

Design Phase of the National Study of Child Care Supply and Demand (NSCCSD):

Revised Sampling Report and Addendum

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2010 National Study of Child Care Supply and Demand:

Sampling Report

Second Draft

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1. Introduction

The Request for Proposals for the National Study of Child Care Supply and Demand (NSCCSD) is both far-reaching in the populations that are to be studied and deep in the early childhood care and education issues that need to be addressed. This is perhaps the case since a study of this kind has not been done in 20 years and because the early childhood field has become more complex with higher stakes for children and their parents. The scope of these services now includes both addressing the child care needs of employed parents or parents who are students and the developmental needs of children ages 0-13.

Although both the federal and state governments have an interest in children of all socioeconomic levels, the primary public responsibility lies with low-income families. The child care subsidy addresses the needs of low-income families for purposes of entering and staying in the labor force, while the Head Start programs address the development and early learning needs of children from poor families. State Pre-K programs have traditionally focused on children at-risk of educational failure, but there has recently been an expansion of these programs to serve more children and, in some states, the intention is to be universal. For school-age children, out-of-school-time programs have proliferated. There is a perception that these programs are different from 20 years ago. The intention is for these out-of-school-time programs to have a complementary role to the school day, as well as provide recreational opportunities for elementary school age children.

The intention of the NSCCSD is to understand families' use of all of these programs in addition to the overlap of these programs within and across the organizations that provide them. The commingling of funds and resources is a new phenomenon that was not an issue 20 years ago. As poor families have been required to obtain or seek employment as a result of welfare reform, the dynamics of early childhood program use has changed as more parents move in and out of jobs and as more "universal" programs, such as pre-K, Head Start and out-of-school time programs become available.

Clearly, the most important aspect of this study is to relate the demand for early childhood care with the supply of providers of this care. Identifying child care markets, from both the demand and supply perspective, is critical to a better understanding of how government policy can help families achieve their goals. We hypothesize that families' decision-making and behavior will be strongly affected by what is available to them—be it formal organization-based programs or friends or family members that are available to care for their children. Similarly, understanding how

providers make decisions about both prices and groups they can serve must be done within the context of other providers with whom they compete. Only when the field knows the choices that families and providers make in the context will policymakers understand what aspects of policy and program administration need to change to improve the responsiveness of the system to families' needs.

The need to adequately address all of these issues can clearly overwhelm a resource-limited research endeavor as larger sample sizes with longer questionnaires are needed to address all issues in a rigorous manner. However, there are multiple ways to address the need to represent all 51 (= 50 + DC) states and/or policy environments; the need to have sufficient numbers of low-income families to be able to report statistically significant results; and coverage of all topics, including utilization, cost, choice, quality, and preferences.

A focus on low-income families excluding higher income families would address the primary populations of interest to the government. The gain would be a larger sample to address the analysis of the behavior and needs of low-income families, a better understanding of why or why not they are using the programs that they are using. The loss here would be understanding the behavior of higher income families—in particular their use of the same resources that lower-income families use. Do higher income families have the same challenges that low-income families have? Some of what we need to know about all families could come from aggregate information provided by the supply survey, but that information may be piecemeal and not particularly satisfactory, especially if higher income families are not using the same providers as low-income families.

Another option would be to focus on families with children 0-5 year olds. We would certainly learn about their older siblings who are 6-13, but would learn nothing about those families who just have children in the school age group. Given the stronger governmental expenditures on the 0-5 year olds and the secondary status of out-of-school time to elementary education, this is also a reasonable prioritization. There are other sources of information on school age children that may provide satisfactory information for this point in time. The loss would be to have a better sense of the amount and kind of out-of-school time programming that is needed for the elementary school-age children. The additional value of focusing on the 0-5 year olds is the difficulty of identifying the sampling frame for out-of-school time programs and perhaps the challenge of survey administration for programs that only operate during the out-of-school time periods.

The need to have cases from all 50 states is important in order to have all of the variations in the features of these programs included. While in theory, it is possible to categorize states into clusters of similar policy regimes, the possibility that policies and practice change just prior to or during data collection prevents excluding any states. We must decide whether the likelihood of policy changing or new policy affecting behavior at the time of data collection is high enough to necessitate the expense of collecting data in all 50 states. Of course, it would be important to have sufficient sample size in the largest states, which drive the majority of the expenditures in the nation.

The need to keep the interviews to a short time period also makes questionnaire content an area where choices have to be made, but that is less of a sampling issue than a task of item construction and selection and understanding what proportion of families will be completing varying portions of the questionnaire. Subsampling into different questionnaire modules may be possible to get both a broad geographic coverage and substantive coverage of important topics.

The National Study of Child Care Supply and Demand (NSCCSD) has two overarching aims: to collect and analyze information on (1) early and school-age care available to parents and young children, and on (2) the use of non-parental child care and early education services by parents in all levels of household income. To address these dual goals, we propose two interrelated sample surveys: a *demand survey* of parents of young and school-age children and a *supply survey* of providers of early and school-age child care. To facilitate joint analysis of the demand for and supply of child care services, we recommend that the demand and supply surveys should be conducted in a common set of geographic areas or child-care markets. See the NSCCSD analysis plan for our definition of a *child care market* and for a description of the kinds of joint analysis we have in mind.

Although we have raised various important design options in the foregoing paragraphs – such as a nationally representative sample versus a sample restricted to certain states, all households versus low-income households only, and all ages 0 to 12 versus ages 0 to 5 – it will be convenient to make concrete choices to enable our investigation of design options to proceed. Thus, in the balance of this report, we shall assume that the target population for the demand survey will consist of all children under age 13 residing in regular housing units within the 50 states and DC regardless of the level of family income. We believe that our investigation of sampling options presented in this report would be informative even in the event that OPRE should choose to restrict the sampling population along one of the foregoing lines. Our investigation

illustrates the kinds of investigations that should be conducted regardless of how the population is ultimately defined.

Our assumed definition of the sampling population excludes children age 13 and older¹, homeless children, children living in group quarters arrangements, and children whose usual place of residence is abroad. Notably, it includes school-age children, higher-income children, and children living in all of the states. Throughout this report, we refer to individuals under age 13 as “age-eligible children.” At this writing, we are proposing no program-based or other criteria for demand survey eligibility.

We exclude homeless children and children living in group quarters arrangements from the target population for three reasons. First, there is no good sampling frame for these populations; second, sampling and collecting data from these two groups would be difficult and disproportionately costly; and third, these groups represent a very small proportion of the overall national population of children under age 13.² As a general rule, the homeless population and the population in group quarters are excluded from most social surveys. On balance, we suggest that there would not be enough substantive value in collecting data from these populations to warrant the expenditure of funds that such data collection would require.

On the other hand, children of parents in the military and children of incarcerated parents would not be excluded from the target population of the demand survey as long as they reside in regular housing units. As will become clear, we are proposing a national probability sample of housing units in which each unit would have a known and nonzero probability of selection. The sample would be fully representative of all children living in regular housing, regardless of the status of the parents or guardians with whom they live.

Children living in households in which English is not the primary language spoken would be included in the target population. The sampling plan we are proposing would pick up non-English speaking households and children living in these households in their true population proportions. We are not proposing a supplemental sample or an oversample of children from non-English

¹ Although we will not explicitly sample and collect data for older children, we will know of their presence and whether or not they provide care for any of the children under age 13.

² According to data from the 2000 Census, only 2.8 percent of the national population is either homeless or lives in institutions or other group quarters.

speaking households, unless OPRE would advance a new requirement that the NSCCSD should permit separate analysis of this population.

The target population for the supply study will include all centers, programs, facilities, and individuals in the 50 states and the District of Columbia that offer regular non-parental child-care services for young children or out-of-school time programs for school-age children.

The sampling design for the overall NSCCSD will be driven by four broad requirements:

- The sample for the demand survey should be probability based and be fully representative of the target population of age-eligible children;
- The sample for the demand survey should include a large enough sample of children in low-income households to permit separate analysis of this population of children;
- The sample for the supply survey should be probability based and be fully representative of the target population of eligible providers; and
- The samples for the demand and supply surveys should be coordinated so as to permit study of the associations between the supply of services and the demand for services within common child-care markets.

OPRE has also asserted an optional (fifth) requirement:

- The sample for the demand survey should include a large enough sample of American Indian or Alaskan Native (AIAN) children to permit separate analysis of this population of children.

To meet the study's requirements, we are proposing that four samples be selected and used as the basis for the demand and supply surveys. For the demand survey, we propose a *core sample* of households to provide a nationally representative sample of all children in the target population; the details of the core sampling design are set forth in Chapter 2. In brief, we propose a three-stage sampling design, selecting counties (or county-clusters in the case of very small counties) at the first stage, census tracts or minor civil divisions within the selected counties at the second stage, and residential addresses or telephone numbers within the selected second-stage units at the third stage. We propose conducting a demand survey interview for each age-eligible child living within the selected households. The core sample would also embody an oversample of low-income households. We recognize the importance of studying demand and supply factors for children in

low-income households, and in Chapter 2 and Appendix C we lay out a method to oversample such households without the need for screening on household income. We believe this method will find enough low-income households for data analysis and will preserve the nationally-representative and probability-based nature of the sample design.

The core sample, however, will not be nearly large enough to meet the requirements for sampling AIAN children, should OPRE invoke that option, because of the relatively small size and dispersed character of this population. A number of alternative sampling designs could be considered that would specifically address the geographic distribution of the AIAN population. A design that is currently held in some favor focuses on federally recognized reservations or reservation-like areas that are awarded grants under the Child Care and Development Fund (CCDF). Thus, for the demand survey, we also propose an *AIAN supplementary sample* of households to be sampled and interviewed in reservations or grantee areas. Details of our proposal are described in Chapter 3 of this report. In brief, the sampling design for the AIAN supplementary sample would likely feature the same or a similar three-stage approach as we propose for the core sample.

The core and AIAN supplementary samples jointly would comprise the demand survey for the overall NSCCSD. In this regard, we have considered various methods of sampling households within second-stage areas and various modes of interviewing the selected households. We considered random digit dialing as a method of sampling, accompanied by telephone interviewing, but we rejected it because it would fail to cover children living in cell-phone-only and nontelephone households. By association, the method would fail to cover a portion of the population of low-income households, one of the survey's key analytical domains. We considered and rejected sampling from a traditional or custom listing of the addresses within the second-stage areas, accompanied by face-to-face interviewing. Such a method would provide good coverage of the population with relatively high response rates, but would tend to be too costly in relation to its analytical value. We also considered a method of sampling addresses from the U.S. Postal Service's delivery sequence file, augmented by a "sample and go" procedure in highly rural counties, accompanied by multiple modes of interview, including telephone, mail, and face-to-face interviewing. This approach to sampling and interviewing may provide a good balance between the cost, feasibility, coverage, and analytical value of the demand survey. We currently support use of this approach, but describe all of these approaches in greater detail in Chapters 2 and 3.

The third and fourth samples for the overall NSCCSD would comprise the supply survey. We propose a *core sample of providers* and an *AIAN supplementary sample of providers*, with these samples to be selected and interviewed within the same geographic areas that are employed for the two demand samples. We describe both of these provider samples in Chapter 4 of the report. In brief, we propose a two- or three-stage sampling design for both of the provider samples. The first stage would share the same samples of counties as would be selected for the demand survey. At the second stage of a two-stage design option, we would directly sample providers within the counties from lists of providers that we would construct for the purpose. At the second stage of a three-stage design option, we would sample broad *provider clusters*, determined to consist of the demand-survey second-stage unit and a ring of census tracts surrounding this unit. Then at the third stage of sampling, we would sample providers within the selected provider clusters from lists of providers that we would construct for the purpose. It is known from the literature that child-care markets differ by type of care (e.g., center-based v. home based v. school based).³ What is possible is that zoning and other conditions may lead to localities that are more dense in providers (e.g., commercial districts) or more dense in households (e.g., purely residential neighborhoods). Public schools and home-based providers would typically be spread throughout residential areas, but center-based providers may not be. To facilitate analysis of the supply and demand data, we do not want to impose on the sampling design a mismatch between the samples of households and of providers. If we want researchers to be able to empirically explore alternative market boundaries and definitions, then it seems useful to select providers from a wider area than the area in which we select the sample of households. It is this thinking that leads us to propose either the countywide selection of providers or the selection of providers from broad provider clusters while clustering the selection of households more narrowly within localities (census tracts or minor civil divisions) within counties.

In preparing this report, we were highly mindful of OPRE's desire for us to define and illuminate various design options for the demand and supply surveys. Accordingly, the ensuing chapters are filled with discussion about design alternatives. In some cases, we are able at this writing to reject some of the alternatives, RDD sampling being a case in point. In other cases, we leave the options open at this time. Additional information from the pretest or from the budget

³ See Kisker, Hofferth, Philips, Farquhar (1991), Meyers and Jordan (2006), and Willer, Hofferth, Kisker, Divine-Hawkins, Farquhar, and Glantz (1991).

process would be needed to narrow the alternatives and to identify a final recommendation. To highlight and preview the design alternatives for the reader, we have inserted a box at the opening of each section of the report. The box contains a brief summary of the options presented and discussed in the ensuing section.

The report closes with a number of appendices that contain detailed information about various aspects of the construction of sampling frames or of the sampling of areas, households, or providers from those sampling frames.

Throughout the report, we make repeated reference to counties, census tracts, minor civil divisions, and other geographic entities that have been described and defined by the U.S. Census Bureau. Virtually all sampling operations that are conducted in the U.S. make use of these census geographies, because they hold many properties that are necessary to the conduct of a proper sampling operation, including fixed, mappable borders, known population and sub-population counts, and a known hierarchical structure. Appendix H presents the hierarchical structure of census geographies and provides definitions for the various geographical units.

2. Core Sample Design

2.1 Introduction

Options for planning data:

- 2000 Census data
- Data from most recent American Community Survey

The main objective of the core sample of households is to provide national estimates on the demand side of child care and early education services. The core sample will also provide statistical estimates for the low income population and the population receiving or eligible for cash assistance. In addition, the core sample, or a similar but separate sample of households selected within the same general sampling design, may be used to generate a representative sample of providers from the category commonly known as “family, friends, and neighbors”. This thought is developed further in Chapter 4.

We recommend taking a multistage sampling approach for the core sample of households. A multistage sampling design might be less efficient than a single stage design, but it has operational and analytical advantages. First, it doesn't require a complete listing of all households residing in the 50 states and the District of Columbia. Instead, a sampling frame is required at each stage only for the units that have been selected at the previous stage. Second, it yields a clustered sample that tends to minimize travel costs, if any, and some other data collection costs. Third, it gives statisticians more control and flexibility to sample at differential rates at the different stages of the sampling design. This flexibility will be useful in oversampling the low-income population and the population receiving or eligible for cash assistance. Finally, in the context of a coordinated design for the demand and supply surveys, it permits a rounded analysis of the supply and demand for child-care services in child-care markets.

At this writing we envision a three-stage sampling design for the demand survey. We discuss the definition and sampling of primary sampling units (PSU) in Section 2.2. Section 2.3 discusses the definition and sampling of second-stage units and also the sampling of our ultimate units, namely households. We discuss the mode of data collection, which is driven by the sampling option at the second stage, in Section 2.4. Section 2.5 focuses on sample sizes and sampling rates at each stage. Finally, to illustrate a range of reasonable multistage sampling designs, we present three complete scenarios in Section 2.6 and highlight the ways in which they vary in terms of cost and accuracy.

We anticipate making extensive use of census data in defining the geographic boundaries of the various sampling units and in selecting samples of the various units. There are really only two feasible sources of such data: (1) data from the 2000 Census and (2) data from a recent American Community Survey (ACS) (ACS replaces the census long form and is an on-going survey now conducted every year). Both sources are readily available from the U.S. Census Bureau. Because the data would be at least ten years old by the time it would be used for the demand survey, we believe the 2000 Census is the less attractive of the two sources. Counties, cities, and neighborhoods may have changed considerably since 2000, and use of such dated data for sampling purposes could result in lost efficiencies, but no bias, in the demand-survey sample.

Our view is that the demand survey would benefit from a more recent source of planning data. Table 2.1 gives the current plans for disseminating ACS data. The fall of 2010 may be seen as a potential tipping point for the NSCCSD, because at that point in time the Census Bureau will

release ACS data on income for census tracts and block groups. Data for such small areas will not have been available since 2000. If the NSCCSD sampling operations can be scheduled in the winter of 2010-2011 or later, then those operations should be conducted using the just-released ACS data. On the other hand, if the sampling operations must be conducted earlier than fall 2010, then we would recommend use of the then most recent ACS data, such as data from 2009. Such data, however, would likely only be available for larger geographic areas of population 20,000 or more or even 65,000 or more. It may then be necessary to combine ACS data with data from the 2000 Census in order to reflect local variation, especially regarding household income, within the NSCCSD sampling design.

In any event, we support the principle of using recent data to plan the NSCCSD wherever possible and assume use of such data without further comment throughout the balance of this report.

Table 2.1 Data Release Dates for the American Community Survey

In the following table, the columns represent the calendar year (CY) when data are released and the rows represent the year (or years) of data collection.

Data Product	Population Size of Area	CY 2006	CY 2007	CY 2008	CY 2009	CY 2010	CY 2011	CY 2012	CY 2013
1-Year Estimates for Data Collected in:	65,000+	2005	2006	2007	2008	2009	2010	2011	2012
3-Year Estimates for Data Collected in:	20,000+			2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012
5-Year Estimates for Data Collected in:	All Areas*					2005-2009	2006-2010	2007-2011	2008-2012

* Five-year estimates will be available for areas as small as census tracts and block groups. Source: US Census Bureau web site (<http://www.census.gov/acs/www/SBasics/DataDiss/RelDates.htm>) as of November 21, 2008

NOTE: Starting with the data collected in 2005, ACS information has been published for areas with population 65,000 or more. In the fall of 2008, the first 3-year estimates were released based on data from the 2005, 2006 and 2007 surveys for geographic areas with populations of 20,000 or more. By 2010, the Census Bureau plans to provide the first 5-year estimates of demographic, housing, social and economic data for geographic areas down to the block group level. These 5-year estimates will then be updated annually by removing the earliest year and replacing it with the latest one. This will provide, for the first time, the ability to monitor social and economic trends in local communities.

2.2 *First Stage of Sampling*

At the first stage of sampling, we propose a stratified probability sample of primary sampling units (PSUs) representative of all geographic areas in the 50 states and the District of Columbia. In order to carry out the first-stage sampling, we need to define the PSUs, choose a stratification variable, and determine the method of sample selection within strata.

2.2.1 *Choice of PSU*

Options for definition of primary sampling units:

- Counties
- Tracts/Tract clusters
- County subdivisions

The choice of PSU should be driven by the analytical goals of the project and by the operational feasibility and cost structure of the data collection operations. The analytical goals of the NSCCSD are to jointly study the demand for and the supply of early-child and school-age care services in America. Therefore, as an ideal matter, a PSU should represent a bundle (one or more) of child-care markets. While the existing child-care literature does not provide a definitive definition of a market, we suggest that a key objective of the NCSCCD should be to gather information that will advance the state of knowledge about what constitutes a market and how markets operate.

As a naïve first step, one might conceive of a child-care market as a compact geographic area that contains all providers used by the households located within the area boundaries and contains all households receiving care from providers located within the area boundaries. But this model of a market is much too simplistic. Except in relatively isolated locations, markets are likely to have vague boundaries or be partially overlapping in terms of geographic area. Providers may be located throughout an area or may be skewed towards one part of an area. Parents and children may travel around the block or across town to the care provider.

A main challenge in defining PSUs is to balance the potential mismatches between the supply and demand sides of markets. We want the PSU to be large enough so that it surely includes

nearly all of the demand and supply elements of one or more markets. At the margin of a PSU, of course, there will nearly always exist some cross-over of demand to providers in a neighboring PSU or of supply to neighboring households. But we would like to define the PSUs such that the cross-overs are likely to account for relatively small proportions of the corresponding household and provider populations.

Cost is a countervailing concern, however, in defining PSUs. It will be necessary to limit travel and other data collection costs if the NSCCSD is to be a viable project. Concern about travel costs drives us towards limiting the size of PSUs in terms of their land mass.

The 1990 National Child Care Survey used counties/county groups as PSUs for sampling purposes, and one option for the NSCCSD would be to replicate this choice. Counties are generally large enough that experts agree they represent a bundle of child-care markets, with relatively modest cross-over of demand or supply. Counties are used as the PSUs for many national sampling designs. Experience with other national surveys suggests that use of counties would acceptably limit travel and other data collection costs.

A second option would be to use census tracts or tract clusters as the study PSUs. Because the average size of a tract is about 1,500 households, the tract might be viewed as being closer to a single child-care market, or perhaps even part of a market, than a county would be. On the other hand, cross-overs may account for a relatively large proportion of a tract's population. The households within a given tract may conceivably seek services largely in neighboring tracts, or the providers within a tract may draw customers substantially from neighboring tracts, resulting in complete mismatches of the supply and demand sides of the true market. Also, if tracts would be implemented as the study PSUs, the core sample would likely be widely dispersed across the country, raising the costs of the study.

Another concern is that tracts/tract clusters might be too small to contain enough households for the demand survey or enough child care providers for the supply survey. Take Illinois for example, which has 102 counties and 1,931 census tracts. The mean number of households at county level is 49,318 and the mean at a census tract level is 2,446. According to the 2006 ACS, about 26.8 percent of the households have eligible children of age under 13. Applying the same eligibility rate, the mean number of households with eligible children in an Illinois county is 12,413 and 656 in a census tract.

A third candidate choice for PSUs is some type of subcounty units that are smaller than counties but bigger than census tracts/tract clusters. A minor civil division (MCD) is one such subcounty unit that is created to govern or administer an area such as a town or a township. The U.S. Census Bureau recognizes MCDs in 28 states, the District of Columbia, Puerto Rico, and the Island Areas. In states where MCDs are not recognized, a census county division (CCD) is a statistical subdivision of a county, delineated by the U.S. Census Bureau in cooperation with state and local government officials for data presentation purposes. A census county division usually represents one or more communities, trading centers or, in some instances, major land uses. MCDs and CCDs together cover the entire country and provide a standard level of geography below the county. Minor civil divisions are more common in the East, while census county divisions are more common in the West. Henceforth, for simplicity, we will use the term MCDs to refer to all county subdivisions.

MCDs are smaller than counties and they vary considerably in size, ranging from sparsely populated areas of population near 0 to large cities such as Baltimore, Brooklyn (Kings County, NY), and Chicago. MCDs as PSUs may tend to spread the core sample more widely across the country than would counties, again raising costs.

On balance, we believe that tracts/tract clusters are generally too small to serve as the study PSUs. We think there are two feasible approaches: one approach is to use MCDs as the PSUs and the second approach is to use counties as the PSUs with a secondary stage of sampling within the selected PSUs. Of these two, we recommend the use of counties as PSUs primarily because they are likely to have cost advantages over the use of MCDs and because of familiarity -- counties have been used successfully before for a national child care study.

Note that, regardless of the choice of PSUs, a minimum PSU size must be established, probably in terms of households, to enable feasible sampling of smaller units. The minimum size should be established just before the actual sample implementation in light of the final sample sizes that are determined for the NSCCSD. Small units should be collapsed with neighboring units until the minimum PSU size is met or exceeded.

2.2.2 Stratification of PSUs

Options for stratification and allocation of PSUs:

- State stratification and allocation of PSUs in proportion to TANF recipients
- State stratification and allocation of PSUs in proportion to children served by CCDF
- State stratification and allocation of PSUs in proportion to households with children
- Policy type stratification and allocation of PSUs in proportion to TANF recipients
- Policy type stratification and allocation of PSUs in proportion to children served by CCDF
- Policy type stratification and allocation of PSUs in proportion to households with children

The NSCCSD will have a special interest in studying how the supply and demand for child care varies in child care policies across the country. One straightforward way to achieve this aim is to stratify PSUs by state because, historically, states set policy for child care and early childhood education and care policies are diverse across states. Stratification by state may have the property of reducing the sampling variance of NSCCSD estimators because of the relative homogeneity within states in child care policies.

Because states vary in size, we may consider three different methods to determine the number of PSUs to be drawn from each state. To illustrate the methods, let us assume that we would want to take about 200 PSUs into the overall national sample. The first method allocates the number of PSUs to each state in proportion to the total number of TANF recipients served in that state, with a minimum of two PSUs for each state.⁴ This allocation method yields 226 PSUs across the 50 states and District of Columbia. The second method allocates the number of PSUs in proportion to the average number of children served by CCDF, leading to a total number of 224 PSUs. The third method allocates the number of PSUs in proportion to the number of households with age eligible children, producing a total number of 222 PSUs.

⁴ The District of Columbia would be a possible exception to this rule. It could be treated for sampling purposes as a PSU in Maryland or Virginia. Alternatively, it could be treated as a “self-representing” PSU or a stratum in its own right, i.e., a PSU selected with certainty.

Table 2.2 displays the number of PSUs to be sampled by state using these different allocation methods. Small states are allocated just 2 PSUs. Large states are allocated several PSUs. Within large states, PSUs could be further stratified by degree of urbanization such that two PSUs would be drawn in each stratum.

Despite the national study's focus on the low income population, we recommend drawing PSUs in proportion to the number of households with age eligible children within each state stratum. TANF and CCDF do not provide a consistent basis for allocating sample across the country. The eligibility rules for these programs vary greatly by state, as a result of which, many TANF/CCDF recipients in California, for instance, would never be eligible for TANF/CCDF in Texas.

Alternatives to state-based stratification could be considered going forward. One alternative would be to stratify PSUs by type of child-care policy. That is, we would partition the country into a number of defined policy-type strata. To execute such a design, one would need to define the various policy types in a data-driven way such that each area of the country could be classified into one and only one stratum. The delineation of policy-type strata could be a challenging and laborious task. In addition, child-care policies do change over time and it is possible that policy type at the survey design stage could be different from policy type in effect at the time of data collection and analysis. Therefore, even if such classification could be accomplished with some effort, it is not clear that it would bring enough advantages over state-based stratification to make it worthwhile.

Another possibility for stratification of PSUs would be some kind of blend between state-based stratification and policy-type stratification. For example, it is a known fact that CCDF policy is set at the local level in some states. Recognizing this fact, it might be feasible to stratify by state within the domain of states where policy is set at the state level, and to stratify by policy type within the domain of all other states. Another similar idea would be to stratify in two steps, starting by establishing strata for all of the states. Then, within those states for which policy is set locally, substratify the state into policy-type areas. It is unclear, at this writing, what effects such a stratification scheme might have on the number of PSUs or on survey costs. It is worth noting that these two hybrid alternatives, blending state-based stratification and policy-type stratification, would inherit the same risks as we observed earlier for pure policy-type stratification.

In weighing the merits of the alternative stratification schemes, one should keep in mind that every one of them will provide the basis for a representative national sample of eligible households and children. Every one of them will provide the basis for estimation and analysis of the demand for child care services with a complete lack of sampling bias. The stratification alternatives may have slightly different effects on the sampling variances of survey statistics and on statistical inferences to the population of eligible households and children. Typically, however, those effects will be quite small.

The choice of stratification scheme could become much more important if it would be decided that direct inference regarding the demand for child care services are required within each of several policy-type domains. If such a decision would be taken, then it would imply the need for a substantial sample size within each of the domains. More direct stratification by policy-type might then rise in importance.

Table 2.2: Number of PSUs to be Drawn by State

State	Allocation in Proportion to Total Number of TANF Recipients⁵	Allocation in Proportion to Average Number of Children Served by CCDF⁶	Allocation in Proportion to Number of Households with Eligible Children⁷
Alabama	2	3	3
Alaska	2	2	2
Arizona	4	3	4
Arkansas	2	2	2
California	58	20	25
Colorado	2	2	4
Connecticut	2	2	2
Delaware	2	2	2
Dist. Of Col.	2	2	2
Florida	4	12	11
Georgia	2	7	7
Hawaii	2	2	2

⁵The TANF data used in this table are taken from the 2007 report, which can be accessed electronically at: http://www.acf.hhs.gov//programs/ofa/caseload/2007/2007_recipient_tan.htm. Total number of recipients refers to the fiscal year of 2007.

⁶The CCDF data comes from the 2006 CCDF report. It can be downloaded from http://www.acf.hhs.gov/programs/ccb/data/ccdf_data/06acf800_preliminary/table1.htm.

⁷The data are from the 2007 Current Population Survey (CPS) March Supplement. CPS is subject to sampling variability at the state level. If this method would be considered for implementation, the allocation should be recalculated using counts obtained from a recent ACS release.

Table 2.2: Number of PSUs to be Drawn by State

State	Allocation in Proportion to Total Number of TANF Recipients⁵	Allocation in Proportion to Average Number of Children Served by CCDF⁶	Allocation in Proportion to Number of Households with Eligible Children⁷
Idaho	2	9	2
Illinois	4	4	8
Indiana	6	2	4
Iowa	2	2	2
Kansas	2	4	2
Kentucky	3	4	3
Louisiana	2	2	3
Maine	2	3	2
Maryland	2	4	4
Massachusetts	5	10	4
Michigan	10	4	7
Minnesota	3	4	3
Mississippi	2	4	2
Missouri	5	2	4
Montana	2	2	2
Nebraska	2	2	2
Nevada	2	2	2
New Hampshire	2	4	2
New Jersey	4	2	6
New Mexico	2	14	2
New York	14	11	13
North Carolina	2	2	6
North Dakota	2	2	2
Ohio	8	6	8
Oklahoma	2	2	2
Oregon	2	2	2
Pennsylvania	8	10	7
Rhode Island	2	2	2
South Carolina	2	2	3
South Dakota	2	2	2
Tennessee	8	5	4
Texas	7	14	17
Utah	2	2	2
Vermont	2	2	2
Virginia	3	3	5
Washington	6	6	4
West Virginia	2	2	2
Wisconsin	2	3	4
Wyoming	2	2	2
Total	226	224	222

In addition to stratification by state (or by child-care policy, or by a blend of state and policy stratification), PSUs could be further stratified by an urban/rural classification, since there is considerable policy interest in understanding urban/rural differences in child care. There are three schemes that could be used as the basis for this classification. First, the Census Bureau defines urban areas by population density and classifies as “urban” core block groups or blocks with a population density of at least 1,000 people per square mile or surrounding census blocks that have an overall density of at least 500 people per square mile. Everything else is rural.

Second, the Core Based Statistical Areas (CBSA) classification developed by the Office of Management and Budget (OMB) is county based. It divides counties into metropolitan statistical areas, micropolitan statistical areas, and non-core counties based on population. These categories would be simpler to apply to the sampling design for the NSCCSD than the Census Bureau’s urban-rural classification.

Third, the Department of Agriculture’s Economic Research Service uses rural-urban continuum codes to distinguish metro counties by size and nonmetro counties by their degree of urbanization or proximity to metro areas. USDA defines codes zero to 3 as metro, and 4 to 9 as nonmetro.

Any one of the three classification schemes could be used to further stratify PSUs within their primary state- or policy-type-based strata.

Stratification by urbanicity is a matter on which reasonable people can disagree. Some child care experts with whom we have consulted believe it is desirable and important to stratify in this manner (regardless of which definition of urban/rural is adopted). Others don’t see the need for such stratification. On balance, we believe stratifying PSUs by urbanicity would become important only if the NSCCSD would have a key objective to oversampling rural areas. Given our current understanding of the study’s likely priorities, we recommend not to stratify PSUs by urbanicity. This matter should probably be re-evaluated as project implementation nears.

Before leaving this work and proceeding further, we observe that one of the important goals of the core sample is to oversample three related categories of disadvantaged households, including low-income households, CCDF recipients, and TANF (past, present, and future) households. Indeed both the RFP for the current NSCCSD contract and discussion at the study kickoff meeting strongly urged oversampling each of these categories. Because of the strong associations between income,

CCDF receipt, and TANF eligibility, a survey design that effectively oversamples low-income households will effectively oversample CCDF recipients and the TANF (past, present, and future) population. Thus there is no competition between the goals of oversampling the low-income domain, oversampling the CCDF domain, and oversampling the TANF domain.

2.2.3 Measure of Size and Selection Method

Options for the measure of size to employ in selecting the sample of PSUs:

- Population of children age under 13
- Number of households with at least one child under age 18
- Number of low-income households with at least one child under age 18

A probability-proportional-to-size (pps) method is recommended to select PSUs within each stratum. Given pps sampling, the probability of selecting a PSU is based on some measure of size (MOS) of the PSU, denoted by the variable X . That is, the selection probability of a PSU i in a stratum h is

$$\pi_{hi} = n_h \frac{X_{hi}}{\sum_{i'} X_{hi'}},$$

where n_h is the number of PSUs to be selected in the stratum. Some of the largest PSUs may be selected with probability equal to 1.0 – such PSUs are typically called *certainty* or *self-representing* PSUs.

Several candidate measures of size could be used in the pps sampling of PSUs. Two outstanding exemplars are the population of children age under 13 and the number of households with at least one child less than 18 years old. Both measures of size are readily available at the county and census tract level from the 2000 Decennial Census (Table PCT12, Summary File 1, Census 2000 and Table PT19, Summary File 1, Census 2000). However, the Census 2000 data are dated. A better alternative would be data from the American Community Survey (ACS). The ACS released a three-year estimate in December 2008; the three-year data include more and smaller geographic areas. We recommend that the implementing survey organization use the three-year data when computing measures of size. In a wide variety of social science studies, households

prove to be a more stable measure of size than population, and thus we are somewhat drawn to recommend households for the NSCCSD.

Given the study's focus on the low-income and TANF populations, the number of TANF recipients could be considered as a MOS. However, the published figures on TANF recipients are at the state level only. Thus, they cannot be used for sampling PSUs within states. And even if they could be used, note that the use of TANF or CCDF figures as a measure of size would be prone to the same problem described earlier that is the result of inconsistent TANF and CCDF eligibility definitions across the states.

Another option is to use the number of low-income households with at least one child under age 18 as a MOS. This option would give counties with more low-income households a higher probability of selection than they would otherwise have. Such an option can achieve the objective of oversampling low-income households. The only caveat with this option is the timing of the implementation of the NSCCSD. As mentioned in the earlier paragraph, ACS income data on small geographies will be released in the second half of 2010. If the study were to be fielded before the five-year ACS data were released, the implementing survey organization would not be able to use the five-year ACS data. However, we recommend that at least the three-year ACS data should be used to calculate the MOS.

Two different pps methods can be used to actually sample $n_h = 2$ PSUs from each stratum. One method is "pps systematic sampling" (Wolter, 2007). With this method, counties are first sorted within stratum alphabetically, geographically, or by the value of the measure of size. Then, a running cumulative MOS is calculated for each PSU. Using a random number generator, PSUs whose cumulative MOS are the first to exceed the chosen random digits will be selected. An alternative method is Durbin's method (Durbin, 1967). Durbin's method chooses the first unit within a stratum with probability

$$p_{hi} = \frac{X_{hi}}{\sum_{i'} X_{hi'}}$$

and the second unit with probability in proportion to

$$p_{hj} \left\{ (1 - 2p_{hi})^{-1} + (1 - 2p_{hj})^{-1} \right\} \quad (j \neq i)$$

such that the total probability of inclusion of the i -th unit in stratum h is $\pi_{hi} = 2p_{hi}$. For either method of sampling, care must be taken to first designate any certainty PSUs in the usual way.

On balance, due to its desirable property of having a known joint inclusion probability, we recommend Durbin's scheme for the NSCCSD.

2.3 Sampling within PSUs

Assuming counties would be chosen as the study PSUs, one could attempt to sample addresses directly within the selected counties, or one could sample areal clusters of addresses followed by the direct sampling of addresses only within the selected clusters. Because counties tend to be large geographic areas, the former approach would disperse the sample widely, raising cost concerns, and it might result in a sample that is not well suited to advancing the study of child-care markets. The latter approach is likely to do a better job of controlling data collection costs and it may focus the demand survey on a sample of child-care markets. In what follows, we focus on this latter approach.

We call the areal clusters selected within the PSUs *second stage units*. Stratification can be applied in second-stage sampling as well to allow for differential sampling rates. Selection methods will be discussed subsequently.

2.3.1 Choice of Secondary Sampling Units (SSUs)

Options for the definition of the SSU:

- Rectangular grid
- PUMAs
- MCDs
- Places
- Census tracts/tract clusters
- School districts
- Break the second stage into two distinct substages of sampling.

As noted previously, the study will benefit from a three-stage design as follows:

1. Counties (or county clusters to achieve a minimum size) as PSUs
2. Areal clusters⁸ (to achieve a minimum size) as Second Stage Units (SSUs)
3. Residential addresses as Ultimate Sampling Units (USUs).

The three-stage design is hierarchical in nature. It implies that we would begin by selecting a sample of counties from the list of all 3,141 county equivalents in the country. Within the selected counties, and only within those counties, we would define the areal clusters. We would make a list of all clusters within each of the selected counties, and then we would select a sample of them within each county. Finally, we would make a list of all addresses within each selected cluster. We would select a sample of the addresses in each selected cluster and release the sample for data-collection operations.

At least two criteria must come into play when considering the candidates for SSUs. First, the SSU should ideally contain one or more child-care markets, and to the extent possible, the markets it covers should be relatively similar to one another. The closer we can come to meeting these attributes, the more the sampling of SSUs within PSUs becomes equivalent to the sampling of child-care markets within counties. Second, the SSU should be some unit of geography that can be designated in a practical way. As discussed earlier in connection with Table 2.2, the overall sampling design for the NSCCSD may involve over 200 PSUs and each and every one of them would have to be subdivided into SSUs before we could sample them. Thus, an SSU should be both definable, using census tools and automated algorithms with only minimal manual intervention, and something like a market or bundle of markets, but maybe not exactly a market or bundle in all circumstances. Ideally, an SSU should stay as faithful as possible to the ideal of a child-care market, while also lending itself to automated or near-automated construction techniques.

We considered six options as possible geographic building blocks for the construction of SSUs, as follows (refer to Appendix H for the census definitions of the various geographic units) :

- A. A *rectangular grid* could be defined by the implementing survey organization and imposed on the selected PSUs. For example, PSUs could be subdivided into regular areas of 100

⁸ An areal cluster is a compact land area with recognizable borders, including all of the households and providers located within the borders.

square miles with 10 miles on a side. Given this option, a hypothetical county of dimensions 50 miles by 60 miles would be partitioned into a population of 30 SSUs.

- B. Define SSUs in terms of *Public Use Microdata Areas* (PUMAs)
- C. Define SSUs in terms of *census places*.
- D. Define SSUs in terms of *minor civil divisions* (MCDs).
- E. Define SSUs in terms of *census tracts*.
- F. Define SSUs in terms of school districts

In each case, units would be collapsed, if necessary, to achieve a minimum size in terms of population or households.

We quickly dismissed Option A as not being viable. It would require too much effort to determine the boundaries of the grid and then to match the units defined to conventional political, postal and census geographic boundaries. There would be almost no cost or analytical benefits the option would bring that would compensate for the difficulties.

We quickly dismissed Option B as not viable too. PUMAs are areas, typically of population 100,000 or more, that the Census Bureau defines for the purpose of inclusion in public-use microdata computer files. The point is that provision of exact geographic location in such databases would breach the confidentiality of the individual census respondent. To protect the respondent's confidential data, the PUMA is the lowest geographic identifier that the Census Bureau includes on the data file. Regrettably, we believe PUMAs are too big to be useful as the SSUs. Also, their geographic boundaries are not necessarily defined to obey the concept of a child-care market(s).

Incorporated places generally correspond to general-purpose local governments such as cities, towns, and villages across America. Census Defined Places are defined for concentrations of population outside of incorporated places. It is reasonable to think that places may generally correspond to child-care markets or bundles of markets and thus that places might provide a reasonable basis for the definition of SSUs. Unfortunately, unorganized territories occur in 10 states (AR, IN, IA, LA, ME, MN, NC, ND, OH, and SD) where portions of counties are not included in any incorporated place, census designated place, or consolidated city. Our desire for complete coverage of the population for the NSCCSD would demand that, if places would serve as PSUs, then unorganized territory should be partitioned by some means into SSUs. Another disadvantage of places is that some of them are too large to serve as SSUs, such as the city of Chicago.

MCDs⁹ are county subdivisions that are used by the Census Bureau for data presentation purposes. For example, in the Midwest region, MCDs generally correspond to townships. Where necessary, the Census Bureau recognizes unorganized territories as one or more MCDs within the corresponding counties. Thus, MCDs are defined and span all of the land area of the US. It is reasonable to think that MCDs may generally correspond to something like child-care markets or bundles of markets and thus that MCDs might provide a reasonable basis for the definition of SSUs. Unfortunately, MCDs are quite variable in size and some are simply too large to serve as separate SSUs. For example, Chicago, Baltimore, and Kings County (Brooklyn) each comprise one MCD. Further, in some counties, there are really too few MCDs to be viable as the SSUs. For example, there are only three MCDs defined in Bexar County (San Antonio). To enable us to seriously consider use of MCDs as SSUs, some MCDs would have to be subdivided into parts. Such subdivision would break up the very largest metro MCDs, thus creating smaller SSUs and more SSUs per county. Some city planning departments acknowledge neighborhood boundaries. Chicago, for example, is a city known worldwide for its neighborhoods. However, neighborhoods, where they exist, do not exist in census data products, and at this writing it is not known for sure whether all MCDs that would require subdivision in fact have an existing system of neighborhoods that the NSCCSD could borrow for purposes of SSU definition. If there would be large MCDs that do not have existing neighborhood definitions, then the implementing survey organization would have to custom make the neighborhood SSUs in those MCDs.

Census tracts are small and relatively permanent subdivisions of counties. The entire US is divided into tracts. They are relatively less variable in size than MCDs, averaging, say, about 1,500 households and 4,000 people. In many cases, a tract may be seen to be a child-care market or part of a market(s).

To give the readers a sense of the contrasts between census tracts and MCDs, we show two maps of the same county. Figure 2.1 displays the census tracts of Alameda County, CA, while Figure 2.2 shows the MCDs in the same county. Additional contrasting information appears in Table 2.3, which presents information about the average size and variability in size of PUMAs, MCDs, and tracts in a range of counties across the four regions of the US.

⁹ Recall that we are using MCD as a shorthand method of describing the class of all county subdivisions, including MCDs, CCDs, and unorganized territory or UT.

Figure 2.1: Census Tracts in Alameda County, CA

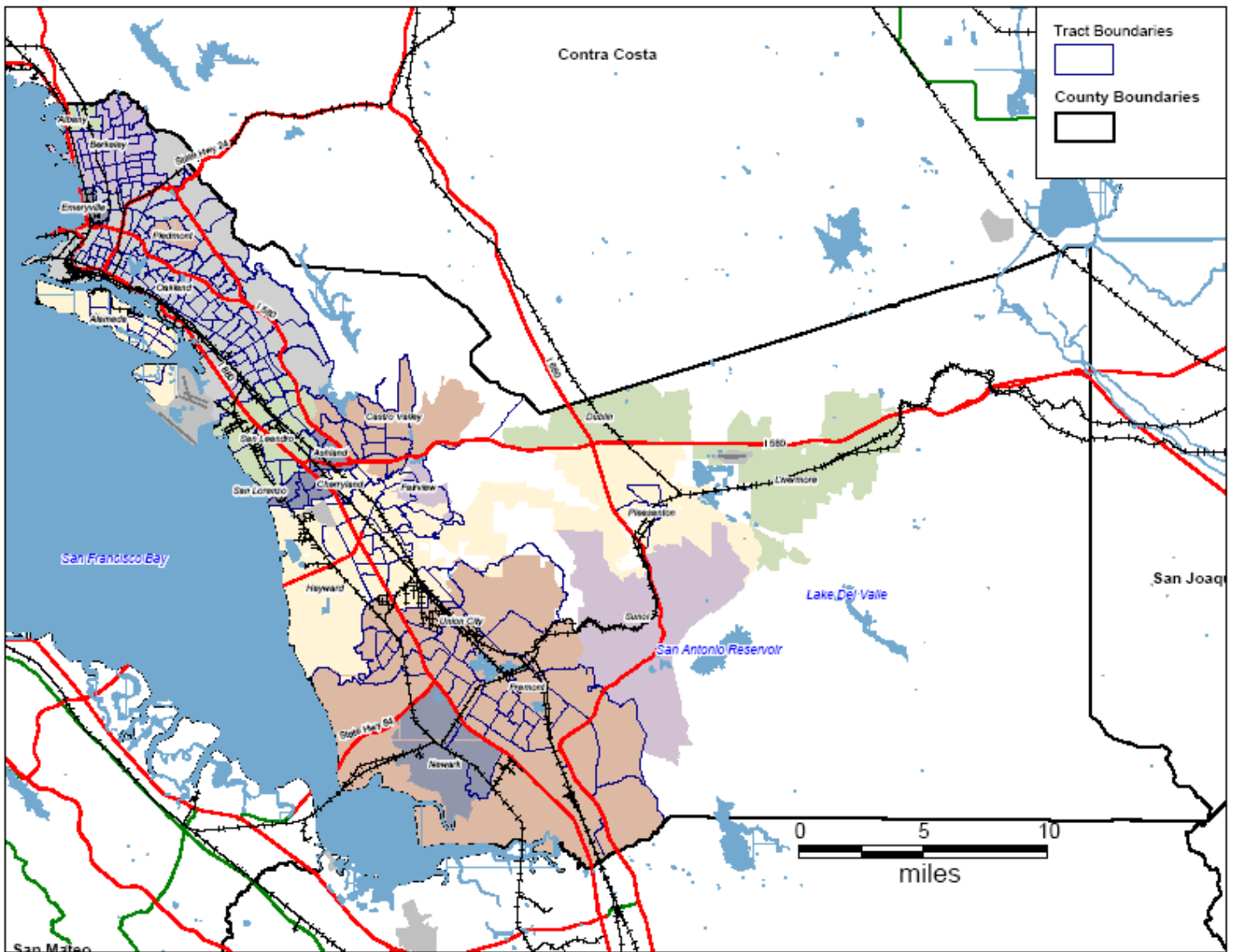


Figure 2.2: MCDs in Alameda County, CA

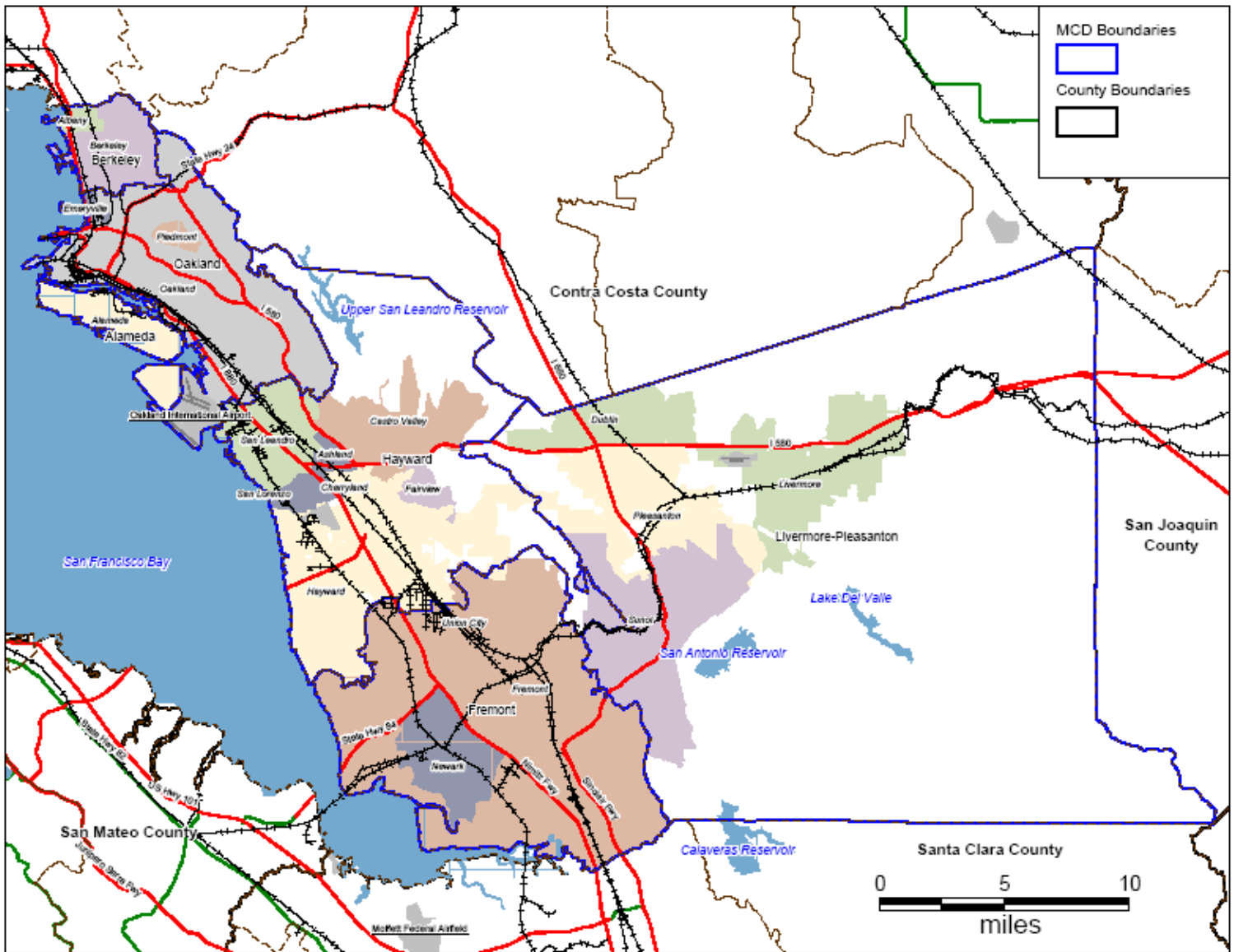


Table 2.3: Sizes of PUMAs, MCDs, and Tracts in 27 Counties: 2000 Census of Population and Housing

Census Region	State	County	Number of PUMAs	Number of MCDs	Number of Tracts	Population						
						Total	Per PUMA		Per MCD		Per Tract	
							Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation
NE	CT	Fairfield	4	23	209	882,567	220,642	53,694	38,372	35,899	4,223	1,487
NE	MA	Suffolk	6	5	177	689,807	114,968	13,564	137,961	252,845	3,897	1,730
NE	ME	Piscataquis	Shared	23	7	17,235			749	978	2,462	1,189
NE	NJ	Essex	6	22	212	793,633	132,272	13,490	36,074	56,229	3,744	1,447
NE	NY	Kings (Brooklyn)	18	1	774	2,465,326	136,963	24,577	2,465,326	N/A	3,185	1,683
NE	PA	Cameron	Shared	7	2	5,974			853	1,133	2,987	652
S	AL	Jefferson	4	17	147	662,047	165,512	34,356	38,944	490,373	4,504	1,965
S	KY	Owsley	Shared	3	2	4,858			1,619	1,285	2,429	939
S	MD	Baltimore city	6	1	200	651,154	108,526	9,677	651,154	N/A	3,256	1,431
S	MD	Baltimore County	7	15	204	754,292	107,756	4,544	50,286	32,801	3,698	1,770
S	TX	Bexar	11	3	278	1,392,931	126,630	26,437	464,310	759,484	5,011	2,239
S	TX	Dallam	Shared	2	2	6,222			3,111	3,316	3,111	2,250
MW	IL	Cook	31	32	1,344	5,376,741	173,443	39,105	168,023	107,649	4,001	2,513
MW	MI	Kalamazoo	Shared	19	60	238,603			12,558	18,749	3,977	1,634
MW	MN	Cottonwood	Shared	25	4	12,167			487	922	3,042	320
MW	MO	St. Louis county	8	28	173	1,016,315	127,039	16,944	36,297	4,945	5,875	2,324
MW	SD	Harding	Shared	4	1	1,353			338	215	1,353	N/A
MW	WI	Milwaukee	6	19	307	940,164	156,694	20,130	49,482	130,394	3,062	1,525
W	AZ	Maricopa	22	9	663	3,072,149	139,643	31,988	341,350	853,475	4,634	2,103
W	AZ	Navajo	Shared	7	23	97,470			13,924	10,645	4,238	1,947
W	CA	Fresno	4	18	158	799,407	199,852	79,864	44,412	131,411	5,060	2,000
W	CA	Santa Barbara	2	7	86	399,347	199,674	926	57,050	66,900	4,644	1,580
W	MT	Cascade	Shared	7	23	80,357			11,480	24,944	3,494	1,392
W	MT	Judith Basin	Shared	3	1	2,329			776	153	2,329	N/A
W	OR	Multnomah	Shared	3	170	660,486			220,162	375,553	3,885	1,532
W	WA	King	15	8	373	1,737,034	115,802	10,638	217,129	314,370	4,657	1,518
W	WA	Lincoln	Shared	3	4	10,184			3,395	815	2,546	600

Table 2.3: Sizes of PUMAs, MCDs, and Tracts in 27 Counties: 2000 Census of Population and Housing

Census Region	State	County	Number of PUMAs	Number of MCDs	Number of Tracts	Total	Occupied Households					
							Per PUMA		Per MCD		Per Tract	
							Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation
NE	CT	Fairfield	4	23	209	324,232	81,058	20,172	14,097	13,573	1,551	579
NE	MA	Suffolk	6	5	177	278,722	46,454	9,762	55,744	102,978	1,575	748
NE	ME	Piscataquis	Shared	23	7	7,278			316	398	1,040	462
NE	NJ	Essex	6	22	212	283,736	47,289	4,141	12,897	18,894	1,338	571
NE	NY	Kings (Brooklyn)	18	1	774	880,727	48,929	7,596	880,727	N/A	1,138	645
NE	PA	Cameron	Shared	7	2	2,465			352	470	1,233	203
S	AL	Jefferson	4	17	147	263,265	65,816	11,126	15,486	47,172	1,791	773
S	KY	Owsley	Shared	3	2	1,894			631	489	947	345
S	MD	Baltimore city	6	1	200	257,996	42,999	8,346	257,996	N/A	1,290	625
S	MD	Baltimore County	7	15	204	299,877	42,840	2,036	19,992	13,268	1,470	744
S	TX	Bexar	11	3	278	488,942	44,449	12,162	162,981	267,879	1,759	830
S	TX	Dallam	Shared	2	2	2,317			1,159	1,241	1,159	863
MW	IL	Cook	31	32	1,344	1,974,181	63,683	19,220	61,693	41,568	1,469	1,007
MW	MI	Kalamazoo	Shared	19	60	93,479			4,920	7,311	1,558	667
MW	MN	Cottonwood	Shared	25	4	4,917			197	391	1,229	125
MW	MO	St. Louis county	8	28	173	404,312	50,539	8,454	14,440	1,628	2,337	906
MW	SD	Harding	Shared	4	1	525			131	80	525	N/A
MW	WI	Milwaukee	6	19	307	377,729	62,955	10,342	19,880	50,674	1,230	671
W	AZ	Maricopa	22	9	663	1,132,886	51,495	15,377	125,876	314,403	1,709	890
W	AZ	Navajo	Shared	7	23	30,043			4,292	4,233	1,306	643
W	CA	Fresno	4	18	158	252,940	63,235	26,929	14,052	43,903	1,601	653
W	CA	Santa Barbara	2	7	86	136,622	68,311	8,709	19,517	23,794	1,589	603
W	MT	Cascade	Shared	7	23	32,547			4,650	10,192	1,415	524
W	MT	Judith Basin	Shared	3	1	951			317	88	951	N/A
W	OR	Multnomah	Shared	3	170	272,098			90,699	154,907	1,601	609
W	WA	King	15	8	373	710,916	47,394	6,834	88,865	135,339	1,906	714
W	WA	Lincoln	Shared	3	4	4,151			1,384	299	1,038	249

The sixth option defines SSUs in terms of school districts. School districts are geographic entities within which state, county, or local officials provide public educational services for the area's residents. The U.S. Census Bureau obtains the boundaries and names for school districts from state officials. The U.S. Census Bureau creates special tabulations of decennial census data by school district geography. These tabulations provide detailed demographic characteristics of the nation's public school systems and offer one of the largest single sources of children's demographic characteristics currently available. Information is distributed through the National Center for Education Statistics (NCES). We examined the school districts and found a large variation in size among school districts. Some are too large to be separate SSUs. For instance, Baltimore city encompass one school district whereas Kings county, New York (Brooklyn) shares one school district with four other counties. Cook county, Illinois, by contrast, have 150 school districts. Furthermore, almost all counties we examined have at least one school district overlapping with adjacent counties. Therefore, we dismiss school districts as a candidate for being SSUs.

Note that the tracts and MCDs that we have available today and that we may have available at the time of the NSCCSD are defined in terms of the 2000 Census. Boundaries for these units of geography change little from one decade to the next, and thus even if we waited for 2010 Census boundaries, we would find them to be nearly identical to the 2000 boundaries.

On balance, we find that there are really only two viable options for the definition of SSUs in the NSCCSD: (1) the tract/tract cluster option and (2) an MCD hybrid option. The latter option would entail use of MCDs as SSUs in most areas of the country, while breaking the large metro MCDs into neighborhood-based SSUs. The tract option would be relatively easy to implement, because the entire country is already covered by tracts. The MCD hybrid option would require an indeterminate amount of manual intervention by the implementing survey organization to determine neighborhood. On the other hand, the MCD hybrid option would likely result in SSU boundaries that are closely aligned with experts' concepts of child-care markets. Tracts may be smaller than a whole market in at least some cases. Modern geographic information systems (GIS) can establish and use adjacency matrices for the tracts within a county. Through use of such matrices, it would be possible, in a fairly automated way, to collapse tracts to form somewhat larger SSUs. Without inviting considerable manual intervention, the collapsing would not always be successful in combining tracts from the same market, e.g., two tracts may be collapsed where each is from different but neighboring child-care markets.

As a final option in this section, we observe that one could consider breaking the second stage of sampling into two distinct substages. For example, one could select census tracts at a stage 2A and select census block groups within the selected census tracts at a stage 2B. Given this option, households selected for the demand survey would be more tightly clustered, thus potentially reducing the cost of data collection operations. Because of increased homogeneity of households within block groups, this option would also tend to increase the survey design effect and thus decrease the precision of NSCCSD analyses.

2.3.2 Sampling Frames for Households within the Selected SSUs

Options for the sampling frame for households:

- Conventional listing
- Sample and go
- USPS delivery sequence file

For the third and final-stage of selection, a sampling frame for households is required within the selected SSUs. The advantage of a multistage sampling is that final-stage frames are only required for the selected SSUs, thus saving substantial cost.

U.S. households can generally be identified through their addresses. There are different ways to construct a sampling frame of household addresses. Traditionally, survey organizations send trained listers to the selected areas to list addresses of the housing units in that area, following a strict protocol. For instance, trained listers walk around each selected area, starting at the northwest corner and continuing around the area clockwise, writing down the address or description of every housing unit they find. The lists are sent back to a central office for further processing and compilation before sampling is carried out on the final compiled list. Such a listing process is usually referred to as “traditional listing” or “custom listing” and is commonly employed in conventional area probability sampling. The sampling frame of residential addresses produced this way is of good quality, but it is expensive to produce and the process is time-consuming. Costs of generating address lists include training, travel, room and board, labor hours, and processing costs.

A variant of this listing process is called “sample and go” process. Instead of trained listers, interviewers are sent to the selected area. They are instructed to start at a particular point of the selected area and to select housing units systematically at a fixed selection interval. Interviews are attempted at the selected housing units on the spot. The “sample and go” process is cheaper than the traditional listing process because sampling and interviewing are done in one trip to the selected areas rather than two trips in the traditional listing process (one trip for address listing and one for interviewing). However, the survey organization loses an element of control of the sampling process and interviewers could make mistakes in selecting households at the designated interval.

A recent development in constructing a sampling frame of household addresses is to make use of a delivery sequence file maintained by the United States Postal Service (USPS). The delivery sequence file is a list of residential addresses that the mail carriers update continually. The list is ordered by zip code, carrier route, and walk sequence number. This sequence of codes uniquely identifies every delivery point in the country. Direct mail marketers (e.g., InfoUSA, ADVO) license the list from the USPS and resell it. Once an address list is purchased from a commercial vendor, addresses can be mapped to census tracts or MCDs or places via a geographical information system (GIS) driven by census TIGER files.

The major advantage of employing address lists purchased from commercial vendors is the low cost. It is about \$100 per 10,000 addresses. The weakness with these address lists, however, is the failure to cover the entire population of households. First, households can opt out by requesting that their addresses not be sold. Second, households that receive mail only at rural route style addresses or post office boxes are not represented in these lists. Furthermore, these address lists might not be up-to-date; they may not capture quickly enough households that move in or out of an area and new constructions. We have conducted extensive research in evaluating the quality and the cost of these commercial lists (O’Muircheartaigh, English, and Eckman, 2007). Our research, confirmed by studies by other survey organizations, shows that these commercial address lists are of good quality for non-rural areas. To further improve coverage, “missing housing units” procedures are typically implemented to pick up households missed by the lists or dropped from the list at the request of the households and to close the gap. For instance, half-open interval procedure is typically used in area probability samples to pick up new constructions or households missing from the sampling frame. With half-open interval procedure, interviewers are instructed to

include all households in the interval between the selected household and the next selected household. A variant of half-open interval procedure can be used together with the USPS delivery sequence file to pick up, for instance, households with P.O. boxes as an address and households that just moved in. In rural segments, the commercial address lists do not provide usable addresses; either traditional listing procedures or the sample-and-go process should be used.

2.3.3 Stratification of SSUs to Facilitate Oversampling of the Low-Income Population

Options to facilitate oversampling the low-income population:

- Screening on income
- Use of ACS data on income at the tract or block-group level, to be released by the Census Bureau late in 2010
- Use of 2009 ACS data on income at a higher level of geography
- Use of 2000 Census data on income at the tract or block-group level
- Stratification of SSUs by income
- Stratification of block groups within SSUs by income

The analytic focus of the NSCCSD on the low-income population, CCDF receipts, and the TANF (past, present, and future) population can be achieved by oversampling the households in which these populations reside. There is a substantial overlap between the low-income population and the TANF/CCDF eligible population and recipients. For instance, in most states, the maximum income limit to be eligible to receive TANF is at or below 185 percent of the standard of need, and the standard of need is 75 percent of the Federal Poverty Level (FPL). Thus, oversampling low-income households will automatically oversample the CCDF/TANF population.

A common approach to oversampling a defined rare domain is to deploy a double sampling scheme wherein a large first-phase sample is screened for membership in the domain, with the second-phase sample consisting of all identified domain members plus a subsample of nonmembers. In the present case, this approach would call for screening on income. Because such screening would likely devastate the demand-survey response rate, we quickly and unequivocally reject the double sampling approach.

We recommend an alternative approach to oversampling the rare domain. To oversample low-income households without screening on income, we propose to divide each PSU into two strata: a stratum with a high density of low-income households (the high-density stratum) and a stratum with a low density of low-income households (the low-density stratum). In this context, density refers to the concentration of low-income households within the stratum. Appendix C describes one way to classify areas into high-density and low-density strata. Within each stratum a sample of SSUs, and households within SSUs, would be taken. We propose to oversample households in the high-density stratum. Such oversampling will tend to oversample households actually in the low-income domain as long as there is an association between the stratification variable(s) used in planning the sample and the actual current income status of households.

An alternative approach to oversampling the rare domain would be to stratify block groups by income status within each selected SSU. Given this option, SSUs would be selected at large from within the PSU without stratification by income at the second stage of sampling. Income stratification and oversampling would be implemented at the third stage of sampling within the selected SSU. It would be advisable for the implementing survey organization to experiment with both stratification options, to verify which is the more effective, possibly using trial samples.

To facilitate the planning for the stratification, we need to define a low-income threshold in terms of recent census data. The reader will note that this use of income is distinct from its use in analysis of the resulting survey data. At the analysis stage, actual household income collected in the survey interview may be used and corresponding analytical domains may be custom designed to meet the needs of each researcher. At the planning stage, however, we need to divide each PSU into high- and low-income areas based upon accurate data on household income that have already been collected. To be precise, let X be the income variable used for stratification purposes and let Y be the actual income variable collected in the NSCCSD interview. We should choose X such that (1) it is available for all areas within all PSUs at the time of sample planning, (2) it is available for the small units of geography that may comprise the SSUs, to enable accurate targeting of low income communities, and (3) it is well correlated with the analysis variable Y . These considerations suggest that X should represent recent census data possibly at the tract or block-group level. Suitable data of this kind will become available from the American Community Survey in late 2010. If the NSCCSD would require stratification at an earlier date, X could represent American

Community Survey data from 2009 at a higher level of geography or older 2000 Census data at the block-group level.

For purposes of planning the sampling design, we may define the low-income threshold in two different ways to allow for maximum overlap with the CCDF/TANF eligible population and recipients. One way is to define the low-income population to be the set of households whose annual household income falls below 185 percent of the federal poverty guidelines.¹⁰ The guidelines are conditional on household size and have separate values for Hawaii and Alaska. According to 2000 Census data, the average household size is 2.59. For simplicity, we can define a poverty cut-off value as 185 percent of the poverty guidelines for a 3-person household; i.e., \$32,560 ($=\$17,600 \times 1.85$) for the 48 contiguous states and the District of Columbia, \$40,700 for Alaska ($=\$22,000 \times 1.85$), and \$37,444 for Hawaii ($=\$20,240 \times 1.85$). In these calculations, we used the poverty guidelines for 2008.¹¹ We recommend using the most recent values as of the time of the survey implementation. A second way is to define low-income households as those for which household income is less than or equal to 85 percent of the most recent state median income. This definition, using 85 percent of state median income, will lead to a varying cut-off point across states. A variable definition could be a potential challenge in sample selection operations. On balance, we recommend the first definition of low-income households.

2.3.3.1 Oversampling Low-Income Households

We propose an oversampling method that will produce a sample wherein all households in the population within a given density stratum have the same overall probability of selection. In other words, all households in the low-density stratum have the same selection probability and all households in the high-density stratum have the same selection probability, but the two selection probabilities differ. In fact, the selection rates should be in the order $f_1 > f > f_2$ (where f_1 is the selection rate for the high-density stratum, f is the overall selection rate, and f_2 is the selection rate

¹⁰ Each year, the Census Bureau promulgates poverty thresholds and the Department of Health and Human Services publishes poverty guidelines. The poverty thresholds are defined in terms of household size, age of householder, and number of related children under 18 years, while the poverty guidelines are defined only in terms of household size. The guidelines are a simplified version of the thresholds and, without loss of efficiency, we use of the guidelines in planning the oversampling of low-income households.

¹¹ The URL for the HHS poverty guidelines is <http://aspe.hhs.gov/poverty/08poverty.shtml>.

for the low-density stratum), because our goal is to oversample the high-density domain, so as to oversample low-income households, and undersample the low-density domain. Equal selection probabilities within a stratum will tend to minimize the sampling variance for an analysis of households in the stratum, such as an analysis of low-income households. Differential sampling rates in the two strata will tend to increase the sampling variance for analysis of the entire eligible population relative to use of a single universal sampling rate. This increase is the “price” to be paid for meeting the survey objective of oversampling the low-income population.

Appendix C outlines the proposed method for oversampling the high-density stratum and specifies f_1 and f_2 with mathematical-statistical formulas. Using this method, high- and low-density strata should be established within each of the selected PSUs, where $h = 1$ indexes the high-density stratum and $h = 2$ indexes the low-density stratum. The method yields sampling fractions f_1 and f_2 for the two strata that are consistent with sample size targets for the low- and high-income domains. These sampling rates are defined in (C.3) and (C.4). The sample size targets should be prespecified by OPRE in light of budget and precision considerations at the time of actual sample selection.

The various sampling probabilities must obey the relations

$$f_1 = \pi_i \pi_{1ji} f_{k|i1j}$$

in the high-density stratum and

$$f_2 = \pi_i \pi_{2ji} f_{k|i2j}$$

in the low-density stratum, where π_i is the selection probability of PSU i , $\pi_{hj|i}$ is the conditional probability of selecting SSU j in stratum h given PSU i , and $f_{k|ihj}$ is the subsampling rate for households k in stratum h within the i -th PSU and j -th SSU. Solving for the subsampling rates gives

$$f_{k|i1j} = \min(f_1 / \pi_i \pi_{1ji}, 1) \tag{2.1}$$

for the high-density stratum and

$$f_{k|i2j} = \min(f_2 / \pi_i \pi_{2ji}, 1) \tag{2.2}$$

for the low density stratum. Subsampling at these rates within the i -th PSU and j -th SSU should tend to guarantee that the overall sampling fractions, f_1 and f_2 , are satisfied.

Observe that an important constraint on the sampling design emerges from (2.1) and (2.2). Because probabilities must be less than or equal to unity, we find that the PSU and SSU selection probabilities and the overall sampling rates should be in the order $f_1 < \pi_i \pi_{1ji}$ and $f_2 < \pi_i \pi_{2ji}$, for all i . These inequalities preserve the self-weighting nature of the sampling design within stratum. The inequalities should be checked at the time of PSU and SSU sample selection and small PSUs/SSUs should be collapsed with larger PSUs/SSUs to ensure that the inequalities are satisfied. A minimum PSU/SSU size should be established to guarantee the inequalities. If an inequality would not be satisfied, the corresponding subsampling rate for households within the PSU/SSU and stratum would be equal to 1.0 and the self-weighting character of the sampling design would be lost, at least within that PSU/SSU and stratum.

We acknowledge the fact that the distribution of actual current income and the presence of children will vary across the two strata within the selected PSUs. As a matter of fact, it is inevitable that both density strata within selected PSUs will contain a mix of actual low-income and high-income households. There will not be perfect association between the X and Y variables. The sample from the high-density stratum will, in fact, include some high-income households as well as many low-income households and the sample from the low-density stratum will include some low-income households as well as many high-income households. The impact of such heterogeneity diminishes as X is defined in terms of more recent data and data for smaller geographic building blocks.¹² However, in our proposed oversampling protocol, all households in the high-density and low-density strata are subject to being sampled and selected; that is, all households in the high-density stratum will be sampled at the same sampling rate regardless of their actual income. Similarly, all households in the low-density stratum will be subject to the same sampling rate. If the sampling rates are determined correctly, as specified in Appendix C, then the resulting sample will include the right proportions of actual low-income and high-income households.

¹² The choice of secondary sampling units is limited by the availability of income data on public use files such as the Decennial Census, the ACS, and the CPS.

We are also aware of the differences among low-income households by income (such as very low income versus low income) and family structure. We understand that some segments of the low-income population move frequently due to frequent eviction and some are difficult to reach because they only have P.O. boxes as addresses. All these factors represent challenges for the NSCCSD. However, these challenges are not new or unique to the NSCCSD. Such coverage problems arise in nearly all surveys and censuses of human populations. Coverage of hard-to-enumerate populations can be improved through special procedures invoked at the data-collection stage such as “half-open interval.”

2.3.4 Methods of Sample Selection

Options for the measure of size to employ in selecting the sample of SSUs:

- Population of children age under 13
- Number of households with at least one child under age 18
- Number of low-income households with at least one child under age 18

Options for the selection of households within SSUs:

- Systematic sampling of residential addresses, given a conventional listing or “list and go” type sampling frame
- Systematic sampling of residential addresses, given use of a commercial address list or USPS delivery sequence file as the sampling frame
- Simple random sampling from telephone numbers in 1+ banks provided by a recognized vendor of telephone samples, such as GENESYS or SSI.

The aim is to produce a self-weighting sample of households within a given income density stratum and to over sample low-income households. Housing units and the households they contain are the ultimate unit of sampling. Thus, after stratifying the areas within PSUs, we select SSUs within the two strata defined within the each of the selected PSUs, and then we select households within the chosen SSUs.

SSUs should be selected within strata using a pps type sampling scheme. The options for the measure of size are the same as the options listed earlier for selecting PSUs.

Let m denote the number of SSUs to be taken per noncertainty PSU, e.g., one might take $m = 4$ or 5 . Let X_{ih} be the total of the measure of size within stratum h in the i -th PSU, and let $X_i = X_{i1} + X_{i2}$ be the total of the measure of size within the PSU. Then, define the trial allocation of the SSUs to be

$$m_{ih}^* = \left\lceil m \frac{X_{ih}}{X_i} \right\rceil$$

where $\lceil a \rceil$ is the smallest integer greater than or equal to a . The trial allocation is not necessarily bounded by the number of SSUs in the stratum, which we denoted by M_{ih} . Thus, we define the final allocation of the SSUs to be

$$m_{i1} = \min(m_{i1}^*, M_{i1})$$

and

$$m_{i2} = \min(m - \min(m_{i1}^*, M_{i1}), M_{i2}).$$

Given pps sampling of SSUs within strata, the conditional probability of including the j -th SSU given the i -th PSU is

$$\pi_{hji} = \min\left(1, m_{ih} \frac{X_{ihj}}{X_{ih}}\right). \quad (2.3)$$

When a traditional listing or “sample-and-go” type procedure is employed to generate the sampling frame of residential addresses, then addresses should be selected systematically within SSUs according to the rates specified in (2.1), (2.2), and (2.3). If a commercial address listing or USPS delivery sequence file would be used as the sampling frame, then again addresses should be selected systematically. If a traditional listing or delivery sequence file would be employed, then the project statistician may select the sample of addresses working in the office. On the other hand, if a “sample and go” procedure would be used, then sampling is conducted by the interviewer working in the field according to instructions set forth by the project statistician.

If RDD sampling and telephone interviewing is adopted for the NSCCSD, the telephone prefixes should be mapped onto our SSU/stratum definitions using two rates usually offered by the telephone sample vendor (GENESYS or SSI) – coverage rates and hit rates. The coverage rate refers to the percent of a specified area covered by the prefix(es) and the hit rate refers to the percent of numbers in the prefix that are in the area. Then, random samples of telephone numbers can be selected from 1+ banks within each stratum.

2.3.5 Screening and Options for Sampling Children

Options for sampling children within households:

- Select all eligible children within the household
- Select one eligible child within the household.

Sampled households will be screened to determine eligibility; that is, to determine whether the household has any age-eligible children under 13. For households with more than one age-eligible child, all children could be selected and interviews conducted for each one of them, or only one child could be randomly selected and the interview conducted only for this child. For a variety of analytical and cost reasons, we are proposing to conduct interviews for all age eligible children in the household. This approach will clearly entail many fewer household interviews and less cost than the alternative method of selecting one child per household. The approach also facilitates analysis at the family or household level. While the proposed approach creates a larger design effect than the alternative method, and thus creates a greater loss of effective sample size, we view the sampling of all children in the household as the superior method.

Pertinent to this study, the children of some low income households tend to move between parents, grandparents, and other relatives. This challenge too is not new or unique to the NSCCSD. To minimize under or overcoverage of such children, a clear and definitive sampling rule should be adopted, interviewers should be trained on the rule, and the rule should be in force during data collection operations. The sampling rule should assign all children to a single unique household. “Usual place of residence” is one such rule; “home of the female guardian, or male guardian in the event a female guardian does not exist” represents a second possible rule that might be appropriate for the demand survey. Recall that the ultimate sampling unit for the demand survey is the

household. After we sample and screen households, we conduct interviews for all age eligible children within the households. In theory, as long as a child is assigned or linked to one and only one household according to an explicit sampling rule, the child has a known probability of being included in the study. Respondent or interviewer error in implementing the residency rule, however, can result in some residual over or undercoverage of eligible children. Interviewers should be trained carefully in advance of data collection operations to avoid or minimize such error

As the demand survey's core sample moves forward to actual implementation, it will be important to recognize the fact that the survey calls for screening by age of child. It is well known that such screening surveys encounter an important degree of undercoverage, ranging from 20 to 40 percent depending on the mode of interview. That is, the survey may screen-in 20 to 40 percent fewer eligible households than would be indicated by census statistics. Telephone surveys typically experience the upper end of this undercoverage range while face-to-face surveys may experience the lower end of the range. Careful design of the advance letter and other printed materials, and appropriate training of interviewers and supervisors, can help to control the extent of the undercoverage. Survey planners must gross-up the survey sample size to account for the loss of interviews implied by this undercoverage.

In addition to screening for eligible children, sampled households could also be screened for their income. The advantage of screening by income is that we can ensure that low-income households have enough representation in the core sample. However, there are huge problems. Income is a sensitive topic that is infamous for incurring a large amount of item nonresponse (Juster & Smith, 1997; Moore, Stinson, & Welniak, 1999). Potential respondents could be turned off or even offended by being asked upfront about their financial situation, intensifying the usual negative effects of using screener questions. Then, because of the lower rate of response, we would need to deploy an even larger sample size, which increase costs. Therefore, we strongly recommend not screening households for their income.

2.4 Mode of Data Collection

Options for mode of data collection:

- Face-to-face interviewing
- Telephone interviewing
- Hybrid approach.

The mode of data collection is driven by the type of sampling frame to be used at the third stage of sample selection. Sampling from a conventional listing or from a commercial address listing or USPS delivery sequence file would likely involve in-person interviewing, which is an expensive operation. However, in-person interviewing ensures that households with only cell telephones or with no telephone services at all will be interviewed. Advance letters and incentives could be sent to the sampled households to encourage respondent cooperation and participation. Listers and interviewers could be instructed to record extra information for each sample line, such as characteristics of the housing units and the neighborhood, that could be used in tailoring the data collection to optimize survey participation and later be used in nonresponse adjustments during post-survey processing.

Telephone interviewing would be used in the event of a telephone sampling frame. However, telephone interviewing cannot reach households without any telephone service or cell-phone-only households. Compared to in-person interviewing, telephone interviewing has the advantages of a lower cost and a faster turn-around.

A hybrid approach to interviewing would likely be the superior approach for an address-based sample obtained from a commercial address list or a USPS delivery sequence file. Sampled addresses could be matched to commercial databases to obtain landline telephone numbers, where available. Our experience indicates that telephone numbers can be obtained in this way for about 40 to 60 percent of the addresses. Then, interviews could be done by mail, in person, or partially in person and partially by telephone, or a mixture of three modes (partially by mail, partially in person and partially by telephone). We note concern for potential mode effects when multiple modes of data collection are used and data are combined at the analysis stage. Yet we also note that steps can be taken to minimize such effects. For instance, randomizing a long list of unordered response

categories removes a potential differential response order effect across modes. Advance letters and/or incentives can be sent to sampled addresses to increase response rates. There are not many ecological variables that could be used for later nonresponse adjustments unless interviewers are sent out to the field.

2.5 Sample Size Considerations

The sample size for the NSCCSD demand survey should be determined by consideration of three factors:

- Amount of available funding
- Analyses to be conducted
- Precision requirements for the key analyses or, in other words, the sizes of the effects to be detected.

The purpose of the current sampling report is to provide design options and to supply enough information to enable OPRE to make design decisions at a later date. The survey budget has not been established at this writing and, indeed, one of the purposes of this report is to provide information that will inform and illuminate the tradeoffs between budget, analysis, and sample size. With these purposes in mind, we will now examine some sample size options for the demand survey, and show how they support key analytical objectives of the survey and the interplay between analytical precision and the required sample sizes.

In Section 2.5.1, we will examine the sample size given the assumption of a strictly proportional or “self-weighting” sample. The essential assumption in this section is that all households in the country will have the same probability of selection. The realized sample size in any given area will be proportional to the population size in the area. Self-weighting sampling designs tend to maximize the precision of estimation for parameters of the overall eligible population, but they also tend to be very costly. In Section 2.5.2, we will examine the sample size given an alternative strategy of oversampling low-income areas. That is, households in areas with a concentration of low-income households will be sampled with a higher probability of selection than will households in remaining higher income areas. The oversampling strategy will tend to support one of the NSCCSD’s chief requirements, i.e., to provide precise estimation of parameters of child-

care supply and demand for children in low-income households. At the same time, it will entail less screening and be less costly, given a fixed number of completed interviews, than the proportional sampling strategy.

2.5.1 Sample Sizes without Considering Oversampling

The 1990 National Child Care Survey completed 4,396 interviews with an overall response rate of 57.4 percent. To determine the sample size for the NSCCSD, we need to consider the definition and prevalence of the key analytic domains, the desired level of the precision for the estimation of the key estimators and contrasts between estimators, the selected mode of data collection, and the expected survey completion rates, among other things. Projected cost and available budget will ultimately be a key determinant of sample size. In what follows, we illustrate some alternative sample sizes and the conditions under which they arise.

To begin, we display a number of socio-economic domains in Tables 2.4 to 2.11, and also the associated distribution of U.S. households based on the 2006 American Community Survey (ACS) and the 2007 Current Population Survey (CPS) March Supplement. We selected these domains because they are thought to be strongly associated with the demand for child care services and are likely to comprise the basis for key parts of the analysis of NSCCSD data. They will surely not be the only domains to be analyzed; other domains, such as domains formed by a crossing of household income by family structure, may play key roles in the analysis too. Nevertheless, the domains listed here are of central importance and, in what follows, we formulate sample size alternatives for the NSCCSD that are intended to provide enough statistical power for descriptive analyses using these domains. These domains are used as the driver or determinant of the sample size alternatives considered here. Later, as the NSCCSD moves towards actual implementation, as the survey budget constraints become better understood, as the analysis plan matures, and as the interests of policy makers sharpen, the implementing survey organization may alter the set of key domains, perhaps dropping some and introducing others. Then, the new and final set of domains may be used, along with the techniques shown here, to determine the demand survey's final sample sizes.

Table 2.4: Distribution of Households by Age of Child and Presence of One or More Eligible Children

Age Group	Percent of US Households	Cases per 1,000 Households
Less than 3	8.88	89
3 to 5 Years	9.33	93
6 to 12 Years	18.05	181
Under 13	26.81	268
No Eligible Children	73.19	732

Source: 2006 American Community Survey (ACS)

Table 2.5: Distribution of Households by Household Structure and Presence of One or More Eligible Children

Household Structure	Percent of US Households	Cases per 1,000 Households
1-Parent Household	8.50	85
2-Parent Household (Married)	18.08	181
Other	0.23	2
No Eligible Children	73.19	732

Source: 2006 American Community Survey (ACS)

Table 2.6: Distribution of Households by Maternal Employment Status and Presence of One or More Eligible Children

Maternal Employment Status	Percent of US Households	Cases per 1,000 Households
In Labor Force	16.79	168
Employed	15.73	157
Unemployed	1.06	11
Not in Labor Force	7.82	78
Employment Status Unknown	2.20	22
No Eligible Children	73.19	732

Source: 2006 American Community Survey (ACS)

Table 2.7: Distribution of Households by MSA Status and Presence of One or More Eligible Children

MSA Status	Percent of US Households	Cases per 1,000 Households
In MSA	22.96	230
Not in MSA	3.92	39
Missing MSA Status	0.22	2
No Eligible Children	72.90	729

Source: 2007 Current Population Survey (CPS) March Supplement

Table 2.8: Distribution of Households by Region and Presence of One or More Eligible Children

Region	Percent of US Households	Cases per 1,000 Households
Northeast	4.66	47
Midwest	5.98	60
South	9.91	99
West	6.25	63
No Eligible Children	73.19	732

Source: 2006 American Community Survey (ACS)

Table 2.9: Distribution of Households by Type of Care and Presence of One or More Eligible Children

Type of Care	Percent of US Households	Cases per 1,000 Eligible Households
Center Care	3.56	36
Family Day Care	1.87	19
Informal Care	16.82	168
Other	4.85	49
No Eligible Children	72.90	729

Source: 1990 National Child Care Study

Table 2.10: Distribution of Households by Income and Presence of One or More Eligible Children

Income	Percent of US Households	Cases per 1,000 Households
Below Low-Income Level ¹	8.76	88
100-149% of Low-Income Level	4.79	48
150% and Above Low-Income Level	13.25	133
No Eligible Children	73.19	732

Source: 2006 American Community Survey (ACS)

¹Low-income level means the 2006 HHS Poverty Guideline.

Table 2.11: Distribution of Households by Race/Ethnicity and Presence of One or More Eligible Children

Race/Ethnicity	Percent of US Households	Cases per 1,000 Households
Hispanic	4.23	42
Black	3.56	36
Other	19.20	190
No Eligible Children	73.19	732

Source: 2006 American Community Survey (ACS)

For example, consider the domains defined by age of child. According to Table 2.4, about 8.9 percent of U.S. households have at least one child less than 3, 9.3 percent have at least one child between 3 and 5, 18.1 percent have at least one child between 6 and 12, 26.8 percent have at least one child under 13, and 73.2 percent have no eligible children. Note that the age categories are not mutually exclusive. In other words, a household may have children in more than one of these age categories. However, the domains are mutually exclusive for the other Tables 2.5 – 2.11.

A main driver in sample size consideration is the size or prevalence of the analytic domains. Because detecting a highly rare domain always requires a larger sample than detecting a less rare domain, a sample that is large enough to detect the most rarely occurring domain will be large enough to detect all other analytical domains of interest. For instance, among the key domains identified in Tables 2.4 to 2.11, the smallest analytic domain is the “Other” household structure category in Table 2.5; only about 0.2 percent of U.S. households with eligible children have a non-parental household structure. This category, in fact, is so rare that the NSCCSD would likely not be cost appropriate if we tried to design the sample to detect it. Further, because this “other” domain is

not really central to the aims of the analysis, we suggest that it not be used to determine the sample size. For the same reason, we will not use the category “Missing MSA Status” to determine sample size.

The next rarest domain is the “Family Day Care” category in Table 2.9; about 1.8 percent of households have children in this status. This percentage is based on a child-level tabulation from the 1990 National Child Care Study. Because the percentage is so out of date and so small, we are reluctant to use it to plan the sample size for the new NSCCSD. The next rarest category is the “100-149 percent of low-income level” in Table 2.10; about 4.8 percent of the households fall into this category. In what follows, we will use this domain and its prevalence in the population to plan the demand survey sample size. Again, any sample size that is large enough to permit precise estimation for this rare domain will be more than large enough to permit precise estimation for other less rare domains.

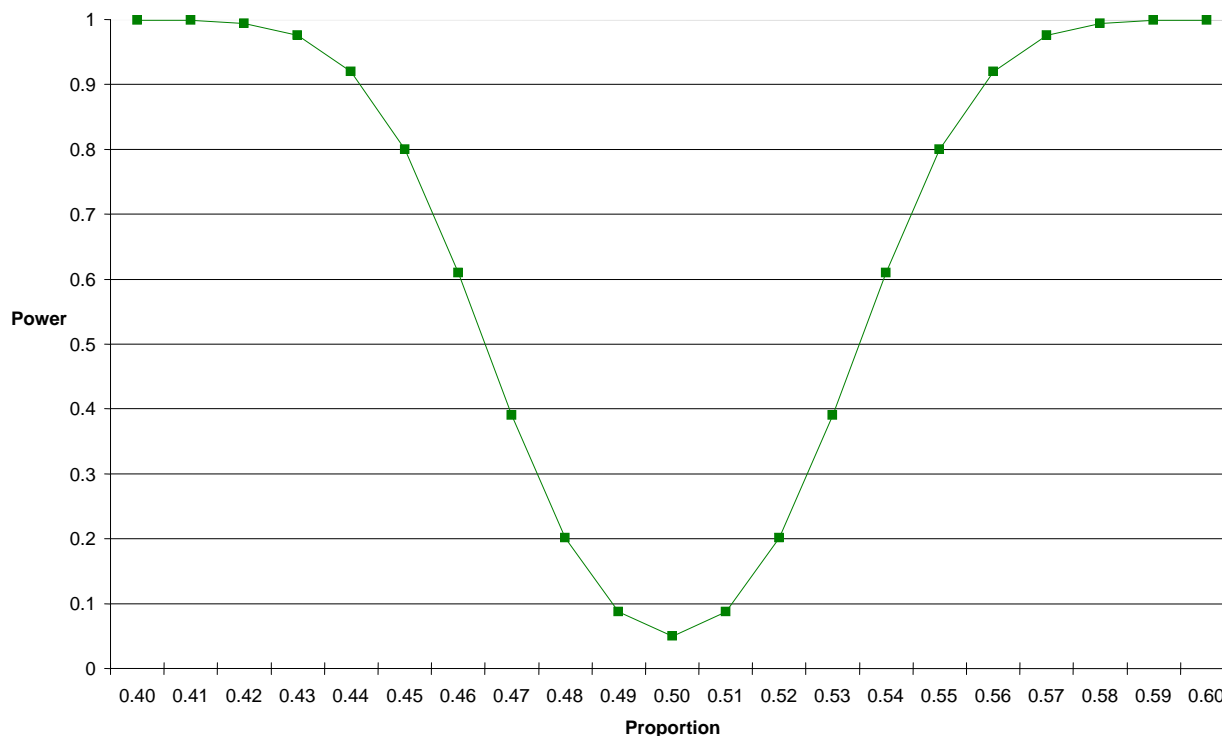
We conducted a power analysis to obtain the minimum sample sizes required to detect a difference between two hypothetical proportions (such as .50 vs. .52, .50 vs. .54, and so on) at the 0.80 power level and the 0.05 alpha level. Based on our calculations, the minimum effective sample sizes required in each cell involved in the comparison are displayed in the first row of Table 2.12. For example, to detect the difference between a proportion of 0.50 for the “100-149 percent of low-income level” domain and a proportion of 0.55 for the “below low-income level” domain would require at least 1,565 completed interviews in each of the two domains. The calculations used in the first line of the table assume a simple random sampling design. On the other hand, for a clustered sampling design of the type we are proposing for the NSCCSD, the design effect may be in the range of 2 to 4. Then, the required sample sizes would be two to four times those for the simple random sampling design, as displayed in rows two and three of the table.

Table 2.12: Effective and Nominal Sample Sizes

Sample Sizes	0.8 Power to Detect a Difference Between a Proportion of 0.50 and a Second Proportion of				
	0.52	0.54	0.55	0.56	0.60
Effective Interviews	9,806	2,448	1,565	1,086	388
Nominal Completed Interviews (Assuming DEFF=2)	19,612	4,896	3,130	2,172	776
Nominal Completed Interviews (Assuming DEFF=4)	39,224	9,792	6,260	4,344	1,552

Given an effective sample size of 1,565 and the proportion in the reference cell being 0.50, the y-axis in Figure 2.3 shows the power to detect differences between the proportion in the reference cell and various proportions, shown on the X-axis, in the comparison cell.

Figure 2.3: Power to Detect Differences Given Effective Sample Size of 1,565 and Reference Proportion of 0.50



By definition, power is equal to the Type I error of 0.05 when the proportion in the comparison cell is 0.50. Power increases as this proportion increase above 0.50 or decreases below this value. Power reaches the 80 percent level when the true proportion in the reference cell is either 0.55 or 0.45. The figure generally will inform the reader about the power to detect differences between different key domains in the NSCCSD, given that each of the domains has at least 1,565 effective completed interviews.

The nominal sample sizes just cited – which are expressed in terms of completed interviews -- have to be adjusted upwards to account for various sample losses that are expected during the data collection process. The losses vary depending on the mode of data collection. If the NSCCSD

would be conducted by RDD sampling and telephone interviewing of the selected telephone numbers, then the sample size should be specified by the equation

$$n = \frac{n_{nominal}}{\lambda_1 \lambda_2 \lambda_3 \lambda_4 \lambda_5 \lambda_6}, \quad (2.4)$$

where $n_{nominal}$ is the number of completes adjusted for the assumed DEFF and

λ_1 = assumed resolution rate

λ_2 = assumed working residential number rate

λ_3 = assumed screener completion rate

λ_4 = assumed eligibility rate (by census data)

λ_5 = assumed discount for survey undercoverage relative to census coverage

λ_6 = assumed interview completion rate.

We estimate these rates drawing on our experience in conducting RDD surveys and display them in Table 2.13. For λ_4 , we take the proportion of households in that very domain that we are using to drive the sample size, namely, households with an eligible child and in the “100-149 percent of low-income level” category. The sample size determined here will produce more than the required number of interviews in any other (less rare) analytic domain.

If an area-probability sampling design would be adopted and in-person interviews attempted on the selected housing units, then λ_1 would be equivalent to an occupancy rate, measuring the proportion of occupied housing units in the sample of addresses. There is no comparable λ_2 in an area-probability sample situation and, for mathematical calculation purposes, we take it to be 1.0. We assume the same values of λ_3 , λ_4 , and λ_6 in face-to-face interviews as in telephone interviews. For λ_5 , we recommend a smaller discount for undercoverage for face-to-face interviews than for telephone interviews.

In a hybrid design scenario where 50 percent of the interviews are conducted through telephone interviewing and the rest by in-person interviewing, the λ 's would be estimated by

combining the λ 's from the telephone survey approach and the face-to-face survey design. We present our current estimates of the various λ 's in Table 2.13.

Table 2.13: Assumed Sources and Magnitude of Sample Loss

	Factor/Rate	RDD Survey (Percent)	Face-to-Face Survey (Percent)	Hybrid Survey (Percent)
λ_1	Resolution Rate in RDD Scenario or Occupancy Rate in Face-To-Face Scenario	81	88	85
λ_2	Working Residential Number Rate in RDD Design or 1.0 in Face-to-Face Design	25	100	63
λ_3	Screener Completion Rate	89	89	89
λ_4	Eligibility Rate	4.8	4.8	4.8
λ_5	Discount for Survey Undercoverage	60	80	70
λ_6	Interview Completion Rate	82	82	82

Table 2.14 presents the required released sample sizes after adjusting for the various sample losses. The table is derived from Table 2.12 with adjustment by (2.4) and Table 2.13.

Table 2.14: Total Released Sample Sizes After Adjusting for Sample Losses, Assuming DEFF = 2

Sample Size	0.8 Power to Detect a Difference Between a Proportion of 0.50 and a Second Proportion of				
	0.52 (A)	0.54 (B)	0.55 (C)	0.56 (D)	0.60 (E)
Nominal Completed Interviews	19,612	4,896	3,130	2,172	776
Final Released Sample Size for RDD Survey	4,615,566	1,152,244	736,627	511,167	182,627
Final Released Sample Size for Face-to-Face Survey	796,578	198,860	127,131	88,220	31,519
Final Released Sample Size for Hybrid Survey	1,480,148	369,509	236,226	163,924	58,566

For example, to detect the difference between the proportion 0.50 in the reference domain and the proportion 0.55 in the comparison domain, where the reference domain is households with eligible children and in the “100-149 percent of low-income level” category, would require a released sample of 736,627 telephone numbers, 127,131 addresses, or 236,226 lines in a hybrid approach.

If a sample of the magnitudes cited in Table 2.14 would actually be implemented, it is of interest to know how many completed interviews we would expect to achieve in each of the various

key analytic cells cited in Tables 2.4 – 2.11. For convenience, let us label the released sample sizes in Table 2.14 by the letters A, B, C, D, and E, working from left to right across the columns of the table. As we have seen, sample sizes A-E equate to detecting the difference between a proportion of 0.50 and a proportion of 0.52, 0.54, 0.55, 0.56, and 0.60, respectively. Then, Tables 2.15 and 2.16 illustrate the number of effective interviews and the number of completed interviews, respectively, that can be expected in each of the key analytical domains, given the five sample sizes A-E. The last row of these tables shows the total number of household interviews expected across all domains. For example, given sample size C, we would expect a total of 8,756 effective interviews and 17,512 completed interviews. By construction, sample size C would provide 1,565 effective interviews and 3,130 completed interviews for the rare domain of households with eligible children and in the “100-149 percent of low-income level” category.

Table 2.15: Expected Number of Effective Household Interviews by Cell

Cells	Sample Size A	Sample Size B	Sample Size C	Sample Size D	Sample Size E
Age group					
Less than 3	18,179	4,538	2,901	2,013	719
3 to 5 Years	19,100	4,768	3,048	2,115	756
6 to 12 Years	36,952	9,225	5,897	4,092	1,462
12 Years or Less	54,885	13,702	8,759	6,078	2,172
Household Structure					
1-Parent Household	17,401	4,344	2,777	1,927	689
2-Parent Household	37,013	9,240	5,907	4,099	1,465
Other	471	118	75	52	19
Maternal Employment Status					
In Labor Force	34,372	8,581	5,486	3,807	1,360
Employed	32,202	8,039	5,139	3,566	1,274
Unemployed	2,170	542	346	240	86
Not in Labor Force	16,009	3,997	2,555	1,773	633
Status Unknown	4,504	1,124	719	499	178
MSA Status					
In MSA	46,500	11,608	7,421	5,150	1,840
Not in MSA	7,939	1,982	1,267	879	314
Region					
Northeast	9,540	2,382	1,523	1,057	377
Midwest	12,242	3,056	1,954	1,356	484
South	20,288	5,065	3,238	2,247	803
West	12,795	3,194	2,042	1,417	506
Type of Care					
Center Care	7,210	1,800	1,151	798	285
Family Day Care	3,787	945	604	419	150
Informal Care	34,065	8,504	5,437	3,773	1,348
Other	9,823	2,452	1,568	1,088	389
Income					
Below Low-Income Level	17,933	4,477	2,862	1,986	710
100-149% of Low-Income Level	9,806	2,448	1,565	1,086	388
150% and Above Low-Income Level	27,125	6,772	4,329	3,004	1,073
Race/Ethnicity					
Hispanic	8,660	2,162	1,382	959	343
Black	7,288	1,819	1,163	807	288
Other	38,937	9,720	6,214	4,312	1,541
Total Effective Household Interviews	54,864	13,697	8,756	6,076	2,171

Table 2.16: Expected Number of Completed Household Interviews by Cell, Assuming DEFF=2

Cells	Sample Size A	Sample Size B	Sample Size C	Sample Size D	Sample Size E
Age group					
Less than 3	36,358	9,077	5,803	4,027	1,439
3 to 5 Years	38,200	9,536	6,097	4,231	1,511
6 to 12 Years	73,903	18,449	11,795	8,185	2,924
12 Years or Less	109,770	27,403	17,519	12,157	4,343
Household Structure					
1-Parent Household	34,802	8,688	5,554	3,854	1,377
2-Parent Household	74,026	18,480	11,814	8,198	2,929
Other	942	235	150	104	37
Maternal Employment Status					
In Labor Force	68,744	17,162	10,971	7,613	2,720
Employed	64,404	16,078	10,279	7,133	2,548
Unemployed	4,340	1,083	693	481	172
Not in Labor Force	32,018	7,993	5,110	3,546	1,267
Status Unknown	9,008	2,249	1,438	998	356
MSA Status					
In MSA	93,000	23,217	14,842	10,300	3,680
Not in MSA	15,878	3,964	2,534	1,758	628
Region					
Northeast	19,080	4,763	3,045	2,113	755
Midwest	24,484	6,112	3,908	2,712	969
South	40,575	10,129	6,476	4,494	1,605
West	25,590	6,388	4,084	2,834	1,013
Type of Care					
Center Care	14,420	3,600	2,301	1,597	571
Family Day Care	7,574	1,891	1,209	839	300
Informal Care	68,130	17,008	10,873	7,545	2,696
Other	19,645	4,904	3,135	2,176	777
Income					
Below Low-Income Level	35,867	8,954	5,724	3,972	1,419
100-149% of Low-Income Level	19,612	4,896	3,130	2,172	776
150% and Above Low-Income Level	54,250	13,543	8,658	6,008	2,147
Race/Ethnicity					
Hispanic	17,319	4,324	2,764	1,918	685
Black	14,576	3,639	2,326	1,614	577
Other	77,875	19,441	12,429	8,625	3,081
Total Completed Household Interviews	109,729	27,393	17,512	12,152	4,342

An important question that this report should shed some light on is “What resources would be required to actually conduct the demand survey?” To begin to address this question, one needs to have information about such detailed issues as

- What is the size of the released sample?
- How many advance letters would be sent out?
- How many screening interviews would be completed?
- How many main household interviews would be conducted?
- How many hours of interviewer labor would be required to complete an interview? and
- What are the appropriate supervisory ratios to employ in this survey?

We defer answers to the two latter questions until later, because these issues should be addressed by the project field test. We tackle the first four questions here and now in the following Table 2.17.

Table 2.17 presents the five sample size scenarios A-E and for each one gives the corresponding sample sizes at each of the major steps of survey operations. The table contains three main blocks of data, one for each of the modes of interview that we have discussed in this report. For example, if the survey would be launched under scenario C and conducted as an RDD survey with telephone interviewing, then the released sample should contain 736,659 telephone numbers. Ultimately, we would resolve 149,174 working residential numbers (WRNs), screen 132,764 households, and interview 17,512 households containing 30,121 eligible children. If the survey would be launched under scenario C and conducted as a face-to-face survey, then the released sample should contain 127,137 residential addresses, of which we would find 111,880 to be actually occupied. We would screen 99,573 households and interview 17,512 households containing 30,121 eligible children. The figures cited for the hybrid method assume that half the sample is enumerated by telephone and half by a face-to-face method. Using Table 2.17, OPRE or a competent survey contractor should be able to translate sample sizes into estimated costs to conduct the demand survey.

The five sample size scenarios cited here are used for illustrative purposes to give the reader a general sense about the relationship between the sample and the analytic aims of the survey. As the NSCCSD moves towards implementation, a number of additional factors should be carefully considered before a final sample size is determined, including the amount of available funding, inference by child-care policy type domains, inference for child-care markets, inference for smaller demographic domains, and inference for any other domains not discussed in this report. If,

in light of funding or other considerations, it would be decided later that additional sample size scenarios, other than the five presented here, should be examined, then the sample sizes by step of survey operations may be calculated by means similar to those presented in Table 2.17.

Table 2.17: Sample Sizes by Mode of Interview and by Stage of Survey Operations, Assuming a Design Effect of 2.0

Stage of Survey Operations	Factor (%)	Sample Size A	Sample Size B	Sample Size C	Sample Size D	Sample Size E
RDD Telephone Survey						
Released telephone numbers	100	4,615,771	1,152,295	736,659	511,190	182,635
Prefinalized outside telephone center	44	2,030,939	507,010	324,130	224,923	80,359
Released to telephone center	56	2,584,832	645,285	412,529	286,266	102,276
Advance letter sent	60	1,550,899	387,171	247,518	171,760	61,365
Resolved telephone numbers	81	3,738,774	933,359	596,694	414,064	147,934
Working residential numbers	25	934,694	233,340	149,174	103,516	36,984
Completed screening interviews	89	831,877	207,672	132,764	92,129	32,915
Eligible households by census data	26.81	223,026	55,677	35,594	24,700	8,825
Eligible households after allowance for undercoverage	60	133,816	33,406	21,356	14,820	5,295
Complete household interviews	82	109,729	27,393	17,512	12,152	4,342
Eligible children with completed household interview	1.72	188,734	47,116	30,121	20,902	7,468
Face-to-Face Survey						
Released address lines	100	796,614	198,869	127,137	88,224	31,520
Advance letter sent	100	796,614	198,869	127,137	88,224	31,520
Occupied housing units	88	701,020	175,005	111,880	77,637	27,738
Completed screening interviews	89	623,908	155,754	99,573	69,097	24,687
Eligible households by census data	26.81	167,270	41,758	26,696	18,525	6,618

Table 2.17: Sample Sizes by Mode of Interview and by Stage of Survey Operations, Assuming a Design Effect of 2.0

Stage of Survey Operations	Factor (%)	Sample Size A	Sample Size B	Sample Size C	Sample Size D	Sample Size E
Eligible households after allowance for undercoverage	80	133,816	33,406	21,356	14,820	5,295
Complete household interviews	82	109,729	27,393	17,512	12,152	4,342
Eligible children with completed household interview	1.72	188,734	47,116	30,121	20,902	7,468
Hybrid Survey						
Released sample lines	100	1,480,214	369,525	236,236	163,932	58,569
Released telephone numbers	50	740,107	184,763	118,118	81,966	29,284
Prefinalized outside telephone center	44	325,647	81,296	51,972	36,065	12,885
Released to telephone center	56	414,460	103,467	66,146	45,901	16,399
Advance letter sent	60	248,676	62,080	39,688	27,540	9,840
Resolved telephone numbers	81	599,487	149,658	95,676	66,392	23,720
Working residential numbers	25	149,872	37,414	23,919	16,598	5,930
Released address lines	50	740,107	184,763	118,118	81,966	29,284
Advance letter sent	100	740,107	184,763	118,118	81,966	29,284
Occupied housing units	88	651,294	162,591	103,944	72,130	25,770
Completed screening interviews	89	713,038	178,005	113,798	78,968	28,213
Eligible households by census data	26.81	191,165	47,723	30,509	21,171	7,564
Eligible households after allowance for undercoverage	70	133,816	33,406	21,356	14,820	5,295
Complete household interviews	82	109,729	27,393	17,512	12,152	4,342
Eligible children with completed household interview	1.72	188,734	47,116	30,121	20,902	7,468

2.5.2 Sample Size Calculations Taking into Account Oversampling by Low-Income Status

Common techniques for increasing the sample size for a rare domain -- or else for completing interviews with a fixed number of members of the rare domain while decreasing the combined overall sample size among rare and nonrare members of the population -- include

screening and *oversampling*. Throughout Section 2.5.1, we use households with eligible children and in the “100-149 percent of low-income level” category as the rare domain for driving the sampling size. Yet to screen for this rare attribute would imply screening on household income, which, in our view, simply will not work for the NSCCSD. Screening on income would devastate the survey cooperation rates.

Thus, in this section, we investigate oversampling as a design strategy for increasing the number of completed demand-survey interviews in the rare domain. To illustrate the technique, let us assume an overall sample size large enough to complete 17,512 main interviews for households with eligible children. This overall sample size is equivalent to sample size C in the prior section, which, given proportional sampling, yielded 3,130 completed interviews in the rare domain and was large enough to provide statistical power to detect the difference between the proportion 0.50 in the rare domain and the proportion 0.55 in a comparison domain. The calculations we display here could easily be repeated for alternative overall sample sizes.

The oversampling strategy we contemplate would involve partitioning the nation into two income strata: a high-density stratum ($h = 1$) and a low-density stratum ($h = 2$), where density is defined in terms of low-income households as a percent of all households in the stratum. We would sample households in the high-density stratum at a higher rate than under proportional sampling and would sample households in the low-density stratum at a lower rate than under proportional sampling, in such manner as to yield an overall total of 17,512 completed demand-survey interviews. If the stratification would be effective, this strategy would yield a larger number of completed interviews in the rare domain than proportional sampling yields.

In what follows, we illustrate the oversampling technique and the resulting sample yields using two alternative definitions of the high-density stratum. Both definitions are implemented in terms of data from the 2000 Census, 5-Percent Public Use Microdata Sample (PUMS) File. For each Public Use Microdata Area (PUMA), we determined the proportion of households in the area, say p , that are at or below 185 percent of the 2000 Federal Poverty Level. For the first definition, we take the high-density stratum to be all PUMAs that are 25 percent or more in low-income status, i.e., $p \geq 0.25$. And for the second, definition, we take the high-density stratum to be all PUMAs that are 40 percent or more in low-income status, i.e., $p \geq 0.40$. Clearly, other cut-points between the

strata could be considered. In fact, we conducted some investigation of 0.50 or 0.60 as the cut-point, but did not find these alternatives as effective as the cut-points presented here.

Let $f = n' / N$ be the national sampling fraction necessary to produce the aforementioned $n = 17,512$ completed household interviews, where n' is the target number of households to be released and N signifies the household population size.¹³ Let $f_1 = n'_1 / N_1$ and $f_2 = n'_2 / N_2$ be the sampling fractions in the high- and low-density strata, respectively. Given proportional sampling as in the prior section, we have $f_1 = f_2 = f$. Given the oversampling strategy, we want to use the sampling fractions

$$f_1 = of \tag{2.5}$$

in the high-density stratum, where $o \geq 1$ is an oversampling factor, and

$$f_2 = \left(\frac{1 - oW_1}{W_2} \right) f \tag{2.6}$$

in the low-density stratum, where $W_1 = N_1 / N$ and $W_2 = N_2 / N$ are the relative sizes of the two income strata. Use of these sampling fractions preserves the target total sample size $n' = n'_1 + n'_2$.

To estimate the yields from the oversampling strategy, we employ data on households and their attributes collected in the 2006 American Community Survey (ACS). Thus, we use 2000 Census data for stratification of the population and data from the 2006 ACS to estimate yields by attribute of the population. From these data, we calculate the proportions of households with certain attributes (α) in each stratum as

$$D_h(\alpha) = \frac{N_h(\alpha)}{N_h} \quad , \text{ for } h=1, 2, \tag{2.7}$$

¹³ The distinction being made in this notation is that n is the target number of completed demand-survey interviews and n' is the target number of households to be released, inflated above n to allow for various forms of nonresponse.

where $N_h(\alpha)$ is the number of households with attribute α in stratum h . We calculate the expected numbers of completed interviews by stratum and by attribute, $n_h(\alpha)$, and the total expected sample size by attribute across both strata, $n_+(\alpha)$, as

$$\begin{aligned} n_h(\alpha) &= n_h D_h(\alpha) \\ n_+(\alpha) &= n_1(\alpha) + n_2(\alpha) \end{aligned} \quad , \quad (2.8)$$

where the stratum-level sample size, n_h , arises from the oversampling sampling fractions in (2.5) and (2.6).

We present the estimated yields in Tables 2.18 and 2.19 corresponding to stratification by the 0.25 and 0.40 cut-points, respectively. Results given for oversampling factor $o = 1$ correspond to proportional sampling, as in the prior section. For the 0.25 cut-point, we present results for the oversampling factor $o = 2$. For the 0.40 cut-point, we display results for $o = 1, 5, 7$, and 9. Gains from oversampling are relatively large. For the 0.25 cut-point and for the rare domain of households with eligible children and in the “100-149% of low-income level” category, we see that use of the factor $o = 2$ results in a total of 277 more completed interviews than use of proportional sampling (3,131 completes for $o = 1$ and 3,408 completes for $o = 2$). For the broader domain of households with eligible children and in either the “100-149% of low-income level” or the “below low-income level” categories, we find that use of the factor $o = 2$ produces a total of 2,141 more completed interviews than use of proportional sampling (8,855 = 5,724+3,131 completes for $o = 1$ and 10,996=7,588+3,408 completes for $o = 2$). For the 0.40 cut-point and for the rare domain of households with eligible children and in the “100-149% of low-income level” category, we see that use of the factor $o = 9$ results in fewer completed interviews than use of proportional sampling (3,132 completes for $o = 1$ and 3,108 completes for $o = 9$).

For the broader domain of households with eligible children and in either the “100-149% of low-income level” or the “below low-income level” categories, we find that use of the factor $o = 9$ produces a total of 3,843 more completed interviews than use of proportional sampling (8,856 = 5,724+3,132 completes for $o = 1$ and 12,699=9,591+3,108 completes for $o = 9$).

Table 2.18: Expected Number of Completed Household Interviews by Domain and Oversampling Factor: Stratum Cut-Point=25%

Domain	Oversampling Factor					
	o=1			o=2		
Stratum	Total	1	2	Total	1	2
Age group						
Less than 3	5,804	2,803	3,002	5,960	5,605	355
3 to 5 Years	6,095	2,885	3,210	6,150	5,770	380
6 to 12 Years	11,793	5,522	6,270	11,787	11,045	742
12 Years or Less	17,512	8,205	9,307	4,692	4,396	295
Household Structure						
1-Parent Household	5,551	3,129	2,422	6,545	6,258	287
2-Parent Household	11,808	4,997	6,812	10,799	9,994	806
Other	152	80	73	168	159	9
Maternal Employment Status						
In Labor Force	10,972	4,986	5,986	10,681	9,973	708
Employed	10,279	4,591	5,687	9,855	9,183	673
Unemployed	694	395	298	826	790	35
Not in Labor Force	5,106	2,466	2,641	5,244	4,931	312
Status Unknown	1,434	753	680	1,587	1,507	80
Region						
Northeast		1,160	1,884	2,544	2,321	223
Midwest		1,356	2,550	3,014	2,713	302
South	6,476	3,741	2,734	7,806	7,483	324
West	4,085	1,947	2,138	4,147	3,895	253
Income						
Below Low-Income Level	5,724	3,672	2,052	7,588	7,345	243
100-149% of Low-Income Level	3,131	1,614	1,517	3,408	3,228	179
150% and Above Low-Income Level	8,657	2,919	5,738	6,517	5,838	679
Race/Ethnicity						
Hispanic	2,762	1,731	1,031	3,583	3,461	122
Black	2,323	1,455	868	3,012	2,910	103
Other	12,428	5,020	7,408	10,917	10,040	876
Total	17,512	8,205	9,307	17,512	16,411	1,101

Source:

Stratification: 2000 Census 5% PUMS

Attributes: ACS 2006

Table 2.19: Expected Number of Completed Household Interviews by Domain and by Oversampling Factor: Stratum Cut-Point=40%

Domain	Oversampling Factor											
	o=1			o=5			o=7			o=9		
Stratum	Total	1	2	Total	1	2	Total	1	2	Total	1	2
Age group												
Less than 3	5,802	584	5,217	5,878	2,922	2,957	5,917	4,090	1,827	5,955	5,259	697
3 to 5 Years	6,090	605	5,485	6,134	3,025	3,109	6,156	4,236	1,921	6,178	5,446	732
6 to 12 Years	11,792	1,185	10,607	11,935	5,924	6,012	12,007	8,293	3,714	12,079	10,663	1,416
12 Years or Less	17,512	1,711	15,801	17,512	8,557	8,955	17,512	11,980	5,532	17,512	15,403	2,109
Household Structure												
1-Parent Household	5,551	798	4,753	6,685	3,992	2,694	7,252	5,588	1,664	7,819	7,185	635
2-Parent Household	11,808	898	10,911	10,671	4,488	6,184	10,103	6,283	3,820	9,534	8,078	1,457
Other	153	16	137	156	78	78	157	109	48	158	140	18
Maternal Employment Status												
In Labor Force	10,971	979	9,992	10,560	4,897	5,663	10,354	6,856	3,498	10,149	8,815	1,334
Employed	10,279	877	9,402	9,715	4,387	5,328	9,433	6,141	3,292	9,151	7,896	1,255
Unemployed	692	102	590	845	510	334	921	715	207	998	919	79
Not in Labor Force	5,104	570	4,534	5,422	2,852	2,570	5,581	3,993	1,587	5,739	5,134	605
Status Unknown	1,437	162	1,275	1,530	808	723	1,577	1,131	446	1,624	1,454	170
Region												
Northeast	3,044	299	2,746	3,050	1,494	1,556	3,053	2,092	961	3,056	2,689	367
Midwest	3,907	197	3,710	3,086	983	2,103	2,676	1,377	1,299	2,266	1,770	495
South	6,476	883	5,592	7,585	4,415	3,170	8,140	6,182	1,958	8,694	7,948	747
West	4,085	333	3,752	3,791	1,664	2,127	3,643	2,330	1,314	3,496	2,995	501
Income												
Below Low-Income Level	5,724	996	4,729	7,658	4,978	2,680	8,625	6,969	1,656	9,591	8,960	631
100-149% of Low-Income Level	3,132	303	2,829	3,120	1,517	1,603	3,114	2,124	991	3,108	2,731	378
150% and Above Low-Income Level	8,655	412	8,243	6,734	2,062	4,672	5,773	2,887	2,886	4,812	3,712	1,100
Race/Ethnicity												
Hispanic	2,763	625	2,138	4,338	3,126	1,212	5,125	4,377	749	5,913	5,627	285
Black	2,325	472	1,852	3,412	2,362	1,050	3,955	3,307	649	4,499	4,252	247
Other	12,424	614	11,810	9,762	3,069	6,693	8,431	4,296	4,135	7,100	5,524	1,577
Total	17,512	1,711	15,801	17,512	8,557	8,955	17,512	11,980	5,532	17,512	15,403	2,109

Source:

Stratification: Census 5% PUMS

Attributes: ACS 2006

In the foregoing tables, we are actually illustrating an approach to oversampling in which the overall total number of completed household interviews is held constant at $n = 17,512$, while the sample size in the rare domain is increased above the level (3,130) deemed to be required on the basis of the power analysis conducted in the prior section. An alternative approach would be to hold the number of completes in the rare domain fixed at 3,130 and take a reduction in the overall total number of completed household interviews.

We present the proportions by stratum and attribute, $D_h(\alpha)$, derived from the 2006 ACS, in Tables 2.20 and 2.21. It is these proportions that we used to develop the estimated yields in Tables 2.18 and 2.19. The proportions represent background information that may be useful to survey planners at the time of sample implementation.

Table 2.20: Distribution of Households by Domain and Sampling Stratum: Stratum Cut-Point=25%

Domain*	Percent of US Households		
	High-Density Stratum (h=1)** (%)	Low-Density Stratum (h=2) (%)	Total Household Population (%)
Stratum			
Age group			
Less than 3	9.15	8.65	8.88
3 to 5 Years	9.42	9.25	9.33
6 to 12 Years	18.03	18.07	18.05
12 Years or Less	26.79	26.82	26.81
Household Structure			
1-Parent Household	10.22	6.98	8.50
2-Parent Household	16.32	19.63	18.08
Other	0.26	0.21	0.23
Maternal Employment Status			
In Labor Force	16.28	17.25	16.79
Employed	14.99	16.39	15.73
Unemployed	1.29	0.86	1.06
Not in Labor Force	8.05	7.61	7.82
Status Unknown	2.46	1.96	2.20

Table 2.20: Distribution of Households by Domain and Sampling Stratum: Stratum Cut-Point=25%

Domain*	Percent of US Households		
	High-Density Stratum (h=1)** (%)	Low-Density Stratum (h=2) (%)	Total Household Population (%)
Region			
Northeast	3.79	5.43	4.66
Midwest	4.43	7.35	5.98
South	12.22	7.88	9.91
West	6.36	6.16	6.25
Income			
Below Low-Income Level	11.99	5.91	8.76
100-149 of Low-Income Level	5.27	4.37	4.79
150 and Above Low-Income Level	9.53	16.53	13.25
Race/Ethnicity			
Hispanic	5.65	2.97	4.23
Black	4.75	2.50	3.56
Other	16.39	21.34	19.02
Total	46.88	53.12	100.00

Table 2.21: Distribution of Households by Domain and Sampling Stratum: Stratum Cut-Point=40%

Domain*	Percent of US Households		
	High-Density Stratum (h=1)** (%)	Low-Density Stratum (h=2) (%)	Total Household Population (%)
Stratum			
Age group			
Less than 3	10.13	8.76	8.88
3 to 5 Years	10.49	9.21	9.33
6 to 12 Years	20.54	17.81	18.05
12 Years or Less	29.67	26.53	26.81
Household Structure			
1-Parent Household	13.84	7.98	8.50
2-Parent Household	15.56	18.32	18.08
Other	0.27	0.23	0.23

Table 2.21: Distribution of Households by Domain and Sampling Stratum: Stratum Cut-Point=40%

Domain*	Percent of US Households		
	High-Density Stratum (h=1)** (%)	Low-Density Stratum (h=2) (%)	Total Household Population (%)
Maternal Employment Status			
In Labor Force	16.98	16.77	16.79
Employed	15.21	15.78	15.73
Unemployed	1.77	0.99	1.06
Not in Labor Force	9.89	7.61	7.82
Status Unknown	2.80	2.14	2.20
Region			
Northeast	5.18	4.61	4.66
Midwest	3.41	6.23	5.98
South	15.31	9.39	9.91
West	5.77	6.30	6.25
Income			
Below Low-Income Level	17.26	7.94	8.76
100-149 of Low-Income Level	5.26	4.75	4.79
150 and Above Low-Income Level	7.15	13.84	13.25
Race/Ethnicity			
Hispanic	10.84	3.59	4.23
Black	8.19	3.11	3.56
Other	10.64	19.83	19.02
Total	8.83	91.17	100.00

Tables 2.18 and 2.19 are expressed in terms of the number of completed household interviews. Assuming response rates are the same for the oversampling strategy as for the proportional sampling strategy, the corresponding sample sizes at each stage of survey operations appear in Table 2.17 under the heading Sample Size C. Some modification of these sample sizes would be required in the event that the implementing survey organization would project lower response rates for the oversampling strategy.

The advantage of the method of oversampling is that it either increases the precision of estimation (reduces sampling variability) for the targeted rare domain while holding total costs fixed, or else it holds fixed the precision of estimation for the rare domain while reducing total overall survey costs. Yet a limitation of the method of oversampling is that it tends to cause a loss

of precision (an increase in sampling variability) for estimators that refer to the overall total population. In our case, oversampling would improve the analysis for eligible children in low-income households, but it would reduce the precision of the analysis for the total national population of eligible children. This limitation would be acceptable as long as it is consistent with OPRE's objectives for the NSCCSD.

We close this section with brief mention of a couple of practical issues. First, we demonstrated the yields possible when census data from the year 2000 are used for stratification and ACS data from 2006 are used to simulate the time of the survey interview. Obviously, this demonstration used a gap of six years between the time the sampling measures were developed and the time of interviewing. In the actual implementation of the NSCCSD, we would face different circumstances. Income data from the ACS is expected to be released in the autumn of 2010. These data will represent a five-year average for the period 2005-2009. If the NSCCSD would conduct interviewing operations in 2011, there would be a 4 year lag between the mid-point of the reference period for sampling measures and the time of interviewing. Each year after 2010, the ACS will release updated 5-year estimates by removing the earliest year and replacing it with the latest one. Thus, if the NSCCSD should be delayed beyond 2011, it would have an opportunity to use a more recent ACS year, thus preserving the approximately 4-year lag between the sampling measures and interviewing.¹⁴

Second, while the work done in this section used PUMAs as the geographic building blocks for defining the high- and low-density strata -- because the 2006 ACS data were not available for any smaller geographical units -- the 2010 ACS data will be available at the census tract and block-group levels, a typically much smaller level of geography. This means that the stratification that should be possible for the NSCCSD can use block-groups or census tracts as the building blocks for stratum construction. Given these smaller building blocks, the real NSCCSD stratification should be much more accurate in terms of delineating low-income areas than was the stratification accomplished in this section.

¹⁴ One can keep track of the ACS dissemination schedule at

<http://www.census.gov/acs/www/SBasics/DataDiss/RelDates.htm>.

Thus, the shorter time lag and the smaller geographic building blocks should combine to make the oversampling strategy even more effective in finding members of the rare domain in actual practice than in the illustrations supplied in this section. During NSCCSD sample implementation, the implementing survey organization and OPRE should consider whether to make some adjustments to sampling rates to account for these expected gains in effectiveness.

2.5.3 Other Considerations

Clearly, the funding available to conduct the NSCCSD will have a huge impact on the determination of the target sample size. Little more need be said at this time.

In an earlier section, we raised the possibility of making separate inferences for each of potentially several policy-type domains. To enable precise direct inferences, a large sample of completed interviews would be required within each policy –type domain.

The possibility of conducting in-depth analysis of how local child-care markets work has also been raised as a possible analytic aim. To enable such analysis, a subsample of PSUs might be identified for study, with an extra large sample of households and children selected within the selected PSUs. Each of the selected PSUs would be viewed as a cluster of one or more markets and the sample size in terms of households would be determined to support separate estimation at the PSU or market level. Note that the purpose of the core sampling plan is to draw a nationally representative sample yielding national estimates and estimates by income and other analytical domains. The core sample would not be large enough to support separate estimation at the PSU or market level.

Yet another analytic aim may be to conduct analysis of demand within the cells of a cross-classification defined by several socio-demographic variables, such as maternal education, maternal employment, household structure, and household income. With a finer and finer cross-classification, the rarest cell would become smaller and smaller, and accordingly the required sample size would become larger and larger.

On the other hand, if one maintained the overall sample size of Scenario C, that is, 17,512 completed household, and wanted to study crossclassified tables, then each cell would likely contain far fewer than the 3,130 completed interviews required by our power calculations. To illustrate the expected sample sizes by cell, Tables N.1 - N.3 in Appendix N display sample sizes in terms of completed household interviews assuming proportional sampling, for the following three-way tabulations:

- Household structure by household income by age of children
- Race/ethnicity by household income by household structure
- Maternal employment status by household income by household structure.

The overall sample size in these tabulations is 17,512 completed household interviews. Tables N.4 - N.6 display the sample sizes for the same three-way tables, assuming an oversampling strategy with a cut point of 25 percent and $o = 2$. Tables N.7 - N.12 display expected sample sizes in terms of children served by CCDF with a completed interview.

Clearly, there are important tradeoffs between the analytic objectives of the survey, its sample size, and its cost. All of these factors should be scrutinized carefully as decisions are made to move forward with the NSCCSD.

2.6 Recommendations

In this final section, we outline the three main design options that emerged in this chapter.

The first option is primarily a RDD sample design. A stratified probability sample of PSUs is first drawn. PSUs are stratified by state (and possibly by urbanicity and poverty status for large states) and are selected with a probability in proportion to the number of households with children under 13. Within selected PSUs, prefixes are assigned to SSUs and to the high- or low-density stratum and list-assisted RDD sampling is conducted within each stratum. Sampled telephone numbers are dialed from a central data collection office and households are screened for the presence of eligible children. Data are collected on all eligible children. Such a design is similar to the 1990 National Child Care Survey. It is the cheapest design option but it suffers from serious coverage issues and it faces low response rates.

The most expensive design, by contrast, would employ primarily an area probability sample design. The same method would be used to draw a probability sample of PSUs. Within each chosen PSU, a probability sample of SSUs would be selected. The SSUs would be stratified by the density of low-income households and selected with a probability in proportion to the number of children age birth to 13. Listers would be sent to selected block groups to make a list of addresses. Interviewers will be sent to selected addresses to conduct interviews. Households would be screened for the presence of eligible children and data would be collected for all eligible children. This design has the best coverage of the population but is very costly and has a longer field period than the first design. The coverage and response rates are expected to be higher than the first option.

The hybrid design is a middle-of-the-road option in terms of cost and population coverage. Once PSUs and SSUs are drawn, a list of addresses is purchased from commercial vendors for the selected SSUs. The selected addresses are sent out to commercial vendors to be matched to listed telephone numbers. Telephone interviews are attempted for the matched telephone numbers. For addresses that are not matched, questionnaires are mailed to the addresses and/or in-person interviews are attempted. Our experience indicates that the commercial address list tends to have poor coverage in rural areas. In such areas, a “sample and go” procedure is used to complement the use of the address list in all other areas. The hybrid option is more expensive than the RDD option, but cheaper than the conventional area probability design. It has better coverage and probably better response rates than the RDD design, and is nearly comparable in these respects to the area-probability design. At this writing, our judgment is that the hybrid option provides the best overall value to the NSCCSD.

Note that all three designs are subject to potential nonresponse bias if response rates are low. However, latest work seems to suggest that there is no direct correspondence between low response rates and the extent of nonresponse bias; a low response rate doesn’t automatically imply a high nonresponse bias. Vice versa, a high response rate doesn’t guarantee that there is no nonresponse bias in the resulted statistics (Groves, 2006). Still, techniques and procedures should be taken to improve response rates and to minimize the risk of nonresponse bias. Various post-data adjustments should also be done to adjust for bias associated with differential nonresponse across population subgroups.

3. AIAN Supplementary Sample Design

Along with the more general aim of studying the early and school-age care experiences of American households with children from birth to twelve years of age, the NSCCSD has a goal of gathering data on the specific early and school-age care experiences of the American Indian or Alaska Native (AIAN) population residing in federally recognized AIAN areas, generally, and Child Care Development Fund (CCDF) grantee areas, specifically. Chapter 3 discusses issues pertinent to this goal. Much of this discussion overlaps with topics covered in Chapter 2, but we cover some material again in the context of the AIAN population and for the purpose of having a complete, stand-alone discussion of the AIAN topic.

The AIAN population in the United States is relatively small and generally widely dispersed. Data from the 2000 Census show that there were a total of 105.5 million households in the country that reported race. Of those, only about 0.7 percent, or 765,000 households, had a householder who identified his or her race as AIAN alone. The vast majority of AIAN households can be found in states west of the Mississippi river, with the five states with the highest AIAN population (California, Oklahoma, Arizona, New Mexico, and Texas) accounting for 44 percent of the AIAN households. However, even in states where a high number of AIAN households can be found, the proportion of the overall households that are AIAN is still quite small. There is only one state in the U.S., Alaska, where AIAN households make up as much as ten percent of the population and there are only three other states (New Mexico, Oklahoma, and South Dakota) where even one household in twenty has an AIAN householder. See Table 3.1.

Table 3.1: Percent of AIAN Households, by State

State	FIPS	Total Households	Total Households with Reported Race	Total Households with AIAN Householder	Percent of Households with AIAN Householder
United States, All	n/a	115,904,641	105,480,101	765,474	0.7
Alabama	01	1,963,711	1,737,080	8,306	0.5
Alaska	02	260,978	221,600	26,556	12.0
Arizona	04	2,189,189	1,901,327	67,501	3.6
Arkansas	05	1,173,043	1,042,696	6,656	0.6
California	06	12,214,549	11,502,870	96,339	0.8
Colorado	08	1,808,037	1,658,238	14,027	0.8
Connecticut	09	1,385,975	1,301,670	3,271	0.3
Delaware	10	343,072	298,736	1,161	0.4
District of Columbia	11	274,845	248,338	756	0.3
Florida	12	7,302,947	6,337,929	19,400	0.3
Georgia	13	3,281,737	3,006,369	8,036	0.3
Hawaii	15	460,542	403,240	1,125	0.3
Idaho	16	527,824	469,645	5,436	1.2
Illinois	17	4,885,615	4,591,779	9,903	0.2
Indiana	18	2,532,319	2,336,306	6,299	0.3
Iowa	19	1,232,511	1,149,276	2,630	0.2
Kansas	20	1,131,200	1,037,891	8,229	0.8
Kentucky	21	1,750,927	1,590,647	3,451	0.2
Louisiana	22	1,847,181	1,656,053	8,657	0.5
Maine	23	651,901	518,200	2,735	0.5
Maryland	24	2,145,283	1,980,859	5,667	0.3
Massachusetts	25	2,621,989	2,443,580	5,432	0.2
Michigan	26	4,234,279	3,785,661	20,265	0.5
Minnesota	27	2,065,946	1,895,127	16,318	0.9
Mississippi	28	1,161,953	1,046,434	3,615	0.3
Missouri	29	2,442,017	2,194,594	9,819	0.4
Montana	30	412,633	358,667	15,879	4.4
Nebraska	31	722,668	666,184	4,184	0.6
Nevada	32	827,457	751,165	9,084	1.2
New Hampshire	33	547,024	474,606	948	0.2
New Jersey	34	3,310,275	3,064,645	5,599	0.2
New Mexico	35	780,579	677,971	47,160	7.0
New York	36	7,679,307	7,056,860	25,108	0.4

Table 3.1: Percent of AIAN Households, by State

State	FIPS	Total Households	Total Households with Reported Race	Total Households with AIAN Householder	Percent of Households with AIAN Householder
North Carolina	37	3,523,944	3,132,013	34,821	1.1
North Dakota	38	289,677	257,152	8,957	3.5
Ohio	39	4,783,051	4,445,773	10,272	0.2
Oklahoma	40	1,514,400	1,342,293	85,759	6.4
Oregon	41	1,452,709	1,333,723	14,378	1.1
Pennsylvania	42	5,249,750	4,777,003	7,040	0.1
Rhode Island	44	439,837	408,424	1,619	0.4
South Carolina	45	1,753,670	1,533,854	5,336	0.3
South Dakota	46	323,208	290,245	15,406	5.3
Tennessee	47	2,439,443	2,232,905	5,981	0.3
Texas	48	8,157,575	7,393,354	39,186	0.5
Utah	49	768,594	701,281	7,765	1.1
Vermont	50	294,382	240,634	1,067	0.4
Virginia	51	2,904,192	2,699,173	8,242	0.3
Washington	53	2,451,075	2,271,398	29,299	1.3
West Virginia	54	844,623	736,481	1,498	0.2
Wisconsin	55	2,321,144	2,084,544	15,909	0.8
Wyoming	56	223,854	193,608	3,387	1.7

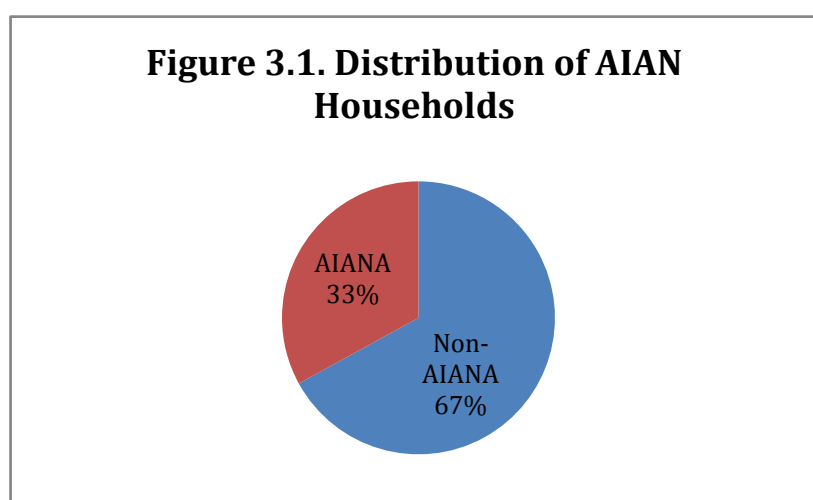
Source: Census 2000, Summary File 3

Given the relative scarcity and wide dispersion of AIAN households, it would likely not be feasible, for reasons of cost, to attempt to sample the entire national AIAN population. However, including the entire AIAN household population is not necessary in order to achieve the research goals of the NSCCSD regarding the AIAN population. There are two general approaches to sampling this population that seem to be feasible. The first is to sample all federally recognized AIAN areas. This approach will allow us to maximize the proportion of the AIAN population that is in the sampling frame and thus the generalizability of the findings of the study while limiting the cost of collecting the data from such a widely dispersed population. This will have the added utility of including virtually all of the CCDF grantee areas. The second approach is to focus only on tribal areas of tribes that receive CCDF funds from the Child Care Bureau. This approach will likely incur a lower cost than sampling in all AIAN areas, but the savings in expense will come with a cost in the proportion of the AIAN household population that is covered, and thus the ability to apply the

findings of this study to the wider AIAN population. What follows is a discussion of the advantages and disadvantages of the sampling options.

3.1 Where are AIANs Located?

Broadly speaking, AIAN households can be categorized as being in one of two types of geographic areas: on a designated American Indian/Alaska Native Area (AIANA) or not on (or off) a designated AIANA. The AIAN household population is split approximately one-third/two-thirds between on-AIANA/off-AIANA, as is demonstrated in the pie chart in Figure 3.1. The distribution of AIAN households varies greatly between these two types of areas.



Source: Census 2000, Summary File 3

AIAN households are relatively denser on AIANAs than off AIANAs. Data from the 2000 Decennial Census shows that of the 2.01 million households with reported householder race on AIANAs, more than 255,000 have an AIAN householder, for an overall AIAN household density of 12.7 percent on AIANAs. This contrasts with the 0.7 percent national AIAN density and 0.5 percent off-AIANA AIAN household density.

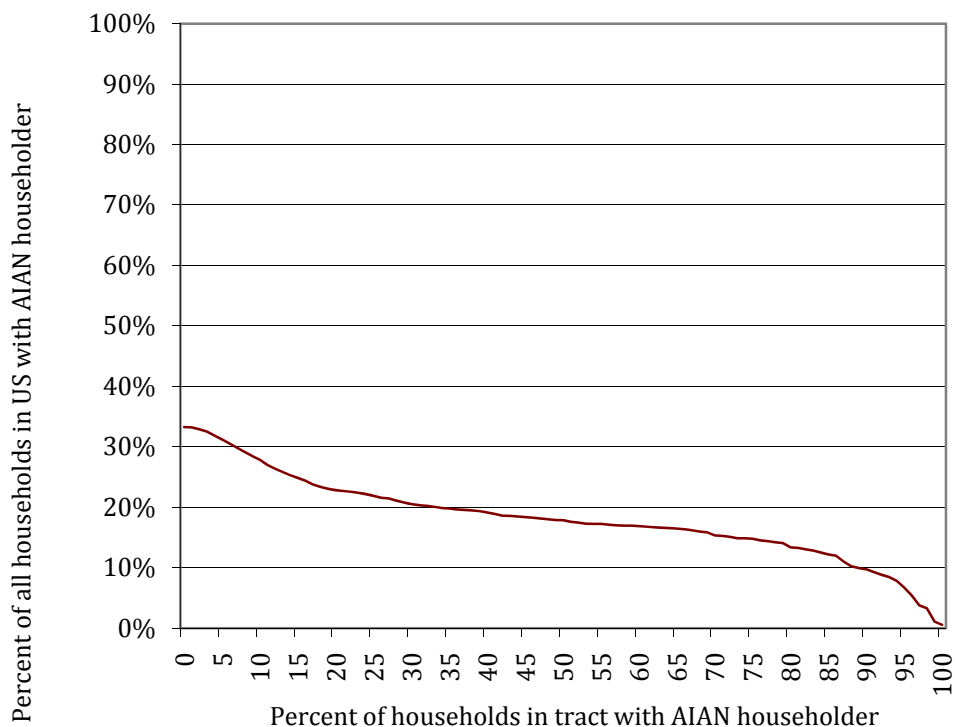
The U.S. Census Bureau recognizes six types of AIANAs: Alaska Native Village Statistical Areas (ANVSAs), American Indian Reservations, American Indian Off-Reservation Trust Lands, American Indian Tribal Subdivisions, Oklahoma Tribal Statistical Areas, State Designated American Indian Statistical Areas (SDAISAs), and Tribal Designated Statistical Area (TDSAs). Detailed descriptions of each type of AIANA can be found in Appendix J. Within AIANAs, the standard hierarchy of Census geographies does not hold. Geographic entities do not necessarily “nest”

within states and counties. For instance, the following American Indian entities can cross state lines: federally recognized American Indian reservations, off-reservation trust lands, tribal subdivisions, and tribal designated statistical areas. Rather, AIANAs are made up of tribal blocks, which nest within tribal block groups, which are nested within tribal tracts, which are nested within tribal subdivisions, which are nested with AIANAs.

There are a total of 542 individual AIANAs in America. See Appendix I for a complete listing of them. The AIANAs vary widely in terms of AIAN and total population, and the proportion of the AIANA's population that is accounted for by AIAN households. The largest AIANA, in terms of AIAN household population is the Navajo reservation. It has over 45,000 AIAN households and an AIAN population density of 95 percent. However, the largest AIANA in terms of overall population is the United Houma Nation SDAISA, which has more than 312,000 households with reported race, but only one percent (i.e., 3,100) of those households have an AIAN householder. Across all AIANAs, the average density of AIAN households is 12.7 percent, as compared to the 0.7 percent national average. Figure 3.2 shows that on AIANAs there is substantial variation in the AIAN household density. The figure displays the percent of all AIAN households in the country that are located in tracts that are at or above a defined level of AIAN density. For example, about 25 percent of the national AIAN population is located in on-AIANA tracts that are at least 10 percent dense in AIAN households. We see that there are some very dense areas that represent a fairly small proportion of the total national AIAN population. If we consider all on-AIANA areas, including those that are 0 percent or more dense in AIAN households, then we would include about a third of the national AIAN population. This result is consistent with Figure 3.1.

AIANAs can be found in 35 states across the country and differ widely in their geographic characteristics. Most have irregularly shaped borders that may or may not correspond to any identifiable land marks or other geographic boundaries. Some are contiguous, but many are not. The AIANAs that are not contiguous often have pockets of territory inside of them that are not a part of the AIANA. The irregular nature of AIANA borders will pose an operational challenge to the collection of data from on-AIANA households that the survey organization must be cognizant of. That is, at the time of sampling and data collection, the survey organization must be sure to make use of the tribal geographies mentioned above. See Appendix L for a map of Alabama, with AIANAs imbedded for a typical representation of the geographic characteristics of AIANAs.

Figure 3.2. Cumulative Percent AIAN Households in AIANAs by Tract-level AIAN Density



3.2 Options for Defining the Sampling Population

A critical choice that must be made is how the sampling population will be defined for the AIAN component of the NSCCSD. There are several options available and we must endeavor to choose the option that strikes the best balance between covering the highest possible percentage of the national AIAN household population in the sampling population and the likely cost of the study. The choice for defining the sampling population runs the entire spectrum from including every Census block in the country, to including only geographies with AIAN household densities over a defined threshold, such as 90 percent. If the former extreme would be adopted, we would include the entire AIAN household population in the sampling population; our results would be widely generalizable, but the cost of conducting the research would be astronomical. Given the latter extreme, we would only include about 8 percent of the national population of AIAN households; we would not be able to confidently generalize our results to the wider AIAN population, but the cost of data collection would be relatively low.

Given the wide breadth of options available, in early February of 2008, NORC prepared a document for OPRE to review with the Child Care Bureau. That memorandum outlined

considerations and sought guidance regarding the definition of the AIAN sampling population. The document presented data demonstrating the distribution of AIAN households both on and off of AIANAs along with the ramifications for population coverage and sample size. We presented six general options for defining the sampling frame, as follows:

- All areas of the country, regardless of AIAN density or AIANA status
- All areas on AIANAs regardless of AIAN density, plus off-AIANA areas for which AIAN density was 5 percent or greater
- All areas on AIANAs regardless of AIAN density, plus off-AIANA areas for which AIAN density was 10 percent or greater
- All areas on AIANAs regardless of AIAN density; no off AIANA areas
- All areas in the country for which AIAN density is 10 percent or greater, regardless of AIANA status
- All areas on AIANAs for which AIAN density is 10 percent or greater; no off AIANA areas

After internal deliberation, the Child Care Bureau opined that the best balance between population coverage and cost would be to include all on-AIANA areas and no off-AIANA areas. The agency further determined that they would consider limiting data collection even further to include only CCDF grantees areas. OPRE supported the focus on the CCDF grantee areas but also emphasized the value of including non-grantee AIANAs, if feasible. Therefore, the remainder of this chapter will focus on the use of on-AIANA areas. Should the scope of the project change in the future to warrant consideration of off-AIANA geographies, a discussion of sampling in these geographies can be found in Appendix K.

3.3 Methods for Sampling Primary Sampling Units

To optimize the allocation of survey resources, we propose a multistage sampling design for the AIAN supplementary sample. Accordingly, the sample should be selected in three stages, with primary sampling units (PSUs) selected at the first stage, secondary sampling units (SSUs or segments) at the second stage, and households at the third and final stage of sampling. Our current view is that the sampling design for the AIAN sample should parallel the sampling design for the core sample, as set forth in Chapter 2, because most of the considerations involved in specifying the design of the core sample also apply to the design of the AIAN sample.

The selection of PSUs should be guided by the scientific goal of accurately representing the early and school-age experiences of AIANs who live in on-AIANA geographies and the practical goal of selecting units that are large enough to provide an adequate number of eligible members, but not so large as to unnecessarily inflate the cost of data collection by increasing the number of households to be listed or interviewed or called, depending on the method of data collection. The PSU will be defined as a geographic entity that most closely meets the right-size requirement mentioned above. Appendix I shows that there are 542 AIANAs that have at least one AIAN household on them. These AIANAs vary in size from very small, with an AIAN household population as small as one up to an AIAN household population of 45,623.

To optimize the precision of survey analyses, the overall goal of our sampling design is to produce a sample that is self-weighting (i.e., the unconditional probability of selecting each household is equal). The probability of selecting any given household is the product of the probability of selection of the PSU, the probability of selecting the SSU given that the PSU is selected, and the probability of selecting the household, given that the PSU and SSU are selected. However, the wide variability in the number of AIAN households in individual AIANAs creates two issues that must be accounted for in order to keep the overall selection probability of each household as close to equal as possible. The first issue has to do with AIANAs with a very small population. They should be collapsed to form PSUs that are larger than a defined minimum size. Furthermore, the smallest of the AIANAs should be considered for deletion from the sampling population on grounds that it may be too cost ineffective to include them. Any collapsing should be based on geographic proximity of the involved AIANAs.

The second, related, issue concerns AIANA's with very large populations. To address this issue, we recommend creating certainty selection strata that will be comprised of the largest AIANAs. Within these certainty AIANAs we would define the PSU to be the tribal tract or clusters of contiguous tribal tracts. The number of tracts that will be selected from each of these certainty AIANAs will be proportional to the AIAN household population of the AIANA relative to the entire on-AIANA sampling population. As with the overall AIANAs, there is an issue of tracts with very small AIAN household populations within the large AIANAs. We recommend clustering tracts, based on geographic proximity, within AIANAs to ensure that each housing unit within these strata have approximately the same probability of selection.

In summary, we recommend that the on-AIANA sample be comprised of multiple strata, several certainty strata that will be made up of the largest AIANAs and one noncertainty stratum

that is made up of all of the other AIANAs. The allocation of PSUs within each stratum will be such that the number of PSUs within a stratum is proportional to the stratum's representation of the on-AIANA AIAN population. The PSUs in the certainty strata will be made up of tracts or tract clusters. The non-certainty stratum will be made up of the smaller AIANAs and the PSU will be the individual AIANA or an AIANA cluster.

3.3.1 Number and Size of PSUs

Once the determinations for what constitutes a PSU and the manner in which PSUs will be selected have been reached, the next step is to determine the number of PSUs to be selected into the sample and the minimum size of a PSU. As discussed above, PSUs must be sufficiently large so that the balance between the overall sampling probability and the conditional probability of selecting a given household within a selected PSU are kept in balance. If a PSU is too small, its selection probability could be as small as the overall sampling rate for households, which would work against our goal of achieving a self-weighting sample of households. The selection probability of a household within a PSU must obey the condition

$$f = \pi_i f_{k|i} \quad (3.1)$$

where f is the overall sampling rate, π_i is the probability of selection of the i th PSU, and $f_{k|i}$ is the conditional probability of selecting the k -th household, given that i th PSU is selected. If we set $f_{k|i}$ equal to 1, we can solve for the minimum PSU size, giving

$$1 = \frac{f}{\pi_i} \quad (3.2)$$

$$\pi_i = n \frac{x_i}{\sum_i x_i}, \quad (3.3)$$

where n is the number of PSUs in the stratum. The selection probability of the i th PSU is a function of the number of PSUs, the value of the measure of size (MOS) or x for the i th PSU, and the cumulative MOS for the stratum.

Equation 3.2 can be re-written for the minimum PSU size as $\pi_i = f$. We know that M , the total number of housing units with reported race on AIANAs, is 2,015,777. Further, our sample size calculations (covered in detail in Section 3.9) show us that m' , our selected sample size, could be about 63,000 households. Therefore, our overall sampling rate would be $f = m'/M = 0.0313$. If we set the number of PSUs to be selected at 100 and replace π_i with Equation 3.3, we can see that the absolute minimum PSU size is about 630 households. In practice, however, we would want to define PSUs such that the minimum PSU size was comfortably larger than 630 to allow for any on-the-

ground changes that may have taken place in the time between when the census data that we are using was collected and the initiation of the study.

We suggest that a minimum PSU size of 1,000 households might be established for the AIAN supplementary sample. Among other things, this size might be viewed as a reasonable minimum number of households to form a childcare market. This figure also gives us a cushion should actual conditions in the field at the time of survey implementation be substantially different than the conditions at the time the census data were collected.

The method described above suggests collapsing small AIANAs to create PSUs that are at least 1,000 households. This is by no means the only defensible way for handling small AIANAs. Another viable option for handling the smallest AIANAs is to declare them out-of-scope and exclude them from the sampling population. If a child care market requires a minimum of roughly 1,000 households to organize itself, a compelling argument can be made that the very smallest AIANAs do not comprise child care markets by themselves and thus they should be considered out of the sampling population. The decision to exclude or to cluster small AIANAs is not a binary choice. A decision can be made at the agency level to cluster some small AIANAs that are deemed important to keep in the sampling population (e.g., CCDF grant recipients) and to exclude others that are less central to the aims of the study. Definition of the sampling population, including clustering versus exclusion of small AIANAs should be determined at the agency level prior to actual sampling.

3.4 Alternative Sampling Frames for Sampling within PSUs

Once the PSUs have been selected in each frame, we still must decide which individual households within each PSU will be chosen. The overall goals of our sampling strategy are twofold: to produce a sample in which each household within each stratum has approximately the same probability of being selected, and to screen for the presence of eligible AIAN children. This stage of sampling, selecting households within PSUs for interview, requires that a complete sampling frame be developed so that each household within selected PSUs can have a known probability of selection. There are a variety of methods for developing the frame within PSUs that can be employed. Each method comes with its own costs and benefits in terms of feasibility, expense, and data quality and will be discussed in turn.

3.4.1 Address-Based Sampling

Address-based sampling would entail obtaining a list of addresses in each selected PSU and selecting a probability sample of housing units from that list, probably in two stages of selection:

tribal tracts followed by housing units within the selected tracts. Address lists are available from commercial vendors (e.g., Advo or Info USA) that re-sell the United States Postal Service Delivery Sequence File. These address lists contain flag variables that identify whether each record represents a residential or business address, which allows for proper sampling of housing units and allows us to know exactly where the selected housing units are located. However, address data are seldom perfect. There are several types of addresses that exist in lists, such as those that do not correspond to a physical location (e.g., a PO box and rural-route addresses). Addresses of this nature are more common in rural or sparsely populated areas. In areas where traditional, city-style addresses comprise the vast majority of addresses, address-based sampling is of considerable utility. This approach allows one to employ multiple modes of data collection (i.e., telephone, mail, and face-to-face) in an optimal way. After the sample is selected, using existing telephone directories, we can first attempt to contact the selected households by phone for screening and data collection. If the household does not have a landline telephone or if the phone number is not listed, we can attempt to conduct a mail or face-to-face interview. Operational experience at NORC suggests that we will be able to find working telephone numbers for around half of the valid city-style addresses in a sample of the general population. The flexibility that this approach affords is extremely attractive. To assess the feasibility of this approach, we drew a two-percent sample of AIANAs. In this sample, we found that about two-thirds of addresses were “city-style” (i.e., not PO boxes or rural routes). The “city-style” addresses varied from zero percent in an AIANA in Alaska to 87 percent in an AIANA in Minnesota. See Table 3.2.

In addition to addresses that can not be linked to a physical location, individual residents can elect to have their addresses omitted from such lists and such lists often suffer from being out of date with respect to new construction and demolition. In light of these various coverage issues, we suggest that address-based sampling might be feasible as one source of the sampling, but it would likely have to be supplemented by other methods.

Table 3.2: Percent City-Style Addresses in a Selection of AIANAs

AIANA Name	Percent City-Style Addresses
Adais Caddo SDAISA, LA	76.2
Aniak ANVSA, AK	0.0
Cherokee OTSA, OK	75.9
Chickasaw OTSA, OK	74.5
Choctaw OTSA, OK	57.3
Citizen Potawatomi Nation-Absentee Shawnee OTSA, OK	79.9
Crow Reservation and Off-Reservation Trust Land, MT	78.6
Fort Apache Reservation, AZ	70.1
Red Lake Reservation, AZ	61.2
Sault Ste. Marie Reservation and Off-Reservation Trust Land, MI	87.6
Standing Rock Reservation, SD – ND	73.6
Total	73.1

Source: ADV0

3.4.2 Custom Listing

Conventional area probability sampling involves a custom listing of addresses and sampling from the list within each selected SSU. The SSUs can be tribal tracts, block groups, or custom segments. After SSUs are chosen within the PSU, the selection of which housing units to interview can be done in one of two ways: central office-based selection of individual housing units or with a “sample-and-go” design. In office-based selection, a list of the residential addresses in the selected segments is created by sending a lister to the segments to make a list of all of the housing units in that area. This list is brought back to the central office and the housing units to be interviewed are selected by a method of probability sampling. The actual interviews are typically conducted face-to-face by an interviewer who may or may not be the same individual as the lister. The primary benefit of using area probability sampling is that this technique allows households that would have no probability of selection using address-based or telephone-based techniques to have an equal probability of selection. Also, interviewing by face-to-face methods will achieve a higher response rate than other modes of data collection. There is a big drawback to this technique, however, in terms of the cost of data collection.

3.4.3 Sample and Go

A sample-and-go approach to frame construction is conceptually similar to custom listing, except that this approach combines listing and interviewing into a single operation. In this approach an interviewer is sent into a selected SSU with a map and explicit instructions to start at a

specified point in the unit and to traverse it in a specific direction to record each housing unit for frame construction purposes. The interviewer is further instructed to attempt to interview every k -th household at the same time that he or she is conducting the listing, where k represents the sampling interval specified in advance by the sampling statistician. This approach offers cost savings over the traditional custom listing approach since interviewers are required to go into the field fewer times. However, there is a risk of some loss of central-office control over the households that are interviewed. In a traditional custom listing approach, listers construct the frame and the sample of households is drawn at the central office. This step allows managers at the central office to decide ahead of time how to handle unusual situations, such as multiple-family households and multiple unit structures. The sample-and-go approach relies on the interviewer to make more decisions which increases the chance for error. The sample-and-go approach also precludes the sending of advance letters to increase cooperation among selected households. On balance, with proper interviewer training and supervision, the sample and go approach can be quite successful and can usefully be used as one component of a comprehensive data-collection strategy. See Wolter and Porras (2002) for a successful application of the sample and go approach on AIAN reservations.

3.4.4 Frames for Telephone Numbers

Generating a list of telephone numbers within PSUs is another way to construct a sampling frame within the selected PSUs. In telephone number based frame construction, the frame is constructed based on the area code and prefix combination (i.e., the first six digits from the left of the standard ten-digit telephone number). For traditional landline telephones, the area code and prefix are reliably associated with small, relatively circumscribed geographic areas. Blocks of numbers within the chosen area code and prefix can then be generated and called to resolve the numbers as working residential numbers or other types of phone numbers (e.g., business numbers or data lines). Screening interviews are attempted for the resolved working residential numbers. The primary advantage of random digit-dial (RDD) sampling is the low cost of data collection and the speed with which collected data can be captured. However, there are significant drawbacks to this method. The first drawback concerns undercoverage due to incomplete telephone penetration. Data from the FCC shows that land-based telephone subscribership on AIANAs was only about 77 percent at the time of the 2000 Census (FCC, 2003). Another source of undercoverage in RDD designs is the presence of cell-phone-only households. These households are excluded from traditional RDD designs that sample only landline telephones. Data from a national face-to-face study conducted by the CDC indicates that 22.8 percent of non-hispanic individuals who are some race other than white, black, or asian only have a cell-phone and do not have a land-based

telephone in their home. Given these findings, there is a likelihood that bias due to undercoverage could be introduced if a landline telephone frame would be the only frame used to support the AIAN component of the NSCCSD.

3.4.5 Tribal Rolls

While tribal rolls, or complete lists of all tribal members, would potentially represent the ideal sampling frame for AIAN households, there are actually substantial shortcomings in terms of coverage and accessibility that make the use of tribal rolls for this project infeasible. It would be virtually impossible to gain access to tribal rolls for sampling purposes. Even if one could gain access there are many different tribes, each with their own standards for who is and is not a member of the tribe. Additionally, more than 20 percent of AIAN persons did not report a tribe in the 2000 Census and it is unlikely that these individuals would appear on any tribal rolls. Also, about two percent of those who reported a tribal affiliation reported multiple tribes. Thus, there is a risk of duplication across tribes by using tribal roles. The access issue and frame problems make the use of tribal lists for sampling within PSUs impossible for us to recommend.

3.4.6 Birth Registration Lists

Like tribal rolls, birth registration lists (i.e., governmental administrative lists of all births in a given geography) have many potential shortcomings that limit their utility as a frame-building tool and the feasibility of using birth registration lists is dubious. Birth registration lists are controlled by individual states. States differ widely in their willingness to share these data with survey research organizations. Typically these lists include the date of birth, the facility where the child was born, mother's race (the new US Standard Certificate of Live Birth also includes the multiple race question for both the mother and the father), and the county in which the child was born. In some states, the address that is listed for the child is included on these lists. Birth lists are static and do not reflect in- and out-migration from and to the selected areas. Also, many of these lists do not have enough geographic specificity to determine if a particular child was born in the selected PSU. Because of access issues and the daunting task of locating the current address of births that occurred as much as 12 years ago, it would not be feasible, in our view, to use birth registration lists as a sampling frame within PSUs.

3.5 Sampling Methods for Households within PSUs

Once PSUs and SSUs are selected, individual households within SSUs must be selected. There are a number of methods that can be employed to select households. The selected method will depend greatly on the method of frame construction. The following discussion will highlight

the major issues involved in selecting households for given frame construction methods. All of methods of sample selection to be discussed should be implemented in the context of Appendix B, wherein each SSU is stratified by high- versus low-density areas and an optimum allocation of the sample is made between the two strata.

3.5.1 Telephone-Based Frame

If the telephone frame is used, individual telephone numbers can be selected either via simple random sampling or from clusters of numbers. In the simple random sampling design, numbers to be dialed are chosen randomly from the list of eligible 100 banks. In the clustered approach, numbers to be dialed are first clustered by prefix and telephone numbers to be dialed are subsampled from these clusters. GENESYS and SSI are the two primary vendors in the US of such RDD samples. Further, they produce hit rates that would make it possible to map telephone geography onto the PSU and other geographic definitions used for the study.

3.5.2 Address-Based Frame, Including the Delivery Sequence File and a Custom Listing

The first stage of sampling within PSUs, and the second stage overall, would be to sample SSUs (often called segments). The third overall stage of sampling would be to select residential addresses or housing units within the selected SSUs. SSUs would likely be tribal tracts or block groups. A probability proportional to size method of sampling would be used to select the SSUs and an equal probability sample of housing units would be selected within the selected SSUs.

3.6 Methods for Sampling Eligible Children within Households

Many selected households will have multiple children in the eligible age range. In fact, while the total of all national AIAN households with children in the eligible age range is 464,415, the unduplicated sum (i.e., where each household is only counted once regardless of how many eligible children are present) is only 355,385.¹⁵ These figures suggest that, on average, each household that contains at least one eligible child will actually contain about 1.3 eligible children. An important operational decision is whether data should be collected for all eligible children in the household or for only a randomly selected one child. The trade-off in this case is that collecting data from only one eligible child per household increases the precision of parameter estimates. However, adopting this approach results in the need to release a much larger sample of households, which results in reduced operational efficiency and greater overall cost. Considering the totality of the situation, the

¹⁵ Source: 2000 Census PUMS file.

precision loss is more than offset by the increased cost effectiveness of collecting data from all age-eligible children in the household and that is the course that we recommend.

3.7 Mode of Data Collection

Our goal in the selection of the mode of data collection is to adopt the mode that provides us with the best value with respect to the population coverage within selected PSUs, flexibility to adjust to obstacles to constructing a proper frame, expected response rate, and cost effectiveness. The mode chosen should be driven in large part by the choice of sampling frame within PSUs. Conventional area probability sampling would likely involve in-person interviews, which is more expensive than other modes of data collection. However, conducting interviews in person has the advantage of allowing higher response rates and more accurate non-response adjustments after data collection. Telephone interviewing is far more economical than face-to-face interviewing but the problems of undercoverage of households without telephones and cell-phone-only households are well known. An additional drawback of RDD data collection is that there is limited data (essentially only census tract characteristics) that can be used to make non-response adjustments.

A hybrid sampling approach would offer an element of flexibility that can be very desirable. A hybrid approach would use an area-probability-like design to draw the sample. That is, PSUs and SSUs would be selected in the same manner as they would be for an area-probability design. However, after segments are selected, the manner in which data would be collected from households would vary depending on several factors.

First, each selected segment would be analyzed for completeness of available address lists. Address lists can be examined at the ZIP code-level for usability. That is, we can determine, at the ZIP code level, if the proportion of city-style addresses in a selected segment is high enough to support using an address-based approach. For segments that do have a sufficient proportion of city-style addresses, we would use the address list. We could then do a directory look-up for the telephone numbers of selected households. For the households for which we are able to determine the telephone number, we would attempt to contact them by telephone to conduct the screening and main interviews. For segments that do not have adequate city-style addresses, we could adopt a sample-and-go approach. Using a hybrid sampling design would also enable us to send advance letters and, possibly, incentives to selected households to increase cooperation. Further, we would be able, as an option, to follow-up with nonrespondents to our telephone interviewing with attempts at face-to-face interviewing to further reduce nonresponse.

Before commencing data collection operations for the AIAN supplementary sample, it will be critical to involve trusted sources to gain entrée into the AIAN community, acquire the appropriate permissions from tribal leaders, and obtain participation from community organizations. An on-site project coordinator or field manager, who would be a visible member of the community, should be appointed and be responsible for arranging meetings with members of the tribe. The on-site coordinator should have already established relationships in the community and have the stature to be able to assist in obtaining access to community leaders and resources.

3.8 Sample Size Considerations Assuming Proportional Sampling

The size of the sample that is required to carry out this project will depend on many factors, including the number of subgroups or analytical domains to be estimated, the desired level of precision of point estimators and of contrasts between estimators, the eligibility rate of the various analytical domains, and the selected mode of data collection. What follows is a discussion of how variations in each of these factors will affect the necessary sample size for this component of the NSCCSD.

One of the main drivers of sample size will be the size or prevalence of the key analytical domains. Detecting and interviewing an adequate sample size in a highly rare domain always requires a larger sample than detecting and interviewing a less rare domain. Sample size for the AIAN supplementary sample will be driven largely by the prevalence of the rarest domain that investigators plan to study.

It follows that an early step in determining sample size is to specify the analytical domains of interest and determine their prevalence in the population of AIAN households. In the following discussion, we assume that the sample size for the AIAN supplementary sample is to be planned around the following analytical domains:

- Age of child (0-2 years, 3-5 years, and 6-12 years),
- Household structure (2-parent, 1-parent, other),

Poverty status of the household (below poverty, 101 percent to 200 percent of poverty, and greater than 200 percent of poverty), and

- Maternal employment status (employed or not employed).

There is little doubt that OPRE and other independent investigators will want to examine additional analytical domains in the future. They will be able to do so. We are simply saying here that the sample sizes to be discussed on the following pages are driven by the domains set forth above. If there would be other important domains that can be identified today, then we should examine the prevalence of each of them. We should determine whether any such domains are rarer than the domains already under our consideration. If any would be rarer, then the sample sizes set forth below would need to be adjusted upwards.

Our primary interest in this chapter is households that contain AIAN children between 0 and 13 years old. While it is difficult to obtain specific data on the ages of children in households in AIANAs, a good estimate can be arrived at by combining multiple data sources. The first data source is Summary File 2 (SF2) from the 2000 Census. This file gives detailed counts of the number of households in each AIANA, but the ages of children within households are not available. Using SF2, we are able to see that the base rate for AIAN households in AIANAs is 12.7 percent. We are able to get detailed information on the ages of AIAN children in households on a national scale from the Public Use Micro-data Set from the 2000 Census. If we multiply the known proportion of AIAN households on AIANAs by the national proportion of AIAN households that have an AIAN child of eligible age by 1000, we can approximate the expected number of cases per 1,000 households contacted on AIANAs that will fall into the eligibility criterion of having an AIAN child in the specified age range. These data are presented in Table 3.3 below. This table illustrates that for every 1,000 on-AIANA households that are interviewed, we can expect to find 12 households with an AIAN child that is less than three years old, 12 with an AIAN child that is 3-5 years old, and 25 with an AIAN child that is 6-12 years old. It should be noted that these household groups are not mutually exclusive. A given household can contain one or more AIAN children in any or all of these age groups.

Table 3.3: Distribution of Households with AIAN Children Age 0-12 by Age of Children

Age Group	Percent of National AIAN Households	Eligible Households per 1,000 Households on AIANAs
Less than 3	9.45	12
3 to 5 Years	9.73	12
6 to 12 Years	19.69	25
All Households with Children 12 Years or Less	29.01	37

Source: Census 2000, 1-percent PUMS file

The existing data on the structure of households, poverty status of AIAN children within households, and maternal employment status of AIAN children within households suffers from the same limitations as age data. Therefore, to determine the frequency of occurrence of these characteristics, we have to follow the same process outlined above in determining the frequency of households with AIAN children of eligible age. Table 3.4 shows the prevalence of households by presence of one or more parents. Clearly “other” households are extremely rare, indeed so rare that we would not be able to assemble a large enough sample of such household without use of an astronomically large sample size. Thus we will collapse the “other” households into the “one-parent” households for the remainder of this document.

Table 3.4: Distribution of Households with AIAN Children Age 0-12 by Household Structure

Household Structure	Percent of National AIAN Households	Eligible Households per 1,000 Households on AIANAs
Two-Parent, Married	16.93	21
One-Parent	11.76	15
Other	0.32	>1
All Households with Children 12 Years or Less	29.01	37

Source: Census 2000, 1-percent PUMS file

Table 3.5: Distribution of Households with AIAN Children Age 0-12 by Maternal Employment Status

Maternal Employment Status	Percent of National AIAN Households	Eligible Households per 1,000 Households on AIANAs
Employed	16.08	20
Not Employed	12.93	16
All Households with Children 12 Years or Less	29.01	37

Source: Census 2000, 1-percent PUMS file

Table 3.6: Distribution of Households with AIAN Children Age 0-12 by Poverty Status

Poverty Status	Percent of National AIAN Households	Eligible Households per 1,000 Households on AIANAs
100 Percent or Below	7.82	10
101 Percent – 200 Percent	8.48	11
201 Percent or Above	12.08	15
Unknown	0.63	< 1
All Households with Children 12 Years or Less	29.01	37

Source: Census 2000, 1-percent PUMS file

The least frequently occurring analytical domain that is central to the NSCCSD is the population of households that are at or below the poverty level with at least one AIAN child who is younger than thirteen years old. We will use this rare domain to determine the necessary sample size.

The next step in computing the necessary sample size is to determine the desired number of completed household interviews per domain, especially the key domain of impoverished AIAN households with eligible children. For the moment, consider 200 completes per domain as a possible sample size. If we would divide this sample size by the prevalence rate of the rare domain, we find that we would need to screen around 20,000 households on AIANAs to obtain 200 impoverished households with an age-eligible AIAN child. However, this number does not yet account for nonresponse and other losses from the total sample size.

The magnitude of the adjustment that must be made for the various sources of non-response depends on the mode of data collection. If we would adopt an RDD/telephone-

interviewing data collection strategy, loss of response occurs when numbers are not resolved as working or not. The resolution rate is the proportion of released telephone numbers that the survey research organization is able to classify as residential or nonresidential. Other sources of data loss in an RDD design include the working residential number (WRN) rate (i.e., how many of the resolved numbers are working residential numbers), the screener completion rate, and the interview completion rate. Table 3.7 outlines a reasonable set of assumptions for each of these values, which are based primarily on current results from the National Immunization Survey (NIS), one of the world's largest RDD surveys, which is conducted by NORC for the Centers for Disease Control and Prevention. The NIS screens for children age 19 to 35 months. Because of this age screener, we believe that the completion rates from the NIS are well suited as a starting point for discussing the planning for the current study. During the conduct of the NIS we have found that the WRN rate has been declining steadily over time. It is currently at about 25 percent, but we expect that it will be somewhat lower by the time the NSCCSD is launched.

Table 3.7: Assumed Sources and Magnitude of Effective Sample Loss in an RDD Design

Resolution Rate = 81 percent
WRN Rate = 25 percent
Screener Completion Rate = 89 percent
Interview Completion Rate = 82 percent

If we adopt a face-to-face interviewing approach, as in a traditional area probability design, there are different sources of sample loss. In a face-to-face approach, the sources are the proportion of addresses that are found to be vacant or out-of-scope, the screener completion rate, and the interview completion rate. NORC has extensive experience in field interviewing studies informs the expected amount of sample loss due to each of these sources. See Table 3.8 for our current assumptions.

Table 3.8: Assumed Sources and Magnitude of Effective Sample Loss in a Face-to-face Design

Vacancy (and Other Out of Scope) Rate = 12 percent
Screener Completion Rate = 89 percent
Interview Completion Rate = 82 percent

Additionally, adopting a multistage sampling design brings with it a statistical cost, known as the design effect (DEFF). The DEFF is a function of the similarity of housing units within clusters.

The more similar units within clusters are, the larger the DEFF and the less precise estimates from a given sample size tend to be. Large DEFFs serve to inflate the sample needed to achieve a constant level of precision. A typical design effect for a stratified design such as the one proposed here is in the range of 2-4. That is, to achieve comparable precision of estimation, we would need our sample to be between two and four times as large as we would need from a simple random sample. In what follows, we will use the assumed value $DEFF = 2$.

To obtain the sample size required to obtain a given number, x , of effective completed interviews using an RDD design, we would use:

$$\frac{x * (DEFF)}{(resolution\ rate) * (WRN\ rate) * (screener\ completion\ rate) * (interview\ completion\ rate) * (eligibility\ rate)} \quad (3.4)$$

Assuming $DEFF=2$, (3.4) shows us that to obtain 200 effective completed interviews of AIAN households in AIANAs with at least one AIAN child under age 13 and household income at or below the poverty line we would need to release a sample of

$$\frac{200 * (2)}{0.81 * 0.25 * 0.89 * 0.82 * (0.0782 * .127)} = 272,534$$

telephone lines. That is, we would need to call at least 272,534 randomly generated numbers on AIANAs to obtain 200 effective interviews in households that have at least one age-eligible AIAN child and that are at or below the poverty line.

The corresponding figure for a face-to-face design is

$$\frac{x * (DEFF)}{(1 - (OOS\ rate)) * (screener\ completion\ rate) * (interview\ completion\ rate) * (eligibility\ rate)} \quad (3.5)$$

or

$$\frac{200 * (2)}{(1 - 0.12) * 0.89 * 0.82 * (0.0782 * 0.127)} = 62,713$$

addresses. That is, we would need to visit at least 62,713 housing units in AIANAs to obtain 200 effective interviews in households that have at least one age-eligible AIAN child and are at or below the poverty line.

If we adopt a hybrid, address-based approach, the necessary sample would be made up of both designs. In this design, some proportion of the sample will experience telephone rates, and the remainder of the sample will experience face-to-face rates. It might be reasonable to assume that approximately half of the sample will be interviewed over the telephone and half will be interviewed face-to-face.

A final consideration regarding sample size relates to the precision of the obtained parameter estimates. Generally speaking, larger samples provide more precise estimators and greater ability to detect differences between analytical domains in the population. Statistical power, or the ability to detect differences, can be determined for a given sample size, or the equation can be manipulated so that we are able to see the sample size needed to detect differences with a given power.

In the above discussion, we assumed a target of 200 effective completes in the least frequently occurring cell. That is, we assumed a simple random sample of 200 completes. The results of a power calculation are presented in Table 3.9, which shows the power to detect differences in proportions of various magnitudes, given two alternatives: 200 effective completes per cell and 400 effective completes per cell.

Table 3.9: Power to Detect the Difference between Two Proportions, given 200 and 400 Effective Completes Per Cell

Effective Completes Per Cell	True Difference in Proportions	Power
200	.50 vs. .52	0.07
200	.50 vs. .54	0.13
200	.50 vs. .55	0.17
200	.50 vs. .56	0.23
200	.50 vs. .60	0.52
400	.50 vs. .52	0.09
400	.50 vs. .54	0.21
400	.50 vs. .55	0.29
400	.50 vs. .56	0.40
400	.50 vs. .60	0.81

There is not great power to detect smaller differences. Indeed, to detect a 5 percentage point difference (0.50 versus 0.55), the sample size 200 offers power merely equal to 0.17 and the sample size 400 offers power of 0.29.

Another way to examine the power issue is to consider the effective sample size that we would need to detect a difference of a given magnitude. Table 3.10 shows the sample sizes needed per cell to detect differences in proportions of .02, .04, .05, .06, and .10. We find that 1,565 effective completes and 3,130 actual completes would be needed per cell to detect a 5 percentage point difference.

Table 3.10: Effective and Released Sample Sizes, by Mode of Data Collection, by Selected Differences in Proportions, Given Power of 0.80

	Difference in Proportions				
	.50 vs. .52	.50 vs. .54	.50 vs. .55	.50 vs. .56	.50 vs. .60
Minimum Effective Sample Size	9,806	2,448	1,565	1,086	388
Nominal Completed Interviews*	19,612	4,896	3,130	2,172	776
Released Sample Size for Custom Listing*	3,074,857	767,617	490,735	340,536	121,665
Released Sample Size for Telephone-Based*	13,362,340	3,335,816	2,132,578	1,479,859	528,716

* Assumes DEFF of 2

Table 3.11a illustrates the total number of effective completed interviews that can be expected in each category of the key analytical domains, given that the sample size is calculated such that we will get at least either 200, 400, or 1,565 effective completed interviews from the rarest cell, households on AIANAs with age-eligible AIAN children that are at or below the poverty level. We can see that we would end up with 741, 1,482, or 5,798 effective completed interviews, respectively, with age- and AIAN-eligible households. Table 3.11.b presents the corresponding total numbers of completed interviews. We see that we would end up with 1,482, 2,964, or 11,596 total completed interviews, respectively, with age- and AIAN-eligible households.

Table 3.11a: Expected Effective Sample Sizes by Cell Given 200, 400, and 1,565 Effective Completes in the Rare Domain*

Cells	Total Numbers of Effective Interviews Given a Simple Random Sample Large Enough to Produce 200 Effective Interviews in the Rare Domain	Total Numbers of Effective Interviews Given a Simple Random Sample Large Enough to Produce 400 Effective Interviews in the Rare Domain	Total Numbers of Effective Interviews Given a Simple Random Sample Large Enough to Produce 1,565 Effective Interviews in the Rare Domain
Age of Child			
Less than 3 Years	242	484	1,894
3-5 Years	249	498	1,948
6-12 Years	504	1,008	3,944
Household Structure			
Two-Parent, Married	433	866	3,388
One-Parent or Other	309	618	2,418
Poverty Status			
100 Percent or Below	200	400	1,565
101 Percent 200 Percent	217	434	1,698
201 Percent or More	309	618	2,418
Unknown	15	30	117
Maternal <i>Employment</i> Status			
Employed	411	821	3,212
Not Employed	330	661	2,586
Total Household Interviews	741	1,482	5,798

*The rare domain is taken to be the households with an AIAN age-eligible child and with household income less than or equal to the poverty line.

Table 3.11b: Nominal Sample Sizes by Cell*

Cells	Total Numbers of Effective Interviews Given a Simple Random Sample Large Enough to Produce 200 Effective Interviews in the Rare Domain	Total Numbers of Effective Interviews Given a Simple Random Sample Large Enough to Produce 400 Effective Interviews in the Rare Domain	Total Numbers of Effective Interviews Given a Simple Random Sample Large Enough to Produce 1,565 Effective Interviews in the Rare Domain
Age of Child			
Less than 3 Years	484	968	3,787
3-5 Years	498	996	3,897
6-12 Years	1,008	2,016	7,887
Household Structure			
Two-Parent, Married	866	1,732	6,776
One-Parent or Other	618	1,236	4,836
Poverty Status			
100 Percent or Below	400	800	3,130
101 Percent 200 Percent	434	868	3,396
201 Percent or More	618	1,236	4,836
Unknown	30	60	235
Maternal Employment Status			
Employed	821	1,642	6,424
Not Employed	661	1,322	5,172
Total Household Interviews	1,482	2,964	11,596

*Assuming DEFF=2

Finally, an important question is what resources would be required to actually conduct the AIAN supplemental sample. Table 3.12 provides useful information that allows us to begin to tackle this central question. The table describes the workload at each of the major steps of survey operations. It contains three main blocks of data, one for each of the modes of interview that we have discussed in this section. If the survey would be conducted with a goal of 200 effective completes in the rarest cell and as an RDD survey with telephone interviewing, then the released sample should contain 454,172 telephone numbers. Ultimately, we would resolve 91,970 WRNs, screen 81,853 households, and interview 1,482 households with an eligible child. If the survey would be conducted face-to-face, then the released sample should include 78,383 residential addresses, we would find 68,977 occupied housing units or households, and we would complete 1,482 household interviews. The figures given for the hybrid method assume that half the sample is

enumerated by telephone and half by a face-to-face method. The table also presents the sample sizes necessary to achieve 400 and 1,565 effective completed interviews in the rarest cell.

Remember that 1,565 effective completes per cell are required to detect a 5 percentage point difference between two cells. A design with 400 effective completes per cell allows one to detect a 10 percentage point difference, and 200 effective completes per cell would provide even less power to detect differences. Should NSCCSD planners determine some other power requirement or effective sample size, then the total sample sizes by step of survey operations may be calculated by means similar to those presented in Table 3.12. The sample sizes cited here are used for illustrative purposes and to give the reader a general sense about the relationship between the sample and the analytical aims of the survey.

As the AIAN supplemental sample moves towards implementation, a number of additional factors should be carefully considered before a final sample size is determined, including

- Budget
- Inferences to be made, if any, for specific child-care markets
- Inferences to be made, if any, for other and possibly smaller demographic domains.

The sample sizes presented here have not yet been fully tempered by any of these considerations.

Table 3.12: Sample Sizes by Mode of Interview and Stage of Survey Operations

Stage of Survey Operations	Factor	Assuming 200 Effective Interviews in the Rare Cell and a Design Effect of 2.0	Assuming 400 Effective Interviews in the Rare Cell and a Design Effect of 2.0	Assuming 1,565 Effective Interviews in the Rare Cell and a Design Effect of 2.0
RDD Telephone Survey				
Released Telephone Numbers		454,172	908,447	3,553,696
Prefinalized Outside Telephone Center	0.44	199,836	399,717	1,563,626
Released to Telephone Center	0.56	254,336	508,730	1,990,070
Advance Letter Sent	0.60	152,602	305,238	1,194,042
Resolved Telephone Numbers	0.81	367,879	735,842	2,878,494
Working Residential Numbers	0.25	91,970	183,961	719,623
Completed Screening Interviews	0.89	81,853	163,725	640,465
Eligible Households by Census Data	0.0368*	3,012	6,025	23,569
Eligible Households after Allowance for Undercoverage	0.60	1,807	3,615	14,141
Completed Household Interviews	0.82	1,482	2,964	11,596
Eligible Children with Completed Household Interview	1.33	1,971	3,942	15,423
Face-to-face Survey				
Released Address Lines		78,383	156,783	613,315
Advance Letter Sent	1.00	78,383	156,783	613,315
Occupied Housing Units	0.88	68,977	137,969	539,718
Completed Screening Interviews	89	61,390	122,792	480,349
Eligible Households by Census Data	0.0368*	2,259	4,519	17,677
Eligible Households after Allowance for Undercoverage	0.80	1,807	3,615	14,141
Completed Household Interviews	0.82	1,482	2,964	11,596
Eligible Children with Completed Household Interview	1.33	1,971	3,942	15,423
Hybrid Survey				
Released Sample Lines		145,647	291,293	1,139,621
Released Telephone Numbers	0.50	72,823	145,647	569,811
Prefinalized Outside Telephone Center	0.44	32,042	64,085	250,717
Released to Telephone Center	0.56	40,781	81,562	319,094
Advance Letter Sent	0.60	24,469	48,937	191,456
Resolved Telephone Numbers	0.81	58,987	117,974	461,547
Working Residential Numbers	0.25	14,747	29,493	115,387
Released Address Lines	0.50	72,823	145,647	569,811
Advance Letter Sent	1.00	72,823	145,647	569,811

Table 3.12: Sample Sizes by Mode of Interview and Stage of Survey Operations

Stage of Survey Operations	Factor	Assuming 200 Effective Interviews in the Rare Cell and a Design Effect of 2.0	Assuming 400 Effective Interviews in the Rare Cell and a Design Effect of 2.0	Assuming 1,565 Effective Interviews in the Rare Cell and a Design Effect of 2.0
Occupied Housing Units	0.88	64,085	128,169	501,433
Total Housing Units Contacted (Face-to-Face and Telephone)	--	78,831	157,663	616,820
Completed Screening Interviews	0.89	70,160	140,320	548,970
Eligible Households by Census Data	0.0368*	2,582	5,164	20,202
Eligible Households after Allowance for Undercoverage	0.70	1,807	3,615	14,141
Completed Household Interviews	0.82	1,482	2,964	11,596
Eligible Children with Completed Household Interview	1.33	1,971	3,942	15,423

*The eligibility rate is $0.0368 = 0.127 \times 0.290$.

3.9 Sample Size Calculations Taking into Account Oversampling by Low-Income Status

The sample sizes presented in the foregoing section were calculated under the implicit assumption that the households would be selected by a straight proportional or self-weighting sampling design wherein each and every household on AIANAs would be subjected to sampling with a common probability f . While this approach maximizes the precision of estimators corresponding to the total eligible AIAN population, it also leads to a very large sample size because the rare domain that is the main driver of the sample size is so small.

To reduce the overall sample size while preserving the capability of measuring the rare domain, one can consider the use of disproportionate sampling. This method of sampling was introduced in Chapter 2 and discussed in depth in Appendix C in the context of the core sample of the total age-eligible population. The method would operate similarly for the AIAN population on AIANAs.

In brief, each SSU in on-AIANA areas would be partitioned into a high- and low-density stratum. The high-density stratum would be oversampled and the low-density stratum would be undersampled, such that the total sample size affordable under the survey budget would be preserved. Simultaneously, the sampling rates in the two strata, and indeed the cutoff point between the strata, would be determined so that the rare domain would end up with an acceptably

large sample of eligible children and households. In Chapter 2, the stratification was determined by the proportion of low-income households in the area. For the AIAN supplemental sample, the stratification could be determined by either the proportion of low-income households, the proportion of AIAN households, or both. An alternative to stratifying within each SSU would be to stratify at the PSU level prior to the selection of SSUs. Given a fixed overall cost (or sample size), the oversampling strategies outlined here would result in lower precision than the self-weighting sampling strategy for the estimation of parameters of the total eligible population, but would result, greater precision for the estimation of parameters of the rarer analytical domains.

3.10 Recommendations

The foregoing sections offer a number of options for drawing the sample and collecting data from the AIAN population. The first choice point concerns the population to be represented. We have focused on the option of including all AIANAs and no off-AIANA areas. If the Child Care Bureau and OPRE prefer to expand, by including off-AIANA areas, or constrict, by using CCDF grantee areas only, the scope of the study, the calculations and considerations presented in this chapter would require some revision.

Given that OPRE would accept on-AIANA areas as the sampling population, we envision that the sampling design would consist of several certainty strata each corresponding to one of the largest AIANAs or one non-certainty stratum consisting of the smaller AIANAs. The design would entail three stages of sample selection: PSUs, SSUs within PSUs, and households within SSUs. Within the certainty strata, PSUs would consist of tribal tracts or clusters of tracts such that no PSU falls below a minimum size. Within the non-certainty stratum, PSUs would consist of entire AIANAs and clusters of AIANAs such that no PSU falls below the minimum size. The number of PSUs drawn from each stratum would be proportionate to the overall on-AIANA AIAN household population. SSUs or segments would be selected within PSUs and would consist of tribal tracts or clusters of tracts.

Once PSUs and SSUs are selected, another key choice point is reached – namely, how to construct the sampling frame for households within SSUs. There are three main options – telephone-based frame construction, custom listing, and a hybrid frame construction approach. Telephone-based frame construction is by far the least expensive method of frame construction. However, severe under-coverage issues are likely to be encountered due to the lower than average landline telephone penetration in the AIAN population and the higher than average incidence of cell-phone-only households within the AIAN population. These shortcomings are nearly fully

addressed by employing custom listing approach. This method ensures that all households in selected PSUs have a known probability of selection. However, this is the most expensive method of sampling and data collection, because interviewers have to go into the selected PSUs to list and interview. A mid-range option in terms of price is the hybrid listing approach. In this method, lists of addresses within selected SSUs are obtained from commercial vendors. If these lists are adequate (i.e., have a sufficient number of city-style addresses and the number of housing units that the census reports as being in the selected area is in line with the number of housing units on the address list), the list may be used as the sampling frame. A directory-based telephone number search can be performed on the obtained addresses to get telephone numbers that allow for telephone interviewing of matched households. Other households can be interviewed in person or through the mail. In areas where this list is inadequate, a sample-and-go approach may be utilized. This hybrid option addresses many of the under-coverage concerns of pure RDD sampling, but does so at a lower cost than traditional area probability sampling. However, address-based sampling could suffer from a lower coverage rate than does traditional area-probability sampling due to errors that may be present in the commercial address lists.

On balance, considering both quality, population coverage, and cost issues, we currently recommend the hybrid approach as providing the best value for the AIAN supplemental sample.

4. Supply Survey Sampling Design

4.1 Target Population of Providers of Child Care

Options for the choice of target population:

- Providers of early-child care
- Providers of early-child care and providers of care for school-age children.

The supply survey shall cover providers that offer two broad types of care: (a) early-child care and (b) care for school-age children (described to in the remainder of this chapter as after-school care, although before-school care and other regular care times are included). The former provide services to children roughly age 0-5, while the latter provide for children age 6-12. These age ranges are only approximate and child age should not be the determining factor in distinguishing between the two types of providers. In fact, some providers only offer early-child programs, some only offer after-school programs, and some offer both.

For a variety of conceptual and practical reasons, it is difficult to provide a simple and rigorous definition of the target population of providers for the supply survey. Nevertheless, we have agreed to several principles that jointly serve to narrow or clarify what is and what is not in the target population. These principles are

- i. We include providers that offer non-parental supervision to age-eligible children.
- ii. We exclude providers who offer only summer and holiday programs, but include providers who offer care during the school year and may also offer care during other time periods too. For example, summer camps that do not otherwise provide regular care during the school year would be excluded given our definition of the in-scope population.
- iii. We exclude programs that provide only ad-hoc drop-in care. For example, shopping malls, athletic teams, and YMCA open gym programs would be excluded given our definition of the in-scope population.
- iv. We exclude providers of after-school programs that do not operate on a regular schedule of at least three days per week and two hours per day.

v. We exclude single-activity after-school programs. For example, dance lessons or clubs and No Child Left Behind tutoring programs would be excluded given our definition of the in-scope population.

From a practical perspective, we must be able to translate these principles into an explicit sampling frame that exactly or approximately covers the elements of the provider target population. Towards this end, we propose the development of a sampling frame for providers of early-child care in two parts: “listable” providers and “all other” providers. “Listable” providers would include

- Providers listed (through licensing, registration, or other means) by state or county agencies, or in case of AIANAs, tribal governments,
- Head Start programs (including Head Start, Early Head Start, Migrant Head Start, and AIAN Head Start), and
- Pre-kindergarten (Pre-K) programs offered by public or private elementary schools or by community-based organizations pursuant to outsourcing contracts obtained from school districts.

“All other” providers of early-child care would include some elements of family, friends, and neighbors (FFN) and generally any other category of child care that can be identified in a household screening interview designed for the purpose.

After considering various tradeoffs between coverage and practicality, we propose the development of a sampling frame for providers of after-school care in two parts: (i) after-school programs that can be identified by the implementing survey organization through contact with major institutions or organizations that are consistently definable and observable across the several states; and (ii) center-based after-school programs that demand survey respondents are able to nominate for their school-age children.

Additional details of the construction of the sampling frames for early child care and after-school care are explained in the following sections.

4.2 General Approach to the Supply Survey

Options for the choice of provider cluster:

- Provider cluster = PSU selected for the demand survey
- Provider cluster = SSU selected for the demand survey
- Provider cluster = SSU selected for the demand survey plus the ring of census tracts adjacent to the selected SSU

The key objective of the NSCCSD is to facilitate empirical analysis of the supply and demand for child care services in America. To support this objective, the survey's sampling design and analytical plans must be mutually supportive. The foremost dimension of our thinking in this regard is that we want the demand and supply surveys to cover approximately the same child-care markets. In addition, we would like the samples of households and providers to be in reasonably close geographic proximity to one another within the markets. It seems undesirable to employ a sample of households in one area for the demand survey and a sample of providers in a completely different area for the supply survey, such that no household in the sample has any chance of using any of the providers in the sample. To reflect the mobility of the American population, we are also thinking that the *provider clusters* should be as broad as or broader than the *demand clusters*.¹⁶ Because parents may travel beyond the limits of the demand cluster in which they are residents to obtain child-care services for their children, it seems reasonable that provider clusters should be somewhat broader than demand clusters. Our reasoning in that the provider cluster should be broad enough to catch most (perhaps 80 percent or more) of the demand for child care generated by residents of the demand cluster.

Towards these ends, we offer three options for the choice of the provider cluster. First, we could take the PSU selected for the demand survey to be the provider cluster; given this option, the sample of providers would be selected at large from the population of all providers in the PSU. A second option would be to take the SSU selected for the demand survey to be the provider cluster.

¹⁶ We use the term *demand cluster* to signify the sampling unit to be used in the demand survey for the stage of sampling immediately preceding the selection of the households themselves. Similarly, we use *provider cluster* to mean the sampling unit to be used in the supply survey for the stage of sampling immediately preceding the selection of the providers.

Given this option, we would only sample the population of providers physically located within the selected SSUs. A third option, a blend of options one and two, would define the provider cluster to be the selected SSU plus a ring of adjacent census tracts surrounding the selected SSU. A likely possibility, as explained in Chapter 2, is that the SSU itself would be a census tract. Thus, for this option, the provider cluster would consist of the selected census tract plus all census tracts that are adjacent to the selected tract. For the demand survey, the demand clusters (in other words, the SSUs) are nonoverlapping; the population within a PSU is partitioned into nonoverlapping and exhaustive SSUs. But given the third option, the provider clusters would be overlapping. The *selected* provider clusters may or may not overlap one another, depending on the outcome of the random sampling of the SSUs. Yet the provider clusters associated with the population of SSUs would certainly be overlapping. We summarize the pros and cons of the three options in Table 4.1.

In the balance of this report, to facilitate the presentation, we shall assume that the PSU is determined to be the provider cluster. The modifications necessary to support the use of the second and third options will be obvious to all readers.

In parallel with the demand study, we are proposing two samples of providers: a core sample of providers and an AIAN supplementary sample of providers. These two samples will be executed within the PSUs selected for the corresponding demand samples, as described in Chapters 2 and 3 of this report.

We envision establishing three primary provider-type strata, as follows:

- Stratum I – listable providers of early-child care
- Stratum II – all other providers of early-child or after-school care
- Stratum III – listable providers of after-school care for school-age children.

In turn, we envision subdividing Stratum I into three provider-type strata

- Stratum IA – child care centers, family child care homes, and other providers listed by state or county governments or tribal governments
- Stratum IB – Head Start programs (including early Head Start, Migrant Head Start, AIAN Head Start programs) *not* in Stratum IA
- Stratum IC – other public or private pre-K programs *not* in Strata IA and IB;

subdividing Stratum II into two provider-type strata

- Stratum IIA – FFN care *not* included in Strata IA, IB, or IC for children of any eligible age
- Stratum IIB – faith-based programs *not* included in Strata IA, IB, IC , or IIA for children of any eligible age;

and subdividing Stratum III into two provider-type strata

- Stratum IIIA – after school programs located in or sponsored by schools, parks, libraries, Community Development Block Grantees, partner organizations of local United Way chapters, and Statewide Networks *not* included in Strata IA, IB, IC, IIA, or IIB
- Stratum IIIB – center-based programs for after-school care reported via a network sampling approach *not* included in Strata IA, IB, IC, IIA, IIB, or IIIA.

Thus, our overall recommendation is that the sample of providers be selected within seven nonoverlapping sampling strata per selected PSU. The sampling frame within each sampling stratum should consist of the corresponding population of providers physically located within the selected PSU.

In what follows, we will demonstrate how to obtain the sampling frame and an efficient random sample of providers from each of the seven strata. The consolidated sample of all providers in all of the strata will be representative of the national target population of providers.

Table 4.1: Summary of the Pros and Cons of Three Options for the Provider Cluster

Option for the Provider Cluster	Summary of Pros and Cons
PSU	<ul style="list-style-type: none"> ▪ Easy to operationalize the sampling and data collection for the provider survey ▪ Analysis of the resulting data is quite straightforward ▪ In large urban counties, selected households and selected providers may not be as closely aligned as in other options ▪ The county as the provider cluster should catch nearly all of the demand for child care generated by the selected household sample, except possibly for households that may be selected as the borders of the county, if any
SSU	<ul style="list-style-type: none"> ▪ Easy to operationalize the sampling and data collection for the provider survey ▪ Analysis of the resulting data is quite straightforward. ▪ Potentially less expensive to develop the provider sampling frames, because the SSUs are smaller areas than

Table 4.1: Summary of the Pros and Cons of Three Options for the Provider Cluster

Option for the Provider Cluster	Summary of Pros and Cons
SSU plus a Ring of Adjacent Census Tracts	the PSUs; however, the difficult frame building exercise would likely have to span an area larger than the provider cluster, followed by geocoding of the addresses on the emergent frame to the census tract level.
	<ul style="list-style-type: none"> ▪ Selected households and providers may be closely aligned in SSUs that contain a mixture of residential and commercial areas. ▪ Selected households and providers may be misaligned in SSUs that are primarily residential (parents may drive to a neighboring census tract to arrange child-care services); the provider cluster may not catch a substantial proportion of the demand for child care generated by the households in the selected demand cluster. ▪ Somewhat more difficult to operationalize the sampling and data collection for the provider survey. ▪ More complex analysis of the resulting data than the first two options. Appendix O gives the survey weights corresponding to an unbiased estimator. Must determine all adjacency relationships between tracts, using GIS software. ▪ Possibly increased sampling variability vis-à-vis the first two options. ▪ Potentially less expensive to develop the provider sampling frames, because the SSUs are smaller areas than the PSUs; however, the difficult frame building exercise would likely have to span an area larger than the provider cluster, followed by geocoding of the addresses on the emergent frame to the census tract level ▪ The provider cluster should catch nearly all of the demand for child care generated by the selected household sample.

4.3 Details of Sampling in Stratum I

4.3.1 Frame Development

Stratum I, by definition, includes all of the providers of early-child care that can be enumerated on a list and from which a list sample can be taken in a cost effective manner.

In the case of Stratum IA, as an early test of our methods, we have made telephone calls to the appropriate state/county agencies within 16 states and have determined that it is quite feasible to obtain lists of all of the child care providers licensed or registered by these governmental entities. The 16 states were selected to explore a diversity of geographic regions, population sizes,

and policy regimes. In some cases, lists of licensed providers are available on the web. In other cases, agencies are able to deliver via email a computer file containing the list of providers. And in one case, the agency has a paper list of providers and would make it available to the implementing survey organization. Such a list could be procured through a personal visit to the agency, or possibly by mail, and then keyed into a computer database. Because all of the states we contacted would make their list of licensed or registered providers readily available, we conclude that all or nearly all states would do so in the actual implementation of the supply survey. Appendix D gives some notes about the available lists in each of the states we called.

Based on a recent study by the National Association for Regulatory Administration www.nara.affiniscape.com/displaycommon.cfm?an=1&subarticlenbr=104 and the National Child Care Information and Technical Assistance Center, we anticipate that the national population in Stratum IA consists of around 335,000 listable providers. Within these facilities, there are about 9 million child-care slots. The NARA data also indicate a variety of exceptions, for example, some states do not license pre-schools. See Appendix E for a cross-tabulation of state by facility type from the 2005 study. By contrast, the 2005 County Business Patterns (US Bureau of the Census) reports a total of 73,057 establishments engaged in industry NAICS: 624,410 (child day care services), with 800,285 paid employees.

To support the supply survey, the sampling frame for Stratum IA should be constructed anew by the implementing survey organization using the state sources cited in Appendix D. The child care centers, family child care homes, and other listable providers on the list should be geocoded to census geography. An extraction of all listed providers located within the selected PSUs will serve as the final sampling frame for Stratum IA.

Stratum IB consists of Head Start programs, which are essentially profit and nonprofit organizations that receive funds from the Head Start Bureau. Head Start refers generally to programs intended for children age 0-5. There are several specific types of programs, including Head Start, Early Head Start geared for children age 0-3, Migrant Head Start designated for children age 0-5 of migrant and seasonal worker families, and AIAN Head Start addressed to the specific needs of children age 0-5 of this race/ethnicity group. A listing of Head Start programs is available at <http://eclkc.ohs.acf.hhs.gov/hslc/HeadStartOffices>. This link is actually a tool for looking up Head Start programs. We recommend that the implementing survey organization be given access to the computer-readable database of all the Head Start programs in the county that must lie behind this tool. The survey organization should then extract a listing of all programs physically located

within the borders of the selected PSUs. This task would require the geocoding of the locations of the Head Start programs to the census geographies that form the basis for the definition of the study PSUs. It will be necessary to enumerate and geocode the actual physical facilities associated with the various Head Start programs. The resulting listing will constitute the preliminary sampling frame for Stratum IB.

Stratum IC consists of pre-K programs or center-based programs for 3- and 4-year olds. The preliminary sampling frame for this stratum should be assembled in four steps, as follows:

1. Each year the National Center for Education Statistics (NCES) makes available a Common Core of Data (CCD) database of all public schools in America and a Private School Survey (PSS) of private schools in the country. These data bases are available with a lag of approximately two years. The implementing survey organization should download the latest school and school district files from the NCES website at the time of sample selection for the NSCCSD, and should extract schools for which either the low grade is pre-K (i.e., the variable GSLOxx = PK) or the total number of pre-K students equals or exceeds an agreed threshold (e.g., PKxx >= 3). The survey organization should geocode the extracted schools to the census geographies that form the basis for the definition of the study PSUs, and then should select a listing of the schools that are physically located within the selected PSUs. This listing constitutes the initial sampling frame of pre-K programs.
2. The firm Quality Education Data (QED) makes available a database of schools in America. At this writing, their database includes almost 30,000 pre-K programs of the types identified in the following tabulation.

Institution Type	File Type	Count
Building	BIA	9
Building	Catholic	3,906
Building	DOD	113
Building	Private	6,862
Building	Public	18,867
Building	State Dept Ed	222
Total Count		29,979

The implementing survey organization should procure an extract of pre-K programs at the time of sample selection for the NSCCSD, and should geocode the physical locations of the programs to the census geographies that form the basis for the study PSUs.

3. Some districts outsource pre-K programs to community-based organizations. While current statistics are not available on the magnitude of this trend, we believe it is important to make allowances for outsourced programs in the sampling frame for the supply survey. To gain some experience with this matter, we called a few districts in 9 states and inquired about the existence of outsourced pre-K programs. Notes of our calls are summarized in Appendix F. In the actual implementation, the survey organization should use the CCD district file to identify all school districts that are located or partially located within the selected PSUs and should place calls to these districts to solicit their cooperation with the study and to determine a listing of any outsourced pre-K programs they may sponsor. The resulting listings should be geocoded to the census geographies that form the basis for the study PSUs. The implementing survey organization should also look into the web site of the National Institute of Early Education Research (NIEER) to get state-by-state information on enrollment and access (www.nieer.org).
4. The implementing survey organization should then implement a reconciliation process for the CCD/PSS listing, the QED listing, and the community-based listing of pre-K programs. The reconciliation should result in one best merged and unduplicated listing of all pre-K programs located within the selected PSUs, which would constitute the preliminary sampling frame for Stratum IC.

We have just described a final sampling frame for Stratum IA and preliminary sampling frames for Strata IB and IC. For sampling purposes, the three strata (Stratum IA, Stratum IB, and Stratum IC) must be non-overlapping. That is, each given provider should appear in one and only one stratum. Towards this end, we recommend a stepped approach to deduplication, whereby the preliminary sampling frame for Stratum IB should be deduplicated versus the final sampling frame for Stratum IA, and the preliminary sampling frame for Stratum IC should be deduplicated versus the final sampling frames for Strata IA and IB. Matching work must be undertaken to check providers in later strata against providers in earlier strata and to remove any duplicate providers found from the later strata so that a provider exists in one and only one stratum.¹⁷

Note that there could be a great deal of duplication between Head Start programs and the listable providers assigned to Stratum IA. Many community-based centers have Head Start slots,

¹⁷ Deduplication of the sampling strata is required for sampling purposes. Note, however, that for purposes of estimation, the analyst is free to classify providers according to his or her own aims and objectives and to tabulate data accordingly.

such that a subset of their total child roster is in Head Start while the complement is not. Similarly, there could be considerable duplication between pre-K programs and the providers in both Stratum IA and IB. For example, a private nursery school may get pre-K funding for its 4-year-old room. All such duplication must be removed in the process of finalizing the sampling frames for the several strata.

To borrow a term from the world of enterprise or business surveys, we are proposing that the single physical location or “establishment” be the ultimate sampling unit for the supply survey. Throughout this chapter, when we speak of sampling providers, we mean that we are sampling locations or establishments that embody a provider(s) and its programs. A given establishment may have one or more child care programs in operation within its walls, some sponsored by one funding source and some by another, or some aimed at one age group and some designed for another. The survey approach that we are recommending would sample establishments on the sampling frame and then interview each child care program that may reside at the same location. In this way, every location, every provider, and every program in the child-care target population will have a single chance of selection into the supply-survey sample with a known probability of selection.

4.3.2 Sampling Methods

The goal in sampling should be to select providers in such fashion that every provider in the provider-type stratum has essentially the same probability of selection, resulting in a self-weighting sample of providers. Providers may have different probabilities of selection from one provider-type stratum to another, but within a stratum, all probabilities should be nearly the same. If this goal would be achieved, it would ensure that the sampling variance is a minimum for an estimator of a population proportion within a provider-type stratum.

The premise of this goal is that most analyses of the supply survey will be conducted in terms of the population proportion of providers with a certain attribute, or functions of such proportions. Alternatively, if the main analyses would focus on estimating population totals, such as the total revenue of all providers, then the self-weighting sample would not be optimal and instead we should plan the survey to employ some type of probability-proportional-to-size (pps) sampling, if feasible. Yet if a pps sample would be prepared, then it may not be very good for estimating the proportion of providers with a certain attribute and in this case it may be better to shift the principal parameter of interest from the proportion of providers with a certain attribute to the proportion of children cared for by providers with a certain attribute. Such parameters could

be explored later if the main focus of the analysis shifts. Given that population proportions and functions of proportions are currently the main focus of the analysis plan, we will proceed to describe an appropriate self-weighting sampling design.

Let the subscript h index the stratum defined by type of provider, such as Stratum IA, IB, and IC. And let D_{hi} designate the set of providers of type h within the i -th PSU. We take the sets of providers D_{hi} to be the sampling strata for providers.

Based on sample size considerations discussed later together with population sizes available from Appendix E, assume a national sampling fraction, f_h , is established for providers of type h . Let π_i designate the inclusion probability for the i -th PSU. See Section 2.2 of this report concerning the demand survey for details of the probability of selecting PSUs.

We would like to subsample the providers of type h in such a way that they all end up with f_h as their approximate unconditional probability of selection. Towards this end, let $f_{j|hi}$ be the subsampling rate for provider j of type h within PSU i , and define

$$f_{j|hi} = \min(1, f_h / \pi_i).$$

In defining and sampling PSUs, a strong effort should be made to guarantee that $f_h < \pi_i$ for all provider types h and thus that the conditional sampling rates are strictly less than 1.

The implementing survey organization should subsample providers at the rate $f_{j|hi}$ for providers $j \in D_{hi}$. Sampling should be independent from stratum to stratum. The easiest way of executing this method would be to subsample providers within stratum using systematic sampling. One could consider using simple random sampling without replacement, but then one may suffer some slight departures from the established probabilities of selection.

If the subsamples of providers would be specified in the manner described here, then the unconditional probabilities of selection for the providers j would be defined by the product

$$\pi_{hij} = \pi_i f_{j|hi}$$

for all providers $j \in D_{hi}$, for all PSUs i and provider types h . And further, if the critical condition $f_h < \pi_i$ would be achieved for all PSUs, then the unconditional probabilities would equal the constant f_h , as desired.

4.4 Details of Sampling in Stratum II

Options for the household supply survey:

- Use of the same sample of households as used for the demand survey
- Use of a separate sample of households, but selected in the same PSUs and SSUs as the demand survey
- Use of a network or snowball sample of providers

Options for the sample of faith-based programs:

- American Church Lists
- Household survey to nominate faith-based programs

4.4.1 Frame Development

Stratum II includes the category of providers known as “family, friends, and neighbors” (FFN) and the subset of faith-based providers that is *not* included in Stratum I. The providers in Stratum II will typically be more informal by almost any metric than those covered in Stratum I. Because they cannot be subjected to list sampling, we propose that they should be identified and sampled through a household survey mechanism (Stratum IIA) and through an area sample of religious institutions (Stratum IIB). Providers in Stratum II may provide care to children of any eligible age.

The household survey should be nationally representative and could occur in one of two ways. In the first method, we would administer a short screening interview to the selected households to determine whether anyone in the household offers child care services in their home to nonresident children. For example, “Do you (or does anyone in your household) provide care to a child under the age of 13 who is not your child or a child in your legal custody (foster-, step-, or adopted child)?” To exclude employees of child-care facilities, we might add a follow-up screening question such as “Do you (or does that person) provide that care as an employee of a child-care program?” We would then administer the main interview to the households that do self-identify

themselves as providers of child care. All other households would be screened out. The sample of households could be the same sample as used for the demand survey, with the supply survey questions comprising a module within the overall household questionnaire, or could be a separate sample of households selected within the same PSUs and SSUs.

Subsequently, prior to analysis of the resulting data, the sample of providers should be matched to the sampling frame for Stratum I and any duplicates should be removed. While it may seem desirable to eliminate duplicates prior to the main interview so as to reduce respondent burden, the logistics of screening, deduplicating, and then going back for the main interview seem to be nearly unworkable. We would support such an approach only if it could be demonstrated that the approach would not damage response rates. Thus, our default position would be to screen, immediately conduct the main interview for eligible households, and then subsequently conduct deduplication back in the office.

The second method of household sampling would provide a network or snowball sample of providers. The method would use the same sample of households as the demand survey and, among other things, the survey respondents would be asked to report the names and contact information for the providers of child care they use for their own resident children. In turn, we would locate the providers and administer the supply-survey interview to each of them (or to a random subsample of them). We present some details about the network sampling method and its associated method of analysis in Appendix A, including a method for determining sampling weights that result in unbiased estimation of population parameters of interest.

The first of the two methods for the household supply survey runs into sample size problems. We estimate that the prevalence of FFN child care in the population of households is less than 7 percent.¹⁸ Thus, it would require a sample large enough to support 10,000 (20,000) completed demand survey interviews to achieve about 2,500 (5,000) completed interviews with FFN homes. Clearly, this method will require a large and expensive sample. On the other hand, the second of the two methods runs into security concerns and risk of an under-reporting bias. We discussed the second method with the Expert Panel at their meeting in Washington, DC in December 2007 and they strongly advised that parent respondents would be reluctant to identify

¹⁸ Richard Brandon has completed work with FFN care and tells us to expect $\frac{1}{4}$ as many providers of informal care as we have households with eligible children. Because about 27 percent of households have at least one child under age 13, we can expect that about 6.75 percent ($= .27 \times .25 \times 100$ percent) of completed household screening interviews will report FFN status.

the providers of early-child care that they use for their own children. The point is that parents would see this matter as an issue of privacy or security for their children and many or most of them would refuse to reveal the names and contact information for their providers and would even, in some cases, break off the interview. So the choice between the two methods pits sample size (and thus sampling variability) concerns versus child security (and thus under-reporting or response bias) concerns. We believe the security concerns trump the sample size concerns, which in any event can be addressed through adequate funding for the household supply survey. Thus, we recommend the first method of surveying households for the supply survey of Stratum IB and we call this survey the *household supply survey*.¹⁹

If the household supply survey would piggyback, as a module, on the screening sample used for the household demand survey, it would increase respondent burden and risk lowering the response rate and increasing the nonresponse bias for both the household supply and demand surveys. Thus, if cost can be accommodated, a separate household sample similar to the household demand sample should probably be used for the household supply survey.

Note that both methods (i.e., the household supply survey method and network sampling method) have the potential of yielding a biased sample of FFN homes when compliant household respondents are significantly different from noncompliant household respondents with regard to the characteristics of the FFN providers. Furthermore, there is no national frame of FFN providers against which to judge representativeness. Therefore, we recommend that the household supply survey employing the direct screening method be included within the objectives of the field test.

To cover unlisted faith-based child-care programs *not* included in the sampling frames for Stratum I, it would be necessary to establish a sampling frame for them within the selected PSUs. At least two possibilities arise, as follows:

- One could develop a list of religious institutions within the selected PSUs. One would subsample the institutions from the list and these institutions would be screened for the

¹⁹ The experience of the 1990 National Child Care Survey as well as a recent RAND survey (“Prepared to Learn: The Nature and Quality of Early Care and Education for Preschool-Age Children in California”, 2008, Lynn A. Karoly, Bonnie Ghosh-Dastidar, Gail L. Zellman, Michal Perlman, Lynda Fernyhough, RAND report available for download at rand.org) of early-child care in California confirms that cooperation rates and therefore yields of informal care providers can be very low when this method is used. At the same time, we note that the Early Childhood Longitudinal Survey – Birth Cohort has successfully used a network sampling approach to collect data from providers of early-child care to its sample members. We acknowledge that the longitudinal and in-person nature of that survey design likely improves cooperation rates relative to what would be experienced on the NSCCSD.

existence of child-care programs they may sponsor. The main supply-survey interview would be administered to the identified programs.

- One could use a household survey to identify congregations that respondents are members of. In turn, one would screen the resulting churches for the existence of child-care programs they may sponsor, and administer the main supply-survey interview to the identified church programs. This household survey could be the demand survey or a separate household supply survey as described in the foregoing paragraphs.

We believe that an adequate list of churches exists and can be procured from American Church Lists, an InfoUSA company. Thus, we currently favor this option for covering faith-based programs. This list currently includes 380,907 churches on a national basis, including 12,394 institutions affiliated as Jewish, Muslim, Buddhist, or other non-Christian religions. Only a fraction of these churches would be geocoded to the project's PSUs and thus would be eligible to participate in the screening interview. Every church on the list is verified by a telephone call at least once each year by American Church Lists. During the phone verification process American Church Lists adds new information to the list. The list is updated the third Friday of each month with the newly gathered information being added and the entire file is processed through the USPS national change of address system.

The list of churches also identifies schools and children's programs run by the churches. It is not known whether these identifiers would be associated with the presence of a child care program. If it could be demonstrated that they are strongly predictive of a child care program, then it may be possible to sample only the churches that have such schools or children's programs. This approach would save considerable screening costs.

Prior to finalizing the sampling frame for churches, the preliminary list of churches or faith-based programs should be deduplicated against the provider frames developed for Strata IA, IB, IC, and IIA. Because it is unlikely that churches or faith-based programs would overlap Strata IB, IC, and IIA, the main task would be to match the preliminary church list against the sampling frame for Stratum IA and remove any duplicates identified.

4.4.2 Sampling Methods

For the household supply survey, the same general method of sampling should be employed as for the household demand survey, as set forth earlier in Chapter 2. We recommend that self-weighting samples of households be selected within each of two sampling domains: a low-income domain and a high-income domain. Correspondingly, two sampling strata should be established

within each selected SSU, one for each domain. Conditional sampling rates within strata should be determined so that all households in the population in a given domain have the same unconditional probability of selection. As an option, households in the low-income domain may be oversampled relative to those in the high-income domain.

For the faith-based component, if we would use the option of using the list of churches offered by American Church Lists, we would recommend the selection of a self-weighting sample of the churches within the selected PSUs. Given this method, all churches in the population would be sampled with the same unconditional probability of selection.

4.5 Details of Sampling in Stratum III

Options for covering after-school programs:

- Include use of a network sample of center-based providers
- Exclude use of a network sample of center-based providers

Options for weighting and analysis of provider data :

- Provider-level weights and analysis
- Child-level weights and analysis, with provider data incorporated as characteristics of the child

One must clearly determine the scope of after-school programs to be included in the sampling frame for the supply survey. Absent a clear definition, the supply survey would be at risk of covering different populations or types of providers in different parts of the county. Such a patchwork quilt could have undesirable statistical properties. The approach may be satisfactory, though less than perfect, from the perspective of estimating the total number of programs in the country. But it surely would not be satisfactory for comparing areas to one another or types of providers to one another. The superior approach will be to determine a consistent definition of the types of programs to be included in Stratum III and then to implement the definition as consistently as possible across all areas of the country.

The National Household Education Survey (NHES) study of before- and after-school care, for example, includes nonparental arrangements in which children participate before and after school during the school year, including care by relatives and people not related to the child; center- or school-based programs; and scouting, sports, and other extracurricular activities.

However, this study includes “self care,” which may not be appropriate for inclusion in the supply survey.

The National Institute on Out-of-School Time (NIOST) defines out-of-school-time programs as those in which children are regularly enrolled, operated four or more days per week and three or more hours daily.

Our approach is similar though not identical to that of the NHES and NIOST. We propose that a sampling frame for after-school programs should be compiled that conforms to the principles set forth in Section 4.1. Also, we want the sampling frame to be both practical and consistently defined across the several states.

In particular, we propose two methods of frame construction and sampling: (Stratum IIIA) construction of a limited, defined list of providers of after-school care followed by sampling from the list, and (Stratum IIIB) a network sample of such providers generated by the demand survey respondents.

4.5.1 Stratum IIIA. Listable Providers of After-School Care

The supply survey will benefit from a practical and cost-effective method of constructing a list of after-school providers that can be consistently applied across the several states. Towards these ends, we recommend that the list be built up from the following sources:

- Programs sponsored by or located in K-6 schools
- Programs offered by city parks and recreation departments
- Programs offered by libraries
- Programs sponsored by partner organizations of local United Way chapters
- Programs sponsored by Community Development Block Grantees
- Programs identified by Statewide Afterschool Networks (www.statewideafterschoolnetworks.net/).

Lists of programs that meet the criteria of Section 4.1 may be obtained from states (registered or licensed programs), United Way chapters, Department of Housing and Urban Development, and the web site www.statewideafterschoolnetworks.net. In addition, lists of programs may be obtained from schools, parks, and libraries via telephone calls initiated by the implementing survey

organization. Lists should be built for each of the PSUs included in the supply survey. The lists should be deduplicated amongst one another and against the sampling frames for the earlier Strata IA, IB, IC, IIA, and IIB.

There are several advantages to the type of list we are recommending. The set of organizations is defined and relatively finite in number. It is reasonable, practical, and likely cost-effective to obtain complete lists of schools, parks, libraries, CDBGs, and such, and then to obtain from the individual entities the after-school programs they sponsor or offer. It is likely that the entities we have identified for list building offer good absolute coverage of after-school programs. That is, it is likely that these entities cover a substantial percentage of the after-school programs and participating children in the county. It is also likely that the coverage of programs and children would be reasonably comparable from one state to another. We believe the various entities recommended here provide a good balance between practicality, cost, and coverage concerns.

We also considered at some length the possibility of constructing a list of after-school programs from Yellow Pages directories. One could organize a four-step effort along the following lines:

- Obtain all of the Yellow Pages directories within the selected SSUs;
- Identify all headings in the directories that may pertain to or contain after-school care;
- Harvest all of the listings from the directories within each of the identified headings;
- Select a sample of the providers on the resulting list.

We selected Minneapolis/St. Paul as the site of an early test of this method. See Appendix G for a description of what we learned from this test. On the basis of this test and further discussion with child-care experts, we decided to abandon the idea of using Yellow Pages. It is difficult to determine all of the categories of interest within directories, and because of variation in naming conventions, the categories of interest could change from one location to another. One of the experts with whom we talked described some previous successes with the Yellow Pages method, but at great cost. Ultimately, while the method could possibly be made to work, we decided against recommending it on grounds of practicality and cost.

The consolidated and deduplicated listing of after-school programs within selected PSUs would constitute the final sampling frame for Stratum IIIA. Sampling would be conducted using the method set forth in Section 4.3.2 for providers in Stratum IA.

It may be prudent to incorporate a brief screening interview at the front of the main supply-survey interview for the purpose of verifying that the provider respondent actually offers the type of care that we consider in-scope to the survey. It is conceivable that some out-of-scope cases may be selected. It is also possible that a few of the programs will no longer be actively operating by the time of the interview, due to lags in the preparation of the sampling frame. The sampling fractions used in planning the supply survey should be inflated somewhat to account for both of these potential losses.²⁰

4.5.2 Stratum IIIB. Network Sample of Center-Based Providers

Earlier, we discussed and rejected the method of network sampling in connection with early-child care, i.e., Stratum II. Because we have seen this method before, here we will just review its top-line details. The method consists essentially of the following five steps:

- (i) The approach starts with a sample of eligible households, where, as before, “eligible” means that the household contains at least one resident child age < 13. The sample of households used in the demand survey is a potential vehicle for this work, but one might want to consider use of a separate sample of households. The current plans for the questionnaire for the household interview call for asking the respondent to report the names and contact information for all center-based after-school programs used by each of the household’s age eligible children.²¹ The questionnaire module should also seek information on one or more auxiliary variables or covariates, such as total children in the program or the total fees paid to the program during a defined reference period. The auxiliary variables will be used later to prepare weights at the analysis stage. Some covariates may be more difficult or error-prone to collect than others, and this factor should be considered in determining which one(s) to collect.
- (ii) Following the household interviews, the implementing survey organization would merge the lists of center-based after-school programs and deduplicate the resulting list, both within itself and against the frames for Strata IA, IB, IC, IIA, IIB, and IIIA. There might be substantial overlap between the current and earlier lists, even though the

²⁰ For the field test, we are proposing to check the eligibility of all identified after-school programs, with the intent that we would then have information about whether or not that would be necessary for the main study or whether an inflation factor would be adequate.

²¹ If this additional module would result in a lower rate of response when added to the sample for the demand survey, then the option of a separate sample of households would likely be the superior approach.

earlier lists were for early-child care while the current list is for the care for school-age children. A deduplication of lists is warranted and only unique programs not on previous lists should progress to step (iii). We understand that it is common for a facility to provide care for more than one age group and that some offer both early-child and after-school care. This situation speaks to the importance of deduplicating the current list against previous lists so that every program exists in one and only one sampling stratum. To control costs, it may be necessary to draw a subsample of after-school programs before proceeding to the main provider interviews. If the sample size and cost of interviewing is not excessive, then the entire list of programs emerging from Step (ii) could proceed to interviewing operations.

- (iii) Each of the after-school programs that have been forwarded to this step shall be interviewed using the center-based provider questionnaire. The questionnaire must include a request for an auxiliary variable, the *x*-variable. This variable is required to enable estimation to occur -- to enable inferences to be made to the population of after-school programs. The variable is the same as the one specified in Step (i) above. There, *x* is reported by the household, while here it is reported by the program.
- (iv) The analysis of the data on after-school programs can be conducted along two lines, depending on the choice of the unit of analysis.
 - a. First, inferences can be made to the population of after-school programs. The program is the unit of analysis and program level sampling weights are required for the analysis. Appendix A describes the method for construction of the program-level weights. The *x*-variable described in Steps (i) and (iii) is required for the calculation of these weights.
 - b. Second, inferences can be made to the population of school-age children. The eligible child is the unit of analysis and child level sampling weights are required for the analysis. The weights would be derived using the methods proposed in Section 2 for the demand survey. The *x*-variable would not be required for weighting as it would be for a program-level analysis, and indeed the variable could be removed from the various household and provider questionnaires if it would be of no other use. The variables collected in the provider interview in Step (iii) would be attached to the child records and would be viewed as characteristics of the child. In this manner, the data set would describe the after-school environment of the sample child. Inferences in this line of work would be made to the population of eligible children.

If OPRE would determine that only one of these two lines of analysis meets their scientific and programmatic needs, then all planning and execution for the supply survey could proceed on that basis. Otherwise, if the sponsors would foresee the possibility of both types of analysis, then both capabilities should be built.

4.5.3 Feasibility of the Methods for Listing Out-of-School Time Programs

We have concerns about the effectiveness of the network sampling method for providers of early-child care due to our judgment that it would meet serious resistance among household respondents and ultimately excessive household nonresponse. Our view is that household respondents would not know or want to report the names and locations of the providers of early-child care for their young children age < 6. We have similar but more limited concerns for the network sampling of after-school programs. Our judgment is that the method would not meet as much resistance among household respondents, both because the children in question are somewhat older, say age ≥ 6 , and use of the method would be restricted to the identification of the larger, more formal, center-based programs. We would not recommend the method for the informal sector even for the older children.

Despite our judgment that the method should work for center-based programs for the older children, it is undeniable that respondents' actual willingness to report their after-school programs would be critical to the success of the survey and that there is enough uncertainty about their actual willingness that the matter rises to a level requiring pretesting. We also have a concern that household respondents may not have knowledge of the information we request, such as the street address and name of the after-school programs. The network sampling method should be examined in the field test to give the implementing survey organization a better handle on the degree of resistance and lack of knowledge exhibited by household respondents.

The method of listing out-of-school-time programs, using schools, libraries, parks, and so on, entails some difficulties and expense. It too rises to a level requiring pretesting. The method of listing programs should be examined in the field test.

The field test, then, is the vehicle to settle the various open questions about the development of sampling frames for Strata IIIA and IIIB.

4.6 Mode of Data Collection

Options for mode of data collection:

- Face-to-face interviewing
- Mail survey
- Computer Assisted Telephone Interviewing (CATI) survey
- Mixed-mode survey

There are trade-offs to be considered regarding the mode of data collection for the supply survey. For example, one could collect the data through face-to-face interviews conducted by field staff. Such interviews could be done using paper-and-pencil instruments or in CAPI mode. These options have the advantage of providing more complete data with higher response rates than other methods, but they are resource intensive and costly.

Data could be collected using CATI interviews and a centrally located interviewing staff. This mode limits access only to respondents for whom a telephone number has been obtained. With the increasing prevalence of cell telephones, it is possible that a few home-based providers may only have a cell telephone and thus that the interview attempt would have to be made through this telephone. Most center-based providers should have a landline telephone where they can be reached. The centralization of the interviewing staff brings opportunities for careful training of interviewers, monitoring of interviewers by supervisors, and other quality assurance measures that may promote the general quality of the survey data. Cost is another important consideration. While telephone interviews conducted in a CATI system will generally be less costly than face-to-face interviews conducted using a paper instrument, there is a greater “start-up” cost to developing the questionnaire instruments in an appropriate form programmed for computer assistance.

Mail offers yet another option for data collection. While this mode has the advantage of more cost effective distribution of materials, it has a number of disadvantages. The method has a tendency to produce considerably lower response rates. Sometimes the low rates may be due to inaccuracy of contact information. Other times they may be due to the ease of ignoring the request for data in the absence of an interviewer or direct contact by a staff person. Additionally, data collected in this mode are more prone to errors caused by problems in the entry and preparation of the data received, which must be processed manually after receipt of the questionnaire instruments.

On balance, we recommend the CATI option for the supply survey as the best compromise between resource requirements/cost and data quality/usefulness. We recommend the data-collection agent have some exposure to conducting interviews via cell telephone, in case this method would be needed. At this writing, the questionnaires for the NSCCSD are still being developed. Despite the generally broad and effective use of CATI interviewing in the general survey research industry across a range of survey topics, there are some types of establishment data, particularly related to organizational finances, which are still more effectively collected through in-person data collection. Respondents in the supply survey may require high levels of interviewer assistance and may be more prone to breaking off interviews than respondents in other surveys, necessitating the more personal approach of a face-to-face visit. If the emergent questionnaires for the supply survey are deemed to be sufficiently complex that CATI interviewing will not suffice for all respondents, then our recommendation for CATI data collection may have to be reversed, at least for some subset of the overall provider sample.

We note that an additional alternative is to plan for a mixed-mode collection of provider data. Although there are increased fixed costs to providing for different modes of data collection, it may be that a mail/CATI or mail/web/CATI combination of modes would provide the greatest flexibility for providers and the highest response rates for the supply survey as a whole. There are of course mode-effect concerns associated with administering a questionnaire in different modes, but those may be less severe for the types of factual data proposed for the provider survey, and many effective questionnaire design techniques have been developed for mixed-mode implementation. In any event, the potential of higher response rates may trump the risk of mode-effects.

4.7 Child-Care Slots

Options for measuring slots:

- Double or two-phase universe sampling as a strategy for collecting data on child-care slots
- Single-phase universe sampling for slots
- Regular multistage sampling for slots

The information from the sampling frame for providers may be of importance in the analysis of the NSCCSD data. It may, for example, be very useful to tabulate on a census basis how many providers there are of varying types within the study PSUs. Similarly, it may be important to

tabulate the number of child-care slots there are on a universe basis within the study PSUs. More broadly, there may be a highly critical but small set of other characteristics of providers that should be known for all providers, but probably not more than half a dozen such characteristics.

A brief questionnaire could be developed to collect the critical items described here. The questionnaire could be delivered by mail with telephone followup for nonresponse. The resulting information could be added to the sampling frame for providers, and the sampling frame itself could be seen to be one of the key analytical deliverables for the NSCCSD.

Single-phase universe sampling for slots (and the short list of other critical variables) would entail contacting all providers on the sampling frame within each of the study's PSUs. Because it would likely be too expensive to administer the brief questionnaire to all providers in all PSUs, one might consider the option of using a special double-sampling or two-phase universe sampling scheme. Such sampling would entail the selection of a subsample of PSUs from the study PSUs. Then, one would contact and attempt to administer the short questionnaire to all of the providers within the second-phase sample of PSUs.

The double sampling would be less expensive than the single-phase universe sample, because it would collect information only within the subsample of PSUs. On the other hand, the information collected by the double sample would be subject to a greater sampling variability.

Of course, collecting data on a universe basis from any set of PSUs may be viewed as too expensive or of insufficient value to justify the cost. In this event, one would collect slots and the other critical items only in the main provider interview, administered to providers selected within the provider clusters, selected within the study PSUs.

4.8 Sample Size Considerations

Options for the sample size are presented here, depending on factors such as :

- Analytical domains that are to be directly estimated
- Size of differences to be measured between analytical domains
- Cost

Initial sample size considerations are set forth in Table 2.12, which for convenience we reproduce here as Table 4.2.

Table 4.2: Effective and Nominal Sample Sizes Per Cell

Row Number	DEFF	.8 Power to Detect a Difference Between				
		.5 and .52	.5 and .54	.5 and .55	.5 and .56	.50 and .60
1	Effective Sample Size (Assuming DEFF=1)	9,806	2,448	1,565	1,086	388
2	Nominal Sample Size (Assuming DEFF=2)	19,612	4,896	3,130	2,172	776
3	Nominal sample Size (Assuming DEFF=4)	39,224	9,792	6,260	4,344	1,552

An effective sample size of 1,565 providers in each of two analytic cells would be required to detect the difference between a proportion of 0.5 in the reference cell and 0.55 in the alternative cell. To detect a smaller difference, a larger sample size would be required. In fact to detect the difference between a proportion of 0.5 and 0.52, an effective sample size of almost 10,000 providers would be required in each of the two cells. These effective sample sizes translate into nominal sample sizes, or actual completed interviews, using the concept of the design effect (DEFF)²². Table 4.2 gives nominal sample sizes for DEFF = 2 and 4. For example, given a DEFF = 2, 1,565 effective completes translates into a nominal sample size of 3,130 completed interviews. Again, this is the sample size per cell. As always, these sample sizes would provide greater power to detect differences for reference proportions both greater or less than 0.5.

²² DEFF is a measure of the departure of the sampling design from simple random sampling. Values greater than 1.0 signify that the sampling variance of the estimator is greater under the actual sampling design than it would be given simple random sampling, while values less than 1.0 indicate that the sampling variance is smaller than it would be given simple random sampling. Values greater than 1.0 are typical in social-science surveys, where the DEFF typically arises due to clustering and weighting effects.

Nominal sample sizes must be inflated to account for various sample losses that will inevitably occur during the supply survey data-collection process. Table 4.3 illustrates the inflation of the sample size, given a set of assumptions regarding the extent of the losses.

Table 4.3: Sample Sizes per Cell for the Supply Survey by Stage of Survey Operations and by the Assumed Difference to be Detected

Stage of Survey Operations	Rate	Assumed Difference to be Detected				
		.50 and .52	.50 and .54	.50 and .55	.50 and .56	.50 and .60
Released Sample Size		32,687	8,160	5,217	3,620	1,293
Unable to Locate	0.20	6,537	1,632	1,044	724	259
Locatable	0.80	26,149	6,528	4,173	2,896	1,035
Nominal Sample Size (Completed Interviews)	0.75	19,612	4,896	3,130	2,172	776
Effective Sample Size	2.00	9,806	2,448	1,565	1,086	388

In this table we assume that we will locate only 80 percent of the released sample of providers. The remainder will have gone out of business or moved, leaving no forwarding address. We also assume a 75 percent interview completion rate and a DEFF of 2.0. For example, to achieve an effective sample of 1,565 providers per cell, we would have to release a sample of 5,217 providers and complete 3,130 interviews per cell.

The interview completion rate applies to the cases that are located. A lower interview completion rate, lower locatable rate, or higher DEFF would imply a larger sample size than that displayed here. Conversely a higher interview completion rate, higher locatable rate, or lower DEFF would imply a smaller sample size.

The foregoing tables give illustrative sample sizes for each analytic cell or domain. If there would be only two domains of interest in the supply survey, the total sample sizes would simply be twice those displayed in Table 4.3. If there would be $p > 2$ nonoverlapping domains of interest, the total sample sizes would be p times those in Table 4.3.

Given the goals of the NSCCSD, we may expect that separate supply-side estimates will be required for at least the following analytical domains:

Type of Child-Care Program

- Center-based programs for early-child care

- Family child-care (FCC) homes for early-child care
- Head Start programs
- Pre-K programs
- FFN homes for early child care
- Faith-based programs for early child care
- School-based programs for after-school care of school-age children
- Other programs for after-school care of school-age children
- Informal care of school-age children

Census Region

- Northeast
- Midwest
- South
- West.

Percent of Clients Who are Low Income

- <= 25 percent
- > 25 percent and <= 50 percent
- > 50 percent and <= 75 percent
- >75 percent.

Some of the domains listed above are overlapping and the overlaps would have to be quantified and accounted for in the sample selection operation.

Supply-side estimates may also be considered for cross-classified domains such as those implied in the following diagram:

Type of Care		Metropolitan Area Status	
		MSA	Non-MSA
Early-Child Care	Center-Based Care		
	FCC Homes		
	Other Care		
After-School Care	School-Based Care		
	FCC Homes		
	Other Care		

One is quick to observe how the number of estimation domains, and thus the required sample size, can multiply in a cross-classification. In the face of budget constraints, a strategy for reducing the overall sample size requirements would be to require full sample sizes for each of the margins of the cross-classification and reduced sample sizes, and thus lower power for detecting differences, in each of the interior cells of the cross-classification.

As a specific illustration of sample sizes, let us consider the foregoing cross-classification as the driver of a possible sample scenario. The diagram includes 12 estimation cells. If one wanted to detect the difference between the proportions 0.5 and 0.55 in any two cells, then 37,560 ($=12 \times 3,130$) completed interviews would be required and the overall released sample would require 62,604 ($= 12 \times 5,217$) providers.

Given the emphasis of the NSCCSD on the low-income population, it is also important to design the supply survey in such a way that it permits analysts to study the extent to which there is an adequate supply of child-care services for this population. Given the scenario outlined in the prior paragraph, the supply survey would include 6,260 completed interviews for centers and 6,260 completed interviews for FCC homes. How many of these providers would we expect to provide services to the low-income population? We can examine this question using Appendix M, which recites statistics from the National Study of Child Care for Low-Income Families. Tables M.1-M.11 show the distributions across counties of the percentage of providers that accept subsidies and of the percentage of providers that make themselves accessible to low-income families and children. From these data, we can make rough estimates of the number of completed interviews that can be expected in the supply survey. Our estimates appear in Table 4.4. For example, in a national sample of 6,260 centers, we might expect to complete interviews with 2,535 centers that accept subsidies, 1,690 of which would be located in low-income communities. We might expect up to 3,500 centers that charge monthly rates at or below the state subsidy rate, with around 2,200 of these in low-income communities.

Turning now to FFN homes, if separate tabulations would be required for them, then, as observed earlier, a substantial screening sample of households would be required. Given the low prevalence of households that offer informal care, we have estimated that it may require a screening sample of at least 46,370 households to yield a sample of 3,130 FFN providers, even if all households responded.²³ Furthermore, if the response rate (incorporating both screening and

²³ 3,130 FFN providers = 6.75 percent of 46,370 households.

interview completion rates) would be as low as 75 percent, the sampling requirement rises to 61,827 households. And if the vacancy rate would be 12 percent, the sampling requirement rises to 70,258 selected addresses.

To complete our hypothetical scenario, if the supply survey would be selected in 800 SSUs and if it would include a released sample of 62,604 providers and a screening sample of 70,258 residential addresses, then it would include, on average, 78 providers and 88 housing units per SSU. It would complete, on average, 47 provider interviews and 4 FFN interviews per SSU.

Trade-offs may need to be made between cost and the statistical power to analyze differences. As the actual implementation of the NSCCSD approaches, we recommend that key determinants of the sample size be re-evaluated in light of the then current circumstances. The target sample sizes can be finalized at that time using an eight-step process:

1. Specify a reasonably small set of key comparisons that should be made in the final analysis of the survey data, which the sampling design must support. These comparisons should address the most important questions that OPRE and other analysts seek to answer using the supply survey data. For example, the comparisons could be specified through use of a table like the one above that crosses type of provider by metro status. The specified set of key comparisons will become the driver of the calculation of the initial sample size. Yet it is important to recognize that analysis will not be restricted to the set of key comparisons. Other analysis of the survey data will be possible too. But the sample sizes for other analyses will not be controlled specifically.
2. Specify the size of the differences that must be detected among the key comparisons and use Table 4.2 to determine the number of completed interviews required per cell. For example, to detect a 5 percentage point difference between two key cells requires 3,130 completed interviews in each of the cells.
3. Add up the required numbers of completed interviews over all of the cells that participate among the key comparisons.
4. Determine final assumptions about the rates of completion likely to be achieved in the supply survey. The field test, among other sources, should be consulted in making this determination.

5. Determine the size of the sample to be released in each of the cells, using the method of Table 4.3. For example, if one assumes that 80 percent of providers can be located, that 75 percent would respond to the survey interview, and that 3,130 completed interviews are required in the cell, then a sample of 5,217 providers should be selected and released for interviewing operations in the cell.
6. Add up the required numbers of selected and released providers over all of the cells that participate among the key comparisons. This completes the calculation of the initial sample size.
7. Determine budgetary and other practical constraints on the sample size and sampling design. If the initial sample size fits within all of the main constraints, then stop. The initial sample size can be declared final.
8. If the sample size violates some of the main constraints, then go back to Steps 1-6, modify assumptions, and iterate until none of the main assumptions are violated. The sample size can be declared final once it meets all main constraints.

The methods of sampling proposed in the foregoing sections carry the implication that all providers within a provider-type stratum will be subjected to sampling at the same rate. Depending on sample and population sizes, however, the sampling rates may vary from stratum to stratum.

Hypothetically, it would be possible to reorder the strata or otherwise reconfigure the nonoverlapping strata in the event that the currently proposed configuration of strata would lead to unacceptable differences in the probabilities of selection for certain types of programs. For example, Head Start programs that may appear in Stratum IA would be sampled at the rate designated for that stratum, while all other Head Start programs listed in Stratum IB would be sampled at the possibly different rate designated for that stratum. As another example, one can see that pre-K programs may be sampled at potentially different rates depending on whether they are listed in Stratum IA or IC. Notwithstanding the potentially different rates by stratum, the methods of sampling proposed here provide for fully representative samples of the various types of providers and for unbiased estimation of provider statistics. Weighting will be required in survey estimation to account for the potentially different probabilities of selection by stratum.

Finally, we note that sample size considerations similar to those discussed in this section will apply to the AIAN supplemental sample of providers. It will be necessary to identify and

deduplicate the overlapping provider sampling frames, if any, that may arise in the event the PSUs and SSUs for the core and AIAN samples either fully or partially overlap.

Table 4.4: Estimated Number of Completed Interviews of Centers and FCC Homes that Accept Subsidies or Provide Services to Low-Income Households, Assuming a Nationwide Sample of 6,260 Centers and 6,260 FCC Homes

Provider Attribute	Estimated Prevalence of Providers with the Given Attribute in Low-Income Communities (%)*	Estimated Completed Interviews of Providers with the Given Attribute in Low-Income Communities[#]	Estimated Completed Interviews of Providers with the Given Attribute in the Nation[†]
Accept Subsidies			
Licensed and License-Exempt Centers that Accept Subsidies	54	1,690	2,535
Licensed and License-Exempt Centers that Accept Subsidies or Operate Head Start or Operate Pre-K	62	1,941	2,911
Regulated FCC Homes that Accept Subsidies	72	2,254	3,380
Rates Accessible to Low-Income Families			
Licensed and License-Exempt Centers for which Pre-School Rates are Within 12% of 85% of State Median Income	25	783	1,174
Regulated FCC Homes for which Pre-School Rates are Within 12% of 85% of State Median Income	29	908	1,362
Rates Accessible to Families using Subsidies			
Licensed and License-Exempt Centers for which Age 12-Month Rates are at or Below the State Subsidy Rate	73	2,285	3,427
Licensed and License-Exempt Centers for which Age 4-Year Rates are at or Below the State Subsidy Rate	70	2,191	3,287
Licensed and License-Exempt Centers for which Age 7-Year Rates are at or Below the State Subsidy Rate	75	2,348	3,521
Regulated FCC Homes for which Age 12-Month Rates are at or Below the State Subsidy Rate	75	2,348	3,521
Regulated FCC Homes for which Age 4-Year Rates are at or Below the State Subsidy Rate	74	2,316	3,474
Regulated FCC Homes for which Age 7-Year Rates are at or Below the State Subsidy Rate	73	2,285	3,427

*Assumes the rates presented in Tables M.1-M.11, which are based upon the National Study of Child Care for Low-Income Families; assumes that each of 25 study communities are approximately of equal population size.

[#]Assumes that approximately half of the supply-survey sample is taken in low-income communities.

[†]Assumes that half of the supply survey experiences prevalence rates approximately of the magnitude seen in the National Study of Child Care for low-Income Families, and that the other half of the supply survey experiences prevalence rates approximately one-half this size.

4.9 Summary of Design for the Provider Survey

Table 4.5 provides a summary of the key sampling strata proposed for the supply survey and an indication of the coverage of programs by age of child. At a glance, one can find the main features of the sampling design in this table. Please note that, by construction, the seven provider strata are nonoverlapping. The strata jointly span all of the providers in the target population and each provider appears in one and only one stratum. At the estimation stage, analysts will have discretion to re-classify providers in other ways that meet their own analytical objectives.

The demand-survey PSUs would be employed for the supply survey, thus clustering both surveys within the same sample of counties. The supply survey would be selected within provider clusters, where these may be the PSUs themselves, the demand-survey SSUs, or the SSU together with a surrounding ring of census tracts.

A sampling frame for providers would be developed within the selected provider clusters, stratified as set forth in Table 4.4. In building the sampling frame, we would want to cast the net for providers beyond the borders of the provider cluster and then geocode the listed providers as to physical location either within the provider cluster or outside the provider cluster. By casting the net wider than the provider cluster, one avoids or minimizes erroneously missing providers. Indeed it may be desirable to make the sampling frame cover the entire PSU, even if it would be decided to limit the provider cluster to the SSU or the SSU and its surrounding ring.

At the last stage of sampling, we would obtain a stratified sample of providers from the sampling frame.

Table 4.5: Summary Description of the Design for the Supply Survey by Sampling Stratum

Provider Stratum	Type of Providers Covered	Coverage of Programs	
		Programs for Children Age 0-5	Programs for School-Age Children Age 6-12
IA	Providers of early-child care listed by county, state, or tribal governments	Yes	Yes
IB	Head Start programs	Yes	No
IC	Pre-K programs affiliated with elementary schools that appear in the Common Core of Data, the Private School Survey, or the Quality Education Data database	Yes	No
IIA	“Family, friends and neighbors” screened-in through a household survey	Yes	Yes
IIB	Faith-based programs	Yes	Yes
IIIA	After-school programs for school-age children run by schools, libraries, parks, United Way affiliates, Statewide Networks, and Community Block Development Grantees	No	Yes
IIIB	Center-based providers of after-school care for school age-children reported by demand-survey respondents using a network sampling approach	No	Yes

Appendix A. Weighting for a Network Sample of Out-of-School Time Programs

A.1 Introduction

Consider the population of providers that are not on the administrative list used for sampling providers. For example, this population may include out-of-school time programs of various kinds for school age children. A method of network sampling offers one potential means of obtaining a probability sample of unlisted providers and of making inferences to the population. At the end of the appendix, we discuss some important limitations of the method.

Let \mathcal{U}^{UP} denote this population of unlisted providers. Let Y_i be the value of a provider variable of interest for the i -th provider in the population. The goal is to develop an unbiased estimator of the total

$$Y^{UP} = \sum_{i \in \mathcal{U}^{UP}} Y_i.$$

Most other parameters of the population can be estimated as functions of estimated totals.

A.2 Sampling

To begin, we turn to the population of eligible children, which we denote by \mathcal{U}^C . We assume that a probability sample s^C of eligible children is selected, using a multi-stage sample of households, with interviews of knowledgeable parents (or other adult guardians). Ineligible households, i.e., those not containing any eligible children, are screened out. We use the sample of children to generate a sample of providers, using a method of network sampling.

In the interview, the parent is asked questions about each of their eligible, resident children and, in particular, is asked to nominate all of the child's providers during a defined period of time, such as the most recent quarter or the last six months. The parent may also be asked for a piece of auxiliary information for each provider. More on this later.

The consolidated sample s^P of all nominated providers for all children in s^C would be matched to the population of listed providers \mathcal{U}^{LP} . We assume that a separate sample of listed

providers has already been selected to represent \mathcal{U}^{LP} . Thus, all nominated providers matching \mathcal{U}^{LP} , say s^{LP} , are not needed and may be set aside. All remaining providers, nominated and nonmatching to \mathcal{U}^{LP} , are needed and constitute the network sample of unlisted providers, s^{UP} . Note that $s^P = s^{LP} \cup s^{UP}$.

We observe that s^{UP} is a probability sample of providers that represents the unlisted population \mathcal{U}^{UP} . However, providers are not taken into this sample with equal probabilities. Larger unlisted providers have a greater probability of being selected into s^{UP} than do smaller unlisted providers. Survey weighting is needed to correct for these unequal probabilities and to reveal an unbiased estimator of the provider total Y^{UP} .

A.3 Weighting

We begin with the child weights. From there, we will work to solve the problem of the provider weights.

Let $\{W_j\}$ be the set of survey weights for children j in the sample s^C . If Z_j is a variable of interest for the demand survey, then we assume that the weights are constructed such that

$$\hat{Z}^C = \sum_{j \in s^C} W_j Z_j$$

is an unbiased estimator of the population total

$$Z^C = \sum_{j \in \mathcal{U}^C} Z_j .$$

While the details of the child weights are not central to our current discussion, we note that, in practice, the weights will reflect known probabilities of selection in the demand survey, adjustments for nonresponse to the screening and main interviews, and possible calibration to population control totals.

Let X_{ji} be the value of an auxiliary variable relating to the use of provider i by child j , and let the total over all children

$$X_{+i} = \sum_{j \in C} X_{ji}$$

be known. In the simplest instance, we might take

$$X_{ji} = 1, \text{ if child } j \text{ used provider } i \text{ in the defined reference period} \\ = 0, \text{ otherwise.}$$

Another possibility is to define X_{ji} to be the total expenditure by child j on provider i within the defined reference period, such as the most recent quarter or the last six months. The value of X_{ji} would be reported in the parent interview. The indicator variable would be a mere by product of the process of nominating providers, while the expenditures variable would have to be collected via a new question in the parent interview.

In the first instance, X_{+i} is the provider's total number of customers and in the second instance it is the provider's total revenue due to customer-paid fees for child care services. The assumption that X_{+i} is known for each provider $i \in S^{UP}$ is key to the following developments. The current methods assume that there is to be a supply survey of all providers or a subsample of providers in S^{UP} . To satisfy the key assumption, the provider interview must include the question(s) necessary to establish the value of X_{+i} .

Now define the new value

$$Z_{ji} = \frac{X_{ji}}{X_{+i}} Y_i$$

for the j -th child, which is the child's share if Y_i , and note that

$$\sum_{j \in C} Z_{ji} = Y_i .$$

Some modifications may be necessary in the event $X_{+i} = 0$, i.e., the provider has no customer-paid fees. For present purposes, we assume $X_{+i} > 0$ for all providers. The new z -variable allows us to write the provider value Y_i as a population total over children. Because we already know how to estimate totals over the population of children, it will be an easy matter to devise an estimator for the population total over providers.

Our goal is to estimate the provider total, which we can write as

$$\begin{aligned}
 Y^{UP} &= \sum_{t \in UP} Y_t \\
 &= \sum_{t \in UP} \sum_{j \in UC} Z_{jt} \\
 &= \sum_{j \in UC} Z_{j+},
 \end{aligned} \tag{A.1}$$

where

$$Z_{j+} = \sum_{t \in UP} Z_{jt}.$$

Equation A.1 demonstrates the duality of the problems of estimating a provider total and of estimating a child total. By assumption, the child weights give an unbiased estimator of a child total. Thus, an unbiased estimator of the provider total is given by

$$\begin{aligned}
 \hat{Y}^{UP} &= \sum_{j \in UC} W_j Z_{j+} \\
 &= \sum_{j \in UC} W_j \sum_{t \in UP} Z_{jt}.
 \end{aligned} \tag{A.2}$$

Because we will be working only with providers used by the children in the sample and $Z_{jt} = 0$ for any provider t not used by child j , it follows that

$$\begin{aligned}
 \hat{Y}^{UP} &= \sum_{j \in UC} \sum_{t \in UP} W_j \frac{X_{jt}}{X_{+t}} Y_t \\
 &= \sum_{t \in UP} W_t^{UP} Y_t
 \end{aligned} \tag{A.3}$$

where the new provider weights

$$W_i^{UP} = \sum_{j \in s_i^C} W_j \frac{X_{ji}}{X_{+i}}, \quad (A.4)$$

for $i \in s^{UP}$, give the unbiased estimator of the provider total Y^{UP} .

The provider weights may also be written as

$$W_i^{UP} = \sum_{j \in s_i^C} W_j \frac{X_{ji}}{X_{+i}}, \quad (A.5)$$

where $s_i^C \subset s^C$ is the subsample of children who used the i -th provider. If the auxiliary measure X_{ji} is essentially a constant such that $X_{ji} = X_{+i}$ for all children who used the i -th provider, then the provider weights are reduced to

$$W_i^{UP} = N_i^{-1} \sum_{j \in s_i^C} W_j$$

for $i \in s^{UP}$, where N_i is the number of children in the population who used provider i .

A.4 Limitations

Two practical difficulties obstruct the implementation of the method of network sampling and weighting described in this appendix. Both would have to be solved successfully through pretesting before we would be willing to recommend use of the method in a main study.

- (i) Parent respondents in the demand survey would have to nominate their child(ren)'s providers and furnish complete and accurate provider name and contact information. The information is needed to enable the supply survey of providers and to conduct the match of the nominated providers to the listed population U^{UP} . Due to security concerns some parents may be unwilling to nominate certain types of providers, thus lowering the surveys' response rates, increasing costs, and raising the risk of nonresponse bias.
- (ii) Parent respondents in the demand survey would have to report the auxiliary measure X_{ji} for each of the providers they nominate for each child, and provider

respondents in the supply survey would have to report their total $\sum_{i=1}^n x_{it}$. Circumstances will vary depending upon the nature of the x -variable. If x is the indicator variable, the provider respondent would have to report their count of customers in the reference period. If x is expenditures for childcare services on behalf of the given child, then the provider respondent would have to report their total revenue due to customer-paid fees. If x is hours of childcare services for the given child, then the provider would have to report their total hours over all of their customers. The feasibility of implementing the various x -variables will depend, in part, on the record keeping practices of providers. On the supply side, standard business practices, including the need to file tax returns, suggest that revenue may be the more feasible x -variable to implement. But then one wonders whether it is feasible for parents to report expenditures, at least approximately.

Appendix B. Optimum Allocation to Two Strata: One High and the Other Low Density in the Rare Population

B.1 Introduction

Consider the problem of screening for and interviewing members of a rare population, such as the AIAN population. The sampling frame is divided into $L = 2$ areal strata based upon advance estimates of the density of the rare population (“density” means the rare population as a proportion of the total population on the sampling frame) in the respective strata. An attractive idea, which we now explore, is to over-sample the high-density stratum.

B.2 Optimum Allocation to Two Strata

Let d_0 be a cut point and define the high-density stratum, labeled stratum $h = 1$, to be all tracts for which the density of the rare population is at least d_0 . All remaining tracts constitute the low-density stratum, $h = 2$. Over all tracts, let P_1 and P_2 be the densities in the high and low strata, respectively, and let P be the density in the total sampling frame.

As usual, let the population and sample sizes be N and n , respectively. N_h and n_h are the population and sample sizes in stratum $h = 1, 2$. Our goal is to determine the optimum sampling fractions $f_h = n_h/N_h$ that minimize the sampling variance of an estimated population mean subject to the constraint on survey cost

$$c^0 + \sum_{h=1}^2 \{c^1 m_h + c^2 (n_h - m_h)\} \leq B,$$

where c^0 represents all fixed costs; m_h is the number of completed main interviews of eligible respondents in stratum h ; n_h is the number of completed screening interviews in stratum h ; c^1 is the cost per case for resolution, screening, and interviewing; c^2 is the cost per case for resolution and screening; and B is the fixed total survey budget. The residual cases $n_h - m_h$ are ineligible and are screened out.

The optimum sampling fractions are determined to be

$$f_h^{opt} = k \sqrt{\frac{P_h}{P_h r + 1 - P_h}}, \quad (B.1)$$

where the proportionality constant, given the fixed budget, is defined by

$$k = \frac{n(Pr + 1 - P)}{N \sum_{h=1}^H W_h \sqrt{P_h (P_h r + 1 - P_h)}} \quad (B.2)$$

$$n = \frac{B - c^o}{c^s(Pr + 1 - P)}$$

$$W_h = \frac{N_h}{N}$$

and

$$r = \frac{c^i}{c^s}.$$

Kalton (2001) shows that the gains from oversampling the high-density stratum will be modest unless two conditions apply:

- (i) The actual density of the rare population must be much higher in the high-density stratum than in the total population;
- (ii) The proportion of the rare population that is located in the high-density stratum must be high.

For example, if $r = 1$, $P_1 = 5P$, and 50 percent of the rare population is in the high-density stratum, then the optimum oversampling strategy displayed here reduces the variance by 20 percent relative to a straight proportional sampling strategy.

B.3 Allowances for Nonresponse

All real surveys, including a survey of households concerning the demand for child-care services, will involve various types of nonresponse or missing data. Adjustments to released sample sizes are necessary to compensate for this loss of data. In this section, we demonstrate the requisite adjustments to the methods set forth in the preceding section.

Let m denote the desired total number of completed main interviews. This sample size should be determined based upon a separate consideration of the size of the available budget, which in turn may be informed by analytical and precision considerations.

Define and produce advance estimates of the following rates:

λ_{res} the *resolution rate* is the proportion of cases in the released sample that are determined to be households or some other known entities;

λ_{hh} the *household rate* is the proportion of cases in the resolved sample that are determined to be households;

λ_{scr} the *screener completion rate* is the proportion of households that complete the brief screening interview;

P the *eligibility rate* (or density) is the proportion of completed screeners that are determined to be eligible for the main interview;

and

λ_{int} the *interview completion rate* is the proportion of eligible households that complete the main interview.

Based upon these advance estimates, we should plan the survey to yield

$$n = \frac{m}{P\lambda_{inf}} \quad (B.3)$$

completed screening interviews by planning to release a total sample of

$$n^t = \frac{n}{\lambda_{res}\lambda_{hhd}\lambda_{cov}} \quad (B.4)$$

cases. (For a telephone survey, cases would be telephone numbers, and for a personal-visit type survey, they would be addresses or structures.) In other words, the targeted numbers of completed interviews should be grossed-up to account for losses due to ineligibility, noncooperation, and other factors.

Now (B.3) defines the planned overall sampling fraction

$$f = \frac{n}{N} \quad (B.5)$$

in terms of completed screening interviews. Using this sampling fraction, (B.1) and (B.2) show how to over and undersample the high- and low-density strata, respectively, in terms of completed screening interviews. To actually launch the survey, one must sample cases. The case-level sampling fractions are defined by

$$f^t = \frac{n^t}{N} \quad (B.6)$$

$$f_h^t = f_h^{opt} \frac{n^t}{n} = \frac{f_h^{opt}}{\lambda_{res}\lambda_{hhd}\lambda_{cov}} \quad (B.7)$$

for $h = 1, 2$.

B.2 Application to the AIAN Population

We provide an illustration of the optimum allocation as it applies to sampling the AIAN population. Table B.1 displays results for two cut points: $d_p = 25\%$ and $d_p = 50\%$. Values of the densities P_1 , P_2 , and P are given for the two cut points. Results are given for the 3 largest AIANAs: the Navajo Reservation, the Cherokee Reservation, and the Lumbee Reseservation. Similar results can be obtained for other AIANAs.

We provide results for two values of the ratio of cost components: $r = 1$ and $r = 2$. For the demand survey, we anticipate a brief screening interview, to establish whether any child in the household is age eligible and of AIAN race, and a lengthy main interview of as much as 45 minutes in length. Given these factors, we have provisionally estimated that $r = 2$ is a likely value of the ratio of cost components.

In reviewing Table B.1, note that the Navajo Reservation has no low-density areas, and thus all sampling would be conducted in high-density areas.

The Cherokee reservation has high density areas above the 25 percent cut point but no high-density areas above the 50 percent cut point. Thus, for the 25 percent cut point, optimum sampling in the high-density stratum would be at 1.60 times the rate of sampling in the low-density stratum for $r = 2$ and at 1.74 times the rate of sampling in the low-density stratum for the less likely value $r = 1$. Because there are no areas above the 50 percent cut point, it does not offer a feasible method of sampling.

The Lumbee reservation has high-density areas above both cut points. The AIAN population is more clustered in its geographic distribution on this reservation than on the Cherokee reservation and thus the oversampling of the high-density stratum is more aggressive. For the 25 percent cut point, optimum sampling in the high-density stratum would be at 2.94 times the rate of sampling in the low-density stratum for $r = 2$ and at 3.59 times the rate of sampling in the low-density stratum for the less likely value of $r = 1$. For the 50 percent cut point, optimum sampling in the high-density stratum would be at 2.72 times the rate of sampling in the low-density stratum for $r = 2$ and at 3.46 times the rate of sampling in the low-density stratum for the less likely value of $r = 1$.

The table also includes the statistics A_h = AIAN population in stratum h as a percent of the reservation's total AIAN population. On the Navajo reservation, the entire AIAN population lives in

high-density areas. On the Cherokee reservation, 37 percent of the AIAN population lives in the high-density area defined by the 25 percent cut point and none of the population lives in areas above the 50 percent cut point. On the Lumbee reservation, 68 percent of the AIAN population lives in high-density areas defined by the 25 percent cut point, and 52 percent of the population lives in high-density areas defined by the 50 percent cut point.

Table B.1: Optimum Allocation to High- and Low-Density Strata for the AIAN Population

Statistic	Cut Point	
	25 Percent	50 Percent
<u>Navajo Reservation</u>		
P_1	0.95	0.95
P_2	NA	NA
P	0.95	0.95
$P_{1/P}$	1.00	1.00
A_1	1.00	1.00
A_2	0.00	0.00
Ratio of Optimum Sampling Rates, $r = 1$	NA	NA
Relative Efficiency, $r = 1$		
Ratio of Optimum Sampling Rates, $r = 2$	NA	NA
Relative Efficiency, $r = 2$		
<u>Cherokee Reservation</u>		
P_1	0.31	NA
P_2	0.10	0.14
P	0.14	0.14
$P_{1/P}$	2.28	NA
A_1	0.37	0.00
A_2	0.63	1.00
Ratio of Optimum Sampling Rates, $r = 1$	1.74	NA
Relative Efficiency, $r = 1$		
Ratio of Optimum Sampling Rates, $r = 2$	1.60	NA
Relative Efficiency, $r = 2$		
<u>Lumbee Reservation</u>		
P_1	0.55	0.72
P_2	0.04	0.06
P	0.11	0.11
$P_{1/P}$	4.85	6.31
A_1	0.68	0.52
A_2	0.33	0.48
Ratio of Optimum Sampling Rates, $r = 1$	3.59	3.46
Relative Efficiency, $r = 1$		
Ratio of Optimum Sampling Rates, $r = 2$	2.94	2.72
Relative Efficiency, $r = 2$		

Appendix C. A Method of Oversampling Low-Income Households without Screening on Income

We describe a method to subsample households within a selected primary sampling unit (PSU). The method oversamples low-income households without requiring the use of a screening question on income. Throughout this appendix, we take a given household to be of low income if its current household income is less than or equal to 85 percent of the corresponding state median income.

To begin the method, all census block groups within the finite population (i.e., the PSU) shall be classified into one of two strata using data on 1999 income from Tables P52 and P53, SF-3, 2000 Census. Determine 85 percent of state median income – as found in Table P53 – and let this value be denoted by $I_{.85}$. Consider a given block group, b , and compute the proportion, P_b , of total households for which household income is less than or equal to $I_{.85}$, using Table P52. Determine a cut point, $p_{.85}$, such as $p_{.85}=.6$, and classify the block group into the high-density stratum if $P_b \geq p_{.85}$, otherwise assign it to the low-density stratum. Here the terminology “high-” and “low-density” refers to the degree of concentration of low-income households. Let $h = 1$ be the high-density stratum and $h = 2$ the low-density stratum. Repeat this classification procedure for every block group in the population.

For example, the following data are for two block groups in the state of Illinois.

P52. HOUSEHOLD INCOME IN 1999 [17] - Universe: Households

Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see <http://factfinder.census.gov/home/en/datanotes/expsf3.htm>.

	Illinois	Block Group 1, Census Tract 8601.01, Lake County, Illinois	Block Group 2, Census Tract 8601.01, Lake County, Illinois
Total:	4,592,740	833	1,274
Less than \$10,000	383,299	6	43
\$10,000 to \$14,999	252,485	40	75
\$15,000 to \$19,999	250,526	30	19
\$20,000 to \$24,999	267,286	32	69
\$25,000 to \$29,999	269,660	45	62
\$30,000 to \$34,999	276,302	33	49
\$35,000 to \$39,999	261,036	67	71
\$40,000 to \$44,999	255,855	13	27
\$45,000 to \$49,999	228,289	19	39
\$50,000 to \$59,999	431,394	112	108
\$60,000 to \$74,999	521,546	160	228
\$75,000 to \$99,999	531,760	142	244
\$100,000 to \$124,999	280,614	47	174
\$125,000 to \$149,999	134,734	59	18
\$150,000 to \$199,999	119,056	28	26
\$200,000 or more	128,898	0	22

U.S. Census Bureau Census 2000

P53. MEDIAN HOUSEHOLD INCOME IN 1999 (DOLLARS) [1] - Universe: Households

Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see <http://factfinder.census.gov/home/en/datanotes/expsf3.htm>.

	Illinois
Median household income in 1999	46,590

U.S. Census Bureau Census 2000

The cut point in this instance is $d_c = .85 \times 46,590 = 39,602$. Using linear interpolation, we find $F_1 = 0.2973$ and $F_2 = 0.3001$ for the two block groups. Therefore, both of these block groups are classified as low density.

Observe that we are relying on a presumption of economic momentum to support the use of two strata that are defined on the basis of 1999 income statistics collected in the 2000 Census. That is, the method will work ideally when areas that had low income households in 1999 still have low income households today, and areas that held high income households in 1999 still hold high income households today. In the actual implementation of the sampling design, consideration may be given to the viability of income data from American Community Survey. That is, one may consider whether the high- and low-density strata should be defined on the basis of income reported in a current ACS rather than income reported in the more aged 2000 Census.

For survey analysis purposes, households in the population shall be classified as high- or low-income based on their actual current income, not based on the 1999 income of the block group. The collection of all low-income households in the population is the low-income domain, $d = 1$, while the collection of all other households in the population is the high-income domain, $d = 2$. The objective of the current method is to oversample the former domain. We execute the objective, however, by oversampling the high-density stratum. The current income status of individual

households is not known prior to the survey interviews, yet it is desired to oversample the low-income domain. To accomplish this objective, we shall plan to oversample the high-density stratum.

Define

n = desired sample size in households

N = number of households in the population, known approximately from the 2000 Census or recent ACS results

$f = n/N$ = desired overall sampling rate.

Note that n represent the target number of completed interviews inflated by the reciprocal of the anticipated survey response rate.

Let N_{hd} be the total number of households in stratum h and domain d , as follows:

N_{11} = number of low-income households in the high-density stratum,

N_{21} = number of low-income households in the low density stratum,

N_{12} = number of high-income households in the high-density stratum, and

N_{22} = number of high-income households in the low density stratum.

Define the marginal totals

$N_{+1} = N_{11} + N_{21}$ = number of low-income households,

$N_{+2} = N_{12} + N_{22}$ = number of high-income households,

$N_{1+} = N_{11} + N_{12}$ = number of households in the high-density stratum,

$N_{2+} = N_{21} + N_{22}$ = number of households in the low-density stratum and

$N = N_{11} + N_{12} + N_{21} + N_{22}$.

And let

$D_1 = N_{11}/N_{1+}$ = density of low-income households in the high-density stratum

$D_2 = N_{21}/N_{2+}$ = density of the low-income households in the low-density stratum.

If we would sample the finite population in a purely proportionate fashion at the rate f , with no oversampling by stratum, we would obtain the expected sample sizes

$$E\{n_{+1}\} = fN_{+1} \quad (C.1)$$

$$\begin{aligned}
&= f(N_{11} + N_{21}) \\
&= fN_{1+}D_1 + fN_{2+}D_2 \\
&= \text{expected number of low-income households} \\
E\{n_{+2}\} &= fN_{+2} \\
&= f(N_{12} + N_{22}) \\
&= fN_{1+}(1 - D_1) + fN_{2+}(1 - D_2), \\
&= \text{expected number of high-income households},
\end{aligned} \tag{C.2}$$

where n_{hi} is the realized sample size in stratum h and domain d . We assume that the expected number of low-income households is too small given this sampling proportionate plan.

To devise a method of oversampling, we specify the desired sample size n_{+1} for low-income households and the corresponding sampling rates

$$\begin{aligned}
g_{+1} &= n_{+1}/N_{+1} \\
g_{+2} &= (n - n_{+1})/N_{+2} = n_{+2}/N_{+2}.
\end{aligned}$$

Again, the sample size is inflated above the target number of completed interviews to allow for nonresponse.

Let us discover the sampling rates (f_1 and f_2) for the high- and low-density strata that is consistent with these targets. We have

$$n_{+1} = g_{+1}N_{+1} = f_1N_{1+}D_1 + f_2N_{2+}D_2$$

and

$$n_{+2} = g_{+2}N_{+2} = f_1N_{1+}(1 - D_1) + f_2N_{2+}(1 - D_2),$$

which is two equations in the two unknowns. Solving for the unknown sampling fractions gives

$$\begin{pmatrix} f_1 \\ f_2 \end{pmatrix} = A^{-1} \begin{pmatrix} n_{+1} \\ n_{+2} \end{pmatrix},$$

Where the 2×2 matrix A is defined by

$$A = \begin{pmatrix} N_{1+}D_1 & N_{2+}D_2 \\ N_{1+}(1-D_1) & N_{2+}(1-D_2) \end{pmatrix}.$$

The solution is

$$f_1 = \frac{n_{+1} - D_2n}{N_{1+}(D_1 - D_2)} \quad (C.3)$$

and

$$f_2 = \frac{D_1n - n_{+1}}{N_{2+}(D_1 - D_2)}, \quad (C.4)$$

Note that $D_1 - D_2 > 0$ since, by definition, $h = 1$ is the high density stratum.

Let us consider an example. Assume

$$n = 300$$

$$n_{+1} = 100$$

$$n_{+2} = 200$$

$$D_1 = .5$$

$$D_2 = .1.$$

Then, we have

$$f_1N_{1+} = 175$$

and

$$f_2N_{2+} = 125.$$

If we further assume that

$$N_{1+} = 1000$$

and

$$N_{2+} = 5000,$$

then

$$f_1 = 0.175$$

and

$$f_2 = 0.025.$$

In this example, sampling in the high-density stratum is done at 7 times the rate in low-density stratum. Observe that the sampling plan is expected to yield $175(.5) + 125(.1) = 100$ interviews of low-income households, as desired.

To achieve the same sample size of low-income households with straight proportional sampling, one would use an overall sampling fraction of $f = 0.1$ and a total sample size of $n = 600$, with about $n_{1+} = 100$ and $n_{2+} = 500$ in the two strata. The high-density stratum would yield about 50 low-income cases and 50 high-income cases, while the low-density stratum would yield about 50 low-income cases and 450 high-income cases. The overall sample size is now twice the sample size of the original oversampling plan. The increased number of interviews may be too expensive for the survey budget to bear. The budget might be brought back under control, in part, by screening out some of the high-income households in the low-density stratum. However, it is not so easy to screen on income and maintain an acceptable response rates.

Summarizing, the following six steps are required to implement the oversampling method studied here.

- (i) Classify all of the census block groups in the population into the high- or low-density stratum based upon data from the 2000 Census or the most recent ACS.
- (ii) Using the 2000 Census or the most recent ACS, determine the best estimates of the stratum sizes, N_{1+} and N_{2+} , and the stratum densities of the low-income domain, D_1 and D_2 . These various best estimates will be used to plan the survey, although they may differ somewhat from current actual values.
- (iii) Determine the sample sizes n , n_{1+} , and $n_{2+} = n - n_{1+}$, incorporating an appropriate allowance for nonresponse.
- (iv) Determine the sampling rates for the high-density, f_1 , and low-density, f_2 , strata according to (C.3) and (C.4), respectively.

It would also be wise to inflate π and π_{t+1} event a bit more to guard against departures of D_1 and D_2 from their actual current values.

Appendix D. Call Notes for 16 States Regarding the Availability of Lists of Licensed Providers of Early Child Care

D.1 Alabama

A list of licensed and exempt providers is available from the Alabama Department of Human Resources, Child Care Services by mail for a cost of \$25 each. Requests should be sent to:

Alabama Department of Human Resources
Child Care Services Division
Gordon Persons Building
50 Ripley Street
Montgomery, AL 36130-1801

Child care providers in Alabama are categorized as either licensed or unlicensed. This variable is available in provider lists from the State. In addition, child care provider types include (this distinction is not made in the provider lists):

- Family Day Care Homes
- Family Nighttime Homes
- Group Day Care Homes
- Group Nighttime Homes

D.2 Arizona

A complete list of licensed child care providers is available on the Arizona Department of Health Services, Division of Licensing Services website. The file includes the following information: Provider name, address, telephone number, type, and capacity.

Types of licensed center and home certified child care providers:

- *Child Care Center:* A child care facility operated by a private or non-profit company. Includes facilities that may be located on a public school campus and facilities operated by private or charter schools.

- *Child Care Group Home*: Child care provided by individuals in their own homes
- *Child Care Public school*: A child care program operated by a public school district

D.3 California

Provider data is available from the Licensing Information Helpdesk of California Department of Social Services, Community Care Licensing Division, Child Care Licensing Program for a fee ranging from \$50 to \$400 per list. Request should be sent to:

California Department of Social Services

Community Care Licensing Division (CCLD)

744 'P' Street, MS 19-58

Sacramento, CA 95814

Attn: Application Support Desk

Lists would include facility number, name, type, address, telephone number, status, capacity, license type, and administrator name as well as other variables that are specific to the State licensing process.

Providers must be licensed if they care for unrelated children from more than one family. Providers do not need to be licensed if they care for only their own children and those of one other family.

Types of child care provider include (further definitions not provided):

- Small Family Child Care Home (and large)
- Large Family Child Care Home
- Day Care centers
- School-age day care centers

D.4 Florida

A list of licensed providers can be downloaded in excel or text format from the Florida Department of Children & Families website. Data includes the following fields: county, program type, facility or home name, address, city, state, zip, capacity. Other fields are available upon request directly from the Day Care Licensing Office.

The following provider types are available:

- *Child Care Facility:* Any center or individual child care arrangement that provides care for more than 5 children (unrelated to provider) and payment, fee or grants for services is received. Every child care facility in the state, unless statutorily exempt, shall have a license which shall be renewed annually.
- *Large family child care home:* Any home where child care is provided regularly for children from at least two unrelated families and payment, fee or grants for services is received and at least two full-time child care personnel are on the premises during hours of operation. Every large family child care facility in the state shall have a license which shall be renewed annually.
- *Licensed Family Day care home:* Any home where child care is provided regularly for children from at least two unrelated families and a payment, fee, or grant is received. Every family day care home in the state shall be registered or have a license which shall be renewed annually.
- *Registered Family Day care home:* Any home where child care is provided regularly for children from at least two unrelated families and a payment, fee, or grant is received.
- *Mildly Ill Child Care facility:* Any facility that cares for children with short term illness or symptoms of illness or disability provided either as an exclusive service in a center specialized for this purpose, or as a component of other child care facility, for a period of less than 24 hours per day.

The website also noted that there are some child care facilities that are religiously exempt from licensing, but a list of those providers was not available on line.

D.5 Illinois

A list of provider (in Excel format) was sent via email from the Illinois Department of Children and Family Services and included the names, address, phone number, provider number

and type, capacity, ages served, hours of operation, and license status as well as other specific licensing information.

In Illinois (according to DCFS website), any home provider who cares for more than three children, including their own, related and unrelated children, must be licensed by DCFS. No home day care provider can care for more than 12 children, including their own children under age 12.

Exemptions include programs (partial list):

- operated by public or private school systems schools
- Recognized or registered by the State Board of Education
- Recognized or accredited by a national or multi-state educational organization (i.e., Montessori)
- Operated by a religious organization that primarily provide religious education

Licensed provider types (included in files from IL DCFS):

- *Day Care Homes (DCH)*: A provider who cares for more than 12 children (including caregiver's own children under age 12) in a home setting. This typically includes children under age 7 who are cared for number of consecutive hours each day.
- *Day Care Center (DCC)*: A provider who regularly provides care for less than 24 hours for more than 8 children in a family home or more than 3 children another facility and who are not licensed as a day care home or group day care home provider.
- *Group Day Care Homes (GDC)*: A provider who care for no more than 16 children (including the caregivers own children under age 12) in a home setting. Typically this includes school-age children who can receive care before school, after school or during school vacation.

D.6 Massachusetts

The provider list is available for download from the Massachusetts Department of Early Education and Care website. There are six regional lists available in Excel format, which include the program name, address, phone, description, capacity and program type in addition to specific Massachusetts licensing data fields.

A license is required to provide most child care services; however providers may submit an application to request licensure exemption.

Licensed provider types include the following:

- *Group Child Care (GCC)*: A provider who cares for unrelated children in a setting other than their home on a regular basis.
- *Family Child Care (FCC)*: A provider who cares for non-related children up to the age of 12 in a location other than the child's home. There are three types of family child care:
 - Regular family child care—up to six children
 - Family child care plus—six children under 7 years old and two children over 7 years of age
 - Large family child care—up to 10 children with the help of an ECC approved assistant
- *School Age Child Care (SACC)*: A provider who cares for unrelated children in a setting other than their home on a regular basis

D.7 Montana

Data requested from the Montana Department of Health & Public Services, Quality Assurance Division, Child Care Licensing Bureau. The Department's website provides a searchable provider database, but this information cannot be downloaded. The Bureau's program manager agreed to send the information pending approval by her supervisor. After two weeks, the information has still not arrived. According to the website, types of providers are as follows:

- *Family Child Care Providers*: Offers care in a home-like setting, usually the provider's residence, for up to 6 children at a time, with no more than 3 under the age of 2 years.
- *Group Child Care Providers*: A group home provides care for 7-12 children, with a limit of six under the age of two years. Anytime there are 7 or more children, a second caregiver must be present.
- *Child Care Centers*: A child care center serves 13 or more children. Most child care centers are licensed by the state of Montana; however pre-school, drop-in and out-of-school time programs are not required to be licensed by the State.
- *Legally unregistered providers*: an individual chosen by a parent to care for all the children in one family or to care for up to two unrelated children. Often, this informal care is provided by extended family members, friends or neighbors.

D.8 New York

A list of providers is available by written request from the New York State Office of Children & Families, Bureau of Early Childhood Services for a \$50 fee. The list would include the name, contact information, capacity, and type of all licensed providers for the entire state EXCEPT New York City providers. New York City provider information is available from the NYC Administration for Children's Services.

Types of licensed and registered providers in New York include:

- *Day Care Centers:* provide care for more than six children at a time, not in a personal residence.
- *Small Day Care Centers:* provide care for up to six children, not in a personal residence.
- *Family Day Care Homes:* provide care for three to six children at a time in a residence; may add one or two school-age children. The maximum allowable number of children will depend on whether there are and how many infants are in care.
- *Group Family Day Care Homes:* provide care for seven to twelve children at a time in a residence; may add one or two school-age children. The maximum allowable number of children will depend on whether there are and how many infants are in care. A provider must use an assistant when more than six children are present.
- *School-Age Child Care Programs:* provide care for more than six children from kindergarten through age twelve. Care for children during non-school hours; also may provide care during school vacation periods and holidays.

Each of the programs listed above can serve children ages six weeks through twelve years and operate for more than three hours a day. As a general rule, any day care program planning to serve three or more children for more than three hours a day on a regular basis must obtain a license or registration certificate.

D.9 North Dakota

List of providers received via email from the North Dakota Department of Human Services, Office of Child & Family Services. The information is provided in Excel format and includes provider name, address, phone, and type as well as specific North Dakota licensing data fields. Provided lists include the following provider types:

- **Licensed Child Care Provider Categories**

- **Licensed Family Child Care:** The care for 7 or fewer children in the provider's own home
- **Licensed Group Child Care:** The care for 8 to 18 children in the home or other type of facility
- **Licensed Child Care Center:** The care for 19 or more children in public or private buildings, churches or schools; children are often grouped by age
- **Licensed Preschools:** Part-time educational and socialization experiences for children age 2 years to kindergarten
- **Licensed School-Age Programs:** The care of 19 or more school-age children before and/or after school; some programs provide care during school holidays and summer vacations

- **Multiple License Facility:** Has more than one type of license such as a Center and Preschool

- **Unlicensed Child Care Provider Categories**

- **Self-Certified Providers:** Care for 5 or fewer children or 3 infants in the provider's home. These providers are not licensed or monitored; they are eligible to participate in the Child Care Assistance Program.
- **Approved Relatives:** Providers who care for 5 or fewer children or 3 infants; these providers are also eligible to participate in the Child Care Assistance Program. By federal law, the 'approved' relatives must be related by marriage, blood relationship or court order and include: grandparents, great-grandparents, aunts, and uncles. A sibling who is age 18 or older and who does not live in the same home as the children for whom care is being provided, can also become an approved relative.
- **Registered Providers:** are also eligible to participate in the Child Care Assistance Program; are generally registered by Tribal entities

D. 10 Ohio

Lists of licensed childcare centers and type A homes is available on the Ohio Dept of Job & Family Services website. The Bureau of Child Care & Development was able to provide a list of certified home providers. The files include the following fields: Provider name, address, telephone number, type, administrator name and capacity. Types of providers requiring licensure/registration include:

- **Centers:** Providers are serving seven or more children of any age.

- *Type A Homes:* Providers serving seven to twelve children (or four to twelve children if four children are under two years of age) cared for in the provider's personal residence. The provider's own children under six years of age must be included in the total count.
- *Type B homes:* Providers serving one to six children cared for in the provider's personal residence. No more than three children may be under two years of age. The provider's own children under six years of age must be included in the total count. Anyone can operate a Type B Home without a license. However, care for more than 6 children requires a license.
- *School age centers:* Provider serving seven or more children aged kindergarten and above. School age centers must be licensed.
- *Child day camps:* Program which operates for less than seven hours a day and only during the vacation of the public schools, cared only for school age children and which is at least 50percent outdoor based. Child day camps must register with the department each year.

Examples of providers that don't require registration/licensure are as follows:

- care provided in a child's own home;
- programs which operate two weeks or less a year;
- programs where parents remain on the premises (unless at the parent's employment site);
- specialized training in specific subjects, such as art, drama, dance, swimming, etc.
- programs which operate one day a week for no more than six hours.

D.11 Oregon

A list of providers was sent via email from the Oregon Department of Employment, Child Care Division. The Excel file included provider name, contact info, type, capacity, and hours of operation. These providers must be certified by the State of Oregon's Child Care Division. The following provider types were included in the file:

- *Certified Family Child care:* A provider who cares for a maximum of 12 children, including the provider's own children in a private residence. With special approval, certified homes may care for up to 16 children.
- *Registered family child care home:* A provider who cares for a maximum of 10 children, including the provider's own children in a private residence. The provider can only care for

two children under the age of 2, and can only care for a total of six children on a full time basis and four children on a part time basis.

- *Child care center:* A provider who cares for more than 13 children in a facility that is not a private residence.

Certain types of providers are exempt from certification requirements. Information about these providers is not available from Oregon Department of Employment, Child Care Division as it is not required to track non-licensed providers. This information may be available through the Oregon Child Care Network Referral Service. These types of non-licensed child care facilities include:

- *Preschools:* Providers who care for children from 3 years old to the start of first grade for less than four hours a day with an educational curriculum.
- *School Age Programs:* A facility that provides care for school-aged children before and/or after school hours and during vacations.
- *Exempt Child Care:* Child care providers are exempt from state regulation if they fit into one of the following categories:
 - Care for a maximum of three or fewer children, in addition to the provider's own children.
 - Care for any number of children from the same family.
 - Provide care in the home of the child.
 - Provide care to their own children, the children of relatives, or children they have guardianship of.
 - Provide care on an occasional basis and do not usually provide care.
 - Offer a preschool program that operates less than four hours a day and provides education to children from age three to school age.
 - Provide training on a specific subject, such as dancing, music, etc.
 - An organized club or hobby group providing athletic or social activities, such as soccer, scouts, etc.
 - Are operated by a government agency.

D.12 Pennsylvania

Provider list received from Bureau of Certification Services, Office of Child Development and Early Learning. The information is provided in two Excel files (center-based and group home care providers) and includes the following fields: provider name and address. These provider types are both requiring licensing by the State and are defined below.

- *Child Day Care Center*: A child day care facility in which seven or more children who are not related to the operator receive child care.
- *Group Day Care Home*: A child day care facility in which seven through 12 children of various ages or in which seven through 15 children from 4th grade through 15 years of age who are not related to the operator receive child care.

In addition, family day care home providers must be registered by the State and defined below:

- *Family Day Care Home*: A child day care facility located in a home in which four, five, or six children who are not related to the caregiver receive child care.

The family day care home provider list is currently unavailable (not included in the on-line directory or listed in a comprehensive database as the other two provider types are). However, the State is preparing to release a comprehensive electronic system for the licensure and registration of all child care facilities, PELICAN Provider Certification. When this system is available, it will ultimately include all licensed and registered child care facilities in Pennsylvania. A specific timeframe for this release was not provided.

D.13 Rhode Island

A provider list is available for download on the Rhode Island Department of Child, Youth & Families, Day Care Licensing Unit website. The files include the following fields: Provider name, address, telephone number, and type. Any individual caring for more than three children who are unrelated to the provider is required to obtain a license. The definitions and certification requirements for these provider types are as follows:

- *Family Day care home*: Any home other than the child's home in which child care day in lieu of parental care and/or supervision is offered at the same time to four or more children who are not relatives of the child.

- *Family Group day care home:* A residence occupied by an individual at least 21 years of age who provides care for not less than nine and not more than 12 children, with the assistance of one or more approved adults for any part of a 24-hour day.
- *Day Care Center:* Any individual who provides care for children 16 or younger not in a residence or home and apart from their parents or guardians for any part of a 24-hour day.

D.14 Texas

Provider lists are available for download from Texas Department of Family & Protective Services, Child Care Licensing website. The Excel files include the following fields: Provider name, address, telephone number, type, status and capacity. The list includes the following types of providers:

- *Listed Family Home (certified):* Providers who are paid to provide regular child care (at least four hours per day, three or more days a week, for more than nine consecutive weeks) in their own homes for 1-3 unrelated children.
- *Registered Child-Care Home:* Registered Child Care Homes provide care in the caregiver's home for up to six children under age 14; they may also take in up to six more school-age children. The number of children allowed in a home is determined by the ages of the children. No more than 12 children can be in care at any time, including children of the caregiver.
- *Licensed Child-Care Home:* The caregiver provides care in her own home for children from birth through 13 years old. The total number of children in care varies with the ages of the children, but the total number of children in care at any given time, including the children related to the caregiver, must not exceed 12.
- *Child-Care Center (licensed):* An provider caring for seven or more children under 14 years old for less than 24 hours per day at a location other than the permit holder's home.

D.15 Washington, DC

The District of Columbia Health Regulation Administration in the Department of Health is responsible for the child care licensing. Paper hard-copy lists of child care providers are available at the school district offices. A pdf file of licensed center and home care providers was located and downloaded from the Department of Health website. NORC staff was told by DOH staff that an

electronic and comprehensive list of provider may be available in an .rtf file format. This list was not collected.

It appears there are only two types of licensed providers:

- *Licensed Center care*: provides care for more than 5 children for less than 24 hours (including full day, part-day, before and after school and during school vacations.)
- *Licensed home care*: provides care in private residence for up to 5 children, including no more than 2 infants. This does not include any children of the caregiver who are six years of age or older as long as the total number of caregiver children is not more than three and of those three no more than two can 10 years old or younger.

D.16 Wyoming

List provided via email by the Wyoming Department of Family Services, Division of Early Childhood. The Excel file included administrator name, provider name, address, capacity and license type. Licensed provider types include:

- *Child Care Center (16+)*: child care center--more than 15 child capacity
- *Family CCC (up to 15)*: Family child care center--up to 15 child capacity
- *Family Child Care Home (3-10)*: Family child care center--3 to 10 child capacity
- *MLF/CCC(CCC)*: multiple location facility child care center
- *MLF/FCCC(FCC)*: multiple location facility family child care center

In Wyoming, any person caring for more than 2 children in addition to their own may be required to be licensed. Licensing exemptions include criteria are as follows:

- Occasional care of a child by a neighbor or friend provided this person does not regularly engage in this activity
- Parents exchanging care on a cooperative basis
- Child care for the children of only 1 immediate family
- Child care provided by a person employed to provide care in the parent or guardian's home
- Child care facilities supervised by the state, any local government, school district, agency or political subdivision

Appendix E. Number of Licensed Child Care Facilities, 2005

A *child care center* is a facility licensed or otherwise authorized to provide child care services for fewer than 24 hours per day per child in a non-residential setting, unless care in excess of 24 hours is due to the nature of the parents' work.

A *family child care home* provides child care services for fewer than 24 hours per day per child, as the sole caregiver, in a private residence other than the child's residence, unless care in excess of 24 hours is due to the nature of the parents' work. Additional information is available in the document, *Definition of Licensed Family Child Care Homes*, available at <http://nccic.acf.hhs.gov/pubs/cclicensingreq/definition-fcc.pdf>.

The following tabulation of child care centers and family child care homes is taken from *The 2005 Child Care Licensing Study* by the National Association for Regulatory Administration (NARA) and the National Child Care Information and Technical Assistance Center (NCCIC).

Table E.1: Number of Licensed Child Care Facilities in 2005

State	Child Care Centers	Small Family Child Care Homes	Large Family Child Care Homes	Total Family Child Care Homes	Total Other Licensed Facilities	Total of All Licensed Facilities
Alabama	1,372	1,272	450	1,722	0	3,094
Alaska	107	239	85	324	0	431
Arizona*	2,182	15	356	371	0	2,553
Arkansas*	1,762	987	NC	987	0	2,749
California	14,841	37,820	6,674	44,494	0	59,335
Colorado*	1,282	4,072	209	4,281	1,602	7,165
Connecticut	1,560	3,023	55	3,078	0	4,638
Delaware*	409	1,556	58	1,614	59	2,082
District of Columbia	360	237	NC	237	0	597
Florida*	4,248	2,224	185	2,409	2,535	9,192
Georgia*	3,019	6,736	See notes	6,736	0	9,755
Hawaii	543	456	6	462	0	1,005
Idaho*	NL	NL	NL	NL	NL	NL
Illinois	2,898	10,286	357	10,643	0	13,541
Indiana*	617	2,803	308	3,111	652	4,380
Iowa	1,495	2,754	3,439	6,193	0	7,688
Kansas	1,270	2,735	4,581	7,316	0	8,586
Kentucky*	2,256	1,029	NC	1,029	0	3,285
Louisiana	1,993	NL	NL	NL	0	1,993
Maine*	707	1,789	NC	1,789	193	2,689
Maryland	2,672	9,775	NC	9,775	0	12,447
Massachusetts*	2,263	6,081	3,322	9,403	1,644	13,310
Michigan	4,588	9,979	3,736	13,715	0	18,303
Minnesota	1,577	3,070	10,015	13,085	0	14,662
Mississippi	1,588	35	91	126	0	1,714
Missouri*	1,938	1,853	216	2,069	562	4,569
Montana	271	663	478	1,141	0	1,412
Nebraska*	854	2,470	596	3,066	297	4,217
Nevada*	447	500	24	524	5	976
New Hampshire*	798	230	129	359	40	1,197
New Jersey*	4,262	NL	NL	NL	0	4,262
New Mexico	636	206	214	420	0	1,056
New York*	3,626	8,321	3,772	12,093	1,780	17,499
North Carolina	4,400	4,671	NC	4,671	0	9,071
North Dakota*	167	480	835	1,315	181	1,663
Ohio	3,876	NL	154	154	0	4,030
Oklahoma*	1,526	3,172	1,153	4,325	386	6,237
Oregon*	976	4,425	267	4,692	0	5,668
Pennsylvania	3,989	4,377	820	5,197	0	9,186

Table E.1: Number of Licensed Child Care Facilities in 2005 (continued)

State	Child Care Centers	Small Family Child Care Homes	Large Family Child Care Homes	Total Family Child Care Homes	Total Other Licensed Facilities	Total of All Licensed Facilities
Rhode Island	460	1,303	11	1,314	0	1,774
South Carolina	1,339	19	284	303	0	1,642
South Dakota*	298	NL	92	92	0	390
Tennessee	2,304	805	663	1,468	0	3,772
Texas*	8,889	8,422	1,732	10,154	3,845	22,888
Utah*	268	2,102	240	2,342	2,176	4,786
Vermont*	640	1,244	NC	1,244	0	1,884
Virginia*	2,700	NL	1,678	1,678	9	4,387
Washington	2,114	6,280	NC	6,280	0	8,394
West Virginia*	432	2,341	86	2,427	144	3,003
Wisconsin*	2,418	3,192	NC	3,192	0	5,610
Wyoming	207	465	81	546	0	753
Total	105,444	166,514	47,452	213,966	16,110	335,520

Key:

NC=No category of facility

NL=Facility not licensed

***Notes:**

Arizona: The number of small family child care homes is facilities that care for four or fewer children and are licensed voluntarily. Licensing for these homes is optional.

Arkansas: The state has voluntary registration for family child care homes with five or fewer children. There were 122 in 2005.

Colorado: Other licensed facilities include part-day preschools and school-age care centers.

Delaware: Other licensed facilities include child placing agencies and residential child care facilities.

Florida: Other licensed facilities include registered family child care homes.

Georgia: The number of small family child care homes is the total of small and large family child care homes.

Findings from the 2005 Child Care Licensing Study By NARA and NCCIC, 2006 3

Idaho: The state has a licensing law, but licensing is not required for centers and family child care homes. The state has voluntary licensing for small and large family child care homes.

Indiana: Other licensed facilities include registered child care ministries.

Kentucky: The state also has certified family child care homes. Information reported is only for licensed family child care homes.

Maine: Other licensed facilities include nursery schools.

Massachusetts: Other licensed facilities include school-age child care, group homes (residential), shelters, and adoption and foster care agencies.

Missouri: Other licensed facilities include inspected facilities.

Nebraska: Other licensed facilities include preschools.

Nevada: Other licensed facilities include institutions.

New Hampshire: Other licensed facilities include residential child care facilities (child welfare).

New Jersey: The state has voluntary registration for family child care homes. There were 3,691 in 2005.

New York: The number of centers includes child care centers in New York City. These centers are regulated by the Bureau of Day Care, New York City Department of Health and Hygiene, not the state. Other licensed facilities include school-age child care.

North Dakota: Other licensed facilities include preschools, school-age child care, and group facilities.

Oklahoma: Other licensed facilities include part-day facilities and school-age child care facilities.

Oregon: The state also has the categories of listed (public assistance reimbursement) and exempt (up to three children) facilities that are not required to be licensed.

South Dakota: The state also has voluntarily registered family day care homes. There were 899 in 2005.

Texas: Other licensed facilities include listed homes.

Utah: The number of small family child care homes is the total of small family child care (763) and residential certificate programs (1,339).

Vermont: The state also has legally exempt child care. There were 1,109 in 2005.

Virginia: Other licensed facilities include family day systems and certified preschools. The state also has religious exempt child day centers. There were 856 in 2005.

Findings from the 2005 Child Care Licensing Study By NARA and NCCIC, 2006 4

West Virginia: Other licensed facilities include Head Start programs (less than four hours per day).

Wisconsin: The state also certifies small family child care homes and school-age care facilities that wish to receive state subsidy reimbursement. There were 4,808 certified family child care homes and 23 certified school-age facilities in 2005.

Source: Findings from the 2005 Child Care Licensing Study By NARA and NCCIC, 2006 2 State Child Care Centers
Small Family Child Care Homes Large Family Child Care Homes Total Family Child Care Homes Total Other
Licensed Facilities Total of All Licensed Facilities

Appendix F. Call Notes for 9 States Regarding the Existence of Pre-Kindergarten Programs that Have Been Outsourced to Community-Based Organizations

F.1 Mesa Unified Public School District (Arizona)

Mesa Unified is the only public school district in Mesa, Arizona. The Early Childhood and Parent Education Department provides an on-line list of resources for preschool programs, including:

- Mesa Early Learning Preschool: free to low-income qualifying students at least 4 years old and located at various elementary schools in district
- Family Tree family literacy program: free to low-income qualifying families; 3-5 year old students attend preschool while parents take English language or GED classes
- Prekindergarten: tuition based program available at some elementary programs
- Special Education Services: free preschool through district for students who have been pre-screened and identified with special needs
- Head Start: provided through Maricopa County to low-income eligible three and four year olds; program is available at various schools and community centers
- Home-based Migrant Preschool: free program for low-income qualifying families that promotes interaction between parents and preschoolers, ages 3-5.

F.2 Duval County School District (Florida)

Duval County SD is the only public school district in Jacksonville, FL. Preschool programs are offered to families as part of Florida's Universal Pre-Kindergarten Program—a voluntary program that provides three hours of education each day to four and five year olds. Voluntary Pre-K (VPK) program contracts with private institutions to provide these preschool programs. A list of partnering programs is available on the Duval County SD website: <http://www.duvalschools.org/static/parents/getinvolved/preschool.asp>. Information from the Florida State Department of Education regarding VPK is available on the department website. (<http://www.floridajobs.org/VPK/index.html>)

F.3 Portland Public Schools (Oregon)

Portland Public Schools (PPS) is the largest of five public school districts in Portland, OR. PPS offers a combination of district-based and external preschool programs to families. A list of programs is available on the PPS website

(http://www.earlyed.pps.k12.or.us/www.pps.k12.or.us/depts/kindergarten/prekindergarten/pk_options.html).

Programs include the following:

- Half and full-day programs are available for no cost at nine PPS elementary schools
- Full-day fee-for-service preschool program at one PPS elementary school
- Head Start programs located at seven elementary schools
- Special Education preschool programs offered in 11 PPS elementary schools in collaboration with a regional education partnership program
- One Montessori preschool program located in a PPS elementary school
- Five private preschool programs located in various PPS schools

F.4 Dallas Independent School District (Texas)

Dallas ISD is the largest of two public school districts in Dallas. According to the district's Early Childhood Education office, the majority of preschool classes are part of the school district curriculum. However, of the approximately 340 preschool teachers in the district, three teachers are in Head Start classrooms. While the district is not a Head Start delegate, this effort is part of the "school readiness integration program," which is a state-level mandate to all districts to have some partnerships with other early education providers. The contact in the office said that a list of those teachers (or the schools where the classes are being taught) could be provided, but a written request would be needed.

F.5 Rockford School District 205 (Illinois)

Pre-kindergarten services are administered directly by the school district. In addition, the City of Rockford administers Head Start programs separately; however, starting this year two certified district teachers are in co-teaching in Head Start classrooms. The district does act as a single point of entry for all pre-K services including Head Start by conducting screening for all students and referring income eligible students to the Head Start program.

At the state level, the **Illinois Department of Education** funds Preschool for All Children Program for eligible public school districts, charter schools, private and public nonprofit and for-profit organizations to serve 3 to 5-year old children in preschool programs. This program is part of the Early Childhood Block Grant.

F.6 Boston Public Schools (Massachusetts)

Boston Public Schools provides all the Pre-K services directly. (The only exception is one pilot program for which they contracted with a community-based provider who uses their curriculum.) The district is not a Head Start designee and there are no Head Start programs located in the schools. The **State of Massachusetts**, however, funds Universal Pre-K (UPK) programs that BPS is eligible to apply for as are any private providers who meet specific criteria.

F.7 Buffalo City School District (New York)

Buffalo City School District is one of two public districts in Buffalo, NY. The district provides state-funded pre-K programs and also contracts with external organizations (i.e, community-based organizations, Head Start, community action organizations, and private providers). A list of these providers would be available from district's Early Childhood Department.

F.8 Fargo (North Dakota)

There are two public schools district in Fargo, ND. **Fargo Public Schools** only provides early childhood special education programs, not any regularly pre-k programs. The district does lease two room in a school to Head Start, but the program is administered separately. The district also has one early childhood special education/Head Start combination class.

West Fargo Public Schools also only offers special education pre-K programs for children who are developmentally delayed.

F.9 District of Columbia Public Schools (Washington, DC)

All District of Columbia Public Schools (DCPS) have pre-k programs and 48 schools (about half) also have 3-year old programs. In addition, DCPS is the Head Start grantee and therefore some schools have Head Start programs that are located within the schools and run by DCPS employees. The district also runs Pre-K incentive program in which it contracts with about 24 external community-based organizations to provide pre-K programs. (Total DCPS funding for this is about \$5 million.) Children who are enrolled in these programs are considered to be DCPS students. A list of those providers is available from the DCPS Early Childhood Education Office.

Appendix G. Notes for Minneapolis/St. Paul Regarding the Feasibility of Constructing a List of Out-of-School Time Programs

G.1 Introduction

Minneapolis/St. Paul was selected as a test city for this task because it was a mid-size city that I had some familiarity with. My primary search was in the yellow pages portion of “Superpages” (www.superpages.com) with a secondary search in the yellow pages portion of “Dex” (www.dexknows.com). I started with Superpages because it has proved fruitful in previous directory assistance/yellow pages searches on other projects. I followed up with Dex because it has been marketed recently as a new, comprehensive yellow pages search engine. I did begin a Yellow Pages (www.yellowpages.com) search as well but a limited review of the findings demonstrated that it yielded fewer search results than either Superpages or Dex and therefore due to time limitations, I concentrated on recording my efforts from these two search engines instead.

G.2 Search Criteria

Search criteria were focused on two factors—services type and location.

Table G.1: Search Criteria Versus Records Yielded

Search Engine	Search Criteria—Service Type	Search Criteria—Location	Number of Records
Superpages	Child Care Centers	Minneapolis	56
Superpages	After School Programs	Minneapolis	1
Superpages	Youth organizations, centers and clubs	Minneapolis	2
Superpages	After School Programs	St. Paul	2
Superpages	Youth organizations, centers and clubs	St. Paul	7
Superpages	Child Care Centers	St. Paul	30
Superpages	Tutoring	Minneapolis	32
Superpages	Tutoring	St. Paul	35
Superpages	Child Care Services	Minneapolis	314
Superpages	Child Care Services	St. Paul	266*
Dex	After School Programs	Minneapolis	21
Dex	After School Programs	St. Paul	15

* Data not recorded

Obviously, “Superpages/Child Care Services/Minneapolis” and “Superpages/Child Care Services/St. Paul” yielded significantly higher search results than all other search criteria combinations. Unfortunately, this was the last search I did and time due to limitations I was unable to record the findings from St. Paul and therefore do not have a count of duplicate records also found in other St. Paul searches and did not include these in the total records found.

G.3 Duplicate Records

I did a basic review of the findings to identify duplicates (sorting by business name and address). Obviously, this method leaves room for error with businesses that may go by more than one name or location. However, this process identified 141 duplicate records and 372 unique records. Within those 141 duplicates, there were 67 unique businesses for a total of 439 unique businesses identified in the various search processes.

G.4 Scope of Findings

While the purpose of this task was to identify after school programs in the test city, it became immediately apparent that the low number of findings from “after school” search criterion was likely not capturing all the relevant records. Using other search criteria (i.e., “Child Care Services”) provided significantly more results. However, it will likely be difficult to identify which of these records may be after school providers and which may be other types of care (i.e., infant/toddler). This appears to be the largest limitation to this process.

G.5 Level of Effort

The level of effort for this task is relatively high, primarily because it involves a multi-step process. First, the numerous variations on search criteria are required in order to include the maximum number of records. (NOTE: Additional search criteria variations not included in this task may be appropriate or necessary in order to include *ALL* appropriate records.) Second, transferring the records into a useable format require cutting and pasting each individual business name, address and telephone number. This is, by far, the most time consuming portion of this task. Finally, duplicates need to be removed from the records. It is important to weigh the high level of effort of this task in comparison to the questionable results that are yielded (as noted above in *Scope of Findings*).

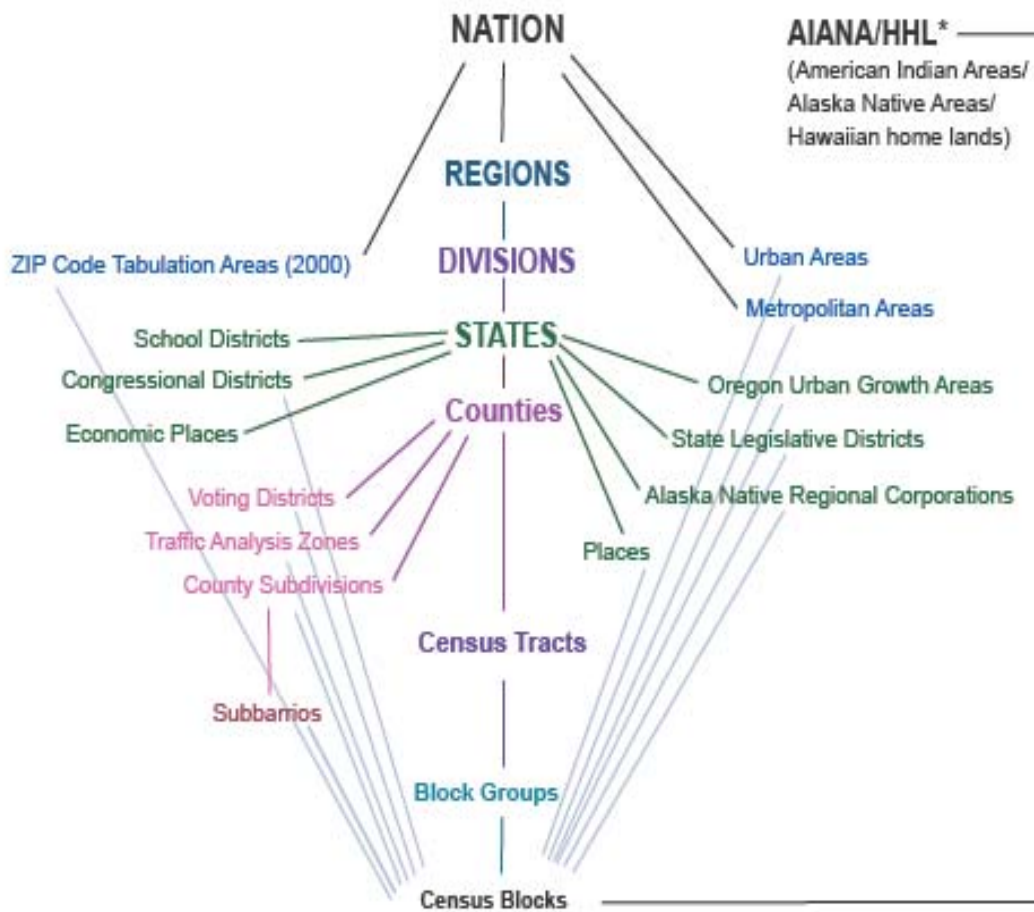
Appendix H. Standard Hierarchy of Census Geographic Entities

In this appendix, we describe the standard hierarchy of the census geographies and present the census definitions on the geographic entities that will be used in the sampling design.

The hierarchical structure of census geographies in the vast majority of the country consists of blocks that are nested within block groups, which are nested within census tracts, which are nested within counties, which are nested within states, which are nested within divisions, which are nested within regions. Units in each level of nesting are non-overlapping, and do not cross borders into other nesting levels. For example, no census tract overlaps with any other tract and no tract crosses a county border. In defined areas associated with the American Indian and Alaskan Native population, however, unique tracts are described that differ from regular census tracts. These special American Indian and Alaskan Native tracts are nested within the defined American Indian and Alaskan Native areas and these special tracts may cross county and state borders.

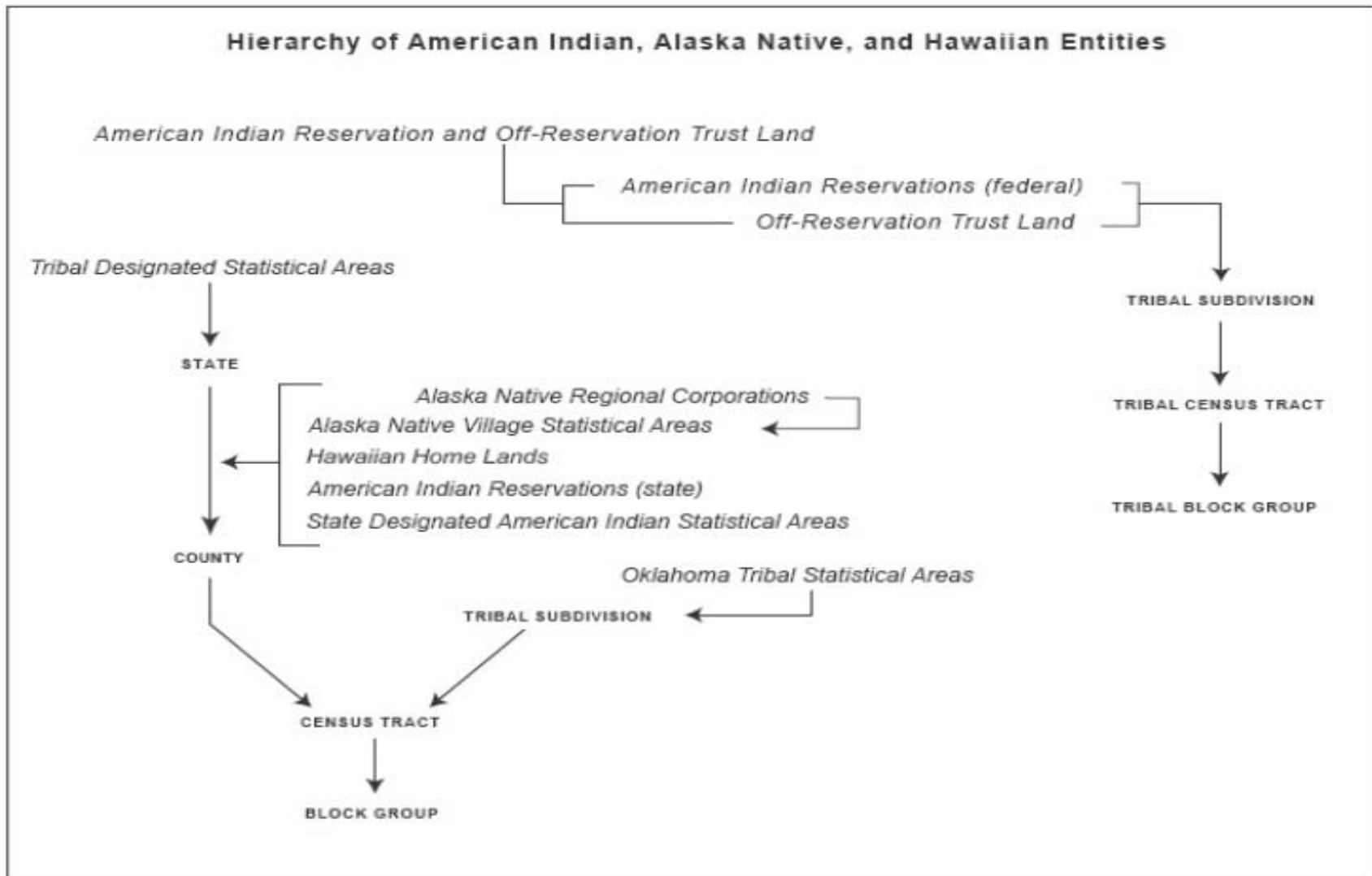
Figure H.1 and H.2 presents the hierarchy of Census geographies for non-AIAN population and for AIAN population.

A list of glossaries is presented to show the census definitions on the key census geographic entities that are used in this sampling report.



* Refer to the "Hierarchy of American Indian, Alaska Native, and Hawaiian Entities" on page 2.

Hierarchy of American Indian, Alaska Native, and Hawaiian Entities



Glossary

Census Tract

Census tracts are small, relatively permanent statistical subdivisions of a county or statistically equivalent entity delineated by local participants as part of the U.S. Census Bureau's Participant Statistical Areas Program. The U.S. Census Bureau delineated census tracts where no local participant existed or where a local or tribal government declined to participate. The primary purpose of census tracts is to provide a stable set of geographic units for the presentation of decennial census data. This is the first decennial census for which the entire United States is covered by census tracts. For the 1990 census, some counties had census tracts and others had block numbering areas (BNAs). For Census 2000, all BNAs were replaced by census tracts, which may or may not represent the same areas.

Census tracts in the United States, Puerto Rico, and the Virgin Islands of the United States generally have between 1,500 and 8,000 people, with an optimum size of 4,000 people. For American Samoa, the Northern Mariana Islands, and Guam, the optimum size is 2,500 people. Counties and statistically equivalent entities with fewer than 1,500 people have a single census tract. Census tracts on American Indian reservations, off-reservation trust lands, and special places must contain a minimum of 1,000 people. (Special places include correctional institutions, military installations, college campuses, workers' dormitories, hospitals, nursing homes, and group homes.) When first delineated, census tracts are designed to be relatively homogeneous with respect to population characteristics, economic status, and living conditions. The spatial size of census tracts varies widely depending on the density of settlement. Census tract boundaries are delineated with the intention of being maintained over many decades so that statistical comparisons can be made from decennial census to decennial census. However, physical changes in street patterns caused by highway construction, new developments, and so forth, may require occasional boundary revisions. In addition, census tracts occasionally are split due to population growth or combined as a result of substantial population decline.

Census tracts are identified by a four-digit basic number and may have a two-digit numeric suffix; for example, 6059.02. The decimal point separating the four-digit basic tract number from the two-digit suffix is shown in the printed reports and on census maps. In computer-readable files, the decimal point is implied. Many census tracts do not have a suffix; in such cases, the suffix field is

either left blank or is zero-filled. Leading zeros in a census tract number (for example, 002502) are shown only in computer-readable files. Census tract suffixes may range from .01 to .98. For the 1990 census, the .99 suffix was reserved for census tracts/block numbering areas (BNAs) that contained only crews-of-vessels population; for Census 2000, the crews-of-vessels population is included with the related census tract.

Census tract numbers range from 1 to 9999 and are unique within a county or statistically equivalent entity. The U.S. Census Bureau reserves the basic census tract numbers 9400 to 9499 for census tracts delineated within or to encompass American Indian reservations and off reservation trust lands that exist in multiple states or counties. The number 0000 in computer-readable files identifies a census tract delineated to provide complete coverage of water area in territorial seas and the Great Lakes.

County Subdivision

County subdivisions are the primary divisions of counties and statistically equivalent entities for data presentation purposes. They include census county divisions, census subareas, minor civil divisions (MCDs), unorganized territories, and incorporated places that are independent of any MCD. Each county subdivision is assigned a five-digit Federal Information Processing Standards (FIPS) code in alphabetical order within each state.

Census County Division (CCD)

Census county divisions (CCDs) are county subdivisions that were delineated by the U.S. Census Bureau, in cooperation with state and local government officials for data presentation purposes. CCDs have been established in 21 states where there are no legally established minor civil divisions (MCDs), where the MCDs do not have governmental or administrative purposes, where the boundaries of the MCDs are ambiguous or change frequently, and/or where the MCDs generally are not known to the public. CCDs have no legal functions and are not governmental units.

The boundaries of CCDs usually are delineated to follow visible features and coincide with census tracts where applicable. (In a few instances, two CCDs may constitute a single census tract.) The name of each CCD is based on a place, county, or well-known local name that identifies its location. CCDs have been established in the following 21 states: Alabama, Arizona, California, Colorado, Delaware, Florida, Georgia, Hawaii, Idaho, Kentucky, Montana, Nevada, New Mexico, Oklahoma, Oregon, South Carolina, Tennessee, Texas, Utah, Washington, and Wyoming.

Census Subarea

Census subareas are statistical subdivisions of boroughs, census areas, city and boroughs, and the municipality (entities that are statistically equivalent to counties) in Alaska. Census subareas are delineated cooperatively by the state of Alaska and the U.S. Census Bureau. They were first used for data presentation purposes in conjunction with the 1980 census.

Minor Civil Division (MCD)

Minor civil divisions (MCDs) are the primary governmental or administrative divisions of a county in many states (parish in Louisiana). MCDs represent many different kinds of legal entities with a wide variety of governmental and/or administrative functions. MCDs are variously designated as American Indian reservations, assessment districts, boroughs, charter townships, election districts, election precincts, gores, grants, locations, magisterial districts, parish governing authority districts, plantations, precincts, purchases, road districts, supervisors' districts, towns, and townships. In some states, all or some incorporated places are not located in any MCD (independent places) and thus serve as MCDs in their own right. In other states, incorporated places are part of the MCDs in which they are located (dependent places), or the pattern is mixed—some incorporated places are independent of MCDs and others are included within one or more MCDs. Independent cities, which are statistically equivalent to a county, also are treated as a separate MCD equivalent in states containing MCDs. In Maine and New York, there are American Indian reservations and off-reservation trust lands that serve as MCD equivalents; a separate MCD is created in each case where the American Indian area crosses a county boundary.

The U.S. Census Bureau recognizes MCDs in the following 28 states: Arkansas, Connecticut, Illinois, Indiana, Iowa, Kansas, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Rhode Island, South Dakota, Vermont, Virginia, West Virginia, and Wisconsin. The District of Columbia has no primary divisions, and the city of Washington is considered equivalent to an MCD for data presentation purposes. Arlington County, VA, also has no MCDs and the entire county is designated as an MCD with the name Arlington.

In the Island Areas, the U.S. Census Bureau recognizes the following entities as MCDs:

- American Samoa: Counties (within the three districts; the two islands have no legal subdivisions).

- Northern Mariana Islands: Municipal districts.
- Guam: Election districts.
- Virgin Islands of the United States: Census subdistricts.

The MCDs in 12 states (Connecticut, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin) also serve as general-purpose local governments that generally can perform the same governmental functions as incorporated places. The U.S. Census Bureau presents data for these MCDs in all data products in which it provides data for places.

Unorganized Territory

Unorganized territories occur in 10 minor civil division (MCD) states (Arkansas, Indiana, Iowa, Louisiana, Maine, Minnesota, North Carolina, North Dakota, Ohio, and South Dakota) where portions of counties are not included in any legally established MCD or independent incorporated place. The U.S. Census Bureau recognizes such areas as one or more separate county subdivisions for purposes of data presentation. It assigns each unorganized territory a descriptive name, followed by the designation “unorganized territory” or “UT.” Unorganized territories were first used for data presentation purposes in conjunction with the 1960 census.

Census County

The primary legal divisions of most states are termed “counties.” In Louisiana, these divisions are known as parishes. In Alaska, which has no counties, the statistically equivalent entities are census areas, city and boroughs (as in Juneau City and Borough), a municipality (Anchorage), and organized boroughs. Census areas are delineated cooperatively for data presentation purposes by the state of Alaska and the U.S. Census Bureau. In four states (Maryland, Missouri, Nevada, and Virginia), there are one or more incorporated places that are independent of any county organization and thus constitute primary divisions of their states; these incorporated places are known as “independent cities” and are treated as equivalent to counties for data presentation purposes. (In some data presentations, they may be treated as county subdivisions and places.) The District of Columbia has no primary divisions, and the entire area is considered equivalent to a county for data presentation purposes. In American Samoa, the primary divisions are districts and islands; in the Northern Mariana Islands, municipalities; in the Virgin Islands of the

United States, the principal islands of St. Croix, St. John, and St. Thomas. Guam has no primary divisions, and the entire area is considered equivalent to a county for data presentation purposes. Each county and statistically equivalent entity is assigned a three-digit Federal Information Processing Standards code that is unique within state. These codes are assigned in alphabetical order of county or county equivalent within state, except for the independent cities, which are assigned codes higher than and following the listing of counties.

Place

Places, for the reporting of decennial census data, include census designated places, consolidated cities, and incorporated places. Each place is assigned a five-digit Federal Information Processing Standards (FIPS) code, based on the alphabetical order of the place name within each state. If place names are duplicated within a state and they represent distinctly different areas, a separate code is assigned to each place name alphabetically by primary county in which each place is located, or if both places are in the same county, alphabetically by their legal description (for example, “city” before “village”).

Census Designated Place (CDP)

Census designated places (CDPs) are delineated for each decennial census as the statistical counterparts of incorporated places. CDPs are delineated to provide census data for concentrations of population, housing, and commercial structures that are identifiable by name but are not within an incorporated place. CDP boundaries usually are defined in cooperation with state, local, and tribal officials. These boundaries, which usually coincide with visible features or the boundary of an adjacent incorporated place or other legal entity boundary, have no legal status, nor do these places have officials elected to serve traditional municipal functions. CDP boundaries may change from one decennial census to the next with changes in the settlement pattern; a CDP with the same name as in an earlier census does not necessarily have the same boundary. For Census 2000, for the first time, CDPs did not need to meet a minimum population threshold to qualify for tabulation of census data. For the 1990 census and earlier censuses, the U.S. Census Bureau required CDPs to qualify on the basis of various minimum population size criteria. Beginning with the 1950 census, the U.S. Census Bureau, in cooperation with state and local governments (and American Indian tribal officials starting with the 1990 census), identified and delineated boundaries and names for CDPs. In the data products issued in conjunction with Census 2000, the name of each such place is followed by “CDP,” as was the case for the 1990 and 1980 censuses. In the data products issued in

conjunction with the 1950, 1960, and 1970 censuses, these places were identified by “(U),” meaning “unincorporated place.” Hawaii is the only state that has no incorporated places recognized by the U.S. Census Bureau. All places shown in the data products for Hawaii are CDPs. By agreement with the state of Hawaii, the U.S. Census Bureau does not show data separately for the city of Honolulu, which is coextensive with Honolulu County. All places in the Northern Mariana Islands and Guam are CDPs. The Virgin Islands of the United States has both CDPs and incorporated places. There are no CDPs in American Samoa; the U.S. Census Bureau treats the traditional villages as statistically equivalent to incorporated places.

Consolidated City

A consolidated government is a unit of local government for which the functions of an incorporated place and its county or minor civil division (MCD) have merged. The legal aspects of this action may result in both the primary incorporated place and the county or MCD continuing to exist as legal entities, even though the county or MCD performs few or no governmental functions and has few or no elected officials. Where this occurs, and where one or more other incorporated places in the county or MCD continue to function as separate governments, even though they have been included in the consolidated government, the primary incorporated place is referred to as a consolidated city. The presentation of data for consolidated cities varies depending on the geographic presentation. In some hierarchical presentations, consolidated cities are not shown. These presentations include the places within the consolidated city and the “consolidated city (balance).” Although hierarchical presentations do not show the consolidated city, the data for it are the same as the county or county subdivision with which it is coextensive. Other hierarchical presentations do show the consolidated city, county or county subdivision, and (balance) as separate entities. For inventory geographic presentations, the consolidated city appears alphabetically sequenced within the listing of places; in 1990, consolidated places appeared at the end of the listing. The data for the consolidated city include the data for all places that are part of and within the consolidated city. The “consolidated city (balance)” entry shows the data for the portion of the consolidated government minus the separately incorporated places within the consolidated city, and is shown in alphabetical sequence with other places that comprise the consolidated city. For data presentation purposes these “balance” entities are treated as statistically equivalent to a place; they have no legal basis or functions. In summary presentations by size of place, the consolidated city is not included. The places within consolidated cities are categorized by their size, as is the “consolidated city (balance).” A few incorporated places are partially inside and partially outside a consolidated city. Data tabulations by place will include all

territory within the place, while the tabulation for the place within a consolidated city is only for part of the place. Each consolidated city is assigned a five-digit Federal Information Processing Standards (FIPS) code that is unique within state. The places within consolidated cities and the “consolidated city (balance)” also are assigned five-digit FIPS place codes that are unique within state. The code assigned to each place within a consolidated city is the same as its regular place code; a place that is partially included in a consolidated city does not have a different code for the portions inside and outside the consolidated city. FIPS codes are assigned based on alphabetical sequence within each state.

Incorporated Place

Incorporated places recognized in decennial census data products are those reported to the U.S. Census Bureau as legally in existence on January 1, 2000, under the laws of their respective states, as cities, boroughs, city and boroughs, municipalities, towns, and villages, with the following exceptions: the towns in the New England states, New York, and Wisconsin, and the boroughs in New York are recognized as minor civil divisions for decennial census purposes; the boroughs, city and boroughs (as in Juneau City and Borough), and municipality (Anchorage) in Alaska are county equivalents for decennial census statistical presentation purposes. In four states (Maryland, Missouri, Nevada, and Virginia), there are one or more incorporated places known as “independent cities” that are primary divisions of a state and legally not part of any county. For data presentation purposes, the U.S. Census Bureau may treat an independent city as a county equivalent, county subdivision, and place. The U.S. Census Bureau treats the villages in American Samoa as incorporated places because they have their own officials, who have specific legal powers as authorized in the American Samoa Code. The village boundaries are traditional rather than being specific, legally defined locations. There are no incorporated places in Guam and the Northern Mariana Islands. The U.S. Census Bureau treats the three towns in the Virgin Islands of the United States as incorporated places. There are a few incorporated places that do not have a legal description. An incorporated place is established to provide governmental functions for a concentration of people as opposed to a minor civil division, which generally is created to provide services or administer an area without regard, necessarily, to population.

Public Use Microdata Area (PUMA)

A public use microdata area (PUMA) is a decennial census area for which the U.S. Census Bureau provides specially selected extracts of raw data from a small sample of long-form census

records that are screened to protect confidentiality. These extracts are referred to as “public use microdata sample (PUMS)” files. Since 1960, data users have been using these files to create their own statistical tabulations and data summaries. For Census 2000, state, District of Columbia, Puerto Rico, and Island Area participants, following U.S. Census Bureau criteria, delineated two types of PUMAs within their states. PUMAs of one type comprise areas that contain at least 100,000 people. The PUMS files for these PUMAs contain a 5-percent sample of the long-form records. The other type of PUMAs, super-PUMAs, comprise areas of at least 400,000 people. The sample size is 1 percent for the PUMS files for super-PUMAs. PUMAs cannot be in more than one state or statistically equivalent entity. The larger 1-percent PUMAs are aggregations of the smaller 5-percent PUMAs. PUMAs of both types, wherever the population size criteria permit, comprise areas that are entirely within or outside metropolitan areas or the central cities of metropolitan areas.

School District

School districts are geographic entities within which state, county, or local officials or the Department of Defense provide public educational services for the areas residents. The U.S. Census Bureau obtains the boundaries and names for school districts from state officials. The U.S. Census Bureau first provided data for school districts in conjunction with the 1970 census. For Census 2000, the U.S. Census Bureau tabulated data for three types of school districts: elementary, secondary, and unified. Each school district is assigned a five-digit code that is unique within state. School district codes are assigned by the Department of Education and are not necessarily in alphabetical order by school district name.

Appendix I. List of All Census-Recognized AIANAs

Table I.1: AIANAs with AIAN Households

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100- Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Acoma Pueblo and Off-Reservation Trust Land	NM	0010	1,004	691	661	95.7
Agua Caliente Reservation	CA	0020	20,926	11,830	73	0.6
Alabama-Coushatta Reservation	TX	0050	203	165	156	94.5
Allegany Reservation	NY	0080	3,035	2,717	449	16.5
Alturas Rancheria	CA	0095	2	2	2	100.0
Annette Island Reserve	AK	0110	562	491	416	84.7
Bad River Reservation	WI	0140	595	456	360	78.9
Barona Reservation	CA	0155	162	151	112	74.2
Battle Mountain Reservation	NV	0165	63	55	53	96.4
Bay Mills Reservation and Off-Reservation Trust Land	MI	0170	333	313	256	81.8
Benton Paiute Reservation	CA	0185	30	15	15	100.0
Berry Creek Rancheria and Off-Reservation Trust Land	CA	0200	40	28	28	100.0
Big Cypress Reservation	FL	0225	55	42	36	85.7
Big Lagoon Rancheria	CA	0240	9	9	9	100.0
Big Pine Reservation	CA	0250	181	153	104	68.0
Big Sandy Rancheria	CA	0265	34	48	42	87.5
Big Valley Rancheria	CA	0275	64	55	51	92.7
Bishop Reservation	CA	0290	530	491	337	68.6

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Blackfeet Reservation and Off-Reservation Trust Land	MT	0305	3,583	2,940	2,330	79.3
Blue Lake Rancheria	CA	0325	41	37	14	37.8
Bois Forte Reservation	MN	0335	398	235	166	70.6
Bridgeport Reservation	CA	0350	21	17	17	100.0
Brighton Reservation	FL	0360	216	152	126	82.9
Burns Paiute Colony and Off-Reservation Trust Land	OR	0400	57	50	47	94.0
Cahuilla Reservation	CA	0435	56	50	26	52.0
Campbell Ranch	NV	0440	80	74	65	87.8
Campo Reservation	CA	0450	111	109	85	78.0
Carson Colony	NV	0510	105	88	78	88.6
Catawba Reservation	SC	0525	174	172	148	86.0
Cattaraugus Reservation	NY	0540	901	842	714	84.8
Cedarville Rancheria	CA	0555	9	8	8	100.0
Celilo Village	OR	0560	22	18	16	88.9
Chehalis Reservation	WA	0575	214	190	104	54.7
Chemehuevi Reservation	CA	0585	699	155	69	44.5
Cheyenne River Reservation and Off-Reservation Trust Land	SD	0605	3,004	2,598	1,648	63.4
Chitimacha Reservation	LA	0635	168	161	131	81.4
Cochiti Pueblo	NM	0680	625	536	202	37.7
Cocopah Reservation	AZ	0695	970	419	172	41.1
Coeur d'Alene Reservation	ID	0705	4,015	2,486	379	15.2

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100- Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Cold Springs Rancheria	CA	0720	46	52	45	86.5
Colorado River Reservation	AZ--CA	0735	5,894	3,273	735	22.5
Colusa Rancheria	CA	0750	25	28	24	85.7
Colville Reservation and Off-Reservation Trust Land	WA	0760	3,309	2,696	1,480	54.9
Coos, Lower Umpqua, and Siuslaw Reservation and Off-Reservation Trust Land	OR	0770	9	1	1	100.0
Coquille Reservation and Off-Reservation Trust Land	OR	0775	98	73	43	58.9
Cortina Rancheria	CA	0780	9	2	2	100.0
Coushatta Reservation	LA	0795	14	15	15	100.0
Coyote Valley Reservation	CA	0825	31	24	18	75.0
Crow Reservation and Off-Reservation Trust Land	MT	0845	2,280	1,851	1,224	66.1
Crow Creek Reservation	SD	0855	617	547	429	78.4
Dresslerville Colony	NV	0940	116	114	109	95.6
Dry Creek Rancheria	CA	0955	15	15	9	60.0
Duck Valley Reservation	ID--NV	0965	457	417	371	89.0
Duckwater Reservation	NV	0975	65	59	45	76.3
Eastern Cherokee Reservation	NC	0990	3,194	2,619	2,079	79.4
Elko Colony	NV	1005	257	258	250	96.9
Elk Valley Rancheria	CA	1010	36	32	13	40.6
Ely Reservation	NV	1040	67	51	48	94.1
Enterprise Rancheria	CA	1055	1	3	3	100.0

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Fallon Paiute-Shoshone Colony	NV	1070	51	40	38	95.0
Fallon Paiute-Shoshone Reservation and Off-Reservation Trust Land	NV	1075	256	220	208	94.5
Flandreau Reservation	SD	1100	137	125	107	85.6
Flathead Reservation	MT	1110	12,679	10,017	2,309	23.1
Fond du Lac Reservation and Off-Reservation Trust Land	MN--WI	1125	1,513	1,317	412	31.3
Forest County Potawatomi Community and Off-Reservation Trust Land	WI	1135	174	158	140	88.6
Fort Apache Reservation	AZ	1140	3,532	3,041	2,762	90.8
Fort Belknap Reservation and Off-Reservation Trust Land	MT	1150	967	823	767	93.2
Fort Berthold Reservation	ND	1160	2,881	1,894	1,103	58.2
Fort Bidwell Reservation	CA	1170	47	45	45	100.0
Fort Hall Reservation and Off-Reservation Trust Land	ID	1185	2,011	1,778	1,064	59.8
Fort Independence Reservation	CA	1195	42	32	19	59.4
Fort McDermitt Reservation	OR--NV	1210	119	105	99	94.3
Fort McDowell Reservation	AZ	1220	275	234	216	92.3
Fort Mojave Reservation and Off-Reservation Trust Land	AZ--CA--NV	1235	416	326	144	44.2
Fort Peck Reservation and Off-Reservation Trust Land	MT	1250	3,755	3,336	1,699	50.9

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Fort Yuma Reservation	CA--AZ	1280	962	793	390	49.2
Gila River Reservation	AZ	1310	2,901	2,689	2,503	93.1
Goshute Reservation	NV--UT	1340	45	32	32	100.0
Grand Portage Reservation and Off-Reservation Trust Land	MN	1355	286	236	150	63.6
Grand Ronde Community and Off-Reservation Trust Land	OR	1365	19	9	9	100.0
Grand Traverse Reservation and Off-Reservation Trust Land	MI	1370	166	172	141	82.0
Greenville Rancheria	CA	1380	9	9	5	55.6
Grindstone Rancheria	CA	1395	49	42	40	95.2
Hannahville Community and Off-Reservation Trust Land	MI	1410	109	106	96	90.6
Havasupai Reservation	AZ	1440	161	126	114	90.5
Ho-Chunk Reservation and Off-Reservation Trust Land	WI--MN	1450	349	266	222	83.5
Hoh Reservation	WA	1460	33	29	25	86.2
Hollywood Reservation	FL	1475	1,498	1,014	184	18.1
Hoopa Valley Reservation	CA	1490	1,001	829	657	79.3
Hopi Reservation and Off-Reservation Trust Land	AZ	1505	2,512	1,919	1,774	92.4
Hopland Rancheria and Off-Reservation Trust Land	CA	1515	18	7	7	100.0

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Houlton Maliseet Trust Land	ME	1530	54	63	58	92.1
Hualapai Reservation and Off-Reservation Trust Land	AZ	1545	475	348	324	93.1
Huron Potawatomi Reservation	MI	1550	7	4	4	100.0
Immokalee Reservation	FL	1555	62	69	62	89.9
Indian Township Reservation	ME	1575	261	244	204	83.6
Iowa Reservation and Off-Reservation Trust Land	KS--NE	1590	67	64	36	56.3
Isabella Reservation and Off-Reservation Trust Land	MI	1610	10,584	9,915	435	4.4
Isleta Pueblo	NM	1625	1,204	1,054	968	91.8
Jamestown S'Klallam Reservation and Off-Reservation Trust Land	WA	1655	8	7	2	28.6
Jemez Pueblo	NM	1685	504	469	459	97.9
Jicarilla Apache Reservation	NM	1700	972	817	705	86.3
Kaibab Reservation	AZ	1720	88	82	55	67.1
Kalispel Reservation	WA	1735	63	48	48	100.0
Karuk Reservation and Off-Reservation Trust Land	CA	1750	124	90	66	73.3
Kickapoo (KS) Reservation	KS	1770	1,902	1,680	209	12.4
Kickapoo (TX) Reservation	TX	1775	104	108	103	95.4
Klamath Reservation	OR	1785	6	2	2	100.0
Kootenai Reservation	ID	1800	24	21	20	95.2

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Lac Courte Oreilles Reservation and Off-Reservation Trust Land	WI	1815	1,990	987	613	62.1
Lac du Flambeau Reservation	WI	1825	2,907	1,077	500	46.4
Lac Vieux Desert Reservation	MI	1830	50	48	40	83.3
Laguna Pueblo and Off-Reservation Trust Land	NM	1840	1,238	1,071	1,047	97.8
La Jolla Reservation	CA	1850	143	123	94	76.4
Lake Traverse Reservation	SD--ND	1860	5,184	3,759	921	24.5
L'Anse Reservation and Off-Reservation Trust Land	MI	1880	1,664	1,455	319	21.9
La Posta Reservation	CA	1895	6	10	10	100.0
Las Vegas Colony	NV	1915	37	33	31	93.9
Laytonville Rancheria	CA	1925	61	60	60	100.0
Leech Lake Reservation and Off-Reservation Trust Land	MN	1940	6,828	3,586	1,356	37.8
Lone Pine Reservation	CA	1970	100	84	62	73.8
Lookout Rancheria	CA	1980	5	2	2	100.0
Los Coyotes Reservation	CA	1995	23	22	16	72.7
Lovelock Colony	NV	2015	38	35	32	91.4
Lower Brule Reservation and Off-Reservation Trust Land	SD	2030	392	356	303	85.1
Lower Elwha Reservation and Off-Reservation Trust Land	WA	2040	99	95	75	78.9

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Lower Sioux Reservation	MN	2055	116	103	94	91.3
Lummi Reservation	WA	2070	1,749	1,455	535	36.8
Makah Reservation	WA	2085	533	471	385	81.7
Manchester-Point Arena Rancheria	CA	2100	65	56	48	85.7
Manzanita Reservation	CA	2115	29	21	14	66.7
Maricopa (Ak Chin) Reservation	AZ	2130	234	216	184	85.2
Mashantucket Pequot Reservation and Off-Reservation Trust Land	CT	2145	114	90	88	97.8
Menominee Reservation and Off-Reservation Trust Land	WI	2175	932	853	748	87.7
Mesa Grande Reservation	CA	2190	19	17	15	88.2
Mescalero Reservation	NM	2205	916	842	769	91.3
Middletown Rancheria	CA	2255	20	18	15	83.3
Mille Lacs Reservation and Off-Reservation Trust Land	MN	2270	2,869	1,862	299	16.1
Minnesota Chippewa Trust Land	MN	2285	43	21	14	66.7
Mississippi Choctaw Reservation and Off-Reservation Trust Land	MS	2300	1,411	1,326	1,051	79.3
Moapa River Reservation	NV	2315	90	77	59	76.6
Montgomery Creek Rancheria	CA	2330	2	3	3	100.0
Mooretown Rancheria	CA	2340	52	54	54	100.0
Morongo Reservation	CA	2360	345	295	196	66.4

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Muckleshoot Reservation and Off-Reservation Trust Land	WA	2375	1,333	1,275	267	20.9
Nambe Pueblo and Off-Reservation Trust Land	NM	2400	735	697	187	26.8
Narragansett Reservation	RI	2415	20	19	3	15.8
Navajo Nation Reservation and Off-Reservation Trust Land	AZ--NM--UT	2430	68,744	47,824	45,623	95.4
Nez Perce Reservation	ID	2445	7,940	7,007	674	9.6
Nisqually Reservation	WA	2460	178	175	97	55.4
Nooksack Reservation and Off-Reservation Trust Land	WA	2475	142	147	110	74.8
Northern Cheyenne Reservation and Off-Reservation Trust Land	MT--SD	2490	1,328	1,191	980	82.3
North Fork Rancheria	CA	2495	2	2	2	100.0
Omaha Reservation	NE--IA	2550	1,837	1,671	484	29.0
Oneida (NY) Reservation	NY	2555	20	19	19	100.0
Oneida (WI) Reservation and Off-Reservation Trust Land	WI	2560	7,559	7,365	1,050	14.3
Onondaga Reservation	NY	2570	311	304	144	47.4
Osage Reservation	OK	2595	18,826	16,617	1,976	11.9
Paiute (UT) Reservation	UT	2625	84	75	70	93.3
Pala Reservation	CA	2635	408	387	211	54.5
Pascua Yaqui Reservation	AZ	2680	785	745	683	91.7

Table I.1 AIANAs with AIAN households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Pauma and Yuima Reservation	CA	2715	53	43	31	72.1
Pechanga Reservation	CA	2745	163	160	135	84.4
Penobscot Reservation and Off-Reservation Trust Land	ME	2760	364	223	186	83.4
Picayune Rancheria	CA	2775	16	4	4	100.0
Picuris Pueblo	NM	2785	883	705	63	8.9
Pine Ridge Reservation and Off-Reservation Trust Land	SD--NE	2810	3,931	3,504	3,093	88.3
Pinoleville Rancheria	CA	2820	42	43	29	67.4
Pit River Trust Land	CA	2835	4	6	6	100.0
Pleasant Point Reservation	ME	2850	256	232	204	87.9
Poarch Creek Reservation and Off-Reservation Trust Land	AL--FL	2865	101	92	59	64.1
Pojoaque Pueblo	NM	2880	1,179	1,071	114	10.6
Port Gamble Reservation	WA	2910	226	211	142	67.3
Port Madison Reservation	WA	2925	2,884	2,600	167	6.4
Prairie Band Potawatomi Reservation	KS	2980	428	363	136	37.5
Prairie Island Indian Community and Off-Reservation Trust Land	MN	2985	65	73	62	84.9
Puyallup Reservation and Off-Reservation Trust Land	WA	3000	16,388	15,456	345	2.2
Pyramid Lake Reservation	NV	3010	687	625	418	66.9

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Quartz Valley Reservation	CA	3020	58	41	17	41.5
Quileute Reservation	WA	3030	128	116	107	92.2
Quinault Reservation	WA	3040	487	403	307	76.2
Red Cliff Reservation and Off-Reservation Trust Land	WI	3085	429	351	303	86.3
Redding Rancheria	CA	3095	17	13	8	61.5
Red Lake Reservation	MN	3100	1,419	1,357	1,302	95.9
Redwood Valley Rancheria Reservation	CA	3115	87	95	29	30.5
Reno-Sparks Colony	NV	3130	282	273	264	96.7
Resighini Rancheria	CA	3145	6	5	5	100.0
Rincon Reservation	CA	3165	385	377	152	40.3
Roaring Creek Rancheria	CA	3185	5	2	2	100.0
Robinson Rancheria and Off-Reservation Trust Land	CA	3195	43	41	31	75.6
Rocky Boy's Reservation and Off-Reservation Trust Land	MT	3205	698	606	583	96.2
Rohnerville Rancheria	CA	3220	29	27	15	55.6
Rosebud Reservation and Off-Reservation Trust Land	SD	3235	3,166	2,784	2,169	77.9
Round Valley Reservation and Off-Reservation Trust Land	CA	3250	108	73	49	67.1
Rumsey Rancheria	CA	3265	11	10	10	100.0

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Sac and Fox/Meskwaki Reservation and Off-Reservation Trust Land	IA	3280	267	237	174	73.4
Sac and Fox Reservation and Off-Reservation Trust Land	NE--KS	3285	79	69	11	15.9
St. Croix Reservation and Off-Reservation Trust Land	WI	3305	208	159	144	90.6
St. Regis Mohawk Reservation	NY	3320	977	904	872	96.5
Salt River Reservation	AZ	3340	2,526	1,961	811	41.4
San Carlos Reservation	AZ	3355	2,497	2,229	2,007	90.0
Sandia Pueblo	NM	3370	1,622	1,490	167	11.2
Sandy Lake Reservation	MN	3385	22	21	21	100.0
San Felipe Pueblo	NM	3400	738	682	436	63.9
San Ildefonso Pueblo	NM	3415	626	558	187	33.5
San Juan Pueblo	NM	3430	2,554	2,288	423	18.5
San Manuel Reservation	CA	3445	27	25	10	40.0
San Pasqual Reservation	CA	3460	228	220	91	41.4
Santa Ana Pueblo	NM	3480	197	118	116	98.3
Santa Clara Pueblo	NM	3495	4,435	4,062	461	11.3
Santa Rosa Rancheria	CA	3520	125	125	112	89.6
Santa Rosa Reservation	CA	3525	25	17	12	70.6
Santa Ynez Reservation	CA	3540	42	38	25	65.8
Santa Ysabel Reservation	CA	3550	102	98	93	94.9

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Santee Reservation	NE	3565	368	294	165	56.1
Santo Domingo Pueblo	NM	3585	601	555	548	98.7
Sauk-Suiattle Reservation	WA	3625	16	14	9	64.3
Sault Ste. Marie Reservation and Off-Reservation Trust Land	MI	3635	673	524	305	58.2
Shakopee Mdewakanton Sioux Community and Off-Reservation Trust Land	MN	3680	120	135	111	82.2
Sherwood Valley Rancheria	CA	3735	49	42	37	88.1
Shingle Springs Rancheria	CA	3750	16	10	5	50.0
Shoalwater Bay Reservation and Off-Reservation Trust Land	WA	3780	35	23	19	82.6
Siletz Reservation and Off-Reservation Trust Land	OR	3795	104	96	58	60.4
Skokomish Reservation	WA	3825	279	235	166	70.6
Skull Valley Reservation	UT	3840	11	7	7	100.0
Smith River Rancheria	CA	3855	21	17	9	52.9
Soboba Reservation	CA	3870	173	160	135	84.4
Sokaogon Chippewa Community and Off-Reservation Trust Land	WI	3885	167	144	117	81.3
Southern Ute Reservation	CO	3925	4,796	4,159	471	11.3
South Fork Reservation and Off-Reservation Trust Land	NV	3930	62	52	52	100.0
Spirit Lake Reservation	ND	3935	1,534	1,253	783	62.5

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Spokane Reservation	WA	3940	701	641	497	77.5
Squaxin Island Reservation and Off-Reservation Trust Land	WA	3955	127	126	100	79.4
Standing Rock Reservation	SD--ND	3970	2,762	2,372	1,406	59.3
Stewart Community	NV	3980	62	67	67	100.0
Stewarts Point Rancheria	CA	3985	17	16	16	100.0
Stillaguamish Reservation	WA	4000	31	31	26	83.9
Stockbridge-Munsee Community	WI	4015	676	532	251	47.2
Sulphur Bank Rancheria	CA	4030	15	15	15	100.0
Summit Lake Reservation	NV	4045	15	8	8	100.0
Susanville Rancheria	CA	4060	95	111	102	91.9
Swinomish Reservation	WA	4075	1,302	1,112	168	15.1
Sycuan Reservation	CA	4090	14	19	16	84.2
Table Bluff Reservation and Off-Reservation Trust Land	CA	4095	35	25	21	84.0
Table Mountain Rancheria	CA	4110	4	3	3	100.0
Taos Pueblo and Off-Reservation Trust Land	NM	4140	2,491	1,918	469	24.5
Tesuque Pueblo and Off-Reservation Trust Land	NM	4170	327	293	141	48.1
Tohono O'odham Reservation and Off-Reservation Trust Land	AZ	4200	3,572	2,876	2,539	88.3
Tonawanda Reservation	NY	4225	197	135	108	80.0
Tonto Apache Reservation	AZ	4235	38	45	45	100.0

Table I.1: AIANAs with AIAN households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Torres-Martinez Reservation	CA	4255	933	859	69	8.0
Trinidad Rancheria and Off-Reservation Trust Land	CA	4275	37	20	18	90.0
Tulalip Reservation	WA	4290	3,638	3,314	499	15.1
Tule River Reservation	CA	4300	179	154	142	92.2
Tunica-Biloxi Reservation	LA	4315	34	33	31	93.9
Tuolumne Rancheria and Off-Reservation Trust Land	CA	4330	68	63	56	88.9
Turtle Mountain Reservation and Off-Reservation Trust Land	ND--MT--SD	4345	2,656	2,491	2,323	93.3
Tuscarora Reservation	NY	4360	398	347	138	39.8
Uintah and Ouray Reservation and Off-Reservation Trust Land	UT	4390	8,700	6,012	787	13.1
Umatilla Reservation	OR	4405	1,065	1,013	454	44.8
Upper Lake Rancheria	CA	4430	34	28	19	67.9
Upper Sioux Reservation	MN	4445	31	29	27	93.1
Upper Skagit Reservation	WA	4455	76	71	55	77.5
Ute Mountain Reservation and Off-Reservation Trust Land	CO--NM--UT	4470	570	508	500	98.4
Viejas Reservation	CA	4500	148	144	83	57.6
Walker River Reservation	NV	4515	339	304	261	85.9
Wampanoag-Aquinnah Trust Land	MA	4530	34	27	19	70.4

Table I.1: AIANAs With AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Warm Springs Reservation and Off-Reservation Trust Land	OR	4545	884	807	732	90.7
Wells Colony	NV	4580	24	23	23	100.0
White Earth Reservation and Off-Reservation Trust Land	MN	4595	4,992	3,317	993	29.9
Wind River Reservation and Off-Reservation Trust Land	WY	4610	9,375	8,373	1,663	19.9
Winnebago Reservation and Off-Reservation Trust Land	NE--IA	4625	875	811	373	46.0
Winnemucca Colony	NV	4635	21	24	15	62.5
Woodfords Community	CA	4665	61	60	57	95.0
XL Ranch	CA	4680	13	5	3	60.0
Yakama Reservation and Off-Reservation Trust Land	WA	4690	9,128	8,561	1,760	20.6
Yankton Reservation	SD	4700	2,581	2,214	693	31.3
Yavapai-Apache Nation Reservation	AZ	4708	197	202	174	86.1
Yavapai-Prescott Reservation	AZ	4710	60	55	41	74.5
Yerington Colony	NV	4725	54	54	50	92.6
Yomba Reservation	NV	4740	36	30	25	83.3
Ysleta Del Sur Pueblo and Off-Reservation Trust Land	TX	4755	116	111	77	69.4
Yurok Reservation	CA	4760	604	442	192	43.4

Table I.1: AIANAs With AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Zia Pueblo and Off-Reservation Trust Land	NM	4770	189	132	132	100.0
Zuni Reservation and Off-Reservation Trust Land	NM--AZ	4785	2,107	1,848	1,691	91.5
Menominee/Stockbridge-Munsee joint use area	WI	4915	118	46	43	93.5
Caddo-Wichita-Delaware OTSA	OK	5540	6,897	5,251	378	7.2
Cherokee OTSA	OK	5550	204,270	175,814	24,151	13.7
Cheyenne-Arapaho OTSA	OK	5560	66,836	58,780	1,971	3.4
Chickasaw OTSA	OK	5580	127,634	109,197	7,289	6.7
Choctaw OTSA	OK	5590	101,877	86,395	9,496	11.0
Citizen Potawatomi Nation-Absentee Shawnee OTSA	OK	5600	41,192	37,753	1,961	5.2
Creek OTSA	OK	5620	306,727	280,760	16,587	5.9
Eastern Shawnee OTSA	OK	5640	278	234	40	17.1
Iowa OTSA	OK	5670	2,536	2,283	120	5.3
Kaw OTSA	OK	5690	2,759	2,404	202	8.4
Kickapoo OTSA	OK	5700	7,130	6,481	459	7.1
Kiowa-Comanche-Apache-Fort Sill Apache OTSA	OK	5720	81,174	69,729	2,795	4.0
Miami OTSA	OK	5730	103	89	6	6.7
Modoc OTSA	OK	5740	79	60	8	13.3
Otoe-Missouria OTSA	OK	5760	323	271	111	41.0
Ottawa OTSA	OK	5770	2,764	2,386	403	16.9
Pawnee OTSA	OK	5780	7,407	6,332	603	9.5

Table I.1: AIANAs With AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Peoria OTSA	OK	5795	2,051	1,957	204	10.4
Ponca OTSA	OK	5800	904	788	220	27.9
Quapaw OTSA	OK	5810	3,119	2,757	366	13.3
Sac and Fox OTSA	OK	5820	24,684	21,788	1,571	7.2
Seminole OTSA	OK	5830	10,255	8,802	1,134	12.9
Seneca-Cayuga OTSA	OK	5835	2,874	1,719	149	8.7
Tonkawa OTSA	OK	5860	1,786	1,504	104	6.9
Wyandotte OTSA	OK	5890	741	707	104	14.7
Creek-Seminole joint use area OTSA	OK	5915	891	773	143	18.5
Kaw-Ponca joint use area OTSA	OK	5950	12,630	11,352	547	4.8
Kiowa-Comanche-Apache-Ft Sill Apache-Caddo-Wichita-Delaware joint use area OTSA	OK	5955	5,023	4,317	1,133	26.2
Miami-Peoria joint use area OTSA	OK	5970	2,016	1,849	242	13.1
Akhiok ANVSA	AK	6015	34	26	21	80.8
Akiachak ANVSA	AK	6020	189	127	118	92.9
Akiak ANVSA	AK	6025	76	72	67	93.1
Akutan ANVSA	AK	6030	38	29	27	93.1
Alakanuk ANVSA	AK	6035	160	143	124	86.7
Alatna ANVSA	AK	6040	17	12	10	83.3
Aleknagik ANVSA	AK	6045	107	71	55	77.5
Algaacig ANVSA	AK	6065	127	99	80	80.8

Table I.1: AIANAs With AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Allakaket ANVSA	AK	6070	68	49	43	87.8
Ambler ANVSA	AK	6075	98	71	53	74.6
Anaktuvuk Pass ANVSA	AK	6080	101	85	67	78.8
Andreafsky ANVSA	AK	6095	59	43	33	76.7
Angoon ANVSA	AK	6100	221	195	151	77.4
Aniak ANVSA	AK	6105	203	172	88	51.2
Anvik ANVSA	AK	6125	49	39	34	87.2
Arctic Village ANVSA	AK	6140	67	48	38	79.2
Atka ANVSA	AK	6150	41	31	27	87.1
Atmautluak ANVSA	AK	6160	64	58	51	87.9
Atkasuk ANVSA	AK	6165	60	51	43	84.3
Barrow ANVSA	AK	6175	1,620	1,371	679	49.5
Beaver ANVSA	AK	6190	54	37	31	83.8
Bethel ANVSA	AK	6205	1,990	1,741	788	45.3
Birch Creek ANVSA	AK	6235	22	10	10	100.0
Brevig Mission ANVSA	AK	6240	76	69	61	88.4
Buckland ANVSA	AK	6250	89	84	75	89.3
Cantwell ANVSA	AK	6255	177	106	15	14.2
Chalkyitsik ANVSA	AK	6265	62	32	32	100.0
Chefornak ANVSA	AK	6275	82	72	64	88.9
Chenega ANVSA	AK	6280	27	22	12	54.5

Table I.1: AIANAs With AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units with Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Chevak ANVSA	AK	6285	190	166	146	88.0
Chickaloon ANVSA	AK	6290	6,393	5,618	189	3.4
Chignik ANVSA	AK	6295	80	34	16	47.1
Chignik Lagoon ANVSA	AK	6300	68	35	20	57.1
Chignik Lake ANVSA	AK	6305	50	37	31	83.8
Chilkat ANVSA	AK	6310	85	42	42	100.0
Chilkoot ANVSA	AK	6315	186	150	15	10.0
Chistochina ANVSA	AK	6325	39	32	19	59.4
Chitina ANVSA	AK	6330	41	38	9	23.7
Chuathbaluk ANVSA	AK	6335	43	37	31	83.8
Circle ANVSA	AK	6350	42	28	18	64.3
Clark's Point ANVSA	AK	6360	51	29	28	96.6
Copper Center ANVSA	AK	6365	218	175	57	32.6
Craig ANVSA	AK	6385	737	631	114	18.1
Crooked Creek ANVSA	AK	6390	46	45	34	75.6
Deering ANVSA	AK	6400	61	42	36	85.7
Dillingham ANVSA	AK	6405	1,000	888	381	42.9
Dot Lake ANVSA	AK	6415	25	18	10	55.6
Douglass ANVSA	AK	6420	2,372	2,227	203	9.1
Eagle ANVSA	AK	6430	57	33	19	57.6
Eek ANVSA	AK	6440	83	75	69	92.0

Table I.1: AIANAs With AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Egegik ANVSA	AK	6445	286	39	23	59.0
Eklutna ANVSA	AK	6450	141	129	23	17.8
Ekwok ANVSA	AK	6460	56	37	35	94.6
Emmonak ANVSA	AK	6480	218	178	154	86.5
Evansville ANVSA	AK	6490	66	32	16	50.0
Eyak ANVSA	AK	6495	65	57	4	7.0
False Pass ANVSA	AK	6500	40	24	11	45.8
Fort Yukon ANVSA	AK	6515	317	237	198	83.5
Gakona ANVSA	AK	6520	39	39	6	15.4
Galena ANVSA	AK	6525	259	215	112	52.1
Gambell ANVSA	AK	6530	187	153	132	86.3
Golovin ANVSA	AK	6540	54	46	34	73.9
Goodnews Bay ANVSA	AK	6545	87	70	64	91.4
Grayling ANVSA	AK	6550	63	49	38	77.6
Gulkana ANVSA	AK	6560	74	58	28	48.3
Healy Lake ANVSA	AK	6575	21	17	11	64.7
Holy Cross ANVSA	AK	6585	81	69	65	94.2
Hoonah ANVSA	AK	6590	348	299	164	54.8
Hooper Bay ANVSA	AK	6595	239	230	200	87.0
Hughes ANVSA	AK	6605	39	26	22	84.6
Huslia ANVSA	AK	6610	111	94	85	90.4

Table I.1: AIANAs With AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Hydaburg ANVSA	AK	6615	154	141	123	87.2
Igiugig ANVSA	AK	6620	20	12	12	100.0
Iliamna ANVSA	AK	6625	58	41	17	41.5
Inalik ANVSA	AK	6630	47	44	40	90.9
Ivanof Bay ANVSA	AK	6650	12	9	9	100.0
Kake ANVSA	AK	6670	288	247	177	71.7
Kaktovik ANVSA	AK	6680	95	88	63	71.6
Kalskag ANVSA	AK	6685	66	64	51	79.7
Kaltag ANVSA	AK	6690	78	72	55	76.4
Karluk ANVSA	AK	6700	24	12	12	100.0
Kasaan ANVSA	AK	6705	39	20	5	25.0
Kasigluk ANVSA	AK	6710	110	107	94	87.9
Kenaitze ANVSA	AK	6720	14,124	10,898	531	4.9
Kiana ANVSA	AK	6730	133	93	81	87.1
King Cove ANVSA	AK	6735	207	166	117	70.5
Kipnuk ANVSA	AK	6750	154	144	136	94.4
Kivalina ANVSA	AK	6755	80	77	68	88.3
Klawock ANVSA	AK	6765	368	309	151	48.9
Knik ANVSA	AK	6785	16,333	11,216	298	2.7
Kobuk ANVSA	AK	6790	45	27	25	92.6
Kokhanok ANVSA	AK	6800	59	51	43	84.3

Table I.1: AIANAs With AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Kongiganak ANVSA	AK	6810	90	85	78	91.8
Kotlik ANVSA	AK	6815	139	123	108	87.8
Kotzebue ANVSA	AK	6820	1,007	889	521	58.6
Koyuk ANVSA	AK	6825	95	76	66	86.8
Koyukuk ANVSA	AK	6830	55	40	37	92.5
Kwethluk ANVSA	AK	6835	199	154	147	95.5
Kwigillingok ANVSA	AK	6840	78	69	62	89.9
Kwinhagak ANVSA	AK	6845	153	137	130	94.9
Larsen Bay ANVSA	AK	6855	70	38	21	55.3
Levelock ANVSA	AK	6865	50	44	39	88.6
Lower Kalskag ANVSA	AK	6890	79	71	61	85.9
McGrath ANVSA	AK	6895	213	145	40	27.6
Manley Hot Springs ANVSA	AK	6900	105	41	11	26.8
Manokotak ANVSA	AK	6905	106	95	92	96.8
Marshall ANVSA	AK	6910	104	89	79	88.8
Mekoryuk ANVSA	AK	6935	96	69	57	82.6
Mentasta Lake ANVSA	AK	6945	68	49	33	67.3
Minto ANVSA	AK	6965	99	72	69	95.8
Mountain Village ANVSA	AK	6975	211	179	147	82.1
Naknek ANVSA	AK	6990	455	236	91	38.6
Nanwalek ANVSA	AK	6995	54	47	38	80.9

Table I.1: AIANAs With AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Napakiak ANVSA	AK	7010	101	85	77	90.6
Napaskiak ANVSA	AK	7020	95	89	83	93.3
Nelson Lagoon ANVSA	AK	7025	33	33	29	87.9
Nenana ANVSA	AK	7030	210	187	76	40.6
Newhalen ANVSA	AK	7035	51	32	32	100.0
New Koliganek ANVSA	AK	7040	77	54	42	77.8
New Stuyahok ANVSA	AK	7050	107	109	97	89.0
Newtok ANVSA	AK	7055	67	63	55	87.3
Nightmute ANVSA	AK	7065	54	52	46	88.5
Nikolai ANVSA	AK	7070	47	37	30	81.1
Nikolski ANVSA	AK	7075	28	19	10	52.6
Ninilchik ANVSA	AK	7080	7,007	5,100	159	3.1
Noatak ANVSA	AK	7085	106	100	89	89.0
Nondalton ANVSA	AK	7100	120	69	56	81.2
Noorvik ANVSA	AK	7110	157	148	127	85.8
Northway ANVSA	AK	7115	39	34	34	100.0
Nuiqsut ANVSA	AK	7125	126	114	95	83.3
Nulato ANVSA	AK	7130	119	91	81	89.0
Nunam Iqua ANVSA	AK	7133	45	38	34	89.5
Nunapitchuk ANVSA	AK	7135	120	101	97	96.0
Old Harbor ANVSA	AK	7150	111	81	63	77.8

Table I.1: AIANAs With AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Oscarville ANVSA	AK	7175	20	14	14	100.0
Ouzinkie ANVSA	AK	7180	86	71	52	73.2
Pedro Bay ANVSA	AK	7205	44	18	7	38.9
Perryville ANVSA	AK	7215	45	29	27	93.1
Pilot Point ANVSA	AK	7225	60	33	25	75.8
Pilot Station ANVSA	AK	7230	126	105	99	94.3
Pitkas Point ANVSA	AK	7235	42	32	30	93.8
Platinum ANVSA	AK	7245	26	20	18	90.0
Point Hope ANVSA	AK	7250	215	183	148	80.9
Point Lay ANVSA	AK	7255	67	64	49	76.6
Port Graham ANVSA	AK	7265	82	67	51	76.1
Port Heiden ANVSA	AK	7270	56	37	27	73.0
Port Lions ANVSA	AK	7275	106	93	57	61.3
Rampart ANVSA	AK	7300	46	19	17	89.5
Red Devil ANVSA	AK	7305	22	18	11	61.1
Ruby ANVSA	AK	7310	107	64	52	81.3
Russian Mission ANVSA	AK	7315	81	72	58	80.6
St. George ANVSA	AK	7340	67	51	48	94.1
St. Michael ANVSA	AK	7375	93	89	75	84.3
St. Paul ANVSA	AK	7390	214	183	154	84.2
Salamatof ANVSA	AK	7400	282	207	10	4.8

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Sand Point ANVSA	AK	7410	282	231	136	58.9
Savoonga ANVSA	AK	7415	160	151	138	91.4
Saxman ANVSA	AK	7420	146	150	89	59.3
Scammon Bay ANVSA	AK	7425	114	94	86	91.5
Selawik ANVSA	AK	7430	188	172	148	86.0
Seldovia ANVSA	AK	7435	391	202	45	22.3
Shageluk ANVSA	AK	7440	52	38	36	94.7
Shaktoolik ANVSA	AK	7450	66	59	54	91.5
Shishmaref ANVSA	AK	7465	148	142	129	90.8
Shungnak ANVSA	AK	7470	64	60	53	88.3
Sleetmute ANVSA	AK	7495	51	31	27	87.1
South Naknek ANVSA	AK	7505	137	52	47	90.4
Stebbins ANVSA	AK	7510	134	125	110	88.0
Stevens Village ANVSA	AK	7520	43	35	30	85.7
Stony River ANVSA	AK	7525	25	23	23	100.0
Takotna ANVSA	AK	7530	49	19	9	47.4
Tanacross ANVSA	AK	7535	53	51	42	82.4
Tanana ANVSA	AK	7540	166	113	85	75.2
Tatitlek ANVSA	AK	7555	57	39	34	87.2
Tazlina ANVSA	AK	7560	173	129	15	11.6
Teller ANVSA	AK	7570	87	72	62	86.1

Table I.1: AIANAs with AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Togiak ANVSA	AK	7605	221	210	183	87.1
Toksook Bay ANVSA	AK	7625	110	109	94	86.2
Tuluksak ANVSA	AK	7630	93	88	76	86.4
Tuntutuliak ANVSA	AK	7640	97	78	71	91.0
Tununak ANVSA	AK	7645	93	78	74	94.9
Twin Hills ANVSA	AK	7650	33	16	12	75.0
Tyonek ANVSA	AK	7655	90	82	79	96.3
Ugashik ANVSA	AK	7665	35	7	4	57.1
Unalakleet ANVSA	AK	7690	242	225	188	83.6
Unalaska ANVSA	AK	7695	988	834	108	12.9
Wainwright ANVSA	AK	7735	179	149	136	91.3
Wales ANVSA	AK	7740	59	49	41	83.7
White Mountain ANVSA	AK	7745	75	66	59	89.4
Yakutat ANVSA	AK	7765	385	263	115	43.7
Aroostook Band of Micmac TDSA	ME	8050	4,888	4,257	81	1.9
Cayuga Nation TDSA	NY	8100	4,906	3,980	6	0.2
Ione Band of Miwok TDSA	CA	8300	4	10	6	60.0
Jena Band of Choctaw TDSA	LA	8350	24,415	22,093	147	0.7
Kanatak TDSA	AK	8400	3,997	3,659	98	2.7
Mechoopda TDSA	CA	8450	1,162	1,077	27	2.5
Pokagon Band of Potawatomi TDSA	MI--IN	8670	15,940	13,948	131	0.9

Table I.1: AIANAs With AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Samish TDSA	WA	8750	18,901	14,449	148	1.0
Tetlin TDSA	AK	8800	66	38	33	86.8
Hassanamisco (state) Reservation	MA	9150	1	2	2	100.0
Mattaponi (state) Reservation	VA	9230	28	26	26	100.0
MOWA Choctaw (state) Reservation	AL	9240	37	26	26	100.0
Pamunkey (state) Reservation	VA	9260	36	29	21	72.4
Paucatuck Eastern Pequot (state) Reservation	CT	9280	19	16	16	100.0
Poospatuck (state) Reservation	NY	9300	104	93	57	61.3
Shinnecock (state) Reservation	NY	9370	194	177	129	72.9
Tama (state) Reservation	GA	9400	21	21	21	100.0
Adais Caddo SDAISA	LA	9510	16,890	14,263	139	1.0
Apache Choctaw SDAISA	LA	9515	13,671	9,221	635	6.9
Cherokees of Southeast Alabama SDAISA	AL	9550	55,734	50,307	215	0.4
Chickahominy SDAISA	VA	9580	1,311	1,241	179	14.4
Clifton Choctaw SDAISA	LA	9630	205	191	79	41.4
Coharie SDAISA	NC	9635	54,248	47,694	547	1.1
Eastern Chickahominy SDAISA	VA	9675	42	38	15	39.5
Echota Cherokee SDAISA	AL	9680	26,997	25,039	511	2.0
Four Winds Cherokee SDAISA	LA	9720	34,316	29,844	309	1.0
Haliwa-Saponi SDAISA	NC	9745	3,384	2,932	825	28.1
Indians of Person County SDAISA	NC	9760	811	719	44	6.1

Table I.1: AIANAs With AIAN Households (continued)

American Indian/Alaska Native Area Name	State	Census Geography Identifier (GEO_ID2)	100-Percent Count of Housing Units	Occupied Housing Units With Reported Race (H009001)	Occupied Housing Units: Householder Who is AIAN Alone (H009004)	Percentage of AIAN Households
Lumbee SDAISA	NC	9815	184,305	167,524	19,150	11.4
MaChis Lower Creek SDAISA	AL	9820	11,048	9,675	76	0.8
Meherrin SDAISA	NC	9825	3,419	3,160	103	3.3
Nanticoke Indian Tribe SDAISA	DE	9830	17,594	10,056	159	1.6
Nanticoke Lenni Lenape SDAISA	NJ	9835	2,959	2,723	100	3.7
Ramapough SDAISA	NJ	9850	262	281	91	32.4
Star Muskogee Creek SDAISA	AL	9880	3,508	2,939	44	1.5
United Houma Nation SDAISA	LA	9960	337,007	312,304	3,130	1.0
Waccamaw Siouan SDAISA	NC	9970	891	798	474	59.4

Appendix J. American Indian and Alaskan Native Areas

There are both legal and statistical American Indian, and Alaska Native, entities for which the U.S. Census Bureau provides data for Census 2000. The legal entities consist of federally recognized American Indian reservations and off-reservation trust land areas, the tribal subdivisions that can divide these entities, state recognized American Indian reservations, and Alaska Native Regional Corporations. The statistical entities are Alaska Native village statistical areas, Oklahoma tribal statistical areas, tribal designated statistical areas, and state designated American Indian statistical areas. Tribal subdivisions can exist within the statistical Oklahoma tribal statistical areas. In all cases, these areas are mutually exclusive in that no American Indian, or Alaska Native home land can overlap another tribal entity, except for tribal subdivisions, which subdivide some American Indian entities, and Alaska Native village statistical areas, which exist within Alaska Native Regional Corporations. In some cases where more than one tribe claims jurisdiction over an area, the U.S. Census Bureau creates a joint use area as a separate entity to define this area of dual claims. The following provides more detail about each of the various American Indian areas and Alaska Native areas.

J.1 Alaska Native Regional Corporation (ANRC)

Alaska Native Regional Corporations (ANRCs) are corporate entities established to conduct both business and nonprofit affairs of Alaska Natives pursuant to the Alaska Native Claims Settlement Act of 1972 (Public Law 92-203). Twelve ANRCs are geographic entities that cover most of the state of Alaska (the Annette Island Reserve—an American Indian reservation—is excluded from any ANRC). (A thirteenth ANRC represents Alaska Natives who do not live in Alaska and do not identify with any of the 12 corporations; the U.S. Census Bureau does not provide data for this ANRC because it has no geographic extent.) The boundaries of ANRCs have been legally established. The U.S. Census Bureau offers representatives of the 12 nonprofit ANRCs the opportunity to review and update the ANRC boundaries. The U.S. Census Bureau first provided data for ANRCs for the 1990 census. A-4Census 2000 Geographic Terms and Concepts U.S. Census Bureau, Census 2000. Each ANRC is assigned a five-digit Federal Information Processing Standards (FIPS) code, which is assigned in alphabetical order by ANRC name.

J.2 Alaska Native Village Statistical Area (ANVSA)

Alaska Native village statistical areas (ANVSAs) are statistical entities that represent the densely settled portion of Alaska Native villages (ANVs), which constitute associations, bands, clans, communities, groups, tribes or villages, recognized pursuant to the Alaska Native Claims Settlement Act of 1972 (Public Law 92-203). ANVSAs are reviewed and delineated by officials of the ANV (or officials of the Alaska Native Regional Corporation (ANRC) in which the ANV is located if no ANV official chooses to participate in the delineation process) solely for data presentation purposes. An ANVSA may not overlap the boundary of another ANVSA, an American Indian reservation, or a tribal designated statistical area. The U.S. Census Bureau first provided data for ANVSAs for the 1990 census. Each ANVSA is assigned a national four-digit census code ranging from 6000 through 7999. Each ANVSA also is assigned a state-based five-digit Federal Information Processing Standards (FIPS) code. Both the census and FIPS codes are assigned in alphabetical order by ANVSA name.

J.3 American Indian Reservation

Federal American Indian reservations are areas that have been set aside by the United States for the use of tribes, the exterior boundaries of which are more particularly defined in the final tribal treaties, agreements, executive orders, federal statutes, secretarial orders, or judicial determinations. The U.S. Census Bureau recognizes federal reservations as territory over which American Indian tribes have primary governmental authority. These entities are known as colonies, communities, pueblos, rancherias, ranches, reservations, reserves, villages, Indian communities, and Indian villages. The Bureau of Indian Affairs maintains a list of federally recognized tribal governments. The U.S. Census Bureau contacts representatives of American Indian tribal governments to identify the boundaries for federal reservations. Some state governments have established reservations for tribes recognized by the state. A governor-appointed state liaison provides the names and boundaries for state recognized American Indian reservations to the U.S. Census Bureau. The names of these reservations are followed by “(State)” in census data presentations. Federal reservations may cross state boundaries, and federal and state reservations may cross county, county subdivision, and place boundaries. For reservations that cross state boundaries, only the portions of the reservations in a given state are shown in the data products for that state. Lands that are administered jointly and/or are claimed by two tribes, whether federally or state recognized, are called “joint use areas,” and are treated as if they are separate American

Indian reservations for data presentation purposes. The entire reservations are shown in data products for the United States. The U.S. Census Bureau first provided data for American Indian reservations in the 1970 census. Each federal American Indian reservation is assigned a four-digit census code ranging from 0001 through 4999. These census codes are assigned in alphabetical order of American Indian reservation names nationwide, except that joint use areas appear at the end of the code range. Each state American Indian reservation is assigned a four-digit census code ranging from 9000 through 9499. Each American Indian reservation also is assigned a five-digit Federal Information Processing Standards (FIPS) code; because FIPS codes are assigned in alphabetical sequence within each state, the FIPS code is different in each state for reservations that include territory in more than one state.

J.4 American Indian Off-Reservation Trust Land

Trust lands are areas for which the United States holds title in trust for the benefit of a tribe (tribal trust land) or for an individual Indian (individual trust land). Trust lands can be alienated or encumbered only by the owner with the approval of the Secretary of the Interior or his/her authorized representative. Trust lands may be located on or off of a reservation. The U.S. Census Bureau Census 2000 Geographic Terms and Concepts A-5 U.S. Census Bureau, Census 2000 recognizes and tabulates data for reservations and off-reservation trust lands because American Indian tribes have primary governmental authority over these lands. Primary tribal governmental authority generally is not attached to tribal lands located off the reservation until the lands are placed in trust. In the U.S. Census Bureau's data tabulations, off-reservation trust lands always are associated with a specific federally recognized reservation and/or tribal government. Such trust lands may be located in more than one state. Only the portions of off-reservation trust lands in a given state are shown in the data products for that state; all off-reservation trust lands associated with a reservation or tribe are shown in data products for the United States. The U.S. Census Bureau first provided trust land data for off-reservation tribal trust lands in the 1980 census; in 1990, the trust land data included both tribal and individual trust lands. The U.S. Census Bureau does not identify restricted fee land or land in fee simple status as a specific geographic category. In decennial census data tabulations, off-reservation trust lands are assigned a four-digit census code and a five-digit Federal Information Processing Standards (FIPS) code that is the same as that for the reservation with which they are associated. As with reservations, FIPS codes for off-reservation trust lands are unique within state, so they will differ if they extend into more than one state. The

FIPS codes for such off-reservation trust lands are the same as those for the associated reservation. In the TIGER/Line® products, a letter code—“T” for tribal and “I” for individual— identifies off-reservation trust lands. In decennial census data tabulations, a trust land flag uniquely identifies off-reservation trust lands. Printed reports show separate tabulations for all off-reservation trust land areas, but do not provide separate tabulations for the tribal versus individual trust lands. Trust lands associated with tribes that do not have a reservation are presented and coded by tribal name, interspersed alphabetically among the reservation names.

J.5 American Indian Tribal Subdivision

American Indian tribal subdivisions are administrative subdivisions of federally recognized American Indian reservations, off-reservation trust lands, or Oklahoma tribal statistical areas (OTSAs), known as areas, chapters, communities, or districts. These entities are internal units of self-government or administration that serve social, cultural, and/or economic purposes for the American Indians on the reservations, off-reservation trust lands, or OTSAs. The U.S. Census Bureau obtains the boundary and name information for tribal subdivisions from tribal governments. The U.S. Census Bureau first provided data for American Indian tribal subdivisions in the 1980 census when it identified them as “American Indian subreservation areas.” It did not provide data for these entities in conjunction with the 1990 census. Each American Indian tribal subdivision is assigned a three-digit census code that is alphabetically in order and unique within each reservation, associated off-reservation trust land, and OTSA. Each tribal subdivision also is assigned a five-digit Federal Information Processing Standards (FIPS) code. FIPS codes are assigned alphabetically within state; the FIPS codes are different in each state for tribal subdivisions that extend into more than one state.

J.6 Oklahoma Tribal Statistical Area (OTSA)

Oklahoma tribal statistical areas (OTSAs) are statistical entities identified and delineated by the U.S. Census Bureau in consultation with federally recognized American Indian tribes in Oklahoma that do not currently have a reservation, but once had a reservation in that state. Boundaries of A-6 Census 2000 Geographic Terms and Concepts U.S. Census Bureau, Census 2000 OTSAs will be those of the former reservations in Oklahoma, except where modified by agreements with neighboring tribes for data presentation purposes. OTSAs replace the “tribal jurisdiction statistical areas” of the 1990 census. The U.S. Census Bureau first provided data for the former

Oklahoma reservations in conjunction with the 1980 census, when it defined a single all-encompassing geographic entity called the “Historic Areas of Oklahoma (excluding urbanized areas).” Each OTSA is assigned a national four-digit census code ranging from 5500 through 5999 based on the alphabetical sequence of each OTSA’s name, except that the joint use areas appear at the end of the code range. Each OTSA also is assigned a five-digit Federal Information Processing Standards (FIPS) code in alphabetical order in Oklahoma.

J.7 State Designated American Indian Statistical Area (SDAISA)

State designated American Indian statistical areas (SDAISAs) are statistical entities for state recognized American Indian tribes that do not have a state recognized land base (reservation). SDAISAs are identified and delineated for the U.S. Census Bureau by a state liaison identified by the governor’s office in each state. SDAISAs generally encompass a compact and contiguous area that contains a concentration of people who identify with a state recognized American Indian tribe and in which there is structured or organized tribal activity. A SDAISA may not be located in more than one state unless the tribe is recognized by both states, and it may not include area within an American Indian reservation, off-reservation trust land, Alaska Native village statistical area, tribal designated statistical area (TDSA), or Oklahoma tribal statistical area. The U.S. Census Bureau established SDAISAs as a new geographic statistical entity for Census 2000, to differentiate between state recognized tribes without a land base and federally recognized tribes without a land base. For the 1990 census, all such tribal entities had been identified as TDSAs. Each SDAISA is assigned a four-digit census code ranging from 9500 through 9999 in alphabetical sequence of SDAISA names nationwide. Each SDAISA also is assigned a five-digit Federal Information Processing Standards (FIPS) code in alphabetical order within state.

J.8 Tribal Designated Statistical Area (TDSA)

Tribal designated statistical areas (TDSAs) are statistical entities identified and delineated for the U.S. Census Bureau by federally recognized American Indian tribes that do not currently have a federally recognized land base (reservation or off-reservation trust land). A TDSA generally encompasses a compact and contiguous area that contains a concentration of people who identify with a federally recognized American Indian tribe and in which there is structured or organized tribal activity. A TDSA may be located in more than one state, and it may not include area within an American Indian reservation, off-reservation trust land, Alaska Native village statistical area, state

designated American Indian statistical area (SDAISA), or Oklahoma tribal statistical area. The U.S. Census Bureau first reported data for TDSAs in conjunction with the 1990 census, when both federally and state recognized tribes could identify and delineate TDSAs. TDSAs now apply only to federally recognized tribes. State recognized tribes without a land base, including those that were TDSAs in 1990, are identified as SDAISAs, a new geographic entity for Census 2000. Each TDSA is assigned a four-digit census code ranging from 8000 through 8999 in alphabetical sequence of TDSA names nationwide. Each TDSA also is assigned a five-digit Federal Information Processing Standards (FIPS) code in alphabetical order within state; because FIPS codes are assigned within each state, the FIPS code is different in each state for TDSAs that extend into more than one state.

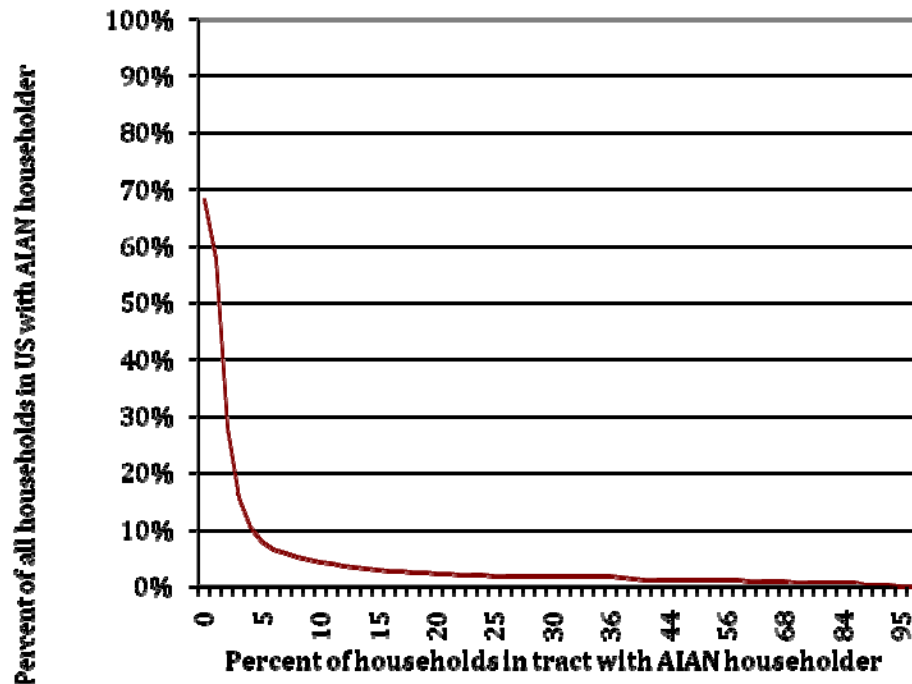
Appendix K. Optional Sampling Methods for High-Density, Off-AIANA Areas

Among the options for the supplementary AIAN sample that may be desired by the Childcare Bureau is the inclusion of AIAN households outside of AIANAs. As discussed in chapter 3, approximately two thirds of AIAN households are outside of AIANAs. This appendix will discuss the nature of the off-AIANA AIAN household population and the considerations involved in including this group in the sampling population. The primary benefit of sampling the off-AIANA AIAN population is the increased coverage of the AIAN population and, therefore, the increased generalizability of any findings. The primary drawback is the increased cost of data collection due to the relative rarity and wide dispersion of AIAN households outside of federally recognized AIANAs.

K.1 AIAN Households Outside of AIANAs

After accounting for AIANAs, when only non-AIANA areas are considered, the AIAN population is extremely widely distributed. In fact, there are very few counties with a AIAN density that even matches the national average of 0.7 percent of households. Figure 3 shows that if consideration is limited to off-AIANA geographies with a household density that is fifty percent or more only 1.8 percent of the off-AIANA household population (1.2 percent of the total AIAN household population) would be included. If consideration were limited to off-AIANA census tracts with an AIAN household density of 25 percent or more, only 2.9 percent of the off-AIANA household population (2.0 percent of the total) would be included. Even if consideration were expanded to include all off-AIANA Census tracts with an AIAN household density of 10 percent or more, only 4.8 percent of the off-AIANA (3.3 percent of the total) AIAN household population would be included. If one wanted to include at least 25 percent of the off-AIANA household population, all Census tracts with a density of greater than two or three percent would have to be included. would be included. See Figure K.1.

**Figure K.1. Cumulative Percent AIAN Households Outside of AIANAs
by Tract-Level AIAN Density**



Given the extremely wide dispersion of the off-AIANA AIAN household population it would not be feasible to attempt to include the entire off-AIANA population in the sampling population. We believe that including the off-AIANA areas with the highest AIAN densities seems to strike a good balance between covering the off-AIANA AIAN population and keeping the costs of data collection within reasonable limits. Our recommendations for sampling the on-AIANA areas are covered in depth in chapter 3. If it is decided that off-AIANA areas should be included in the AIAN supplementary sample, the overall sampling design would not be dramatically changed; it would remain a multi-stage stratified design. Two options exist for the inclusion of off-AIANA AIAN households within this design; either the entire sampling population would be further stratified such that there would be two main strata, on- and off-AIANA, and multiple substrata or the off-AIANA areas could be conceptualized as an additional stratum. We recommend the latter approach.

K.2 Defining High-Density Off-AIANA Geographies

The first issue that one must address if one is to take this approach is to define what a ‘high-density’ area is. This definition poses some difficulty because of the somewhat arbitrary decision that must be made as to what the threshold between a high-density area and an area that is not high-density. The factors to consider in making this decision involve weighing the benefits of fuller coverage of the AIAN household population against the literal costs of data collection. So, we must strike a balance between cost and coverage. The precise balance point must be determined scientific goals and budgetary constraints of the project.

A data-driven approach to the definition of high-density versus low density areas would lead us to examine the density distribution of census tracts in the area of interest to find a point of inflection whereby tracts beyond a certain threshold seemed to be markedly different than tracts that were not beyond that threshold. An examination of figure 3 shows us that by the 10-percent density point the graph has passed the point of inflection or ‘flattened out’. The average decrease in the percentage of the off-AIANA AIAN household population accounted for is about nine percent per one percentage-point increase in tract-level AIAN density for the interval from zero to nine percent, from 100 percent to about seven percent. Additionally, there is no interval in this range where the percentage of the AIAN population accounted for decreases by less than two-thirds of one percent. However, in the interval from 10 percent AIAN household density to 100 percent AIAN density only accounts for the other seven percent of the AIAN household population and there is no interval in this range where the percentage of the AIAN population accounted for decreases by as much as two-thirds of one percent. In accordance with these data, we recommend using a threshold of ten-percent AIAN household density or greater to define high-density tracts outside of AIANAs. Taken together, these data support the conclusion that the 10-percent or higher threshold is a good level for defining what constitutes high density off-AIANA tracts. Using this threshold will result in about 4.8 percent of the AIAN household population being included in the off-AIANA sampling population. The suggested threshold is based on an examination of the available data on AIAN household density, but is not ‘carved in stone’. However, as one considers moving the threshold to higher or lower values, it is difficult to find a stopping point on the slippery slope of these continuous data.

To implement this sample design, we must decide on what will constitute the primary sampling units in this study, how those primary sampling units will be selected, and how selection of individual respondent households will take place within each primary sampling unit.

K.3 Primary Sampling Units (PSUs)

The selection of primary sampling units (PSUs) is informed by the scientific goals of the study as well as characteristics of the population. That is, each PSU must be large enough to provide an adequate number of eligible members, but not so large as to unnecessarily inflate the cost of data collection by increasing the number of households to be listed or interviewed or called, depending on the method of data collection. The PSU will be defined as a geographic entity that most closely meets the right-size requirement mentioned above. The candidate entities for consideration as PSUs would be counties, tracts, and block groups (BGs). Of these, Counties, would not be suitable for PSU definition as there are very few counties that would meet the criterion of 'high-density'. As noted in the introduction to Chapter 3, AIAN households constitute a large percentage of the population of very few counties across the country. The next smaller geographic unit is the Census tract. Census tracts provide a reasonable number of households, about 2,000 per tract, and are small enough that there are tracts with a high enough AIAN population density that the risk of not obtaining enough eligible members in any selected tract is remote. Block groups have many of the same advantages that tracts offer as a PSU, but suffer from the disadvantage of an elevated risk that an insufficient number of eligible participants could be found in a selected PSU. So, we recommend using Census tracts as PSUs in this design.

K.4 Methods for Selecting Primary Sampling Units

Within the off-AIANA stratum, the primary sampling unit will be the Census tract. There will not be further stratification within the off-AIANA stratum. Any tracts that overlap with AIANAs will be partitioned such that only the off-AIANA portion of the tract is considered for this portion of the sample. Individual tracts will be selected using probability proportional to size (PPS) systematic sampling where the measure of size (MOS) can be any of a number of attributes related to the number of eligible households in the tract – total tract household population (H001001, summary file 3, Census2000), Occupied housing units with reported race (H009001, summary file 3, Census2000), number of AIAN households in the tract (H009004, summary file 3, Census2000), number of AIAN households with at least one child (Table P146C, Summary file 3, Census2000),

total tract population, population of AIAN children Table P146C, Summary file 3, Census2000) . Similarly to the on-AIANA sample, we would recommend that the total number of households with reported race be used as the MOS.

There are two candidate data sources to use for defining the sampling frame and drawing the sample of PSUs – The 2000 Decennial Census and the American Community Survey. Each of these data sources has costs and benefits associated with its use. The primary benefit of the 2000 Census is its completeness and the fact that the properties of the data are so well-known to the survey research industry. The primary drawback to using the 2000 Census is the long interval that has passed between the collection of the data and the initiation of the current project. At the start of the project Data from the 2000 Census will be as much as ten years old and there is some risk that the areas that are selected no longer have the same population characteristics that they had at the time of Census data collection. The primary benefit of data from the American Community Survey (ACS) is its newness. In 2010 none of the data that will be used to design the sample frame or select PSUs will be more than five years old. This makes it more likely that the selected areas will be very similar to the characteristics ascribed to them in the ACS. The primary drawback of planning to use ACS data is uncertainty around the availability of the data at the time that we wish to initiate this project. The five-year estimates, which are necessary to design the off-AIANA sample, are not scheduled to be released until 2010. Given the risk of the data not being available when needed, we recommend using data from the 2000 Census to design and select both the on- and off-AIANA samples for the AIAN household population. However, should the ACS five-year estimates be available at the time the actual sampling is to commence, strong consideration should be given to using ACS data to define the sampling population.

K.4.1 Number and Size of PSUs

Once the determinations for what constitutes a PSU and the manner in which PSUs will be selected have been reached. The next step is to determine the number of PSUs to be selected into the sample and the minimum size of a PSU. As discussed above, PSUs must be sufficiently large that the balance between the overall sampling probability and the probability of selecting a given household within a selected PSU are kept in balance. If a PSU is too small, its selection probability could be as small as the overall sampling rate for households, which would work against our goal of a self-weighting sample of households. The selection probability of a household within a PSU must obey the condition:

$$f = \pi_i f_{k|i} \quad (K.1)$$

where f is the overall sampling rate, m'/M , π_i is the probability of selection of the i -th PSU, and $f_{k|i}$ is the subsampling rate for unit k in the i -th PSU, given that i -th PSU is selected. If we set $f_{k|i}$ equal to 1, we can solve for the minimum PSU size. See equation 3.

$$1 = \frac{f}{\pi_i} \quad (K.2)$$

$$\pi_i = n \frac{m_i}{\sum m_i} \quad (K.3)$$

The selection probability of the i -th PSU is a function of the number of PSUs, the value of the MOS for the i -th PSU, and the cumulative MOS for the sampling frame. It is expressed in Equation K.3.

Equation K.2 can be re-written for the minimum PSU size as $\pi_i = f$. We know that M , the total number of housing units with reported race in AIANAs and high-density off-AIANA tracts, is 2,167,375. Further, our sample size calculations (covered in detail in section 3.9) show us that m' , our selected sample size, is about 63,000. Therefore, if it is decided that we will include high density off-AIANA tracts our overall sampling rate, f , is 0.0291. If we set the total number of PSUs to be selected at 110 and replace π_i with equation K.3, we can see that the absolute minimum PSU size is about 572 households. In practice, however, we would want to define PSUs such that the minimum PSU size was comfortably larger than 572 to allow for any on-the-ground changes that may have taken place in the time between when the Census data that we are using was collected and the initiation of the study.

We suggest that a minimum PSU size of 1,000 households might be established for the AIAN supplementary sample. Among other things, this size might be viewed as a reasonable minimum number of households to form a childcare market. This figure also gives us a cushion should actual conditions in the field at the time of survey implementation be substantially different than the conditions at the time the Census data were collected.

The method described above suggests collapsing small tracts to create PSUs that are at least 1,000 households. This is by no means the only defensible way for handling the smallest tracts.

Another viable option for handling small tracts is to declare them out-of-scope and exclude them from the sampling population. If a child-care market requires a minimum of roughly 1,000 households to organize itself, a compelling argument can be made that the very smallest high-density tracts don't comprise child-care markets by themselves and should be considered out of the sampling population. The decision to exclude or to cluster small tracts is not a binary choice. A decision can be made at the agency level to collapse some very small tracts that are deemed important to keep in the sampling population (e.g., tracts in CCDF grantee areas) and to exclude others that are less central to the aims of the study. Definition of the sampling population, including clustering versus exclusion of small tracts should be determined at the agency level prior to actual sampling.

K.5 Alternative Sampling Frames for Sampling within PSUs

Once the PSUs have been selected, we still must decide which individual households within each tract will be chosen. The overall goals of our sampling strategy are twofold, to produce a sample in which each household within each stratum has approximately the same probability of being selected, and to screen for the presence of eligible AIAN children. This stage of sampling, selecting households within PSUs for interview requires that a complete sampling frame be developed so that each household within selected PSUs can have a known probability of selection. There are a variety of methods for developing the frame within PSUs that can be employed. Each method comes with its own costs and benefits in terms of feasibility, expense, and data quality and will be discussed in turn.

K.5.1 Address-Based Sampling

The general considerations for designing an address-based sampling frame are covered in detail in section 3.5.1. To assess the feasibility of address-based frame construction in high-density off-AIANA tracts, we drew a 2.5 percent sample of high-density off-AIANA tracts. In this sample, we found that about 69 percent of addresses were 'city-style' (i.e., not PO boxes or rural routes). The 'city-style' addresses varied from 44 percent in an high-density tract in Alaska to virtually 100 percent percent in a high-density tract in Arizona. See table 2. These data suggest that address-based sampling might be feasible as one source of frame construction in high-density off-AIANA tracts, but it would likely have to be supplemented by other methods.

Table K.1: 2.5-Percent Sample of High-Density Off-AIANA Tracts

State	County	Tract	Housing Units with Reported Race	Percent of AIAN Households	Percent City-Style
AL	Mobile	005800	1,853	14.9	63.9
AK	Ketchikan Gateway	000300	1,273	20.0	43.9
AZ	Baxter	000500	1,238	12.9	99.9
NM	McKinley	943900	1,095	68.0	73.6
NM	San Juan	943200	1,142	23.5	63.8

Source: Advo

K.5.2 Custom Listing

The considerations for the application of custom listing as a frame-building technique are covered in detail in section 3.5.2.

K.5.3 Sample and Go

The considerations for the application the sample and go technique for frame-building are covered in detail in section 3.5.3.

K.5.4 Frames for Telephone Numbers

The general considerations for address-based sampling as a frame building technique are covered in detail in section 3.5.4. The specific considerations for building a telephone number-based frame in high-density off-AIANA tracts concern the possible differential coverage issues between on-AIANA AIAN households and AIAN households in high-density off-AIANA tracts. Data from 2000 Census shows that only 87.4 percent of AIAN households had a telephone available, versus 97.6 percent in non-AIAN households. Another source of undercoverage in RDD designs is the presence of cell-phone only households. These households are excluded from traditional RDD designs that sample only landline telephones. Data from a national face-to-face study conducted by the CDC indicates that 22.8 percent of non-hispanic individuals who are some race other than white, black, or asian only have a cell-phone and do not have a land-based telephone in their home. Given these findings, there is a likelihood that bias could be introduced if a landline telephone frame was the only frame used to support the study.

K.6 Sampling Methods for Households within PSUs

Once PSUs are selected, individual households within PSUs must be selected. There are a number of methods that can be employed to select households. The selected method will depend greatly on the method of frame construction. The following discussion will highlight the major issues involved in selecting households for given frame construction methods.

K.6.1 Telephone-Based Frame

If the telephone frame is used, individual telephone numbers can be selected either via simple random sampling or from clusters of numbers. In the simple random sampling design, numbers to be dialed are chosen randomly from the list of eligible 100 banks. In the clustered approach, numbers to be dialed are first clustered by prefix and telephone numbers to be dialed are subsampled from these clusters. GENESYS and SSI are the two primary vendors in the US of such RDD samples. Further, they produce hit rates and coverage rates that would allow the implementation team for the National Study to map telephone geography onto the PSU and other geographic definitions used for the study.

K.6.2 Address-Based Frame

If a custom listed or hybrid approach is used, there is, again, a choice between selecting housing units using a one or two-stage approach. However, in the custom listing approach, clusters would be comprised of geographic units (e.g., census blocks). The first stage of sampling within PSUs in the clustered design would be to sample second stage units (often called segments) and the second stage of sampling within PSUs (or the third stage overall) would be to select housing units within second stage units.

Regardless of the sampling frame used in within PSU selection, if a clustered design is employed, a pps method would be used to select the second stage units (e.g., census blocks in address frame and prefixes in RDD frame) and an equal probability sample of housing units would be selected within the selected second stage units. Otherwise, for single-stage sampling within PSUs, systematic sampling could be conducted to subsample housing units from an address list purchased from a commercial vendor. The primary advantage of using a clustered design is a generally lower cost of data collection, due to a reduced cost travel, among other things of listing. However, clustered designs generally would have higher variance due to the similarity of households within clusters.

K.7 Methods for Sampling Eligible Children within Households

Many selected households will have multiple children of eligible ages. In fact, while the sum of all national AIAN households with children in each eligible age range (i.e., Less than 3 years old, 3 to five years old, and 6 to 12 years old) is 355,385, the unduplicated sum (i.e., where each household is only counted once regardless of how many eligible children are present) is only 265,256. This figure suggests that on average, each household that contains at least one eligible child will actually contain 1.3 eligible children. An important operational decision is whether data should be collected for all eligible children in the household or for only a randomly selected one. The trade-off in this case is that collecting data from only one eligible child per household increases the precision of parameter estimates. However, adopting this approach results in the need to release a much larger sample of households, which results in reduced operational efficiency and greater overall cost. Considering the totality of the situation, the precision loss is more than offset by the increased cost effectiveness of collecting data from all age-eligible children in the household and that is the course that we recommend.

K.8 Mode of Data Collection

Our goal in the selection of the mode of data collection is to adopt the mode that provides us with the greatest combination of population coverage within selected PSUs, flexibility to adjust to obstacles to constructing a proper frame, and cost effectiveness. The mode of data collection chosen will be driven by the choice of sampling frame generation within PSUs. Conventional area probability (AP) sampling would likely involve in-person interviews and is a more expensive than other modes of data collection. However, conducting interviews in person has the advantage of allowing for more accurate non-response adjustments after data collection. RDD sampling is far more economical than conventional AP sampling, but the problems of under coverage of households without telephones and cell phone only households are well known. An additional drawback of RDD data collection is that data that can be used to make non-response adjustments are not collected. A hybrid sampling approach offers an element of flexibility that is very desirable.

A Hybrid approach would use an AP-like design to draw the sample. That is, segments would be selected in the same manner as they would in an AP design. However, after segments are selected, the manner in data would be collected from households would vary depending on several factors. The factors that will guide these decisions will be discussed below.

First, each selected segment would be analyzed for completeness of available address lists. Address lists can be examined at the ZIP code-level for usability. That is, we can determine, at the ZIP code level, if the proportion of city-style addresses in a selected segment is high enough that using an address-based approach would be feasible. For segments that do have a sufficient proportion of city-style addresses, we would purchase the list for those segments and sample households based on that list. We would then do a directory look-up for the phone numbers of selected households. For the households that we are able to determine the telephone number, we would attempt to contact them by telephone to conduct the screening and interview. For segments that do not have city-style addresses would have to be enumerated by an interview. In these segments, we would adopt a sample-and-go approach. In this approach the interviewer would be given a map of the selected segment and instructions on how to traverse the segment and to conduct a face-to-face interview with every k -th household. Using a hybrid sampling design will also allow us to send advance letters and, possibly, incentives to selected households to increase cooperation. Further, we will be able to follow-up with nonrespondents to our telephone interviewing with attempts at face-to-face interviewing to further reduce nonresponse.

K.9 Sample Size Considerations

See section 3.9 for a detailed discussion of the considerations regarding sample size and statistical power in the proposed design.

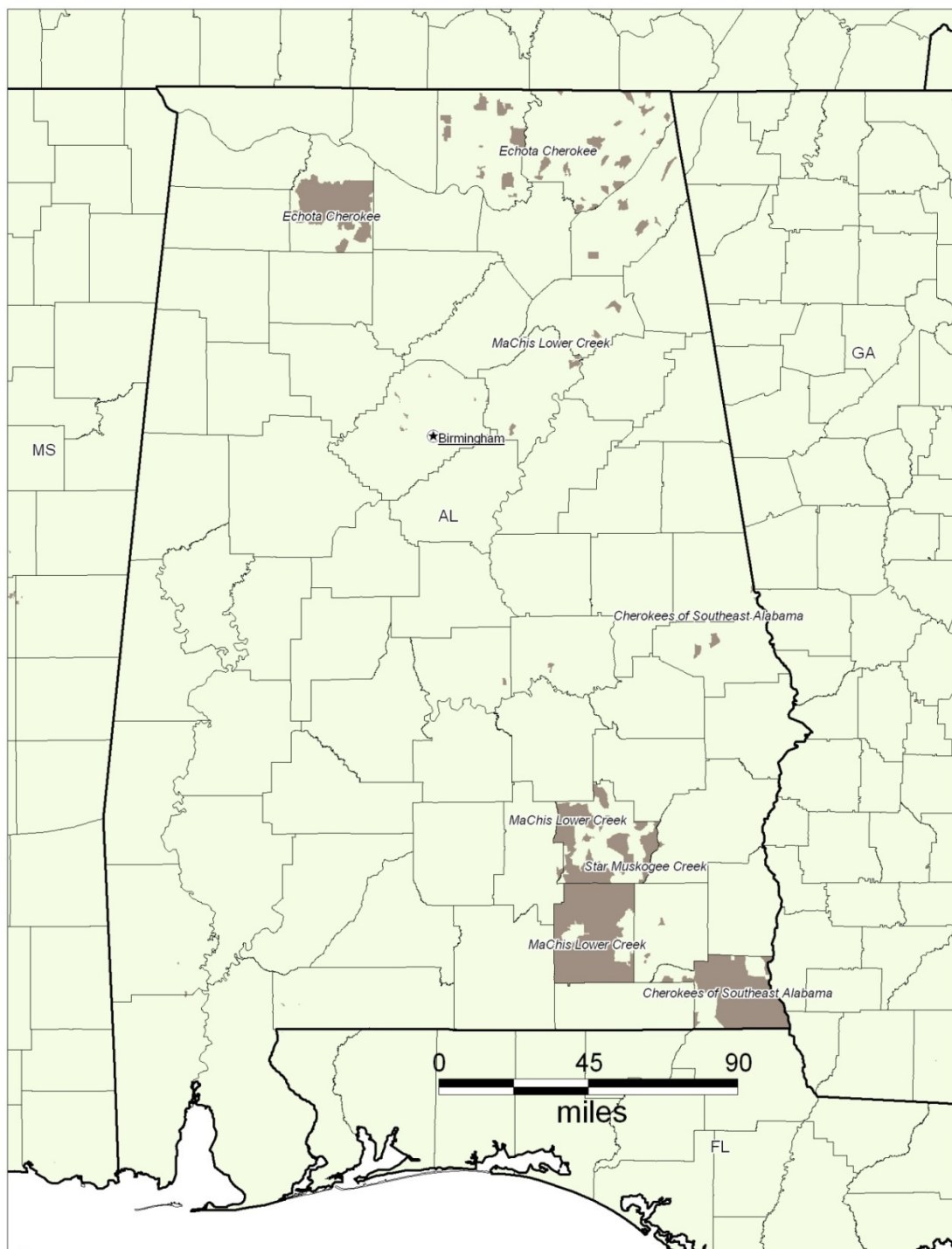
K.10 Recommendations

The above sections suggest that there are a number of ways to draw the sample and collect data in the AIAN population. Decisions must be made to shape the direction of this endeavor. The first choice point is the population to be included in the sample. In this appendix, we have focused on the option of including AIAN households from high-density off-AIANA census tracts. We have envisioned this sample as an addition to the primary population of the on-AIANA AIAN households. AIAN households from high-density off-AIANA tracts would form an additional stratum in the overall sampling design. If the child care bureau decides to expand the sampling plan described in chapter 3, by including off-AIANA areas we realize a substantial gain in terms of population coverage (from 33.3 to 38.1 percent of the AIAN household population in the sampling population), but also an increase in the cost of conducting the study. The number of PSUs being drawn from this stratum will be proportionate to representation of the stratum to the overall AIAN household

population. PSUs will be made up of tracts and clusters of tracts such that no PSU falls below the minimum size.

Households in selected PSUs can be sampled using either un-clustered or a clustered design. Clustered designs offer savings in terms of the cost of data collection, but come with a cost in design effect, which necessitates a larger sample for the same level of precision.

Appendix L. Extent of American Indian/Alaska Native Areas in Alabama



Appendix M. Tabulations of the Prevalence of Child-Care Providers by Type of Support and by Service to Low-Income Households

Tables M.1 to M.11 are abstracted from the National Study of Child Care for Low-Income Families. See Collins, A., Kreader, J. L., & Layzer, J. I. (2004).

The study's first level is a sample of 17 states containing 25 communities that were selected from a national sampling frame to be as close as possible to a representative sample of counties with child poverty rates above 14 percent. "For the National Study of Child Care for Low-Income Families, we have used the county as our definition of a community. An advantage of using counties is the availability of benchmark data at the county level from the National Child Care Survey (NCCS) and the Profiles of Child Care Settings (PCCS) studies conducted in 1990 in a nationally representative sample of counties. Our goal in the selection of counties was to select a sample that, in a broad sense, would be representative of where low-income children live. Starting with the NCCS/PCCS sample of 100 counties or county groupings, we identified 80 counties/county groupings with a 1993 poverty rate for children greater than 13.8 percent. When properly weighted, these 80 counties/county groupings represent more than 90 percent of poor children in the United States in 1990. Our sample of 25 communities was selected to be a representative sample of these 80 counties/county groupings." (From page 9, <http://www.researchconnections.org/location/197>)

Given this sampling plan, one would expect the 25 study counties/communities to have higher percentages of centers/facilities and homes receiving some public support and serving low-income household than other, more prosperous counties.

Table M.1: Distribution of 22 Counties by Percentage of Licensed and License Exempt Centers that Accept Subsidies: 2000

Percentage of Providers	Midpoint of Interval	Number of Counties
80-100	90	2
60-79	70	5
40-59	50	10
20-39	30	5
0-19	10	0
0-100		22

Source: Appendix 3F of Collins, Kreader and Layzer (2004).

Table M.2: Distribution of 22 Counties by Percentage of Licensed and License-Exempt Centers that Accept Subsidies or Operate Head Start or Operate Pre-K [Growth of the Pre-K movement since 2000 may by now have boosted the percentages below.]: 2000

Percentage of Providers	Midpoint of Interval	Number of Counties
80-100	90	4
60-79	70	10
40-59	50	3
20-39	30	5
0-19	10	0
0-100		22

Source: Appendix 3F of Collins, Kreader and Layzer (2004).

Table M.3: Distribution of 21 Counties by Percentage of Regulated FCC Homes that Accept Subsidies : 2000

Percentage of Providers	Midpoint of Interval	Number of Counties
80-100	90	9
60-79	70	6
40-59	50	5
20-39	30	1
0-19	10	0
0-100		21

Source: Appendix 3G of Collins, Kreader and Layzer (2004).

Table M.4a: Distribution of 21 Counties by Percentage of Licensed and License-Exempt Centers for which Pre-School Rates are within 12% of 85% of State Median Income: 2000

Percentage of Providers	Midpoint of Interval	Number of Counties
50-100	75	4
10-49	30	6
0-9	5	11
0-100		21

NOTE: According to the fall 1993 SIPP, low-income families spent an average of 12% of their incomes on preschool child care; 85% SMI is the maximum federal eligibility for CCDF subsidies.

Source: Appendix 3A of Collins, Kreader and Layzer (2004).

Table M.5: Distribution of 21 Counties by Percentage of Regulated FCC Homes for which Pre-School Rates are within 12% or 85% of State Median Income: 2000

Percentage of Providers	Midpoint of Interval	Number of Counties
50-100	75	5
10-49	30	6
0-9	5	10
0-100		21

NOTE: According to the fall 1993 SIPP, low-income families spent an average of 12% of their incomes on preschool child care; 85% SMI is the maximum federal eligibility for CCDF subsidies.

Source: Appendix 3A of Collins, Kreader and Layzer (2004).

Table M.6: Distribution of 24 Counties by Percentage of Licensed and License-Exempt Centers for which Age 12-Month Rates are at or Below the State Subsidy Rate: 2000

Percentage of Providers	Midpoint of Interval	Number of Counties
80-100	90	16
60-79	70	3
40-59	50	1
20-39	30	1
0-19	10	3
0-100		24

Source: Appendix 3C of Collins, Kreader and Layzer (2004).

Table M.7: Distribution of 23 Counties by Percentage of Licensed and License-Exempt Centers for which Age 4-Year Rates are at or Below the State Subsidy Rate: 2000

Percentage of Providers	Midpoint of Interval	Number of Counties
80-100	90	11
60-79	70	5
40-59	50	4
20-39	30	2
0-19	10	1
0-100		23

Source: Appendix 3C of Collins, Kreader and Layzer (2004).

Table M.8: Distribution of 15 Counties by Percentage of Licensed and License-Exempt Centers for which Age 7-Year Rates are at or Below the State Subsidy Rate: 2000

Percentage of Providers	Midpoint of Interval	Number of Counties
80-100	90	NA
60-79	70	NA
40-59	50	NA
20-39	30	NA
0-19	10	NA
0-100		15

Source: Appendix 3C of Collins, Kreader and Layzer (2004).

Table M.9: Distribution of 22 Counties by Percentage of FCC Homes for which Age 12-Month Rates are at or Below the State Subsidy Rate: 2000

Percentage of Providers	Midpoint of Interval	Number of Counties
80-100	90	13
60-79	70	3
40-59	50	4
20-39	30	2
0-19	10	0
0-100		22

Source: Appendix 3H of Collins, Kreader and Layzer (2004).

Table M.10: Distribution of 22 Counties by Percentage of FCC Homes for which Age 4-year Rates are at or Below the State Subsidy Rate: 2000

Percentage of Providers	Midpoint of Interval	Number of Counties
80-100	90	12
60-79	70	4
40-59	50	4
20-39	30	2
0-19	10	0
0-100		22

Source: Appendix 3H of Kreader (2002).

Table M.11: Distribution of 22 Counties by Percentage of FCC Homes for which Age 7-Year Rates are at or Below the State Subsidy Rate: 2000

Percentage of Providers	Midpoint of Interval	Number of Counties
80-100	90	11
60-79	70	5
40-59	50	4
20-39	30	2
0-19	10	0
0-100		22

Source: Appendix 3H of Collins, Kreader and Layzer (2004).

Appendix N. Expected Number of Completed Household Interviews in Cells Crossed by Three Domains

The following three tables present the expected number of completed households in each cell crossed by three domains under the proportional sample design.

Table N.1: Expected Number of Completed Household Interviews by Household Structure by Household Income by Age of Children¹

Two-Parent Household	Less than 3	3 to 5	6 to 12
Below Low-Income Level	1,058	1,084	1,777
100-149% of Low-Income Level	738	797	1,463
150% and Above Low-Income Level	2,280	2,365	4,709
One-Parent Household	Less than 3	3 to 5	6 to 12
Below Low-Income Level	1,104	1,130	2,110
100-149% of Low-Income Level	274	300	673
150% and Above Low-Income Level	320	366	967
Other	Less than 3	3 to 5	6 to 12
Below Low-Income Level	13	20	33
100-149% of Low-Income Level	7	13	20
150% and Above Low-Income Level	13	20	46

¹Derived from population proportions obtained from the 2006 American Community Survey.

Table N.2: Expected Number of Completed Household Interviews by Race/Ethnicity of Children by Household Income by Household Structure¹

Hispanic	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	862	679	7
100-149% of Low-Income Level	385	176	7
150% and Above Low-Income Level	477	170	7
Black	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	216	986	7
100-149% of Low-Income Level	176	229	7
150% and Above Low-Income Level	444	255	7
Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	1,470	1,463	33
100-149% of Low-Income Level	1,528	607	26
150% and Above Low-Income Level	6,251	993	59

¹Derived from population proportions obtained from the 2006 American Community Survey.

Table N.3: Expected Number of Completed Household Interviews by Maternal Employment Status by Household Income by Household Structure¹

In Labor Force, Employed	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	947	1,542	0
100-149% of Low-Income Level	1,228	607	0
150% and Above Low-Income Level	5,147	803	0
In Labor Force, Unemployed	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	163	281	0
100-149% of Low-Income Level	78	26	0
150% and Above Low-Income Level	131	20	0
Not in Labor Force	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	1,437	797	0
100-149% of Low-Income Level	784	91	0
150% and Above Low-Income Level	1,894	98	0
Employment Status, Unknown	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	0	509	52
100-149% of Low-Income Level	0	281	33
150% and Above Low-Income Level	0	496	65

¹Derived from population proportions obtained from the 2006 American Community Survey.

The next three tables show the expected number of completed households in the same cells under the oversampling design. The oversampling factor (o) is 2 and the cut-off point is 25%.

Table N.4: Expected Number of Completed Household Interviews by Household Structure by Household Income by Age of Children¹

	Total			h=1			h=2		
Two-Parent Household	Less than 3	3 to 5	6 to 12	Less than 3	3 to 5	6 to 12	Less than 3	3 to 5	6 to 12
Below Low-Income Level	1,364	1,381	2,296	1,317	1,332	2,217	47	50	79
100-149% of Low-Income Level	774	844	1,584	730	796	1,500	44	47	84
150% and Above Low-Income Level	1,656	1,668	3,416	1,473	1,475	3,038	183	193	377
One-Parent Household	Less than 3	3 to 5	6 to 12	Less than 3	3 to 5	6 to 12	Less than 3	3 to 5	6 to 12
Below Low-Income Level	1,528	1,546	2,838	1,486	1,501	2,751	42	45	87
100-149% of Low-Income Level	0	0	314	0	0	300	0	0	15
150% and Above Low-Income Level	282	326	814	261	300	743	22	26	70
Other	Less than 3	3 to 5	6 to 12	Less than 3	3 to 5	6 to 12	Less than 3	3 to 5	6 to 12
Below Low-Income Level	14	27	41	13	26	39	1	1	2
100-149% of Low-Income Level	14	14	28	13	13	26	1	1	2
150% and Above Low-Income Level	14	14	42	13	13	39	1	1	3

¹Derived from population proportions obtained from the 2006 American Community Survey.

Table N.5: Expected Number of Completed Household Interviews by Race/Ethnicity by Household Income by Household Structure¹

	Total			h=1			h=2		
Hispanic	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	1,197	979	13	1,164	955	13	33	24	0
100-149% of Low-Income Level	476	218	13	458	209	13	19	8	0
150% and Above Low-Income Level	499	180	0	471	170	0	28	10	0
Black	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	309	1,482	13	301	1,451	13	8	31	0
100-149% of Low-Income Level	218	298	0	209	288	0	8	10	0
150% and Above Low-Income Level	422	276	13	392	262	13	30	15	0
Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	1,798	1,760	41	1,726	1,687	39	72	73	2
100-149% of Low-Income Level	1,571	588	28	1,478	549	26	93	39	2
150% and Above Low-Income Level	4,320	757	43	3,805	680	39	515	77	4

¹Derived from population proportions obtained from the 2006 American Community Survey.

Table N.6: Expected Number of Completed Household Interviews by Maternal Employment Status by Household Income by Household Structure¹

	Total			h=1			h=2		
In Labor Force Employed	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	1,206	2,025	0	1,162	1,958	0	44	66	0
100-149% of Low-Income Level	1,374	649	0	1,306	614	0	68	36	0
150% and Above Low-Income Level	3,925	672	0	3,525	614	0	400	59	0
In Labor Force Unemployed	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	216	389	0	209	379	0	7	11	0
100-149% of Low-Income Level	83	28	0	78	26	0	5	2	0
150% and Above Low-Income Level	89	15	0	78	13	0	11	2	0
Not in Labor Force	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	1,877	1,139	0	1,815	1,110	0	63	29	0
100-149% of Low-Income Level	805	109	0	757	104	0	48	5	0
150% and Above Low-Income Level	1,219	98	0	1,058	91	0	161	6	0
Employment Status Unknown	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	0	674	68	0	653	65	0	22	2
100-149% of Low-Income Level	0	316	41	0	300	39	0	15	2
150% and Above Low-Income Level	0	439	57	0	405	52	0	35	5

¹Derived from population proportions obtained from the 2006 American Community Survey.

The next three tables give expected sample sizes of CCDF children, assuming proportional sampling.

Table N.7: Expected Number of CCDF Children Less than 13 by Household Structure, Household Income, and Age of Children *

Two-Parent Household	Less than 3	3 to 5	6 to 12
Below Low-Income Level	61	63	103
100-149% of Low-Income Level	43	46	85
150% and Above Low-Income Level	132	137	273
One-Parent Household	Less than 3	3 to 5	6 to 12
Below Low-Income Level	64	65	122
100-149% of Low-Income Level	16	17	39
150% and Above Low-Income Level	19	21	56
Other	Less than 3	3 to 5	6 to 12
Below Low-Income Level	1	1	2
100-149% of Low-Income Level	0	1	1
150% and Above Low-Income Level	1	1	3

*Derived from Table N.1 and from tables of CCDF children obtained via personal communication from Ivelisse Martinez-Beck.

Table N.8: Expected Number of CCDF Children Less Than 13 by Race/Ethnicity of Child, Household Income, and Household Structure *

Hispanic	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	50	39	0
100-149% of Low-Income Level	22	10	0
150% and Above Low-Income Level	28	10	0
Black	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	12	57	0
100-149% of Low-Income Level	10	13	0
150% and Above Low-Income Level	26	15	0
Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	85	85	2
100-149% of Low-Income Level	88	35	2
150% and Above Low-Income Level	362	57	3

*Derived from Table N.2 and from tables of CCDF children obtained via personal communication from Ivelisse Martinez-Beck.

Table N.9: Expected Number of CCDF Children Less than 13 by Maternal Employment Status, Household Income, and Household Structure *

In Labor Force Employed	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	55	89	0
100-149% of Low-Income Level	71	35	0
150% and Above Low-Income Level	298	47	0
In Labor Force Unemployed	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	9	16	0
100-149% of Low-Income Level	5	2	0
150% and Above Low-Income Level	8	1	0
Not in Labor Force	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	83	46	0
100-149% of Low-Income Level	45	5	0
150% and Above Low-Income Level	110	6	0
Employment Status Unknown	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	0	29	3
100-149% of Low-Income Level	0	16	2
150% and Above Low-Income Level	0	29	4

*Derived from Table N.3 and from tables of CCDF children obtained via personal communication from Ivelisse Martinez-Beck.

The final three tables in this appendix show the expected sample sizes of CCDF children, assuming an oversampling strategy with a cut point of 25 percent and a factor of $o = 2$.

Table N.10: Expected Number of CCDF Children Less than 13 by Household Structure, Household Income, and Age of Child*

	Total			h=1			h=2		
Two-parent Household	Less than 3	3 to 5	6 to 12	Less than 3	3 to 5	6 to 12	Less than 3	3 to 5	6 to 12
Below Low-Income Level	79	80	133	76	77	128	3	3	5
100-149% of Low-Income Level	45	49	92	42	46	87	3	3	5
150% and Above Low-Income Level	96	97	198	85	85	176	11	11	22
One-Parent Household	Less than 3	3 to 5	6 to 12	Less than 3	3 to 5	6 to 12	Less than 3	3 to 5	6 to 12
Below Low-Income Level	88	89	164	86	87	159	2	3	5
100-149% of Low-Income Level	0	0	18	0	0	17	0	0	1
150% and Above Low-Income Level	16	19	47	15	17	43	1	1	4
Other	Less than 3	3 to 5	6 to 12	Less than 3	3 to 5	6 to 12	Less than 3	3 to 5	6 to 12
Below Low-Income Level	1	2	2	1	2	2	0	0	0
100-149% of Low-Income Level	1	1	2	1	1	2	0	0	0
150% and Above Low-Income Level	1	1	2	1	1	2	0	0	0

*Derived from Table N.4 and from tables of CCDF children obtained via personal communication from Ivelisse Martinez-Beck.

N.11: Expected Number of CCDF Children Less than 13 by Race/Ethnicity of Child, Household Income, and Household Structure*

Hispanic	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	69	57	1	67	55	1	2	1	0
100-149% of Low-Income Level	28	13	1	26	12	1	1	0	0
150% and Above Low-Income Level	29	10	0	27	10	0	2	1	0
Black	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	18	86	1	17	84	1	0	2	0
100-149% of Low-Income Level	13	17	0	12	17	0	0	1	0
150% and Above Low-Income Level	24	16	1	23	15	1	2	1	0
Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	104	102	2	100	98	2	4	4	0
100-149% of Low-Income Level	91	34	2	86	32	2	5	2	0
150% and Above Low-Income Level	250	44	2	220	39	2	30	4	0

*Derived from Table N.5 and from tables of CCDF children obtained via personal communication from Ivelisse Martinez-Beck.

Table N.12: Expected Number of CCDF Children Less than 13 by Maternal Employment, Household Income, and Household Structure

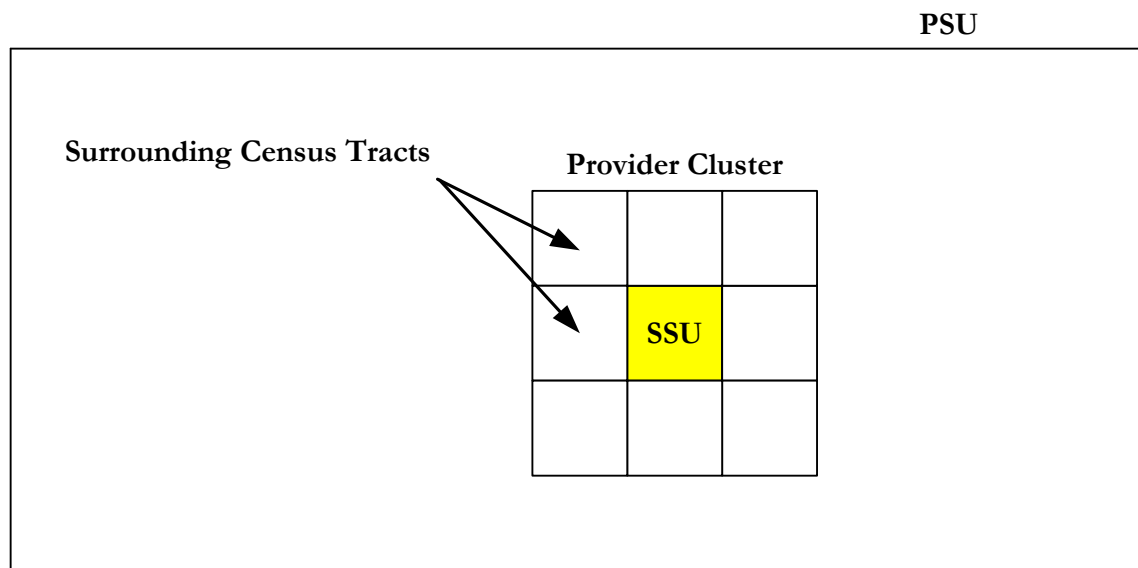
In Labor Force Employed	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	70	117	0	67	113	0	3	4	0
100-149% of Low-Income Level	79	38	0	76	36	0	4	2	0
150% and Above Low-Income Level	227	39	0	204	36	0	23	3	0
In Labor Force Unemployed	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	12	23	0	12	22	0	0	1	0
100-149% of Low-Income Level	5	2	0	5	2	0	0	0	0
150% and Above Low-Income Level	5	1	0	5	1	0	1	0	0
Not in Labor Force	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	109	66	0	105	64	0	4	2	0
100-149% of Low-Income Level	47	6	0	44	6	0	3	0	0
150% and Above Low-Income Level	71	6	0	61	5	0	9	0	0
Employment Status Unknown	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other	2-Parent Household	1-Parent Household	Other
Below Low-Income Level	0	39	4	0	38	4	0	1	0
100-149% of Low-Income Level	0	18	2	0	17	2	0	1	0
150% and Above Low-Income Level	0	25	3	0	23	3	0	2	0

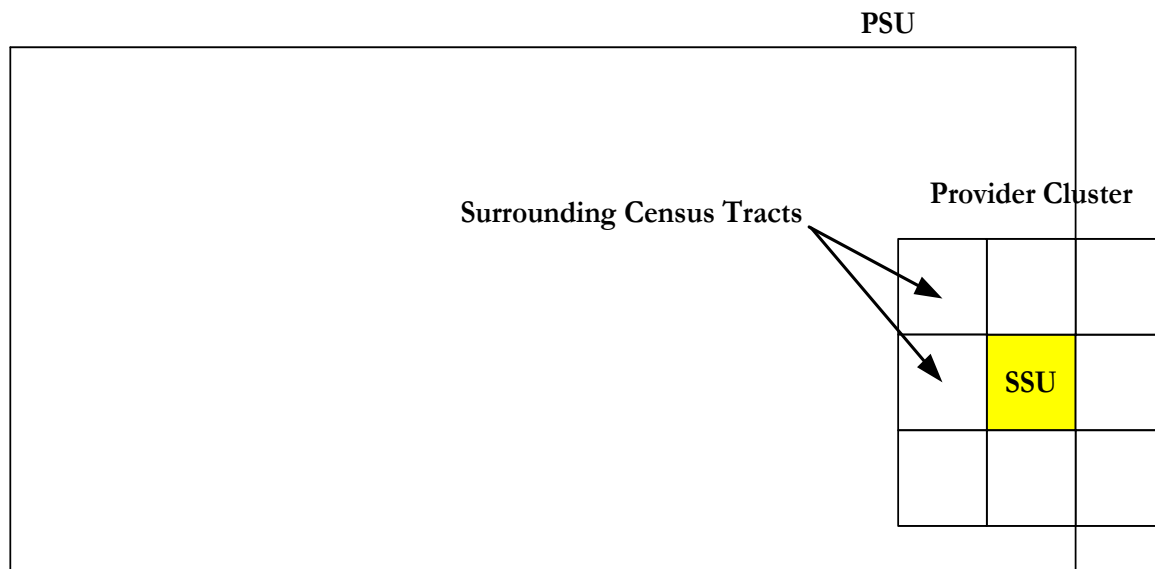
*Derived from Table N.6 and from tables of CCDF children obtained via personal communication from Ivelisse Martinez-Beck.

Appendix O. Weighting for the Supply Survey When the Provider Cluster Consists of the Demand-Survey SSU and the Surrounding Ring of Census Tracts

0.1 Introduction

We consider the problem of determining survey weights when the provider cluster consists of the demand-survey SSU and the surrounding ring of census tracts. Two illustrations of the provider cluster appear in the following diagrams. In the first sketch, the demand-survey SSU is located in the interior of the PSU, while in the second sketch, the SSU is located next to one of the PSU's boundaries and a portion of the surrounding census tracts are located in a neighboring PSU. In the work of this appendix, we will





assume that the PSU is a county and the SSU is itself a census tract, although these assumptions are not strictly required to justify our methods of estimation or their statistical properties.

Let Y_{ijk} be the value of the k -th provider physically located in the j -th demand-survey SSU and in the i -th PSU, and let U_{ij} be the population of providers physically located in the ij -th SSU. Notably, the populations of providers in the various SSUs are nonoverlapping and jointly exhaust the national population of child-care providers in America. Let U be the population of PSUs and let U_i be the population of SSUs in the i -th PSU. Then the parameter of interest, to be estimated, is the population total

$$T_Y = \sum_{i \in U} \sum_{j \in U_i} \sum_{k \in U_{ij}} Y_{ijk}. \quad (0.1)$$

Let \tilde{U} be the population of all providers in America organized in this way.

Let Z_{ijk} be the value of the same characteristic for the k -th USU located in the j -th provider cluster and in the i -th PSU, and let V_{ij} be the population of USUs associated with the ij -th provider cluster. Each USU is a child-care provider, but now providers either physically located in or adjacent to the SSU are associated with the SSU. Then the population total of the z -variable is given by

$$T_z = \sum_{i \in U} \sum_{j \in U_i} \sum_{k \in V_{ij}} Z_{ijk} = \sum_{i \in U} \sum_{j \in U_i} \sum_{k \in U_{ij}} Y_{ijk} t_{ij}, \quad (0.2)$$

where t_{ij} is the number of census tracts in the ij -th provider cluster. Let \tilde{V} be the population of all USUs in America organized in this way.

Note that the y - and z -variables both represent the same characteristic or questionnaire item. We are using the two different variable designations and universe designations to help us cope with the fact that provider clusters in the population are overlapping. A given provider in America appears just once in \tilde{U} , but may appear as several USUs \tilde{V} .

0.2 Probabilities of Selection

Let s denote the sample of PSUs and let s_i denote the sample of SSUs obtained from the i -th PSU for the demand survey. For example, we may select a sample of about 200 PSUs and 4 SSUs per PSU according to methods of pps sampling. Also, let s_{ij} denote the sample of USUs obtained from the ij -th provider cluster by simple random or systematic sampling. We assume that sampling is independent from provider cluster to provider cluster and that, in the event of duplicate selections of the same provider in different provider clusters, the provider is interviewed only once. Then, let \tilde{s} be the set of unique triples ijk obtained in the combined sample of providers from all of the selected PSUs and SSUs.

To estimate the parameter of interest, it is natural to begin by considering the Horvitz-Thompson estimator

$$\hat{T}_Y = \sum_{ijk \in \tilde{s}} \frac{Y_{ijk}}{\pi_{ijk}} = \sum_{ijk \in \tilde{s}} W_{ijk} Y_{ijk}, \quad (0.3)$$

where π_{ijk} is the inclusion probability for the ijk -th provider in the \tilde{U} population and $W_{ijk} = \pi_{ijk}^{-1}$ is the base weight. It is well known that (0.3) is an unbiased estimator of the parameter of interest T_Y . The problem with this estimator is that the inclusion probabilities will generally be unknown. They depend in a complicated way on the first-order, two-way, and multi-way probabilities of selection of the PSUs and SSUs with which a given provider is associated as a USU.

If the inclusion probabilities are unknown, then the Horvitz-Thompson estimator \hat{T}_Y is almost unworkable. An approximation to the estimator could be constructed by acting as if the PSUs were selected according to a Poisson sampling design and the SSUs were selected within the selected PSUs according to a Poisson sampling method. Given Poisson sampling, the pairs ij are selected independently. The two-way and multiway probabilities of selection for different pairs are expressed as products of the first-order inclusion probabilities of the pairs. From the first-order inclusion probabilities and these approximated joint inclusion probabilities, it is straightforward to develop an approximate inclusion probability for each provider in the population \tilde{U} .

Substitution of the approximate inclusion probabilities into (0.3) gives an estimator of the total of interest. At this writing, the exact properties of such an estimator under non-Poisson sampling are unknown. It is reasonable to think that the estimator is subject to a small, but nonzero, bias.

0.3 Unbiased Estimator

A strictly unbiased estimator of the parameter of interest can be derived by approaching estimation through the \tilde{V} population. The Horvitz-Thompson estimator of the total T_Z is defined by

$$\hat{T}_Z = \sum_{i \in s} \sum_{j \in s_i} \sum_{k \in s_{ij}} \frac{Z_{ijk}}{\psi_{ijk}}, \quad (0.4)$$

where ψ_{ijk} is the inclusion probability associated with the ijk -th USU. Because this estimator is unbiased for estimating the z -total, from (0.2) it follows that

$$E\{\hat{T}_Z\} = \sum_{i \in U} \sum_{j \in U_i} \sum_{k \in U_{ij}} Y_{ijk} t_{ij}. \quad (0.5)$$

Thus, an unbiased estimator of the parameter of interest is given by

$$\tilde{T}_Y = \sum_{i \in s} \sum_{j \in s_i} \sum_{k \in s_{ij}} \frac{Z_{ijk}}{\psi_{ijk}} \frac{1}{t_{ij}} = \sum_{i \in s} \sum_{j \in s_i} \sum_{k \in s_{ij}} \Omega_{ijk} Z_{ijk}, \quad (0.6)$$

where $\Omega_{ijk} = (\psi_{ijk} t_{ij})^{-1}$ is the new sampling weight.

To calculate the sampling weights, the project statistician will need to keep track of the inclusion probabilities for the USUs in the \tilde{V} population, a standard task in almost any survey project. The statistician will also need to count the t_{ij} , the number of tracts in the ij -th provider cluster. This counting is a nonstandard task, but should be feasible through use of modern GIS software. The count t_{ij} is a multiplicity factor for each provider physically located in the ij -th tract. It represents the number of SSUs in the population that offer a positive probability of selection of each such provider. The count t_{ij} is only required for pairs ij in the demand-survey sample. However, if the sample SSU is located at the boundary of the sample PSU, then t_{ij} may include surrounding tracts from the adjacent PSU(s), which themselves may not be in the sample.

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Design Phase of the National Survey of Child Care Supply and Demand: Addendum to the Sampling Report

1. Introduction

This material updates and supersedes the *2010 National Study of Child Care Supply and Demand: Sampling Report* dated March 30, 2009 and labeled a Second Draft (hereafter the “Revised Sampling Report”). Since the end of March, a Feasibility Test was conducted to test and examine some of the options put forward in the Revised Sampling Report. In addition, OPRE has reviewed the Revised Sampling Report, offered comments, and clarified its priorities and preferences for the NSCCSD. In sum, new information is available today that was not available during the drafting of the Revised Sampling Report.

We emphasize that much of the material set forth in the Revised Sampling Report remains valid today and a part of the recommended sampling design produced as part of the Design Phase of the NSCCSD. If a given topic is not treated in this Addendum but is covered in the Revised Sampling Report, then the Revised Sampling Report remains as the authoritative source of information concerning the given topic.

The Addendum mainly covers changes or refinements in the sampling design. If a given topic is treated in this Addendum, regardless of whether it is covered in the Revised Sampling Report or not, then the Addendum becomes the authoritative source of information concerning the given topic.

Section 2 of this Addendum gives our direct response to the comments OPRE made on the Revised Sampling Report. Clarification and updating of the design of the demand survey appears in Section 3. Section 4 clarifies and updates the design of the supply survey. The Addendum closes in Section 5 with clarification of the design of the optional AIAN survey.

2. Response to OPRE Comments on Sampling Report

The Revised Sampling Report posed many options for OPRE’s consideration. Many of these options were also presented and discussed in more detail in a briefing for senior OPRE officials on February 18, 2009. The Design Phase project team received guidance from OPRE regarding many of these options in an April 27, 2009 memorandum from Project Officer Ivelisse Martinez-Beck to Design Phase Project Director Rupa Datta entitled, “Decision points to inform sampling and methodology report, analyses plans and resource estimates for the Design Phase of the NSCCSD-2010.”

The memorandum reads, in part,

“As discussed during our face-to-face meeting on February 18, 2009, and informed by subsequent discussions (meeting with Federal partners; design team calls; steering committee call on 4/22/09), we are submitting additional guidance to the project regarding decision points that will inform the completion of the deliverables related to the sampling, methodology, analyses and resource estimates for the proposed national study.

Many of the decision points are in agreement with the recommendations submitted by the Project Director and other key staff for the project and are already addressed in the Second Draft of the Sampling Report dated March 30, 2009. Alternative sampling, design and methodology options will mostly have implications for the generalizability of findings to populations not covered in the alternative options, the cost estimates, and questions that could be answered by the study.”

Below, we note specific guidance provided by OPRE in that memorandum in response to options presented in the Sampling Report.

Chapter 2. Core Sample Design

2.1 Introduction (Revised Sampling Report, page 8)

OPRE agrees with NORC’s recommendation that the main study use 5-year American Community Survey estimates for planning purposes, understanding that those data are scheduled for Fall 2010 release.

2.2.1 Choice of PSU (page 11)

The Sampling Report offers choices of primary sampling units: counties, tracts/tract clusters, or county subdivisions. OPRE expressed a preference for county subdivisions. Subsequent work on the provider cluster concept for the supply survey has revealed that counties or county clusters are the appropriate primary sampling unit for the demand survey.

2.2.2 Stratification of PSUs (page 14)

OPRE agreed with NORC’s recommendation that PSUs be stratified by State and percentage of households with children in the targeted age groups. OPRE also stated a preference for urban/rural stratification within states, but no oversampling of rural areas. This preference can be discussed at the time of main study sample selection.

2.2.3 Measure of Size and Selection Method (pages 19-21)

OPRE accepted the option of using the number of low-income households with at least one child under age 18 as the measure of size, understanding that the five-year ACS data are recommended for this option. OPRE also concurred with NORC's recommendation of Durbin's scheme for pps method.

2.3.1 Choice of Secondary Sampling Units (page 21)

OPRE expressed preference for census tracts/tract clusters over a hybrid Minor Civil Division option which NORC had noted would be more challenging to implement. The implementation of provider clusters on the supply side should help the approximation of child-care choice sets or markets.

2.3.2 Sampling Frames for Households within the Selected SSUs (page 30)

OPRE opted for a hybrid of the USPS delivery sequence file with sample and go to improve coverage in selected areas.

2.3.3 Stratification of SSUs to facilitate oversampling of the Low-Income Population (page 32)

OPRE requested stratification of block groups within SSUs by income. This request comes with the caveat that decisions about the level of income for oversampling eligibility and the level of oversampling are still pending, and that those decisions may have implications for this issue.

2.3.4 Methods of Sample Selection (page 37)

OPRE specified for measure of size the number of households with at least one child under age 18 years. For selection of households within SSUs, OPRE echoed its earlier preference for the USPS delivery sequence file with sample and go as needed by electing systematic sampling of address from the USPS with 'list and go.'

2.3.5 Screening and Options for Sampling Children (page 39)

OPRE prefers selecting all eligible children within the household, which is consistent with the design of the demand questionnaire. The memorandum also notes that it prefers to see inclusion of all children to age 13 within eligible households if the demand survey eligibility is restricted to households with children under age 6, not yet in kindergarten.

2.4 Mode of Data Collection (page 41)

OPRE agreed with NORC's recommendation for a hybrid approach employing face-to-face interviewing and telephone data collection.

2.5 Sample Size Considerations (Table 2.15, page 52)

OPRE prefers cell sizes to detect differences between .50 and .55, implying nominal completed interviews of 3,130 per cell.

Chapter 4. Supply Survey Sampling Design

4.1 Target Population of Providers of Child Care (page 100)

OPRE requested that NORC retain separate options for a supply survey of providers of early education and care as well as a supply survey of providers of early education and care and school-age care.

OPRE also concurred with the principles for defining the supply survey target population as specified.

4.2 General Approach to the Supply Survey (page 102)

OPRE chose the option of the provider cluster being the second stage unit plus a surrounding ring of census tracts. The following note elaborated on this choice,

“Note that under this assumption the SSUs selected would differ depending on decisions about the target population for the demand survey. OPRE is interested in making sure that the supply survey includes programs and providers serving children (in the targeted age groups in 1 above) in households of all income levels, and that decisions about selection of provider clusters will allow for analyses to better understand the interaction between supply and demand, e.g., if only low-income strata in demand survey then market analyses only in the low-income strata.”

OPRE also approved the seven overlapping provider-type strata described.

4.3.1 Frame Development (page 105)

OPRE noted that the feasibility test examined the question of appropriate ultimate sampling unit for the supply survey and reserved its judgment pending the results of those examinations.

4.3.2 Sampling Methods (page 109)

OPRE preferred equal probability sampling of providers within SSU/Strata.

4.4 Details of sampling in Stratum II (page 111)

No mention was made of these options in the memorandum. NORC has proceeded with the design assuming that the same sample of households will be screened for both the demand survey and the home-based provider survey. Feasibility testing indicated that no additional data source was required for the sampling of faith-based programs.

4.5 Details of Sampling in Stratum III (page 115)

No mention was made in the memorandum regarding these options. NORC has proceeded with the design assuming provider-level weights and analysis.

4.6 Mode of Data collection (page 121)

OPRE elected the mixed-mode survey option, which also emerged as dominant during the feasibility test.

4.7 Child Care Slots (page 122)

OPRE noted that approaches for sample selection were being reviewed in the feasibility test. Those reviews suggest that regular multi-stage sampling would be adequate, with slots collected only for sampled providers.

4.8 Sample Size Considerations (page 124)

OPRE stated that NORC should work toward sample sizes per cell to detect differences at .55 (from .50). That is, 3,130 completed interviews per cell.

For a sample with 12 estimation cells, this implies a sample size of 37,560 completed provider interviews, with an additional target of 3,130 completed FFN interviews from the home-based provider survey. We note that later design work has altered the implied total sample size by reducing the number of estimation cells.

3. Demand-Survey Sampling Design

The sampling design for the demand survey was described in Section 2 of the Sampling Report. This section updates portions of that material.

Tables AD-3.1 – AD-3.4 demonstrate the oversampling of low-income households using a cutoff of 250 percent of the poverty guideline, published each year by the Department of Health and Human Services, to classify whether a household is low-income or not. This set of tables updates Tables 2.18 to 2.21 in the Sampling Report.¹

For purposes of the calculations in Table AD-3.1, all census PUMAs that have 25 percent or more low-income households (defined as households whose income is at or below 250 percent of the poverty guideline) are placed in the high-density low-income stratum, whereas in Table AD-3.2, PUMAs that have 40 percent or more low-income households are placed in the high-density low-income stratum. Tables AD-3.1 and 3.2 show the expected numbers of completed household interviews by income domain under different oversampling factors (o in the tables). Results given for oversampling factor $o = 1$ correspond to proportional sampling without consideration of oversampling of low-income households.

Given the 25 percent cut-off point and an oversampling factor of at least 1.5, many of the expected sample sizes in the low-density stratum are negative and corresponding sample sizes in the high-density stratum exceed the total sample size. Clearly, these results are inadmissible. Thus, either the 25 percent cut-off cannot be used, or it must be used with a much smaller oversampling factor. By contrast, the stratum cut-off point of 40 percent entails no negative sample sizes and shows valuable gains in the number of low-income households as the oversampling factor increases. The expected number of completed household interviews below 250 percent of the poverty guideline increases from 8,039 ($= 3,477 + 4,562$), to 8,886 ($= 4,020 + 4,866$), to 9,734 ($= 4,563 + 5,171$) as the oversampling factor increases from $o = 1$ to 1.5 to 2.

¹ In Tables 2.18 to 2.21, stratification was conducted according to the percentage of households at or below a “low income level” defined as 185% of the poverty guideline, and sample sizes were tabulated for income domains defined in terms of ranges of percentages ($< 100\%$, $100\% - 149\%$, and $\geq 150\%$) of this low income level.

Table AD-3.1 Expected Number of Completed Household Interviews by Domain and Oversampling Factor: Stratum Cut-Point=25%

Domain	Oversampling Factor								
	o=1			o=1.5			o=2		
	Total	1	2	Total	1	2	Total	1	2
Age Group:									
Less than 3	5,804	4,509	1,296	5,944	6,763	(819) ^a	6,083	9,017	(2,934)
3 to 5 Years	6,093	4,683	1,410	6,133	7,024	(891)	6,173	9,366	(3,193)
6 to 12 Years	11,792	9,020	2,772	11,777	13,530	(1,752)	11,762	18,040	(6,277)
12 Years or Less	17,512	13,405	4,107	17,512	20,108	(2,596)	17,512	26,810	(9,298)
Household Structure:									
1-Parent Household	5,554	4,691	863	6,490	7,036	(546)	7,427	9,381	(1,954)
2-Parent Household	11,807	8,588	3,218	10,848	12,883	(2,034)	9,890	17,177	(7,287)
Other	151	126	25	173	189	(16)	195	252	(57)
Maternal Employment Status:									
In Labor Force	10,973	8,346	2,627	10,859	12,519	(1,660)	10,745	16,692	(5,947)
Employed	10,277	7,760	2,517	10,050	11,641	(1,591)	9,822	15,521	(5,699)
Unemployed	695	586	110	809	879	(69)	923	1,171	(248)
Not in Labor Force	5,108	3,873	1,235	5,028	5,809	(781)	4,948	7,745	(2,797)
Status Unknown	1,431	1,187	245	1,625	1,780	(155)	1,819	2,373	(554)
Region:									
Northeast	3,047	2,025	1,022	2,391	3,037	(646)	1,736	4,049	(2,314)
Midwest	3,905	2,883	1,022	3,679	4,325	(646)	3,452	5,766	(2,314)
South	6,477	5,397	1,080	7,414	8,096	(682)	8,350	10,795	(2,445)
West	4,083	3,100	983	4,029	4,650	(622)	3,974	6,200	(2,226)
Income:									
Below 125% Poverty Guideline	3,478	3,152	326	4,521	4,728	(206)	5,565	6,304	(739)
125-250% Poverty Guideline	4,562	3,909	653	5,452	5,864	(412)	6,341	7,819	(1,478)
Above 250% Poverty Guideline	9,472	6,344	3,128	7,539	9,516	(1,977)	5,606	12,688	(7,082)
Race/Ethnicity:									
Hispanic	2,764	2,383	381	3,334	3,575	(241)	3,903	4,766	(863)
Black	2,325	2,015	310	2,826	3,022	(196)	3,327	4,029	(702)
Other	12,423	9,007	3,416	11,352	13,511	(2,159)	10,281	18,015	(7,734)
Total	17,512	13,405	4,107	17,512	20,108	(2,596)	17,512	26,810	(9,298)

Source: Stratification – Census, 2000, 5% PUMS

Attributes – ACS, 2006

^a Values given within parentheses are negative values.

Table AD-3.2 Expected Number of Completed Household Interviews by Domain and Oversampling Factor: Stratum Cut-Point=40%

Domain	Oversampling Factor								
	o=1			o=1.5			o=2		
	Total	1	2	Total	1	2	Total	1	2
Age Group:									
Less than 3	5,804	2,264	3,541	5,862	3,396	2,466	5,919	4,528	1,392
3 to 5 Years	6,093	2,336	3,757	6,121	3,504	2,617	6,148	4,671	1,477
6 to 12 Years	11,792	4,460	7,332	11,797	6,690	5,107	11,802	8,920	2,882
12 Years or Less	17,512	6,614	10,898	17,512	9,922	7,590	17,512	13,229	4,283
Household Structure:									
1-Parent Household	5,553	2,574	2,979	5,936	3,861	2,075	6,319	5,149	1,171
2-Parent Household	11,810	3,976	7,833	11,421	5,965	5,456	11,032	7,953	3,079
Other	149	64	86	155	95	60	161	127	34
Maternal Employment Status:									
In Labor Force	10,970	3,994	6,976	10,850	5,990	4,859	10,729	7,987	2,742
Employed	10,277	3,668	6,609	10,105	5,502	4,603	9,934	7,336	2,598
Unemployed	693	325	368	744	488	256	795	651	144
Not in Labor Force	5,107	2,007	3,100	5,169	3,010	2,159	5,232	4,013	1,219
Status Unknown	1,435	614	821	1,493	921	572	1,551	1,228	323
Region:									
Northeast	3,047	947	2,100	2,883	1,420	1,463	2,719	1,893	826
Midwest	3,906	1,079	2,828	3,588	1,618	1,969	3,269	2,157	1,111
South	6,474	3,087	3,387	6,990	4,631	2,359	7,505	6,174	1,331
West	4,084	1,502	2,582	4,052	2,253	1,799	4,019	3,004	1,015
Income:									
Below 125% Poverty Guideline	3,477	1,989	1,487	4,020	2,984	1,036	4,563	3,979	585
125-250% Poverty Guideline	4,562	2,102	2,460	4,866	3,153	1,713	5,171	4,204	967
Above 250% Poverty Guideline	9,473	2,523	6,950	8,626	3,784	4,841	7,778	5,046	2,732
Race/Ethnicity:									
Hispanic	2,762	1,434	1,328	3,076	2,151	925	3,390	2,868	522
Black	2,324	1,221	1,103	2,600	1,832	768	2,876	2,442	434
Other	12,426	3,959	8,466	11,836	5,939	5,897	11,246	7,919	3,328
Total	17,512	6,614	10,898	17,512	9,922	7,590	17,512	13,229	4,283

Source: Stratification – Census, 2000, 5% PUMS
Attributes – ACS, 2006

Tables AD-3.3 and AD-3.4 give the proportions by stratum and domain

derived from the 2006 ACS. These proportions are used to develop the estimated yields in Tables AD-3.1 and AD-3.2. The proportions represent background information that may be useful to survey planners at the time of sample implementation.

Table AD-3.3 Distribution of Households by Domain and Sampling Stratum: Stratum Cut-Point=25%

Domain*	Percent of US Households		
	High-Density Stratum (h=1)**	Low-Density Stratum (h=2)	Total Household Population
Age Group:			
Less than 3	8.93%	8.74%	8.88%
3 to 5 Years	9.27%	9.51%	9.33%
6 to 12 Years	17.86%	18.69%	18.05%
12 Years or Less	26.55%	27.69%	26.81%
Household Structure:			
1-Parent Household	9.29%	5.82%	8.50%
2-Parent Household	17.01%	21.70%	18.08%
Other	0.25%	0.17%	0.23%
Maternal Employment Status:			
In Labor Force	16.53%	17.71%	16.79%
Employed	15.37%	16.97%	15.73%
Unemployed	1.16%	0.74%	1.06%
Not in Labor Force	7.67%	8.33%	7.82%
Status Unknown	2.35%	1.65%	2.20%
Region:			
Northeast	4.01%	6.89%	4.66%
Midwest	5.71%	6.89%	5.98%
South	10.69%	7.28%	9.91%
West	6.14%	6.63%	6.25%
Income:			
Below 125% Poverty Guideline	6.24%	2.20%	5.32%
125-250% Poverty Guideline	7.74%	4.40%	6.98%
Above 250% Poverty Guideline	12.56%	21.09%	14.50%
Race/Ethnicity:			
Hispanic	4.72%	2.57%	4.23%
Black	3.99%	2.09%	3.56%
Other	17.84%	23.03%	19.02%
Total	77.30%	22.70%	100.00%

Table AD-3.4 Distribution of Households by Domain and Sampling Stratum: Stratum Cut-Point=40%

Domain*	Percent of US Households		
	High-Density Stratum (h=1)**	Low-Density Stratum (h=2)	Total Household Population
Age Group:			
Less than 3	9.25%	8.67%	8.88%
3 to 5 Years	9.54%	9.20%	9.33%
6 to 12 Years	18.23%	17.95%	18.05%
12 Years or Less	27.03%	26.67%	26.81%
Household Structure:			
1-Parent Household	10.52%	7.29%	8.50%
2-Parent Household	16.25%	19.17%	18.08%
Other	0.26%	0.21%	0.23%
Maternal Employment Status:			
In Labor Force	16.32%	17.08%	16.79%
Employed	14.99%	16.18%	15.73%
Unemployed	1.33%	0.90%	1.06%
Not in Labor Force	8.20%	7.59%	7.82%
Status Unknown	2.51%	2.01%	2.20%
Region:			
Northeast	3.87%	5.14%	4.66%
Midwest	4.41%	6.92%	5.98%
South	12.62%	8.29%	9.91%
West	6.14%	6.32%	6.25%
Income:			
Below 125% Poverty Guideline	8.13%	3.64%	5.32%
125-250% Poverty Guideline	8.59%	6.02%	6.98%
Above 250% Poverty Guideline	10.31%	17.01%	14.50%
Race/Ethnicity:			
Hispanic	5.86%	3.25%	4.23%
Black	4.99%	2.70%	3.56%
Other	16.18%	20.72%	19.02%
Total	37.46%	62.54%	100.00%

Table 2.17 in the Sampling Report shows the sample sizes by stage of survey operations. Three scenarios are presented. First is a RDD telephone survey, which is low in cost. The second is an area probability face-to-face survey. This option produces the best response rates and population coverage but at a high cost. Third, a compromise or hybrid option is where 50 percent of targeted completes are from a RDD survey and the other 50 percent from an area probability face-to-face survey. This hybrid approach is supposed to be more expensive than a pure RDD option but less expensive than a pure face-to-face survey. This hybrid option is intended to employ an address-based sampling (ABS), multimode interviewing approach. The term ABS was first used in Section 3.4.1 of the Sampling Report. Because ABS was not explicitly used in Section 2, we now want to make clear that the ABS, multimode approach is recommended for the main demand-survey sample.

An ABS sampling approach starts with a probability sample of addresses from a commercial address list or a USPS delivery sequence file (DSF). Sampled addresses are matched to commercial databases to obtain landline telephone numbers, where available. Our experience indicates that telephone numbers can be obtained in this way for about 40 to 60 percent of the addresses. Then, matched telephone numbers are sent to the phone center where interviews are conducted by telephone. Addresses without matched telephone numbers are sent to the field to be worked on through a face-to-face interview. Nonrespondents in the telephone center are also sent to the field. This ABS, multi-mode approach takes the advantage of the low cost associated with telephone center activities and the high response rates in the face-to-face interviewing. Also, allowing sample cases to move from the telephone center to the field adds flexibility to the approach. In theory, the approach covers the entire household population, including cell-phone-only households and phoneless households. For the NSCCSD, the sampling approach will also include consideration of the sample-and-go method in areas in which the ABS address frame is known to be deficient.

Table AD-3.5 presents the recommended sample sizes and assumed completion rates for such an ABS, multi-mode approach. Given recent industry experience with the ABS approach, we are now assuming that about 35 percent of the completed interviews would be obtained by telephone and the remaining 65 percent by field enumeration.

AD-3.5 Sample Sizes and Assumed Completion Rates for the Demand Survey, Given an ABS, Multi-Mode Approach: Children Less than 13 Years

Stage of Data-Collection Operations	Telephone Rates	Field Rates	All Rates	Sample Sizes
Released sample of addresses			100%	141,477
Addresses matched with telephone number and sent to telephone center	46%		46%	64,394
Addresses (matched or unmatched) sent to field		54%	54%	77,083
Resolved residential households	82%	90%	86%	122,178
Completed screening interviews	88%	90%	89%	108,904
Eligible households by census data	27%	27%	27%	29,197
Eligible households after allowance for undercoverage	60%	80%	71%	20,866
Complete household interviews	82%	85%	84%	17,512
Number of eligible children	1.72	1.72	1.72	30,121

While the foregoing tables treat the population of children under 13 years, there is some consideration to instead focus the demand survey on children under 6 years. Restricting the demand survey to households with children less than 6 increases the sample sizes for households using early childhood education and enables analyses involving early childhood education. Tables AD-3.6 shows the distribution of U.S. households with at least one child under 6 by key analytic domains. Table AD-3.7 presents the expected number of effective household interviews and completed household interviews by key analytic domains.

AD-3.6 Distribution of Households by Presence of One or More Children Less Than 6 Years and Other Domains of Interest

Domain	Percent of US Households	Cases per 1,000 Households
Age Group:		
Less than 3	8.88%	89
3 to 5 Years	9.33%	93
Under 6	15.15%	152
6 to 12 years	0.00%	0
No age eligible child	84.85%	849
Household Structure:		
1-Parent Household	4.58%	46
2-Parent Household	10.46%	105
Other	0.11%	1
No age eligible child	84.85%	849
Maternal Employment Status:		
In Labor Force	8.93%	89
Employed	8.30%	83
Unemployed	0.63%	6
Not in Labor Force	4.99%	50
Status Unknown	1.23%	12
No age eligible child	84.85%	849
Region:		
Northeast	2.52%	25
Midwest	3.39%	34
South	5.61%	56
West	3.62%	36
No age eligible child	84.85%	849
Income:		
Below 125% Poverty Guideline	3.39%	34
125-250% Poverty Guideline	4.09%	41
Above 250% Poverty Guideline	7.67%	77
No age eligible child	84.85%	849
Race/Ethnicity:		

Hispanic	2.64%	26
Black	1.95%	20
Other	10.56%	106
No age eligible child	84.85%	849

AD-3.7 Expected Number of Effective Household Interviews and Completed Household Interviews (Assuming a Design Effect of 2.0) by Domain, Given 17,512 Total Completed Household Interviews: Households with Children Less than 6 Years

Domain	Table 2.15	Table 2.16
	Expected Effective Sample Size	Expected Number of Completed Households Assuming DEFF=2
Age Group:		
Less than 3	5,132	10,264
3 to 5 Years	5,392	10,785
6 to 12 years	0	0
Household Structure:		
1-Parent Household	2,647	5,294
2-Parent Household	6,045	12,091
Other	64	127
Maternal Employment Status:		
In Labor Force	5,161	10,322
Employed	4,797	9,594
Unemployed	364	728
Not in Labor Force	2,884	5,768
Status Unknown	711	1,422
Region:		
Northeast	1,456	2,913
Midwest	1,959	3,919
South	3,242	6,485
West	2,092	4,184
Income:		
Below 125% Poverty Guideline	1,959	3,919
125-250% Poverty Guideline	2,364	4,728
Above 250% Poverty	4,433	8,866
Race/Ethnicity:		
Hispanic	1,526	3,052
Black	1,127	2,254
Other	6,103	12,206
Total Sample Size	8,756	17,512

Table AD-3.8 shows the sample sizes by stage of survey operations for a RDD survey and a face-to-face survey of households with children less than 6. Table AD-3.9 presents the sample sizes for an ABS, multi-mode survey of the same target population.

AD-3.8 Sample Sizes by Mode of Interview and by Stage of Survey Operations, Assuming a Design Effect of 2.0: Children Less than 6 Years

Stage of Survey Operations	Factor (%)	Sample Size
RDD Telephone Survey		
Released telephone numbers	100	1,303,620
Prefinalized outside telephone Center	44	573,593
Released to telephone center	56	730,027
Advance letter sent	60	438,016
Resolved telephone numbers	81	1,055,932
Working residential numbers	25	263,983
Completed screening interviews	89	234,945
Eligible households by census data	15.15	35,594
Eligible households after allowance for undercoverage	60	21,356
Completed household Interviews	82	17,512
Eligible children with completed household interview	1.36	23,817
Face-to-Face Survey		
Released address lines	100	224,985
Advance letter sent	100	224,985
Occupied housing units	88	197,987
Completed screening interviews	89	176,209
Eligible households by census data	15.15	26,696
Eligible households after allowance for undercoverage	80	21,356
Complete household Interviews	82	17,512
Eligible children with completed household interview	1.36	23,817

AD-3.9 Sample Sizes and Assumed Completion Rates for the Demand Survey, Given an ABS, Multi-Mode Approach: Children Less than 6 Years

Stage of Data-Collection Operations	Telephone Rates	Field Rates	All Rates	Sample Sizes
Released sample addresses			100%	250,363
Addresses matched with telephone number	46%		46%	113,954
Unmatched addresses sent to field		54%	54%	136,409
Resolved residential households	82%	90%	86%	216,210
Completed screening interviews	88%	90%	89%	192,720
Eligible households by census data	15%	15%	15%	29,197
Eligible households after allowance for undercoverage	60%	80%	71%	20,866
Complete household interviews	82%	85%	84%	17,512
Number of Eligible Children	1.36	1.36	1.36	23,816

To facilitate comparison between oversampling of households below 185 percent of the federal poverty level (FPL) and oversampling of households below 250 percent of FPL, we reproduce tables 2.18-2.21 from the Revised Sampling Report below. The only material difference in Tables AD-3.10-AD.3-11 from Tables 2.18-2.21 is the categorization of household poverty into the levels: less than 125% of FPL, 125% to 250% of FPL, and greater than 250% of FPL.

We note that the final main study sample should certainly have at 3,130 completed interviews in the most important analytic cells, including those for Black and Hispanic households. In the Tables AD-3.2 and AD-3.10, we see that the proposed sample would yield sufficient numbers of Hispanic households, but might not yield sufficient numbers of Black households. For example, if households under 250% of FPL were oversampled with a stratum cut-off at 40%, then Table AD-3.2 indicates that 2,876 Black households would be sampled. If households under 185% of FPL were oversampled with a stratum cut-off at 25%, then Table AD-3.10 indicates that 3,012 Black households would be sampled. Given that these numbers are quite close to the desired 3,130 minimum cell size and do not use the data that will be most current at the time of sample selection, we do not alter the recommended sample size at this time. We do however note that the final sample size should be determined during the sample design process, ensuring that the minimum cell size is achieved for Black and Hispanic households and for other key groups.

Table AD-3.10: Expected Number of Completed Household Interviews by Domain and Oversampling Factor: Stratum Cut-Point=25%

Domain	Oversampling Factor								
	o=1			o=1.5			o=2		
Stratum	Total	1	2	Total	1	2	Total	1	2
Age group									
Less than 3	5,804	2,803	3,001	5,883	4,205	1,678	5,961	5,606	355
3 to 5 Years	6,093	2,883	3,210	6,120	4,325	1,795	6,146	5,767	380
6 to 12 Years	11,792	5,523	6,269	11,790	8,284	3,506	11,787	11,046	742
12 Years or Less	17,512	8,205	9,307	17,512	12,308	5,204	17,512	16,411	1,101
Household Structure									
1-Parent Household	5,551	3,129	2,422	6,048	4,694	1,354	6,545	6,258	287
2-Parent Household	11,808	4,997	6,812	11,304	7,495	3,809	10,799	9,994	806
Other	152	80	73	160	119	41	168	159	9
Maternal Employment Status									
In Labor Force									

	10,972	4,986	5,986	10,827	7,480	3,347	10,681	9,973	708
Employed	10,279	4,591	5,687	10,067	6,887	3,180	9,855	9,183	673
Unemployed	694	395	298	760	593	167	826	790	35
Not in Labor Force	5,106	2,466	2,641	5,175	3,698	1,477	5,244	4,931	312
Status Unknown	1,434	753	680	1,510	1,130	380	1,587	1,507	80
Region									
Northeast	3,045	1,160	1,884	2,794	1,741	1,054	2,544	2,321	223
Midwest	3,907	1,356	2,550	3,461	2,035	1,426	3,014	2,713	302
South	6,476	3,741	2,734	7,141	5,612	1,529	7,806	7,483	324
West	4,085	1,947	2,138	4,116	2,921	1,195	4,147	3,895	253
Income									
Below 125% poverty level	3,479	2,334	1,145	4,141	3,501	640	4,803	4,668	135
125-250% of poverty level	4,563	2,561	2,002	4,960	3,841	1,120	5,358	5,121	237
250% of poverty level	9,470	3,311	6,159	8,410	4,966	3,444	7,351	6,622	729
Race/Ethnicity									
Hispanic	2,762	1,731	1,031	3,172	2,596	576	3,583	3,461	122
Black	2,323	1,455	868	2,668	2,182	485	3,012	2,910	103
Other	12,428	5,020	7,408	11,672	7,530	4,142	10,917	10,040	876
Total	17,512	8,205	9,307	17,512	12,308	5,204	17,512	16,411	1,101

Source:

Stratification: Census 5% PUMS

Attributes: ACS 2006

Pb>=0.25 ==> h=1

Pb<0.25 ==> h=2

Table AD-3.11: Expected Number of Completed Household Interviews by Domain and by Oversampling Factor:
Stratum Cut-Point=40%

Domain	Oversampling Factor								
	o=1			o=1.5			o=2		
Stratum	Total	1	2	Total	1	2	Total	1	2
Age group									
Less than 3	5,804	584	5,220	5,814	877	4,937	5,823	1,169	4,655
3 to 5 Years	6,093	605	5,488	6,099	908	5,191	6,104	1,211	4,893
6 to 12 Years	11,792	1,185	10,607	11,810	1,777	10,033	11,828	2,370	9,459
12 Years or Less	17,512	1,711	15,801	17,512	2,567	14,945	17,512	3,423	14,089
Household Structure									
1-Parent Household	5,551	798	4,753	5,693	1,197	4,495	5,835	1,597	4,238
2-Parent Household	11,808	898	10,911	11,666	1,346	10,320	11,524	1,795	9,729
Other	153	16	137	153	23	130	153	31	122
Maternal Employment Status									
In Labor Force	10,971	979	9,992	10,920	1,469	9,450	10,868	1,959	8,909
Employed	10,279	877	9,402	10,209	1,316	8,893	10,138	1,755	8,383
Unemployed	692	102	590	711	153	558	730	204	526
Not in Labor Force	5,104	570	4,534	5,144	856	4,288	5,184	1,141	4,043
Status Unknown	1,437	162	1,275	1,448	242	1,206	1,460	323	1,137
Region									
Northeast	3,044	299	2,746	3,045	448	2,597	3,046	598	2,448
Midwest	3,907	197	3,710	3,805	295	3,509	3,702	393	3,309
South	6,476	883	5,592	6,614	1,325	5,290	6,753	1,766	4,987
West	4,085	333	3,752	4,048	499	3,549	4,011	666	3,346

Income Below Low- Income Level	3,481	694	2,787	3,677	1,041	2,636	3,873	1,388	2,485
100-149% of Low-Income Level	4,560	540	4,020	4,612	810	3,802	4,664	1,080	3,585
150% and Above Low-Income Level	9,471	478	8,993	9,223	716	8,506	8,974	955	8,019
Race/Ethnicity									
Hispanic	2,763	625	2,138	2,960	938	2,022	3,157	1,251	1,907
Black	2,325	472	1,852	2,461	709	1,752	2,596	945	1,652
Other	12,424	614	11,810	12,091	921	11,171	11,759	1,227	10,531
Total	17,512	1,711	15,801	17,512	2,567	14,945	17,512	3,423	14,089

Source:

Stratification: Census 5%

PUMS

Attributes:

ACS 2006

Pb>=0.4

==> h=1

Pb<0.4 ==>

h=2

4. Supply-Survey Sampling Design

This section updates the material in Section 4 of the Sampling Report.

Subsequent to the preparation and release of the Sampling Report, NORC conducted a Feasibility Test in Peoria, IL and Birmingham, AL. We constructed sampling frames of child care providers, using the sources and matching methods outlined in the Sampling Report. The Feasibility Test culminated with a final report (see “NSCCSD Design Phase Feasibility Test Report,” by Datta, Yan, Bowman, Guiltinan, and Connelly, 2009). We shall not repeat this report here in its entirety. For convenience and completeness, however, we do repeat the report’s final recommendations concerning the construction of provider sampling frames:

“The sampling frame constructed for the feasibility test performed well on a variety of measures. Even so, we recommend several changes to the protocol for sample frame building in the main study.

- A. State-level lists of licensed programs, including centers and home-based providers.
- B. Where applicable, lists of license-exempt providers should also be reviewed to identify providers who might be eligible for the main study and should therefore be added to the frame.
- C. Head Start lists of programs.
- D. Pre-k providers excerpted from the Common Core of Data. (This does not cover private schools participating in pre-k.). Contact state agency with authority over pre-k. If applicable, incorporate list of pre-k providers that are not housed in public schools.
- E. Include all schools offering one or more grades K-6 as listed in the Quality Education Data file. These schools will be an over-representation of school-based pre-k and afterschool programs. It is not cost-effective to pre-screen all of these schools in advance. Rather, we recommend grossing up the school-based programs selected for the supply survey, with the expectation that approximately 35 % will be ineligible for the study.

There are two steps that are sufficiently labor-intensive that they could be completed once first-stage PSUs or even second stage sampling units have been selected. These include:

- F. School-age programs other than school-based. Protocol from sampling report involves contacting YMCAs, Boys and Girls Club offices, United Way, Parks and Recreations districts, and Community Development Block Grant lists to identify potential school-age programs.
- G. Where license-exempt lists are inadequate, Child Care Resource and Referral lists may be required for completion of the frame in specific local areas. This step is not necessary for home-based providers, who should be identified through the demand-side screening activity if they do not appear in the sample frame.”

Based on these recommendations and findings from the Feasibility Test, we are now recommending use of six provider sampling strata for the supply survey, with four of the strata representing providers of early care

newIA: community-based child care centers, faith-based programs, and other programs listed (or licensed) by state, local or tribal governments

newIB: family child care homes

newIC: Head Start and pre-kindergarten (pre-k) programs

newII: FFN care reported by demand survey respondents

and two of the strata representing providers of school-age care that are not otherwise represented in early care strata

newID: after-school programs

newIII: center-based programs reported by demand survey respondents and not included in any of the foregoing strata.

Sampling frames of provider locations (or establishments) are to be developed by the implementing survey organization in each of the selected provider clusters for strata newIA, newIB, newIC, and newID. Matching techniques are to be used, as necessary, to eliminate overlaps between the sampling frames. Provider locations should be assigned to the first stratum, in order, in which they are eligible. Samples of providers are to be selected and interviewed within each of these nonoverlapping strata. The providers in strata newII and newIII will be identified by demand survey respondents. Selected FFN households arising in stratum newII will be interviewed at the household as a part of demand-survey interviewing operations. Center-based programs arising in stratum newIII will be interviewed as a part of supply-survey interviewing operations. Again matching techniques should be used to eliminate any overlaps with earlier strata. A cross-walk between the strata originally proposed in the Sampling Report and the strata now recommended appears in Table AD-4.1.

Table AD-4.1 Cross-walk Between Original Sampling Strata and New Sampling Strata

Description of Type of Care	Original Stratum	New Stratum
Early care – community-based child care centers	IA	NewIA
Early or school-age care - family child care homes	IA	NewIB
Early care - other programs listed (licensed) by state, county, or tribal governments	IA	NewIA
Early care – Head Start programs	IB	NewIC
Early care – pre-K programs	IC	NewIC
Early or school-age care – FFN programs reported by demand survey respondents	IIA	NewII
Early care – other faith-based programs	IIB	NewIA
School age care – after school programs	IIIA	NewID
School age care – other center-based programs reported by demand survey respondents and not previously classified	IIIB	NewIII

We now turn to our final recommendation concerning sample sizes for provider locations. In the Sampling Report, we built a case for having 3,130 completed provider interviews per key domain. As an illustration, we worked with the cross-classification

Type of Care		Metropolitan Area Status	
		MSA	Non-MSA
Early-Child Care	Center-Based Care		
	FCC Homes		
	Other Care		
After-School Care	School-Based Care		
	FCC Homes		
	Other Care		

Because this illustration involves 12 key domains, it implied a sample size large enough to achieve 37,560 ($= 12 \times 3,130$) completed interviews. Based upon assumed rates, we determined that a released sample of 62,604 providers would be necessary to support this number of completes.

Since the time of the Sampling Report, discussions with OPRE continued and we conducted the Feasibility Test. In light of analytical needs and perceived budget limitations, we are now recommending 3,130 completed interviews in each of only four key domains. The key domains now correspond to the four new provider sampling strata newIA, newIB, newIC, and newID. The metro/nonmetro dichotomy is no longer a controlled element of the recommended design and is no longer employed in defining the key domains. In addition to the four provider strata, the demand survey sample size will drive a certain number of FFN completes, stratum newII, and a certain number of other center-based programs for school-age care, stratum newIII.

Table AD-4.2 gives the minimum recommended sample sizes corresponding to the four new provider sampling strata for provider locations. The completion rates assumed in the table are informed by findings from the Feasibility Test. Overall, given the assumed rates, to achieve 12,520 completed provider interviews, the implementing survey organization will need to select and release a sample of 21,453 providers from the provider sampling frame.

These minimum sample sizes would permit comparisons between strata, for example, community-based centers versus family child care homes, but might not yield sufficient sample sizes within strata, for example, to compare community-based centers in low-income areas with those in higher-income areas. If resources permit, we would recommend doubling the sample sizes shown in Table AD-4.2 to 25,040 completed provider interviews from an initially selected and released sample of 42,906 providers from the provider sampling frame. Doing so would better support comparisons of providers within a single strata.

We note that the new stratum IC includes both Head Start and Pre-K programs. We combine them because their relative rarity among early education programs makes it infeasible to analyze either program alone (i.e., only Head Start or only Pre-k). They share many common features, and so can be considered a ‘public’ stratum. It may not be possible to double this stratum depending on the actual numbers of providers within the selected clusters. Given that this stratum is probably the most homogeneous in terms of staffing characteristics, quality and type of services offered, we believe that a smaller sample size would be tolerable than for the other, more diverse strata (such as Community-based Centers, Family Child Care, or School-age Programs).

For the remainder of this discussion, we presume the recommended minimum sample sizes, totaling 12,520 completed provider interviews from the provider sampling frame.

The implementing survey organization is advised to select extra sample as a safety buffer in case it is needed, to maintain a system of replicates, and to put in place key indicator reports that will allow near real-time monitoring of the yield of the initially released sample. If it appears the released sample is yielding fewer completes than the target, more sample can be released from the buffer.

If the sample would be selected proportionately across America, then the completed interviews of providers should distribute themselves to geographic areas approximately as described in Table AD-4.3.

Table AD-4.2 Target Sample Sizes in New Strata

Strata	Released Entities	Proportion Not Obsolete or Unlocatable	Number Not Obsolete or Unlocatable	Eligibility Rate	Number Eligible	Interview Completion Rate	Completed Interviews
newIA	4,576	0.95	4,347	1.00	4,347	0.72	3,130
newIB	4,721	0.85	4,013	1.00	4,013	0.78	3,130
newIC	4,576	0.95	4,347	1.00	4,347	0.72	3,130
newID	7,580	0.95	7,223	0.67	4,815	0.65	3,130
School Part	6,688	0.96	6,421	0.65	4,173	0.65	2,713
Non-School Part	892	0.90	803	0.80	642	0.65	417
Total	21,453	0.93	19,930	0.88	17,523	0.71	12,520

Table AD-4.3 Distribution of Completed Interviews by Geographic Area, Assuming Proportional Sampling

Geographic Area	Proportion of 2000 Census Population	Expected Completed Interviews
United States	1.00	12,520
Not in metropolitan area	0.20	2,466
In metropolitan area	0.80	10,054
In central city	0.30	3,799
Not in central city	0.50	6,254
5,000,000 or more	0.30	3,740
In central city	0.11	1,388
Not in central city	0.19	2,352
2,500,000 to 4,999,999	0.12	1,485
In central city	0.04	468
Not in central city	0.08	1,016
1,000,000 to 2,499,999	0.16	1,961
In central city	0.06	746
Not in central city	0.10	1,215
500,000 to 999,999	0.08	985
In central city	0.03	381
Not in central city	0.05	604
250,000 to 499,999	0.08	1,020
In central city	0.03	417
Not in central city	0.05	603
100,000 to 249,999	0.06	787
In central city	0.03	351
Not in central city	0.03	435
50,000 to 99,999	0.01	76
In central city	0.00	47
Not in central city	0.00	29
Northeast Region	0.19	2,384
New England Division	0.05	619
Middle Atlantic Division	0.14	1,765
Midwest Region	0.23	2,865
East North Central Division	0.16	2,009
West North Central Division	0.07	856
South Region	0.36	4,459
South Atlantic Division	0.18	2,303
East South Central Division	0.06	757
West South Central Division	0.11	1,399

Table AD-4.3 Distribution of Completed Interviews by Geographic Area, Assuming Proportional Sampling

Geographic Area	Proportion of 2000 Census Population	Expected Completed Interviews
West Region	0.22	2,812
Mountain Division	0.06	808
Pacific Division	0.16	2,003

For example, we should expect about 2,466 provider completes outside of metro areas and 10,054 completes within metro areas.

Table AD-4.4 gives a summary of the current recommended sampling design for the NSCCSD.

Table AD-4.4 Description of the Sampling Design for the NSCCSD

Stage of Sampling	Description of Sampling Design
Primary Sampling Units (PSUs):	PSUs are single counties or clusters of contiguous counties
	Minimum size = 100,000 population
	State-based stratification
	Sample size $n \doteq 222$ PSUs, with allocation to strata in proportion to the numbers of households with eligible children, along the lines indicated in Sampling Report, Table 2.2
	Measure of size X_i = households with at least one child under age 18 as determined by 3-year data from the American Community Survey released in 2009 for the period 2006-2008. See http://www.census.gov/acs/www/Products/index.html .
	Within defined strata, PSUs are sorted by measure of size prior to sampling
	Probability proportional to size sampling; sampling independently from stratum to stratum
Secondary Sampling Units (SSUs):	<p>Demand-survey SSUs are tracts or clusters of contiguous tracts</p> <p>Supply-survey will use the provider cluster defined by the selected tract, where a provider cluster = selected tract plus any tract (in or out of the selected PSU) that intersects a 2-mile radius from the population centroid of the selected tract.</p>

	Minimum size = demand-survey SSU population $\geq 1,000$ and provider cluster population $\geq 10,000$
	Sample size $m \doteq 1,000$ SSUs, with about 4 SSUs selected per noncertainty PSU and a few more selected per certainty PSU on a proportional basis
	Measure of size X_{ij} = households with at least one child under age 18 as determined by 5-year data from the American Community Survey to be released in autumn 2010 for the period 2005-2009
	Within a selected PSU, SSUs are sorted prior to sampling to achieve an approximately continuous geographic ordering, using the Peano key or equivalent
	Probability proportional to size sampling; sampling independently from PSU to PSU
Providers or Ultimate Sampling Units (USUs):	Sample size $q \doteq 21,453$ selected and released provider locations or establishments
	Sample size per provider cluster $q_{ij} = \min(q_0, Q_{ij})$, where Q_{ij} is the total number of providers listed on the provider sampling frame within the j -th provider cluster and the i -th PSU, and q_0 is a sample size “chosen” by the implementing survey statistician to yield on average an expected 21.4 ($= q / m$) providers per provider cluster
	Providers on the sampling frame are sorted prior to sampling by provider stratum newIA, newIB, newIC, newID
	Systematic sampling of providers to achieve the determined sample size; sampling independently from provider stratum to provider stratum defined within provider cluster or within PSU
	Data collection to include all eligible child care programs operated with the selected provider location or establishment

The reader will note that a minimum size is established for both PSUs and SSUs or provider clusters. The minimum is required to ensure the availability of a large enough population of providers to support the sample size requirements set forth in Table AD-4.2.

The implementing survey organization may re-evaluate the specific minimum sizes set forth here as the actual sample selection progresses and new information emerges about the specific sampling frame and sample.

At this writing, we have recommended a large number of PSUs. The number $n \doteq 222$ ensures that each state would have a minimum of two PSUs and that the NSCCSD sample would well represent all child-care policy types across America. In the larger states that are allocated more PSUs, the PSUs could be stratified by degree of urbanization prior to sample selection. A smaller number of PSUs could be considered in the event that representing all policy types diminishes in priority or that pressure to reduce the cost of survey implementation increases.

Because the distribution of the number of providers is likely to be quite skewed across the population of provider clusters, it will be challenging to configure the sampling design both to achieve enough selected providers and to maintain the ideal circumstance in which all providers have a nearly equal probability of selection. To investigate this matter, we constructed a reasonably complete provider sampling frame in each of five states: AL, IL, MA, SD and TX. This frame building exercise was conducted shortly after the Feasibility Test and it may be viewed as a component of the Feasibility Test. Using the complete sampling frames, we developed and studied all possible provider clusters in each state. Figures AD-4.1a – AD-4.1e display histograms of the total number of providers across all provider clusters in AL, IL, MA, SD, and TX, respectively. Tables AD-4.5 – AD-4.9 give the percentiles of the distributions of the total numbers of providers across all provider clusters in the five states.² From these data, it is clear that there are a substantial number of provider clusters in which there very few or no providers at all. Throughout these figures and tables we used all possible provider clusters without setting a minimum size.

The sample size requirement is to average about 21 or 22 (the noninteger calculation is 21.4) selected and released providers per provider cluster. Let us call q_0 the *chosen sample size* (or the attempted sample size) per provider cluster. If we would choose the sample size $q_0 = 21$ or 22 in a given provider cluster, (i, j) , in fact we would only yield a sample of size $\min(q_0, Q_{ij})$, since it is not possible to take more providers than are actually in the population in the provider cluster. Because of the skewness of the population of provider clusters, we would be doomed to average many fewer than the required 21 or 22 providers per selected provider cluster. In fact, to actually average 21 or 22 providers, we would have to choose the sample size q_0 to be quite a bit larger than 21 or 22. If we would do so, then the actual sample yield $\min(q_0, Q_{ij})$ would tend to equal 21 or 22 providers, as required.

² By design, the frame building task did not seek to develop a complete list of all after school programs in the states. Thus, the counts of after school programs given in the figures and tables in the remainder of this section considerably understate the true but unknown numbers of after school programs, while the counts of total programs are slightly understated. The task did seek to develop a complete list of all early care facilities and of all elementary schools.

We studied this matter further using the populations of provider clusters in the five states of AL, IL, MA, SD, and TX. For each state we considered three chosen sample sizes: $q_0 = 25, 30$, and 35 . Assuming probability proportional to size sampling of the provider cluster, we calculated the expected sample size per provider cluster, $E\{\min(q_0, Q_{ij})\}$. Our results appear in Table AD-4.10. In AL, the chosen sample size should be about $q_0 = 35$ in order to reach an expected sample size of 21 or 22. In IL, MA, SD, and TX, the chosen sample sizes should be about 25, 25, 30, and 25, respectively, in order to reach an expected sample size of 21 or 22. If we would be able to reach the judgment that the AL result is extreme and that the results for the other four states are the more representative of the nation as a whole, then this analysis teaches that the NSCCSD should use a chosen sample size of around $q_0 = 25$ or 30 .

The implementing survey organization may consider varying the chosen sample size, q_0 , by state, after it collects additional information about the numbers of providers in the population within the selected provider clusters.

Figure AD-4.1a Histogram of Total Programs: All Provider Clusters in AL

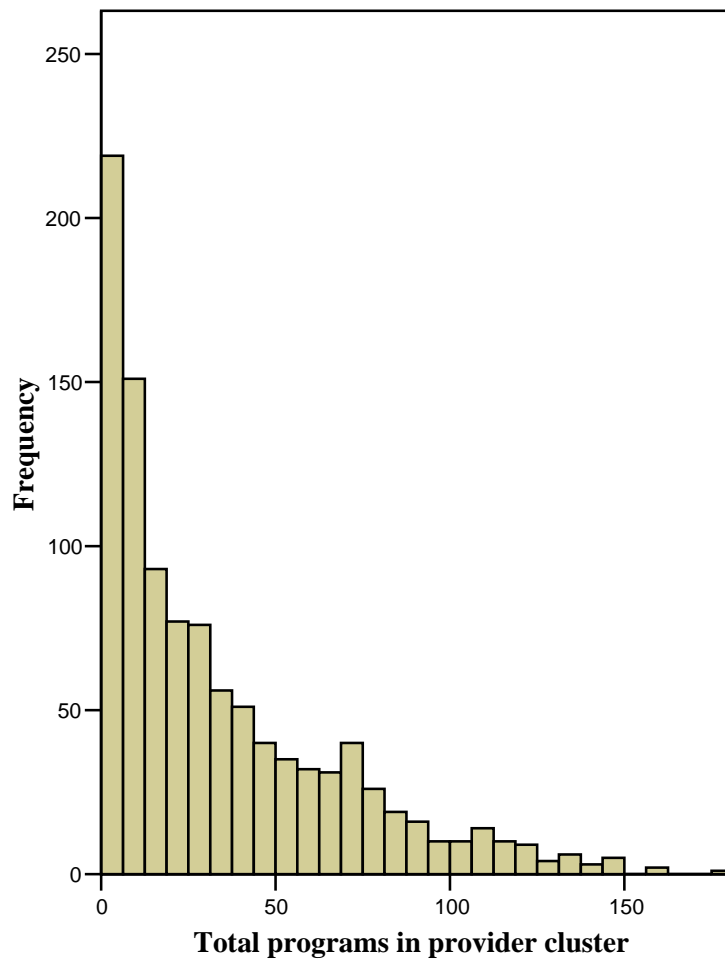


Figure AD-4.1b Histogram of Total Programs: All Provider Clusters in IL

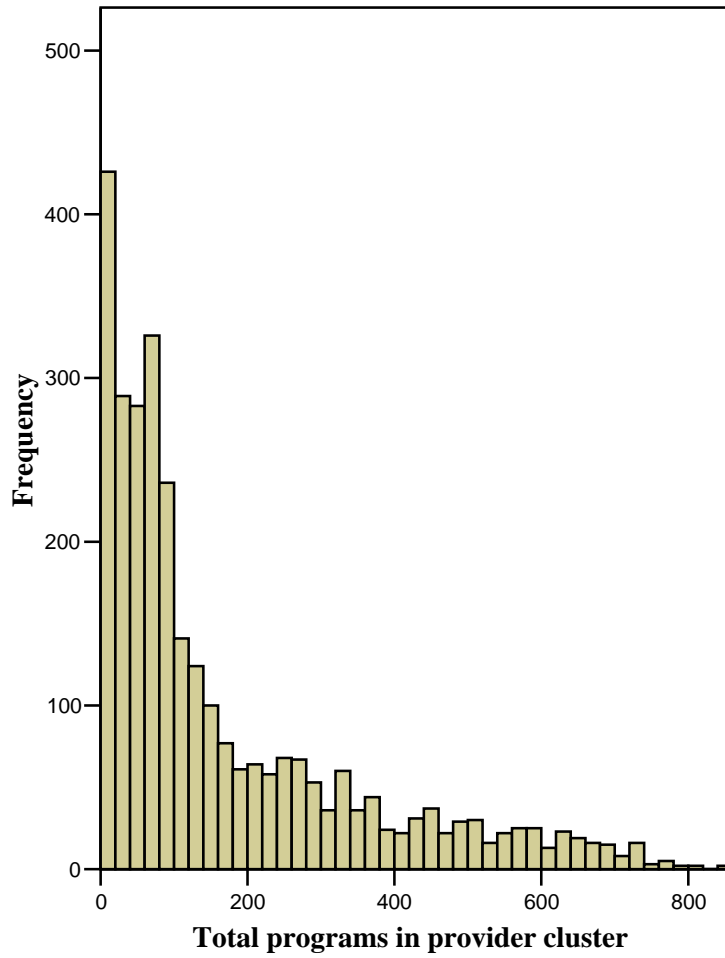


Figure AD-4.1c Histogram of Total Programs: All Provider Clusters in MA

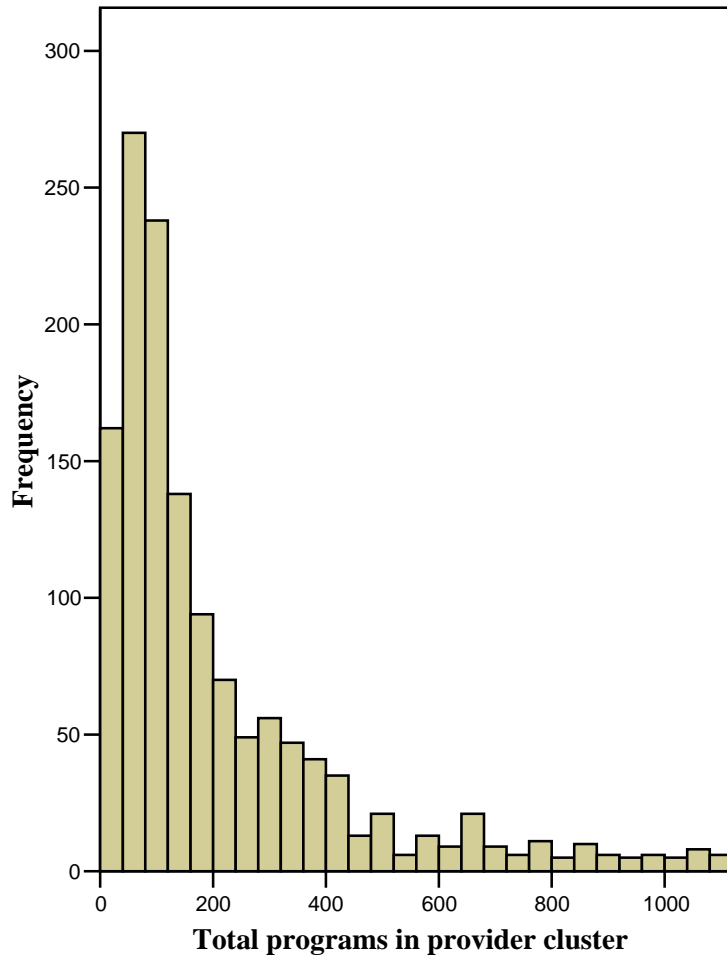


Figure AD-4.1d Histogram of Total Programs: All Provider Clusters in SD

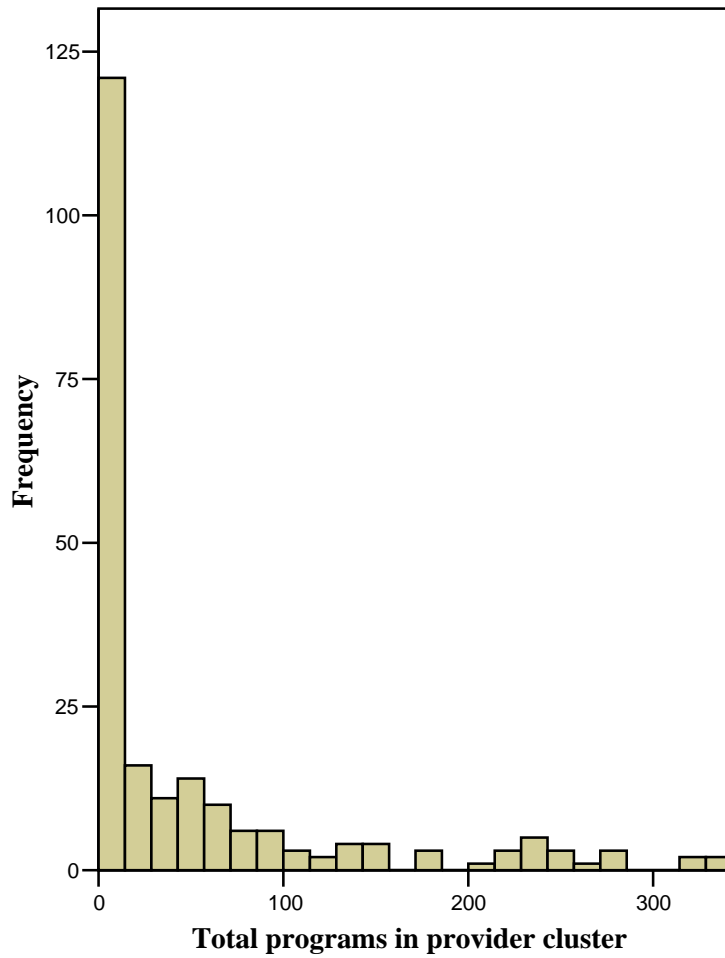


Figure AD-4.1e Histogram of Total Programs: All Provider Clusters in TX

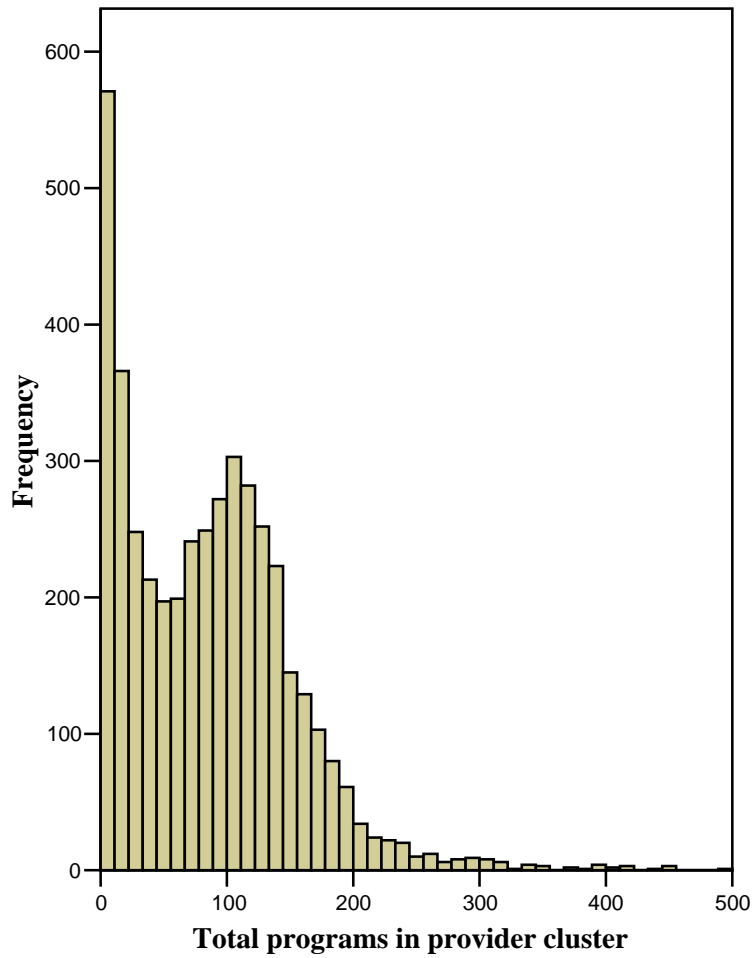


Table AD-4.5 Summary of the Distribution of the Number of Providers: All Provider Clusters in AL

Providers	Mean	Percentile 05	Percentile 25	Median	Percentile 75	Percentile 95
Tracts in provider cluster	7	1	1	5	11	20
After school programs in tract	0	0	0	0	0	0
Community-based programs in tract	2	0	0	1	3	5
Head Start programs in tract	0	0	0	0	0	1
Family child care homes in tract	1	0	0	0	1	4
Elementary schools in tract	1	0	0	1	2	3
Pre-k programs in tract	0	0	0	0	1	1
Total programs in tract	5	1	3	4	7	11
After school programs in provider cluster	0	0	0	0	0	0
Community-based programs in provider cluster	15	0	2	8	22	50
Head Start programs in provider cluster	1	0	0	1	2	5
Family child care homes in provider cluster	6	0	0	3	10	25
Elementary schools in provider cluster	8	0	2	6	13	22
Pre-k programs in provider cluster	2	0	0	1	3	6
Total programs in provider cluster	34	2	8	23	52	108

Table AD-4.6 Summary of the Distribution of the Number of Providers: All Provider Clusters in IL

Providers	Mean	Percentile 05	Percentile 25	Median	Percentile 75	Percentile 95
Tracts in provider cluster	30	1	7	16	43	107
After school programs in tract	0	0	0	0	0	2
Community-based programs in tract	1	0	0	1	1	3
Head Start programs in tract	0	0	0	0	0	2
Family child care homes in tract	3	0	0	2	5	12
Elementary schools in tract	1	0	0	1	2	4
Pre-k programs in tract	1	0	0	0	1	2
Total programs in tract	7	1	3	6	9	18
After school programs in provider cluster	17	0	0	3	26	78
Community-based programs in provider cluster	21	0	6	17	33	56
Head Start programs in provider cluster	12	0	0	2	14	56
Family child care homes in provider cluster	75	2	12	36	97	302
Elementary schools in provider cluster	30	1	10	23	46	76
Pre-k programs in provider cluster	14	0	2	6	20	49
Total programs in provider cluster	169	6	41	90	251	580

Table AD-4.7 Summary of the Distribution of the Number of Providers: All Provider Clusters in MA

Providers	Mean	Percentile 05	Percentile 25	Median	Percentile 75	Percentile 95
Tracts in provider cluster	20	3	7	13	27	66
After school programs in tract	0	0	0	0	0	3
Community-based programs in tract	2	0	1	2	3	6
Head Start programs in tract	0	0	0	0	0	1
Family child care homes in tract	6	0	2	4	8	15
Elementary schools in tract	1	0	0	1	2	3
Pre-k programs in tract	0	0	0	0	1	2
Total programs in tract	11	2	6	10	14	23
After school programs in provider cluster	25	0	0	0	0	224
Community-based programs in provider cluster	44	4	16	30	53	148
Head Start programs in provider cluster	3	0	0	2	5	14
Family child care homes in provider cluster	107	10	34	63	135	348
Elementary schools in provider cluster	21	3	9	17	31	51
Pre-k programs in provider cluster	7	1	2	5	9	26
Total programs in provider cluster	209	24	64	123	278	726

Table AD-4.8 Summary of the Distribution of the Number of Providers: All Provider Clusters in SD

Providers	Mean	Percentile 05	Percentile 25	Median	Percentile 75	Percentile 95
Tracts in provider cluster	4	1	1	1	4	16
After school programs in tract	0	0	0	0	0	0
Community-based programs in tract	1	0	0	1	2	6
Head Start programs in tract	1	0	0	0	1	3
Family child care homes in tract	5	0	0	2	6	17
Elementary schools in tract	2	0	1	2	3	6
Pre-k programs in tract	1	0	0	0	1	2
Total programs in tract	11	1	5	8	13	26
After school programs in provider cluster	0	0	0	0	0	0
Community-based programs in provider cluster	9	0	0	1	8	55
Head Start programs in provider cluster	2	0	0	1	3	14
Family child care homes in provider cluster	26	0	1	4	35	142
Elementary schools in provider cluster	7	0	1	3	9	33
Pre-k programs in provider cluster	3	0	0	1	2	16
Total programs in provider cluster	51	1	6	11	60	245

Table AD-4.9 Summary of the Distribution of the Number of Providers: All Provider Clusters in TX

Providers	Mean	Percentile 05	Percentile 25	Median	Percentile 75	Percentile 95
Tracts in provider cluster	11	1	4	11	18	26
After school programs in tract	0	0	0	0	0	0
Community-based programs in tract	2	0	1	2	3	6
Head Start programs in tract	0	0	0	0	0	1
Family child care homes in tract	3	0	0	2	4	10
Elementary schools in tract	2	0	0	1	2	4
Pre-k programs in tract	1	0	0	1	1	3
Total programs in tract	8	1	4	6	11	20
After school programs in provider cluster	1	0	0	0	0	13
Community-based programs in provider cluster	24	0	7	24	37	58
Head Start programs in provider cluster	2	0	0	1	3	10
Family child care homes in provider cluster	32	0	7	21	43	94
Elementary schools in provider cluster	16	1	6	16	23	33
Pre-k programs in provider cluster	10	0	3	8	14	23
Total programs in provider cluster	86	4	29	83	127	193

Table AD-4.10 Expected Sample Sizes per Provider Cluster by State and by Chosen Sample Size

State	q_0	Expected Sample Size per Provider Cluster
AL	25	16.6
AL	30	18.6
AL	35	20.4
IL	25	22.9
IL	30	27.0
IL	35	31.0
MA	25	24.5
MA	30	29.2
MA	35	33.8
SD	25	18.3
SD	30	21.2
SD	35	24.0
TX	25	22.3
TX	30	26.3
TX	35	30.1

The calculations presented here assume that PSUs have been defined to be large enough so that provider clusters tend to be nonoverlapping. Alternatively, if we would anticipate nontrivial overlaps between selected provider clusters, then the chosen sample size q_0 would have to be even larger than 25 or 30 in order to average around 21 or 22 unique providers per selected provider cluster.

Table AD-4.11 Distribution of Providers by Type: Constructed Lists of Providers in Five States

State	Statistics	After School Stratum newID	Community- Based Centers Stratum newIA	Head Start Programs Stratum newIC	Family Child Care Stratum newIB	Elementary Schools Stratum newID	Pre-K Stratum newIC	Total Programs
AL:	Number of Programs	0	1,984	288	911	1,365	316	4,864
	Proportion of Total Programs	0.00	0.41	0.06	0.19	0.28	0.06	1.00
IL:	Number of Programs	1,019	2,728	773	9,785	4,018	1,492	19,815
	Proportion of Total Programs	0.05	0.14	0.04	0.49	0.20	0.08	1.00
MA:	Number of Programs	603	3,130	208	7,888	1,723	548	14,100
	Proportion of Total Programs	0.04	0.22	0.01	0.56	0.12	0.04	1.00
SD:	Number of Programs	0	313	153	1,046	447	154	2,113
	Proportion of Total Programs	0.00	0.15	0.07	0.50	0.21	0.07	1.00
TX:	Number of Programs	317	9,352	1,126	12,628	6,688	3,836	33,947
	Proportion of Total Programs	0.01	0.28	0.03	0.37	0.20	0.11	1.00

As indicated in Table AD-4.2, sample size requirements are also established in each of four provider type strata. The corresponding sample size requirements are unlikely to be achieved given straight random or systematic sampling of providers within provider clusters, or with allocation proportional to the sizes of the provider strata.

Table AD-4.11 gives the numbers of providers by type in the sampling frames constructed for the five states. The table also gives the distribution of providers by type in the sampling frames. For example, 1,984 center programs appear on the AL sampling frame, representing about 41 percent of the total providers on the AL sampling frame. If a straight random or systematic sample would be taken of providers within provider clusters, it would tend to distribute itself similarly to the proportions set forth in Table AD-4.11. Thus, from the sample size requirements in Table AD-4.2 and the distributions by provider type in Table AD-4.11, it is clear that in some states the NSCCSD may need to undersample providers in strata newIA, new IB, and newIC, and oversample them especially in stratum newIC.

It is recommended that the implementing survey organization review this matter as actual sample implementation progresses in light of current information at that time. As necessary to achieve sample size objectives, provider type strata should be established within provider clusters (or within a consolidation of the selected provider clusters within a PSU), with sample sizes set by stratum.

The foregoing discussions and analysis make clear the challenge facing the sampling design to yield enough total providers and enough providers by provider stratum to achieve the sample size requirements set forth in Table AD-4.2. To meet this challenge, it will be helpful to establish a minimum population size for SSUs and provider clusters. Tracts and associated tract clusters above the minimum size would stand on their own as SSUs and provider clusters, while tracts and tract clusters below the minimum size would be collapsed with neighboring tracts until the minimum size would be met or exceeded. The immediate goal of establishing a minimum size would be to largely eliminate provider clusters that have zero or only a few providers. The ultimate goal of the minimum size would be to establish a practicable sampling framework within which the sample size requirements for providers can be achieved.

To simulate these ideas, we consider the select populations of provider clusters, in the five states, for which the SSU population is 1,000 or more and the provider cluster population is 10,000 or more. Histograms of the total numbers of providers across these select populations appear in Figures AD-4.2a – AD-4.2e for AL, IL, MA, SD, and TX, respectively. By comparing these tables to Figure AD-4.1a – AD-4.1e, one sees that the problem of provider clusters has been greatly diminished while not completely eliminated.

Throughout the foregoing discussions and analysis, the provider cluster is defined as the selected demand-survey tract plus the set of all contiguous tracts that intersect a two-mile radius from the

population centroid of the selected demand-survey tract (call this the *2-Mile Radius* method). Within the Feasibility Test sites of Peoria, IL and Birmingham, AL, we examined and compared this definition of provider cluster versus an alternative definition that included the demand-survey tract plus the set of all contiguous tracts that intersect an area circumscribed by a line drawn 500 feet outward from the edges of the demand-survey tract (call this the *500' Buffer* method). Results of the comparison appear in Table AD-4.12, which summarizes the distribution of total providers across all provider clusters in both Feasibility Test sites, given both definitions of provider cluster. For example, in the AL site, the median value of total providers across provider clusters is 28 and 19 for the 500' Buffer method and 2-Mile Radius method, respectively. From these data, we see stronger performance of the 500' Buffer method at the lower tail of the distribution in both Feasibility Test sites. That is, at the lower tail, the 500' Buffer method appears to offer more providers per provider cluster than the 2-Mile Radius method.

We recommend that the implementing survey organization consider the choice of provider cluster further during the actual implementation of the survey design in light of new information that will be developed at that time and determine a final method at that time. The primary criteria for determining the final method should include (1) practicality of implementation and (2) ability to support the required sample sizes of providers.

Figure AD-4.2a Histogram of Total Programs: Select Provider Clusters in AL for Which Tract Population ≥ 1000 and Cluster Population $\geq 10,000$

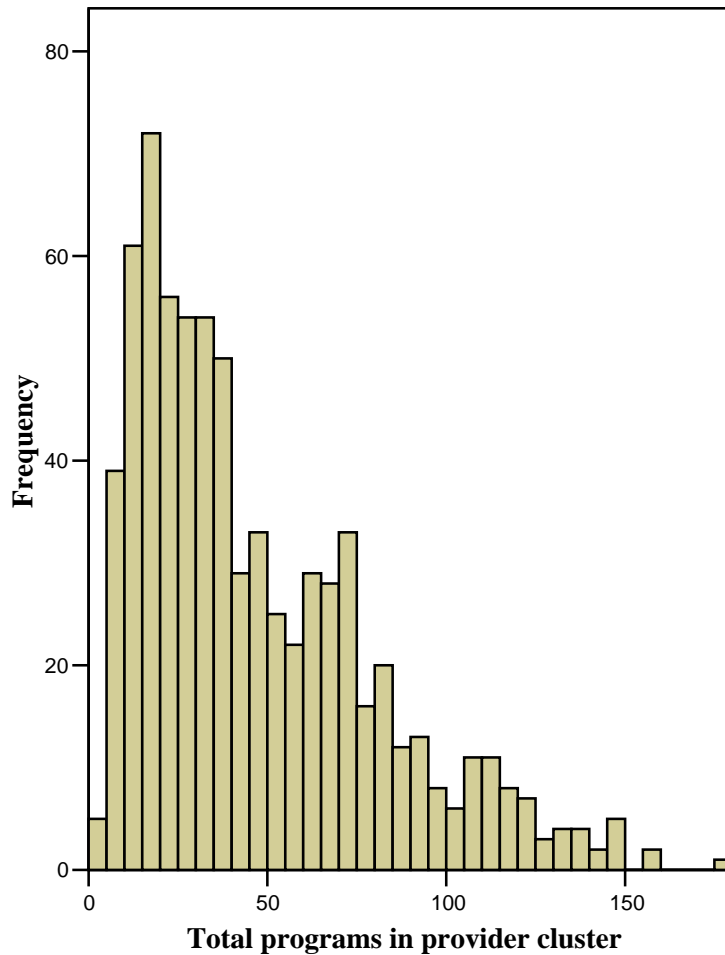


Figure AD-4.2b Histogram of Total Programs: Select Provider Clusters in IL for Which Tract Population ≥ 1000 and Cluster Population $\geq 10,000$

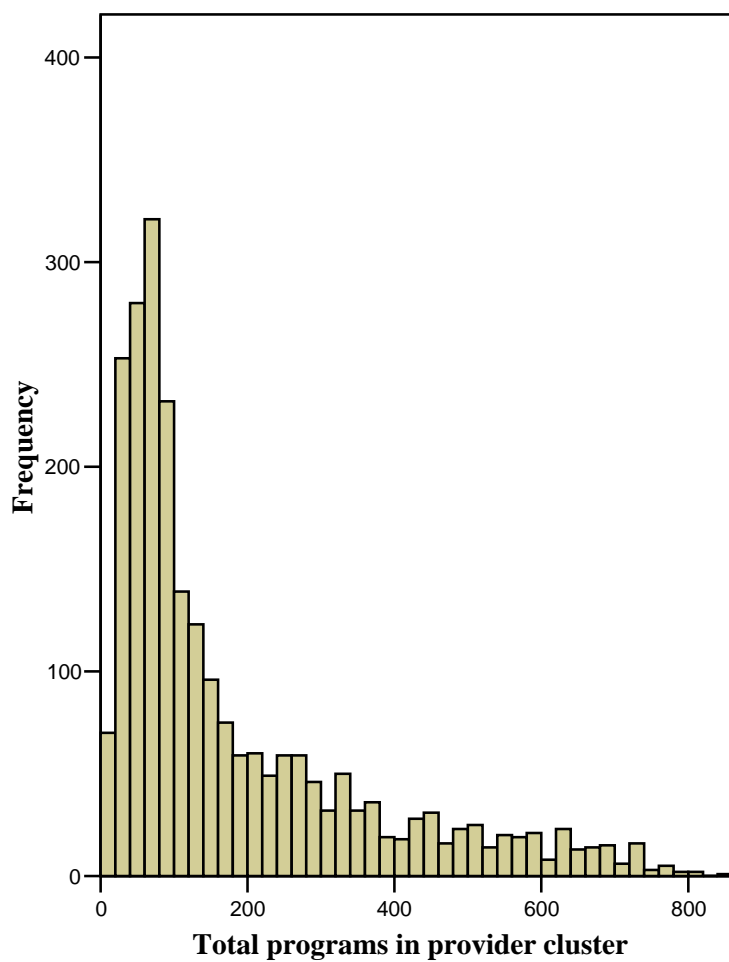


Figure AD-4.2c Histogram of Total Programs: Select Provider Clusters in MA for Which Tract Population ≥ 1000 and Cluster Population $\geq 10,000$

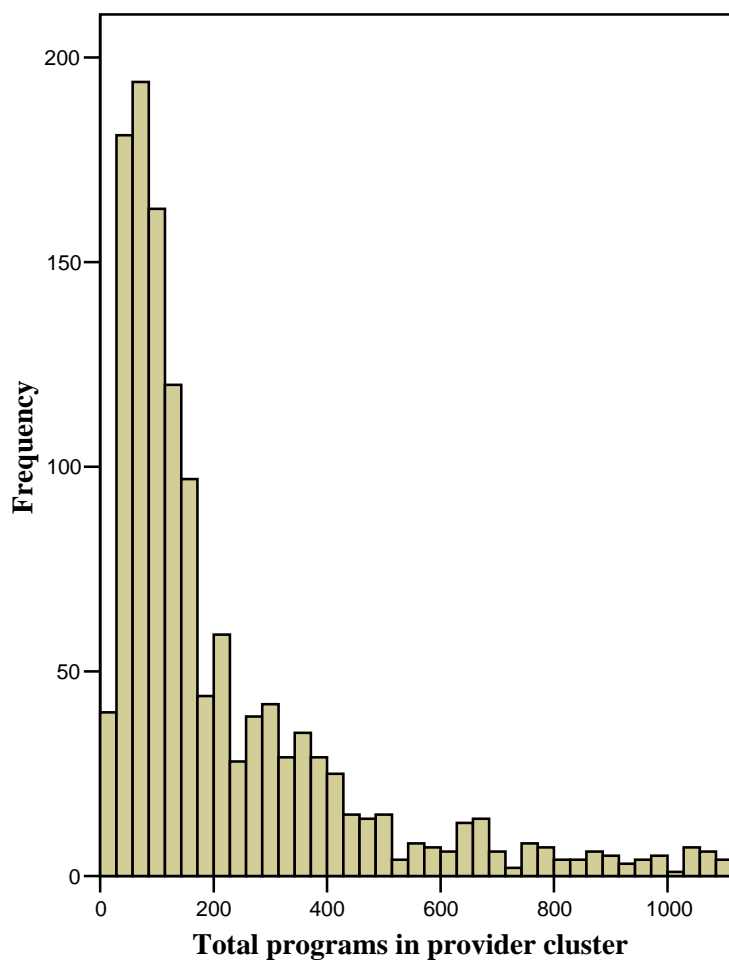


Figure AD-4.2d Histogram of Total Programs: Select Provider Clusters in SD for Which Tract Population ≥ 1000 and Cluster Population $\geq 10,000$

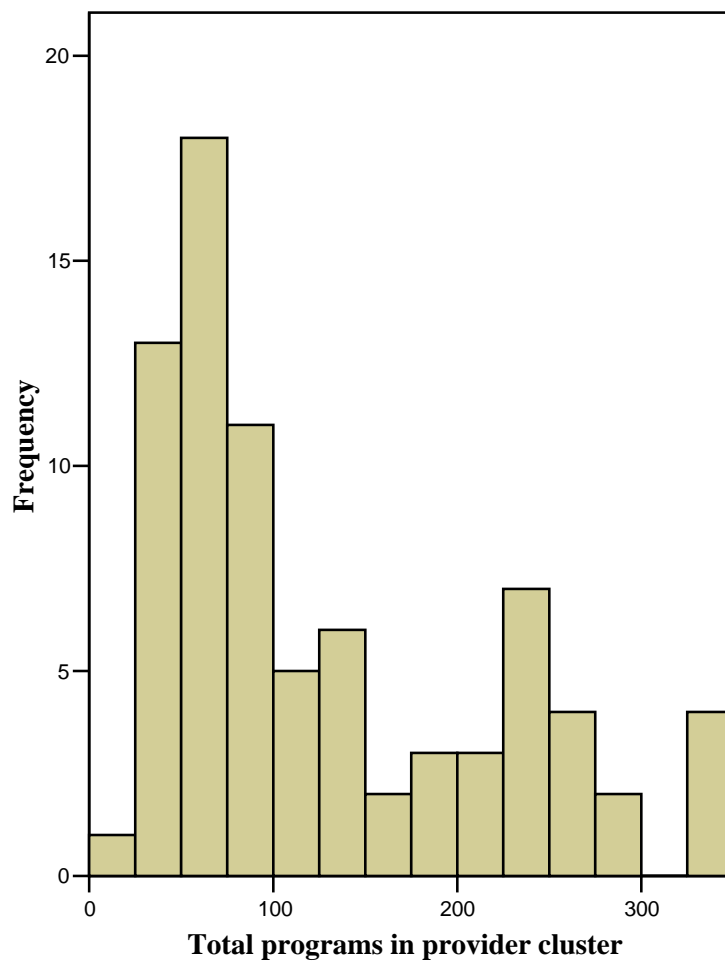


Figure AD-4.2e Histogram of Total Programs: Select Provider Clusters in TX for Which Tract Population ≥ 1000 and Cluster Population $\geq 10,000$

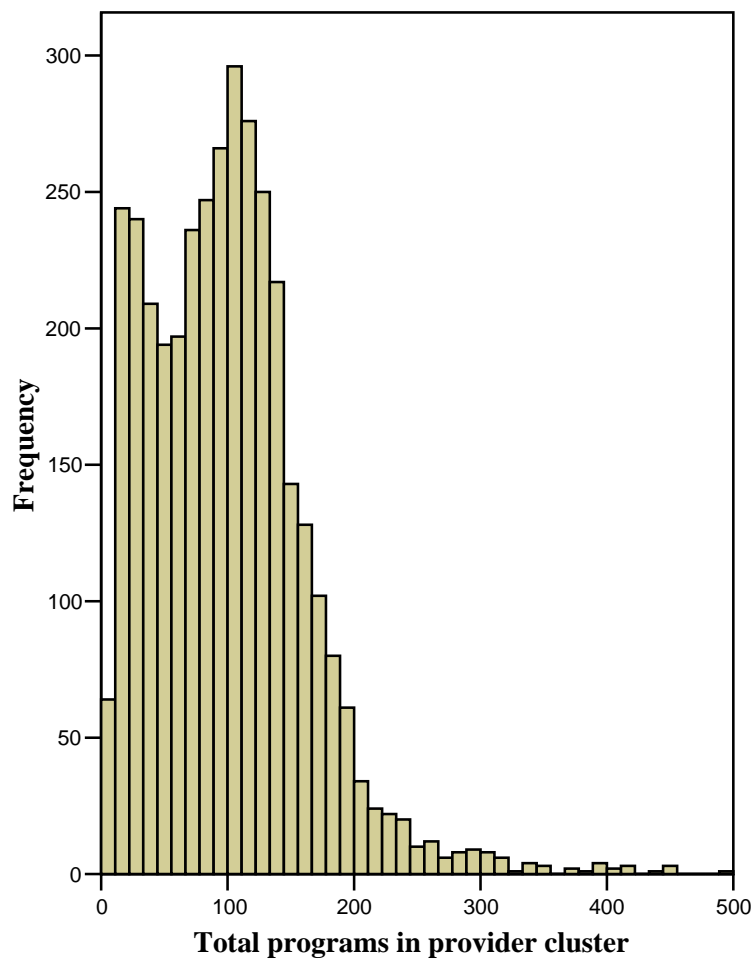


Table AD-4.12 Comparison of the Distribution of Providers, Given Two Definitions of Provider Cluster

State	Definition of Provider Cluster	Mean	5 th Percentile	25 th Percentile	Median	75 th Percentile	95 th Percentile
AL	500' Buffer	29.8	12.0	21.0	28.0	38.0	52.4
AL	2-Mile Radius	22.2	2.0	8.3	19.0	33.8	53.4
IL	500' Buffer	30.8	15.2	25.0	31.0	37.0	46.4
IL	2-Mile Radius	30.5	3.2	20.0	31.0	43.0	54.8

5. Sampling Design for the Optional AIAN Study

A sampling design for the optional AIAN survey is described in Section 3 of the Sampling Report. At this writing, we are recommending the ABS, multi-mode interviewing approach, which was set forth in Section 3.4.1. The approach uses some version of the postal Delivery Sequence File as the sampling frame of addresses. The selected addresses are matched to lists of telephone numbers. Matches are sent to the telephone center for interviewing. Unmatched addresses are sent out for field interviewing. Telephone nonrespondents are followed up in the field. We are also recommending consideration of the sample-and-go method in areas in which the ABS address frame is known to be deficient.

The Sampling Report considered alternative sample sizes. We are now recommending 2,964 completed household interviews, the middle option appearing in Table 3.11b. Table AD-5.1 gives the current assumed completion rates for the AIAN survey and displays the corresponding survey sample sizes by stage of data-collection operations. We are estimating that the implementing survey organization will need to select and release a sample of 154,294 addresses to achieve the target of 2,964 completed interviews. As in the case of other components of the NSCCSD, a safety buffer and system of replicates should be maintained to lend control over the achieved number of completes.

Table AD-5.1 Sample Sizes and Assumed Completion Rates for the Optional AIAN Demand Survey, Given an ABS, Multi-Mode Approach: AIAN Children Less than 13 Years

Stage of Data-Collection Operations	Telephone Rates	Field Rates	All Rates	Sample Sizes
Released sample addresses			100%	154,294
Addresses matched with telephone number sent to the telephone center	15%		15%	22,687
Addresses (matched or unmatched) sent to field		85%	85%	131,607
Resolved residential households	82%	90%	86%	137,049
Completed screening interviews	88%	90%	89%	122,972
Eligible households by census data	3.68%	3.68%	4%	4,525
Eligible households after allowance for undercoverage	60%	80%	71%	3,500
Complete household interviews	82%	85%	84%	2,964
Number of eligible children	1.33	1.33	1.33	3,942