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School Food Purchase Study: Final Report

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EXECUTIVE SUMMARY

This study provides national estimates of the food acquisitions of public unified school districts participating in the National School Lunch Program (NSLP) and School Breakfast Program (SBP). It describes the type, quantity, and value of foods purchased by public school districts and the relative importance of foods donated to these school districts by the US Department of Agriculture (USDA). The study also examines procurement practices and operating characteristics of these school districts and the relationship of these characteristics to food costs. Data were collected from a nationally representative sample of 324 unified public school districts during School Year (SY) 1996/97. Findings are compared to the results of a similar study conducted in SY 1984/85.

School Food Acquisitions

Food acquisitions by school districts participating in these programs were classified in one of three categories: commercial purchases, USDA-donated commodities, or processed products containing donated commodities. The type, volume, and frequency of USDA-donated commodities can have an important effect on what school districts purchase locally. In addition, variations in food purchasing behavior among public school districts can reflect many influences including differences in local food preferences, the availability of a breakfast program, the relative importance of *a la carte* foods, as well as operating characteristics such as district size, rates of participation, access to wholesale markets, availability of vendors, and food storage capacity. Key findings related to the acquisition of food by NSLP school districts in SY 1996/97 are as follows:

- Unified public school districts acquired food valued at more than $4.6 billion in SY 1996/97. Of the total value of school food acquisitions, 83 percent were purchased commercially, 13 percent were donated by USDA, and 4 percent were processed foods containing donated commodities.
- Milk and other dairy products accounted for almost one-fourth of the total value of foods acquired. Bakery products, red meats, poultry, fruits and fruit juices, vegetables, and prepared foods each accounted for about 10 percent of the total value.
- School districts acquired a great diversity of food items as evidenced by the 842 different food items obtained by the sample districts. However, ten food categories representing less than 7 percent of the individual food items accounted for nearly half the value of all

school acquisitions. Fluid milk, pizza, ground beef, cheese, and potato products (frozen and chips) were the five leading food categories by share of total value.

- For certain foods, USDA donations are the primary source of supply. USDA donations accounted for at least half of the total value of all acquisitions of peanuts and peanut butter, turkey products, beef products, vegetable oils and shortening, cheese, flour, and eggs.

Comparison of SY 1984/85 and SY 1996/97 Food Acquisitions

The last study conducted by the Food and Nutrition Service to collect detailed information about school food purchases occurred during School Year 1984/85. Since then the Department has made a concerted effort to improve the nutritional content of school meals. Recent legislation requires that school meals meet the Dietary Guidelines for Americans that call for diets lower in fat and containing more fruits, vegetables, and grains. While it was not the intent of this study to make an assessment of the nutritional values of foods acquired by schools, the study did examine shifts in the type and mix of foods acquired since the previous study. A comparison of results of the two studies reveals the following:

- There have been striking changes in the composition of the school food market basket. Foods that experienced sharply higher rates of use include breakfast cereals, prepared foods, yogurt, fruit drinks, and margarine. There were significant reductions in the use of fluid milk, butter, salad dressing and mayonnaise, vegetable oils and shortening, and lard and other animal fats.
- There was a dramatic change in beverage use, with the reduction in fluid milk partially offset by large gains in the use of fruit juices, fruit drinks, carbonated beverages, and bottled water.
- The acquisition of fresh fruits and vegetables increased with the share of total volume rising from 5.6 percent to 7.2 percent. A much larger variety of fresh fruits and vegetables are now being made available through the donation program.
- The role of donated commodities has been substantially reduced over this period. While donated commodities accounted for about 30 percent of the total value of food acquisitions in SY 1984/85, in SY 1996/97 they accounted for less than 13 percent.

Food Procurement Practices

The analysis of school district food purchase practices provides an up-to-date profile on several dimensions of school food procurement. The purchase and acquisition of food is a complex process that is affected by many influences including the type of food acquired and the size of the school district. Purchasing practices that are effective in one set of circumstances might not be effective in a different set of circumstances. Study findings indicate the following with regard to school food procurement practices:

- On average, public unified school districts used eight vendors to satisfy their food purchase requirements. Large school districts with higher volume needs and access to more vendors used three times the number of vendors than smaller districts (17 vendors to 5 vendors). While price was the key consideration in vendor selection, vendor dependability and food quality were also very important.
- Methods of food procurement varied among school districts as well as by food type. With the exception of the purchase of fresh produce, fresh meats, and snack items, a majority of school districts used formal bidding procedures in buying their food in SY 1996/97. Of the two formal approaches, line item bids were used by more school districts than lump sum bids.
- The share of school districts participating in cooperative buying programs has grown dramatically since the earlier study. In SY 1996/97 over one-third of all public unified school districts participated in cooperative buying compared to less than 10 percent in SY 1984/85. Although small school districts are the most frequent participants in cooperative buying, almost one-fourth of the large districts took part as well. Participating districts reported buying over 60 percent of their food purchases through cooperatives.
- The number of food service management companies (FSMCs) operating school food programs continues to grow, accounting for almost 10 percent of all public unified school districts. FSMCs have concentrated their operations among mid-size school districts but are found in districts of all sizes.
- Branded foods were offered in almost 40 percent of all public school districts with national brands offered about twice as frequently as house brands (38 percent and 18 percent). Pizza and tacos/burritos were the most prominent national branded products while pizza and subs/sandwiches were the most prevalent house brands.

Relationship of School District Characteristics and Procurement Practices to Food Costs

School feeding programs have been under continuing pressure in recent years to hold the line on the prices they charge students, while confronted with escalating labor and food costs. When attempting to identify purchasing practices that could possibly provide cost savings to school districts, it is necessary to examine these relationships with caution. Observed relationships between purchasing practices and food costs can be greatly influenced by district size or some other variables.

Large school districts tend to pay lower per unit prices for their food. However, it is unclear if this relationship reflects an economy of scale based on the volume of food they are purchasing, the use of highly centralized procurement systems or formal procurement and pricing methods typically found in large school districts, the accessibility to more vendors leading to a more competitive marketplace, or a combination of factors. No one method produced the best cost per pound for all food items. It is therefore not possible to say that adopting certain purchasing practices would necessarily lead to a reduction in food costs.

I. INTRODUCTION AND PURPOSE OF THE STUDY

A. School Food Programs

The Federal Government helps support the provision of meals to elementary and secondary school students through two programs: the National School Lunch Program (NSLP) and the School Breakfast Program (SBP). The NSLP, the larger of the two programs, reached an average of 26.3 million school children each day in FY 1997; an average of 6.9 million children were served each day by the SBP during the same period. Both programs operate through public and nonprofit private schools as well as residential child care institutions. Nearly all public schools (about 99 percent in FY 1995) and many private schools participate in the School Lunch Program. Fewer schools participate in the SBP than in the NSLP – 63,000 compared to 88,800 in FY 1997.

Federal support to the participating schools is made available in two forms: (1) cash assistance and (2) donated commodities. In FY 1997, cash assistance of $6.1 billion and donated commodities valued at $620 million were provided to the participating school systems. The level of assistance is based on the number of reimbursable meals served in the individual schools and on the eligibility status of children receiving meals. Any child at a participating school may purchase a meal through the National School Lunch Program or School Breakfast Program. Children from families with incomes at or below 130 percent of the poverty level are eligible for free meals. Those between 130 percent and 185 percent of the poverty level are eligible for reduced-price meals, for which students can be charged no more than 40 cents for lunch and 30 cents for breakfast. Children from families with incomes over 185 percent of poverty pay full-price for the meal as set by the local school food authority (SFA),[1] though their meals are still subsidized to some extent. The Federal government reimbursement rates per meal in school year 1996/97 are shown in Table I-1 below.

1/ "School food authority" is the governing body responsible for the administration of schools within its jurisdiction that is granted legal authority to operate in the NSLP and the SBP. In this report, the term is used interchangeably with "school district."

Table I-1: Federal Government Reimbursement Rates for the National School Lunch Program and the School Breakfast Program, SY 1996/97

	Lunch			Breakfast	
Type of meal	Regular reimbursement rate[1]	Average commodity entitlement	Total subsidy	Regular reimbursement rate	Severe-need reimbursement[2]
	----------dollars per meal----------			----------dollars per meal----------	
Free	1.8375	.1450	1.9825	1.0175	1.2125
Reduced-price	1.4375	.1450	1.5825	.7175	.9125
Full-price	.1775	.1450	.3225	.1975	.1975

[1]Reimbursements are higher in Alaska and Hawaii. Also, districts that served more than 60 percent of their lunches free or at a reduced price in the second prior school year receive an additional $.02 in reimbursement on each meal.
[2]Schools that served 40 percent or more of their lunches to children below 185 percent of the poverty level two years prior to the school year may request to receive severe-need reimbursements for free and reduced-price breakfasts.

Sources: USDA, FNS.

B. Purpose and Objectives of the Study

The central purpose of this study was to derive statistically valid national estimates of food acquisitions made in SY 1996/97 by public unified school districts participating in the NSLP[1]. Food acquisitions include both purchases made from commercial sources and donations from the US Department of Agriculture. In addition, the study collected information on the procurement practices of these school districts and assessed the relationship of their procurement practices to school district characteristics.

A similar study was conducted under FNS sponsorship in SY 1984/85. Another purpose of this study, therefore, was to compare results for SY 1996/97 with those from the earlier study to determine what changes have occurred, both in the composition of school food acquisitions and in procurement practices.

1/ The school year is on a July/June basis. Unified school districts are those that include elementary, middle, and secondary grades. Most commonly the grades extend from kindergarten through twelfth grade.

More specifically, the study has been designed around achievement of the following five objectives:

- To develop national estimates of the types, volume, and dollar value of food acquired (commercially and through USDA donations) by unified public school districts participating in the NSLP.
- To compare the composition and value of foods acquired by school districts in SY 1984/85 and SY 1996/97 and describe changes in the extent to which acquired foods arrive at the district in a prepared or processed form.
- To describe current school food purchase practices and identify relationships between food purchase practices and school district characteristics and the cost of foods to schools.
- To compare school food purchase practices in SY 1984/85 and SY 1996/97 and describe changes in the relationships between these practices and SFA characteristics and food costs.
- To describe the extent to which *a la carte* foods are available to students enrolled in these schools and the types and volumes of *a la carte* foods that are acquired.

C. Report Outline

The remainder of this report details the approach taken in conducting this study and describes its major findings. It is divided into seven chapters, including the Introduction, which is Chapter I. Chapter II is devoted to a description of the methodology used in conducting the study. This includes a description of the sample design and sample selection and how the data were collected and processed. Chapter III is the first one to report on study findings. As in all of the findings chapters, it discusses methodological considerations unique to the topic and compares the results of this study to the one conducted in SY 1984/85, when such comparisons are relevant. In Chapter III, the principal characteristics of public unified school districts participating in the NSLP and the SBP in SY 1996/97 are described.

Chapter IV sets the stage for interpretation of the major food acquisition findings by briefly reviewing the economic and policy setting of the period within which the study was conducted. This description provides a general backdrop to understanding how both market factors and policy factors might have influenced study results. National estimates of food acquisitions by public unified NSLP school districts are described and interpreted in the following chapter,

Chapter V. Summary estimates of the volume and value of major food categories are examined. Major shifts in the composition of school food purchases since SY 1984/85 are also discussed. This is followed in Chapter VI by a description of the current procurement practices of public school districts and the changes that have occurred over the past dozen years. Finally, the relationships between and among school district characteristics and procurement practices and school food acquisitions are examined in Chapter VII.

In addition to this report, a Statistical Report containing the detailed statistical tables that served as a basis for the findings reported here is available.

II. METHODOLOGY[1]

A. Sample Design and Selection

1. Sample Design

The universe studied here consists of all public unified NSLP school districts in the continental United States. These districts are a subset of the total number of school districts in the nation since not all districts participate in the NSLP. They are also a subset within the universe of districts that participate in the NSLP since the program also serves private schools and nonunified school systems, both of which were excluded from the study. Private school enrollment accounts for approximately 3.5 percent of total NSLP enrollment and nonunified enrollment is estimated to account for about 4.2 percent of NSLP enrollment.[2] NSLP districts in Alaska, Hawaii, and the US possessions were excluded from the sample as well. In FY 1995, these jurisdictions accounted for 2.7 percent of NSLP participation. Given these exclusions, the estimates provided here will differ somewhat from other sources. For example, most FNS data series include nonunified schools and all 50 states and US possessions. Private schools are included in some series and not in others.

The sample frame used in the study was based on a database purchased from Quality Education Data, Inc. (QED). The database contained information for 13,222 public school districts in all 50 states and the District of Columbia and was current as of February 1996. Of the total number of school districts in the database, 11,177 were identified as unified school districts.

A national sample of 480 school districts was drawn from the universe of unified public school districts. The sample was stratified by the same ten farm production regions used by the US Department of Agriculture in publishing data on agricultural production. This particular set of regions was used for two reasons. First, it is the same set used in the 1984/85 study and therefore provided continuity with the methodology used in that study. Second, these regions are generally coterminous with regional systems of food production and distribution.

1/ A more detailed description of the methodology used in the study appears in Appendix A.

2/ The share of NSLP enrollment that is in private schools is from unpublished administrative data collected by the USDA. The share of enrollment attributable to nonunified public schools is based on two sources. One source is the QED Super 2000 database from which the sample was drawn. The nonunified school districts that were eliminated from the universe prior to drawing the sample accounted for 4.2 percent of total enrollment. The other source is the US Department of Education's Common Core of Data (CCD) for SY 1992/93 which indicated that districts other than "regular" districts accounted for 4.3 percent of total public school enrollment that year.

The boundaries of these regions correspond to state boundaries with each region including from two to ten states. The distribution of the sample school districts among the regions and states are displayed in Table II-1. The sample was stratified regionally to help ensure that sample districts were selected from throughout the country. It should be noted that these strata were not used as domains of study and that only national estimates have been developed.

There are about 350 school districts nationwide that participate in the NSLP but do not receive donated commodities. This includes all school districts in Kansas (over 300) as well as those districts that continue to receive cash or commodity letters of credit (CLOC) as a result of past demonstration studies of alternatives to commodity donation. These districts were kept in the database for purposes of drawing the sample. Of the 480 school districts in the sample, two were in Kansas and five were former demonstration sites that were receiving cash or letters of credit instead of donated commodities.

To derive a national estimate of school food procurement, it is necessary to collect data for an entire school year. There is a significant seasonal influence in the patterns of school food procurement and use. Since most school systems are not in session year-round, food procurement typically diminishes in the spring, ceases altogether through much of the summer, and begins again with the approach of the start of school in the early fall. In addition, there are seasonal influences associated with changes in the weather and the availability of foods as well as the traditional holidays.

To help lessen the burden of assembling and copying food procurement records for the participating school districts – which can be substantial, depending on the size of the district and the nature of their procurement records – each district was asked to provide records for a specified 3-month period during SY 1996/97. The quarterly periods were defined as follows:

1st quarter – July - September, 1996
2nd quarter – October - December, 1996
3rd quarter – January - March, 1997
4th quarter – April - June, 1997

The sample of 480 school districts was evenly divided among the four quarters.

Table II-1: Number of School Districts in the Sample by Region and by State

Region/state	Number of school districts	Region/state	Number of school districts
Northeast		**Southeast**	
Massachusetts	12	South Carolina	9
Maine	4	Georgia	16
Connecticut	6	Florida	16
New Jersey	14	Alabama	13
New York	29	Total	54
Maryland	1	**Delta**	
Delaware	1	Mississippi	7
Pennsylvania	23	Louisiana	11
Vermont	1	Arkansas	3
Total	91	Total	21
Lake States		**Southern Plains**	
Michigan	22	Oklahoma	7
Wisconsin	10	Texas	42
Minnesota	6	Total	49
Total	38	**Mountain**	
Midwest		Montana	1
Ohio	21	Colorado	9
Indiana	13	Wyoming	1
Iowa	6	Idaho	4
Illinois	16	Utah	5
Missouri	10	Arizona	9
Total	66	New Mexico	3
Northern Plains		Total	32
South Dakota	2	**Pacific**	
North Dakota	2	California	61
Kansas	2	Oregon	5
Nebraska	5	Washington	5
Total	11	Total	71
Appalachia			
Virginia	13	**Grand Total**	480
West Virginia	4		
North Carolina	13		
Tennessee	7		
Kentucky	10		
Total	47		

Source: *School Food Purchase Study*, 1998.

2. Sampling Procedure

The size distribution of public school districts is highly skewed. While 47.9 percent of all public school districts have an enrollment of less than 1,000, they account for only 5.9 percent of total enrollment. At the other extreme, districts with an enrollment of 25,000 or more account for only 1.6 percent of the total number of districts but 31.0 percent of total enrollment.[1] While the school district is the basic unit of observation that is to be represented in the sample, it is also important that student enrollment be given prominent consideration given that food procurement and utilization is the principal focus of the study.

To insure that larger school districts were appropriately represented, we used a variant of the probability proportional to size (PPS) technique in drawing the sample. As its name implies, use of PPS results in more of the larger districts (and therefore more students) being included in the sample. However, since standard PPS sampling can sometimes shift the sample "too far" toward the larger units and leave the smaller units under-represented, a variant of the standard technique was used.

Under the sampling technique used here, the sample was drawn with probability proportional to *a power* of enrollment rather than enrollment alone. The power was set at a level (slightly below one) that would yield a sampling probability for the largest district in each stratum sufficient to allow for non-responses.

The first step in the sampling procedure was to allocate the 480 sample districts to the ten geographic strata. Each stratum was assigned a fraction of the 480 districts equal to that stratum's share of total enrollment.

Within each stratum, an ordered, systematic selection procedure was used to select school districts for the sample. The steps followed for each stratum were as follows:

- An appropriate value for the power of enrollment for that stratum was developed.
- The measure of size for each school district was raised by the power of enrollment.

1/ Quality Education Data, The Education Market Guide and Mailing List Catalog, 1997-98, p. 10

- A skip interval was developed equal to the sum of all of the size measures of districts in the region divided by the sample size for the region.
- School districts within the region were ordered by their measure of size and a cumulative size distribution was established.
- A random start number was selected between zero and the skip interval.
- Using the cumulative size distribution of the ordered set of districts in the region, the first district in the sample was determined by the random start number.
- The remainder of the sample for the region was drawn by repeatedly adding the skip value to the random number and finding the district whose value falls within that range.

The remaining allocation was the assignment of sample districts to quarters. A fourth of the selected districts in each geographic stratum were allocated to each quarter so that the enrollment of the districts in each quarter was as close to equal as possible. In addition, the seven school districts included in the sample that did not receive donated commodities were allocated among quarters so as to keep their distribution as even as possible.

3. Derivation of Final Weights

Final sample weights were developed to produce national estimates for the universe of public unified school districts participating in the NSLP. Because response rates differed for the survey and for the submission of food acquisition data and because we were collecting a combination of *stock* measures (e.g. school district enrollment as of a specified time) and *flow* measures (e.g. quarterly purchases of individual food items), two sets of weights were derived. These weights consist of three parts: a basic sampling weight equal to the reciprocal of the districts initial selection probability, post-stratification adjustments to account for known population totals, and adjustments to compensate for nonresponse. Once derived, these weights were applied to the observations collected from the participating school districts to derive national estimates. A more detailed description of the weighting methodology appears in Appendix A.

B. Recruitment and Training

1. Recruitment

Recruitment began with the collection of basic information for each of the 480 school districts from the Child Nutrition (CN) Programs Directors in the 45 states with school districts in the sample. In collecting this information it was determined that five of the school districts in the sample were not participating in the NSLP in March 1996, leaving 475 prospective participants in the sample.

Table II-2: Allocation of Sample by Region and by Quarter

Region	Enrollment		School District Sample by Quarter				
	Number of students	Percent of total	1	2	3	4	Total
Northeast	7,677,407	19.1	22	23	23	23	91
Lake States	3,174,178	7.9	10	9	9	10	38
Midwest	5,577,520	13.8	16	17	17	16	66
Northern Plains	959,500	2.4	3	3	2	3	11
Appalachia	3,916,084	9.7	12	11	12	12	47
Southeast	4,537,866	11.3	13	14	14	13	54
Delta	1,723,619	4.3	6	5	5	5	21
Southern Plains	4,117,205	10.2	13	12	12	12	49
Mountain	2,686,580	6.7	8	8	8	8	32
Pacific	5,932,237	14.7	17	18	18	18	71
Total	40,302,196	100.0	120	120	120	120	480

Source: *School Food Purchase Study*, 1998.

The school food director of each school district in the sample was initially notified of the study by mail and told that they would be contacted by telephone and invited to participate. At the time

of the telephone call, details of the study and the role they were being asked to play were discussed.

School districts were recruited on a quarterly basis, beginning with those assigned to the first quarter. Recruiting got underway in May 1996 and was largely completed by the end of February 1997. Of the 475 school districts recruited, 381 (80.2 percent) initially agreed to take part in the study.

2. Training

The collection of food procurement records, which are found in different forms and levels of detail among school districts, made it necessary to conduct brief training telephone calls with a representative of each participating district. In addition to the training call, each SFA was provided with a training document that reviewed major elements of their participation in the study. Most training calls were conducted within two weeks of the SFA agreeing to participate in the study.

C. Data Collection and Processing

Two types of data were collected, each using a different collection technique. Food purchase and donation records for a specified three month period were copied by SFA staff and mailed to the study data collection center. School district characteristics and procurement practices information were collected through a self-administered survey completed by the food service director. The procedures used in collecting and processing these data are described below.

1. Food Purchases and Donations

Food acquisitions by school districts taking part in the study were assigned to one of three categories: (1) purchased foods not containing donated commodities, (2) purchased foods containing donated commodities, or (3) donated commodities. Foods were considered to have been acquired at the point in time when the school district assumed ownership. This generally coincides with the time of delivery to the district.

1.1 Valuing Donated Commodities

The valuation of donated commodities required special treatment. Foods that are commercially purchased and contain no donated commodities are assigned a value by the vendor. For these food items there is no ambiguity with regard to their market value. The valuation of donated commodities and processed foods containing donated commodities is less straightforward. Commodities donated by the USDA are assigned dollar values by the Department based on what they pay, plus transportation charges. However, this value excludes some cost elements associated with the procurement, storage, and delivery of these foods to school districts and therefore generally underestimates their delivered market value.

In addition, some donated commodities are used as ingredients in foods that are processed expressly for schools participating in the NSLP. This is the second category identified above. There are three major types of arrangements under which these products are processed. They are:

State Processing. Some State agencies negotiate processing agreements for their recipient agencies and have commodities shipped directly from the USDA supplier to these processors. These processors then sell the processed food directly to SFAs, discounted or rebated by an amount equal to the value of the donated commodities used. Around 39 states currently have state processing contracts.

SFA Processing. Larger SFAs often negotiate processing contracts on their own. When this is done, the donated commodities can be routed either directly to the processor from the USDA or through the SFA before moving to the processor and back again as a finished product.

SOC Processing. Some SFAs can also receive processed products in lieu of donated commodities as part of their commodity deliveries. These State Option Contract (SOC) products include such foods as chicken nuggets and patties, beef patties, and pork ribettes. The contracts for processing these products are negotiated by USDA. However, SOC products are processed using the manufacturer's ingredients unlike state processing and SFA processing which use USDA purchased ingredients. The States participating in these contracts reimburse USDA for the cost of the processing and added ingredients, usually by charging the recipient SFAs. The cost of the commodity component is charged

to the State's entitlement. Nine states are currently participating in the SOC program.

Recognition that a product is a donated commodity is not always straight-forward. Commodities that are delivered directly to SFAs from State warehouses are easily recognized, but those that are delivered by commercial vendors in combination with commercial purchases might not be recognized unless delivery slips make this clear. Similarly, processed products obtained through SOC contracts, and commodities converted into processed products by State processing or local processing agreements are sometimes difficult to identify. In addition to asking SFAs to identify these foods in the records they submitted, the State Distributing Agencies (SDAs) were asked to provide information on commodity deliveries to the SFAs in their states for the relevant quarter and on foods processed under state processing agreements. Most SDAs responded to this request, thereby providing a useful check against the information provided by the SFAs.

Given that neither USDA-assigned values nor processor prices for products containing commodity ingredients were considered reliable measures of market price, commercial prices of comparable foods were used in valuing these foods.

1.2 Food Procurement Variables

The following variables were used in developing national estimates of the types, volumes, and value of foods acquired by NSLP school districts in SY 1996/97 and in comparing these estimates to those for SY 1984/85:

- **Name of the individual food item.** This is the generic name of each food item for which quantity and value information was reported. It is the most detailed level at which information for individual foods is being analyzed in this study. A total of 842 unique food items were identified. This compares to approximately 1,150 separate food items identified in the study conducted in SY 1984/85. The system used in assigning 6-digit codes to individual food items is described in the Statistical Appendix Report.

- **Form in which the food is acquired.** Form refers to whether the food is in a fresh, frozen, canned, dried, or fluid form at the time of procurement. Categories representing more than one category (e.g., fresh or frozen) were used when the form could not be determined with certainty.

- **Volume of acquisition.** The net weight of acquisitions measured in pounds. Total volume was determined by multiplying per unit weight by the number of units acquired. To derive this weight when the unit of acquisition was another measure (e.g., cases of "number 10" cans), standard conversion factors for the individual food items were used.

- **Mean cost per pound of food item.** This is the mean delivered cost of a food item per pound (net weight) measured in dollars. For foods purchased commercially (and not containing USDA donated foods), this is the invoice cost. For donated commodities and processed foods containing donated commodities, it is the invoice cost of comparable foods purchased commercially. When the same food item was acquired at more than one price by a given SFA during the period of study, the mean cost was determined by weighting prices on the basis of volume. The many different units represented in the raw data (e.g. cases of #10 cans, dozens, gallons, etc.) were converted to pounds.

- **Total cost of food item acquisition.** As the term implies, this was derived by multiplying the mean per unit food item cost by the number of pounds of the item acquired. It represents the total acquisition cost of a given food item.

- **Cost per thousand students of food item acquisition.** This variable was derived by dividing the total dollar cost of the food item by the student enrollment with access to the food program of the school district they attended. An adjustment for those having access to the program is made necessary by the fact that some enrolled students (e.g. kindergarten students attending half-day sessions) are included in overall enrollment numbers but do not have access to the program. To the extent this adjustment is required, it is usually small.

- **USDA donated commodities.** These are food items donated by the USDA and received by SFAs in the same form in which they were purchased and shipped by the USDA (as distinguished from donated commodities that have been further processed following purchase by the USDA or processed foods obtained under SOC contracts). While these items frequently share the same generic name as commercially purchased food items, quantity and value measures for donated commodities are treated separately.

- **Purchased food item containing one or more USDA donated commodities.** These food items will also frequently share the same generic name as other purchased food items. Quantity and value measures for these items are treated separately, both from commercially purchased foods that contain no USDA donated commodities and from USDA donated commodities. The valuation of these items is as described above. This variable also includes products processed under SOC contracts.

- **Period of purchase.** Food items were considered to have been acquired on the date at which the SFA accepted delivery. The site of delivery varied and included individual schools sites, central kitchens, and central warehouses, among other locations. The period of study was divided into four quarterly periods of purchase: July-September, 1996; October-December, 1996; January-March, 1997; April-June, 1997. The date of delivery within the quarter was not recorded, except as required for internal record-keeping.

- **Food item used in *a la carte* offerings.** SFAs were asked to identify those foods in general terms (e.g. hamburgers, ice cream, cookies, etc.) that were used in *a la carte* offerings and to estimate the share of total volume of each food so identified that was used in *a la carte* offerings.

- **Change in volume of acquisition and share of total volume.** This variable was derived from national estimates for those individual food items for which information was available both in SY 1984/85 and SY 1996/97 and for aggregations of food items.

1.3 Transcription and Processing of Raw Data

On the basis of the telephone interviews with the principal contact for each participating SFA, the least burdensome, most cost-effective means of retrieving copies of existing procurement records from the archives of each school district were identified. The principal sources of this information were vendor summaries, copies of invoices, tally sheets prepared by district staff, and bid specifications.

Since data collection procedures were tailored to the particular situation of each school district, data arrived in a variety of forms. Data were transcribed, in most cases, by vendor, by month for a given SFA. Relevant data elements were copied from the SFA-provided document to a

standard transcription form. If necessary, telephone calls were made to the SFA contact or the vendor (with SFA approval) to capture missing data elements. As a further source of information, State Distributing Agencies (SDAs) provided records on deliveries of USDA donated commodities to the SFAs in their states that were participating in the study.

Given the large volume of highly detailed data, it was necessary to conduct several edit checks to help ensure the highest possible degree of accuracy. A description of these edit checks appears in Appendix A.

2. District Characteristics and Procurement Practices

2.1 Survey Collection Procedures

A pre-test of the initial draft of the survey instrument was conducted in January 1996. Five school districts took part: one each in Arkansas, Maryland, and Virginia and two in Pennsylvania. Student enrollment in the pre-test districts ranged from 1,248 to 116,859. Respondents were debriefed, two by telephone and three during on-site visits. The average length of time required to complete the instrument was 1 to 1½ hours. Results of the pre-test were helpful in identifying ambiguities in terminology and question structure. They also pointed toward potential difficulties in collecting detailed information on *a la carte* food sales.

Procurement practices surveys, accompanied by a cover letter and reimbursement check,[1] were mailed to participating school districts following receipt of their food procurement records for the quarter of their participation. Since some of the survey questions requested information for this quarter, (e.g., number of reimbursable meals served and food expenditures), it was necessary to delay sending the survey until the quarter was over and SFA personnel had an opportunity to tabulate their numbers. The first surveys were mailed in November 1996. Respondents were asked to return the completed survey by a specified data, generally within two to three weeks of receipt.

SFAs late in responding were contacted, first by letter and then by telephone, if necessary. Returned surveys were reviewed for completeness, consistency, and accuracy at time of receipt. Missing, incomplete, or incorrect information was handled by telephone with the SFA contact.

1/ A payment of between $70 and $270 was made to each participating school district to compensate for the time and out-of-pocket expense associated with assembling, copying and mailing of their food procurement records. The amount of the payment was based on the number of reimbursable lunches served in October 1995.

Follow-up telephone calls were required for nearly every SFA; repeat telephone calls were often necessary.

2.2 District Characteristics and Procurement Practices Variables

SFA characteristic variables were used both to document and describe key features of the public unified school food universe and to assess and interpret food purchase practices. Most of these variables are identical to those used in the earlier study, thereby facilitating comparison with the earlier results. In general, these are the dimensions of the school districts and their lunch/breakfast programs that most influence the types and amounts of foods purchased and/or their procurement practices. The following SFA characteristic variables were used:

- **School district enrollment.** School district enrollment as of October 31, 1996 is used as an indicator of district size. There is no entirely satisfactory measure of the patronage of a school feeding program. Reimbursable meal counts are partial in that they exclude students that choose their lunches from *a la carte* options or don't participate in the program at all. Enrollment numbers alone overstate the potential patronage by the extent of daily absences and by the number (if any) who do not have access to the program, (e.g., enrolled students attending half-day kindergarten.) Thus, student enrollment adjusted for absences and for those lacking access provides an upper limit on the average number of students who could participate in a school feeding program.

- **Number of schools and student enrollment by grade category.** Both the quantity and types of food utilized by a school food program are influenced by the age distribution of the student population. This is represented by using the following grade categories: elementary, middle/secondary, and others. Elementary schools were defined as a school that had a kindergarten or grade 1, 2, or 3 *and* no grade higher than grade 6. Middle/secondary schools were defined as schools with no grade lower than grade 6. All other schools were assigned to the "other" category. Thus, a school with grades K through 12, for example, fell in the "other" category.

- **Program participation by meal category.** This variable is expressed as the total number of meals served, both in SY 1995/96 and in the relevant quarter of SY 1996/97. In both periods, the numbers are disaggregated by meal category

(school lunch and school breakfast) and by category of participation (free, reduced-price, full-price.)

- **Meal prices.** This variable (expressed in dollars) is disaggregated by elementary and middle/secondary schools, by full and reduced-price meals, and by lunch and breakfast. If more than one price was charged for full-price meals, a weighted average price was calculated.

- **Number of approved free and reduced-price applications on file.** This is the total number of students as of October 31, 1996 approved to receive free meals and the number approved to receive reduced-price meals. These approvals set an upper boundary on the number of meals served in these categories. These totals are also disaggregated by elementary, middle/secondary, and other grade categories.

- **Receipts from other food program sales.** Some SFAs prepare and serve meals for purposes other than student and staff meals. This can include foods served through USDA food assistance programs (e.g., Child and Adult Care, Summer Food Service, and the Nutrition Program for the Elderly) or through locally sponsored programs. To the extent these programs utilize food that is included as part of a district's overall food procurement, this variable provides an approximation of the scale of these activities relative to the receipts from reimbursable meals and from a la carte sales.

- **Regional location of school district.** To some extent, the availability and cost of foods can be influenced by the district's proximity to sources of supply. This effect is most pronounced for perishable foods such as fresh fruits and vegetables but it applies to other foods as well. For this analysis, regional location serves as a proxy for this influence, using the USDA's ten agricultural production regions.

- **Urbanicity.** Urbanicity can influence the cost of food to a school district as a result of its proximity to central points of food distribution and/or to competitive vendor markets. A seven-category urbanicity measure included in the QED database was used. It ranges from metropolitan areas with a population of 400,000 or more to places of less than 2,500.

- **Income.** The income level of households within a school district directly influences eligibility for free and reduced-price meals and can indirectly

influence participation in school feeding programs. Income was represented by a variable included in the QED database that measures the share of students within a school district that come from households with incomes below the Federal poverty guidelines. QED derives its measure from data found in the National Center for Education Statistics' Common Core of Data which is based on the 1990 census.

Several different dimensions of SFA food procurement, preparation, and serving are represented by variables in the analysis that follows. They include:

- **Indicators of *a la carte* activity.** This includes an indication as to whether *a la carte* is used and if it is used, total *a la carte* receipts for SY 1995/96 and for the relevant quarter in SY 1996/97, its availability among schools in the district, and the identification of foods most prominently offered *a la carte*.

- **Indicators of vendor use and availability.** This includes the number of vendors serving school districts for each of eight product categories and the total number of vendors serving the market in which the school district is located for each product line.

- **Procurement methods.** This variable represents the following range of procurement options, disaggregated by major food category: formal line item bids, formal lump sum bids, telephone bids/quotes, salesman visits, and other methods.

- **Product pricing.** For the principal vendors for each of the major food categories, this variable indicates which of the several alternative methods of product pricing were used by the district.

- **Use of food service management company.** This variable indicates whether the school district was under the direction of a private food service management company in SY 1996/97 and, if so, the period of time this arrangement had been in effect (measured in years) and whether the management company is responsible for both vendor selection and food selection.

- **Cooperative buying.** This variable indicates school district participation in a cooperative food buying program in SY 1996/97. For participants in cooperative buying, the period of participation, involvement of other school districts, share

of total food purchases made cooperatively, and types of foods purchased were also reported.

- **Product specifications.** School districts' use of alternative means of product specifications such as quality/grade standards, brand name, fat content, use of Child Nutrition (CN) labels, etc. is represented by this variable.
- **Preparation facilities.** The number of kitchens by type, including base, central, receiving/satellite, combination, and on-site kitchens is indicated by this variable.
- **Storage and delivery of food.** For each of the major food categories, this variable indicates the principal point of receipt within the SFA and the frequency of vendor delivery. It also indicates whether deliveries initially go to a central warehouse, how frequently deliveries within the district are made to schools, whose vehicles are used, and the cost of transporting food within the district in SY 1995/96.
- **Menu planning.** This variable represents the number of schools using alternative menu planning methods in SY 1996/97, including NuMenu, Assisted NuMenu, food based, and traditional meal patterns.
- **School district decision-making.** This includes indicators of the level within the school district organization at which decisions are made regarding choice of vendors, identification of foods to be purchased, and food orders.
- **Branded food products.** This variable identifies the use of branded food products – in-house and national brands – in SY 1996/97. For those districts using branded products, this variable indicates the number of schools within the district that feature brands, principal types of products sold under brand, and principal forms in which the product (or its ingredients) are supplied.

2.3 Edit Checks

As the surveys were received, they were reviewed for completeness and legibility. Responses that were missing, unclear, or contradictory were resolved through telephone contact with the SFA. Once all questions were resolved, the survey was entered into the database. A standard verification process was used to verify, on a question-by-question basis the answers provided. SFA responses were verified in relation to other answers given on the survey and were compared to those given by other SFAs to test their reasonableness. For numeric entries, acceptable ranges

and relationships were incorporated into the edit check process. Survey responses were also checked against procurement data submitted by the SFA for consistency.

D. Standard Errors

The standard errors of population means and totals were estimated using a bootstrap or resampling technique that is commonly used in survey data analysis. The major steps in this estimation procedure are described in Appendix A.

Standard errors for a selected list of prominent food items and key SFA characteristic estimates appear in Table II-3. Confidence intervals calculated on the basis of a 90 percent confidence level (plus or minus the point estimate) are also shown.

Table II-3: Standard Error of Estimate for Selected Variables

Variable	Unit of measure	Estimate	Standard error	Confidence interval[1/]	Confidence interval as % of estimate
All acquired foods	thousand dollars	4,642,667	166,996	274,708	5.9
Purchased ground beef	dollars	15,511,523	1,918,827	3,156,470	20.3
Donated ground beef	dollars	83,717,742	6,631,022	10,908,031	13.0
Purchased 2% fluid milk	dollars	97,286,128	8,576,973	14,109,120	14.5
Purchased 1 % flavored milk	pounds	770,347,867	18,844,210	30,998,725	4.0
Purchased formed frozen potatoes	pounds	67,830,866	2,135,367	3,512,679	5.2
Purchased formed frozen potatoes	dollars	29,530,001	1,981,542	3,259,637	11.0
Total enrollment, SY 1996/97	number	41,806,303	1,798,619	2,958,728	7.1
Number of lunches served, SY 1996/97	thousands	3,888,257	173,848	285,980	7.4
Number of free lunches served, SY 1996/97	thousands	1,965,208	133,816	220,127	11.2
School districts managed by food service management companies	number	975	164	270	27.7
Number of public unified NSLP schools	number	75,696	2,714	4,465	5.9

[1/] 90 percent confidence level.

Source: *School Food Purchase Study*, 1998.