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Summer Feeding Design Study—Final Report

Volume II: Feasibility, Design, and Cost of a Participant-Nonparticipant Study

Prepared by Anne Gordon, Michael Sinclair, Laura Kalb, and Fazana Saleem-Ismail of Mathematica Policy Research, Inc.

ERS contact: Jane Allshouse

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I. INTRODUCTION

The Summer Food Service Program (SFSP) was created to provide children from low-income families with nutritious meals when school is not in session. Although the program has undergone many changes in eligibility criteria, administrative procedures, and funding levels since its authorization in 1975, it still serves far fewer children than the National School Lunch Program (NSLP), which aims to prevent hunger among children from low-income families by providing them with nutritious meals in school. The difference between the number of children who participate in each program has always been large. In 1999, 15 million children from low-income households participated in the NSLP, while only 2.2 million received meals through the SFSP (Food Research and Action Center [FRAC] 2000).

The Economic Research Service (ERS) of the U.S. Department of Agriculture (USDA) is interested in learning more about the factors that contribute to the large gap in participation levels between the NSLP and the SFSP and in obtaining detailed information on SFSP operations and administration. Such knowledge will help the USDA's Food and Nutrition Service (FNS) to determine whether future changes in SFSP policy are warranted.

A. PURPOSE OF THE STUDY DESIGN

ERS has contracted with Mathematica Policy Research, Inc. (MPR) to design a study to collect detailed information on SFSP state agencies, sponsors, sites, child participants, and eligible nonparticipants and to estimate the cost of such a study. Two of ERS's primary goals are to use the data to assess whether the program is efficiently meeting its goal of hunger prevention and to identify possible barriers to program participation among low-income children. ERS has asked MPR to design an evaluation that can be completed prior to the next reauthorization period (FY 2003) and

to assess the feasibility and costs of conducting such an evaluation. The current design study has the following components:

- Consulting with ERS and FNS staff and a panel of four experts to identify and prioritize key research issues
- Proposing an appropriate sampling frame and methodology for selecting a representative sample of program providers
- Developing methods of collecting and analyzing data from states, SFSP sponsors, former sponsors, and SFSP sites
- Identifying and developing feasible methods for collecting household and individual data on SFSP participants and eligible nonparticipants
- Developing an instrument for collecting data on participants and nonparticipants
- Pretesting data collection instruments
- Recommending final instruments based on pretest results
- Estimating the costs of a study that uses these methods under alternative requirements for statistical precision

This volume of the report focuses on the design for a study of children who participate in SFSP or come from low-income families but do not participate in the program. (Volume I focuses on the design for a study of program operations of SFSP providers.) The rest of this chapter (1) provides an overview of the SFSP, (2) discusses the program's history along with pertinent findings from other studies conducted on the SFSP, (3) describes the current policy context in which the program is operating, (4) details the research questions on which the design of the participant/nonparticipant component of the study is based, and (5) outlines the structure of the report.

B. OVERVIEW OF THE SFSP

The SFSP is a federal program that operates in 54 jurisdictions (all 50 states, the District of Columbia, Guam, the Virgin Islands, and Puerto Rico). FNS administers the SFSP, providing funds to states to run the program. In most states, a state government agency--typically, the state education agency that administers the school meals program--also administers the SFSP. In states that choose not to administer the SFSP directly, FNS regional offices assume responsibility for the management of the program.

In 1999, SFSP participation was only 14.4 percent of participation in the free and reduced-price components of the NSLP (FRAC 2000). State participation rates ranged from 2.9 percent in Alaska to 67.6 percent in Washington, DC (FRAC 2000).[1]

Local program sponsors, which are approved and monitored by the states, carry out daily operations. Eligible sponsors include public or nonprofit private school food authorities; public or nonprofit private residential summer camps; local, municipal, county, or state government units; public or private nonprofit colleges or universities participating in the National Youth Sports Program (NYSP); and private nonprofit organizations. In FY 1997, about 45 percent of sponsors were schools, about 19 percent were camps, 17 percent were government agencies, 16 percent were private nonprofit organizations, and 3 percent were NYSP programs (General Accounting Office [GAO] 1998b). Sponsors are responsible for applying for SFSP funds, providing meals, and monitoring meal service.

Each sponsor operates one or more sites where meals are served free to children. In 1986, 63 percent of sponsors administered a single site; by 1997, however, this figure had decreased to 51

[1]The SFSP participation figure includes *all* children who participate in the program, whereas the NSLP participation figure includes only those who are considered low-income and are eligible for free or reduced-price meals. Although it is possible some higher-income children participate in the SFSP, they are likely to be a very small percentage of participants.

percent (Ohls et al. 1988; and GAO 1998b). The remaining sponsors operate multiple sites. In 1997, six percent operated 25 or more (GAO 1998b).

There are two types of eligible program sites: open sites and enrolled sites.[2] Open sites are located in neighborhoods where at least 50 percent of the children come from families with incomes at or below 185 percent of the federal poverty level. In enrolled sites, at least 50 percent of the children *attending* the program must live in households with incomes at or below 185 percent of poverty. According to data collected in 1986 (the last year for which relevant data are available), a large majority of sites (79 percent) were open.

Sponsors may receive reimbursement for meals served to all children (regardless of family income level) at an open site. Similarly, at enrolled sites, sponsors may receive reimbursement for meals served to all children who are enrolled in site activities, such as day camp, regardless of income. Residential summer camps may also qualify as SFSP sites. However, they differ from open and enrolled sites in that they only receive reimbursement for meals served to children who meet the income eligibility requirements. Thus, to qualify as an SFSP site, residential summer camps need only furnish income statements for children to whom they intend to serve SFSP meals.

Currently, sponsors may be reimbursed by the USDA through the state for two meals per child per day (except for residential camps and sites serving migrant children, which can receive reimbursement for up to three meals). These meals may be prepared on-site, by a central kitchen, or purchased from a vendor and delivered to the site. The meals and snacks served at SFSP sites must meet the program's meal pattern guidelines, which specify the minimum amounts of several

[2]Recent regulations include new definitions for sites: *closed enrolled site* (open only to enrolled children in which at least 50 percent of the enrolled children at the site are eligible for free or reduced-price NSLP; *open site* (meals are made available to all children in an area in which at least 50 percent of the children are from households that would be eligible for free or reduced-price school meals); and *restricted open site* (initially open to broad community participation, but at which the sponsor restricts or limits attendance for security, safety, or control reasons).

types of foods to be served at each meal. In 1986, more than 99 percent of the sites served lunch, and one-third (33.8 percent) served breakfast (Ohls et al. 1988). Supper was served at 16.4 percent of the sites, whereas morning and afternoon snacks were provided at almost one-quarter of the sites (24.5 percent).

Reimbursement for each meal covers two types of costs: (1) operational costs, including the purchase, preparation, and delivery of meals; transportation (in rural sites); and program and staff time for supervision; and (2) administrative costs, including program management, office expenses, administrative salaries, insurance, and some financial management costs. Reimbursement rates for administrative costs vary by type of site, with higher rates available for meals served at rural sites and self-preparation sites.[3]

C. LEGISLATIVE CHANGES AND PREVIOUS RESEARCH ON THE SFSP

The SFSP began more than 30 years ago as a pilot program that helped to provide meals to children--particularly those from low-income families--when school was not in session and NSLP meals were not available. In 1975, it was authorized as a permanent program that provided funding to sites in areas where at least one-third of the children came from families with an income at or below 185 percent of the poverty level. In 1977, the GAO documented evidence of excessive food waste, poor-quality food, spoilage, inadequate storage, failure to meet meal-pattern guidelines, and other abuses. In an effort to address these issues, Congress restricted the use of private food service companies and vendors, enacted more stringent reimbursement rules, limited the size of some nonprofit organization sponsors, and reformed monitoring and administrative practices (GAO 1990, 1991a, and 1991b). These program changes contributed to a decline in the number of children who

[3]Reimbursement rates for all meals are also higher in Alaska and Hawaii.

reported receiving meals through the SFSP. After reaching a peak of 2.8 million children in 1977, participation levels fell between 1977 and 1981 to approximately 1.9 million (FNS Web site 2000).

In response to continuing reports of problems with the SFSP, Congress, in the Omnibus Budget Reconciliation Act of 1981, reduced funding by $400 million, barred private nonprofit sponsors other than schools and residential camps from participating, and increased from 33 to 50 the percentage of low-income children required in an area for sites to be deemed eligible (FNS Web site 2000). As a result of these legislative changes, the number of low-income children participating in the SFSP dropped even further: the program served only 1.4 million children in 1982, compared to 1.9 million in 1981 (FNS Web site 2000).

FNS contracted with MPR to evaluate the 1986 SFSP. The study was designed to serve two broad purposes: (1) to describe the current operating, administrative, and meal-service characteristics of SFSP sponsors and sites; and (2) to describe the costs incurred by states and sponsors participating in the program. Study findings include the following:

- In 1986, the SFSP served 1.5 million children.
- The ratio of SFSP participation to NSLP participation varied from .06 in the Southwest and Mountain Plains regions to .28 in the Northeast.
- Ninety-four percent of child participants attending sampled sites were served meals that fully met USDA meal-pattern requirements.
- Between 60 and 70 percent of the food served to SFSP participants was actually eaten. On average, 80 percent of the milk served was actually consumed.
- On average, 68 percent of sites in state-administered programs were reviewed annually. The corresponding figure for sites in programs the FNS regional office administered was 30 percent.
- More than half the interviewed sponsors reported operating costs and administrative costs that exceeded the maximum reimbursement levels.

- States that administered their own SFSP devoted significantly more resources to it than states whose SFSP was administered by an FNS regional office. The median cost per participant for the state-administered programs was $2.75, while the corresponding figure for FNS-administered programs was $1.20.

- Camp sponsors reported higher costs per meal than other sponsors. School sponsors had higher costs than government sponsors.

Although the program appeared to have improved in operational integrity, the low levels of participation heightened concerns that the program was not adequately serving children from low-income families, leading to program changes designed to increase participation. These changes included (1) in 1986, extending automatic eligibility to children in families receiving Aid to Families with Dependent Children (AFDC) or food stamps; (2) in 1988, making private colleges and universities participating in the NYSP eligible to sponsor SFSP sites; and (3) in 1989, once again making private nonprofit organizations other than schools eligible to be sponsors. Between 1989 and 1994, the number of children participating in the SFSP rose steadily, from 1.7 million to 2.2 million (FRAC 1999).

Save for 1995 (when participation levels decreased slightly as a result of cutbacks sponsors made in anticipation of major changes in the child nutrition programs), the number of children participating in the SFSP has been relatively stable at about 2.1 million (FRAC 2000). Thus, the focus of program change has once again shifted to improving administrative procedures and reducing operating costs. In particular, the most recent comprehensive welfare reform legislation, the 1996 Personal Responsibility and Work Opportunity Reconciliation Act, lowered reimbursement rates and the number of reimbursable meals per day. It also eliminated start-up and expansion grants and streamlined administrative requirements.

According to a recent GAO study, as of summer 1997, the reductions in reimbursements had little impact on the number and characteristics of sponsors participating in the SFSP or on the

number of children served. Some sponsors reported, however, that they substituted less expensive foods for those previously served, reduced staff wages, and reduced the number of sites (GAO 1998a and 1998b).

The share of sponsors that participated in the program in FY 1996 but did not return in FY 1997 was 9.9 percent, and the dropout rate from FY 1997 to FY 1998 was 7.9 percent (GAO 1998b). According to state officials that GAO interviewed, only 5.5 percent of the sponsors that left the program in 1997 and 1998 did so because of cuts in the reimbursement rate. However, fully 27 percent dropped out for unknown reasons (GAO 1998b). In general, small sponsors and private nonprofit sponsors were more likely to leave the program, but they were also the groups more likely to drop out as a result of reimbursement reductions (GAO 1998b).

Some USDA officials have speculated that major changes as a result of reduced reimbursements would be seen only in 1998, after sponsors had adequately assessed their ability to operate sites with a decreased reserve of financial resources. Advocacy groups suggest that the rate of increase in the number of program sponsors between 1997 and 1998 was much slower than in the early 1990s as a result of the cuts (FRAC 1999). However, the data they cite does not definitively reflect a link between reimbursement rates and program sponsorship.

To improve program access for low-income children, Congress relaxed many of the restrictions on private nonprofit sponsors when it passed the Child Nutrition Reauthorization Act on October 31, 1998. The law expanded to 25 the number of sites that nonprofit sponsors could operate and eliminated prohibitions on contracting with commercial vendors. The effect on program participation remains to be seen.

D. RESEARCH QUESTIONS FOR A STUDY ON PARTICIPANTS/NONPARTICIPANTS

The recent changes in SFSP legislation described above, coupled with continued low participation rates, have increased interest in the effectiveness of the SFSP in reaching low-income children. Little is known about the extent to which lack of access to SFSP sites versus low participation rates in areas with SFSP sites contribute to low SFSP participation rates overall. Thus, factors that contribute to the participation (or lack of participation) of low-income children in the SFSP are a central research and policy concern and are therefore the focus of the participant/nonparticipant component of this design study.

Specific research questions that the study is designed to answer include the following:

- What proportion of children from low-income families participate in the SFSP?
- Of the areas in the United States that are qualified to have an SFSP site based on area eligibility criteria, what proportion is not served?
- How many children from low-income families live in areas that are not eligible for SFSP sites?
- To what extent are low-income parents aware of the SFSP and what it offers?
- What demographic and socioeconomic characteristics affect program participation by children in low-income families?
- What are parents' attitudes toward the program?
- How does the location of the SFSP site influence participation in the program?
- To what extent does the provision of other activities at SFSP sites encourage participation in the program?
- How do participating families' perceptions of different aspects of SFSP sites affect the frequency of program participation?
- To what extent do children from low-income families participate during the summer in non-SFSP activities or programs that also serve food?

This list includes questions the design team compiled before they received input from other parties, as well as those that panel members, ERS and FNS staff, and a GAO staff member raised at our expert panel meeting. Volume I of this report contains a list of meeting participants in its Appendix A.

For answers to the research questions listed above, we recommend collecting (or compiling) and analyzing two different sources of data. For information on participation rates and on the characteristics of children in both well-served and underserved areas, we recommend the analysis of census data using Geographic Information Systems (GIS) tools. For collection of detailed household-level information on program participants and eligible nonparticipants, we discuss the feasibility and costs associated with conducting surveys of parents with school-age children who are eligible for the program and who live near an SFSP site.

E. ORGANIZATION OF VOLUME II

This design report will help ERS determine the appropriate sample and data collection design, analytic methods, and estimated costs of a national study of the SFSP. The study has two primary components: (1) a study of program operations, and (2) a study of program participants and eligible nonparticipants.

Volume I of this report concentrated on the design for the program operations component. Volume II focuses on the design for the participant/nonparticipant component of the study. It is divided into two parts: Part I focuses on secondary analysis using census data and GIS; Part II discusses the feasibility and recommended design for a survey of parents of participating children and low-income children not participating but living near an SFSP site.

Part I (Chapter II) details the use of census data and mapping techniques to obtain information on the locations of participants and eligible nonparticipants relative to the locations of current

program sites. It describes results of a pilot study conducted to demonstrate the feasibility of this approach, issues involved in extending the approaches piloted to the national level, issues involved in using 2000 census data, and the likely costs of the national analysis.

Part II (Chapters III to VII) describes the feasibility, design, and cost of surveying parents of participants and eligible nonparticipants who live near SFSP sites. Chapter III discusses both the feasibility of alternative approaches to obtaining a sample frame and the reasons for the option selected. Chapter IV discusses the sample design for a nationally representative survey of participant and nonparticipant families living near SFSP sites. The chapter also explains the impact of sample sizes and clustering on the precision of the estimates. Chapter V covers the proposed data collection plan for the survey. Chapter VI describes the analytical techniques and plans for using the survey data on SFSP participants and eligible nonparticipants. Finally, Chapter VII discusses cost estimates for the proposed design at two levels of precision for the survey of program participants and nonparticipants.

PART I

SECONDARY DATA ANALYSIS OF SFSP ACCESSIBILITY AND PARTICIPATION

II. ANALYSES USING SECONDARY DATA

This chapter explores how secondary data can be used to examine access to and participation in the SFSP. We illustrate how to integrate two types of secondary information--census data and SFSP participation records--using geographic information systems (GIS), to describe SFSP accessibility and coverage. In addition, we discuss how census data can be used to profile the characteristics of the neighborhoods containing SFSP sites, as in the analysis presented in Ohls et al. (1988).

In order to provide a basis for assessing alternative approaches to the use of secondary data, we begin in Section A by presenting the results of a pilot study we conducted using selected GIS data. In particular, four different lines of analysis are illustrated in this pilot study:

- ***Needs and Resources Mapping*** provides visual displays of SFSP sites in geographic relation to concentrated areas of child poverty.
- ***Distance-Based Analysis*** presents similar information in a tabular format to permit methodical examination of results.
- ***Tract-Based Analysis*** follows the Ohls et al. report, profiling SFSP sites by detailing demographic characteristics of the census tract in which they exist.
- ***State-Level Penetration Analysis*** demonstrates the reach of the SFSP into its target population, children in need, at the state level.

Section B draws on the results of the pilot study to develop recommendations for the planned national study of the SFSP. Section C discusses the costs of the potential analysis.

A. PILOT STUDY

We selected three non-adjacent counties in New Jersey--Camden, Essex, and Cumberland--to design and test our protocols, using SFSP data from summer 1999.[1] Camden County includes Camden city, part of the greater Philadelphia metropolitan area. Essex County includes Newark, a major northeastern city. Cumberland County has a less urban population. In 1999, these three counties encompassed 19 SFSP sponsors and 527 SFSP sites that served more than 42,000 children.

In providing the pilot study results, a child age 18 or below will be referred to as "eligible" for the SFSP if he or she has a family income at or below 185 percent of poverty.[2] We consider a census tract as "qualified" for SFSP services if at least 50 percent of its child residents are "eligible," in that a site in that tract could qualify as an open site.

Sections A.1 to A.4 describe the methodologies used in each of the four lines of analysis pursued in the pilot study, and present the results of the four analyses.

1. Needs and Resources Mapping

Needs and resources mapping provides graphic information on the accessibility of the SFSP to its primary constituency, children at or below 185 percent of poverty. A major advantage of the mapping approach is that it enables us to visualize needs and services. One can infer at a glance whether SFSP sites are located in the areas of highest need, and whether some qualified areas have been overlooked. Census tract maps showing child poverty are overlaid with symbols identifying SFSP sites. Although they are not the only unit that could be used to measure area eligibility or need,

[1]New Jersey was chosen because it will be one of the states involved in the pretest of the survey instruments.

[2]Following the FNS standard method of calculating child poverty, children for whom poverty status is not calculated are assumed to be impoverished. These are children who are not related to any other person in the household; many are foster children.

census tracts are the best geographic areas for analysis because they are uniform and readily available nationally.

Needs and resources mapping utilizes GIS tools that have their foundation in the machine-readable maps that underlie census data collection and publication. These GIS tools exist in commercially available software and services, and MPR and Decision Demographics have employed these tools to analyze other FNS programs.

a. Methods

To depict census tracts in a county according to the percentage of children with family incomes at or below 185 percent of poverty, Decision Demographics used the special 1990 census poverty tabulation of children 18 and under that FNS employs in administering the SFSP. Most census data for small geographic areas such as tracts or block groups do not include the 185 percent poverty threshold as a standard break point, showing instead the 150 percent, 175 percent, and 200 percent of poverty levels; or they lack such tabulations specific to children. To circumvent this problem, FRAC commissioned a special tabulation of the 1990 census (STP144) from the national level down to the block group, which includes 185 percent of poverty as a threshold. Since these data are one of the means for determining SFSP open-site eligibility (along with such sources as school district data on the percentage of children qualifying for free or reduced-price lunch programs), they provide a sound basis for portraying children in need.

Locating SFSP sites and sponsors on maps required a list of site and sponsor addresses that could be translated into their corresponding latitude-longitude points. Computer printouts detailing SFSP sponsor addresses and specific site information (site number, address, dates and hours of operation, number of meals served) were obtained by MPR from the state of New Jersey.

Decision Demographics reformatted the data and geocoded the addresses of SFSP sponsors and sites. At this point, we explored several alternatives. Data sets for Camden and Cumberland counties (approximately 200 addresses) were submitted to a geocoding service, using an automated matching process. The procedure yielded the census geographic unit, down to the block group level, in which each address was located, as well as a latitude-longitude point associated with each address. Approximately 84 percent of Camden County site addresses and 52 percent of Cumberland County site addresses were geocoded in this way. The 54 addresses that did not geocode were primarily the result of missing address ranges, unknown streets, or unknown intersections. Decision Demographics personnel manually corrected many of these addresses, using reverse telephone directories, direct telephone inquiries, and Internet tools.

To increase matching success, we sent address datasets for Camden, Cumberland, and Essex Counties to an address "cleaning" service. The service uses Coding Accuracy Support System (CASS)-certified software to standardize address elements. CASS-certified software configures addresses to meet U.S. Postal Service specifications and, where possible, appends ZIP+4.

Following cleaning, we resubmitted datasets for geocoding. To test the efficacy of address cleaning, both before- and after-cleaning data sets were submitted, as well as the hand-corrected set of uncoded addresses (for Camden and Cumberland counties only) from the first geocoding run. The results are shown in Table II.1.

TABLE II.1

ADDRESSES GEOCODED
(In Percent)

	Camden County	Cumberland County	Essex County
Original Data Set Only	84	52	84
Original plus Hand Corrections	99	87	--[a]
Automated Cleaning Only	86	58	90
Best Effort (all methods)	**99**	**88**	**90**

[a]No hand corrections were made for Essex County.

As shown, there was considerable variation by county in success in geocoding the original data, as well as in the effect of manual corrections versus automated cleaning. Most of the additional address matches were the result of the hand corrections, with the manual process frequently identifying errors not recognized by the automated procedures. Using the best results available, we overlaid geocoded SFSP sponsors and sites on tract poverty maps, using commercial cartographic software.

b. Results

Figures II.1 to II.5 are 1990 census tract maps for the three New Jersey counties showing tracts in which less than 50 percent of children age 18 and under were eligible for the SFSP (unshaded and yellow shading), versus tracts with 50 percent or more eligible children (blue shading). SFSP sponsors and sites are shown on the maps as distinct symbols. Detail maps show the areas in which both poverty and SFSP sites are concentrated. Inset maps show the areas with greater levels of child poverty for the county as a whole.

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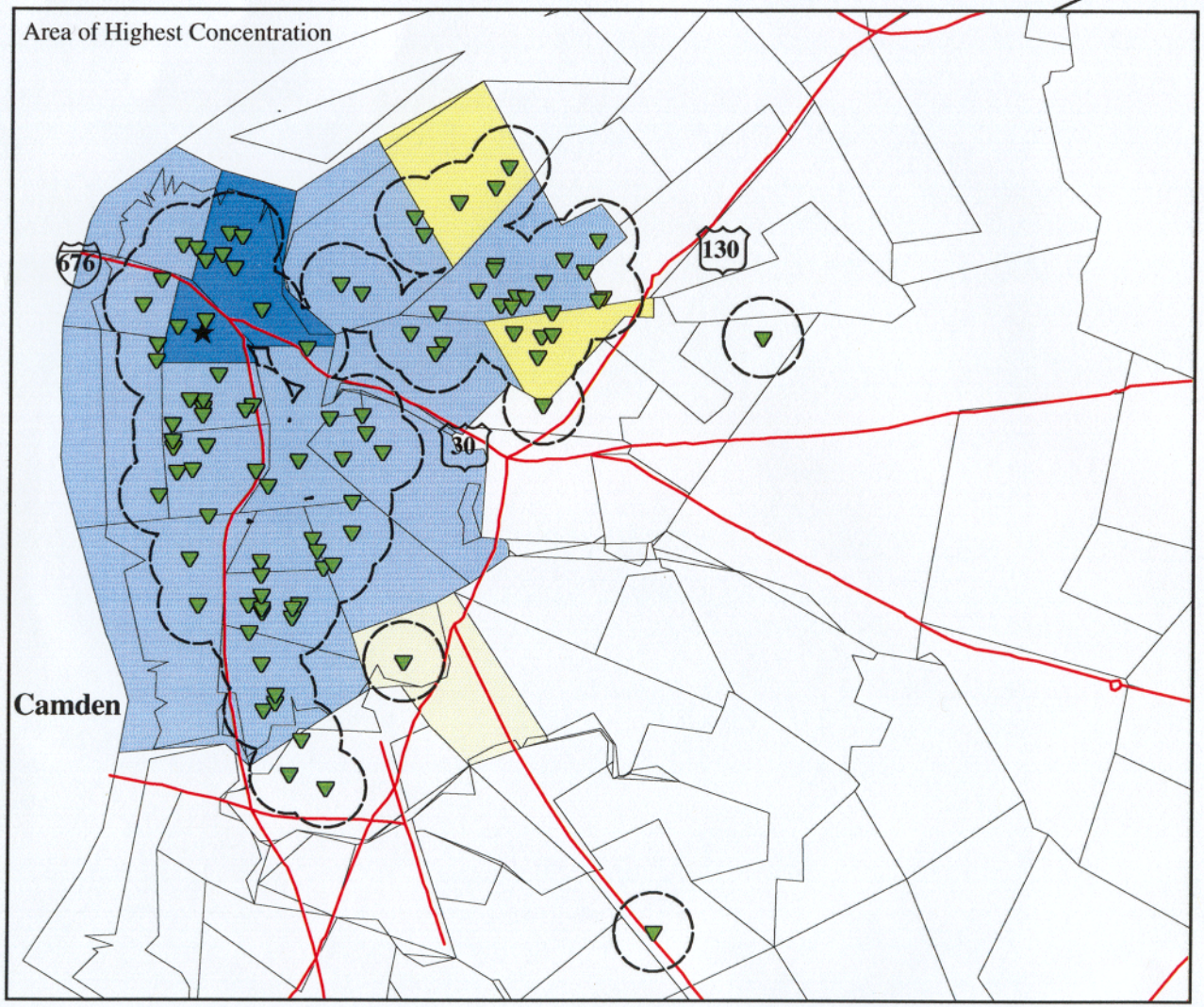
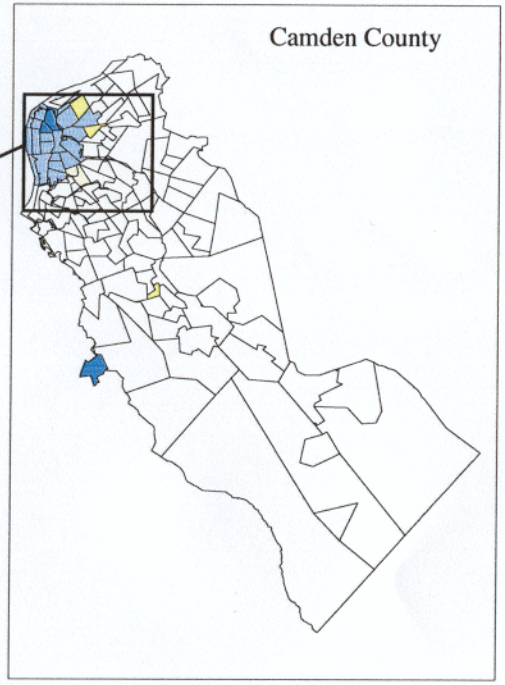
FIGURE II.1

USDA SUMMER FOOD SERVICE PROGRAM

CAMDEN COUNTY, NEW JERSEY





Percent of Children at or Below 185% Poverty

- 75 or more
- 50 to 74
- 40 to 49
- 30 to 39
- 0 to 29

- ★ Sponsor Site
- ▼ Service Site
- ⊙ 0.25 Mile Radius

Decision Demographics 2000

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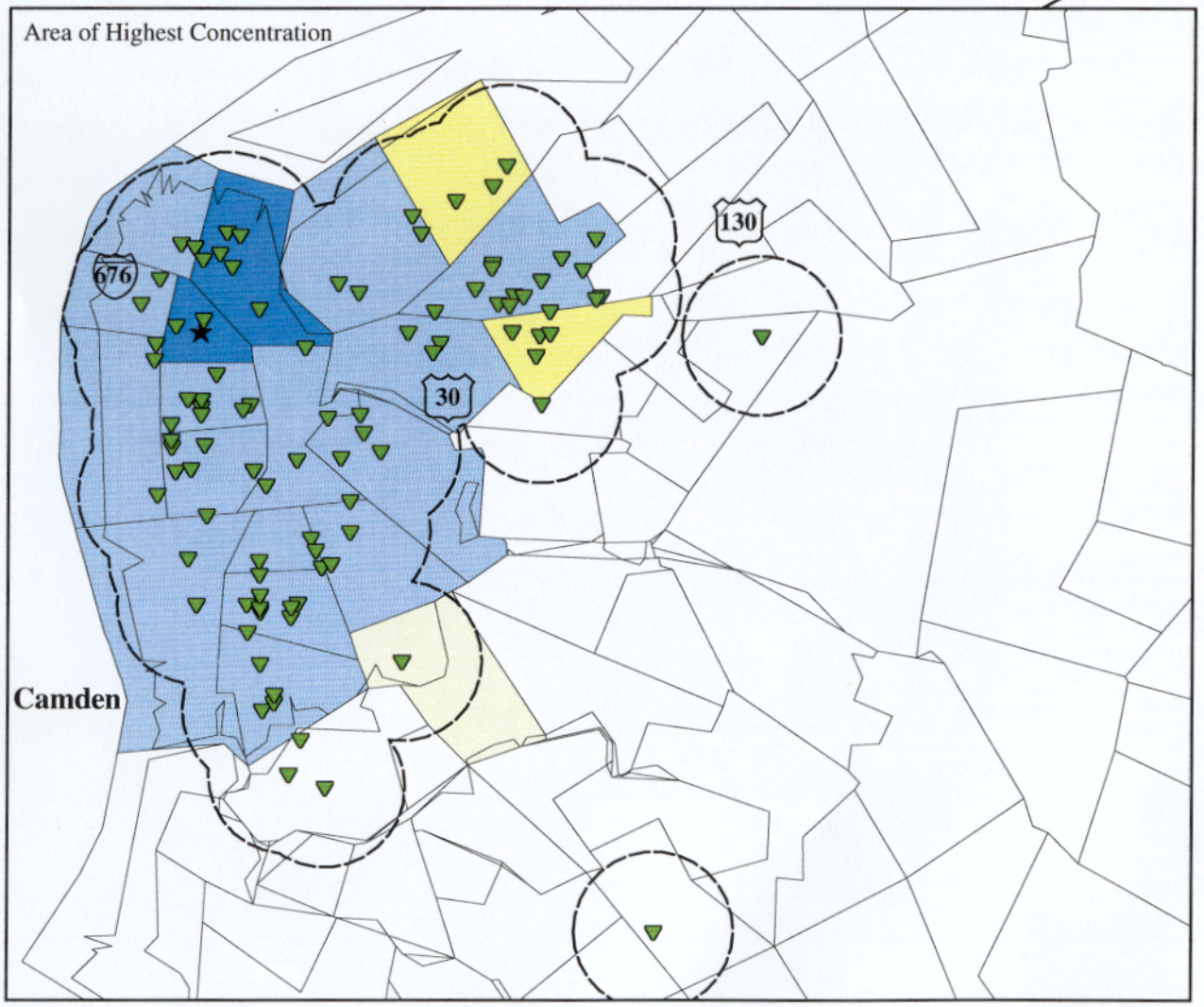
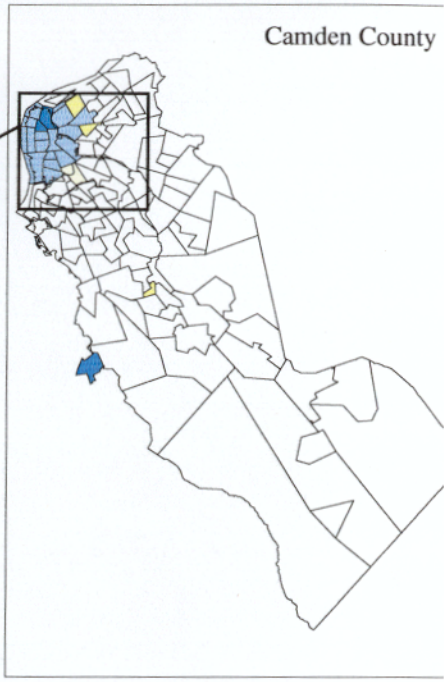
FIGURE II.2

USDA SUMMER FOOD SERVICE PROGRAM

CAMDEN COUNTY, NEW JERSEY





Percent of Children at or Below 185% Poverty

- 75 or more
- 50 to 74
- 40 to 49
- 30 to 39
- 0 to 29

★ Sponsor Site

▼ Service Site

⊙ 0.5 Mile Radius

Decision Demographics 2000

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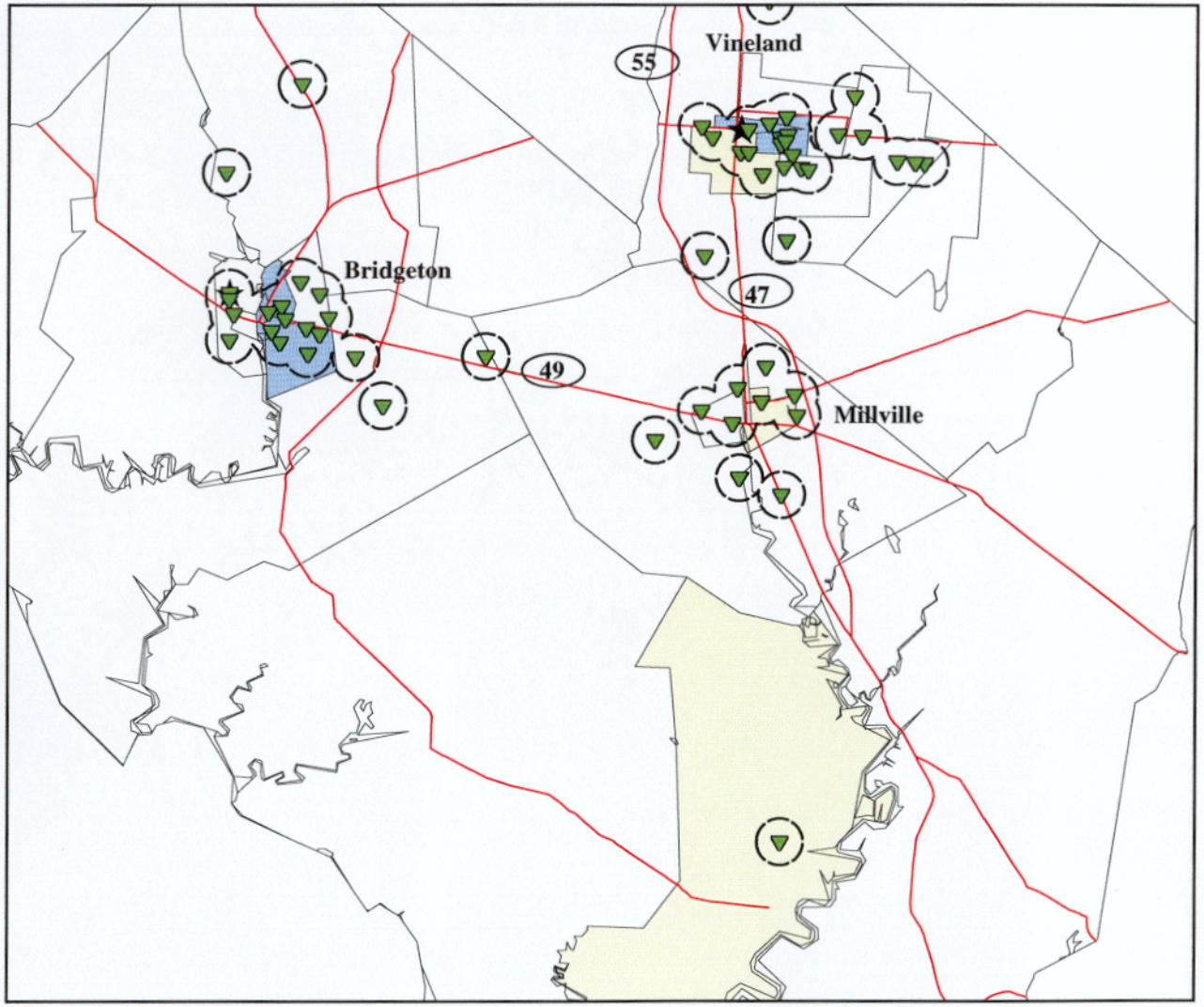
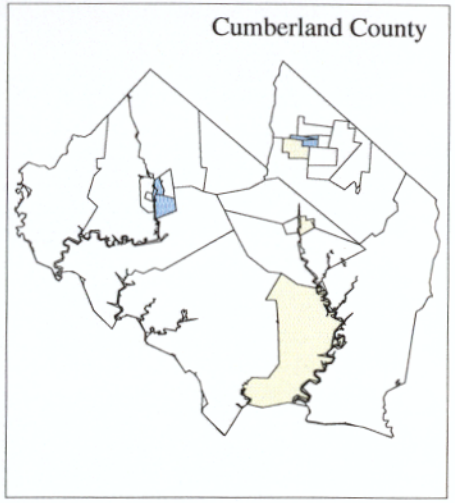
FIGURE II.3

USDA SUMMER FOOD SERVICE PROGRAM

CUMBERLAND COUNTY, NEW JERSEY





Percent of Children at or Below 185% Poverty

- 75 or more
- 50 to 74
- 40 to 49
- 30 to 39
- 0 to 29
- ★ Sponsor Site
- ▼ Service Site
- ⊙ 0.5 Mile Radius

Decision Demographics 2000

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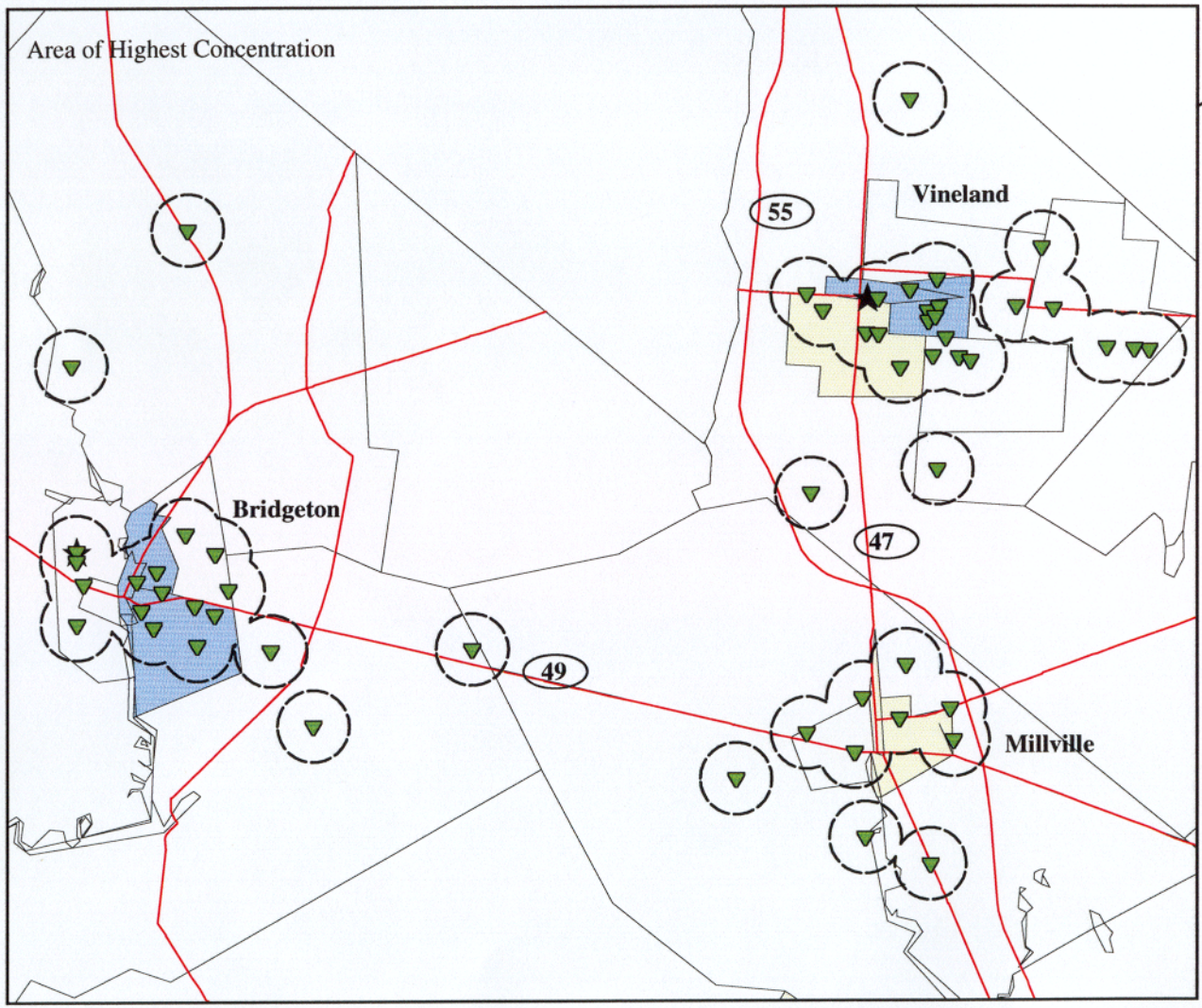
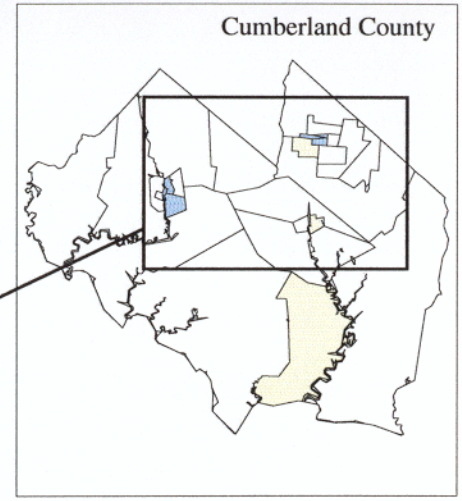
FIGURE II.4

USDA SUMMER FOOD SERVICE PROGRAM

CUMBERLAND COUNTY, NEW JERSEY





Percent of Children at or Below 185% Poverty

- 75 or more
- 50 to 74
- 40 to 49
- 30 to 39
- 0 to 29
- Sponsor Site
- Service Site
- 0.5 Mile Radius

Decision Demographics 2000

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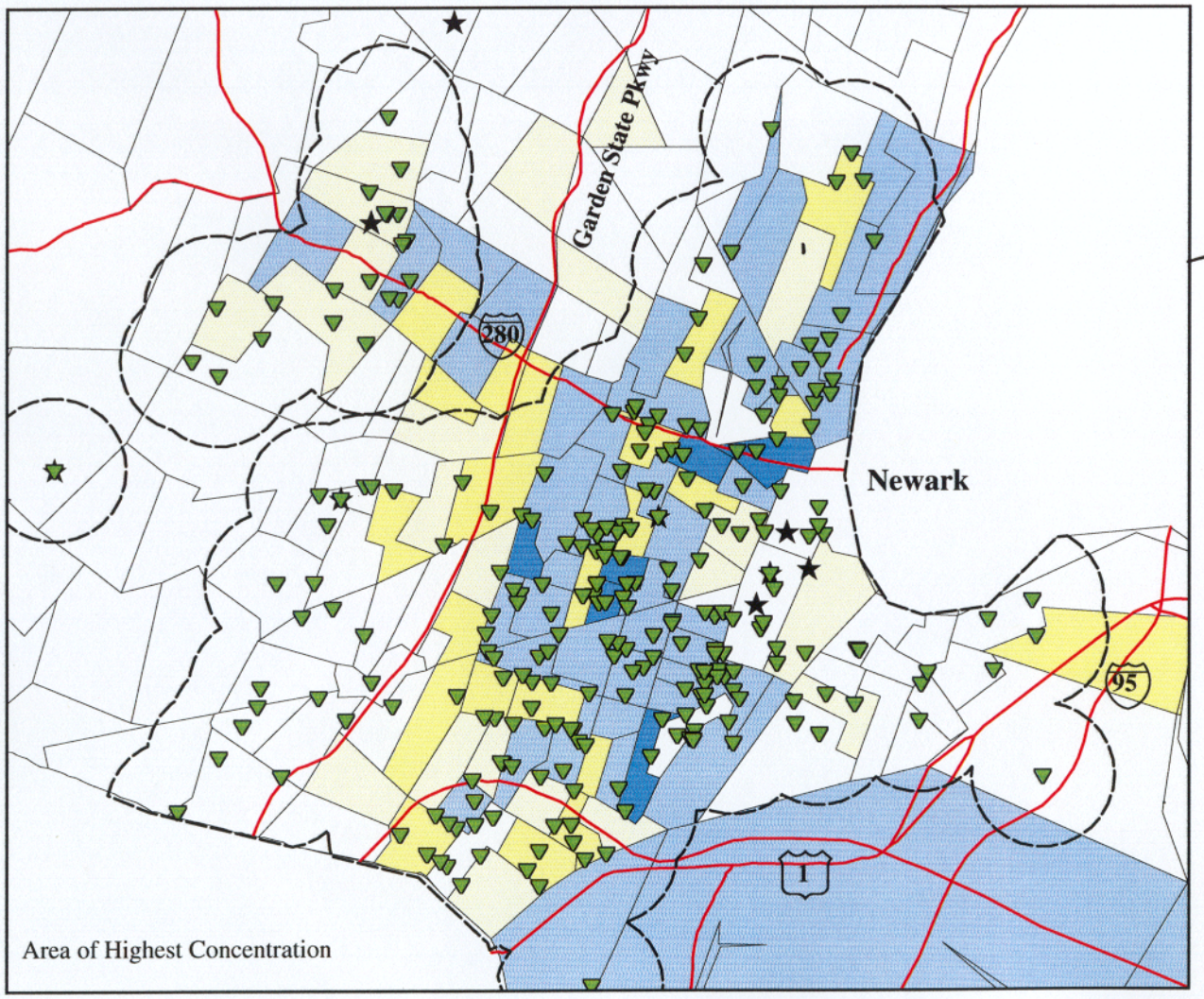
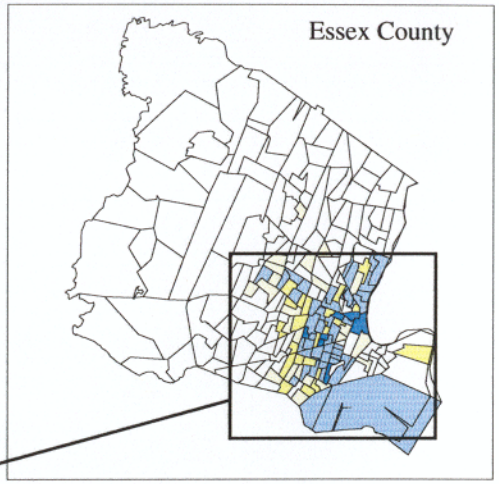
FIGURE II.5

USDA SUMMER FOOD SERVICE PROGRAM

ESSEX COUNTY, NEW JERSEY





Percent of Children at or Below 185% Poverty

- 75 or more
- 50 to 74
- 40 to 49
- 30 to 39
- 0 to 29

- Sponsor Site
- Service Site
- 0.5 Mile Radius

Decision Demographics 2000

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Clearly, poverty in both Camden and Essex counties is concentrated geographically. Camden County appears to have one pocket of high poverty, whereas Essex County has a slightly more dispersed impoverished population, with tracts of lower poverty mixed among tracts of higher poverty. Essex County also shows a more continuous progression from lower poverty areas to higher.

Clustering of SFSP sites in areas of highest poverty is evident, particularly in Camden and Essex counties. Cumberland County has few areas of deep poverty, although the SFSP sites are located in its poorest regions.

While the majority of sites are located in blue tracts, where blue indicates the potential for open-site qualification, a number of sites are located outside these tracts. In fact, in Cumberland County, a number of sites are clustered in areas with no qualified census tracts. There are several reasons why SFSP sites may be located outside of the highest poverty tracts. In some cases, a site may qualify based on the poverty status of a block group within a census tract or on data from a school attendance area. The poverty distribution shown on the map suggests that many of the SFSP sites in 1999 qualified by criteria other than 1990 census tract poverty status. During the decade since the census, these areas may have seen sufficient increases in poverty to qualify on the basis of current free and reduced-price school lunch participation in local schools. In addition, these sites may include residential camps or enrolled sites that qualify on the basis of children attending their particular program. We lack information on the basis of eligibility for specific sites.

2. Distance-Based Analysis

We used distance-based analysis to quantify the information displayed in the maps on the accessibility of the SFSP to children in need. Accessibility in this analysis is defined as the distance from a child's home to an SFSP site. Tabular analysis of distance provides a systematic method of

summarizing, ranking, and comparing distances to sites. In addition, tabular measures readily permit analysis at any geographic level, from a census tract to the nation as a whole. In contrast, mapping generally requires a detailed map page at the county, or even the subcounty level, for each area analyzed, and interpretation of maps is visual and somewhat subjective.

a. Methods

To calculate the distance a child must travel to an SFSP site, we needed the latitude-longitude points of both the child's home and the site. We used the census block group as a proxy location for the child's home since address lists of children were not available. The 1990 census data available at the block group level include the total number of children, the children who lived in families with income at or below 185 percent of poverty, and the latitude and longitude of the block group centroid. All children residing in a block group were assigned a home address of that block group's centroid. We obtained the latitude-longitude points of 1999 SFSP sites through the geocoding process previously described, using the best-effort results.

As discussed earlier, obtaining the latitude-longitude of the sites presents a number of data quality and methodological issues. In addition, using the block group centroid as a proxy for a child's home address will nearly always result in an under- or overstatement of the distance to an SFSP site, depending on the position of the centroid relative to the actual location. However, the error introduced with this approach should present minimal bias, since it can reasonably be assumed that children are evenly distributed across their home block group.[3]

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[3]To obtain some perspective on the potential error in this block-group-centroid approach, we calculated the average distance between block groups in SFSP-qualified and non-qualified tracts for the three-county study area. As shown in the table below, SFSP-qualified tracts have shorter median distances between block groups. This implies higher population density in SFSP-qualified tracts. With greater population density, census tracts and, in turn, block groups are geographically smaller, and the children's assumed location at their block group centroid is likely to be closer to their actual homes.

(continued...)

Distance-based analysis faces additional potential problems when applied to rural areas. Geocoding software is based on the street network of the U.S. Census' TIGER system; geocoding capabilities are highest for metropolitan areas. Outside these street networks, addresses are often geocoded according to their ZIP code. Since ZIP code boundaries are determined by the U.S. Postal Service to optimize mail processing and delivery, their geographic shape and size vary substantially. A ZIP code centroid is the center point of the polygon formed by ZIP code borders. While block groups tend to be somewhat square and compact in shape, the centroid of an erratically shaped ZIP code region could literally be outside its borders.

Aside from these geocoding issues, distance-based analysis cannot take into account some determinants of accessibility. For example, a child might not use the geographically closest site because of physical obstacles such as busy streets, restricted-access highways, railroads, or bodies of water. Daytime child care location could also preclude use of the site nearest to the home block group. In addition, the shortest geographical distance does not necessarily reflect actual walking distance.

Site availability presents another measurement issue. The number and location of sites available to children is not static throughout the summer. Of 469 sites in the study area, 15 percent operated

[3](...continued)

MEDIAN DISTANCE IN MILES TO NEAREST BLOCK GROUP CENTROID
BY TRACT SFSP QUALIFYING STATUS

	Camden County	Cumberland County	Essex County
Block Groups in Qualified Tracts	0.18	0.43	0.17
Block Groups in Non-Qualified Tracts	0.35	0.87	0.22

for less than 30 days. It must be determined whether and how to include short-term sites; we examine the effects of their exclusion below.

b. Results

Detailed tables of distance-based results appear in Appendix A. For the purposes of this discussion, we present several concise tables in the text. Table II.2 shows the median and 95th percentile distance that children must travel to reach an SFSP site. The first two panels show tracts qualified for the SFSP program, based on the percentage of children with near-poverty income. In contrast, the third panel shows the same measures for nonqualified tracts--tracts not eligible for SFSP based on the share of children with income near the poverty level. Within qualified tracts, data are shown for two populations. The first panel shows the distance for all children age 18 and under while the second calculates the distance for low-income children only.

Changes in data definition or universe have little or no effect on distance measures. In Table II.2, for Camden County, using all children 18 and under within qualified tracts, versus only income-eligible children, results in the same median distance to the nearest site.

This lack of effect is apparent in Tables II.3 and II.4 as well, where different data strategies are presented. Table II.3 illustrates the effect of different levels of data preparation, as described in Needs and Resources Mapping. Geocoding the site address as reported by the state (Original Data) is compared to intensive manual address cleaning, lookup, and verification of site location (Corrected Data). As in Table II.2, the results are the same for all children in qualified tracts and for the subset of children with family income at or below 185 percent of the poverty level. Even more detailed tables (Tables A.1 to A.12) reveal only minor variations between original and corrected data,

TABLE II.2

ACCESSIBILITY AS MEASURED BY DISTANCE IN MILES TO SFSP SITE

	Camden County	Cumberland County	Essex County
All Children 18 and Under in SFSP-Qualified Tracts			
Median	0.13	0.18	0.11
95th percentile	0.36	0.65	0.63
Children 18 and Under in SFSP-Qualified Tracts with Family Income 185 Percent of Poverty or Less			
Median	0.13	0.18	0.11
95th percentile	0.36	0.65	0.63
Children 18 and Under in SFSP-Non-Qualified Tracts with Family Income 185 Percent of Poverty or Less			
Median	1.41	0.55	0.21
95th percentile	4.17	4.21	1.94
Children At or Below 185 Percent of Poverty in SFSP-Qualified Tracks (Percent of Children)	55.7	34.5	49.9

TABLE II.3

ACCESSIBILITY AS MEASURED BY DISTANCE IN MILES TO SFSP SITE: COMPARISON OF DATA PREPARATION METHODS

	Camden County		Cumberland County	
	Original Data	Corrected Data[a]	Original Data	Corrected Data[a]
All Children 18 and Under in SFSP-Qualified Tracts				
Median	0.14	0.13	0.27	0.18
95th percentile	0.40	0.36	0.78	0.65
Children 18 and Under in SFSP-Qualified Tracts with Family Income 185 Percent of Poverty or Less				
Median	0.14	0.13	0.27	0.18
95th percentile	0.40	0.36	0.78	0.65

[a]Based on intensive geocoding procedures.

TABLE II.4

ACCESSIBILITY AS MEASURED BY DISTANCE IN MILES TO SFSP SITE:
COMPARISON OF FULL AND RESTRICTED CALENDAR SITES

	Camden County			Cumberland County		
	All	Full	Restricted[a]	All	Full	Restricted[a]
All Children 18 and Under in SFSP-Qualified Tracts						
Median	0.13	0.15	0.23	0.18	0.18	1.05
95th percentile	0.36	0.37	0.61	0.65	0.65	1.59
Children 18 and Under in SFSP-Qualified Tracts with Family Income 185 Percent of Poverty or Less						
Median	0.13	0.14	0.23	0.18	0.18	1.05
95th percentile	0.36	0.36	0.61	0.65	0.65	1.59

[a]Sites open fewer than 30 days.

although differences were a little greater for Cumberland County. The sites in Cumberland County are less densely distributed across qualified tracts; thus, missing any one site has a greater impact on the summary statistics.

Table II.4 breaks down the data for the "full calendar" sites (defined as serving 30 or more days) and "restricted calendar" sites (open less than 30 days) in Camden and Cumberland counties. In Camden County, removing the restricted calendar sites increased the median distance by 0.02 mile; whereas, in Cumberland County, exclusion of the restricted calendar sites had no effect on the median. Therefore, in these two counties, restricted calendar sites had essentially no effect on access.

3. Tract-Based Analysis

Once an SFSP site is geocoded with a latitude and longitude position, the census tract in which the site is located can easily be determined. The census tract can be used as a proxy for the site's service territory. The characteristics of children in that census tract can then be studied as a proxy for the characteristics of children being served by that site, or, more accurately, as a measure of the characteristics of children with access to SFSP sites.

a. Methods

Analysis of the characteristics of children living near SFSP sites can be approached in two ways. The unit of analysis can be either the individual site or the number of participants served by each site. Essentially, weighting to make the sample representative of sites makes all sites equally important. Weighting to make the sample representative of participants focuses the analysis more on large sites.

b. Results

Tables II.5 to II.7 use both approaches in presenting the data. As with the distance-based tabular information, these tables can easily be aggregated to broader geographic levels such as administrative service area, state, or nation as a whole. However, we analyzed only the data for Camden and Cumberland counties.

Tables II.5 to II.7 replicate the tables provided in Chapter V of the 1988 Ohls et al. report, which used 1980 census tract data to profile the SFSP program. We have added the reported language ability of children ages 5 to 17. This information could help clarify the need for program promotion in languages other than English.

Table II.5 shows that, in Camden County, the majority of SFSP sites are located in qualifying census tracts. Cumberland County presents a different distribution. From the Cumberland maps, the presence of numerous sites in nonqualified tracts is visually apparent (Figures II.3 and II.4). Table II.5 confirms the presence of these sites in lower-poverty areas. Recall that nearly 66 percent of children in need in Cumberland County do not live in SFSP-qualified census tracts. Tables II.6 and II.7 display data for Camden County, organized by type of sponsor. All sponsors in Cumberland County were of one type (public or private school authorities).

4. State-Level Penetration Analysis

State-level penetration, defined as the ratio of (a) children served by the SFSP to (b) the population of children with family incomes less than or equal to 185 percent of poverty, is derived independently for each state. It is a measure of the SFSP's coverage of its target population.

Yearly rates of SFSP participation at state and regional levels can be calculated by combining state-level SFSP average daily attendance data with state-level estimates of eligible children. Both

TABLE II.5

1990 CENSUS TRACT CHARACTERISTICS BY PERCENTAGE OF PARTICIPANTS AND SITES, BY COUNTY FOR SUMMER 1999

	Camden County		Cumberland County	
Census Tract Characteristic	Percentage of Participants	Percentage of Sites	Percentage of Participants	Percentage of Sites
Percent of Children at or Below 185 Percent of Poverty				
Less than 10 percent	2.5	5.6	0	0
10 to 19 percent	4.8	6.4	20.5	27.1
20 to 29 percent	4.3	3.2	36.5	32.2
30 to 39 percent	0.4	0.8	24.7	17.0
40 to 49 percent	8.5	8.0	0	0
50 to 74 percent	68.7	64.8	18.3	23.7
75 or more	10.9	11.2	0	0
Total	100.0	100.0	100.0	100.0
Percent Nonwhite				
Less than 10 percent	5.3	6.4	0	0
10 to 19 percent	5.1	7.2	21.3	25.4
20 to 29 percent	0	0	14.2	22.0
30 to 39 percent	0.3	0.8	13.2	6.8
40 to 49 percent	0	0	3.0	6.8
50 to 74 percent	5.2	5.6	40.3	30.5
75 or more	84.1	80.0	8.0	8.5
Total	100.0	100.0	100.0	100.0
Percent Hispanic				
Less than 10 percent	20.1	18.4	41.4	35.6
10 to 19 percent	14.4	19.2	19.3	22.0
20 to 29 percent	15.5	15.2	10.3	15.3
30 to 39 percent	12.3	11.2	0	0
40 to 49 percent	21.2	20.8	23.2	17.0
50 to 74 percent	16.5	15.2	5.8	10.2
75 or more	0	0	0	0
Total	100.0	100.0	100.0	100.0

TABLE II.5 *(continued)*

Census Tract Characteristic	Camden County		Cumberland County	
	Percentage of Participants	Percentage of Sites	Percentage of Participants	Percentage of Sites
Percent Age 5 to 17 Who Do Not Speak English Well				
Less than 10 percent	92.9	93.6	100	100
10 to 19 percent	7.1	6.4	0	0
20 to 29 percent	0	0	0	0
30 to 39 percent	0	0	0	0
40 to 49 percent	0	0	0	0
50 to 74 percent	0	0	0	0
75 or more	0	0	0	0
Total	100.0	100.0	100.0	100.0

TABLE II.6

1990 CENSUS TRACT CHARACTERISTICS BY PERCENTAGE OF SITES, BY TYPE OF SPONSOR, CAMDEN COUNTY, SUMMER 1999

Census Tract Characteristics	Public or Nonprofit Private: School Food Authority	Public or Nonprofit Private: Residential Summer Camp	Units of Local, Municipal, County, or State Government	Public or Private Nonprofit College Participating in National Youth Sports Program	Private Nonprofit Organization
Percent of Children at or Below 185 Percent of Poverty					
Less than 10 percent	--	--	0.9	0	54.6
10 to 19 percent	--	--	1.8	100.0	45.5
20 to 29 percent	--	--	3.5	0	0
30 to 39 percent	--	--	0.9	0	0
40 to 49 percent	--	--	8.9	0	0
50 to 74 percent	--	--	71.7	0	0
75 or more	--	--	12.4	0	0
Total	--	--	100.0	100.0	100.0
Percent Nonwhite					
Less than 10 percent	--	--	4.4	0	27.3
10 to 19 percent	--	--	0.9	100.0	63.6
20 to 29 percent	--	--	0	0	0
30 to 39 percent	--	--	0.9	0	0
40 to 49 percent	--	--	0	0	0
50 to 74 percent	--	--	5.3	0	9.1
75 or more	--	--	88.5	0	0
Total	--	--	100.0	100.0	100.0
Percent Hispanic					
Less than 10 percent	--	--	9.7	100	100
10 to 19 percent	--	--	21.2	0	0
20 to 29 percent	--	--	16.8	0	0
30 to 39 percent	--	--	12.4	0	0
40 to 49 percent	--	--	23.0	0	0
50 to 74 percent	--	--	16.8	0	0
75 or more	--	--	0	0	0
Total	--	--	100.0	100.0	100.0
Percent Age 5-17 Who Do Not Speak English Well					
Less than 10 percent	--	--	92.9	100	100
10 to 19 percent	--	--	7.08	0	0
20 to 29 percent	--	--	0	0	0
30 to 39 percent	--	--	0	0	0
40 to 49 percent	--	--	0	0	0
50 to 74 percent	--	--	0	0	0
75 or more	--	--	0	0	0
Total	--	--	100.0	100.0	100.0

TABLE II.7

1990 CENSUS TRACT CHARACTERISTICS BY PERCENTAGE OF PARTICIPANTS, BY TYPE OF SPONSOR, CAMDEN COUNTY, SUMMER 1999

Census Tract Characteristics	Public or Nonprofit Private: School Food Authority	Public or Nonprofit Private: Residential Summer Camp	Units of Local, Municipal, County, or State Government	Public or Private Nonprofit College Participating in National Youth Sports Program	Private Nonprofit Organization
Percent of Children at or Below 185 Percent of Poverty					
Less than 10 percent	--	--	0.5	0	37.1
10 to 19 percent	--	--	0.8	100.0	62.9
20 to 29 percent	--	--	4.5	0	0
30 to 39 percent	--	--	0.4	0	0
40 to 49 percent	--	--	9.1	0	0
50 to 74 percent	--	--	73.1	0	0
75 or more	--	--	11.6	0	0
Total	--	--	100.0	100.0	100.0
Percent Nonwhite					
Less than 10 percent	--	--	4.8	0	14.3
10 to 19 percent	--	--	0.6	100.0	72.4
20 to 29 percent	--	--	0.0	0	0
30 to 39 percent	--	--	0.3	0	0
40 to 49 percent	--	--	0	0	0
50 to 74 percent	--	--	4.8	0	13.3
75 or more	--	--	89.6	0	0
Total	--	--	100.0	100.0	100.0
Percent Hispanic					
Less than 10 percent	--	--	14.9	100	100
10 to 19 percent	--	--	15.4	0	0
20 to 29 percent	--	--	16.5	0	0
30 to 39 percent	--	--	13.1	0	0
40 to 49 percent	--	--	22.6	0	0
50 to 74 percent	--	--	17.6	0	0
75 or more	--	--	0	0	0
Total	--	--	100.0	100.0	100.0
Percent Age 5-17 Who Do Not Speak English Well					
Less than 10 percent	--	--	92.4	100	100
10 to 19 percent	--	--	7.6	0	0
20 to 29 percent	--	--	0	0	0
30 to 39 percent	--	--	0	0	0
40 to 49 percent	--	--	0	0	0
50 to 74 percent	--	--	0	0	0
75 or more	--	--	0	0	0
Total	--	--	100.0	100.0	100.0

sets of estimates are updated annually. This analysis tracks state-level trends in participation and produces rankings of participation by state.

a. Methods

We calculated penetration rates in two ways, using two different age groups in the denominator. One set of analyses uses each state's income-eligible population for the denominator in creating participation rates. This analysis is the first to examine state-level SFSP participation rates using the state-level estimates of low-income children prepared for FNS by MPR, using "shrinkage" techniques which optimally combine data from the census, the annual Current Population Survey (CPS), and state administrative data. The alternative set of analyses estimates participation as the ratio of participants to the income-eligible population that resides in SFSP-qualified census tracts, based on ratios derived from the 1990 STP144 census tabulation described above.

Several adjustments to the MPR data were necessary to make them comparable to the SFSP participation data. MPR state-level poverty estimates do not include an estimate of 18-year-olds at or below 185 percent of poverty. We factored in the 18-year-old population in a straightforward manner, based on calculating the national ratio of children aged 0 to 18 to those aged 0 to 17, for children at 185 percent of poverty or below. Based on this ratio, the MPR estimate of the 0-17 income-eligible population was inflated by 4.4 percent for 1992 and for each subsequent year. Since the underlying data are estimates, and because this adjuster is a rough approximation, it was not recalculated annually. A similar ratio adjustment approach was followed for the age 5-17 population.

The STP144 census data used in calculations based on qualified tracts also needed adjustment to estimate children age 5 to 18, since these data reflect only the age 0 to 18 population. For each state, the 1990 ratio of total population age 5 to 18 to the population age 0 to 18 was obtained from

other census files and used to adjust the STP144 census poverty population data. Essentially, this approach assumes that poverty in the infant and preschool population is distributed the same way as it is in the school-age population.

b. Results

Tables II.8A and II.9A use a base population aged 0 to 18, while Tables II.8B and II.9B use ages 5 to 18 to reflect the school-age population. We show both age groupings because, although children of preschool age are technically eligible for the SFSP, the program is targeted primarily at school-age children, and other measures of participation compare SFSP participation to participation in free or reduced-price school meals.

Tables II.8A and II.9A provide a look at state-level participation rates over time. The 1992-1997 data present a uniform time series that demonstrates a trend of increasing participation rates. These increases arise from two factors. Over the 1992-1997 period, the number of participants (the numerator) generally increased each year, while those with income at or below 185 percent of poverty (the denominator) decreased each year from 1993 through 1997. The growth in participation rates reflects these trends.

In 1997, participation rates based on the 0 to 18 population ranged from a high of 25.2 percent in the District of Columbia to a low of 0.1 percent in Alaska, whereas the national average was 8.0 percent (Table II.8A). At the regional level, the Northeast had the highest participation rate, at 17.6 percent, and the West had the lowest, at 3.9 percent.

When we define the SFSP target population in a state as being limited to eligible low-income children in qualified tracts, as in Tables II.9A and II.9B, participation rates for some states are greater than 100 percent. For example, in New Hampshire, one of the most extreme cases, the 1990 census counted 39,459 children with family income at or below 185 percent of poverty; only 537 of these

TABLE II.8A

SFSP PENETRATION RATES: AVERAGE SFSP DAILY ATTENDANCE COMPARED TO TOTAL POPULATION AGE 0-18 WITH INCOME AT OR BELOW 185 PERCENT OF POVERTY

	From MPR/FNS Estimates					
State/Region	1992	1993	1994	1995	1996	1997
Connecticut	9.8	9.1	10.3	9.2	10.4	11.4
Maine	2.2	2.6	3.7	4.2	4.9	5.3
Massachusetts	5.1	5.4	6.8	8.6	7.7	9.5
New Hampshire	2.6	3.9	3.5	2.8	3.6	3.1
New York	18.0	18.2	18.8	15.7	16.7	21.4
Rhode Island	10.9	10.8	11.0	17.2	12.9	17.1
Vermont	1.5	4.3	4.1	4.4	5.0	6.1
Northeast Region	**14.0**	**14.2**	**15.1**	**13.4**	**13.9**	**17.6**
Delaware	28.1	26.8	31.9	10.9	11.1	15.0
District of Columbia	9.2	8.5	8.7	9.4	28.9	25.2
Maryland	7.3	7.1	8.1	8.7	7.9	8.6
New Jersey	11.8	11.2	12.9	14.2	11.3	10.7
Pennsylvania	9.8	9.6	9.2	9.5	11.2	12.2
Virginia	6.4	6.3	6.8	6.2	6.2	5.0
West Virginia	3.9	3.6	4.5	5.9	5.9	8.6
Mid-Atlantic Region[a]	**9.0**	**8.8**	**9.4**	**9.3**	**9.7**	**10.1**
Alabama	9.3	8.7	8.6	8.2	7.3	9.0
Florida	12.8	12.2	13.4	11.5	13.3	14.1
Georgia	8.2	10.9	9.0	10.5	9.4	9.6
Kentucky	4.9	4.8	5.8	6.6	7.0	6.6
Mississippi	10.0	9.3	9.6	7.8	7.7	8.4
North Carolina	6.7	5.9	6.1	5.9	5.2	5.2
South Carolina	14.9	14.4	14.5	14.0	16.0	15.6
Tennessee	5.2	4.8	5.3	5.6	6.0	6.9
Southeast Region	**9.5**	**9.4**	**9.7**	**9.2**	**9.6**	**10.1**

TABLE II.8A *(continued)*

State/Region	From MPR/FNS Estimates					
	1992	1993	1994	1995	1996	1997
Illinois	5.7	6.2	7.2	7.7	10.1	10.7
Indiana	2.8	2.9	2.5	1.8	2.5	3.4
Michigan	4.8	5.0	4.6	4.7	4.8	4.5
Minnesota	3.5	4.2	4.3	4.9	5.1	6.8
Ohio	3.2	3.2	3.6	3.9	3.6	3.8
Wisconsin	3.7	4.1	4.7	4.8	5.3	6.2
Midwest Region	**4.2**	**4.4**	**4.8**	**5.0**	**5.7**	**6.2**
Arkansas	4.5	5.4	8.1	7.0	2.9	3.2
Louisiana	8.1	8.0	9.3	8.4	9.9	9.0
New Mexico	19.8	20.4	18.3	18.8	19.3	19.2
Oklahoma	2.7	3.5	3.7	2.9	2.8	3.6
Texas	3.4	3.6	3.8	3.8	3.7	4.3
Southwest Region	**5.2**	**5.4**	**5.8**	**5.6**	**5.5**	**5.7**
Colorado	5.1	4.4	4.9	5.1	4.4	4.5
Iowa	2.7	2.5	2.9	2.7	2.8	2.4
Kansas	2.6	2.5	2.9	2.1	2.2	3.0
Missouri	4.0	4.1	4.5	4.3	5.2	6.0
Montana	3.2	3.4	3.6	3.7	3.6	3.5
Nebraska	3.8	3.6	4.2	3.8	6.5	4.9
North Dakota	4.1	4.2	3.7	4.0	4.4	3.4
South Dakota	5.5	5.6	11.0	6.5	6.5	6.6
Utah	5.2	7.0	8.5	7.9	8.4	9.6
Wyoming	2.1	1.4	0.6	0.9	0.9	1.3
Mountain Plains Region	**4.0**	**4.0**	**4.7**	**4.3**	**4.7**	**5.0**
Alaska	0.1	0.4	0.4	0.0	0.5	0.1
Arizona	4.1	4.8	4.3	3.8	5.1	3.9
California	3.1	3.1	3.3	3.5	4.3	3.8
Hawaii	3.2	3.2	7.1	6.6	2.5	3.4
Idaho	2.0	1.1	1.5	1.8	2.0	1.9

TABLE II.8A *(continued)*

State/Region	From MPR/FNS Estimates					
	1992	1993	1994	1995	1996	1997
Nevada	2.5	2.0	2.8	3.3	2.7	3.5
Oregon	3.5	3.0	3.9	3.8	3.9	4.5
Washington	3.6	4.3	4.8	4.8	5.0	6.0
Western Region	**3.2**	**3.3**	**3.5**	**3.6**	**4.3**	**3.9**
United States	**6.8**	**7.1**	**7.5**	**7.2**	**7.6**	**8.0**

[a]Mid-Atlantic Region here does not include Puerto Rico and the Virgin Islands, although the FNS region does.

TABLE II.8B

SFSP PENETRATION RATES: AVERAGE SFSP DAILY ATTENDANCE (ALL AGES) COMPARED TO TOTAL POPULATION AGE 5-18 WITH INCOME AT OR BELOW 185 PERCENT OF POVERTY

	From MPR/FNS Estimates					
State/Region	1992	1993	1994	1995	1996	1997
Connecticut	9.8	9.1	10.3	9.2	10.4	11.4
Maine	2.2	2.6	3.7	4.2	4.9	5.3
Massachusetts	5.1	5.4	6.8	8.6	7.7	9.5
New Hampshire	2.6	3.9	3.5	2.8	3.6	3.1
New York	18.0	18.2	18.8	15.7	16.7	21.4
Rhode Island	10.9	10.8	11.0	17.2	12.9	17.1
Vermont	1.5	4.3	4.1	4.4	5.0	6.1
Northeast Region	**14.0**	**14.2**	**15.1**	**13.4**	**13.9**	**17.6**
Delaware	28.1	26.8	31.9	10.9	11.1	15.0
District of Columbia	9.2	8.5	8.7	9.4	28.9	25.2
Maryland	7.3	7.1	8.1	8.7	7.9	8.6
New Jersey	11.8	11.2	12.9	14.2	11.3	10.7
Pennsylvania	9.8	9.6	9.2	9.5	11.2	12.2
Virginia	6.4	6.3	6.8	6.2	6.2	5.0
West Virginia	3.9	3.6	4.5	5.9	5.9	8.6
Mid-Atlantic Region[a]	**9.0**	**8.8**	**9.4**	**9.3**	**9.7**	**10.1**
Alabama	9.3	8.7	8.6	8.2	7.3	9.0
Florida	12.8	12.2	13.4	11.5	13.3	14.1
Georgia	8.2	10.9	9.0	10.5	9.4	9.6
Kentucky	4.9	4.8	5.8	6.6	7.0	6.6
Mississippi	10.0	9.3	9.6	7.8	7.7	8.4
North Carolina	6.7	5.9	6.1	5.9	5.2	5.2
South Carolina	14.9	14.4	14.5	14.0	16.0	15.6
Tennessee	5.2	4.8	5.3	5.6	6.0	6.9
Southeast Region	9.5	9.4	9.7	9.2	9.6	10.1

TABLE II.8B *(continued)*

State/Region	From MPR/FNS Estimates					
	1992	1993	1994	1995	1996	1997
Illinois	5.7	6.2	7.2	7.7	10.1	10.7
Indiana	2.8	2.9	2.5	1.8	2.5	3.4
Michigan	4.8	5.0	4.6	4.7	4.8	4.5
Minnesota	3.5	4.2	4.3	4.9	5.1	6.8
Ohio	3.2	3.2	3.6	3.9	3.6	3.8
Wisconsin	3.7	4.1	4.7	4.8	5.3	6.2
Midwest Region	**4.2**	**4.4**	**4.8**	**5.0**	**5.7**	**6.2**
Arkansas	4.5	5.4	8.1	7.0	2.9	3.2
Louisiana	8.1	8.0	9.3	8.4	9.9	9.0
New Mexico	19.8	20.4	18.3	18.8	19.3	19.2
Oklahoma	2.7	3.5	3.7	2.9	2.8	3.6
Texas	3.4	3.6	3.8	3.8	3.7	4.3
Southwest Region	**5.2**	**5.4**	**5.8**	**5.6**	**5.5**	**5.7**
Colorado	5.1	4.4	4.9	5.1	4.4	4.5
Iowa	2.7	2.5	2.9	2.7	2.8	2.4
Kansas	2.6	2.5	2.9	2.1	2.2	3.0
Missouri	4.0	4.1	4.5	4.3	5.2	6.0
Montana	3.2	3.4	3.6	3.7	3.6	3.5
Nebraska	3.8	3.6	4.2	3.8	6.5	4.9
North Dakota	4.1	4.2	3.7	4.0	4.4	3.4
South Dakota	5.5	5.6	11.0	6.5	6.5	6.6
Utah	5.2	7.0	8.5	7.9	8.4	9.6
Wyoming	2.1	1.4	0.6	0.9	0.9	1.3
Mountain Plains Region	**4.0**	**4.0**	**4.7**	**4.3**	**4.7**	**5.0**
Alaska	0.1	0.4	0.4	0.0	0.5	0.1
Arizona	4.1	4.8	4.3	3.8	5.1	3.9
California	3.1	3.1	3.3	3.5	4.3	3.8

TABLE II.8B *(continued)*

State/Region	From MPR/FNS Estimates					
	1992	1993	1994	1995	1996	1997
Hawaii	3.2	3.2	7.1	6.6	2.5	3.4
Idaho	2.0	1.1	1.5	1.8	2.0	1.9
Nevada	2.5	2.0	2.8	3.3	2.7	3.5
Oregon	3.5	3.0	3.9	3.8	3.9	4.5
Washington	3.6	4.3	4.8	4.8	5.0	6.0
Western Region	**3.2**	**3.3**	**3.5**	**3.6**	**4.3**	**3.9**
United States	**6.8**	**7.1**	**7.5**	**7.2**	**7.6**	**8.0**

[a]Mid-Atlantic Region here does not include Puerto Rico and the Virgin Islands, although the FNS region does.

TABLE II.9A

SFSP PENETRATION RATES: AVERAGE SFSP DAILY ATTENDANCE COMPARED TO TOTAL POPULATION AGE 0-18 WITH INCOME AT OR BELOW 185 PERCENT OF POVERTY LIVING IN SFSP-QUALIFIED TRACTS

	From MPR/FNS Estimates					
State/Region	1992	1993	1994	1995	1996	1997
Connecticut	30.8	28.5	32.4	29.0	32.6	35.7
Maine	32.2	37.9	53.0	59.5	70.2	76.2
Massachusetts	19.3	20.4	25.6	32.7	29.4	36.0
New Hampshire	191.7	282.9	260.4	202.6	264.2	226.1
New York	41.3	41.6	43.1	36.0	38.2	49.1
Rhode Island	34.0	33.7	34.2	53.6	40.1	53.4
Vermont	34.0	96.0	91.5	96.8	110.1	134.3
Northeast Region	**38.1**	**38.7**	**41.0**	**36.4**	**37.7**	**48.0**
Delaware	261.4	249.0	296.4	101.6	103.5	139.4
District of Columbia	17.7	16.3	16.7	18.0	55.3	48.3
Maryland	28.3	27.2	31.4	33.7	30.7	33.3
New Jersey	43.7	41.7	47.9	52.7	42.1	39.8
Pennsylvania	36.8	36.2	34.7	35.7	42.2	45.9
Virginia	29.5	29.2	31.2	28.6	28.6	23.3
West Virginia	14.4	13.5	16.9	22.0	22.1	32.3
Mid-Atlantic Region[a]	**34.8**	**33.8**	**36.2**	**35.7**	**37.5**	**38.8**
Alabama	24.6	23.1	22.7	21.7	19.4	23.8
Florida	40.7	38.8	42.6	36.5	42.2	44.8
Georgia	23.8	31.7	26.3	30.6	27.4	28.0
Kentucky	12.6	12.4	15.0	17.1	18.0	16.9
Mississippi	17.7	16.4	16.9	13.8	13.6	14.9
North Carolina	30.3	26.8	27.7	26.7	23.7	23.5
South Carolina	51.7	49.7	50.2	48.4	55.5	53.9
Tennessee	16.3	14.9	16.4	17.3	18.7	21.4
Southeast Region	**27.6**	**27.3**	**28.1**	**26.9**	**27.9**	**29.3**

TABLE II.9A *(continued)*

State/Region	From MPR/FNS Estimates					
	1992	1993	1994	1995	1996	1997
Illinois	15.5	16.9	19.8	21.1	27.5	29.4
Indiana	14.4	14.6	12.9	9.1	12.5	17.3
Michigan	12.7	13.1	12.0	12.2	12.5	11.9
Minnesota	19.3	22.9	23.6	27.0	28.1	37.4
Ohio	9.6	9.4	10.7	11.6	10.8	11.2
Wisconsin	12.8	14.1	16.3	16.5	18.4	21.4
Midwest Region	**13.1**	**13.8**	**14.9**	**15.6**	**17.8**	**19.3**
Arkansas	13.1	15.8	23.6	20.5	8.4	9.4
Louisiana	15.2	15.0	17.5	15.8	18.7	16.9
New Mexico	41.2	42.3	38.0	39.1	40.1	39.8
Oklahoma	9.5	12.2	12.8	10.1	9.9	12.4
Texas	7.2	7.5	8.0	8.0	7.9	9.0
Southwest Region	**11.4**	**11.9**	**12.8**	**12.3**	**12.0**	**12.5**
Colorado	19.1	16.4	18.5	19.1	16.5	16.9
Iowa	23.7	21.9	25.5	23.9	24.3	20.8
Kansas	16.4	15.3	18.0	13.2	13.7	18.9
Missouri	13.7	13.9	15.4	14.6	17.7	20.3
Montana	14.8	15.9	17.0	17.2	16.6	16.4
Nebraska	22.4	21.4	24.7	22.2	38.4	28.8
North Dakota	25.3	26.0	22.9	24.8	27.1	20.6
South Dakota	21.5	21.6	42.6	25.1	25.1	25.7
Utah	41.2	55.5	67.3	62.8	66.5	76.4
Wyoming	21.6	14.4	6.4	9.0	9.7	13.1
Mountain Plains Region	**18.9**	**19.1**	**22.5**	**20.4**	**22.5**	**23.7**
Alaska	0.5	1.5	1.6	0.1	1.7	0.2
Arizona	9.1	10.7	9.7	8.4	11.4	8.8
California	9.1	9.2	9.8	10.5	12.8	11.2
Hawaii	24.5	24.2	54.2	50.4	19.1	25.7

TABLE II.9A *(continued)*

State/Region	From MPR/FNS Estimates					
	1992	1993	1994	1995	1996	1997
Idaho	22.2	12.5	16.2	20.1	22.4	21.1
Nevada	12.8	9.9	14.0	16.4	13.5	17.7
Oregon	30.7	26.6	33.9	33.2	33.8	38.9
Washington	18.4	21.5	24.1	24.4	25.4	30.6
Western Region	**10.3**	**10.5**	**11.5**	**11.8**	**13.8**	**12.7**
United States	**20.4**	**21.0**	**22.3**	**21.3**	**22.6**	**23.8**

[a]Mid-Atlantic Region here does not include Puerto Rico and the Virgin Islands, although the FNS region does.

TABLE II.9B

SFSP PENETRATION RATES: AVERAGE SFSP DAILY ATTENDANCE (ALL AGES) COMPARED TO TOTAL POPULATION AGE 5-18 WITH INCOME AT OR BELOW 185 PERCENT OF POVERTY LIVING IN SFSP-QUALIFIED TRACTS

	From MPR/FNS Estimates					
State/Region	1992	1993	1994	1995	1996	1997
Connecticut	45.6	45.4	47.2	40.1	44.9	46.4
Maine	46.4	53.8	72.5	77.2	91.7	99.2
Massachusetts	26.3	29.4	36.0	44.6	40.6	48.1
New Hampshire	275.9	473.4	345.8	276.0	350.7	293.3
New York	58.3	61.1	64.1	51.5	53.8	69.0
Rhode Island	51.7	51.3	50.5	76.7	55.9	74.2
Vermont	49.3	135.7	130.5	132.8	145.0	175.4
Northeast Region	**54.0**	**56.8**	**60.3**	**51.2**	**52.6**	**66.1**
Delaware	385.9	377.7	428.2	142.4	146.6	190.0
District of Columbia	27.4	26.4	28.3	27.4	83.2	69.3
Maryland	41.6	39.5	43.9	46.8	42.1	45.3
New Jersey	64.5	62.5	66.5	68.9	55.8	51.4
Pennsylvania	52.5	52.3	48.8	49.1	55.1	62.2
Virginia	43.2	44.2	44.3	40.4	39.7	32.2
West Virginia	19.4	18.3	23.6	29.2	29.9	43.6
Mid-Atlantic Region[a]	**50.4**	**49.8**	**51.2**	**49.3**	**50.9**	**52.6**
Alabama	34.5	32.7	31.3	30.1	27.5	33.0
Florida	60.4	58.0	61.4	51.8	60.1	62.7
Georgia	33.7	46.5	36.6	42.6	38.2	38.3
Kentucky	17.5	17.2	20.7	23.4	24.6	23.0
Mississippi	24.7	22.7	23.6	18.8	19.0	20.4
North Carolina	44.4	39.6	40.7	38.2	33.4	32.9
South Carolina	74.3	71.8	70.7	67.3	77.4	73.1
Tennessee	24.0	21.9	23.9	24.2	26.9	31.2
Southeast Region	**40.3**	**40.3**	**40.6**	**38.4**	**40.0**	**41.7**

TABLE II.9B *(continued)*

State/Region	From MPR/FNS Estimates					
	1992	1993	1994	1995	1996	1997
Illinois	22.2	25.1	28.7	31.6	40.1	41.4
Indiana	21.0	21.9	18.8	13.1	17.9	23.8
Michigan	18.2	18.7	17.7	17.4	17.2	16.0
Minnesota	26.4	33.5	33.0	37.6	37.0	49.8
Ohio	13.4	13.5	15.0	16.4	15.4	15.6
Wisconsin	18.2	20.0	22.3	22.9	24.7	30.2
Midwest Region	**18.7**	**20.1**	**21.3**	**22.4**	**25.0**	**26.7**
Arkansas	18.7	22.1	32.6	28.1	12.1	13.4
Louisiana	21.1	20.6	23.7	21.5	25.7	22.7
New Mexico	59.9	61.9	54.6	55.4	57.4	55.5
Oklahoma	13.5	17.2	17.8	13.9	13.9	17.1
Texas	10.6	11.1	11.4	11.1	11.4	12.7
Southwest Region	**16.5**	**17.3**	**18.0**	**17.1**	**17.2**	**17.5**
Colorado	27.3	24.2	26.0	27.1	23.2	23.1
Iowa	33.2	30.9	35.3	32.9	33.9	28.7
Kansas	23.1	21.9	25.5	18.6	19.4	26.2
Missouri	19.9	20.0	22.2	20.4	25.2	28.2
Montana	20.4	21.8	22.6	23.0	22.8	22.2
Nebraska	31.9	30.7	33.6	31.2	54.6	41.6
North Dakota	35.5	37.0	31.4	34.3	36.9	28.2
South Dakota	29.8	30.1	58.7	35.0	35.5	35.5
Utah	58.7	79.6	93.7	92.1	94.2	109.8
Wyoming	30.8	20.5	8.8	12.9	13.8	18.5
Mountain Plains Region	**27.2**	**27.5**	**31.6**	**28.8**	**31.6**	**32.8**
Alaska	0.8	2.3	2.4	0.1	2.3	0.3
Arizona	13.3	15.8	14.2	12.2	16.7	12.4
California	13.6	13.7	14.8	15.2	18.6	16.2
Hawaii	37.7	36.6	83.1	73.9	27.3	37.3

TABLE II.9B *(continued)*

State/Region	From MPR/FNS Estimates					
	1992	1993	1994	1995	1996	1997
Idaho	31.6	17.7	22.4	28.1	32.7	30.3
Nevada	19.5	15.2	20.1	23.8	19.2	24.9
Oregon	45.3	37.9	46.8	46.7	48.3	54.8
Washington	27.5	32.7	34.7	34.5	35.6	42.8
Western Region	**15.2**	**15.5**	**16.9**	**16.9**	**19.8**	**17.9**
United States	**29.7**	**30.9**	**32.2**	**30.3**	**32.1**	**33.4**

[a]Mid-Atlantic Region here does not include Puerto Rico and the Virgin Islands, although the FNS region does.

children resided in the state's two SFSP-qualified census tracts. Some eligible children received services, probably at enrolled sites or camps, yet they were not counted in the denominator. This geographic dispersion of low-income children continued to be reflected in the 1992-1997 data. Nationally, 34 percent of eligible children lived in qualified tracts. It follows that the majority of children in need in the United States lived in census tracts that did not meet the area eligibility standard for an SFSP site.

Tables II.8B and II.9B, which focus on children age 5 to 18, show trends similar to those of II.8A and II.9A. The "B" tables show higher absolute participation rates, since children aged 0 to 4 are removed from the denominator and no adjustments are made to the numerator (the average number of participants).

B. RECOMMENDATIONS

Each of the four approaches used has it own strengths and purpose. The mapping and distance-based approaches display the relationships between the same types of data--census poverty information and geocoded SFSP sites--in two very different ways. Mapping vividly illustrates variations in access at the local level. Tabular data can provide a comprehensible summary measure of accessibility at the national, state, and local levels. Both forms of data presentation could also be useful in ongoing program administration. For a state- or regional-level program administrator, tables could be developed that provide county or state-level summaries, to help identify areas of high and low accessibility. Maps could then be employed to examine local accessibility issues in depth.

The tract-based analysis offers a means of understanding some basic characteristics of children served by the program. This may be most useful in understanding who is using the program and in planning promotion efforts to reach specific populations, including minorities and immigrants. The tables could be tailored with further detail for analysis of local participants, such as cross-tabulations

of race/ethnicity and language. Finally, tract-based analysis could also be used to compare characteristics of eligible tracts with and without sites.

The major strength of the state-level penetration analysis is its ability to track program growth over time. At the state level, it is feasible to update annually the total number of children at or below 185 percent of poverty; this cannot be done reliably at a lower level of aggregation. While the local maps and tabular summaries can be updated annually with the most recent SFSP sites, it is not possible to accurately update child poverty at the tract level. In other words, *supply* (sites) can be followed at the local level from year to year, but *need* (children in poverty) cannot. Need can, however, be estimated at the state level. If economic conditions decline regionally or nationally, these annual updates could capture the increases in children in or near poverty.

Based on the results of the feasibility study, we recommend including, as part of the SFSP study, a national analysis of accessibility and coverage of the SFSP, using each of the four types of analysis. A set of procedures has already been established. The mapping of needs and resources and the distance-based analyses can be carried out in tandem and delivered in a report, and, if desired, in a CD-ROM tabulation and mapping system (see Section B.2 below). The state penetration analysis can be repeated with future years of data that are likely to be produced by FNS for other purposes, thus providing a barometer of the program's growth. The tract-level profiles of SFSP sites can supply information on demographic characteristics of children with access to the SFSP, which can provide a useful benchmark for the participant/nonparticipant survey.

Within the context of an overall decision to conduct these lines of analysis, three strategic issues are particularly important:

1. Whether to use complete national data or to examine only a sample of U.S. counties
2. Whether to build a CD-ROM system to facilitate dissemination of results

3. Whether, and when, to update available census data to year 2000 findings

Each of these is discussed below.

1. Scope of Coverage

The national analysis could be carried out for a nationally representative set of counties or for the entire country. There are two major advantages of undertaking the analysis for all counties. One is that the analysis would be more comprehensive and accurate. Second, and probably more important, undertaking the geocoding work for the entire country would yield maps and tabulations that could be useful to state and local officials at the program's operational level in reviewing their programs and assessing where additional sites are needed.

The main disadvantage of extending the analysis to the whole country is that of cost. Although many costs of the analyses being discussed are largely independent of the number of counties included, the cost of the geocoding work is not; since, as discussed above, geocoding requires considerable manual intervention. In particular, we estimate that the cost differential of extending the analysis to all counties would be in the range of $35,000 to $40,000.[4] Disseminating the results to states and local officials could add substantially more costs, as discussed in the next subsection.

Overall, we believe that extending the analysis to the entire country warrants serious consideration. A final decision must be made by ERS, based on priorities for research and technical assistance.

[4]We have increased this estimate since the draft report, based on increases in our overall geocoding estimates, which are discussed below.

2. Whether to Produce a CD-ROM System with Data and Maps

Once the basic geocoding work is completed, a series of maps and distance-based access tabulations similar to those presented for New Jersey could be created to support the national evaluation of the SFSP. Intensive analysis could be focused on geographic areas for which local program evaluation is being carried out or for other geographies of special policy interest. Tables for the nation, for the 50 states, and for the areas containing sponsors and sites selected for primary data collection, could be produced and analyzed.

It would be impractical, however, to print and deliver a series of more than 3,000 maps showing the SFSP delivery and need patterns for every U.S. county. The most flexible way to produce maps and tables showing the demand for and locations of the SFSP program is to create a CD-ROM system containing all the analysis results for the country, from the census tract level on up to the national level; such a CD-ROM system would generate maps and tables on demand. The user would specify a geographic area and call up census tract data and maps showing the locations of SFSP sponsors and sites, as well as a complete set of social and economic data from the most recent census.

We recommend that consideration be given to designing a standard set of maps like those produced for this feasibility study, which would show SFSP sites and sponsor locations superimposed on census tract poverty counts. Any area, from a neighborhood to the nation, could be mapped. In addition, a standard set of tables would be available that portray child poverty according to detailed distributions (both above and below 185 percent of poverty) and according to whether eligible children live in SFSP-qualified tracts. The tract poverty information would reflect the 1990 or 2000 census data, depending on the timing options ERS chooses (see Section B.3). Tables showing the distance-based results would be calculated at the tract level and at higher levels of geography.

This application could be prepared using the year 2000 sponsor and site lists as part of the deliverables for the national SFSP study. A complete complement of census data on tracts could be added to provide other social and economic neighborhood profiles. Once the data are collected and processed, it becomes possible to create such a CD-ROM tool using existing delivery technology. If desired, annual updates of the software, using updated lists of sites and sponsors, could be used to keep the information current, at modest additional cost.

The CD-ROM would be useful for both evaluation and program purposes. Some states, including Missouri, are doing a limited amount of map-based SFSP targeting and promotion. However, creating the maps presents a substantial technical barrier for staff oriented toward managing the SFSP rather than mastering complex GIS software.

We believe that the CD-ROM system described above could be a useful research and planning tool. Considerable resources would be needed to create it, however. The cost falls into two broad categories. First, it will be necessary to geocode the entire country, rather than a subsample of counties. As noted above, the additional cost of coding the entire country, instead of a subsample, will be $45,000 to $50,000.

The second cost of the system being discussed is the cost of the software itself. We estimate this to be approximately $90,000, as discussed in Section C.

We believe that CD-ROM software could be an exciting tool for ERS to develop. The issue of whether it is worth the cost is one the government must decide.

3. Whether and When to Update Census Data

A key component of the secondary data for evaluating the SFSP are the estimated counts of children by poverty status from the decennial census, at the census tract level. In the feasibility study, 1990 census data have been used for this purpose; in the actual analysis, it will be highly

desirable to use data from the 2000 census. This raises difficult timing issues, however, as discussed below.

a. The Need for the Special Census Tabulation

The SFSP is designed principally to serve children at or below 185 percent of the poverty level. When FNS measures poverty, it makes use of the U.S. Department of Health and Human Services (DHHS) poverty guidelines.[5] FNS takes the further step of computing poverty thresholds that represent an average of the most recent two years of DHHS poverty guidelines. Because the 1990 census asks about income during the previous year, the appropriate poverty thresholds are for 1989. Thus, for the 1990 census, the FNS poverty measures are computed by taking an average of the DHHS poverty guidelines from 1988 and 1989.

Open-site qualification tests for the SFSP depend on the percentage of children at or below 185 percent of the FNS poverty level. Standard Census Bureau tabulations use the census poverty thresholds, not the FNS thresholds, and often do not include the 185 percent threshold. As noted earlier, for previous analysis of the 1990 census data, FNS and FRAC commissioned a special tabulation of the 1990 census for the SFSP.

It would be useful for the geocoding-based analyses of SFSP participation and access if a special poverty tabulation from the 2000 census, similar to that prepared for 1990, were available. Nevertheless, a crucial issue is how soon the special tabulation could be undertaken.

[5]These guidelines are developed annually by DHHS using the census poverty thresholds as a starting point. The DHHS poverty guidelines eliminate differentials that exist in the detailed census thresholds for age of householder and presence of children under 18, and they add cost of living differentials for the states of Alaska and Hawaii.

b. Timing of Different Research Options

Decision Demographics has consulted with Marie Pees, the Census Bureau official who coordinates the special tabulation program, to discuss the feasibility of repeating the special tabulation.

The income data needed for the SFSP special tabulation are part of the "long form" census that is administered to one in six households. Standard tabulations of the long form questions are due to be released on a state-by-state flow basis between August and December 2002. In computer form, these standard tabulations will be known as Sample Summary Files, or SSFs. After production of the SSFs is underway, Census Bureau analysts and programmers are expected to be available to work on special tabulations; this will occur in mid to late 2002. Several special tabulations are already scheduled for the 2000 census. After these are produced, a special SFSP tabulation could be done. In practical terms, this means that custom SFSP poverty data from the 2000 census probably could not be available until spring or summer 2003, well beyond the point when ERS would like to have the results of the planned study.

There are two possible alternatives to using custom poverty tabulations from the 2000 census. First, we could use the 1990 census data; second, we could make adjustments to the standard 2000 census data available earlier. Since, in 2002, SFSP program sponsors still will have the option of qualifying sites according to the 1990 census criteria, using those same criteria for this analysis is potentially defensible. However, the number and location of children in need of the SFSP will have changed; thus, using the 2000 census data would be preferable for understanding the level of need for the program.

The second alternative involves using standard tabulations from the 2000 census. We could gain several months by adjusting the standard SSF poverty tabulations to approximate the SFSP target

population. Draft tabulations from the 2000 census dress rehearsals incorporate two standard tables that are pertinent to the SFSP program. The first table shows the 0-17 population below 100 percent of the poverty level, while the second shows the total population of all ages according to various poverty levels, including 100 percent and 185 percent of poverty. Joseph Dalaker, of the Census Bureau's Poverty and Health Statistics Branch, who is designing the poverty tabulations for the 2000 census, confirms that these tabulations are expected to be available at the census tract level in the 2000 SSFs.

These standard poverty measures could be used for the SFSP evaluation by adjusting them to reflect the SFSP target population. This can be accomplished by applying a series of ratios to the initial estimates of child poverty at the tract level. The first step would be to multiply the 0-17 population below 100 percent of the poverty level by the ratio of (a) the total population below 185 percent of poverty to (b) the total population below 100 percent of poverty. The second step would be to add the 18-year-olds below 185 percent of poverty, using detailed age data at the tract level. The third step would be to use data from the 2000 CPS that incorporate the special FNS poverty definition as well as the standard census poverty definition to adjust for the way FNS defines children in need of SFSP services. Applying these adjustments to the 2000 census data at the tract level would yield approximate SFSP target population counts three to six months before a special tabulation would become available. That is, ratio-adjusted data probably would be available by January or February 2003, versus availability in late 2003 for data from a custom tabulation. The early 2003 date is closer to but still later than the mid-2002 target date for the results of the planned study.

These timing issues must ultimately be resolved by ERS on the basis of its requirements.

C. COST ESTIMATES FOR SECONDARY DATA ANALYSIS

This section describes the estimated costs of the recommended design for the secondary analysis component of the SFSP study, including cost estimates for each major secondary analysis activity. The cost estimates are broken down for specific elements of the secondary analysis, so ERS can use them to decide which elements of the secondary analysis should be funded.

These cost estimates rely on several assumptions. These assumptions are based on the experience of Decision Demographics staff in completing similar secondary analyses and building similar systems for data retrieval and mapping.

1. Cost Assumptions

In estimating cost, we have used market rates for various types of staff and typical assumptions about fringe, overhead, computer, and other direct costs. In addition, we have assumed that the contract will be fixed-price, with a fee level comparable to that of recent USDA fixed-price contracts. We have assumed that the project will commence January 1, 2001 and continue until September 30, 2003.

Many of these tasks are interdependent, and cannot stand on their own. For example, site list collection and geocoding provide the foundation for the custom mapping, the CD-ROM development, the distance-based analysis, and the tract-based analysis. Without the geocoded site list, the other activities cannot proceed. It is possible, however, to collect and process address and other information for a subset of states, as we did for New Jersey in the feasibility study.

Specific discussion of the cost assumptions, by task, follows.

a. Start-Up Costs

The start-up costs are those for the principal investigator and a research demographer to prepare for and attend the first project meeting with ERS.

b. Site List Collection and Geocoding

This task involves receiving site and sponsor address information collected as part of the program operations study from all the states and putting the information into a form that can be used in all the other study tasks. It will require substantial automated and manual reprocessing of the address lists. The format and quality of these lists will determine the extent of post-processing required. Depending on the state, each list will be in a paper form or a computer file. It is likely that states will supply the data in 51 unique formats--one per state. We have evaluated lists from Maryland, Missouri, and New Jersey. These states provided information in paper format, even though the data were stored on a computer system. In addition, we have been told that, in Ohio, although sponsor lists are in a computer database, site lists are currently available only from hard-copy sponsor application forms.

We assume that at least three-quarters of the site and sponsor addresses collected from states will require manual data entry from printed lists. This estimate has been increased on the basis of MPR's experiences during the pretest. We have incorporated time for setting address components from all states into a common, standard format for further processing and geocoding. Additional time for automated and manual address correction and improvement has been allowed, but it is difficult to anticipate the quality of information states will provide. The estimated costs shown in the table assume coding of *all* locations within the United States. Costs could be reduced by approximately 40 percent if only a sample of locations was selected.

c. Custom Mapping

This task involves supporting evaluation activities in specific, selected geographic areas by providing maps of demand for and location of SFSP sites and by providing analysis of the maps to be included in the final report. Maps produced would be similar to those provided in the feasibility study, but they would be tailored to the specific needs and target areas of the evaluation study. Either 1990 or 2000 census data must be used for this task. Census data for 2000 entails costs included in the distance-based analysis.

d. CD-ROM Development

The CD-ROM development activity involves the design of a series of tables and maps that can support analysis of any geographic area in the United States. This budget assumes that the CD-ROM system will be designed as a customized version of an existing CD-ROM-based census information system accompanied by custom documentation. We have assumed that this system will make use of the 2000 census special tabulation so as to provide timely information to potential users. The CD-ROM system is an option that enhances the utility of the site data and demographics for state and local program purposes. Omitting this option would reduce secondary analysis costs substantially.

e. Distance-Based Analysis

The distance-based analysis requires both site address data and special tabulation census poverty data. Either 1990 or 2000 census data must be used for this task. If 2000 data are used, the projected cost of generating a 2000 census special tabulation is included.

f. State Penetration Analysis

Under this task, the state penetration analysis would be updated through the year 2001. The raw penetration of the program into its target age/poverty group can be calculated using the annual

special estimates produced by MPR for FNS. However, penetration rates calibrated according to whether children live in a qualifying tract would need to use the 1990 or 2000 census special tabulation data. Analysis of these results would be incorporated in the final report.

g. Tract-Based Analysis

The tract-based analysis requires both site address data and special tabulation census poverty data. Either 1990 or 2000 census data can be used for this task, but only one round of this analysis is included in the budget. Costs of producing those data are incorporated in preceding tasks. Analysis and presentation of the results in the final report are included in the budget for this task. These tables could also be incorporated into the CD-ROM, if it is developed.

2. Cost Estimates

Costs are summarized in Table II.10, by task. Some uncertainty is associated with these estimates, because the site list collection and geocoding will be relatively labor-intensive and because it is difficult at this point to anticipate how many logistical issues will arise.

Costs are presented for three options. The first option involves completing the analysis in 2002, using 1990 census data. The second option is to complete the analysis in 2003, using 2000 census data. This option includes costs for creating the special census tabulation but not costs for the CD-ROM. The third option also is for the analysis of 2000 census data but includes the costs of developing the customized CD-ROM.

TABLE II.10

COSTS OF SFSP SECONDARY ANALYSIS STUDY
(Dollars)

Study Task	1990 Census Data Only	2000 Census Data without CD-Rom	2000 Census Data with CD-ROM
Start-Up Costs	13,000	13,000	13,000
Site List Collection and Geocoding	92,000	92,000	92,000
Special 2000 Census Tabulation	0	38,000	38,000
Custom Mapping	27,000	27,000	27,000
CD-ROM Development	0	0	90,000
Distance-Based Analysis	43,000	0	0
Distance-Based Reanalysis for 2000	0	51,000	51,000
State Penetration Analysis	29,000	29,000	29,000
Tract-Based Analysis	34,000	34,000	34,000
Project Management	24,000	24,000	24,000
Total	**262,000**	**308,000**	**398,000**

PART II

SURVEY OF SFSP PARTICIPANTS AND NONPARTICIPANTS

III. FEASIBILITY OF A PARTICIPANT-NONPARTICIPANT SURVEY

One part of designing a study of SFSP participants and nonparticipants involves assessing the feasibility of a survey of their parents or guardians. The focus of this survey would be on understanding reasons for participation or nonparticipation, including barriers to participation, knowledge of the program, and perceptions of the meals offered and any associated activities. The major challenge in designing such a survey is developing a sample frame of families with children who are SFSP participants or eligible nonparticipants.

Before embarking on the design for a survey of participants and nonparticipants, we considered the feasibility of three options for developing a sample frame and completing the survey:

1. A telephone survey of a sample selected from lists of children attending (or receiving free or reduced-price school lunches at) elementary schools near a subsample of sites selected for the site observations in the program operations component of the study

2. In-person listing and screening of households in the areas around a subsample of selected sites

3. A telephone survey using a combination of listed directories and random-digit-dialing (RDD) in a subsample of the counties served by selected sponsors

We presented this feasibility assessment to ERS and FNS staff and received feedback from them on the options. This chapter defines the criteria used to assess feasibility, summarizes the options considered and their advantages and disadvantages, and then presents the reasons for pursuing the option chosen. After discussions with ERS and FNS staff, it was decided to pursue the first option, in the more restricted form of obtaining lists of children who receive free or reduced-price lunches from local schools and then conducting telephone interviews with their parents or guardians. The remaining chapters of Part II develop the design for this option.

A. DEFINITION OF FEASIBILITY

We considered three criteria for feasibility for a participant-nonparticipant survey:

1. ***It must be possible to complete the survey with a sufficiently high response rate among eligible families to ensure that data are high quality and not biased.*** In this case, we mean a response rate that is a product of the cooperation rate at the stage of screening or obtaining a list (if applicable) and the actual response rate among eligible families, once they have passed any screener.[1]

2. ***The sample frame must represent the full target population or a segment large enough to provide useful information for policy purposes.*** *S*ome difficult decisions were necessary in determining an acceptable sample frame. We decided that we are only interested in surveying participants and nonparticipants who live near a site. Thus, the catchment area of a site needs to be approximated. In addition, for a school-based list frame, we considered restricting the sample to children in public schools or to children of elementary age.

3. ***The survey must be operationally feasible within the time and resources available.*** With enough resources, any option is likely to be operationally feasible. Some options are clearly more feasible than others, however, particularly given the limited time frame during which the SFSP operates. Furthermore, resources are inevitably limited. We attempted to indicate the approximate relative costs of the options, so that ERS has the best information possible to assess the options. However, we did not prepare detailed budgets for all three options, as our resources permitted us to budget only one in detail.

B. FEASIBILITY OF A SURVEY BASED ON A SCHOOL LIST SAMPLE FRAME (OPTION 1)

The first option considered was to obtain lists of students, with addresses and telephone numbers, from schools in the neighborhood of sampled SFSP sites. The contractor could seek lists either of all students or only of students who have applied for free or reduced-price school meals. This option seemed most appealing initially, because of its efficiency in identifying the target

[1]The true response rates may be difficult to determine in some cases (for example, if adults respond "No" to a screener question on the presence of children just to get rid of the interviewer). In addition, it is difficult to get aggregate data on the number of families with children in these local areas.

population and the associated low cost. Thus, we focused on assessing the issue of whether schools would actually provide the needed lists.

Our initial understanding of the target population of interest was that it involved all low-income children (children with family incomes at or below 185 percent of poverty) living near SFSP sites. Later, FNS and ERS explained that they were interested mostly in the population of children already receiving free or reduced-price school lunches. In addition, our initial understanding of the legal issues with regard to schools was that they were permitted, but not required, to supply this information to a contractor. However, FNS has since clarified that their interpretation of the law is that schools are required to provide a USDA contractor with relevant information from free or reduced-price lunch applications, and they have assured us that their staff will be available to assist the contractor in obtaining cooperation from schools.

This option would proceed as follows:

- As early as possible during the school year before data collection, the contractor would have to select a set of sponsors from the previous year's list and then select a preliminary site sample from the previous year's list of sites.

- The contractor would then need to identify the local school(s) near each site and request the needed list of students from the chief school administrator and the head of the School Food Authority. The list would include parents' names, addresses, and phone numbers, if available. This request would be supported by materials explaining the study and by letters of endorsement from USDA and other relevant agencies or professional organizations. The process of obtaining these lists is expected to take several months.

- After the lists are received, the contractor must convert them to a consistent format and then delete, to the extent possible, addresses outside the catchment area. During the summer, the contractor would then select a sample of students and attempt telephone interviews with their parents or guardians. If the list did not include a telephone number, database searches could locate it. If it was still not possible to find a number, letters would be sent requesting families to call a toll-free number to complete the interview.

- Families contacted by telephone would be screened to verify residence in the site catchment area and presence of a student of the appropriate age. Interviewers would then complete the full interview with respondents who pass the screener.

- Field followup with nonresponders could be attempted, but it would erode much of the cost advantage of this approach.

These steps (and the reasons behind them) are discussed in more detail below.

1. Assessing the Cooperation Rate of Schools

Before we learned from FNS that they interpreted the law as requiring schools to cooperate in providing lists for this study, we were pessimistic that it would be possible to obtain an acceptable rate of cooperation from school districts, particularly from those that are not SFSP sponsors. We based this on discussions both with colleagues who have considerable experience in collecting data from schools and with school officials in a sample of nine school districts nationwide. Our best estimate was that a contractor would achieve a 50 percent cooperation rate.

Based on their interpretation that compliance is mandatory, FNS officials have estimated that a contractor could achieve 90 percent cooperation with diligent efforts and assistance from FNS regional- and state-level staff. For budgeting purposes, we have assumed an 80 percent cooperation rate, but we remain concerned that such a high level of cooperation may be unrealistic, particularly as these requests will be urgent (for reasons described below) and as delays may be effectively the same as refusals.

2. Limits on the Population Covered

We already discussed limiting the study population to students receiving free or reduced-price lunches and living near the SFSP sample sites. Several operational issues lead us to recommend further limiting the population covered under this option:

- For complete coverage, it would be necessary to obtain lists from all levels of public schools--elementary, middle, and high schools. However, obtaining lists from multiple levels of schools would take more effort. Furthermore, middle and high schools cover wider geographic areas, so that a larger proportion of their lists would not be relevant.

- Another issue is students who attend private schools, particularly parochial schools. Should the contractor include them in the sample? If private school students are excluded, the sample will not represent some portion of the student population. If they are included, the contractor would need to determine the relevant private schools and to obtain lists from them as well. At present, we propose to include private schools.

- Site catchment areas and school attendance areas have different borders. There are several possible options for addressing this:

  - The contractor could use the boundary of the school attendance area to define the site catchment area. We would recommend rejecting this option in most instances, since the areas within these boundaries are likely to be much too large, and some sites may be located on borders.

  - If sites are located on or near the border between two school attendance areas, the contractor would need either to obtain lists from both schools or to choose one at random. One concern is that the school more closely involved with the SFSP may be willing to provide a list, while the other school may not.

  - The contractor could geocode the addresses from each school to determine if they are in the site's designated catchment area, then attempt interviews only with addresses sufficiently "near" the local SFSP site. As discussed in Chapter IV, we recommend this approach.

- Those with missing or out-of-date addresses and telephone numbers or no telephones will be more difficult to locate for the survey and may be underrepresented.

- Children who move into the area during the summer (and thus did not attend local schools in the previous year) will not be on the school lists and thus will not be represented. This may bias participation rate estimates upward.

3. Operational Feasibility: Timing Issues

Obtaining lists of student from schools takes several months. In addition, school staff are more likely to consider such requests while school is in session. Thus, it is important to determine which schools need to be contacted as early as possible in the school year before data collection occurs. To do this, sites would ideally be selected in the fall. The contractor would select the part of the

sample of sponsors and sites that will be included in the participant-nonparticipant survey in the fall, based on the previous summer's SFSP sponsors and sites. This implies it would only be possible to survey families near established sites (those that are open in both the previous year and the survey year), not near new sites. Using the previous year's lists may lead to some upward bias in participation rate estimates, as continuing sites are likely to be better known in the community.

In practice, the soonest the contractor could obtain the previous year's lists from states would be when OMB clearance is received (estimated to be February 2001, since the OMB package is scheduled to be submitted in October 2000). The contractor would then select the sample of continuing sponsors and sites as soon as all state lists are received and processed (estimated to be April 2001). This implies that the contractor would not be able to start contacting schools until April at the earliest, close to the end of the school year in many states. This short time frame is a major reason for our concern about obtaining cooperation from schools. Although the likely schedule for the project implies that it will not be feasible to contact schools in the fall, we still recommend selecting the samples so that schools can be contacted as early as possible.

4. Operational Feasibility: Cost Issues

If it is feasible, the school-based option is likely to be the least costly. Up-front costs involve:

1. Obtaining not just lists of sponsors, but also the list of sites in stages, and selecting a preliminary sponsor and site sample based on the previous year's data
2. Identifying the schools near the selected sites and obtaining the lists of students from the schools
3. Processing the school lists for sampling, including geocoding them to determine which students live within the site's catchment area

However, the availability of the school lists would create the possibility of conducting all or most interviews by telephone, which is much less expensive than the in-person interviewing approach discussed next (Option 2). In addition, it would involve much less screening than needed in either Option 2 or Option 3, since the household is known to have school-age children and to be low income, and this reduces costs.

With this approach, it would be possible to use field followup to interview those without telephones or not reachable by telephone. However, field followup would substantially reduce the cost advantage of the telephone approach relative to Option 2, and thus is not recommended.

C. FEASIBILITY OF A SURVEY USING AREA LISTING AND SCREENING TO OBTAIN A SAMPLE FRAME (OPTION 2)

Area listing and screening is the only option for identifying a sample frame for the survey of SFSP participants and nonparticipants that has the potential for representing the full population of interest--children living in areas near SFSP sites. However, it requires an intensive, in-person effort, which makes it the most costly of the options.

An area listing and screening approach to developing a sample frame involves several steps:

- Obtaining detailed street maps of each site's catchment area (available from a number of GIS software packages)
- Dividing the map into segments and sampling segments for listing
- Sending fieldworkers (usually a team of two) to each area to list all residential addresses in the sampled segments
- Screening all or a sample of addresses listed for membership in the population, through a brief, in-person interview at the door

In this instance, the final screening step would involve asking whether there are any children in the household and then screening based on the income of the family or their participation in free or

reduced-price school meals. For families that passed the screener, the interview could be completed in person right away, or the fieldworker could record a telephone number for an interviewer to call. Completing the interview immediately is likely to be more cost-effective.

1. Cooperation and Response Rates

A potential obstacle to this approach is that adults may refuse to answer the screener or may provide false answers to induce the interviewer to leave. For example, if asked, "Do you have any children under age 18?" some respondents might say no, even if they did have children. Some methods for obtaining a good response to the screener could include publicizing the study in the community, structuring questions so that it is not apparent which answer the interviewer is looking for, and offering a small incentive for the interview, which would be mentioned at the outset. If such methods are carefully applied, and the screener and interview are kept brief, cooperation should be fairly high.

2. Limits on the Population Covered

A major advantage of the area listing and screening approach is that there would be no need to limit the population covered. It would be possible to interview parents with children in the full range of ages and to include parents whose children attend private schools. The interviews could also be conducted in the areas around new sites as well as continuing sites (see more discussion in the next section). Furthermore, families new to the area would be included.

3. Operational Feasibility: Timing Issues

The area listing and screening approach does not require any changes from the procedures recommended in Volume I in how sample frame information is obtained for sponsors and sites. In particular, there is no need to obtain site lists from the previous year. Site lists for the survey year,

which include both new and continuing sites, would be used to select the areas in which the interviews would occur. Listing and screening would begin in midsummer. Under all three options, interviews would likely begin in August and continue through October or November.

4. Operational Feasibility: Cost Issues

The costs of in-person data collection would call for concentrating the sample in a subset of the SFSP sites visited, but, for desired precision levels, a substantial number of sites throughout the country would probably have to be visited. The in-person listing, screening, and interviewing would thus require hiring and training a large staff of fieldworkers and/or having fieldworkers do extensive traveling. This presents an operational challenge, particularly because this survey would be going on at the same time as the site visits, which also require a large field staff.

Because of its in-person nature, this option is more expensive than Options 1 and 3. The additional costs include the time costs for interviewers to travel to sites and to travel from house to house, the costs of the travel itself, and the additional recruiting and supervision costs of field interviewers relative to telephone interviewers. The need to screen for presence of children is another factor that makes area listing and screening more expensive than a school list approach, but such screening would also be needed in an RDD survey (Option 3).

D. FEASIBILITY OF A SURVEY USING RDD, LISTED DIRECTORIES, AND TELEPHONE SCREENING TO IDENTIFY THE SAMPLE (OPTION 3)

In our technical proposal, we rejected the option of a telephone survey based on RDD or listed directories, largely because of the difficulties in matching telephone numbers to very small geographies. In particular, RDD samples are for telephone exchanges, but telephone exchanges do not map reliably into small geographic areas such as block groups or even census tracts. In part, we reconsidered the telephone option because we had concerns about the feasibility of the school-based

frame and the cost of the sample frame derived from area listing and screening. In addition, we realized it would be feasible to focus on a larger geographic entity--the catchment area of the sponsor, rather than the site (and that of other sponsors in the same county).

1. Survey of Sponsor Catchment Area

The third possible approach would proceed as follows:

- Randomly select a subsample of the sites that are visited for inclusion in the participant/nonparticipant study.
- Once the sites are selected, note the county in which they are located and whether any other sponsors serve sites there. Obtain site lists from all the sponsors in the county.
- Use GIS to map the catchment areas of all sites in the county. Determine if there are substantial areas that are not close to any site, so that families in those areas can be excluded from the survey.
- Obtain listed telephone numbers for the county and screen out the numbers with addresses outside the catchment areas of all the sites. Call a sample of the remaining numbers and screen for location, presence of children, and income. If the household passes the screener, complete an interview. (Oversampling of listed numbers may be used to reduce costs.)
- Obtain an RDD sample for the county to reach unlisted numbers (removing all numbers in the listed directory sample frame). Call these numbers, and again screen first for location, then for presence of children, and then for income. In this instance, the screener for location would eliminate a large percentage of numbers called.

2. Limits to Sample Frame

The major limit to this sample frame is that it excludes eligible households without telephones, which could represent as much as 15 percent of the target population.[2] An approach that can partially compensate for this would be to include in the interview questions about interruptions in telephone service. If households with such interruptions in the past year are given greater weight,

[2]Based on the CPS 1998 March Supplement public use file, an estimated 14.2 percent of people at or below the 150 poverty level do not have a telephone in the household.

they can be used to represent that proportion of nontelephone households with temporary interruptions in service. However, households without telephones over long periods would still not be represented.

3. Operational Feasibility: Timing Issues

There would need to be enough time between when sites are selected and when interviewing begins to obtain lists of sites from other area sponsors, to obtain the relevant RDD and listed-number samples, and to develop the programming needed to screen for location by telephone. These tasks need to be customized for each area.

Because of the time needed to prepare for the telephone interviewing, it might be necessary under this option, as under the school list option, to select a site sample based on lists of sites from the previous summer. This would be a change from the sampling plan recommended in the design report of Briefel et al. (2000). Unlike with the school list option, the contractor could add new sites to the sample, but this would mean interviewing families close to new sites somewhat later.

If it were possible to reduce to eight weeks or less the time between site selection and being prepared to start interviews, then it might be feasible to select sites as proposed in Briefel et al. (2000). The contractor would subsample the sites selected early (say, by the end of May), then define the county catchment areas and obtain RDD and listed-number samples for them. The contractor would repeat the process for sites sampled in June, then for those sampled in July.

Further study of the time involved in these steps would be needed to determine which method for selecting sites would be the best, but either seems feasible with careful planning.

4. Operational Feasibility: Cost and Analysis Issues

The up-front costs of obtaining the sample, doing the necessary mapping, and writing programs for including geographic screening in the computer-assisted telephone interviewing would need to be accounted for in estimating the costs of this effort. Extensive screening would also be required to find eligible households. Such screening is much less expensive by telephone than in person, however, and telephone interviewers are generally easier to recruit than field interviewers. Thus, this option is likely to be considerably less expensive than the area listing and screening approach, although more expensive than a school list approach.

MPR has successfully completed a similar study. For the Youth Fair Chance evaluation, an evaluation of a community-based initiative for low-income youth for the U.S. Department of Labor, MPR used a combination of RDD and listed directories to complete a telephone survey of youth in 30 communities. The communities were generally defined as one or more census tracts, and extensive screening--using a computer program linked to geographic information on each area--was used to determine if the numbers called were in the appropriate area.

A disadvantage of the county-based approach is that it reduces our ability to link interviews to sites and sponsors for which we have also collected data. Not all participants and nonparticipants interviewed will be close to sites that are being visited as part of the site data collection. Some may not even be close to sites whose sponsors have been interviewed as part of the sponsor survey. This is a drawback, because such linkages could be useful in the analysis. For example, it may be useful to examine whether SFSP participation is related to the extent of site outreach or to the nutritional content of the meals served.

5. Summary and Assessment

Each of the options for the participant-nonparticipant survey discussed has advantages and disadvantages:

- Option 2, the area listing and screening approach, would be best suited to capturing the full population of children potentially eligible for SFSP meals. There would be no need to rule out older children, children served by newer sites, children attending private schools, or children without telephones. This approach would also allow for full linkage of participants-nonparticipants to observed sites, but it is substantially more expensive than the others. Although we did not budget this option in detail, experienced survey division staff at MPR estimate that this option would be at least twice as costly as Options 1 and 3.

- Option 3 involves using a combination of RDD and listed directories to reach the areas served by the SFSP in selected counties. It involves fewer restrictions on the target population than Option 1 and is much less costly than Option 2. However, it also has several disadvantages. One is that it would not be possible to interview families without telephones. Second is that participant-nonparticipant data would not always be linked to a site and sponsor who have been visited or interviewed, which would result in less possibility for linked analysis. As noted, this option is likely to be half or less the cost of Option 2. It is likely to cost more than Option 1, but how much more is not clear.

- Option 1, the school list approach, raises concerns about the feasibility of obtaining lists from a large proportion of schools. However, if schools are obligated to provide information from applications for free or reduced-price school meals, this requirement may mitigate this problem. Furthermore, FNS has assured us that the contractor for this study, if it goes forward, would have full cooperation from FNS staff in obtaining information from schools. The key advantage of this approach is that it would almost certainly be the least costly. It would also allow for full linkage of participants and nonparticipants to observed sites.

Given these considerations, it was decided that Option 1, the school list approach, should be the option for which a detailed design is developed in the rest of the report. This project is expected to receive OMB clearance in February 2001. We believe that obtaining OMB clearance earlier, perhaps through a separate OMB package targeted at the collection of sample frame information, would have been very desirable because of the scheduling issue discussed above. However, ERS judged that it was not feasible to advance the OMB clearance schedule. In light of this, the Option 1 schedule for

the project implies that school lists would have to be obtained late in the school year. It should be recognized, however, that this timing raises substantial concerns about the feasiblity of obtaining a high response rate.

IV. SAMPLE DESIGN

This chapter presents MPR's approach to the sample design for the survey of SFSP participant and eligible nonparticipant families. We define the target population for the survey, in principle, as children who live near an SFSP site and who are "eligible" in the sense that they have family incomes at or below 185 percent of poverty. Respondents to the survey will be these children's parents or guardians.

The objectives of the sample design are as follows:

- ***To Design a Sample That Is Nationally Representative of Both Participants and Eligible Nonparticipants Living near SFSP Sites.*** We propose to rely on the secondary data analysis for information on nonparticipants who do not live near sites. One implication is that it is important to define "near." Another is that we exclude participants at sites that draw participants from wide areas, such as residential camps, since there is no way to define an appropriate group of nonparticipants for such sites.

- ***To Meet Precision Objectives at Minimum Cost.*** We use precision objectives similar to those used in the program operations design report (a 5 percent and 10 percent coefficient of variation on a characteristic with a 50 percent mean). We present sample sizes that reach each of these levels of precision and a level in between, so that ERS can judge the tradeoffs between precision and cost.

- ***To Design a Sample That Is Operationally Feasible Using School Lists as a Sample Frame.*** The use of school lists leads us to propose some restrictions on the target population and has important implications for the timing of data collection activities.

- ***To Ensure That the Data on Participants and Nonparticipants Can Be Linked to Data Collected on SFSP Sponsors and Sites.*** An implication is that the participant-nonparticipant sample selection must be embedded in the process of sampling sponsors and sites for the program operations data collection. Fortunately, this is possible without major changes in the proposed design for the sponsor-site sample.

A. KEY DESIGN ISSUES

This section describes key issues that have shaped the participant-nonparticipant sample design and the decisions we have made with regard to those issues.

1. Precision Standard

As in the sponsor-site study, we provide sample designs, including completed sample sizes and cost estimates, to meet two levels of precision: a coefficient of variation (CV) of 5 or 10 percent for key variables. We also provide sample sizes for a 7.5 percent CV, to provide a sense of an intermediate level of precision, but we have not costed this option. Since the data items collected in this study will be of both a categorical and a continuous nature, with wide differences in the mean levels, the use of the CV provides a convenient and equivalent basis for evaluating the precision in the survey estimates. We note that a CV of 10 percent in a 50 percent characteristic is equivalent to the statement that the 50 percent characteristic has a 90 percent confidence interval between 40.2 percent and 59.8 percent (plus or minus 9.8 percentage points), or a 95 percent confidence interval between 41.8 percent and 58.3 percent (plus or minus 8.3 percentage points).

These precision standards are applied separately to estimates for participants and nonparticipants, since our understanding is that the goal of the study is to provide national estimates for each group. For those instances in which the analysis considers the full sample, the level of precision will be somewhat higher.

2. Limits to Target Population

The ideal target population for this study consists of all children who are eligible and live near an SFSP site. However, as discussed in Chapter III, we propose to obtain student lists from schools that are near the selected food service sites to develop the sample frame of SFSP participants and

nonparticipants, and this leads us to propose several limits to the target population. In addition, we propose additional limits to enhance the operational feasibility of the study.

Our proposed study population would be defined as follows:

- ***Schoolchildren Certified for Free or Reduced-Price School Lunches in the Previous School Year.*** For both practical and policy reasons, ERS and FNS have decided to limit the target population to the students who were eligible to receive free or reduced-price lunches (FRPL) during the school year. A key policy concern has been why FRPL students have such low participation rates in the SFSP. In addition, as discussed in Chapter III, FNS believes that school districts are legally obligated to release lists of FRPL students to USDA contractors; therefore, we anticipate that the contractor doing this study should be able to obtain lists from about 80 percent of the schools selected. Furthermore, by limiting the target population to FRPL recipients, the students on the lists provided will be eligible for the SFSP, which eliminates the need to screen for income eligibility before completing an interview.[1]

- ***Students in Elementary Grades in the Previous Year, Most Likely Kindergarten Through Fifth Grade.*** Since the SFSP serves primarily elementary school children, we also recommend limiting the lists to the elementary school or schools that have students in grades K through 5 living near the selected sites. Obtaining and processing the lists from higher-level schools would increase the cost of the study. Furthermore, since middle and high schools tend to serve wider geographic areas, smaller proportions of the lists would be useful. On average, we anticipate that lists from about 1.5 elementary schools will be needed to develop the sample frame for each selected site. For households with multiple children in grades K to 5, we recommend selecting one child randomly to be the "target" child for the interview.[2]

- ***Students Who Live Near Sites That Serve Geographically Well-Defined Areas and Operate for at Least Two Weeks.*** We propose to limit the study to food service sites that serve a well-defined geographical area and serve meals for at least two weeks during the summer. Many camps, National Youth Sports Programs, and some other SFSP sites operate only for a short period and/or serve children from a wide geographic area. While it might be possible to obtain a list of participants from these programs, it would be very difficult to define and interview the nonparticipant population. As a result, we recommend excluding these nongeographically specific sites from the study population.

[1]One additional limitation of this sample frame is that children who recently moved into the neighborhood will be excluded.

[2]The interviewer will select the child with the most recent birthday to be the target child.

In effect, then, we define the population as students who live near open sites or near enrolled sites that serve a well-defined area.[3]

- ***Students Who Live Near Continuing Sites.*** With a school-based sample frame development strategy, the food service sites for this study must be limited to the sites that operate in both the prior and the current year. School districts often have limited administrative support during the summer, which means that the student lists must generally be obtained during the school year. To meet this objective, the sites to be surveyed must also be identified during the school year. Since lists of current-year sponsors and their sites are not available until after the application process ends in late May or in June, the site sample frame must be developed from the prior summer's lists. This ultimately results in limiting the study population to students who are served by prior-year sites that continue to operate in the following summer.

- ***Students Who Live in the Approximate Catchment Area.*** As discussed below, we recommend defining a catchment area for each site using a strategy that basically draws either one or two circles around each selected site's location. However, any such definition will probably omit some students who attend the site or could attend the site.[4]

3. What Does It Mean to Be "Near" a Site? Definition of Site Catchment Area

The methodology for defining the catchment area has a substantial impact on the study's level of coverage of the target population and the ratio of participant to nonparticipant children encountered. If the catchment area is too narrow, the rate of coverage will be low. On the other hand, if the catchment area is too wide, the majority of sampled children will be nonparticipant children who in reality do not have access to the program. Given the diversity of site situations, we feel a customized procedure is needed to define the catchment area for each site.

[3]The food service sites are also confined to the sites selected for observational visits, which exclude sites in Puerto Rico, the Virgin Islands, and Guam.

[4]Furthermore, we will omit students who have moved out of the area since school ended, as they no longer are near the selected site. If resources permit, we will try to determine whether movers still live in the catchment area, and interview those who do.

We recommend using both the sponsor and site interviews to obtain information on the perceived catchment area for each site. This will enable the design team to obtain two assessments and to consider the consistency of this information in finalizing the catchment areas.

In addition, we recommend the use of a two-tiered catchment area where appropriate. This approach defines an outer "ring" of geography that, based on the available information, covers all the geography from which children could attend the site. Within the outer ring, an inner ring is defined so that the area within it (the first tier) captures 50 percent or more of the site participants. The second tier is defined as consisting of the area between the inner ring and the outer ring. We anticipate that these rings could be defined based on a standard set of distances (radii) such as one-quarter mile, one-half mile, or one mile from the site's location. The reasons for using two tiers are discussed in the next section.

The specific radii used for each site would be determined by considering (1) the geographical nature of the site's neighborhood (such as whether a river runs through it or whether it is densely or sparsely populated), (2) the input from sponsor and site staff, and (3) a detailed map for each selected site location. To limit the judgmental nature of this decision, we recommend defining rules for how the radii are determined to the extent possible, and documenting these rules (and the extent of exceptions from them, if any) in the final study report. It would also be straightforward to include maps of each site's defined catchment area in the final report, if confidentiality concerns do not prevent this.

We considered defining the catchment area based on a combination of the distance tiers and physical or street boundaries. However, we do not recommend using street boundaries or other physical attributes in defining the catchment area, for two reasons. First, the use of street boundaries requires a manual processing step to determine whether the student's address is in the catchment

area, based on a street map review. This increases the cost of conducting the survey. Second, this process results in less standardization in the catchment area definitions. Given these concerns, we recommend basing the catchment area boundaries simply on circles of specified radii. That way, automated methods can be used to determine whether each student's address is within the specified catchment area.

4. Ensuring an Adequate Participant Sample

The primary objective of this study is to describe the characteristics of SFSP participants and eligible nonparticipants living near sites. Specifically, we want to obtain the same precision level for each of these two groups, which in general would imply collecting an equal number of interviews from participants and nonparticipants. However, we must consider two survey-specific situations. First, we anticipate that the participant population will be smaller than the nonparticipant population. Second, we propose not to screen for participation status during the interview, for reasons to be discussed below. As a result, it is likely that more interviews will be conducted with nonparticipants than with participants. Hence, the sample size requirements are driven by the number of completed participant interviews needed to reach the stated precision level. (A sample that achieves the precision goal for participants will achieve the same level of precision or greater for nonparticipants.) However, by using a two-tiered catchment area and oversampling from the population in the inner tier, we hope to ensure adequate representation of participants in the sample and to minimize the differences between the sizes of the two samples.

The rest of this section explains each of these issues in turn.

a. Projecting the Participation Rate in Areas with Sites

To prepare the sample design, we had to make some assumption about the likely participation rate in the areas near SFSP sites. Approximately 15 percent of FRPL children participate in the SFSP nationally (FRAC 1999), but it seems likely that the rate is higher among those who have access to SFSP sites. The research by Decision Demographics described in Chapter II indicates that one-third of all eligible children lived in census tracts that could qualify as SFSP open sites. If all participants lived in such tracts, the participation rate in these areas would be around 45 percent. However, some participants attend enrolled sites or open sites that qualify using other geographic units. Thus, we assume the participation rate in the areas near sites to be about 40 percent.

The actual participation rate depends in part on how the catchment area is defined. This is discussed in Section 4.c below.

b. To Screen or Not to Screen?

One option to increase the ratio of participant to nonparticipant interviews would be to screen for SFSP participation when a sampled respondent first comes on the telephone, and then to terminate interviews with nonparticipants after a sufficient number have been reached. There are two reasons that we do not recommend screening for SFSP participation. First, it is difficult to determine who participates in the SFSP, as most programs are not known by the name "Summer Food Service Program" but simply by the name of the local site. Second, and more important, most of the cost of the interview occurs in locating an eligible respondent. Once an eligible nonparticipant's parent is on the phone, the additional cost of completing the interview is minor, and it will increase the precision of the estimates for nonparticipants. In particular, since we believe the

participant-nonparticipant ratio is not far from 50/50, it does not seem worthwhile to omit the extra nonparticipants.

c. Oversampling the Inner Tier of the Catchment Area as an Alternative to Screening

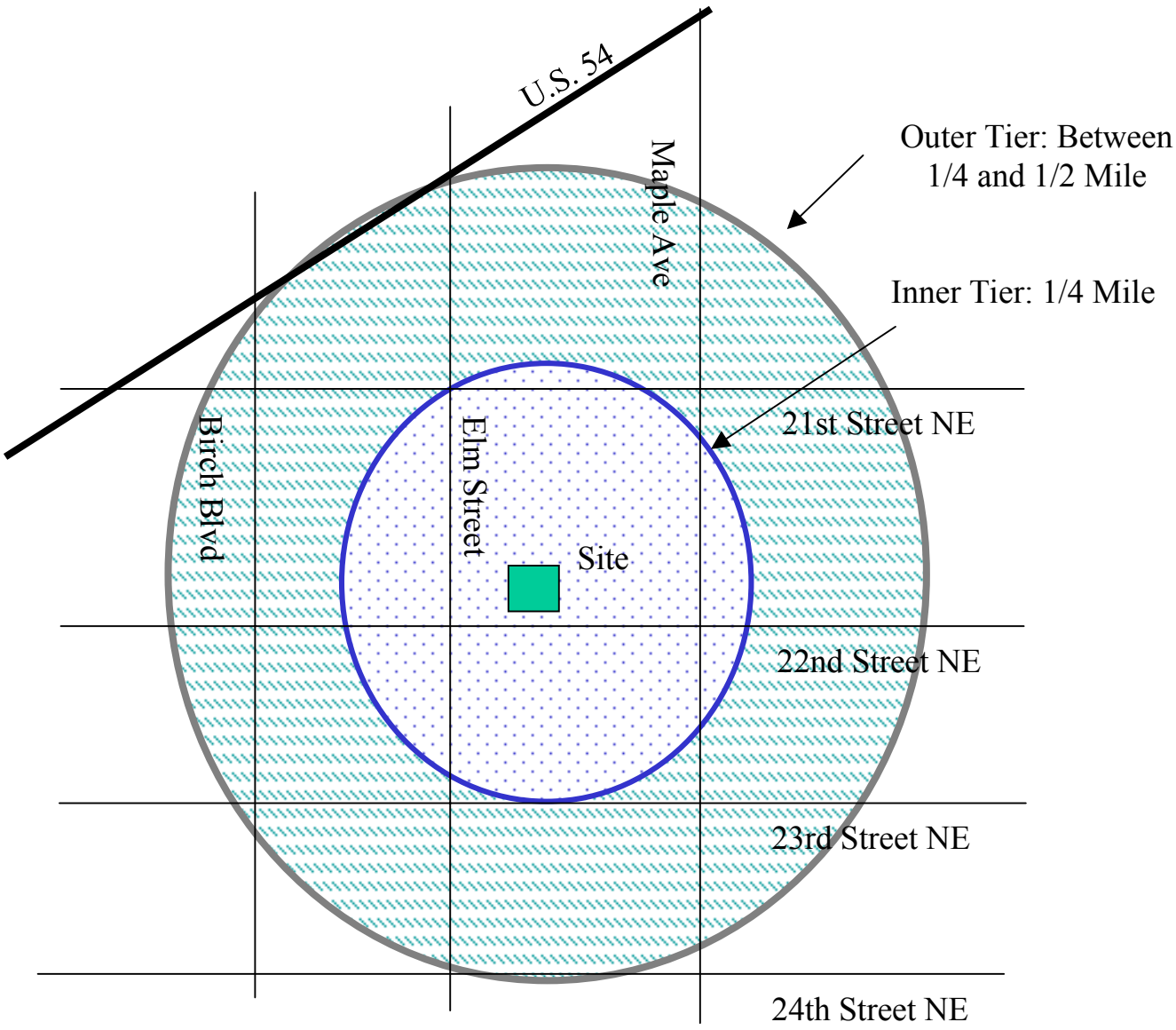
The two-tiered design has two primary benefits compared to a single catchment boundary definition. First, it allows the researcher to oversample students in the inner tier, which should increase the percentage of participants in the sample. Since some of the sample is also obtained from the outer tier, this approach increases the efficiency of the data collection process without sacrificing coverage of the population. Second, oversampling of students in the inner tier alleviates the potential need to screen for participation status during the interviewing. We realize that a two-tiered approach may not be needed for all sites, as some sites will have a clearly and narrowly defined catchment area (such as one building in a housing project). The final procedures for each site should be determined on a site-by-site basis. Figure IV.1 illustrates how the catchment area tiers might be defined for a site in which a two-tiered approach is deemed beneficial.

The two-tiered strategy also permits examination of how the student's distance from the site affects participation rate. We anticipate that, with a two-tiered approach, a researcher could, as needed, define a wider catchment area than would be efficient under a single-tier design. As a result, the study will collect some interviews from students over a wider range of distances, thus enabling a more thorough analysis of how participation is related to distance.

Finally, if the average participation rates are lower than expected in the catchment areas we define, the two-tiered approach allows some flexibility in that we can increase the rate of oversampling of the inner tier in order to obtain a sufficient participant sample.

FIGURE IV.1

EXAMPLE OF SITE CATCHMENT AREA



5. Integrating the Participant-Nonparticipant Sample Design with Sponsor-Site Sample Design

To ensure that we can link data from the participant-nonparticipant interviews to data from the site observations, we want to select as our site sample the sites included in the observation study, or a subset of those sites. Thus, we are in effect adding another sampling stage to the sponsor-site study. In doing this, we have tried to take the design of the sponsor-site study as given, to the extent possible. It was important, however, to check that meeting the precision goals for this study was feasible with the number of sites chosen for the site observation study. As described below, we find that in fact only a small subset of the observation sites need to be included in the participant-nonparticipant study.

The need to obtain lists from schools also requires a slight modification in the design for the sponsor-site study, as described next.

6. Timing Constraints

The selection of the sites for participant-nonparticipant interviews must occur during the school year, so that the contractor can obtain student lists from the schools near selected sites while schools are in session. If a participant-nonparticipant study is conducted, this scheduling problem will require a slight modification in the sponsor and site sampling plan outlined in Volume I. Specifically, Volume I proposed a three-phase procedure to select the sponsors, followed by a single-phase approach to selecting the sites from each selected sponsor once current site lists become available.

However, adding a participant-nonparticipant study implies that the phase one sponsor and site selection procedures must be modified to identify the sites that will be part of the participant-nonparticipant study during the school year. Specifically, we must select sites to be observed from

prior-year sponsors using their prior-year sites. The phase two and phase three sponsor selection procedures and the related site selection steps remain the same.

As noted in Chapter III, it would have been ideal if it were possible to obtain the previous year's sponsor and site lists from the states in the fall of 2000. However, the schedule for OMB approval of the data collection activities for the study precludes this approach. Nonetheless, it will be critical to obtain these lists as early as possible in 2001, so that it will be possible to contact schools before the end of the school year.

B. APPROACH TO PREPARING THE SAMPLE FRAME

The development of the sample frame for the participant-nonparticipant study is interwoven with the sampling process for the study of sponsors and sites. (Appendix B provides a detailed description of the sample frame development procedures for both these studies and how they are interrelated). This section provides an overview of a strategy that will allow the sites for the participant-nonparticipant study to be identified during the school year.

The sponsor-site study design uses a three-phase sponsor selection procedure to select continuing, new, and former sponsors as the lists to identify these type of sponsors become available. Phase one involves selecting a sample of sponsors from the prior-year lists provided by the states. Phase two involves selecting a sample of potential new sponsors from spring lists of sponsors attending new-sponsor training. For phase three, the contractor selects a supplemental sample of former sponsors, identified by comparing current-year and prior-year sponsor lists, once the current-year lists become available in the fall. For phases one and two, a subset of the selected sponsors are selected for site observational studies and, once their current lists become available, a sample of the

sites is selected. In this approach, while the sponsors are selected in phases, the site selection process occurs only once for each selected sponsor using current-year site lists.

Given that the sites for the participant-nonparticipant study must be identified during the school year, the contractor cannot wait to obtain the current-year lists from the sponsors selected in phase one. Therefore, we recommend obtaining prior-year lists of sites from the states.[5] As a starting point, the contractor would select the phase one sample of sponsors and the subset of these that receive site observations as early as possible from the prior-year sponsor lists. Then, from the prior-year lists of sites, the contractor would select a sample of sites for observation (on average 1.5 per sponsor) and select a subset of these (one per sponsor) to be part of the participant-nonparticipant study. Later in the spring, these phase one sponsors are contacted again to obtain a current list of sites. The current-year lists would be used to identify new sites, and a subsample of these would be selected to ensure adequate coverage of the target population. For the phase two and phase three sponsor selection procedures, the methodology remains the same, as none of their sites are used in the participant-nonparticipant study. A detailed flowchart of the sample selection steps is presented in Figure IV.2.

Once the sample of sites is identified, the next steps are to identify the schools from which lists are needed and to obtain these lists. For each of the sites, we recommend preparing a detailed map of the area around the site and using these maps as needed to identify the schools and school districts that serve the area. In many cases, the site will be a school, which will make the identification of the

[5]If necessary, the site lists could be obtained from the phase one sponsors selected for site observations. However, discussions with state administrators during the pretest led us to assume that all would be able to provide site lists for the previous year if contacted before their summer season begins.

FIGURE IV.2

FLOWCHART OF SAMPLING AND INTERVIEWING ACTIVITIES

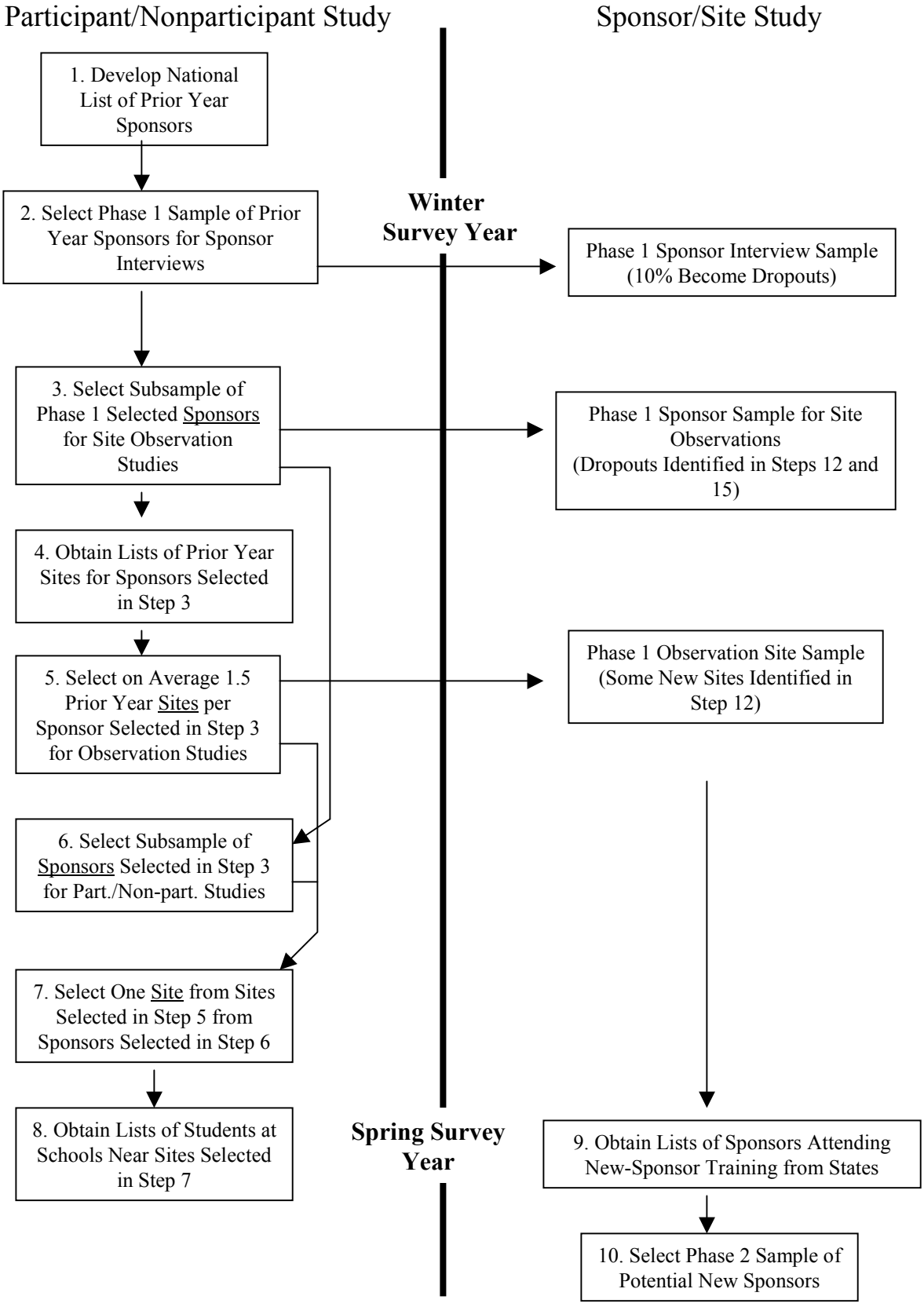
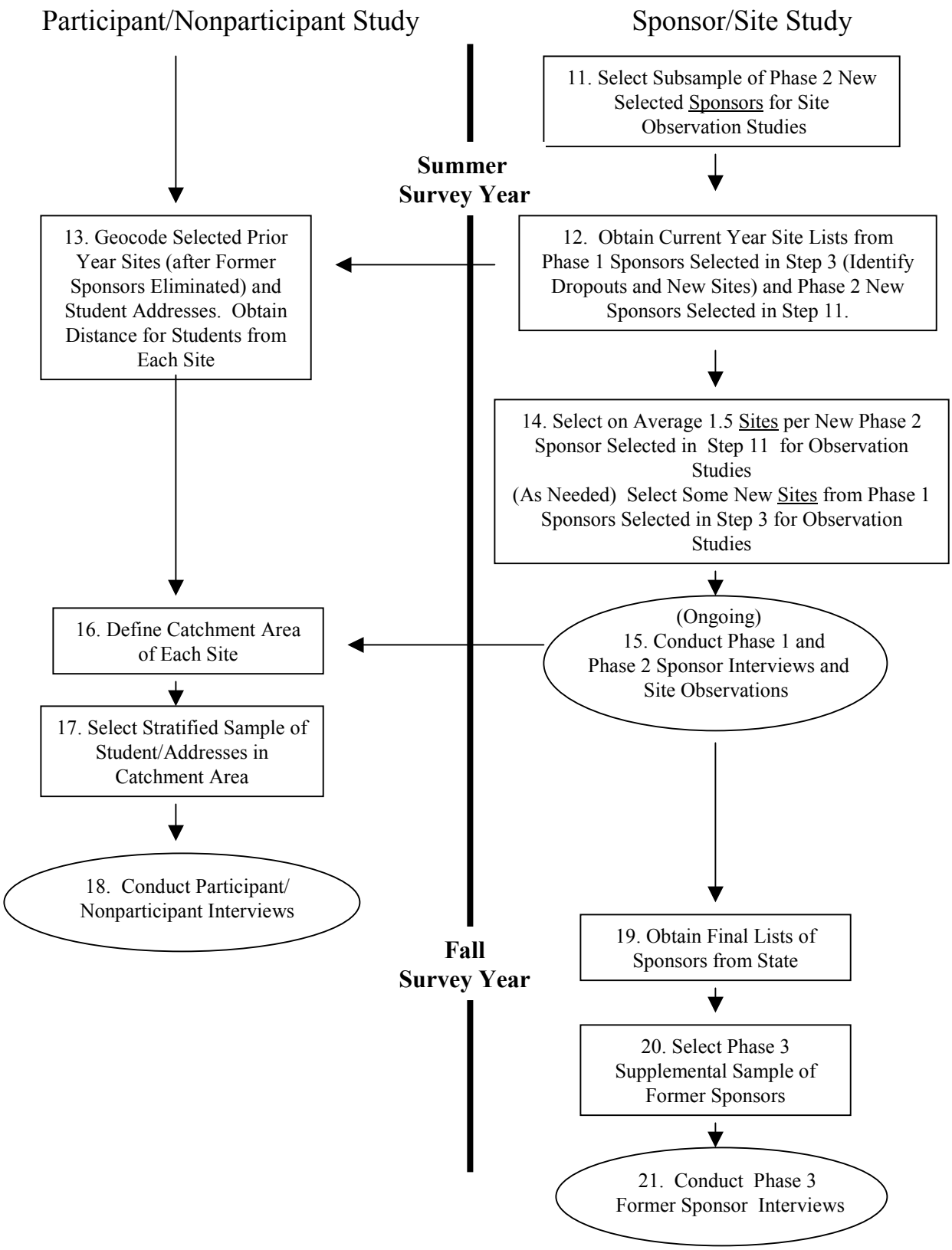


FIGURE IV.2 (*continued*)



related school district easy. In other cases, some calls to school districts or local government agencies may be needed to identify the appropriate district or administrative units.

Once the school districts that are associated with each selected site are identified, these units will be contacted to request the FRPL student lists for the elementary schools (grades K through 5) with students living near the selected sites. The information requested should include at a minimum the student's name, grade, full street address, parent's name(s), and telephone number. The contractor should request the lists from the School Food Authority, but informational letters should also be sent to the chief school administrator for the district and to the principal of the selected school(s). The process of obtaining the lists is expected to take several months. As noted above, we anticipate an 80 percent cooperation rate from the selected schools and plan to oversample sites accordingly.

As discussed previously, the catchment area for each selected site will be determined after the visit to that site. The addresses of both the students on the school lists and the selected sites will be geocoded in order to determine whether the students are in the catchment area. Success in geocoding the address depends on the quality of the address information. Addresses that cannot be geocoded will either be placed in an "unknown" sampling stratum and undersampled, or they will be dropped from the study. Hence, the level of coverage of the target population is dependent on the effort expended to geocode the lists. The appropriate trade-off between coverage and cost must be determined at the time of the study, depending on the quality of the school data provided. At a minimum, before attempting the geocoding process, we recommend processing the student lists to standardized the final electronic format and to parse or reformat the address information. A combination of phone look-up and reverse directory procedures should be used to obtain missing phone numbers or missing physical address information.

For the selected sites, we also recommend contacting the selected sponsors to obtain a list of their sites with detailed address information, such as the cross-street names near the site. So as not to indicate which site was selected, we recommend asking for this information for all their sites and keeping the focus of the interview as general as possible.[6] We assume that with these efforts all the sites will be geocoded.

After the student lists are entered and cleaned, they should be geocoded to reflect the distance between the student's address and the sampled site.[7] These distance measures will then be used to determine who is in the catchment area. The students identified as being in the catchment area (with the addition of some students with unknown addresses as deemed appropriate) define the final participant-nonparticipant sample frame for the study. The students in the frame may be stratified by distance tier, as discussed above. Then a random sample should be selected from each tier.

C. MODELING THE SAMPLE SIZES NEEDED AT EACH STAGE, TO MINIMIZE COST

To determine how many students' parents to interview, we need to consider both the number of sites to select and the number of students to select from each. Given the costs associated with contacting school administrators, processing the school lists, and defining the catchment areas, the costs of this survey are dependent on the number of sites selected, as well as on the total number of interviews completed. However, the greater the clustering of the students by site, the lower the

[6]We also need to geocode addresses of the other sites, in order to determine if there are sites very near the selected site that should be asked about during the interview. If other sponsors overlap the area, we will need to obtain site addresses for them as well.

[7]Geocoding can be conducted at several levels, as described in Chapter II; as the level of manual intervention increases, the greater the success in geocoding the address, but the greater the cost. For our cost estimates, we assumed a mid-level of intervention is needed for about one-quarter of the addresses, but this will in fact depend on the quality of the lists obtained.

precision in the survey estimates. Therefore, we need to determine the sample sizes for sites and students that will result in the required levels of precision at the lowest cost.

In this section, we present a model for how to determine the appropriate sample sizes. This model requires data or assumptions of three types to produce estimates. We then describe the data and assumptions used to apply the model, which include (1) drawing on results from a similar study to measure the impact of clustering the students by site on the precision in the survey estimates; (2) estimating the relative per unit survey costs for each site and for each interview; and (3) estimating the design effect from oversampling of the inner tier of the catchment area to increase the rate of participants in the sample, based on some tentative assumptions.[8]

Section D presents the sample design that results from these estimates and calculations. (Nontechnical readers may wish to skip and go directly there.)

1. The Model

In this section, we present a set of mathematical formulas that determine the sample sizes to select at each stage of a two-stage sampling procedure to minimize survey costs for a specified precision level. To apply these formulas, we treat the recommended participant-nonparticipant sample design as a two-stage procedure. For the first stage, the design is to select a nationally representative sample of summer food service sites, referred to as primary sampling units (PSUs). From each of these PSUs, for stage two, a sample of students living near the site is selected. With this structure, the approximate sampling variance associated with a sample mean or percentage can be expressed as given by Cochran (1977, equation 10.4) in equation (1):

[8]The design effect is defined as the sampling variance associated with the survey estimates that results from the sampling and weighting procedures implemented relative to the sampling variance that would be achieved from a simple random sample of the population with constant survey weights. The design effect also provides an estimate of the "effective" sample size by dividing the expected number of completed interviews by the estimated design effect.

$$(1)\ Var(\bar{y}) \doteq (1 - \frac{n_1}{N_1})\frac{S_1^2}{n_1} + (1 - \frac{n_2}{N_2})\frac{S_2^2}{n_1 \times n_2}$$

In this equation,

S_r^2 denotes the population variance among the site level values at the r-stage of selection. For r = 1, this term defines the variation between the PSU (site) mean values for a specified site variable, y. For r = 2, this term defines the variation between the student values for y within each of the selected sites, averaged over these sites.

N_r denotes the average number of r-stage units in the population within each r-1 stage selected unit. For r = 1, this is equal to the number of PSUs (sites) in the national population. For r = 2, this is equal to the average number of eligible students that live in the catchment area of a site.

n_r denotes the average sample sizes at each stage of the selection process. For r = 1, this is equal to the number of PSUs (sites) selected. For r = 2, this is the number of eligible students selected on average within each of the selected PSUs. The total number of students selected is equal to the product of n_1 and n_2.

It was useful to express equation (1) and some of its components slightly differently. First, we can assume that the population sizes are large and the sample sizes are small in relation.[9] In particular, 1998 FNS data indicate that there were 30,377 food service sites in 1998 serving 2.3 million meals on average per day. Next, we can rewrite the two variance components as a function of the intracluster correlation, denoted by δ, which reflects the influence of clustering the students by site (Kish 1965, equation 5.6.17). We can also express these variance components in terms of the variance associated with an estimated proportion, p. Last, we need to account for the potential to disproportionately select the students within the various tiers of the catchment area to improve the efficiency of the data collection process. This is accomplished by incorporating a variance multiplier

[9]This implies $1-n_1/N_1$ and $1-n_2/N_2$ are approximately equal to 1.

or design effect denoted by *deff* into the right-hand side of (1). The revised expression for the estimated variance of a sample proportion is given in equation (2):

$$Var(p) \doteq deff \times \left[\frac{S_1^{\,2}}{n_1} + \frac{S_2^{\,2}}{n_1 \times n_2} \right]$$

(2) $$S_1^2 \doteq p \times (1 - p) \times \delta$$

$$S_2^2 \doteq p \times (1 - p) \times [1 - \delta]$$

Equation (2) provides a formula that expresses the sampling precision of a sample proportion as a function of the sample sizes selected at each of the two stages of the design, the influence of clustering the students by site, and the design effect resulting from disproportionate sampling within the tiers of the catchment area.

At the same time, the cost of conducting a two-stage design can be expressed as a function of the fixed costs to plan and implement the study plus a set of variable costs that are associated with the number of units selected at each phase. Such a relationship is given in (3):

(3) $$Cost = C_0 + C_1 \times n_1 + C_2 \times n_1 \times n_2,$$

where C_1 is the variable cost associated with each site selected in terms of obtaining and processing the school lists and C_2 is the cost to conduct an interview.

Using the relationship in equation (2), and the results from Chromy (1987), we can show that the sample sizes that will minimize the cost required to meet a specified sampling precision level, expressed as a coefficient of variation (CV) for an estimated proportion *p,* are given by (4):

(4) $$n_1(opt) \doteq \sqrt{\frac{\lambda \times \delta \times p \times (1-p) \times deff}{C_1}}$$

$$n_2(opt) = \frac{1}{n_1(opt)} \times \sqrt{\frac{\lambda \times [1-\delta] \times p \times (1-p) \times deff}{C_2}}$$

$$\lambda = \left[\frac{\sqrt{\delta \times p \times (1-p) \times deff \times C_1} + \sqrt{(1-\delta) \times p \times (1-p) \times deff \times C_2}}{(CV \times p)^2} \right]^2$$

For this study, we used (4) to compute the sample sizes needed to obtain CVs equal to .05, .075, or .10 (5, 7.5, or 10 percent) for a proportion of .50 (50 percent). To compute these sample sizes, we needed to estimate (1) the expected intracluster correlation that results from clustering the students by site, (2) the relative costs associated with the two stages of the design, and (3) the design effect. In the following subsections, we develop estimates for each of these components.

Equations (1) to (4) are appropriate for a two-stage design in which a national sample of sites is selected followed by a sample of students in each site. In actuality, the selection of the sites will occur in multiple stages (as described above and in Appendix B). Hence, the proposed site-sampling procedures are not exactly equivalent to the two-stage methodology that forms the basis of equations (1) to (4). However, we anticipate that the impact of this approximation on the recommended sample sizes is minor.

2. Using Data from a Similar Study to Estimate the Intracluster Correlation

The School Nutrition Dietary Assessment study (SNDA) was similar to the recommended participant-nonparticipant study in design and in the nature of the information collected (Burghardt et al. 1993). MPR, in conjunction with the National Opinion Research Center (NORC) and the University of Minnesota Nutrition Coordinating Center (NCC), conducted SNDA for the U.S. Department of Agriculture, Food and Nutrition Service, during spring 1992 to measure the impact of

the National School Lunch Program and the School Breakfast Program. The sample design for this study consisted a three-stage design starting with a national selection of about 100 school districts, followed by the selection of, on average, three schools per district. For the third stage of the study, a sample of about 10 students was selected from each school to yield a final sample of about 3,000 students. Interviewers conducted in-person, 24-hour dietary intake interviews with the selected students at the school. Parents of these students were also interviewed by mail or phone.

For SNDA, we have information on the components of variation in the dietary information collected from children from the same school. As part of the SNDA analysis, MPR researchers analyzed the proportion of the total variance in the dietary items that was associated with the district selection and the school-within-district selection process. From these data, we developed a rough estimate of the intracluster correlation to use in equation (4) in the previous section to determine the sample requirements.

Although the SNDA design was the most similar study with the required data readily available, we considered several issues in applying estimates from that study to the present context. The variability in the SNDA student data is affected in a similar manner as in the proposed study by the clustering of the students and their parents by school membership. On the other hand, SNDA used a three-stage design that selects districts prior to selecting schools. Since the prior analysis evaluated the proportion of the variance explained by each of these three stages, we had to transform these data to approximate what the variance properties would be if the design were in two stages. More important, the prior analysis was limited to the nutrient items. We do not know if student nutrient values are more correlated within a school than the types of survey items that will be asked in the participant-nonparticipant survey. If they are more correlated, the resulting intracluster correlations may overestimate the clustering effect and as such provide a conservative (high) estimate of the

sample size requirements. If they are less correlated, we may underestimate the clustering effect and thus underestimate the sample size requirements. Our best assessment is that our estimate is conservative.

Table IV.1 provides the proportion of the total variation in a nutrient value for each of the three stages of the SNDA design. Results are presented for several nutrient items. The total variation in this table is based on an unweighted Analysis of Variance (ANOVA) procedure which partitions the total sum of squared deviations in the nutrient values into three components based on district membership, school membership within district, and the remainder. The remainder reflects the variation in the student values within each school, averaged over the schools and the districts. We denote the district, school, and student components of the variance as computed from the SNDA sample values by s_1, s_2, and s_3.

Kish (1965, equations 5.6.18 and 5.6.19) indicates that in a two-stage design, an estimate of the intracluster correlation coefficient from the sample-based variance components can be approximated by (5):

$$(5) \quad \delta \doteq \frac{s^2_{bw/sch} - \frac{s^2_{w/sch}}{n_2}}{s^2_{bw/sch} + \frac{(n_2 - 1)}{n_2} \times s^2_{w/sch}}$$

We define $s^2_{bw/sch}$ in the context of our problem as the variation between schools and $s^2_{w/sch}$ as the variation among students within the selected schools, averaged over the schools. To estimate the intracluster correlation in the proposed two-stage design, we decided to use:

1. The sum of s_1 and s_2 from the SNDA data for the value of $s^2_{bw/sch}$,
2. s_3 from the SNDA data for $s^2_{w/sch}$ with n_2 set to 10 to reflect the average number of students selected per school in the SNDA study.

TABLE IV.1

ESTIMATED INTRACLUSTER CORRELATION COEFFICIENTS
FROM 1992 SNDA STUDY

Item		Percent of Total Variation Due to School Clustering		Percent of Total Variation Due to District Clustering		Percent of Remaining Variation		Delta	Delta
		Breakfast	24 hour	Breakfast	24 Hour	Breakfast	24 Hour	Breakfast	24 Hour
Total Fat	Percent of Food Energy	7.4	8.1	7.9	5.6	84.7	86.3	0.075	0.055
Calcium	Percent of RDA	9.6	9.5	4.8	5.6	85.6	84.9	0.064	0.072
Folate	Percent of RDA	11.1	12.2	5.7	5.0	83.2	82.8	0.092	0.097
Iron	Percent of RDA	7.1	6.9	6.2	4.9	86.7	88.2	0.051	0.033
Vitamin A	Percent of RDA	8.3	6.3	5.6	4.9	86.1	88.8	0.058	0.025
Vitamin B12	Percent of RDA	8.8	7.2	5.2	4.1	86.0	88.7	0.059	0.027
Vitamin C	Percent of RDA	8.5	7.0	4.6	6.0	86.9	87.0	0.048	0.047
Zinc	Percent of RDA	8.5	7.0	4.0	4.4	87.5	88.6	0.041	0.028
Sodium	Absolute	8.1	9.8	6.8	5.2	85.1	85.0	0.070	0.071
Food Energy	Percent of REA	8.0	7.3	5.7	5.3	86.3	87.4	0.055	0.042
Average								**0.061**	**0.050**
Combined Average									**0.056**

In effect, we used the combined variation in the district and school within district selection process to estimate the variation between schools had the study been conducted as a two-stage design with the school as the PSU. The resulting values for the estimated intracluster correlations (denoted by δ) are presented in Table IV.1 for each nutrient estimate. The average value of the intracluster correlation (0.056) was used as the final value for estimating the sample sizes for the participant-nonparticipant study.

3. Estimating Cost Components

To obtain the relative per-site and per-student survey costs, we conducted a limited budgetary analysis for a trial study design. In this design, we assumed that a total of 20 sites and about 75 students per site would be selected for the study. These counts we felt would not over- or underestimate levels of administrative efficiency that are obtained from conducting the same processing procedures on multiple units. Based on the resulting budget, we developed an estimate that the cost per site (of obtaining and processing the school lists, and defining the catchment areas) is about 35 times as large as the cost associated with conducting a parent interview, resulting in values of C_1 and C_2 for equation (4) of 35 and 1, respectively.

4. Approximate Design Effect from Oversampling Inner Tier

With the cost components and the impact from clustering the students by site, the final component we need to compute the sample size requirements is an estimate of the impact of the proposed disproportionate allocation process. Table IV.2 presents an illustration of the design effect that could result from the targeting of certain student address types. In Table IV.2, we have assumed that about 70 percent of the eligible student addresses would be located in the outer tier (stratum 1) and that this tier would have a participation rate of 10 percent. The inner tier (stratum 2) represents

TABLE IV.2

ESTIMATED DESIGN EFFECT RESULTING FROM DISPROPORTIONATE ALLOCATION BY STRATUM

Sampling Stratum	Population Percent	Proposed Sample Percent	Participation Rate	Rate of Participants in Sample	Estimated Design Effect
Inner Tier	20	55	65		
Outer Tier	70	44	10		
Unknown Distance	10	1	0.5		
Total	100	100	20	40.2	2.19

20 percent of the addresses and has a 65 percent participation rate. A total of 10 percent of the addresses (stratum 3) cannot be geocoded, and this stratum has a negligible participation rate. These assumptions imply a 20 percent participation rate among the eligible addresses. If sampling was proportionate, the study would either interview many more nonparticipants than participants to reach the participant quota, or would need to screen for participant status. However, by using the sampling percentages indicated, the rate of participants in the sample increases from 20 to 40 percent. This process results in an estimated combined design effect of 2.2. Since these assumptions are very approximate, we decided to use a design effect of 2.00 in our final computations. We judge this to be a conservative estimate, in the sense that it will move us toward higher sample sizes.[10]

D. RECOMMENDED SAMPLE DESIGN AND SAMPLE SIZES

The participant-nonparticipant design can be summarized as consisting of three steps:

Step 1 Selection of a subsample of the prior-year continuing sponsors selected to receive site visits.

Step 2 Selection of one visited site at random from each sponsor selected in Step 1.

Step 3 Selection of a stratified sample of students with addresses in the catchment area of each site selected in Step 2 (or at an unknown distance from the site). The students will be stratified into up to three sampling strata and the allocation of the sample across these three strata will be disproportionate to increase the efficiency of the interviewing process.

This design will provide fully linkable data, in which participant-nonparticipant interviews are conducted for areas served by sponsors that are interviewed and sites that are observed. The first two

[10]We did not account for another form of oversampling--the oversampling of rural sites proposed in the sponsor-site design report. However, this estimate is probably conservative enough to account for that as well.

selection steps are timed to be completed during the school year, so that school lists can be acquired before the summer.

For each site selected in Step 2, the lists of students obtained from the schools will be stratified into four groups:

1. Students with geocodeable addresses in the outer ring or tier of the catchment area
2. Students with geocodeable addresses in the inner ring or tier of the catchment area
3. Students with unknown or non-geocodeable addresses (unknown distance from the site)
4. Students with geocodeable addresses outside the outer ring or tier (to be excluded from sample selection)

As indicated in Section IV.A, we propose to oversample the inner tier of students and to undersample the outer tier and students with unknown addresses to increase the representation of participants in the sample.

Table IV.3 indicates the recommended number of sponsors and sites (these numbers are equal) to select in Step 1 and Step 2 and the total number of completed interviews needed from each of these sites in Step 3, as calculated by applying the model, estimates, and assumptions described in Section IV.C.[11]

The sample size recommendations were prepared for three different precision levels to achieve the stated precision in an estimated 50 percent characteristic for the subsample of *participants*. The total student sample size requirements assume a mix of 40 percent participants versus 60 percent nonparticipants, with no screening during the data collection process. We developed the participant sample size requirements using equation (4) in section IV.C.1, assuming an intracluster correlation

[11]The number of students sampled with be larger, to account for movers and nonresponse.

TABLE IV.3

RECOMMENDED SAMPLE SIZES TO MEET DESIRED PRECISION LEVELS FOR SFSP PARTICIPANTS

(Participant sample recommendations assume no screening and an average participation rate of 40 percent.)

Precision Level Desired For Participant Interviews*	Site Sample Size Recommended	Total Completed Interviews Recommended Per Site	Total Expected Yield in Parent Interviews		
			Group	Count	CV
5% CV	75	60	Participants	1800	5.0%
			Nonparticipants	2700	4.6%
			Total	4500	4.3%
7.5% CV	35	60	Participants	840	7.5%
			Nonparticipants	1260	7.0%
			Total	2100	6.5%
10% CV	20	60	Participants	480	10%
			Nonparticipants	720	9.3%
			Total	1200	8.7%

coefficient of .056, relative costs of adding a site versus an interview of 35 to 1, and an estimated design effect of 2.0. The results from equation (4) yield a constant number of 60 parents of students to interview per site at all precision levels. Thus, the total sample size requirements are simply 60 times the number of sites selected.

The total student sample sizes are 2.5 times (1 divided by .40) larger than participant sample sizes required to meet the stated precision level, and the nonparticipant sample sizes are 50 percent larger. Thus, the precision levels associated with the nonparticipant sample and the total sample are higher (and the CVs are lower), as shown in the table.

As shown in Table IV.3, the sample size required to obtain a 5 percent CV (4,500) is nearly four times that required for a 10 percent CV (1,200), which clearly has important cost implications. Chapter VII presents costs for these two sample sizes (and the associated site samples of 75 versus 20).

V. DATA COLLECTION PLAN

To assess why participation in the SFSP is so low, the survey will collect information from parents of SFSP participants and low-income children who do not participate. Data on the characteristics of participants and low-income nonparticipants and their families can also be useful in understanding how well the program meets the needs of its target population. This chapter describes the key variables to be collected, the methodology proposed, and major issues related to timing and achieving a high response rate. The final section describes the staffing and training requirements for implementing the data collection effort.

A. OVERVIEW OF METHODS

For this survey, we recommend conducting telephone interviews with parents or guardians of children who participated in FRPL programs, attended grades K to 5 in the past year, and live within a specified distance of an SFSP site that operates in both 2000 and 2001. Because the sample frame will be drawn from lists of students certified for free or reduced-price school meals, the contractor administering the survey will not need to screen potential respondents for the presence of children or for income. Furthermore, by limiting the geographic area from which the sample is drawn, the sample will include adequate numbers of both participants and nonparticipants who have access to an SFSP site.

The telephone interviews will average 20-25 minutes in length. They will be conducted with parents or guardians of children who received free or reduced-price school lunches in school year 2000-2001. Parents will be asked questions about one specific child in the household (the target child), as well as demographic questions about the family as a whole. As discussed in Chapter IV, we expect that 40 percent of the interviews will be with parents whose child participated in the SFSP, while the remaining 60 percent will be with parents whose child did not participate. So that

the response rate is adequate, we recommend vigorous efforts to locate respondents' telephone numbers and to persuade them to complete the interview.[1] We also recommend offering a small in-kind incentive, such as a $10 phone card. We expect the field period to last three to four months.

B. KEY VARIABLES TO BE MEASURED

To assess the primary research questions--participation rates, characteristics of participants and nonparticipants, and factors affecting participation--the survey will cover the following issues:

- ***Measuring SFSP Participation.*** This is the most challenging measurement issue, as many parents will not know the program as the SFSP. In addition, children may participate in the SFSP at sites other than the study site.

- ***Participation in Alternative Activities.*** Some children will not participate in the SFSP because they are enrolled in other programs, particularly those that meet parents' needs for child care while they are working.

- ***Participants' Views of the SFSP.*** So that they can encourage participation, program operators would like to know how participating families view the services offered. The major methodological challenge is that the parent is responding to some extent as a proxy for the child.

- ***Nonparticipants' Knowledge of and Views of the SFSP.*** Among families whose children do not participate, it is important first to determine if the family is aware of the program. If the family is aware of it, reasons for not participating can be ascertained. In shaping SFSP policy, it is important to know whether the reasons for not participating are related to access (such as transportation problems), cultural barriers, perceived problems with the food offered, or the use of alternative programs.

[1]MPR recommended that sampled families first be contacted by mail and encouraged to call a toll-free number. Advance letters increase response rates in most settings. However, ERS has asked that MPR design the instrument and data collection plan without an advance letter. Their concern is that an advance letter would raise awareness among parents of the study's connection to USDA and could discourage participation in the NSLP.

- ***Demographic and Socioeconomic Characteristics.*** It will be important to learn about the characteristics of participant and nonparticipant families in order to learn whether the program is well targeted to those in most need and, in general, what types of families are most likely to participate. This information may help in formulating outreach strategies.

Table V.1 illustrates the types of data to be collected in each of these categories. The rest of this section discusses measurement issues related to assessing SFSP participation and participants' perceptions of the SFSP site.

1. Measuring Participation

Because the SFSP is offered in a great variety of settings, many families will not know that their child receives food from a national program but will know only the name of the local program. We therefore recommend developing an instrument that is customized for each site, so that families living near each site are asked about that site. The site would be described by its local name and the name of its sponsor, as appropriate. (Some examples could be "the lunch program at Meadow Elementary School, sponsored by the Hunger Action Center" or "the YMCA day camp" or "the recreation program at the Center City Community Center.")

In addition, we recommend asking families about participation at other SFSP sites close to the study site, since the sites in some areas are located close together, and the survey would underestimate participation if it asked only about the target site. Tentatively, we would recommend including any sites that are located within the outer tier of the target site's catchment area, but we do not know exactly which sites would be most relevant to include. Again, it might be useful during site visits to ask about other sites in the area.

TABLE V.1

KEY RESEARCH TOPICS AND VARIABLES

Research Topics	Variables to Be Measured
Measuring SFSP Participation	Participation at sampled SFSP site this summer
	How they heard of the program
	Participation at other nearby site
	Over what period of time (target child) attended site
	Days per week during that time
	Meals served
	Does parent, child or someone else decide whether to send (target child) to site each day, or does child attend on a set schedule?
	Who accompanies the child to the site—parent/guardian, other adult, sibling; or does child go alone or on a bus provided by site?
	Participated in past summers
Participation in Alternative Activities	Programs or organized activities that target child participate in for the summer (summer school, day camp, residential camp, child care centers, other child care, recreation programs, other)
	Frequency of attendance at this program (number of weeks and days per week)
	Hours of operation of this program

TABLE V.1 *(continued)*

Research Topics	Variables to Be Measured
	Child does/does not receive meals at this program
	Reason for using program--hours, child care, activities, transportation, other
Participant's Views of the SFSP	Overall satisfaction with SFSP site Satisfaction in terms of specifics such as amount of food served, taste, nutritional value
	Have you recommended the site/program to others?
	Activities provided at this site
	Do you plan to send (target child) to site/program next year? If not, why not?
	How often do you receive communication from the SFSP site, such as announcements about upcoming events?
Nonparticipant's Knowledge of and Views of the SFSP	Aware of any of the SFSP sites in their area?
	Ever participated in past summers?
	Aware that sites serve free meals?
	If aware of SFSP sites, why don't they use--other programs, meal quality, transportation, safety, other?

TABLE V.1 *(continued)*

Research Topics	Variables to Be Measured
Demographic and Socioeconomic Characteristics	Age and sex of respondent
	Number of adults in household
	Number of children in various age groups in household
	Marital status of respondent
	Number of adults employed full time, part time, or not currently employed?
	Household income
	Education of respondent (and spouse)
	Race/ethnicity of child
	Own or have access to a working car
	Participation in government assistance programs (such as food stamps, TANF, WIC)
	Number of years in neighborhood
	Type of housing
	Availability of nearby public transportation
	Language spoken at home

We also recommend asking about intensity of participation, in terms of the number of weeks and the number of days per week (or number of times, if only a few that the child attends the site). We would tentatively recommend measuring participation as any participation, but also suggest some analysis by frequency of participation (see Chapter VI).

2. Participants' Views of the Site

In some instances, participation at the site may depend on the child's views of the site, as well as those of the parent, who, in effect, will be a proxy respondent for the child. In addition, the parent may not attend the site in person and thus may not have reliable information about site operations. Parents' views of the SFSP must be interpreted with this in mind.

One method for addressing the proxy issue is to determine whether the respondent usually accompanies the child to the site and to analyze whether responses differ for those who do and those who do not attend the site in person. If there are multiple parents or responsible adults in the household, the interviewer will ask to speak to the person who is most knowledgeable about the child's activities during the day.

In addition, the parents' perspective is important, even if their information is not complete, as they are likely to be the ones who decide whether the child attends. However, it would be useful to ask whether the decision is, in fact, made by them or by a child care provider, a sibling, or the child himself or herself.

C. ISSUES RELATED TO THE TIMING OF DATA COLLECTION

Chapter IV, Section B described the timing of various steps related to obtaining the sample frame and drawing the sample. This section addresses timing issues involving the telephone portion of the participant-nonparticipant survey. Since the study design requires linking participant-nonparticipant data to the site data before interviewing can begin, it is necessary to confirm that the

site opened as intended and that a site observation was conducted. In addition, the site catchment area will be defined only after the site visit occurs. Thus, in drawing a sample of respondents that live near the selected site, final sample selection and interviewing cannot occur until after the site visit. The process of deciding on the appropriate distance cutoff for the catchment area and drawing the sample will take approximately four weeks after the site visit, at which point interviewing can begin.

Notwithstanding the four-week delay, the interview should be conducted during the summer or as soon after the end of the summer as possible, since much of the content of the survey focuses on summer activities and arrangements for the target child. Furthermore, parents with children who attended an SFSP site will be asked questions about the meals and activities there. The ability to recall such specific details and to form and voice opinions will diminish as the lag time grows between patronizing the site and being questioned about the experience. On the other hand, if the interview occurs too early in the summer, the survey may underestimate participation, as some children may participate in programs that are open only in August.

In order to minimize the lag time, we recommend doing a rolling start to the participant survey. That is, as soon as a site is visited, the contractor should determine its catchment area and draw the sample. However, we recommend delaying the start of the first round of interviews until early August, to maximize the ability to capture participation. The final round of interviews should start no later than the end of September, and every attempt should be made to complete the interview within the first month of calling. (Not screening for SFSP participation during the interview should speed up the interviewing process and reduce costs related to callbacks.) We recommend completing the data collection effort in November, as we believe this provides the best balance between a respondent's ability to recall summer events and the contractor's ability to locate and contact sample members.

D. OBTAINING HIGH RESPONSE RATES

To ensure that the survey is nationally representative, we would set a goal of achieving at least a 75 percent response rate. Doing so would depend on the contractor's ability to contact and interview most members of the survey sample. This section describes the recommended methods for overcoming two of the most important reasons for nonresponse in surveys: (1) difficulty locating sample members because of incomplete information, moves, and name changes; and (2) reluctance to participate in the survey.

1. Locating Respondents

Locating respondents with incomplete address or telephone number information and those that have moved since the compilation of the free and reduced-price school lunch lists (usually done in the fall) is important for achieving a representative sample. The ability to complete the interview depends on the ability to find current addresses and telephone numbers. Sample members will move or change their names.[2] Some will not have a telephone at all, and others will have nonpublished telephone numbers or telephones listed in another name. We recommend that a variety of techniques be used to obtain up-to-date addresses and telephone numbers for members of the sample.

As interviewing begins, some of the telephone numbers and addresses on the student lists will be found to be incorrect. For these cases, we recommend that the contractor use MetroNet, a nationwide address and change-of-address verification tool and an electronic criss-cross directory. The comprehensiveness of this data source provides a powerful locating tool. MetroNet can:

- Verify existing information when telephone companies cannot. For example, Pacific Bell in California will not verify a nonpublished number. The directory assistance operator will state that there is no listing for the name requested. However, MetroNet

[2]Those who move out of the catchment area are ineligible and will be dropped from the sample, but we need to know who has moved out, in order to know the response rate among eligibles.

will verify the address without a phone number listed. Letters promising an incentive to call the contractor can be sent to verified addresses.

- Verify that a certain person is living in a household. If a street address is entered, along with a zip code and the surname of the sample member, MetroNet will provide the names and birth dates of the head of household and other household members, as well as the telephone number for the household. This feature will be especially useful for women who do not have telephones listed in their own names.

- Provide changes of address, if available, for sample members who have moved. This will allow us to identify without a telephone call sample members who have moved out of the target area of the selected site.

- Provide information about neighbors. MetroNet provides information on current neighbors with listed telephone numbers and length of residence for requested addresses and neighbors. Neighbors can provide useful leads for locating sample members.

If MetroNet is not helpful for finding a current address, D-TEC, a service that provides address information obtained from a national database based on credit histories, can be used. While D-TEC is not always helpful for young, low-income populations who have no credit histories, it can sometimes provide information that MetroNet cannot.[3]

A final attempt to contact sample members could include sending an in-person interviewer to the last known address. A higher response rate could be achieved if sample members who cannot or will not be interviewed by telephone were followed up by in-person interviewers. We have not included field followup as part of the data collection design, for two reasons. First, face-to-face interviews cost 2.5 to 3 times as much as those conducted by telephone, and our understanding is that ERS is concerned about the level of resources available for this study. Second, the contractor may have limited field resources, as some in-person interviewers in the area may already be engaged in conducting site visits throughout the summer months. The extent to which field followup would be

[3]D-TEC will list an unpublished telephone number if, for example, the sample member provided it as part of a credit application.

required is closely linked to the quality of the student lists and may be worth reconsidering after reviewing them.

2. Obtaining Cooperation

Avoiding refusals and overcoming reluctance to participate is also important to obtaining a high response rate. Even after being located, a sample member must still agree to be interviewed. The strategies suggested here to encourage participation center on convincing the sample member that the study is worthwhile. The advance letter will address the importance of the study, both by its content and by the fact that it came from USDA, and will legitimize the contractor. The letter will discuss the topics to be covered during the interview and the incentive to be given to respondents that complete the interview.

The contractor will prepare a letter to be used with sample members who are contacted but express reluctance to complete the interview, or with those for whom an address is located but not a phone number. The letter will contain a toll-free number, so that those without telephones can call the contractor.[4] In addition, we recommend adding a line in Spanish at the bottom of the letter indicating that bilingual interviewers are available at the toll-free number. Several versions of this letter will be produced. One will be an information-only letter, which provides additional information on the study to respondents who never received or who misplaced the first letter or who request more information about the study, their participation, or the legitimacy of the contractor. Another version will be mailed just prior to refusal conversion attempts. This refusal conversion letter will be tailored to the concerns of sample members who have not been interviewed. For those who say that they do not like to participate in surveys, the letter will stress that the survey is not for

[4]Experience has shown that the toll-free number is a very effective way to reach groups that are otherwise unreachable. During 1993, MPR sent letters to 148 low-income students who were part of the Evaluation of the Upward Bound Program and who could not be reached by telephone. More than half called MPR.

marketing purposes, but for an important research project. For those who say they do not have the time to participate, the letter will stress that the interview is short, can be completed at the sample member's convenience, and can even be accomplished in two or three 5- to 10-minute segments if the respondent can only spare that amount of time at one sitting. For those who are concerned about confidentiality, the letter will explain the contractor's confidentiality procedures. All survey materials, including the questionnaire and letters, need to be available in both English and Spanish.

Interviewers should be trained to encourage participation. They should be prepared to address common respondent concerns such as:

- What is this study about? Why should I participate?
- Is this a voluntary study?
- How long will the interview take?
- Where did you get my name? Can't you ask someone else?
- What will be done with the information I give you? Is this confidential?

We recommend including a nominal incentive to increase participation in this study. We have budgeted a $10 incentive (such as a phone card) for all respondents that complete the interview. One of the advantages of providing everyone with incentives is that it will encourage people to call the toll-free number when they receive the advance letter. The quick response shortens the time lag between attendance at the site and completion of the telephone interview, thereby improving the respondent's recall. As an alternative, the incentive could be targeted to selected groups of the sample, such as sample members who do not have listed telephone numbers and who call the contractor's toll-free number, sample members who may have initially refused to be interviewed, or sample members in a specific site whose initial response rate is low. However, since the survey is concentrated in small geographic areas, one concern with a targeted incentive is that those receiving

one may tell those who did not receive one, which would lead to a perception of unfairness in the community and limit further cooperation.

E. STAFFING AND TRAINING

In order to be able to conduct the interviews as quickly as possible on a rolling basis while integrating this effort with the sponsor and site portion of the study, it is critical to have enough knowledgeable staff assigned to the project from the sampling phase in the winter of 2000 through the completion of data collection in the fall of 2001. The recommended staff will include the project director (who will oversee all parts of the study) and one senior-level survey director (different from the survey director for the sponsor-site study), who will be assisted by junior professional survey staff. In addition, the senior sampling statistician responsible for the main study should be in charge of sampling for the participant-nonparticipant segment, as the two parts are interrelated. The senior statistician will be assisted by junior statisticians. The statisticians will handle all sampling functions, including the monitoring of cooperation among schools, monitoring quality of lists, defining catchment areas, assigning students into various tiers of sample, and drawing the student sample. A database programmer will work with the statisticians and research staff to design and maintain the databases needed to manage and link sampling information with data collection efforts in the sponsor-site part of the study. The programmer will design the system to trigger the scheduling of interviewing once site observations and participant sampling has occurred.

We recommend that between 12 and 24 telephone interviewers (depending on the sample size needed to produce the level of precision desired) be assigned to the participant-nonparticipant survey. At least one, and two if necessary, should speak both English and Spanish. A separate set of people who specialize in locating should also be assigned to this survey. Interviewers should be trained in study-specific training sessions, which typically would be about a day long. Training should cover the background and importance of the study, question-by-question instructions for

administering the questionnaire, how to introduce the study and overcome objections to participation, practice probing and recording open-ended responses, and conducting mock interviews. For locators, a separate, shorter training session would have to be conducted regarding what information is needed and how to determine when the information gathered is sufficient to indicate that the sampled member has moved outside the eligible geographic area.

We assume that a telephone center supervisor would be assigned to the project to be responsible for scheduling interviewers, monitoring their day-to-day productivity and performance, and reporting daily to the survey director. A supervisor should monitor 10 percent of each interviewer's work on silent call-monitoring equipment. Any problems that are identified can then be reviewed immediately with the interviewers. The contractor should maintain records to ensure that the supervisors are monitoring each interviewer at the appropriate level and are assessing each interviewer's progress over time.

VI. ANALYSIS PLAN

Analysis of data from the participant-nonparticipant survey will largely involve preparing descriptive statistics such as means, medians, frequency distributions, and cross-tabulations to describe the characteristics of SFSP participants and eligible nonparticipants. A number of different factors that may affect the decision to participate will be examined. In some cases, data from the participant-nonparticipant survey will be combined with state, sponsor, or site-level data collected in other parts of the study in order to provide a more comprehensive analysis.

For the planned tabulations to produce national estimates, appropriate weights must be applied. Standard errors that reflect the complex sample design will also need to be estimated. Multivariate analyses may also be used to explore factors affecting SFSP participation.

This chapter provides an overview of the types of data analysis that will be conducted to produce national estimates of the characteristics of low-income SFSP participants and nonparticipants living in areas with SFSP sites. We provide examples of data tabulations to illustrate the types of data that will be analyzed and reported in the participant-nonparticipant component of the study. Next, we describe possible multivariate analyses. Finally, we discuss the use of sample weights and of statistical methods that account for the complex sample design.

A. CHARACTERISTICS OF PARTICIPANTS AND NONPARTICIPANTS

This section describes how tabular analysis will be used to describe SFSP participants and eligible nonparticipants, including their characteristics, their parents' characteristics, their summer activities, their experiences with and view of the SFSP (for participants), and their knowledge of and reasons for not using the SFSP (for nonparticipants), as well as objective barriers to participation that both groups face. SFSP participation rates among various sample subgroups will also be estimated.

In general, in comparing the characteristics of participants and nonparticipants, keep in mind that the sample is designed to describe each group with the desired level of precision, but not to conduct formal statistical tests of differences between the groups, which requires a much larger sample.

1. Background Characteristics of Participants and Nonparticipants

The background characteristics of low-income, school-aged SFSP participants and nonparticipants will be tabulated and analyzed to describe the two groups and identify their similarities and differences. This comparison will suggest which background characteristics may be related to program participation. This analysis of participants and nonparticipants could begin with a comparison of demographic characteristics such as age of the child, gender, race/ethnicity, number of other children in the household, parents' age and education, and household structure (Table VI.1). Information on family income as a percentage of poverty should be tabulated as well (Table VI.1), in order to provide information on how well targeted the program is to those most in need.

Information on families' receipt of other forms of public assistance could also be presented as in Table VI.1, analyzed, and used to address the following research questions:

- Does the degree of economic hardship influence program participation?
- Has the experience of applying for other forms of public assistance deterred parents from allowing their children to participate in the SFSP, or has it made participation more likely?
- Are the parents of eligible nonparticipants not aware of the resources available to them and their children? Are these parents more likely to depend on other forms of food assistance, such as food pantries?

In addition, calculating the percentage of participants and nonparticipants who do not speak English in the home could determine the extent of the need for non-English outreach activities.

TABLE VI.1

BACKGROUND CHARACTERISTICS OF ELEMENTARY SCHOOL-AGE SFSP PARTICIPANTS AND NONPARTICIPANTS[a]

Background Characteristics	Participants	Nonparticipants
Age (In Years; Percent Distribution)		
6 or Younger		
7		
8		
9		
10		
11 or Older		
Grade Level Last Spring (Percent Distribution)		
Kindergarten		
First		
Second		
Third		
Fourth		
Fifth		
Sixth or Above		
Race/Ethnicity (Percent Distribution)		
Non-Hispanic White		
Non-Hispanic Black		
Hispanic		
Asian/Pacific Islander		
Native American		
Other		
Gender (Percent Distribution)		
Male		
Female		
Number of Other Children in Household		
None		
One		
Two		
Three		
More than Three		

TABLE VI.1 *(continued)*

Background Characteristics	Participants	Nonparticipants
Mean Family Income (In Dollars)		
Mean Family Income as Percentage of Poverty Level (Percent)		
Family Income as Percentage of Poverty Level (Percent Distribution)		
50 or Less		
51 to 100		
101 to 130		
131 to 150		
151 to 185		
186 or More		
Receipt of Public Assistance (Percent)		
Family Receives TANF		
Family Receives Food Stamps		
Family Receives WIC		
Family Receives Emergency Food		
Parent's Mean Age (Years)		
Parent's Educational Attainment (Percent Distribution)		
Mother		
No high school		
Some high school		
High school graduate		
Some college		
College graduate		
Father		
No high school		
Some high school		
High school graduate		
Some college		
College graduate		
Employment		
Number of Adults Employed (Mean)		

TABLE VI.1 *(continued)*

Background Characteristics	Participants	Nonparticipants
Percentage of Households with Employed Adult		
Number of Teens (Age 14 to 18) Employed (Mean)		
Percentage of Households with Employed Teen		
English Is *Not* Spoken in the Home (Percent)		
Household Structure (Percent Distribution)		
Single-Parent		
Two or More Adults		
Child Has Special Dietary Needs/Preferences (Percent Distribution)		
Yes		
No		
Sample Size		

[a]Participants and nonparticipants live in low-income households that have family incomes that are 185 percent or less of the poverty level. They also live near SFSP sites.

TANF = Temporary Assistance for Needy Families.

As shown in Table VI.1, information on the employment status of adults and teens will also be collected via the parent survey for both participants and nonparticipants. Differences between the two groups may indicate obstacles to SFSP participation created by parents' and teens' work schedules.

2. Estimating Participation Rates for Population Subgroups

Since one of the primary goals of the study is to determine how effectively the program serves low-income children, another line of analysis will examine the participation rates of different groups as defined by demographic characteristics, measures of economic need, and participation barriers, such as distance from the site. This analysis will identify groups with especially low participation rates (Table VI.2).

3. Participation in Summer Programs/Activities by SFSP Participants and Eligible Nonparticipants

This segment of the participant-nonparticipant study will involve the collection and analysis of data on the summer programs/activities in which SFSP participants and nonparticipants partake, possibly including programs that offer the SFSP, as well as alternative programs. The presentation of tabular data will be structured to accommodate the possibility that some children may participate in more than one program during the summer. Table VI.3 describes separately the percentage of SFSP participants and the percentage of nonparticipants that are involved in various types of summer programs/activities, facilitating an analysis of the similarities and differences of the two groups in summer program participation.

Table VI.4 focuses on the characteristics of the specific types of summer programs used by participants and nonparticipants. In particular, it compares their programs in terms of duration,

TABLE VI.2

PARTICIPATION RATES, BY SELECTED BACKGROUND CHARACTERISTICS

	Number of Eligible Elementary School-Age Children from Low-Income Households (Participants + Nonparticipants)	Participation Rates
Gender		
Male		
Female		
Race/Ethnicity		
Non-Hispanic white		
Non-Hispanic black		
Hispanic		
Asian/Pacific Islander		
Native American		
Other		
Age		
8 years or younger		
More than 8 years		
Number of Other Children in Household		
None		
One		
Two		
Three		
More than three		
Family Income as a Percentage of Poverty Level		
50 or less		
51 to 100		
101 to 130		
131 to 150		
151 to 185		
186 or more		

TABLE VI.2 *(continued)*

	Number of Eligible Elementary School-Age Children from Low-Income Households (Participants + Nonparticipants)	Participation Rates
Receipt of Public Assistance		
TANF		
Food Stamps		
WIC		
Emergency Food		
Household Structure		
Single-parent		
Two or more adults		
Distance to SFSP Site (Miles)		
c or less		
c to ¼		
¼ to ½		
½ to 1		
More than 1		

TANF = Temporary Assistance for Needy Families.

TABLE VI.3

PARTICIPATION OF SFSP PARTICIPANTS AND ELIGIBLE NONPARTICIPANTS IN SUMMER PROGRAMS/ACTIVITIES
(Percentages)

Type of Summer Program/Activity	SFSP Participants	Nonparticipants
Summer School		
Day Camp		
Formal Child Care Arrangement[a]		
Informal Child Care Arrangement[b]		
Residential Camp		
Other Informal Programs[c]		
Sample Size		

NOTE: Some summer programs in which children participate may include the SFSP. More than one type of program may be indicated, so percentages may add up to more than 100 percent.

[a]Includes day care centers or before- and after-camp programs.

[b]Includes care by a relative or babysitter.

[c]Includes programs in which child can participate on a drop-in or short-term basis, such as recreation programs, library programs, and feeding programs offered at open SFSP sites.

TABLE VI.4

CHARACTERISTICS OF SUMMER PROGRAMS/ACTIVITIES ATTENDED BY SFSP PARTICIPANTS AND ELIGIBLE NONPARTICIPANTS[a]
(Percentages)

	Summer School		Day Camp		Child Care Arrangement		Residential Camp		Other Informal Programs	
Characteristic	Participants	Nonparticipants	Participants	Nonparticipants	Participants	Nonparticipants	Participants	Nonparticipants	Participants	Nonparticipants
Duration of Program (Weeks)										
Less than 2										
2 to 4										
4 to 6										
6 to 8										
More than 8										
Number of Hours per Day Program Is Offered										
Less than 2										
2 to 4										
4 to 6										
6 to 8										
More than 8										
Meals Are Offered										
Yes										
No										
Are Meals Free?[b]										
Yes										
No										
Meals Received[b]										
Breakfast										
Lunch										
AM snack										
PM snack										
Supper										
Sample Size										

[a]Categories shown are for illustrative purposes; categories of summer programs/activities may be expanded or consolidated based on sample size restrictions and the needs of ERS. Statistics in each column will refer only to those attending the specific type of activity or program.

[b]Applies to respondents whose children participate in summer programs that offer meals.

hours, and whether meals are provided. This table will help in assessing, for example, whether nonparticipants are as likely to receive meals as participants.

4. Participants' Interaction with and Views Concerning SFSP

This component of the descriptive analysis will focus on participants and their interaction with and views concerning the SFSP. The percentage distribution of referral sources will be tabulated to provide information on the most effective means of informing eligible children and their families about the program (Table VI.5). The frequency with which participants receive meals through the SFSP will also be analyzed as shown in Table VI.6. This information could be combined with data on how long the site nearest to the participant is open for the summer to determine whether or not participants are taking full advantage of the program. Table VI.6 also analyzes whether the child attends the SFSP site on a regular schedule (even if not every day) or whether the decision is made on a day-to-day basis. If the decision is made day to day, the table analyzes who makes the decision and factors affecting it.

Table VI.7 looks at the factors that may have an effect on the frequency of participation in the SFSP among participants. Percentage distributions for infrequent participants (for example, those who participate two times a week or less) and frequent participants (those who participate more than two times a week) will be tabulated individually and then compared.[1] Tests of statistical significance will also be conducted. Analysis of the following pieces of information will help to shed light on the factors that appear to affect the frequency of participation: how child

[1]These cutoffs and others suggested in this chapter are intended to be illustrative. The most appropriate cutoffs will be determined after the data are examined.

TABLE VI.5

PRIMARY SOURCE OF REFERRAL TO SFSP SITE

Source	Percent of Participants Referred, by Source
Community-Based Agency	
School	
Church	
Public Assistance Office	
Newspaper/TV/Radio Advertisement, or PSA	
Posters in Community	
Flyer, Mailing, or Insert in Mail	
Friend/Family Member/Neighbor	
Promotional Event	
Past Experience with Facility or Staff	
Other	
Sample Size	

PSA = public service announcement.

TABLE VI.6

SCHEDULE OF SFSP PARTICIPATION

Schedule Variable	Percent of Participants
Frequency of Participation	
4 to 5 times per week	
2 to 3 times per week	
Once per week	
Less than once per week	
Person Who Attends Site with Child	
Parent	
Sibling (younger than 18)	
Child care provider or other responsible adult	
Child goes on own	
Child goes on bus/van provided by site	
Child Attends Site on Regular Schedule	
If Not on Regular Schedule, Who Decides Whether Child Attends?	
Parent or adult in household	
Sibling or young relative	
Child care provider or other responsible adult	
Child	
If Not on Regular Schedule, Factors Affecting Decision to Attend	
Child's health	
Weather	
Menu	
Availability of adult to go with child	
Schedule of other activities	
Availability of food at home	
Availability of transportation	
Sample Size	

TABLE VI.7

FACTORS THAT MAY AFFECT FREQUENCY OF SFSP PARTICIPATION

	Frequent Participants	Infrequent Participants	All Participants
How Child Usually Travels to Site			
Walks alone			
Walks with other child/children			
Walks with an adult			
Takes public transportation			
Gets dropped off in car			
Takes transportation provided by site			
Other			
Meals Served			
Breakfast			
Morning snack			
Lunch			
Afternoon snack			
Dinner			
Evening snack			
Activities Offered			
None			
Arts/crafts			
Educational			
Field trips			
Free play			
Organized games			
Religious activities			
Swimming			
Other sports			
Other			
Child Likes Meals			
Most days			
Some days			
Hardly any days			
Don’t know			
Child Usually Eats			
All or most of the food			
Some of the food			
Only a little			
Don’t know			
Quantity of Food/Portion Size			
Too much			
Not enough			
About right			
Program Serves Healthy, Well-Balanced Meals			
Often			
Sometimes			
Rarely			
Never			
Don’t know			

TABLE VI.7 *(continued)*

	Frequent Participants	Infrequent Participants	All Participants
Frequency of Site Communication with Parents			
Daily			
Weekly			
Every few weeks			
Never			
Don't know			
Parents' Rating of Information Sent by Site			
Too much			
About right			
Not enough			
Don't know			
Menus Are Sent Home			
Plan on Attending Next Summer			
Recommended Site to Others			
Satisfaction with Overall Program			
Very satisfied			
Somewhat satisfied			
Somewhat dissatisfied			
Very dissatisfied			
Child Attends More than One Site			
Sample Size			

NOTE: The cutoff for the "Infrequent Participants" classification will be determined after data have been collected.

participants usually get to the SFSP site; the parent's perception of the safety of the meal site; whether the child ever experienced not receiving a meal because the site ran out of food; the child's satisfaction with the taste of meals, the temperature of food, the type of meals served, the variety of food, and the site's ability to meet dietary needs/restrictions; the child's level of comfort with site staff; how often the child eats all the food served; and whether the child attends more than one site during the summer.

Because parents' experiences with the SFSP site will affect their ability to report on these factors (for example, how often the child eats all the food), these variables will also be broken down by whether the parent usually goes to the site with the child (not shown).

5. Nonparticipants' Knowledge of and Views Concerning the SFSP

A major goal of the evaluation is to determine why participation in the SFSP is considerably lower than in the National School Lunch Program (NSLP) although the target populations are the same. An important component of the participant-nonparticipant study thus focuses on nonparticipants, their knowledge (or lack of knowledge) about the SFSP, and their reasons for not participating if they are aware of the program.

In Table VI.8, the percentage of nonparticipants who knew about SFSP sites prior to the survey is calculated, as well as the percentage of nonparticipants whose parents knew about sites but did not know that meals were provided free. These data can be used to measure the extent to which outreach methods are not reaching the SFSP target population. In the parent survey, nonparticipants' parents will be asked to provide reasons for not participating in the program if they were aware that it existed and that it provided free meals. This information will be presented (as in Table VI.8) in such a way that the primary reasons for nonparticipation (aside from lack of knowledge) can be

TABLE VI.8

NONPARTICIPANT KNOWLEDGE ABOUT THE SFSP AND REASONS FOR NOT PARTICIPATING
(Percentages)

	Nonparticipants
Knew about Any SFSP Site Prior to Survey	
Yes	
No	
Knew That Meals Were Free[a]	
Yes	
No	
Reasons for Not Participating in Program[b]	
Child participates in alternative activities	
Lack of transportation	
Parent is concerned about child's safety	
Parent cannot eat with child at site because of site regulations	
Parent does not feel comfortable with sponsor	
Parent does not want/need assistance	
Parent would feel embarrassed to send child to summer feeding site	
Child has dietary restrictions	
Other Activities in Which the Child Participates	
Child care	
Day camp	
Summer school	
Other	
Do Other Activities Provide Food to Children?	
Yes	
No	
Does Parent Have to Pay for Food?[c]	
Yes	
No	

[a]Among parents who said they knew about an SFSP site prior to the survey.

[b]Among parents who said they knew about an SFSP site prior to the survey *and* knew that meals were free.

[c]Among parents who said their child participates in other summer activities that provide food.

identified. The table also contains information on whether children are enrolled in programs that "compete" with the SFSP in terms of serving children during the summer months. These data will be useful in determining why parents choose one program over another.

6. Barriers to Participation

Although background characteristics affecting participation in the SFSP have been covered in previous sections, along with participants' and nonparticipants' views on why they do or do not participate, this component of the participant-nonparticipant study will analyze objective factors that may be barriers to SFSP participation. Table VI.9 illustrates the analysis by comparing the percentage distributions of frequent participants, infrequent participants, and nonparticipants for measures such as the following: distance to nearest site from child's home; transportation issues; characteristics of nearby sites such as type of site, sponsor that operates site, meals offered, activities offered, location of site, duration of service, and length of daily program.

B. MULTIVARIATE ANALYSIS OF SFSP PARTICIPATION

The descriptive tabular analyses described in the last section will offer some insight into what factors are related to participation. However, multivariate analysis may be useful in separating out the relative importance of various factors. For example, both families with lower incomes and single-parent families may be more likely to participate. It is difficult to determine from tabular analyses such as those described above whether single-parent families are more likely to participate simply because they have lower incomes or for other reasons (such as a single-parent having less time to prepare bag lunches). Multivariate analysis may be used to determine how each factor affects participation with all others held constant.

TABLE VI.9

FACTORS THAT AFFECT SFSP PARTICIPATION BY ELEMENTARY-SCHOOL CHILDREN FROM LOW-INCOME HOUSEHOLDS
(Percentages)

Factor	Frequent Participants	Infrequent Participants	Nonparticipants
Distance from Home to Nearest Site (miles)			
¼ or less			
¼ to ½			
½ to ¾			
¾ to 1			
1 to 2			
More than 2			
Transportation Issues			
Family Owns Car			
Child Characteristics			
Child Has Special Dietary Needs			
Child's Age			
Under 6			
6 to 8			
9 to 10			
11 or above			
Characteristics of Nearby Sites			
Number of Hours Per Day Program is Offered			
Less than 2			
2 to 4			
4 to 6			
6 to 8			
More than 8			
Type of Site			
Open			
Enrolled			

TABLE VI.9 *(continued)*

Factor	Frequent Participants	Infrequent Participants	Nonparticipants
Duration of Service (weeks)			
Less than 2			
2 to 3			
4 to 6 weeks			
More than 6			
Activities Offered at Site			
None			
Arts/crafts			
Education/instruction			
Free play			
Organized games			
Religious activities			
Swimming			
Other Sports			
Field Trips			
Other			
Transportation			
Site offers transportation			
Location of Site			
Community center			
Housing project			
Indoor recreation center			
Playground/park			
Religious institution			
Residential camp			
School			
University			
Other			
Meals Offered at Site			
Breakfast			
Lunch			
AM snack			
PM snack			
Supper			
Type of Sponsor			
Government			
School			
Private nonprofit			
Residential camp			
National Youth Sports Program			
Sample Size			

Since participation is a binary variable, we anticipate using logistic regression methods. Logistic models can be estimated with SUDAAN, as described below.

Another benefit of multivariate analyses is that they tend to be more precise, perhaps allowing identification of factors that significantly affect participation.

C. USE OF SAMPLE WEIGHTS AND CALCULATION OF VARIANCES

Analyses of the participant-nonparticipant data will be weighted using the survey weights, whose construction is described in detail in Appendix C. Survey weights are necessary to account for differences in the selection probabilities of various units and for nonresponse bias adjustments.

The complex sample design implies that standard errors computed by statistical packages that assume simple random sampling will be inaccurate. A number of statistical packages are available that estimate standard errors under complex sample designs. We recommend conducting the data analysis using the SUDAAN software package in conjunction with SAS to appropriately account for the sample design process (Shah et al. 1997). However, other variance estimation techniques, such as Balanced Repeated Replication (BRR) and the Jackknife method, can also be used. SUDAAN is designed primarily to use a Taylor-series estimation method to approximate the sampling precision in both linear and nonlinear estimates from survey data. SUDAAN has various procedures for comparing mean values, percentages, and totals between two analytical groups, and for conducting model-based estimation techniques such as multivariate linear regression and logistic regression. In each of these data analysis procedures, SUDAAN yields the appropriate design-based estimates of the standard errors, confidence intervals, and design effects associated with the survey values or the model parameter estimates.

VII. COSTS

This chapter describes the estimated costs of MPR's recommended design for the participant-nonparticipant component of the Summer Feeding Integrity Study. We developed cost estimates with the goal of providing information to ERS on the following issues:

- The overall cost of the study
- The cost of attaining various levels of precision in the participant-nonparticipant survey

ERS can then use these cost estimates to determine whether the participant-nonparticipant survey should be funded and, if so, with what precision goal.[1]

The estimates presented in this chapter are based on a number of assumptions. The major one is that the state-sponsor-site study will be occurring at the same time and will share some of the same staff. Thus, costs for certain activities are lower than they would be in a stand-alone study.

Whenever possible, other assumptions are based on MPR's experience completing similar studies, including the previous SFSP evaluation, and on our experiences during the pretest. The assumptions have been reviewed by senior MPR staff. We describe our assumptions in the first section of this chapter. The second section presents the cost estimates and briefly discusses their implications.

[1]The costs of the secondary data analysis were discussed in Chapter II, but in the final cost summary, we add in the middle estimate of these costs to give ERS a more complete view of the costs of the recommended study.

A. COST ASSUMPTIONS

In estimating costs, we have used average rates for various levels of staff and made typical assumptions about overhead and other direct costs. In addition, we have assumed that the contract will be fixed-price, with a fee level comparable to that of recent ERS contracts. We have assumed that the data collection will occur in the year 2001 and that the project will start January 1, 2000, and continue through June 2002.[2]

1. Start-Up Costs

We assume that the sponsor-site study will have the same project director as the participant-nonparticipant study, but that another senior survey researcher will be added to the project to direct the participant-nonparticipant survey, as there is more than full-time work for a survey director during the summer and fall survey periods. Thus, start-up costs here reflect the costs for a second survey researcher to attend the project kickoff meeting.

In addition, we include here the costs of final revisions to the participant-nonparticipant instrument in response to OMB comments.

2. Sample Frame Development and Sampling

In order to select a sample of students to be included in the participant-nonparticipant sample, we first must select the phase one sample of sponsors and sites. This involves contacting all 50 states to obtain their lists of sponsors and sites for the previous summer (2000), an activity that we project will occur from January through March.[3] We assume that all the lists will need to be data-

[2]If ERS decides to fund the Census 2000 option for the secondary data analysis, that part of the project would continue through 2003. However, we have not included any costs related to that study here, as we assume that it would be a completely separate effort and report.

[3]For the sponsor-site study, we had planned a smaller effort that would occur in the spring, (continued...)

entered. In addition, we assume that only 75 percent of states will be able to provide site lists; in one-quarter of states, it will be necessary to contact the selected sponsor to obtain the list of sites.

Next, the senior sampling statistician will select the sponsors to be interviewed, the sites to be visited, and the subset of those sites that will be targets for the participant-nonparticipant survey. The site sample selected for the participant-nonparticipant study will be larger than needed, to account for the fact that we estimate that only 80 percent of schools contacted will provide lists, that 10 percent of sites from the previous year will not open, and that 10 percent of sites that do open will not be visited. Therefore, in order to have 20 final sites, for example, from which the sample of participants and nonparticipants will be drawn, one needs to select 31 sponsors and 31 sites. Once the sites are selected, the list of site addresses will be formatted and cleaned as much as possible and then sent for geocoding.

The next step will be to identify and contact elementary schools near selected sites. Nearby schools will be identified through calls to sponsors, examination of maps and calls to school districts in the area, and gathering of available lists of nonpublic schools. After the schools are identified, letters will be sent to the chief school administrator and the director of the School Food Authority (SFA) explaining the study and the types of information required. The letter to the SFA will include a prepaid return envelope. The letters will be followed up by telephone calls to the director of the SFA explaining in more detail that a list of students certified for free and reduced-price school meals is needed and stating why the contractor is entitled to receive this information. After the SFA provides the lists, a courtesy letter will also be sent to school principals informing them about the study. In some cases, we assume multiple calls will be needed to obtain cooperation. Contacts with

[3](...continued)
simply to obtain lists of sponsors. The costs here are those above and beyond that effort.

FNS regional offices will be used to follow up with noncooperating SFAs. We assume lists will be obtained from 1.5 schools per site and contain approximately 500 names each.

Upon receipt of the lists, the contractor will data-enter all student names, parent names, telephone numbers, and addresses into a standardized database. Once the database has been created, the lists will be geocoded to show distance from the target site. The data will also indicate the level of geocoding applied (that is, whether the distance was calculated from an address match, a census tract match, or a zip code match).

After a site visit, the catchment area for each site will be determined. At that time, the sampling statistician should identify which addresses remain in the sample frame and, if necessary, divide them into tiers. Then sampling staff will draw random samples of desired sizes from each tier. The sample selected for each site will be large enough to allow for 5 percent to be ineligible and for 25 percent of those remaining to be nonrespondents. Sampling will occur on a rolling basis, during approximately the four weeks after the site is visited, so that telephone calls to the sample can begin in a timely way.

3. Telephone Survey

We estimate the costs of the participant-nonparticipant survey for two sample sizes, 1,200 or 4,500 interviews, drawn from 20 or 75 sites, respectively. The participant-nonparticipant interviews will be conducted by telephone and are assumed to last about 25 minutes. No screening for participation in the SFSP is planned; however, based on the sample design, we anticipate that 40 percent will be SFSP participants (that is, attending an SFSP site during summer 2001) and that 60 percent will not be participants. We have estimated that 95 percent of the sample will be eligible (in that they still live within the site catchment area) and anticipate an overall response rate of 75 percent among eligible families. The survey will be conducted with a parent or guardian of the

sampled child. The instrument will be CATI-programmed and will include insertions for the names of the selected site and nearby sites. One instrument has been designed, with branching instructions based on SFSP participation.

a. Interviewing

Given the limited field period (August through November) and the desire to complete as many interviews as possible during the summer months, we estimate that the contractor will need 11 or 38 interviewers, depending on the sample size, and will train an additional 50 percent to handle the concentration of interviews in the summer and to compensate for interviewer attrition. The budget assumes that each interviewer will receive eight hours of training at one of two separate training sessions. The training will be conducted by the senior survey researcher and will be attended by junior professional staff in addition to interviewing supervisory staff. Ten percent of all interviews will be monitored by a telephone supervisor. Moreover, senior project staff will also randomly monitor telephone interviews and interviewers. It has been assumed that it will take an average of 1.3 hours to complete an interview, including unsuccessful attempts. Interviewers will make at least 15 attempts, if needed, to complete the interview with a parent or guardian of the sampled child. The interviewing schedule will be "front-loaded," with most of the attempts made within the first few weeks.

b. Locating

For those people we are unable to contact because the information from the student lists is missing or incorrect, we propose conducting special locating efforts. For budgeting purposes, we have estimated that 20 percent of all addresses and telephone numbers from student lists will go to an electronic look-up service and that 40 percent of all numbers will need in-house staff to do

manual locating efforts taking on average a half-hour. Locating staff will receive a separate training session that will last two hours. To respondents who have not been reached and to those with unpublished phone numbers, follow-up letters will be sent requesting that they call the toll-free number and complete the survey. Similarly, parents who initially refuse to complete the interview by telephone will also be sent a customized letter requesting their participation and addressing their concerns. We have budgeted for 50 percent of the initial sample to receive a letter relating to contact and 20 percent to receive a refusal conversion letter.

c. Open-End Coding

For budgeting purposes, we have assumed that the instrument may include up to five open-ended questions. Senior project staff, in consultation with ERS staff, will build codes after the first 100 or so completed interviews. Upon approval of the codes, the senior survey researcher will train a group of coders. All coders will receive a two-hour training session. We are assuming that open-end coding will take, on average, 15 minutes per completed interview.

Upon completion of the data collection effort, we have assumed that thank-you cards with a $10 telephone card will be sent to all respondents.

All levels of the professional staff, from the project director on down, will meet weekly during the field period to review questions and problems that arise.

4. Analysis and Reporting

The analysis and reporting costs include the costs of cleaning the data and preparing files for analysis; developing sample weights; preparing tabulations and multivariate estimates; and preparing draft, revised, and final reports. The report is assumed to include a stand-alone executive summary and appendixes on the data collection methods, sample design, and sample weights.

Staff for this part of the project would include the project director, a junior researcher, the senior sampling statistician, and research programmers.

5. Other Tasks

We have added the costs of additional project tasks in which we expect ERS to be interested, and which are not sensitive to sample sizes. These include a final briefing and the preparation of documented datafiles for USDA use. These costs are in addition to the costs of these tasks included in the state-sponsor-site study design.

B. COST ESTIMATES

Estimated costs for the participant-nonparticipant study are summarized in Table VII.1. For the survey, costs are estimated to be approximately $1.3 million to reach the higher precision level (corresponding to a five percent coefficient of variation (CV), as discussed in Chapter IV), or $1.6 million if the costs of the secondary data analysis (middle estimate) are included.[4] If a less precise level corresponding to a 10 percent CV is used, costs are estimated to be about $600,000 for the survey and $900,000 for the full study, including the secondary data analysis. Thus, survey costs for a 10 percent CV are roughly half those for a 5 percent CV. This large difference is because both the costs of sample frame development and those of the interviews themselves vary with the precision level.

These estimates have been slightly decreased since the draft report was prepared in March to account for the fact that the participant-nonparticipant interview is estimated to be 25 minutes long, rather than 30 minutes. However, as discussed in Chapter II, we have also increased the estimated cost of the secondary data analysis to allow for more manual data entry and editing of sponsor and

[4]See Chapter II for further detail on the costs of the secondary data analysis.

site lists. The net change is small--a slight saving at the 5 percent CV and a slight increase in cost at the 10 percent CV.

We have not updated the salary escalation assumptions implicit in our cost estimates, but continued to use those in place when the estimates were originally prepared. However, recent analysis suggests that the strong economy has led to substantial labor market pressures throughout our industry, implying that salary increases over the next several years are likely to be higher than our estimates reflect. Based on this information, ERS may want to set aside an amount 5 to 10 percent higher than the figures in Tables VII.1. In sum, our best estimate of the cost of the participant/nonparticipant study is from $912,000 to $1,003,000 for a 10 percent CV, or from $1,578,000 to 1,736,000 for a 10 percent CV.

TABLE VII.1

COSTS OF PARTICIPANT-NONPARTICIPANT STUDY AT TWO PRECISION LEVELS
(Dollars)

	Precision Level	
Study Task	5 Percent CV	10 Percent CV
Orientation Meeting/OMB	7,000	7,000
Sample Frame Development and Sampling	503,000	212,000
Data Collection	594,000	219,000
Analysis/Reporting	149,000	149,000
Final Briefing	4,000	4,000
Datafile Preparation	7,000	7,000
Project Management	6,000	6,000
Total for Survey	**1,270,000**	**604,000**
Secondary Data Analysis (Middle Option)[a]	308,000	308,000
Total for Participant-Nonparticipant Study	**1,578,000**	**912,000**

CV = Coefficient of Variation

[a]See Table II.10.

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APPENDIX A

DETAILED TABULATIONS FOR DISTANCE-BASED ANALYSIS

TABLE A.1

DISTANCE TO NEAREST SUMMER FEEDING SITE: TOTAL CHILDREN AGE 18 AND UNDER IN SFSP-QUALIFIED TRACTS, BY COUNTY, 1990

	Camden		Cumberland		Essex	
	Number	Percent	Number	Percent	Number	Percent
Distance in Miles						
0 to .04	2,334	8.8	0	0.0	5,212	11.2
.05 to .09	8,622	32.5	1,002	16.4	11,723	25.1
.10 to .14	4,810	18.1	1,114	18.2	13,677	29.3
.15 to .19	3,274	12.3	1,709	27.9	5,379	11.5
.20 to .24	3,014	11.3	217	3.5	3,572	7.7
.25 to .29	1,405	5.3	667	10.9	384	0.8
.30 to .34	845	3.2	0	0.0	634	1.4
.35 to .39	986	3.7	0	0.0	1,660	3.6
.40 to .44	669	2.5	0	0.0	799	1.7
.45 to .49	20	0.1	0	0.0	13	0.0
.50 to .59	137	0.5	678	11.1	1,196	2.6
.60 to .69	0	0.0	735	12.0	1,514	3.2
.70 to .79	386	0.0	0	0.0	313	0.7
.80 to .89	0	1.5	0	0.0	603	1.3
.90 to .99	0	0.0	0	0.0	0	0.0
1.00 to 1.99	0	0.0	0	0.0	0	0.0
2.00 to 2.99	61	0.2	0	0.0	0	0.0
3.00 to 3.99	0	0.0	0	0.0	0	0.0
4.00 to 4.99	0	0.0	0	0.0	0	0.0
5.00 to 9.99	0	0.0	0	0.0	0	0.0
10.00 or More	0	0.0	0	0.0	0	0.0
Total	**26,563**	**100.0**	**6,122**	**100.0**	**46,679**	**100.0**

TABLE A.1 *(continued)*

	Camden		Cumberland		Essex	
	Number	Percent	Number	Percent	Number	Percent
Summary Statistics (in miles)						
Mean Distance to Nearest Feeding Site	0.16		0.26		0.17	
25th Percentile	0.07		0.10		0.07	
50th Percentile-Median	0.13		0.18		0.11	
75th Percentile	0.22		0.27		0.18	
90th Percentile	0.34		0.65		0.39	
95th Percentile	0.36		0.65		0.63	

TABLE A.2

DISTANCE TO NEAREST SUMMER FEEDING SITE: TOTAL CHILDREN AGE 18 AND UNDER WITH FAMILY INCOME 185 PERCENT OF POVERTY OR LESS IN SFSP-QUALIFIED TRACTS, BY COUNTY, 1990

	Camden		Cumberland		Essex	
	Number	Percent	Number	Percent	Number	Percent
Distance in Miles						
0 to .04	1,665	9.4	0	0.0	3,396	11.5
.05 to .09	5,748	32.6	518	14.1	7,596	25.8
.10 to .14	3,140	17.8	762	20.8	8,749	29.7
.15 to .19	2,429	13.8	1,088	29.7	3,379	11.5
.20 to .24	2,137	12.1	135	3.7	2,156	7.3
.25 to .29	808	4.6	303	8.3	250	0.8
.30 to .34	409	2.3	0	0.0	243	0.8
.35 to .39	701	4.0	0	0.0	924	3.1
.40 to .44	334	1.9	0	0.0	410	1.4
.45 to .49	0	0.0	0	0.0	9	0.0
.50 to .59	24	0.1	335	9.1	859	2.9
.60 to .69	0	0.0	523	14.3	913	3.1
.70 to .79	177	0.0	0	0.0	251	0.9
.80 to .89	0	0.0	0	0.0	353	1.2
.90 to .99	0	0.0	0	0.0	0	0.0
1.00 to 1.99	0	0.0	0	0.0	0	0.0
2.00 to 2.99	61	0.3	0	0.0	0	0.0
3.00 to 3.99	0	0.0	0	0.0	0	0.0
4.00 to 4.99	0	0.0	0	0.0	0	0.0
5.00 to 9.99	0	0.0	0	0.0	0	0.0
10.00 or More	0	0.0	0	0.0	0	0.0
Total	**17,623**	**100.0**	**3,664**	**100.0**	**29,488**	**100.0**

TABLE A.2 *(continued)*

	Camden		Cumberland		Essex	
	Number	Percent	Number	Percent	Number	Percent
Summary Statistics (in miles)						
Mean Distance to Nearest Feeding Site	0.16		0.26		0.17	
25 Percentile	0.06		0.12		0.07	
50th Percentile-Median	0.13		0.18		0.11	
75th Percentile	0.21		0.27		0.18	
90th Percentile	0.29		0.65		0.39	
95th Percentile	0.36		0.65		0.63	

TABLE A.3

DISTANCE TO NEAREST SUMMER FEEDING SITE: TOTAL CHILDREN AGE 18 AND UNDER WITH FAMILY INCOME 185 PERCENT OF POVERTY OR LESS IN TRACTS NOT QUALIFYING FOR SFSP, BY COUNTY, 1990

	Camden		Cumberland		Essex	
	Number	Percent	Number	Percent	Number	Percent
Distance in Miles						
0 to .04	0	0.0	0	0.0	1,312	4.4
.05 to .09	895	6.4	0	0.0	3,151	10.6
.10 to .14	709	5.1	0	0.0	5,506	18.6
.15 to .19	765	5.5	779	11.0	3,508	11.8
.20 to .24	111	0.8	782	11.0	4,045	13.7
.25 to .29	287	2.0	211	3.0	1,972	6.7
.30 to .34	210	1.5	196	2.8	1,117	3.8
.35 to .39	161	1.1	457	6.5	1,205	4.1
.40 to .44	626	4.5	149	2.1	589	2.0
.45 to .49	96	0.7	373	5.3	752	2.5
.50 to .59	168	1.2	686	9.7	1,290	4.4
.60 to .69	587	4.2	147	2.1	1,223	4.1
.70 to .79	160	1.1	481	6.8	258	0.9
.80 to .89	323	2.3	202	2.9	441	1.5
.90 to .99	242	1.7	17	0.2	451	1.5
1.00 to 1.99	2,880	20.5	1,195	16.9	1,373	4.6
2.00 to 2.99	3,580	25.5	541	7.6	638	2.2
3.00 to 3.99	1,104	7.9	386	5.5	392	1.3
4.00 to 4.99	1,001	7.1	136	1.9	240	0.8
5.00 to 9.99	113	0.8	339	4.8	150	0.5
10.00 or More	0	0.0	0	0.0	0	0.0
Total	**14,018**	**100.0**	**7,077**	**100.0**	**29,613**	**100.0**

TABLE A.3 *(continued)*

	Camden		Cumberland		Essex	
	Number	Percent	Number	Percent	Number	Percent
Summary Statistics (in miles)						
Mean Distance to Nearest Feeding Site	1.68		1.27		0.46	
25th Percentile	0.42		0.29		0.12	
50th Percentile-Median	1.41		0.55		0.21	
75th Percentile	2.63		1.43		0.42	
90th Percentile	3.44		3.69		0.94	
95th Percentile	4.17		4.21		1.94	

TABLE A.4

DISTANCE TO NEAREST SUMMER FEEDING SITE: TOTAL CHILDREN AGE 18 AND UNDER WITH FAMILY INCOME 185 PERCENT OF POVERTY OR LESS, BY COUNTY, 1990

	Camden		Cumberland		Essex	
	Number	Percent	Number	Percent	Number	Percent
Distance in Miles						
0 to .04	1,655	5.2	0	0.0	4,708	8.0
.05 to .09	6,643	21.0	518	4.8	10,747	18.2
.10 to .14	3,849	12.2	762	7.1	14,255	24.1
.15 to .19	3,194	10.1	1,867	17.4	6,887	11.7
.20 to .24	2,248	7.1	917	8.5	6,201	10.5
.25 to .29	1,095	3.5	514	4.8	2,222	3.8
.30 to .34	619	2.0	196	1.8	1,360	2.3
.35 to .39	862	2.7	457	4.3	2,129	3.6
.40 to .44	960	3.0	149	1.4	999	1.7
.45 to .49	96	0.3	373	3.5	761	1.3
.50 to .59	192	0.6	1,021	9.5	2,149	3.6
.60 to .69	587	1.9	670	6.2	2,136	3.6
.70 to .79	337	1.1	481	4.5	509	0.9
.80 to .89	323	1.0	202	1.9	794	1.3
.90 to .99	242	0.8	17	0.2	451	0.8
1.00 to 1.99	2,880	9.1	1,195	11.1	1,373	2.3
2.00 to 2.99	3,641	11.5	541	5.0	638	1.1
3.00 to 3.99	1,104	3.5	386	3.6	392	0.7
4.00 to 4.99	1,001	3.2	136	1.3	240	0.4
5.00 to 9.99	113	0.4	339	3.2	150	0.3
10.00 or More	0	0.0	0	0.0	0	0.0
Total	**31,641**	**100.0**	**10,741**	**100.0**	**59,101**	**100.0**

TABLE A.4 *(continued)*

	Camden		Cumberland		Essex	
	Number	Percent	Number	Percent	Number	Percent
Summary Statistics (in miles)						
Mean Distance to Nearest Feeding Site	0.83		0.93		0.31	
25th Percentile	0.09		0.18		0.09	
50th Percentile-Median	0.21		0.43		0.14	
75th Percentile	1.28		0.82		0.28	
90th Percentile	2.76		2.93		0.63	
95th Percentile	3.32		3.93		0.95	

TABLE A.5

COMPARISON OF DATA PREPARATION METHODS FOR DISTANCE TO NEAREST SUMMER FEEDING SITE: TOTAL CHILDREN AGE 18 AND UNDER IN SFSP-QUALIFIED TRACTS, CAMDEN COUNTY, 1990

	Camden County			
	Corrected Data		Original Data	
	Number	Percent	Number	Percent
Distance in Miles				
0 to .04	2,334	8.8	2,334	8.8
.05 to .09	8,622	32.5	7,921	29.8
.10 to .14	4,810	18.1	4,671	17.6
.15 to .19	3,274	12.3	3,607	13.6
.20 to .24	3,014	11.3	3,293	12.4
.25 to .29	1,405	5.3	1,633	6.1
.30 to .34	845	3.2	845	3.2
.35 to .39	986	3.7	0	0.0
.40 to .44	669	2.5	1,655	6.2
.45 to .49	20	0.1	20	0.1
.50 to .59	137	0.5	137	0.5
.60 to .69	0	0.0	0	0.0
.70 to .79	386	1.5	386	1.5
.80 to .89	0	0.0	0	0.0
.90 to .99	0	0.0	0	0.0
1.00 to 1.99	0	0.0	0	0.0
2.00 to 2.99	61	0.2	61	0.2
3.00 to 3.99	0	0.0	0	0.0
4.00 to 4.99	0	0.0	0	0.0
5.00 to 9.99	0	0.0	0	0.0
10.00 or More	0	0.0	0	0.0
Total	**26,563**	**100.0**	**26,563**	**100.0**

TABLE A.5 *(continued)*

	Camden County			
	Corrected Data		Original Data	
	Number	Percent	Number	Percent
Summary Statistics (in miles)				
Mean Distance to Nearest Feeding Site	0.16		0.17	
25th Percentile	0.07		0.07	
50th Percentile-Median	0.13		0.14	
75th Percentile	0.22		0.23	
90th Percentile	0.34		0.34	
95th Percentile	0.36		0.40	

TABLE A.6

COMPARISON OF DATA PREPARATION METHODS FOR DISTANCE TO NEAREST SUMMER FEEDING SITE: TOTAL CHILDREN AGE 18 AND UNDER IN SFSP-QUALIFIED TRACTS, CUMBERLAND COUNTY, 1990

	Cumberland County			
	Corrected Data		Original Data	
	Number	Percent	Number	Percent
Distance in Miles				
0 to .04	0	0.0	0	0.0
.05 to .09	1,002	16.4	0	0.0
.10 to .14	1,114	18.2	559	9.1
.15 to .19	1,709	27.9	1,665	27.2
.20 to .24	217	3.5	217	3.5
.25 to .29	667	10.9	711	11.6
.30 to .34	0	0.0	555	9.1
.35 to .39	0	0.0	1,002	16.4
.40 to .44	0	0.0	0	0.0
.45 to .49	0	0.0	0	0.0
.50 to .59	678	11.1	0	0.0
.60 to .69	735	12.0	0	0.0
.70 to .79	0	0.0	1,413	23.1
.80 to .89	0	0.0	0	0.0
.90 to .99	0	0.0	0	0.0
1.00 to 1.99	0	0.0	0	0.0
2.00 to 2.99	0	0.0	0	0.0
3.00 to 3.99	0	0.0	0	0.0
4.00 to 4.99	0	0.0	0	0.0
5.00 to 9.99	0	0.0	0	0.0
10.00 or more	0	0.0	0	0.0
Total	**6,122**	**100.0**	**6,122**	**100.0**

TABLE A.6 *(continued)*

	Cumberland County			
	Corrected Data		Original Data	
	Number	Percent	Number	Percent
Summary Statistics (in miles)				
Mean Distance to Nearest Feeding Site				
25th Percentile				
50th Percentile-Median	0.26		0.36	
75th Percentile				
90th Percentile	0.10		0.18	
95th Percentile	0.18		0.27	

TABLE A.7

COMPARISON OF DATA PREPARATION METHODS FOR DISTANCE TO NEAREST SUMMER FEEDING SITE: TOTAL CHILDREN AGE 18 AND UNDER WITH FAMILY INCOME 185 PERCENT OF POVERTY OR LESS IN SFSP-QUALIFIED TRACTS, CAMDEN COUNTY, 1990

	Camden County			
	Corrected Data		Original Data	
	Number	Percent	Number	Percent
Distance in Miles				
0 to .04	1,655	6.2	1,655	6.2
.05 to .09	5,748	21.6	5,473	20.6
.10 to .14	3,140	11.8	3,017	11.4
.15 to .19	2,429	9.1	2,445	9.2
.20 to .24	2,137	8.0	2,401	9.0
.25 to .29	808	3.0	926	3.5
.30 to .34	409	1.5	409	1.5
.35 to .39	701	2.6	0	0.0
.40 to .44	334	1.3	1,035	3.9
.45 to .49	0	0.0	0	0.0
.50 to .59	24	0.1	24	0.1
.60 to .69	0	0.0	0	0.0
.70 to .79	177	0.7	177	0.7
.80 to .89	0	0.0	0	0.0
.90 to .99	0	0.0	0	0.0
1.00 to 1.99	0	0.0	0	0.0
2.00 to 2.99	61	0.2	61	0.2
3.00 to 3.99	0	0.0	0	0.0
4.00 to 4.99	0	0.0	0	0.0
5.00 to 9.99	0	0.0	0	0.0
10.00 or more	0	0.0	0	0.0
Total	**17,623**	**66.3**	**17,623**	**66.3**

TABLE A.7 *(continued)*

	Camden County			
	Corrected Data		Original Data	
	Number	Percent	Number	Percent
Summary Statistics (in miles)				
Mean Distance to Nearest Feeding Site	0.16		0.17	
25th Percentile	0.06		0.06	
50th Percentile-Median	0.13		0.14	
75th Percentile	0.21		0.21	
90th Percentile	0.29		0.29	
95th Percentile	0.36		0.40	

TABLE A.8

COMPARISON OF DATA PREPARATION METHODS FOR DISTANCE TO NEAREST SUMMER FEEDING SITE: TOTAL CHILDREN AGE 18 AND UNDER WITH FAMILY INCOME 185 PERCENT OF POVERTY OR LESS IN SFSP-QUALIFIED TRACTS, CUMBERLAND COUNTY, 1990

	Cumberland			
	Corrected Data		Original Data	
	Number	Percent	Number	Percent
Distance in Miles				
0 to .04	0	0.0	0	0.0
.05 to .09	518	8.5	0	0.0
.10 to .14	762	12.4	400	6.5
.15 to .19	1,088	17.8	1,068	17.4
.20 to .24	135	2.2	135	2.2
.25 to .29	303	4.9	323	5.3
.30 to .34	0	0.0	362	5.9
.35 to .39	0	0.0	518	8.5
.40 to .44	0	0.0	0	0.0
.45 to .49	0	0.0	0	0.0
.50 to .59	335	5.5	0	0.0
.60 to .69	523	8.5	0	0.0
.70 to .79	0	0.0	858	14.0
.80 to .89	0	0.0	0	0.0
.90 to .99	0	0.0	0	0.0
1.00 to 1.99	0	0.0	0	0.0
2.00 to 2.99	0	0.0	0	0.0
3.00 to 3.99	0	0.0	0	0.0
4.00 to 4.99	0	0.0	0	0.0
5.00 to 9.99	0	0.0	0	0.0
10.00 or more	0	0.0	0	0.0
Total	**3,664**	**59.8**	**3,664**	**59.8**

TABLE A.8 *(continued)*

	Cumberland			
	Corrected Data		Original Data	
	Number	Percent	Number	Percent
Summary Statistics (in miles)				
Mean Distance to Nearest Feeding Site	0.26		0.35	
25th Percentile	0.12		0.18	
50th Percentile-Median	0.18		0.27	
75th Percentile	0.27		0.36	
90th Percentile	0.65		0.74	
95th Percentile	0.65		0.78	

TABLE A.9

COMPARISON OF FULL AND RESTRICTED SUMMER SITES TO TOTAL FOR DISTANCE TO NEAREST SUMMER FEEDING SITE: TOTAL CHILDREN AGE 18 AND UNDER IN SFSP-QUALIFIED TRACTS, CAMDEN COUNTY, 1990

	Camden County					
	Total (Corrected Data)		Full Summer		Restricted Summer	
	Number	Percent	Number	Percent	Number	Percent
Distance in Miles						
0 to .04	2,334	8.8	1,440	5.4	894	3.4
.05 to .09	8,622	32.5	7,599	28.6	2,697	10.2
.10 to .14	4,810	18.1	4,135	15.6	2,254	8.5
.15 to .19	3,274	12.3	4,569	17.2	3,825	14.4
.20 to .24	3,014	11.3	4,305	16.2	4,062	15.3
.25 to .29	1,405	5.3	1,405	5.3	1,147	4.3
.30 to .34	845	3.2	772	2.9	2,715	10.2
.35 to .39	986	3.7	1,065	4.0	1,754	6.6
.40 to .44	669	2.5	669	2.5	2,914	11.0
.45 to .49	20	0.1	20	0.1	859	3.2
.50 to .59	137	0.5	137	0.5	1,668	6.3
.60 to .69	0	0.0	0	0.0	1,324	5.0
.70 to .79	386	1.5	386	1.5	389	1.5
.80 to .89	0	0.0	0	0.0	0	0.0
.90 to .99	0	0.0	0	0.0	0	0.0
1.00 to 1.99	0	0.0	0	0.0	0	0.0
2.00 to 2.99	61	0.2	61	0.2	0	0.0
3.00 to 3.99	0	0.0	0	0.0	0	0.0
4.00 to 4.99	0	0.0	0	0.0	0	0.0
5.00 to 9.99	0	0.0	0	0.0	61	0.2
10.00 or More	0	0.0	0	0.0	0	0.0
Total	**26,563**	**100.0**	**26,563**	**100.0**	**26,563**	**100.0**

TABLE A.9 *(continued)*

	Camden County					
	Total (Corrected Data)		Full Summer		Restricted Summer	
	Number	Percent	Number	Percent	Number	Percent
Summary Statistics (in miles)						
Mean Distance to Nearest Feeding Site	0.16		0.18		0.30	
25 Percentile						
50th Percentile-Median	0.07		0.07		0.15	
75th Percentile	0.13		0.15		0.23	
90th Percentile	0.22		0.22		0.40	
95th Percentile	0.34		0.34		0.54	

TABLE A.10

COMPARISON OF FULL AND RESTRICTED SUMMER SITES TO TOTAL FOR DISTANCE TO NEAREST SUMMER FEEDING SITE: TOTAL CHILDREN AGE 18 AND UNDER IN SFSP-QUALIFIED TRACTS, CUMBERLAND COUNTY, 1990

	Cumberland County					
	Total (Corrected Data)		Full Summer		Restricted Summer	
	Number	Percent	Number	Percent	Number	Percent
Distance in Miles						
0 to .04	0	0.0	0	0.0	0	0.0
.05 to .09	1,002	16.4	1,002	16.4	0	0.0
.10 to .14	1,114	18.2	1,114	18.2	0	0.0
.15 to .19	1,709	27.9	1,709	27.9	0	0.0
.20 to .24	217	3.5	0	0.0	217	3.5
.25 to .29	667	10.9	884	14.4	0	0.0
.30 to .34	0	0.0	0	0.0	0	0.0
.35 to .39	0	0.0	0	0.0	0	0.0
.40 to .44	0	0.0	0	0.0	0	0.0
.45 to .49	0	0.0	0	0.0	0	0.0
.50 to .59	678	11.1	678	11.1	667	10.9
.60 to .69	735	12.0	735	12.0	44	0.7
.70 to .79	0	0.0	0	0.0	555	9.1
.80 to .89	0	0.0	0	0.0	347	5.7
.90 to .99	0	0.0	0	0.0	559	9.1
1.00 to 1.99	0	0.0	0	0.0	3,733	61.0
2.00 to 2.99	0	0.0	0	0.0	0	0.0
3.00 to 3.99	0	0.0	0	0.0	0	0.0
4.00 to 4.99	0	0.0	0	0.0	0	0.0
5.00 to 9.99	0	0.0	0	0.0	0	0.0
10.00 or More	0	0.0	0	0.0	0	0.0
Total	**6,122**	**100.0**	**6,122**	**100.0**	**6,122**	**100.0**

TABLE A.10 *(continued)*

	Cumberland County					
	Total (Corrected Data)		Full Summer		Restricted Summer	
	Number	Percent	Number	Percent	Number	Percent
Summary Statistics (in miles)						
Mean Distance to Nearest Feeding Site	0.26		0.26		1.05	
25th Percentile						
50th Percentile-Median	0.10		0.10		0.87	
75th Percentile	0.18		0.18		1.05	
90th Percentile	0.27		0.27		1.45	
95th Percentile	0.65		0.65		1.59	

TABLE A.11

COMPARISON OF FULL AND RESTRICTED SUMMER SITES TO TOTAL FOR DISTANCE TO NEAREST SUMMER FEEDING SITE: TOTAL CHILDREN AGE 18 AND UNDER WITH FAMILY INCOME 185 PERCENT OF POVERTY OR LESS IN SFSP-QUALIFIED TRACTS, CAMDEN COUNTY, 1990

	Camden County					
	Total (Corrected Data)		Full Summer		Restricted Summer	
	Number	Percent	Number	Percent	Number	Percent
Distance in Miles						
0 to .04	1,655	6.2	1,060	4.0	595	2.2
.05 to .09	5,748	21.6	5,127	19.3	1,665	6.3
.10 to .14	3,140	11.8	2,817	10.6	1,371	5.2
.15 to .19	2,429	9.1	3,063	11.5	2,521	9.5
.20 to .24	2,137	8.0	3,042	11.5	3,002	11.3
.25 to .29	808	3.0	808	3.0	746	2.8
.30 to .34	409	1.5	399	1.5	1,926	7.3
.35 to .39	701	2.6	711	2.7	1,101	4.1
.40 to .44	334	1.3	334	1.3	1,984	7.5
.45 to .49	0	0.0	0	0.0	545	2.1
.50 to .59	24	0.1	24	0.1	1,005	3.8
.60 to .69	0	0.0	0	0.0	921	3.5
.70 to .79	177	0.7	177	0.7	180	0.7
.80 to .89	0	0.0	0	0.0	0	0.0
.90 to .99	0	0.0	0	0.0	0	0.0
1.00 to 1.99	0	0.0	0	0.0	0	0.0
2.00 to 2.99	61	0.2	61	0.2	0	0.0
3.00 to 3.99	0	0.0	0	0.0	0	0.0
4.00 to 4.99	0	0.0	0	0.0	0	0.0
5.00 to 9.99	0	0.0	0	0.0	61	0.2
10.00 or More	0	0.0	0	0.0	0	0.0
Total	**17,623**	**66.3**	**17,623**	**66.3**	**17,623**	**66.3**

TABLE A.11 *(continued)*

	Camden County					
	Total (Corrected Data)		Full Summer		Restricted Summer	
	Number	Percent	Number	Percent	Number	Percent
Summary Statistics (in miles)						
Mean Distance to Nearest Feeding Site	0.16		0.17		0.31	
25th Percentile						
50th Percentile-Median	0.06		0.07		0.17	
75th Percentile	0.13		0.14		0.23	
90th Percentile	0.21		0.21		0.40	
95th Percentile	0.29		0.29		0.54	

TABLE A.12

COMPARISON OF FULL AND RESTRICTED SUMMER SITES TO TOTAL FOR DISTANCE TO NEAREST SUMMER FEEDING SITE: TOTAL CHILDREN AGE 18 AND UNDER WITH FAMILY INCOME 185 PERCENT OF POVERTY OR LESS IN SFSP-QUALIFIED TRACTS, CUMBERLAND COUNTY, 1990

	Cumberland County					
	Total (Corrected Data)		Full Summer		Restricted Summer	
	Number	Percent	Number	Percent	Number	Percent
Distance in Miles						
0 to .04	0	0.0	0	0.0	0	0.0
.05 to .09	518	8.5	518	8.5	0	0.0
.10 to .14	762	12.4	762	12.4	0	0.0
.15 to .19	1,088	17.8	1,088	17.8	0	0.0
.20 to .24	135	2.2	0	0.0	135	2.2
.25 to .29	303	4.9	438	7.2	0	0.0
.30 to .34	0	0.0	0	0.0	0	0.0
.35 to .39	0	0.0	0	0.0	0	0.0
.40 to .44	0	0.0	0	0.0	0	0.0
.45 to .49	0	0.0	0	0.0	0	0.0
.50 to .59	335	5.5	335	5.5	303	4.9
.60 to .69	523	8.5	523	8.5	20	0.3
.70 to .79	0	0.0	0	0.0	362	5.9
.80 to .89	0	0.0	0	0.0	170	2.8
.90 to .99	0	0.0	0	0.0	400	6.5
1.00 to 1.99	0	0.0	0	0.0	2,274	37.1
2.00 to 2.99	0	0.0	0	0.0	0	0.0
3.00 to 3.99	0	0.0	0	0.0	0	0.0
4.00 to 4.99	0	0.0	0	0.0	0	0.0
5.00 to 9.99	0	0.0	0	0.0	0	0.0
10.00 or More	0	0.0	0	0.0	0	0.0
Total	**3,664**	**59.8**	**3,664**	**59.8**	**3,664**	**59.8**

TABLE A.12 *(continued)*

	Cumberland County					
	Total (Corrected Data)		Full Summer		Restricted Summer	
	Number	Percent	Number	Percent	Number	Percent
Summary Statistics (in miles)						
Mean Distance to Nearest Feeding Site	0.26		0.26		1.06	
25th Percentile						
50th Percentile-Median	0.12		0.12		0.87	
75th Percentile	0.18		0.18		1.05	
90th Percentile	0.27		0.27		1.45	
95th Percentile	0.65		0.65		1.52	

APPENDIX B

RECOMMENDED SAMPLE SELECTION STEPS AND SAMPLE WEIGHTING PROCEDURES

A. INTEGRATING THE PARTICIPANT-NONPARTICIPANT STUDY INTO THE SPONSOR-SITE DESIGN

As indicated in Chapter IV, the sponsor-site sample design serves as the backbone for the participant-nonparticipant study's design. Incorporating a participant-nonparticipant study implies that the timing of the selection of sponsors and their sites becomes more critical, as the school lists must be obtained during the school year. In particular, both the sponsor and site selection procedures occur in phases to separate the selection of prior year sponsors and prior year sites from the selection of new sponsors and their sites (and, if needed, the selection of new sites from prior year sponsors). Figure IV.2 in Chapter IV provides a suggested flow-chart for conducting the various sampling steps for the combined studies. In this section, we review each of these steps and provide specific details on implementing the procedures.

The first step in developing the sample is to obtain a list of prior year sponsors and sites from the state administrative offices (all 54 "state" offices including the offices in the 50 states and four U.S. territories). For the second step, the contractor should select the phase one sample of prior year sponsors as outlined in Appendix C of Volume I. For this step, the sponsors are stratified into 14 sampling strata based on a combination of FNS region, average daily attendance (ADA), and urban/rural status. Within each stratum, a probability-proportionate-to-size (PPS) sample of sponsors is selected using average daily attendance (ADA) as the size measure.

In the absence of a participant-nonparticipant study, contacts with phase one sponsors and the subsequent selection of the new sponsors in phase two would occur before the observation site sampling began. This would allow the contractor to obtain lists of current-year sites before selecting the observation site sample.

To obtain school lists for a participant-nonparticipant study, a site sample must be identified from the prior-year sites during the winter, so that the schools near those sites can be contacted

during the school year to obtain lists of children in the neighborhoods near these sites. As a result, we recommend conducting the site selection process in two phases in conjunction with the three-phase sponsor selection process. The same site sampling methodology is used, but the site sample selection is conducted separately for the phase one and phase two sponsor samples. The phase one site selection process is conducted immediately after selection the phase one sponsor sample based on the sponsor's prior-year list of sites. Since these sites are selected prior to interviewing the sponsors, some of these sites will be eliminated from the sample because the sponsor is dropping out of the program or not operating the site in the current year.

With the two-phase site selection process, the next step is to select a random subsample of the phase one sponsors to receive observational site visits as outlined in Appendix C, Section A of Volume I (pages C.10-C.12). Phase one sponsors selected from Puerto Rico, Guam, and the Virgin Islands are eliminated prior to selecting the subsample.

Once the sponsors are identified for the observational site studies, a sample of their sites is selected as outlined in Appendix C, Section B (pages C.13-C.16) of Volume I. In this process, if the sponsor has two or fewer sites, all of the sites are selected for observation. If the sponsor has three or more sites, a PPS procedure is used to select 2 or more sites from the sponsor. A summary of the proposed sample guidelines is given in Table B.1, based on the sponsor sample sizes presented in Table C.2 and Table C.3 of Volume I, and an expected average sampling rate of 1.5 sites per sponsor. These site selections (195 to 400 depending on the required CV) form the sampling frame for selecting the sites to be used in the participant-nonparticipant study.[1] Our recommendations for

[1]The probability of a site being selected as part of the sampling frame for the participant-nonparticipant study is given by the product equations (C.13) and (C.15) in Appendix C, Section B of Volume I. Also see equation (B.2) below.

TABLE B.1

RECOMMENDED PHASE ONE SPONSOR AND OBSERVATIONAL SITE SUBSAMPLE SELECTION PROCEDURES

	5% CV			10 % CV		
Sponsor Group	Number of Sponsors to Select Phase One	Subsample of Sponsors to Select for Observational Site Studies*	Total Sites Selected for Observational Studies	Number of Sponsors to Select Phase One	Subsample of Sponsors to Select for Observational Site Studies*	Total Sites Selected for Observational Studies
Continuing	477	240	360	117	117	175
Dropouts (expected)	53	26**	40**	13	13**	20**
Total	530	266	400	130	130	195

* Less any sponsors that were selected in Puerto Rico, Virgin Islands and Guam.

** To be eliminated after sponsor interviews.

selecting a sample of sites for the participant-nonparticipant study and the students from these sites are discussed in Sections 2 and 3.

The selection of the new phase two sponsors to receive observational site visits and the corresponding observed sites is conducted in a similar manner as for the phase one sponsor sample once the current-year lists of sites becomes available. However, for the phase two sponsor sample, the sites can be selected after the sponsors are interviewed and the non-interviewed sponsors eliminated from the site selection step.

As outlined in steps 9 through 14 of Figure IV.2, a sample of the identified new phase two sampled sponsors is selected to receive site observations. From these sponsors, a sample of their sites is again selected using the procedures outlined in Appendix C, Section B of Volume I. In phase three, as outlined in steps 19 and 20 of Figure IV.2, a supplemental sample of former sponsors is selected. A summary of the phase two and three sample requirements is presented in Table B.2.

Given that the phase one sponsor-site sample is restricted to the phase one sponsor's list of prior-year sites, we also recommend considering sampling a small number of new sites from those identified among phase one sponsors selected for site observation studies. This process ensures complete coverage of the current year sites in the sample design.

As the flowchart in Figure IV.2 indicates, we do not recommend selecting the sample of observed sites (in steps 3 and 5) independently from the sites selected for the participant-nonparticipant study (steps 6 and 7). Doing so could result in the selection of sites for the participant study at which site observations were not conducted. Hence, an independent selection process could interfere with the desired linkage between the survey data and the site observation data. Furthermore, selecting the observed sites and then the sites for the participant-nonparticipant study from the prior-year sponsors at the same time results in a straightforward hierarchical structure for drawing the sample and producing the survey weights.

TABLE B.2

RECOMMENDED PHASE TWO AND THREE SPONSOR AND OBSERVATIONAL SITE SUBSAMPLE SELECTION PROCEDURES

	5% CV			10 % CV		
Sponsor Group	Number of Sponsors to Select Phase Two	Subsample of Sponsors to Select for Observational Site Studies*	Total Sites Selected for Observation Studies	Number of Sponsors to Select Phase Two	Subsample of Sponsors to Select for Observational Site Studies*	Total Sites Selected for Observation Studies
New	55	28	42	16	15	23
Former (expected)	197			126		
Total	252	28	42	253	15	23

* Less any sponsors that were selected in Puerto Rico, Virgin Islands and Guam and those that failed to complete the sponsor survey.

B. SELECTION OF SPONSORS AND SITES FOR THE PARTICIPANT-NONPARTICIPANT STUDY

The sponsor and site combinations selected in phase one to receive observational visits form the basis of the sampling frame for the participant-nonparticipant sites. From the sponsors selected for the observational study (step 3 in Figure IV.2), the contractor should select a random subsample within each of the 14 sponsor sampling strata. The subsample should be allocated across the sampling strata in proportion to the number of sponsors selected in phase one from each stratum. In this process, the probability of selecting a sponsor for the participant-nonparticipant study, given they were selected to participate in the observational site visits, is as follows:

$$\text{(B.1)} \qquad Prob(sponsor\ part|selected\ phase\ 1\ site) = \frac{np_h}{ns_h}$$

where

$$np_h = np \times \left(\frac{n1_h^c}{n^c}\right)$$

In equation (B.1), h indexes the phase one sponsor sampling strata for selection of sponsors, $h=1, ...,14$; $n1_{h,}$ defines the number of non-certainty sponsors allocated in phase one to sponsor sampling stratum h; ns_h denotes the subsample size in stratum h of the sponsors selected for site observations; and np is the subset of the ns selections that are selected for the participant-nonparticipant study.[2] The c superscript on the sample sizes indicates that the sample sizes reflect the elimination of any selections in Puerto Rico, The Virgin Islands and Guam.

Based on the information available on the sponsors and their sites at the time the phase one sample of sponsors is selected, the sponsor sample should be limited to those sponsors that have

[2]See the notation associated with equations (C.1) and (C.8) in Appendix C of the sponsor-site report.

geographically specific catchment areas for the majority of their sites. Sponsors associated predominately with summer camp sites, sports events and other sites that have a wide geographical coverage or that serve students for less than two weeks should be eliminated prior to sample selection as discussed in Chapter IV.

Finally, one of the sites selected for observational visits is selected from each of the sponsors selected for the participant-nonparticipant study. A summary of the recommended sample sizes to yield the site completed interview requirements presented in Table IV.3 at each of the three CV levels is given in Table B.3 below. We note that with either the 5 or 10 percent CV option for the observational site sample, the sponsor-site sampling frame is sufficiently large to accommodate any of the three precision requirements for the participant study.

If the observed sites turn out to include any non-geographically specific sites, these should be excluded from the sample. This situation could occur if the majority of the sponsor's sites are geographically specific but a few of the sites selected for observation are not. Furthermore, some substitutions for the sites selected maybe required if the sites cannot be observed. In general, we anticipate that by selecting a larger than needed sample of sponsors, we can replace a nonresponding sponsor-site combination with a different sponsor-site combination to ensure that the sites for which student interviews are conducted received a completed site visit.

C. HOUSEHOLD SELECTION PROCEDURES

From each of the sites selected for the participant-nonparticipant study, the contractor will contact the local school districts to identify the elementary schools that have students near the selected geographically specific sites. From these schools, lists of the FRPL students in grades K to 5 with names, addresses, and telephone numbers will be obtained. We will convert these student-based lists to a household list based on common address data.

TABLE B.3

RECOMMENDED NUMBER OF SPONSORS AND SITES TO SELECT
FOR THE PARTICIPANT-NONPARTICIPANT STUDY

(From Those Selected for Observational Study)

	Sample Frame For 5 Percent Observational Site CV (Table B.1)	Subsample of Sponsors to Select for Participant-Nonparticipant Study			Sample Frame For 10 Percent Observational Site CV (Table B.1)	Subsample of Sponsors to Select for Participant-Nonparticipant Study		
Sponsor/Site Group	Sponsors Selected for Site Observations (Table B.1)	5% CV	7.5 % CV	10% CV	Sponsors Selected for Site Observations (Table B.1)	5% CV	7.5 % CV	10% CV
Continuing	240	104	49	28	117	104	49	28
Dropouts (expected)	26**	12*	5*	3*	13**	12*	5*	3*
Total Sponsor Sample to Select	266	116	54	31	130	116	54	31
Total Site Sample (one site selected from among sponsors sites selected for observation)		116	54	31		116	54	31
Expected Completed Observed Sites in Participant-Nonparticipant Study-- Assuming 90% completion rate among continuing sponsor sites and availability of school lists for 80% of sites		75	35	20		75	35	20

*To be eliminated after sponsor interviews.

We note that it is possible that some households could end up being in more than one selected site's catchment area if two of the selected sites are close to each other. In this situation, if possible, we recommend determining the overlap in the two student lists prior to sample selection.
The site and student addresses are geocoded to yield lists of students for each selected site with the student's distance from the site.

Based on our proposed catchment area definitions, as discussed in Chapter IV, we recommend stratifying the household addresses into four sampling strata, based on the two distance rings or tiers defined for the catchment area:

1. Households with geocodeable address in the outer tier of the catchment area (between the inner and outer distance rings)
2. Households with geocodeable address in the inner ring or tier of the catchment area
3. Households with unknown or non-geocodeable addresses (unknown distance from the site)
4. Households with geocodeable addresses outside the outer ring or tier

Households beyond the outer ring in sampling stratum four are then excluded from the selection process.

We recommend allocating the sample to the three eligible sampling strata disproportionately to achieve a minimum expected participant rate of 40 percent among sampled households. A tentative strategy is shown in Table IV.2 and Table B.4. Within each sampling stratum, we recommend selecting a random sample using a systematic serpentine-sorted sample selection procedure, as outlined by Chromy (1979). This systematic sample selection process sorts the sampling units in each sampling stratum in a serpentine fashion based on their characteristics. This

TABLE B.4

RECOMMENDED WITHIN-SITE HOUSEHOLD SAMPLE SIZES
(Assumes Household Response Rate of 75 Percent and Eligibility Rate of 95 Percent)

Total Household Address Interviews Recommended Per Site (Table 5)	Recommended Household Sample Sizes Per Site to Select	Sampling Strata	Tentative Suggested Allocation Percent of Sample
60	84	1. Inner Tier	51-55%
		2 Outer Tier	44-49%
		3. Unknown	1-5%

process effectively imposes stratification beyond the sampling strata to ensure the sample is balanced by a variety of available characteristics, but does not adversely affect precision and allocation.[3] Given that the sample frame is expected to contain information on the student's age or grade and gender, the characteristics of the youngest or oldest elementary child could be used as the household sorting variables.

The recommended sample sizes to select assuming a 75 percent response rate and an 80 percent eligibility rate are given in Table B.4. With a fixed number of households required within each site to meet each of the precision levels, a sample of 84 households per site should be sufficient to reach the interview targets. Some adjustments to these sample sizes may be required if any of the sites are selected with certainty.

Finally, we will randomly select one elementary-age student from each contacted household with more than one child in that age range. We will instruct the interviewer to obtain the name of the child with the birthday nearest the date of the interview, and this child becomes the focus child.

D. HOUSEHOLD PROBABILITIES OF SELECTION

Based on the procedures proposed to select the students from within each of the sites, equation (B.2) provides an expression for the overall probability of selecting a student from each of the three eligible catchment area sampling strata. The inverse of these probabilities serves as the basic sampling weight and provides for unbiased estimation of the study population.

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[3]Serpentine ordering is an ordering of units using multiple factors that increases the similarity of units nearby each other, whereas a sequential sort using multiple factors is different at changes in the levels of the ordering factors. For example, using two factors each with "high/low" levels, a sequential sort results in an ordering of "low/low, low/high, high/low, and high/high." The serpentine ordering results in an ordering of the form "low/low, low/high, high/high, and high/low." The middle units with serpentine ordering are different only on the first factor but are the same of the second factor, whereas the middle units with the sequential ordering are at different levels on both factors.

$$Prob(Student)_{h,p,a,st}\ '$$

$$(B.2)\qquad \underbrace{\frac{n1_h \times MOS_{h,p}}{MOS_h}}_{1} \times \underbrace{\frac{ns_h}{n1_h{}^{c}}}_{2} \times \underbrace{\frac{np_h}{ns_h}}_{3} \times \underbrace{\frac{nsite_{h,p} \times MOS^{)}_{h,p,site}}{MOS^{)}_{h,p}}}_{4} \times \underbrace{\frac{1}{nsite_{h,p}}}_{5} \times \underbrace{\frac{nh_{h,p,site,a}}{HH_{h,p,site,a}}}_{6} \times \underbrace{\frac{1}{st_{h,p,site,a,hh}}}_{7}$$

In equation B.2, the term (1) is associated with the probability of selecting a prior-year sponsor in phase one as defined in equation (C.1) of the sponsor-site report, and term (2) is associated with selecting from this sponsor sample the subsample of sponsors to participant in the observational site visits. Term (3) is defined as in equation B.1 and reflects the probability of selecting another subsample of the phase one sponsor sample to be part of the participant-nonparticipant study. Term (4) reflects the probability of selecting (usually 1 or 2) sites for observation visits from the selected sponsors as outlined in equations (C.15)-(C.17) of the sponsor-site report and term (5) reflects the probability of selecting one of those sites to be part of the participant-nonparticipant study. Term (6) represents the probability of selecting *nh* households from household catchment area sampling strata *a, a=1,..,3* among the *HH*-eligible households on the student list from the selected site, from sponsor *p*, in sponsor strata *h*. The final term (7) represents the probability of selecting one child from each selected household *(hh)* from the *ST*-eligible students in the household.

E. SAMPLE WEIGHTING PROCEDURES

We recommend developing a set of survey weights for the completed parent interviews based on the strategy outlined in Appendix D, Section C of the sponsor-site report. For the household weights, we recommend using a weight based on the product of a minimum of seven factors as outlined in Table B.5. The first of these factors uses the inverse value of the product of terms (1)-(5) in equation (B.2) to prepare an initial site-based weight. The next three factors adjust these site weights as needed for ineligibility of the sampled records and for nonresponse using the same methodology as outlined in Appendix D, Section C of the sponsor-site report. The combined product

of the first four factors will produce a projection weight for the participant-nonparticipant sites that is similar to those computed for the observed sites, except for a scaling effect due to the differences in the sample sizes.[4]

Once the basic participant-nonparticipant site weights are developed, these are multiplied by the inverse of the student probabilities of selection (the inverse of the product of terms (6) + (7) in equation (B.2)) to produce a basic student weight for the sampled students. These weights are then adjusted for ineligibility of the sampled students and student nonresponse, using the same methodology for the site weighting process (factors 6 and 7 in Table B.5). An additional alignment factor similar to that used for the site weights (factor 2) could be incorporated into the student weights if administrative data was available to post-stratify the students into categories with known counts.

[4]It might be possible to use the projection weights for the observed sites as the basic site weight for the participant-nonparticipant sites by simply adjusting the observation site weights for the subsampling process (using the inverse of the product of terms (3) and (5) in equation (B.2)). As a result, a separate non-response adjustment process might not be required for the participant-nonparticipant study sites.

TABLE B.5

COMPONENTS OF THE SURVEY WEIGHTS FOR THE PARENT INTERVIEWS

Factor	Purpose
1	Reflects the inverse probability of selecting the site
2	An alignment factor that adjusts the factor 1 site survey weights (or some function of these weights) to sum to a specified value such as the total number of food service sites or the total number of meals served based on administrative data
3	Adjusts the weight from factor 1 for the estimated rates of ineligibility of sites
4	A model-based or weighting class that accounts for differences among the site respondents and nonrespondents based on the sampled unit's characteristics
5	Reflects the within-site inverse probability of selecting the student
6	Adjusts the weight from factors 1 to 5 for the estimated rates of ineligibility of the student within each site
7	A model-based or weighting class that accounts for differences among the student respondents and nonrespondents based on the sampled unit's characteristics