100	37	148
Phosphorus	33	100	54	168
Magnesium	33	100	43	142
Zinc	33	100	35	117
Other Dietary Components (Intake)				
Cholesterol (mg)	≤ 100 mg	≤ 300 mg	85	317
Sodium (mg)	≤ 800 mg	≤ 2,400 mg	1,501	4,819
Sample Size (Unweighted)	—	—	1,744	1,744

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

mg = milligrams.

lunch, as intended, they consume more than two-thirds of the RDA at other eating occasions during the day.

Participants' mean intakes of fat and protein over 24 hours exceed the Dietary Guideline goals and NRC recommendations. They receive 35 percent of food energy from fat and 13 percent from saturated fat, compared with the Dietary Guideline goals of 30 percent or less and less than 10 percent, respectively. Because the percentage of food energy from fat obtained over 24 hours is less than the percentage obtained at lunch (35 percent versus 37 percent), NSLP participants consume proportionately less fat at other meals than they do at lunch. Similarly, the percentage of energy from saturated fat is lower over 24 hours than at lunch (13 percent versus 14 percent). Finally, the mean 24-hour intake of protein exceeds twice the RDA by a considerable margin.

NSLP participants' 24-hour intakes of all vitamins and minerals are well above the RDA. Given that the RDA are set in a manner whereby even intakes well below the RDA may be sufficient for many individuals, these data suggest that, as a group, NSLP participants receive adequate amounts of key vitamins and minerals.

Data on the percentage of NSLP participants who consume at least one-third of the RDA at lunch and the percentage who consume the full RDA over 24 hours provide additional perspective on participants' dietary intakes (Table VIII.4). Consistent with the data on mean intakes at lunch, one-half or more of NSLP participants consume at least one-third of the RDA for all nutrients, except vitamin A (33 percent of participants), vitamin B6 (40 percent of participants), and zinc (39 percent of participants). In addition, just 42 percent of NSLP participants consume at least one-third of the RDA for food energy at lunch. For food energy and each nutrient, somewhat larger percentages of NSLP participants consume at least the RDA over 24 hours than consume at least one-third of the RDA at lunch.

Also consistent with the data on mean intakes at lunch and over 24 hours, the percentages of students meeting Dietary Guideline goals for fat and NRC recommendations for sodium and

TABLE VIII.4
 PERCENTAGE OF NSLP PARTICIPANTS MEETING DIETARY TARGETS,
 AT LUNCH AND OVER 24 HOURS

Dietary Component	Target at Lunch	Target Over 24 Hours	NSLP Participants: Percentage Meeting Dietary Target	
			At Lunch	Over 24 Hours
Macronutrients				
Food Energy	1/3 of the RDA	RDA	42	58
Protein	1/3 of the RDA	RDA	92	96
Percentage of Food Energy from:				
Fat	≤ 30 percent	≤ 30 percent	21	22
Saturated fat	<10 percent	<10 percent	14	16
Carbohydrate	>55 percent	>55 percent	26	32
Vitamins				
Vitamin A	1/3 of the RDA	RDA	33	50
Vitamin C	1/3 of the RDA	RDA	50	78
Thiamin	1/3 of the RDA	RDA	64	86
Riboflavin	1/3 of the RDA	RDA	84	90
Niacin	1/3 of the RDA	RDA	60	80
Vitamin B6	1/3 of the RDA	RDA	40	64
Folate	1/3 of the RDA	RDA	69	88
Vitamin B12	1/3 of the RDA	RDA	90	94
Minerals				
Calcium	1/3 of the RDA	RDA	64	60
Iron	1/3 of the RDA	RDA	47	69
Phosphorus	1/3 of the RDA	RDA	78	84
Magnesium	1/3 of the RDA	RDA	58	68
Zinc	1/3 of the RDA	RDA	39	50
Other Dietary Components				
Cholesterol (mg)	≤ 100 mg	≤ 300 mg	73	60
Sodium (mg)	≤ 800 mg	≤ 2,400 mg	21	10
Sample Size (Unweighted)	--	--	1,744	1,744

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

mg = milligrams.

carbohydrate are relatively small. Just over one-fifth of participants meet the Dietary Guideline goal for percentage of food energy from total fat, and less than one-fifth meet the Dietary Guideline goal for saturated fat. Similarly, just over one-fourth of NSLP participants obtain more than 55 percent of food energy from carbohydrate at lunch, and just less than one-third do so over 24 hours. Just one-fifth of participants consume one-third or less of the NRC daily recommended amount of sodium at lunch, whereas only 10 percent consume the daily amount or less over 24 hours. Finally, nearly three-fourths of participants meet the reference standard for lunch intake of cholesterol, and 60 percent consume an amount over 24 hours that meets the NRC recommendation for cholesterol.

The findings that, on average, NSLP participants consume more than 100 percent of the RDA for food energy, and that more than one-half consume at least the RDA, are surprising. Because the RDA for food energy is set in accordance with the *average* energy needs of the population, one would expect the average energy intake of NSLP participants to be approximately 100 percent of the RDA.

These findings have several possible explanations or interpretations. First, measurements from the dietary intake interviews of students' intakes may have contained errors. Thus, mean intakes are reported as high because the data overestimate true intakes. Second, the average energy needs of NSLP participants may be higher than those of students who elect not to eat the NSLP lunch. Because the NSLP is a relatively inexpensive source of a considerable amount of food, the program may attract students who are not fussy about what they eat, and who tend to consume more food than do nonparticipants. A third possibility is that mean intakes actually do exceed the RDA, but that participants have average energy needs. If so, the RDA for energy may be set relatively low, or some participants may be consuming more food energy than needed, with the associated increase in the risk of overconsumption.

The basic patterns of 24-hour intakes observed for all NSLP participants also hold for all age and gender groups and all income groups. Adolescent females' 24-hour intakes of most nutrients are

lower relative to their RDA than are the intakes of younger children and adolescent males (Table VIII.5). Although adolescent females' mean 24-hour intakes of calcium are less than the RDA (93 percent for the 11- to 14-year-olds and 87 percent for the 15- to 18-year-olds), the mean lunch intakes are 33 percent of the RDA (for each group). Thus, the slight shortfall over the 24-hour period occurred even though the lunch target was met.

Finally, NSLP participants with family incomes below the poverty level, between 100 percent and 185 percent of the poverty level, and more than 185 percent of the poverty level all have very similar 24-hour intakes of food energy and of all other nutrients (Table VIII.6). Although students whose family incomes are less than 185 percent of the poverty level have slightly lower mean intakes of food energy than do students from families whose incomes exceed 185 percent of the poverty level, the difference is not statistically significant.

3. Waste and OVS

Concerns about plate waste prompted the introduction of OVS into the NSLP more than a decade ago. Under OVS, schools must offer all five of the items required by the NSLP meal pattern and may receive reimbursement for the meal from the U.S. Department of Agriculture, even though students may decline one or two of the five items.⁴ In a school that does not use OVS, a student is required to take all five items in order for the meal to qualify for federal reimbursement. OVS is required in all secondary schools. It is optional in schools below the secondary level, at the discretion of local officials. According to the data, 71 percent of elementary schools and 90 percent of middle schools currently use OVS. Schools that do not offer OVS may be concerned that the nutritional quality of the meal as consumed could be compromised if children are allowed to refuse two items.

⁴Schools are required to charge the same price to all students in a given meal-price eligibility category, regardless of the number of components selected.

TABLE VIII.5

24-HOUR DIETARY INTAKES OF NSLP PARTICIPANTS, BY AGE AND GENDER

Dietary Component	Target Over 24 Hours	6- to 10-Year-Old Students	11- to 14-Year-Old Students		15- to 18-Year-Old Students		All NSLP Participants
			Female	Male	Female	Male	
Macronutrients							
Food Energy (Percentage of the RDA)	100	113	108	121	116	117	115
Protein (Percentage of the RDA)	100	311	185	260	210	226	268
Percentage of Food Energy from:							
Fat	No more than 30 percent	35	35	36	35	35	35
Saturated fat	Less than 10 percent	13	13	13	13	13	13
Carbohydrate	More than 55 percent	51	52	50	51	51	51
Vitamins (Percentage of the RDA)							
Vitamin A	100	142	118	140	97	131	134
Vitamin C	100	272	218	313	236	316	274
Thiamin	100	184	161	188	172	194	182
Riboflavin	100	200	175	212	167	194	195
Niacin	100	175	148	177	153	180	170
Vitamin B6	100	135	126	144	126	147	136
Folate	100	298	174	240	150	217	251
Vitamin B12	100	393	269	430	234	397	371
Minerals (Percentage of the RDA)							
Calcium	100	139	93	123	87	135	126
Iron	100	152	100	163	102	201	148
Phosphorus	100	182	125	164	126	187	168
Magnesium	100	170	100	137	98	103	142
Zinc	100	122	102	112	109	126	117
Other Dietary Components (Intake)							
Cholesterol (mg)	No more than 300 mg	288	274	379	276	427	317
Sodium (mg)	No more than 2,400 mg	4,215	4,382	5,697	4,790	6,768	4,819
Sample Size (Unweighted)	--	846	246	327	138	187	1,744

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

mg = milligrams.

TABLE VIII.6

24-HOUR DIETARY INTAKES OF NSLP PARTICIPANTS, BY POVERTY STATUS OF FAMILY

Dietary Component	Target Over 24 Hours	Family Income			All NSLP Participants
		Below Poverty Level	100 to 185 Percent of Poverty Level	More than 185 Percent of Poverty Level	
Macronutrients					
Food Energy (Percentage of the RDA)	100	112	112	116	115
Protein (Percentage of the RDA)	100	274	270	264	268
Percentage of Food Energy from:					
Fat	No more than 30 percent	35	35	35	35
Saturated fat	Less than 10 percent	13	13	13	13
Carbohydrate	More than 55 percent	51	52	52	51
Vitamins (Percentage of the RDA)					
Vitamin A	100	133	127	139	134
Vitamin C	100	270	252	279	274
Thiamin	100	178	183	182	182
Riboflavin	100	188	196	199	195
Niacin	100	161	174	173	170
Vitamin B6	100	129	138	139	136
Folate	100	248	260	251	251
Vitamin B12	100	389	363	367	371
Minerals (Percentage of the RDA)					
Calcium	100	122	124	128	126
Iron	100	140	150	152	148
Phosphorus	100	164	165	170	168
Magnesium	100	144	143	141	142
Zinc	100	112	118	119	117
Other Dietary Components (Intake)					
Cholesterol (mg)	No more than 300 mg	316	312	317	317
Sodium (mg)	No more than 2,400 mg	4,596	4,654	4,933	4,819
Sample Size (Unweighted)	--	459	282	782	1,744

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

NOTE: Students for whom data on family income are missing are omitted from the income subgroup tabulations, but are included in the tabulations for all NSLP participants.

mg = milligrams.

The analysis of OVS addresses the following questions:

- Overall, how much of the various nutrients from NSLP lunches do students waste?
- Does the nutrient content of NSLP lunches as consumed differ between schools using OVS and schools not using OVS?
- Are students more likely to select some meal components than others, and does the amount of waste differ by component?

The findings in this section are based on data drawn from the dietary intake interviews, in which students were asked about the foods they consumed and discarded at school.

a. Nutrients Wasted, by Age and Gender

The most comprehensive measure of food waste is the difference between the total caloric content of foods that a student reported selecting for lunch and the total caloric content of foods that a student reported consuming. Overall, NSLP participants waste about 12 percent of the food energy in the meal that they select (Table VIII.7).

For most nutrients, the percentage wasted does not deviate greatly from this overall 12 percent figure. Eleven percent of both fat and protein and 13 percent of carbohydrate are wasted. About 14 percent of most vitamins is wasted, although the percentage is lower for riboflavin (11 percent), niacin (12 percent), and vitamin B12 (10 percent). Eleven percent of calcium and phosphorus and 13 percent of iron and magnesium are wasted. Finally, 10 percent of cholesterol and 13 percent of sodium are wasted.

Age and gender groups exhibit different patterns of intake and waste. Younger students generally leave more waste than do older students. For example, 6- to 10-year-old NSLP participants waste 14 percent of the food energy in the foods that they select; 11- to 14-year-old participants waste approximately 10 percent (17 percent by females, and 8 percent by males); and 15- to 18-year-old participants waste about 7 percent (11 percent by females, and 5 percent by males).

TABLE VIII.7

PERCENTAGE OF NUTRIENTS WASTED IN NSLP LUNCHES, BY AGE AND GENDER

Dietary Component	6- to 10-Year-Old Students	11- to 14-Year-Old Students		15- to 18-Year-Old Students		All NSLP Participants
		Female	Male	Female	Male	
Macronutrients						
Food Energy	14	17	8	11	5	12
Protein	13	18	7	11	3	11
Fat	14	16	7	11	5	11
Saturated Fat	13	16	7	10	4	11
Carbohydrate	15	17	9	13	5	13
Vitamins						
Vitamin A	18	19	9	11	4	14
Vitamin C	17	21	14	10	4	14
Thiamin	17	20	9	13	3	14
Riboflavin	13	17	7	11	4	11
Niacin	14	18	8	12	5	12
Vitamin B6	15	20	9	14	5	14
Folate	18	23	10	12	5	15
Vitamin B12	12	17	5	8	3	10
Minerals						
Calcium	14	16	6	9	3	11
Iron	16	20	8	12	5	13
Phosphorus	14	17	7	11	3	11
Magnesium	15	19	9	12	4	13
Zinc	14	19	7	10	4	12
Other Dietary Components						
Cholesterol	12	17	6	10	4	10
Sodium	16	19	9	13	4	13
Sample Size (Unweighted)	846	246	327	138	187	1,744

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

NOTE: Entries show the mean of amount wasted as a percentage of amount selected.

b. Effects of OVS on Dietary Intake

Table VIII.8 shows the lunchtime dietary intake of NSLP participants in schools that use OVS and in schools that do not. The comparison is restricted to the age groups that attend elementary and middle schools (in other words, students younger than age 15), because only schools below the secondary level have the option of using or not using OVS. For most nutrients, differences in mean intake as a percentage of the RDA are small. Indeed, the difference exceeds two percentage points only for vitamin C (8 percentage points difference) and vitamin B12 (4 percentage points difference). None of the differences between the intakes of NSLP participants at OVS schools and at non-OVS schools is statistically significant. These patterns strongly support the claim that OVS does not significantly affect the nutritional quality of the USDA lunch as consumed.

The close similarity between nutrient intakes at OVS and non-OVS schools also suggests that NSLP participants at OVS schools may be less likely to select certain components, but waste somewhat more food. To examine this possibility, the percentage of students who selected each meal component and the percentage of each meal component that was wasted were compared at OVS and non-OVS schools.

c. Effects of OVS on Meal-Component Selection and Waste

Table VIII.9 compares the percentage of NSLP participants at OVS and non-OVS schools selecting each of the five meal components that must be offered as part of an NSLP meal, and the mean percentage of the component that is wasted. Students at OVS schools are considerably less likely than those at non-OVS schools to select milk; this difference is statistically significant. In general, however, differences in the percentage of students who select each component are much smaller than one would expect. For meal components other than milk, the difference in the percentage selecting the component is 1 to 3 percentage points, which is not statistically significant. It is also surprising that only 63 percent of students in non-OVS schools reported selecting a second vegetable/fruit item, because all such students are required to do so. Either students forgot to

TABLE VIII.8

LUNCH INTAKES OF NSLP PARTICIPANTS AT OVS AND NON-OVS SCHOOLS: STUDENTS AGED 6 TO 14 YEARS

Dietary Component	OVS Schools	Non-OVS Schools	Difference
Macronutrients			
Food Energy (Percentage of the RDA)	34	33	1
Protein (Percentage of the RDA)	89	88	1
Percentage of Food Energy from:			
Fat	37	36	1
Saturated fat	15	14	1
Carbohydrate	48	49	-1
Vitamins (Percentage of the RDA)			
Vitamin A	34	34	<1
Vitamin C	57	49	8
Thiamin	46	45	1
Riboflavin	56	56	<1
Niacin	47	47	<1
Vitamin B6	33	32	1
Folate	59	56	2
Vitamin B12	113	109	4
Minerals (Percentage of the RDA)			
Calcium	44	45	-1
Iron	37	36	1
Phosphorus	54	54	<1
Magnesium	45	46	-1
Zinc	35	33	2
Other Dietary Components (Intake)			
Cholesterol (mg)	82	77	4
Sodium (mg)	1,405	1,342	63
Sample Size (Unweighted)	1,095	326	--

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

NOTE: None of the differences shown is statistically significant.

OVS = offer versus serve.

mg = milligrams.

TABLE VIII.9

EFFECTS OF OVS ON SELECTION AND WASTE
OF MEAL-PATTERN COMPONENTS

Meal Component	Percentage of Students Selecting Component			Mean Percentage of Component Wasted		
	OVS Schools	Non-OVS Schools	Difference	OVS Schools	Non-OVS Schools	Difference
Meat	96	98	-2	11	15	-4
Bread	89	91	-3	13	16	-3
Milk	84	95	-11 *	9	14	-5
One Vegetable/Fruit	94	95	-1	17	25	-8
Second Vegetable/Fruit	61	63	-2	22	31	-9
Sample Size (Unweighted)	1,095	326	--	1,095	326	--

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

OVS = offer versus serve.

* indicates the difference is statistically significant at the 95 percent confidence level with a two-tailed test.

mention a selected item or cafeteria workers in some non-OVS schools do not require all students to select five components.⁵

As shown in the table, reported waste is somewhat higher at non-OVS schools than at OVS schools. The percentage wasted is 3 to 5 percentage points lower for meat, bread, and milk, and 8 to 9 percentage points lower for vegetables.

In summary, the data indicate that NSLP participants' average intakes of most nutrients are virtually identical in OVS and non-OVS schools. The surprisingly small differences in the proportion of students at OVS schools and non-OVS schools who select each component (except milk) suggest that non-OVS schools do not adhere strictly to the five-component requirement, but that most students nonetheless select most components. In addition, students in OVS schools report wasting somewhat less food than do those in non-OVS schools. Together, these findings--that waste is lower in OVS schools, and that OVS does not reduce the intake of key nutrients--support the use of OVS for all students below the secondary level.

C. INTAKES OF SBP PARTICIPANTS

This section presents findings on SBP participants' nutrient intakes at breakfast and over 24 hours.

1. Breakfast Intakes

SBP participants' mean intakes at breakfast of nearly all nutrients exceed one-fourth of the RDA (Table VIII.10). Only the mean intake of zinc is less than one-fourth of the RDA--22 percent. Mean intakes of protein, vitamin C, thiamin, riboflavin, folate, and vitamin B12 are more than one-half of the RDA, and mean intakes of vitamin A, niacin, vitamin B6, calcium, iron, phosphorus, and magnesium are more than one-third of the RDA. The mean intake of food energy is 26 percent of

⁵Further discussion of this issue is presented in Appendix B, which describes the operational definition of NSLP participant and the sensitivity of the estimates to whether students in non-OVS schools who choose three or four items are categorized as NSLP participants.

TABLE VIII.10

DIETARY INTAKES AT BREAKFAST OF SBP PARTICIPANTS

Dietary Component	Target at Breakfast	6- to 10-Year-Old Students	Family Income Below 185 Percent of Poverty Level	All SBP Participants
Macronutrients				
Food Energy (Percentage of the RDA)	25	26	26	26
Protein (Percentage of the RDA)	25	63	57	57
Percentage of Food Energy from:				
Fat	No more than 30 percent	31	31	31
Saturated fat	Less than 10 percent	13	13	13
Carbohydrate	More than 55 percent	57	57	57
Vitamins (Percentage of the RDA)				
Vitamin A	25	41	40	38
Vitamin C	25	85	89	89
Thiamin	25	60	58	58
Riboflavin	25	68	68	66
Niacin	25	40	39	39
Vitamin B6	25	37	37	36
Folate	25	104	96	92
Vitamin B12	25	95	89	88
Minerals (Percentage of the RDA)				
Calcium	25	43	41	40
Iron	25	40	40	39
Phosphorus	25	48	45	45
Magnesium	25	41	37	37
Zinc	25	23	22	22
Other Dietary Components (Intake)				
Cholesterol (mg)	No more than 75 mg	98	98	97
Sodium (mg)	No more than 600 mg	760	817	840
Sample Size (Unweighted)	--	218	286	319

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

mg = milligrams.

the RDA. The means for students 6- to 10-years old and the means for students from families whose incomes are less than 185 percent of the poverty level are very similar to the means for all SBP participants. This finding is not surprising, as students aged 6 to 10 years comprise two-thirds of SBP participants, and those from low-income families comprise 85 percent.⁶

SBP participants' mean breakfast intake of fat is just slightly above the Dietary Guideline goal, but their breakfast intake of saturated fat exceeds the Dietary Guideline goal by a substantial amount. Breakfast intakes of cholesterol and sodium exceed reference standards for breakfast (which are defined as one-fourth of the amount that the NRC recommends as the maximum daily intake). SBP participants consume a mean of 31 percent of food energy from fat, compared with a goal of 30 percent or less. The mean percentage of food energy from saturated fat is 13 percent, compared with a goal of less than 10 percent. The mean percentage of food energy from carbohydrate is 57 percent (the NRC recommendation is more than 55 percent). As with NSLP lunches, the percentage of food energy from fat in breakfasts as consumed is similar to the percentage in breakfasts as offered. However, this finding is less surprising than the analogous finding for lunch, because breakfasts generally offer fewer food choices than do lunches. A mean of 97 mg of cholesterol is consumed at breakfast, which exceeds the reference standard of 75 mg. Finally, the mean breakfast intake of sodium is 840 mg, which is well above the breakfast target reference standard of 600 mg. The mean intakes of these dietary components by low-income students and by students 6 to 10 years old are nearly identical to the mean intakes by all SBP participants.

2. 24-Hour Intakes

SBP participants' mean intakes over 24 hours of nearly all nutrients exceed the RDA (Table VIII.11). They consume an average amount of food energy of 117 percent of the RDA. Thus, breakfast provides about 22 percent of the participants' total food energy. SBP participants' intake

⁶Sample sizes were too small to support separate analyses of other subgroups.

TABLE VIII.11

DIETARY INTAKES OF SBP PARTICIPANTS, AT BREAKFAST AND OVER 24 HOURS

Dietary Component	Target at Breakfast	Target Over 24 Hours	SBP Participants: Intake	
			At Breakfast	Over 24 Hours
Macronutrients				
Food Energy (Percentage of the RDA)	25	100	26	117
Protein (Percentage of the RDA)	25	100	57	296
Percentage of Food Energy from:				
Fat	≤ 30 percent	≤ 30 percent	31	36
Saturated fat	<10 percent	<10 percent	13	13
Carbohydrate	>55 percent	>55 percent	57	51
Vitamins (Percentage of the RDA)				
Vitamin A	25	100	38	116
Vitamin C	25	100	89	290
Thiamin	25	100	58	192
Riboflavin	25	100	66	197
Niacin	25	100	39	170
Vitamin B6	25	100	36	133
Folate	25	100	92	260
Vitamin B12	25	100	88	384
Minerals (Percentage of the RDA)				
Calcium	25	100	40	129
Iron	25	100	39	145
Phosphorus	25	100	45	175
Magnesium	25	100	37	155
Zinc	25	100	22	123
Other Dietary Components (Intake)				
Cholesterol (mg)	≤ 75 mg	≤ 300 mg	97	334
Sodium (mg)	≤ 600 mg	≤ 2,400 mg	840	4,700
Sample Size (Unweighted)	--	--	319	319

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

mg = milligrams.

of protein is nearly three times the RDA. Mean intakes of all vitamins and minerals over 24 hours are well above the RDA.

SBP participants' mean intakes over 24 hours of fat, saturated fat, cholesterol, and sodium are higher than the Dietary Guideline goals and NRC recommendations. Although breakfast intakes of fat are close to the Dietary Guideline goal, SBP participants consume proportionately more fat at other meals, thus raising the 24-hour percentage of food energy from fat from 31 percent at breakfast to 36 percent over 24 hours. Data presented in the companion report by Devaney et al. (1993) indicate that low-income students, who comprise the great majority of SBP participants, obtain more of their food energy from fat than do students from families with incomes above 185 percent of the poverty level.

D. CONTRIBUTION OF USDA MEALS TO 24-HOUR INTAKES

This section presents data on the percentage of the total 24-hour intake of various dietary components that program participants derive from the NSLP and the SBP. Table VIII.12 shows the intakes of students who participated in either the NSLP or the SBP, or in both programs, as a percentage of their 24-hour intakes, by family income level.

Overall, participants derive 35 percent of food energy from school meals. Students from families with incomes below the poverty level receive 38 percent of their food energy from school meals. Those from families with incomes between 100 percent and 185 percent of the poverty level receive 35 percent from school meals. Students from families with incomes above 185 percent of the poverty level receive 32 percent of their food energy from school meals.

Percentages of other dietary components derived from school meals follow the same pattern across the income groups. Percentages are highest for the low-income group and are lowest for the higher-income group. School meals provide more than 40 percent of vitamin A, riboflavin, vitamin B12, calcium, phosphorus, and magnesium for students from families with incomes below the poverty level.

TABLE VIII.12

INTAKES FROM NSLP AND SBP MEALS AS A PERCENTAGE OF TOTAL 24-HOUR INTAKES,
BY FAMILY INCOME

Dietary Component	Family Income			All Students
	Below Poverty Level	100 to 185 Percent of Poverty Level	More than 185 Percent of Poverty Level	
Macronutrients				
Food Energy	38	35	32	35
Protein	39	38	35	37
Fat	39	38	36	37
Saturated Fat	41	39	37	38
Carbohydrate	37	34	30	33
Vitamins				
Vitamin A	44	36	32	37
Vitamin C	37	35	29	33
Thiamin	37	34	30	33
Riboflavin	43	37	32	37
Niacin	37	33	31	33
Vitamin B6	37	33	29	33
Folate	38	32	27	32
Vitamin B12	44	40	36	39
Minerals				
Calcium	49	43	38	43
Iron	36	33	29	32
Phosphorus	43	39	35	38
Magnesium	40	36	33	36
Zinc	39	37	33	36
Other Dietary Components				
Cholesterol	38	37	34	36
Sodium	37	37	34	35
Sample Size (Unweighted)	488	294	702	1,801^a

SOURCE: Weighted tabulations of data collected from Dietary Intake Interviews with students, School Nutrition Dietary Assessment study.

^aSample includes students whose family income is unknown because data on income are missing.