RAND

The Design of a Multilevel Longitudinal Survey of Children, Families, and Communities: The Los Angeles Family and Neighborhood Survey

Narayan Sastry
Bonnie Ghosh-Dastidar
John Adams
Anne Pebley

DRU-2400/1-LAFANS

November 2000

Labor and Population Program
Working Paper Series 00–18

THE DESIGN OF A MULTILEVEL LONGITUDINAL SURVEY OF CHILDREN, FAMILIES, AND COMMUNITIES: THE LOS ANGELES FAMILY AND NEIGHBORHOOD SURVEY†

October 2000

Narayan Sastry
Bonnie Ghosh-Dastidar
John Adams
Anne Pebley

RAND
P.O. Box 2138
Santa Monica, CA 90407

† Primary funding for L.A.FANS comes from NICHD Grant R01 HD35944. Additional funding has been provided by the Assistant Secretary for Planning and Evaluation, DHHS, and by Los Angeles County.

Abstract. In the last ten years, there has been a growing interest in the role of neighborhoods in shaping a variety of outcomes for families, adults, and children. Although theoretical perspectives are well advanced and the basic statistical methods for modeling neighborhood effects are in place, a major shortcoming concerns the limitations of existing datasets. Recent studies concerned with understanding children's outcomes have not been designed with the explicit goal of supporting multilevel modeling. This makes it difficult to address the most important unresolved research issue in this area, which is to develop an understanding of the *causal* effects of neighborhoods factors. In this paper, we describe the sampling design of the Los Angeles Family and Neighborhood Study (L.A.FANS), a new survey of children, families, and neighborhoods in Los Angeles County. This survey was designed explicitly to support multilevel studies on a number of topics, including child development, residential mobility, and welfare reform. The study is longitudinal and includes a baseline survey and several follow-up waves, which will track previously interviewed respondents and will include a sample of new entrants into the sampled neighborhoods. We highlight the main design and analytical considerations that shaped the study. We also describe the results of an in-depth statistical investigation of the survey's ability to support multilevel analyses that were carried out as part of the study design.

1. Introduction

In the last ten years, there has been a growing interest in the role of neighborhoods in shaping a variety of outcomes for families, adults, and children. The broad set of outcomes that have been studied includes violent crime (Sampson, Raudenbush, and Earls, 1997), educational attainment (Garner and Raudenbush, 1991), domestic violence (O'Campo et al., 1995), fertility (Billy and Moore, 1992), residential mobility (Lee et al., 1994), and children's development (Duncan, Brooks-Gunn, and Klebanov, 1994). Studies examining neighborhood effects have considered not only the U.S., but also countries overseas (e.g., Pebley et al., 1996; Sampson and Groves, 1989; Sastry, 1996). From a scientific and policy perspective, the potential importance of understanding the effects of neighborhoods is considerable. Research in this area has, however, failed to produce persuasive and consistent results about the nature and strength of neighborhood effects, especially regarding children's outcomes (Jencks and Mayer, 1990; Duncan and Raudenbush, 1998; Furstenberg and Hughes, 1997; Gephard, 1997). Although theoretical perspectives are well advanced and the basic statistical methods for modeling neighborhood effects are in place, a major shortcoming concerns the limitations of existing datasets. The Los Angeles Family and Neighborhood Survey (L.A.FANS) was designed to overcome many of these limitations.

The most recent theoretical work regarding neighborhood effects on children's development and well-being highlights the role of child- and family-related institutions, social organization and interaction, and the normative environment. Child- and family-related institutions include schools, child care providers, recreational programs and activities, religious institutions, and social service providers. These institutions may play an important role in shaping children's outcomes by providing access to services and resources. Neighborhoods with high levels of social organization and interaction may be effective in obtaining more institutions and better institutions, even if they are disadvantaged in terms of income or education. In addition, stronger social organization may promote social ties and the active support and social control of children (Coleman, 1988; Sampson and Morenoff, 1997; Wilson, 1987 and 1996). Finally, the normative environment, which is shaped by a concentration of people with similar positive or negative outlook and behaviors, may be a key element linking neighborhood composition and child outcomes (e.g., Crane, 1991).

Multilevel models are now widely used to study the effects of neighborhood characteristics on child outcomes. Compared to standard regression techniques, these models account for the correlation among observations measured at the same level—for example, children in the same family or families in the same neighborhood—that remains after controlling for measured characteristics. Other statistical approaches—such as generalized estimating equations (Liang and Zeger, 1986) or bootstrapping (Efron and Tibshirani, 1993)—also provide a similar correction. However, multilevel models provide a straightforward method for estimating the strength of this correlation. This information is useful for understanding the importance of unmeasured or unmeasurable factors that are not included in the model, but are picked up by the multilevel model's random effects because they are shared among children belonging to the same family or living in the same neighborhood.[1]

[1] In the context of studying family and neighborhood effects on children's development, unobserved family effects level may capture the family's motivation for their children to succeed. At the neighborhood level, unmeasured factors may reflect how the community values children's learning achievements.

Advances in statistical software over the past few years have now made it straightforward to estimate multilevel models.

The widespread use of multilevel models in social science research is supported by the universal practice of using multistage, clustered sampling schemes in the design of standard household surveys. These schemes are designed to balance a trade-off between efficiency of fieldwork operations, which argue for the concentration of the sample in a relatively small number of compact areas, and the size of design effects, which increase with cluster size to reduce the effective sample size.

From the perspective of designing a survey to support the estimation of multilevel models, several additional considerations are relevant. These include factoring in the added costs of collecting community data and having sufficient observations within each cluster to *estimate* certain community-level explanatory variables. For many potentially important neighborhood variables, averaging individual responses is the only way to construct neighborhood measures; larger samples per cluster result in more precise estimates of these measures. Some of these issues, but not all, have been addressed in a new line of research that builds on standard sample survey methods to look at additional issues raised by designing surveys for analysis using multilevel models (e.g., Cohen, 1998; Mok, 1995; Snijders and Bosker, 1993).

With very few exceptions—most notably, the Project on Human Development in Chicago Neighborhoods—recent studies concerned with understanding children's outcomes have not been designed with the explicit goal of supporting multilevel modeling. Moreover, few major household surveys have collected community data at the same time; rather, community measures were usually assembled after the fact, based primarily on data collected in the census but occasionally on administrative data sources. As we explain below, this makes it difficult to address the most important unresolved research issue in this area, which is to develop an understanding of the *causal* effects of neighborhoods factors. Issues of causality are confounded by the potential endogeneity of the availability and quality of institutions—through the targeting of programs, for example—and the processes of residential selection and neighborhood change.

In this paper, we describe the sampling design of the Los Angeles Family and Neighborhood Study (L.A.FANS), a new survey of children, families, and neighborhoods in Los Angeles County. This survey was designed explicitly to support multilevel studies on a number of topics. The study is longitudinal and includes a baseline survey and several follow-up waves. We highlight the main design and analytical considerations that shaped the study. We also describe the results of an in-depth statistical investigation of the survey's ability to support multilevel analyses that were carried out as part of the study design.

We begin, in the next section, by describing the main goals of the L.A.FANS. In Section 3, we provide details on key sample design issues, including the definition of neighborhoods, sample size, the number of sampled communities, stratification, selection of household survey respondents, and follow-up rules. We end the paper with some brief conclusions.

2. The Los Angeles Family and Neighborhood Survey

The Los Angeles Family and Neighborhood Survey is a longitudinal study of families in Los Angeles County and of the neighborhoods in which they live. The L.A.FANS is specifically designed to answer key research and policy questions in three areas: the effects of neighborhoods and families on children's development; the effects of welfare reform at the neighborhood level; and the process of residential mobility and neighborhood change.

Neighborhoods and families are thought to have a substantial effect on children's and teens' behavior and health, their attitudes toward education and work, their chances of becoming a teen-age parent, and their educational and employment opportunities. Yet, as discussed above, evidence about the influence of families, neighborhoods, and peers on these outcomes is limited. The L.A.FANS will trace the neighborhood and family roots of children's successes and failures in several areas: cognitive development, school performance, behavioral and emotional development, health, youth violence and crime, drug and alcohol abuse, and adolescent pregnancy.

The effects of welfare reform are likely to vary greatly among neighborhoods in Los Angeles County because of differences in the availability of employment, transportation, day care, and private social service providers. The L.A.FANS is designed to measure, over time, local-level differences in the response to and effects of welfare reform in Los Angeles County.

Moving from one town or neighborhood to another can be an important means of upward (or downward) social mobility. Residential mobility can also change the character of neighborhoods for those who live there, particularly in terms of socioeconomic and race/ethnic composition. While general patterns of residential mobility are well known, there is little information about factors behind the choices that families make about moving or staying, and where to move. Local-level mobility patterns of new immigrant families are another important issue on which there is little information. The L.A.FANS will provide micro-level data to study residential mobility, neighborhood selection, the processes leading to residential segregation, and migration patterns of recent immigrant families.

Existing data sets do not provide the necessary information to study these three main research issues satisfactorily. Their shortcomings arise from having cross-sectional designs and inadequate or incomplete measures of important child, family, and neighborhood characteristics. Most important, however, is that they are plagued by selection effects that emerge over time through the process of residential mobility. Because families choose the neighborhoods in which they live—and this choice may be related to the outcome of interest, such as children's development or well-being—it is necessary to understand how families select their neighborhood of residence in order to understand the effects of neighborhood characteristics on outcomes. Thus, to understand the effects of neighborhoods, it is necessary to also collect detailed data on the process of residential choice, as the L.A.FANS does. Finally, existing surveys that support detailed studies on children, families, and neighborhoods focus almost exclusively on cities on the East Coast and in the Midwest. Los Angeles is very different to these older cities in a number of key dimensions, such as physical layout, ethnic mix, political structure, and patterns of social interaction and daily life. Studies focusing on Los Angeles will provide insights into the effects of neighborhoods in newer cities in the West and Southwest of the U.S. Furthermore, given that Los Angeles leads the nation in many important trends—for example, in terms of suburbanization and urban sprawl—the data from L.A.FANS could be used to understand one possible future for cities around the country.

Fieldwork for the baseline wave of L.A.FANS began in April 2000 and will be completed by the spring of 2001. A second wave will be fielded during roughly the same months in 2002. A third wave is tentatively planned for 2004. Note that a public use version of the data will be prepared and released a few months after the completion of each wave.[2] Each wave of data will include the collection or assembly of three interrelated data sets: (1) a household survey, (2) a neighborhood survey, and (3) a file of neighborhood services and characteristics (NSC) based on administrative and other records. Our focus in this paper is to describe the sampling plan for the household survey.

3. L.A.FANS Sample Design

The L.A.FANS was designed as a multilevel survey, first sampling neighborhoods, then selecting families within these neighborhoods, and finally sampling children within these families. As discussed below in greater detail, the multistage, clustered sampling scheme has several strengths, as well as certain limitations. Two strengths are worth mentioning here. First, it provides an efficient and cost-effective method for collecting detailed information about households and neighborhoods because the sample is concentrated in a relatively small number of locations. Second, family and neighborhood clustering provide researchers with the opportunity to control for unmeasured or unmeasurable factors at the family and neighborhood levels using, for example, fixed effects or random effects models.

In this section, we discuss: the study site; the definition of neighborhoods that was used for sampling purposes; the sample size; the number of neighborhoods in the sample; stratification; the sampling of tracts, blocks, and households; the selection of household respondents; and the longitudinal design of the study.

Study Site

L.A.FANS focuses on the County of Los Angeles, California. Los Angeles County is the largest county in the United States, with an estimated population in 1997 of 8.8 million. It is also tremendously diverse in terms of race and ethnic composition. In 1997 the population was 41 percent Latino, 34 percent white, 13 percent Asian, and 10 percent black. Southern California is a major destination for immigrants to the U.S. According to the 1990 Census, 38 percent of adults in Los Angeles County were foreign born, as were 17 percent of children.

Defining Neighborhoods

As in many other urban areas, neighborhood boundaries are not clearly defined in Los Angeles County. This has important implications for both the sample design and the subsequent analyses. For sampling purposes, neighborhood units must be well-defined local geographic areas for which up-to-date population and poverty estimates can be produced. In Los Angeles County, these units include: cities, zip codes, elementary school attendance areas (ESAAs), and census tracts, block groups, and blocks.[3] After examining maps, visiting several areas of the county, and consulting Los Angeles experts, we concluded that census tracts and ESAAs most closely approximate social definitions of neighborhoods, because they are of moderate size (an average of

---

[2] Information on the progress of the fieldwork and on the public use data can be obtained from the project website at www.lasurvey.rand.org. The website will also provide documentation for the data and results of analyses by RAND and other researchers.

[3] The boundaries of traditional "neighborhoods" such as Rancho Park or Pico Union in the City of Los Angeles are generally not well defined and not coded in administrative data needed to produce population and poverty estimates.

8,000 inhabitants per ESAA and 5,600 per census tract) and are defined based on social ecological criteria and are generally compact and not crossed by major geographic boundaries (e.g., freeways, major boulevards, and parks). We decided to use census tracts rather than ESAAs as the sampling unit, because tracts generally include children attending two or more elementary schools. Thus, the use of census tracts as sampling units will provide researchers greater scope for examining both neighborhood and school effects on children's development.

With information from the L.A.FANS household survey, researchers can examine *variation* in definitions of neighborhoods and identify the places where people live, work, shop, and attend school. With tract-level data being assembled for all of Los Angeles County as part of this survey project, researchers can choose whether to use census tracts or consider larger "neighborhoods" in their analyses by combining data for adjacent census tracts.[4]

Sample Size

Drawing on information from the design of earlier multipurpose household surveys and imposing a constraint set by our budget, we initially established a sufficient sample size for the L.A.FANS to be approximately 3,250 households. We also performed a parallel set of sample size calculations to verify this estimate. The parallel calculations were based on a generic test of proportions between two comparison groups, the equivalent to a logistic regression with a single explanatory variable. This represents a standard and routinely used approach to calculating the sample size for a survey. Note that this approach is not based on a particular hypothesis tied to a specific variable, since there are a large number of different areas that the L.A.FANS was designed to address. Rather, it represents a generic approach that is both hypothetical and fairly conservative.

Because L.A.FANS is based on a stratified design (as explained below) this test can be thought of as a between-strata comparison of proportions. We assumed a baseline proportion of 0.25 in the reference group and a minimum detectable difference of 0.1, or 40 percent, between the baseline group and a comparison group. This means that we would like to be able to detect, with sufficient statistical precision, the difference between the baseline group and a group with a proportion of 0.35 (= 0.25 + 0.1). Based on standard power calculations, we determined that a sample size of 325 per group was required to detect such a difference with a type-1 error rate of 0.05 and power of 0.8. Note that depending on the analysis in question, this may refer to a sample of 325 adults, children, or individuals belonging to a particular sub-group; thus, the power associated with any particular analysis depends on the specific sample being considered.

If we were to draw a simple random sample (SRS) from the population of Los Angeles County, we would require 325 people per group. Practical considerations relating to cost and logistics—and the nature of the study—led us to consider a multilevel, clustered design. This type of sample results in a design effect that modifies the actual sample size, to yield the effective sample size, in the following way:

Effective sample size = Actual sample size/Design effect.

Clustering produces a design effect greater than 1, so that the actual sample size is reduced proportional to the design effect. However, we need an effective sample size of 325, which

[4] Given the relatively small geographic and population size of census tracts, most alternative neighborhood definitions are likely to be larger than census tracts.

indicates that we need an actual sample size that is larger than this. Note that the design effect is an increasing function of the intra-cluster correlation (ICC) and the cluster size:

Design Effect = 1 + Intra-cluster correlation % (Cluster size – 1).

Also, the inclusion of control variables in regression models will generally account for at least part of the correlation among observations in the same group, and hence lead to smaller design effects and more powerful tests than in simpler comparisons.

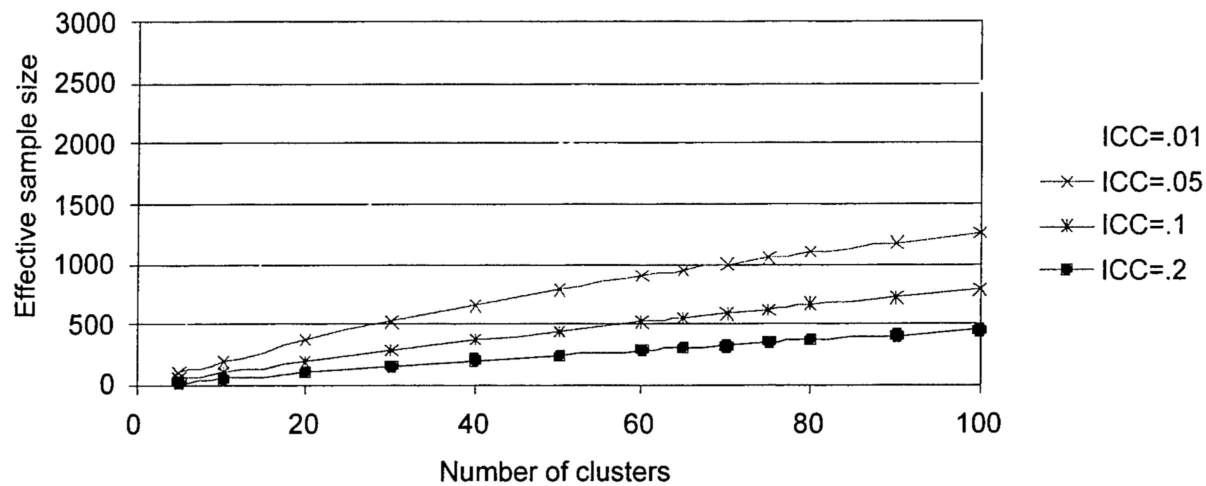
The intra-cluster correlation is determined by the correlation in behavior and outcomes among individuals living in the same community and belonging to the same household. Drawing on *a priori* knowledge of correlations associated with multistage designs involving communities and households, we would expect intra-community correlation to range from 0.01 to 0.05, while the intra-household correlation may be substantially larger (0.2 to 0.5). However, our sample design and the types analyses that will use these data suggest that the design effect will typically be due to intra-community correlation alone. Based on these estimates—and given a moderate cluster size of, say, 50 households per community—we calculate the design effects for our sample to range from 1.45 to 3.45. (Note that we conducted a detailed simulation study, described below, to evaluate the sensitivity of the sample design to cluster size.) The effective sample size calculations and design effects together suggest that a conservative actual sample size for L.A.FANS should be about 1,100 households per stratum ($325 \times 3.45 = 1125$). Given that the L.A.FANS design calls for three strata (see below), the total sample size of 3,250 appears to be reasonable. Using our specific sampling rules (described below) and characteristics of households in Los Angeles County drawn from recent waves of the Current Population Survey, we estimate that this will yield a total of approximately 3,250 primary adult respondents and 3,624 sampled children.

Finally we performed an additional pair of power calculations to determine whether we would have a sufficient sample size to undertake a between-strata comparison and a regression analysis using only the sampled children in L.A.FANS. This was useful because some of the most important L.A.FANS analyses will relate to children's outcomes in the areas of health, education, development, and well-being. The power calculations assumed a sample of 50 households from each neighborhood and that the sample was divided between poor neighborhoods (60 percent) and non-poor neighborhoods (40 percent). We accounted for the fact that, by design, 70 percent of the sampled households have children and that many of these households contribute two children to the sample. The between-strata comparison looked at a measure of child cognitive development, namely the score on the reverse digit span (RDS) test. The power calculations were based on estimates of sample means and standard errors of the RDS from existing studies. The design effect associated with RDS was determined to be 2.49, and mean RDS and associated standard deviation were estimated to be 28.7 and 26.9, respectively. For a hypothesis test comparing the RDS scores for children living in poor and non-poor neighborhoods, the power associated with both a one-sided test and a two-sided test were over 99 percent. We also considered a fixed-effects analysis of the relationship between birthweight and the RDS score. The power associated with a test of significance of the regression coefficient was well over 80 percent. From these calculations we concluded that a sample size of 3,250 households was sufficient to meet the central goals of this study.

Cluster Size/Number of Clusters

Given a sample size of 3,250 households, the next key decision was the number of clusters to select for the sample. With a fixed sample size, a greater number of clusters implies a smaller number of sampled households per cluster. However, choosing a large cluster size—and, hence, a small number of clusters—reduces survey expenses because of savings in the cost of listing operations, locating respondents, supervising field operations, and making repeat visits to complete an interview or collect additional information from respondents. But this also works to increase the variance of estimates, due to correlation among units in the same cluster. The trade-off between the number of clusters and increased variance—represented here using the effective sample size—is illustrated in Figure 1. This figure shows power curves for four different values of the intra-cluster correlation that all keep the sample size fixed at 3,250. As the number of cluster increases along the x-axis, the effective sample size, shown on the y-axis, increases. However, the slopes—representing the gains in sample size—are quite different for the four curves; in particular, the gains in effective sample size as the number of clusters increases are greatest when intra-cluster correlation is weaker.

Figure 1. Effective sample size by number of clusters, holding actual sample size at 3,250



As discussed above, our *a priori* estimates of intra-community correlation range from 0.01 to 0.05. Thus our initial choice of dividing the sample of 3,250 households across 65 communities (equivalent to 50 households per cluster) should yield an effective sample size of between 1,000 and 2,200 households. This is likely to be sufficient for the generic types of analyses that the L.A.FANS is designed to address, such as those illustrated in our power calculations. Nevertheless, we were concerned that our simple power calculations may not be adequate. This is because most analyses based on the L.A.FANS data will employ multilevel models, which are designed to exploit the within-cluster and between-cluster structure of the sample. We were also uncertain of the degree of clustering and the distributions of key measures of interest in Los Angeles County census tracts. We therefore undertook a simulation study to examine in greater detail, and with more confidence, the trade-offs associated with changing cluster size while holding sample size constant. The goal was to determine whether a change in the number of clusters would improve the statistical properties of our sample while keeping costs roughly constant.

The simulations were conducted using data from the 1990 Census STF3A tables for Los Angeles County. These tables allowed us to simulate many of the key details of our sampling plan. In particular, using a stratified two-level design, we first sampled census tracts and then sampled block groups within the selected tracts. Although we could not simulate the sampling of households, we were able to select individuals and, hence, to estimate individual-level regression models. We chose unemployment status as the dependent variable, considering only adults in the civilian labor force; we omitted those in the armed forces (0.3 percent) or out of the labor force (32.8 percent). We ran a logistic regression model that corrected for clustering using the Huber-White approach, with unemployment status as the outcome and the following variables as explanatory factors: race (white/Asian versus black versus other), sex, percent Hispanic in the tract, percent receiving Welfare Assistance in the tract, and the block-group unemployment rate. For the simulations, we considered several competing designs that held the sample size fixed at 3,250 households but differed according to the number of sampled census tracts (and, consequently, the number of households per tracts). For each design we simulated 200 samples and ran a logistic regression model for each sample; finally, we computed the variability of the regression coefficients and standard errors across the 200 analyses. We compared the results for the four designs with 51, 66, 75, and 81 total tracts. Table 1 presents the main results, which are the standard errors for a representative group of regression coefficients, for each of the four different sample designs.

Table 1. Standard Errors for Logistic Regression Coefficients from a Simulation Analysis Based on a Model of Unemployment Status

Number of census tracts	Coefficient (Level of measurement)			
	Sex is female (Individual)	Race is black (Individual)	Percent Hispanic (Tract)	Unemployment rate (Block group)
51	0.140	0.191	0.196	1.81
66	0.136	0.175	0.188	1.75
75	0.134	0.173	0.189	1.70
81	0.130	0.170	0.190	1.73

Note: Tracts were allocated equally across three strata. See text for a description of the simulations.

The results in the table show that there was a substantial decline in the standard errors of the estimated parameters when the number of sampled clusters increased from 51 to 66. Note that smaller standard errors indicate that the regression parameters were estimated with greater precision and hence are preferable. In contrast, the declines were much smaller when the number of tracts was increased to 75 or 81. We also examined the distributions of the estimated coefficients—using boxplots, for instance—under the four different designs to see the extent to which extreme values of the estimated parameters emerged. We wanted to choose a scheme that offered some protection against the possibility of having a realization that represented an outlying case. The results indicated that there was a very low likelihood of ending up with such an adverse outcome with 66 or more tracts but this possibility was somewhat higher with 51 tracts.

Several additional issues may influence the choice of the number of clusters in the sample and average cluster size. These mainly concern the fixed fieldwork costs per cluster. To this point, we have discussed cost issues only as they have influenced overall sample size. However, holding overall sample size constant, an increase in the number of clusters will raise costs because there are certain fixed costs for each cluster in the sample. These fixed costs cover various aspects of fieldwork operations and the assembly or calculation of neighborhood-level measures—which are important for studying the main research questions that the L.A.FANS is designed to address. The costs for neighborhood-level data may be quite small if they are largely available through external sources, such as administrative records or the decennial census. The costs may be higher if community data are collected through, for example, a neighborhood key informant survey. The L.A.FANS includes such a survey, but the marginal costs are low because it will be conducted by telephone. Finally, for neighborhood-level measures that are estimated from the household interview data, there are two competing concerns. A larger number of households per cluster will improve the precision of the cluster-level estimates; on the other hand, a certain number of clusters is required in order to capture cross-cluster variability. However, since the minimum number of cluster needed to capture cross-cluster variability is likely to be substantially smaller than the range that we have be examining in the simulations, this latter consideration is unlikely to be important. Thus, cost and design considerations all argue for choosing the smallest number of clusters that meet the other needs reflected in the simulations. Based on the analysis described above, we decided to select a total of 65 tracts for the L.A.FANS sample from among the 1,624 eligible tracts in Los Angeles County.[5]

Stratification

The L.A.FANS has a stratified sampling design. Stratification was adopted in order to obtain an oversample of poor and very poor tracts which, in turn, provides us with a relatively large number of respondents in poor households and of welfare recipients. A key feature of the L.A.FANS, however, is that it includes a sample of neighborhoods across the entire income range. This is important because neighborhoods are unlikely to exert an influence just for children growing up in poor areas; rather, neighborhoods may also affect children growing up in middle-class or affluent areas. Nevertheless, the poorest neighborhoods are of particular scientific and policy interest and it is important to be able to conduct strata-specific analyses for the poorest neighborhoods and compare findings to results for other strata.

In order to identify current or former welfare recipients, oversampling poor and very poor areas was determined to be an easier and more cost-effective approach than screening households. A screening operation would have required interviewers to ask questions about welfare recipiency soon after contacting a potential respondent. This would have been both time consuming and expensive, as well as awkward for the interviewer and the respondent. Stratification also reduces the variance of many estimates based on the full sample. This is because respondents are more similar to others within the same stratum, according to several important measures such as rates of welfare participation, but are quite different to respondents in other strata. It is straightforward to show that under these conditions, stratification will lead yield more precise estimates of population parameters (see Kish, 1965).

[5] Of the 1,652 tracts in Los Angeles County, a total of 28 tracts were removed from the sampling frame (see Appendix A for a listing of these tracts). There were three reasons for dropping tracts. First, 13 tracts were deemed ineligible because they had a high percentage (over 80%) of persons living in group quarters, based on 1990 Census data. Second, 11 tracts representing ships-at-sea were excluded. Finally, we dropped 4 tracts for which essential data was missing. Thus, the sampling frame consists of 1,624 tracts.

Prior to sampling census tracts, they were divided into three strata based on the percent of the tract's population in poverty. Tract-level estimates of percent in poverty in 1997 were developed by Los Angeles County's Urban Research Division (URD) using state and county administrative data. The sampling strata in the L.A.FANS design correspond to tracts that are very poor (those in the top 10 percent of the poverty distribution), poor (tracts in the 60-89th percentiles), and non-poor (tracts in the bottom 60 percent of the distribution). The choice of three strata and the specific cut-offs were based on an analysis that examined the trade-off under different schemes between likely yield of welfare recipients and the concentration of the sample in a small number of high poverty areas. The chosen scheme represented the best balance between these two competing objectives.

A key decision regarding the stratification scheme concerns the allocation of the sample of tracts across strata. There are several considerations in determining this allocation. For example, holding the number of respondents per tract constant, different schemes will provide varying yields of poor families, welfare recipients, and respondents of different race and ethnic groups. To decide on the allocation of tracts across strata, we undertook an analysis of alternative schemes as part of the detailed simulation exercise.

We considered several alternative schemes for allocating tracts across the three strata (see Table 2). Scheme A allocates an approximately equal number of census tracts to the three strata. It selects 20 tracts from both the very poor and poor stratum and 25 from the non-poor stratum. We allocated a slightly larger share to the non-poor stratum under this scheme, because this stratum covered a large share of the population—about 56 percent. This scheme—which provides a disproportionately large sample from the smaller strata (poor and very poor)—will also yield a large sample of families and children in the poorest neighborhoods, which are of particular research and policy interest. A relatively even allocation of the sample across the three strata will provide sample-based estimates with similar levels of precision across each stratum, which improves the efficiency (i.e., reduces the variance) of cross-strata comparisons. Scheme B, which allocates the sample of tracts in proportion to stratum size, has the attraction of leading to estimates with smallest variances. However, given our balanced sample design—i.e., we plan to interview the same number of households per tract—this scheme would lead to a relatively small number of respondents in poor and very poor tracts. This is undesirable given the research goals of this study. Schemes C and D oversample very poor and poor tracts in ratios of 2:2:1 and 3:2:1 compared to non-poor tracts. These two schemes provide a substantially larger sample of poor households and households receiving welfare. However, a disadvantage is that poorer tracts—especially very poor tracts—are greatly overrepresented in the entire sample. This also reduces the efficiency of cross-stratum comparisons.

Table 2. Schemes for Allocating 65 Sampled Tracts Across Strata

		Stratum		
Scheme	Description	Very poor	Poor	Not poor
A	Roughly equal tracts per stratum	20	20	25
B	Allocate tract proportional to stratum size	7	22	36
C	2:2:1 allocation	26	26	13
D	3:2:1 allocation	32	22	11

To decide between these alternatives, we examined the trade-off in efficiency across these different schemes as part of our simulation analysis. We also compared the yield of minorities and welfare recipients. The number of welfare recipients in 2000 was estimated to be 80 percent of the 1997 counts, to account for the decline in program participation over this period. The simulation analysis—as well as efficiency considerations—led to us to choose Scheme A. It also showed that oversampling of poor tracts was necessary to obtain a sufficient number of welfare recipients and minorities, particularly blacks (who are concentrated in poorer neighborhoods).

We considered further stratifying the sample of neighborhoods by race and ethnicity. The main reason for doing this would be to obtain a sufficient sample of the smaller race/ethnic groups in Los Angeles County, notably blacks (who comprise 10 percent of the population) and Asians (who make up 13 percent of the population). Although Asians are a larger portion of the population than blacks, they are a heterogeneous group. Major Asian groups in Los Angeles County include Koreans and Chinese, although there are also sizable populations of a wide variety of groups, including Cambodians and Armenians.

One option was to sample blocks according to some function of their race/ethnic composition. However, stratifying tracts by race and ethnicity as well as by income was very complex. There are four major ethnic groups in Los Angeles County—Hispanics, whites, blacks and Asians. But there is no easy way to categorize tracts according to their ethnic composition into a small number of groups because most tracts have at least two groups—and many times all four groups—but in widely varying proportions. Thus there was too wide a range of neighborhood types to justify oversampling some subset of them. Another option was to oversample respondents of certain ethnicities within tracts selected independently of ethnic composition. With our oversample of very poor and poor neighborhoods we expected to effectively obtain an oversample of blacks. We decided against oversampling Asians because of cost and logistical considerations (e.g., translation and programming costs and difficulty finding bilingual interviewers).

Table 3. Stratification of Tracts in Los Angeles County

Stratum	Percentile rank by percent in poverty	Weighted average percent in poverty	All tracts			Sampled tracts		
			Number of tracts	Estimated population	Percent of total	Number of tracts	Estimated population	Percent of total
Very poor	90-100th	47%	161	881,956	9%	20	134,407	27%
Poor	60-89th	30%	490	3,302,831	34%	20	179,210	37%
Non poor	1-59th	10%	973	5,409,384	56%	25	177,145	36%
Total	-	-	1,624	9,594,171	100%	65	490,762	100%

Note: Population and poverty estimates are for 1997 and are based on data from the Los Angeles County Urban Research Division.

Table 3 provides descriptive statistics for the final stratification scheme. Tables 4 and 5 provided weighted summary tract characteristics for all tracts in Los Angeles County (Table 4) and the 65 tracts in the L.A.FANS sample (Table 5). Information is provided on percent in poverty, median household income, percent of persons receiving welfare, percent of households with children under age 18, and race and ethnic composition. With the exception of the percent of households with a child under 18, which is from the 1990 Census, all the data are from the Los Angeles County Urban Research Division's estimates for 1995 (median household income) and 1997 (all other variables).

Table 4. Weighted Average Tract Characteristics by Strata for All of Los Angeles County

Stratum	Number of tracts	Population in poverty	Median HH income	Welfare population	HHs with children under 18	White	Black	Hispanic	Asian
Very poor	161	47%	$12,500	19%	46%	5%	20%	68%	6%
Poor	490	30%	$17,400	12%	40%	15%	11%	62%	11%
Non poor	973	10%	$32,700	4%	30%	49%	6%	29%	15%
Total	1,624	20%	$26,500	8%	34%	33%	9%	44%	13%

Note: All figures are 1997 estimates except for median HH income which corresponds to 1995 and HHs with child under 18, which is from the 1990 Census.

A comparison of the figures in Tables 4 and 5 reveals that characteristics of the sampled tracts generally corresponded well to the tracts that they represent, within each strata. There are differences, due to sampling variability, in the percent of households with children under 18 and in the race/ethnic composition of the tracts. Sampled tracts in the very poor stratum have fewer whites and blacks than expected, but more Hispanics. In the poor stratum there are fewer blacks and more Hispanics. The totals obviously differ because of the disproportionate number of very poor and poor tracts among the 65 sampled tracts.

Table 5. Weighted Tract Characteristics by Strata for 65 Tracts in Sample

Stratum	Number of tracts	Population in poverty	Median HH income	Welfare population	HHs with children under 18	White	Black	Hispanic	Asian
Very poor	20	47%	$12,600	19%	53%	3%	15%	75%	7%
Poor	20	30%	$17,300	12%	43%	15%	5%	71%	9%
Non poor	25	10%	$32,700	4%	34%	52%	4%	28%	14%
Total	65	28%	$22,800	11%	42%	25%	7%	57%	10%

Note: All figures are 1997 estimates except for median HH income which corresponds to 1995 and HHs with child under 18, which is from the 1990 Census.

Sampling Tracts Within Strata

The remainder of the L.A.FANS sampling plan involves selecting tracts within strata, blocks within tracts, households within blocks, and, finally, respondents within households. One consideration guiding the selection of tracts within strata is the desire to obtain equal samples of households and respondents from each tract, even though tracts vary greatly in size. There are two main reasons for this. First, tract-level means will be used in a variety of L.A.FANS analyses; having equal samples across clusters will strengthen these analyses because it will lead to tract-level estimates with roughly equal variances. Second, for the analysis of the relationships among members of the same cluster, equal numbers may also be preferable.

We have good estimates of the population sizes of Los Angeles County tracts in 1997, which allow us to sample census tracts within each stratum with probability proportional to population size. By then selecting an equal number of households (50) from each tract, we have a multistage design with a minimum design effect. Ignoring the intermediate step of selecting blocks within tracts, the probability of selecting the *i*th household in the *j*th tract in the *k*th stratum is given by:

$$\begin{aligned}\Pr(HH_{ijk}) &= n_k / N_k \times p_{jk} / P_k \times 50 / p_{jk} \\ &= n_k / N_k \times 50 / P_k ,\end{aligned}$$

where n_k is the number of tracts to be selected in the *k*th stratum, N_k is the total number of tracts in the *k*th stratum, p_{jk} is the population of the *j*th tract in the *k*th stratum, and P_k is the total population in the *k*th stratum. Because this expression does not depend on any characteristics of the tract, the sampling probabilities—and hence the sampling weights—are the same for all households in the stratum, resulting in a self-weighted sample. As a consequence the weights are easily computed and the design is efficient because of less variability between the sampling weights. The probability proportional to size design was implemented using a systematic sampling algorithm.

Sample of Blocks within Selected Tracts

In the second sampling stage, we selected census blocks within each sampled census tract. We then sampled households from these blocks (rather than from the tract as a whole) in order to simplify the fieldwork associated with listing addresses, interviewing households, and monitoring operations—and hence reduce the costs. However, a sufficient number of blocks was selected in order to retain the diversity within each tract.

We determined the number of blocks to be sampled in each tract by dividing the target number of listings per tract (615) by the tract's weighted average block size. Because the weighted average block size varies by tract, so too does the number of sampled blocks. In total, 439 blocks were selected (of which 11 turned out to have no households), for an average of 6.6 non-zero blocks per tract and with a range between 2 and 14. The target number of listings per tract of 615 is equal to our total target number of listings for the entire sample (40,000) divided by the number of tracts in the sample (65). The total number of listings was based on estimated rates of occupancy, non-response, households with children, and limited English/Spanish proficiency. We chose to list the same number of dwelling units per tract because we planned to interview the same number of households per tract. Note that we also plan to interview the same number of households per block, within each tract. This will serve to minimize the harmonic mean and, therefore, both the block- and tract-level cluster effect.

In order to obtain updated estimates of block population for our sampled tracts, we used block-level data from the 1990 Census and tract-level population estimates for 1997 from the Los Angeles County Urban Research Division. We assumed that the change in block population between 1990 and 1997 was uniform for all blocks within the same tract. This procedure worked well because the 1997 estimates were of very high quality and the assumption of uniform growth across blocks in the same tract was generally reasonable. However, there were certain tracts and blocks where this assumption did not hold. The main issue we needed to guard against was blocks that had a substantially larger population size than we estimated. This occurred often when there was major new construction. Therefore as a first step in the listing operation we obtained a rough count of dwelling units in each block. This allowed us to identify blocks for which our estimates represented a substantial undercount. For these cases, we split the blocks into smaller units based on visits to the area and careful counting and mapping. We subsampled these smaller units to yield a count of listings close to the desired size.

We sampled census blocks with probability within probability proportional to block population size. First, however, we calculated the distribution of block size for Los Angeles County and set the block sizes in the lowest five percentiles to the fifth percentile in order to put a floor on the sampling probabilities. This results in a ceiling on the weights and protects against an unusual block having a very large weight, although it does result in some loss of efficiency. In addition, very large blocks were selected with certainty to avoid being sampled more than once in the systematic sampling algorithm that we employed.

Sample of Households

The goal of the third sampling stage was to select 50 households within each tract. This number of households per tract was set by our decision to sample 65 tracts and our desire to have a balanced design, in which the same number of households per tract is interviewed. A balanced design is required for certain modeling approaches and minimizes the cluster effect and the variance. The 50 households were allocated evenly across the sampled blocks in each tract. Thus within each tract, we sampled the same number of households per block (although households per block varied across tracts).

The L.A.FANS design calls for interviewing adults and children living in standard housing units, based on definitions typical of those used in other household surveys. Dwelling units that were eligible for selection include houses, apartments, mobile homes and converted garages. Excluded dwelling units are institutions (such as prisons, barracks, ships, detention centers, and nursing homes); non-institutional group quarters (such as shelters, halfway houses, group homes for the disabled); hotels and motels, including SROs; and temporary arrangements such as tents, cars or vans, recreational vehicles, trailers, and boats. Note that homeless people are excluded from the baseline sample (though we ask retrospective questions about homelessness and will follow people prospectively to collect information about homelessness.

The 50 households were selected at random from a listing of all dwelling units within the sampled blocks. In total we listed about 41,000 addresses, slightly more than the target of 40,000. Households with children under 18 years of age will be oversampled so that they make up 70 percent of the sample, compared to an average of 35 percent they would otherwise comprise. Households that are unable to complete the interviews in one of the two survey languages—English and Spanish—will be excluded from the sample. Our original intention was to carry out interviews in three languages. We explored in detail which languages are spoken in the sampled census tracts using up-to-date home language information from the Los Angeles Unified School District and the Los Angeles County Office of Education for schools in or near the census tracts in our sample. Our analysis of these school data showed that many languages are spoken in these census tracts, but that each language is spoken by less than 5 percent of the population. The two most common languages (aside from English and Spanish) are Armenian and Cambodian/Khmer, each with less than 1-2 percent of the total population in the L.A.FANS tracts. Because so few people speak any third language and given the substantial costs of high quality translation, CAPI programming, and interviewing in a third language, L.A.FANS interviewing is restricted to English and Spanish. However, basic information on these excluded households will be collected.

Household Survey Respondents

In the final sampling stage, one adult respondent will be sampled at random in each selected household (designated the RSA or randomly sampled adult). In households with children, one child respondent will also be selected at random and designated the RSC (randomly sampled child). These two respondents will be followed throughout the longitudinal survey. The reason for selecting two primary respondents in each household, one adult and one child, is that it makes the rules straightforward for tracking respondents in subsequent waves, especially if the original household splits. Other adults and children will be selected for the sample based on their relationship with the two primary respondents at the time of each interview.

Residents eligible for selection as primary or secondary respondents are those who live in the sampled household for half time or more. People who were temporarily away from the household are eligible for selection; this includes patients in hospitals, vacationers, and business travelers. Part-time residents who spend less than half time in the household and overnight visitors in the past two weeks are not eligible for selection, although they are listed in the roster and basic demographic information on them is collected.[6]

Table 6 summarizes which respondents will be interviewed in households with and without children. In households with children, the mother of the randomly selected child will be selected as a respondent and termed the Primary Caregiver (PCG). If the RSC's mother does not live in the household or is unable to answer questions about the child, the child's actual primary caregiver will be selected as the respondent to provide information on the selected child. Note that the selection of the PCG does not depend on his or her age—if necessary, we will select and interview a mother or other primary giver who is under 18 years of age.

Table 6. L.A.FANS Respondents by Household Type

HHs with Children <18	HHs without Children <18
Randomly selected adult (RSA)	Randomly selected adult (RSA)
Randomly selected child (RSC)	
Primary Caregiver of RSC (PCG)	
Sibling of RSC (SIB)	

If the RSC has one or more siblings under 18 years of age who share the same biological or adoptive mother and the same PCG, we will randomly select one of them for interview (and designate this child as the SIB). Based on data for Los Angeles County from the 1996-97 Current Population Survey (CPS), we expect that an eligible sibling will be present in approximately 60 percent of households with children. Under these selection rules, in some households with two adults and two children all four people will be interviewed. Also, in many cases the RSA and the

[6] Note that people who do not spend at least half time in any single location—e.g., they divide their time evenly across three or more different locations—are not eligible for selection.

PCG will be the same person, since the RSA is chosen at random from among all the adults in the household. Based on the 1996-97 CPS data for Los Angeles County, we estimate that approximately half the time the RSA will be the RSC's primary caregiver and almost 30 percent of the time the RSA will be the PCG's spouse. Only in about 20 percent of cases will the RSA be another adult in the HH. Finally, we have made provisions for households in which there are only children less than 18 years of age and those in which no adult functions as a PCG for a selected child (e.g., a household of roommates, some of which are under 18). The same rules for selecting a child at random will apply, but a sampled child without a primary caregiver in the household will be deemed an emancipated minor. They will be treated the same as a randomly selected adult respondent in terms of the questionnaires they receive and how they will be followed in subsequent waves.

In Table 7 we indicate which questionnaire modules are completed by each respondent and in Table 8 we briefly summarize the content of each questionnaire module. Any adult resident of a sampled household can complete the roster. This module must be completed first because it is used to sample respondents in the household. The roster provides a list of all household members, their relationships with each other, and basic demographic information.

Table 7. Questionnaire Modules to Be Completed by Each Respondent

	Respondent				
Questionnaire	Any Adult	RSA	PCG	RSC	SIB
Roster	X				
Household		X			
Adult		X	X		
Primary Caregiver			X		
Parent-Child			X		
Child				X	X
Assessments			X	X	X

The RSA completes the household questionnaire, which asks about family income and assets. A second household questionnaire module is completed if the RSA and PCG belong to different nuclear family units within the same household. The RSA and PCG both complete an Adult questionnaire, which asks for the respondent's own demographic, social, and economic characteristics and basic information on non-interviewed spouses. On average, we expect to have 1.5 adults completing the RSA questionnaire in each household. The PCG completes several additional modules including the Primary Caregiver module, which collects behavioral and psychological information on the respondent through a largely self-administered questionnaire; the Parent-Child module, which collects detailed information on the family background and the lives of the RSC and the SIB; and the Passage Comprehension test from the Woodcock-Johnson Psycho-Educational Battery (Revised). The RSC and SIB each complete a self-administered Child questionnaire if they are 9 years of age or older, with a more extensive set of questions asked for children aged 12 and older. Children aged 3 to 5 years will complete the Letter-Word Identification and Applied Problems tests from the Woodcock-Johnson battery and children 6-17 year olds will complete these two tests plus the Passage Comprehension test. All questionnaire modules and testing materials are available in English and Spanish.

Table 8. Summary of Questionnaire Content

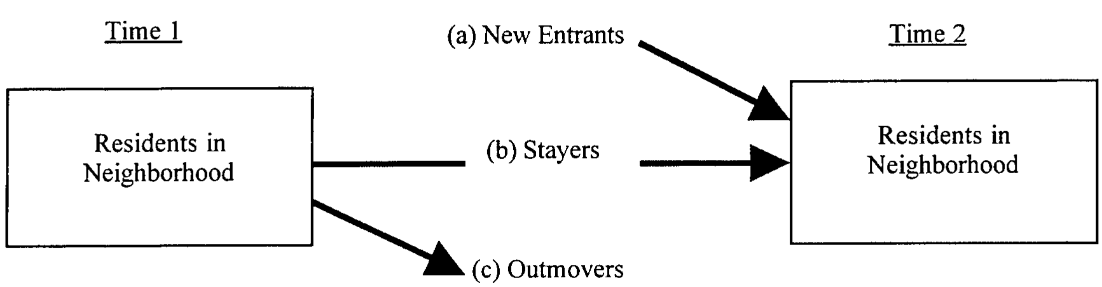
Questionnaire	Content
Roster	List of HH members, relationships among HH members, basic demographic characteristics
Household	Family income and assets
Adult	Demographic, social, economic characteristics; basic info on non-interviewed spouses
Primary Caregiver	Behavioral and psychological information (e.g., depression and self-esteem)
Parent-Child	PCG's reports on the RSC and SIB
Child	SAQ info about child
Assessments	Reading and mathematics reasoning

Follow-Up Waves

To help understand the causal effects of neighborhoods on children and families it is necessary to collect longitudinal data at all three of these levels. This will allow researchers to capture changes in family composition or neighborhood characteristics over time and model the process of neighborhood choice. Families choose the neighborhood in which to raise their children through the process of residential mobility. Moreover, high levels of residential mobility, in Los Angeles County and around the country, can change the characteristics of neighborhoods in a relatively short period of time. Data from the decennial census are not well suited to picking up these rapid changes.

Figure 2 illustrates the main ideas guiding the design of the study in subsequent waves. The design essentially combines two studies in one: a panel study of the main respondents and a repeated cross-sectional study of residents in each sampled community. In each wave, we will interview sampled respondents who remain in the neighborhood as well as those who have left. We will also select a sample of "new entrants" into the neighborhood, that is people who have moved into the neighborhood between the preceding wave and the current wave. Thus, at each wave we will have a representative sample of all neighborhood residents. The new entrants become part of the sample and will be followed in subsequent waves.

Figure 2. Design of Follow-Up Waves



The RSCs and RSAs are considered our primary respondents and once they join the sample they will be followed throughout the study, whether they live together or apart. We plan to interview these sampled individuals wherever they move. For this reason, detailed contact information is collected for each respondent at Wave 1 and we will remain in contact with respondents between waves. Respondents who remain in Los Angeles County will be interviewed in person in subsequent waves, regardless of the neighborhood in which they live. Those who move out of Los Angeles County will be interviewed by telephone, even if they leave the country. Other adults and children will be interviewed depending on whether or not they live with the RSCs.[7] We expect most moves to be within Los Angeles County and to other locations in California, although there will be some moves to elsewhere in the U.S. and overseas. Table 9 shows migration rates from the 1990 Census covering all moves between 1985 and 1990, except moves overseas. Eighty-four percent of residents in Los Angeles County in 1985 remained in the county in 1990, although 43 percent of these people had changed residence at least once. Based on Los Angeles County respondents from the 1996-97 CPS, annual housing turn-over rates may be as high as 25 percent.

Table 9. Migration 1985-1990 for 1985 Residents of Los Angeles County

	Number	Percent
No move	3,847,330	48%
Move Elsewhere in LA	2,906,640	36%
Move Elsewhere in CA	808,456	10%
Move Elsewhere in US	468,607	6%
Move Overseas	N/A	N/A
Total	8,031,033	100%

Note: Data are from the 1990 Census.

In follow-up waves, new entrants to sampled neighborhoods will be selected using several different methods. Once they enter the sample, all new entrants will remain in the study and will be tracked in subsequent waves according to the same rules used to follow respondents from the baseline. In Wave 2, to be fielded two years after the baseline, new household members in study households that remain in the 65 neighborhoods and new entrant households will be identified and sampled. The general principle guiding the selection of new entrants is that everyone moving into or being born into the tract will have a positive probability of being selected as an RSA or RSC.

We will identify new entrant households using a vacancy replacement method, in which eligible households from the previous wave are screened for a complete turnover of residents. Eligible households include those with residents selected and interviewed in the previous wave but who subsequently moved; households that were split into two or more units; previously vacant units; and households that refused to participate or were ineligible. Note that it does not include households that were screened out of the sample because they had no children. Eligible households will be sampled using a 70-30 split that favors households with children.

In Wave 3 we will relist all dwelling units in the 65 sampled neighborhoods in order to identify new housing units. A sample of new entrants to the neighborhood, living in both new and existing housing, will be selected for the sample. Wave 3 will also include a sample of new members

[7] Specifically, the RSC's Primary Caregiver will be interviewed even if this is a different person than in previous waves. SIB respondents will be interviewed only if he/she still lives with the RSC. If he/she no longer lives with the RSC, we will collect limited information on the SIB.

in existing study households. Table 10 provides estimates of the total number of respondents at each wave.

Table 10. L.A.FANS Estimated Total Sample Sizes

	Wave 1	Wave 2	Wave 3
Households	3,250	3,401	3,788
RSAs	3,250	3.439	3,850
RSCs + Siblings	3,624	3,881	4,394
PCGs	2,275	2,345	2,594

4. Conclusion

The Los Angeles Family and Neighborhood Survey is an important new resource for policymakers with an interest in Los Angeles and researchers in the social and behavioral sciences. It will be especially useful for researchers who seek to understand the effects of neighborhoods on child development, migration and residential mobility, and welfare reform. However, it will also serve as a more general resource for researchers interested in a variety of other topics. It will complement data from other planned or on-going local area studies, such as the Project on Human Development in Chicago Neighborhoods, the Study on Welfare Reform and Children in Three Cities (Boston, Chicago, and San Antonio), the Panel Study of Income Dynamics Child Development Supplement, the National Longitudinal Survey of Youth Child Supplement, the new 1997 National Longitudinal Survey of Youth, and the Fragile Families and Child Well-Being Project (see Brooks-Gunn et al., 2000). Together with these studies, L.A.FANS will help to provide a new nationwide understanding of a number of important policy and research issues.

References

Billy, John O.G., and David E. Moore. 1992. "A multilevel analysis of marital and nonmarital fertility in the United States," *Social Forces* 70: 977-1011.

Brooks-Gunn, Jeanne, Lisa J. Berlin, Tama Leventhal, and Allison Sidle Fuligni. 2000. "Depending on the kindness of strangers: Current national data initiatives and developmental research," *Child Development* 71: 257-268.

Cohen, Michael P. 1998. "Determining sample sizes for surveys with data analyzed by hierarchical linear models," *Journal of Official Statistics* 14: 267-275.

Coleman, J.S. 1988. "Social capital in the creation of human capital," *American Journal of Sociology* 94: S95-S120.

Crane, J.S. 1991. "The epidemic theory of ghettos and neighborhood effects on dropping out and teenage childbearing," *American Journal of Sociology* 96: 1226-59.

Duncan, G.J., and S.W. Raudenbush. 1998. "Neighborhoods and adolescent development: How can we determine the links," Joint Center for Poverty Research Working Paper Num. 3.

Duncan, G.J., J. Brooks-Gunn, and P. Klebanov. 1994. "Economic deprivation and early childhood development," *Child Development* 65: 296-318.

Efron, Bradley, and Robert J. Tibshirani. 1993. *An introduction to the bootstrap.* New York: Chapman and Hall.

Entwisle, B., and W.M. Mason. 1985. "Multilevel effects of socioeconomic development and family planning programs on children ever born," *American Journal of Sociology* 91: 616-649.

Enwisle, B., W.M. Mason, and A.I. Hermalin. 1986. "The multilevel dependence of contraceptive use on socioeconomic development and family planning program strength," *Demography* 23: 199-216.

Furstenberg, Frank F., and Mary E. Hughes. 1997. "The influence of neighborhoods on children's development: A theoretical perspective and a research agenda," in Jeanne Brooks-Gunn, Greg J. Duncan, and J. Lawrence Aber (eds.), *Neighborhood poverty: Policy implications in studying neighborhoods*, Volume II. New York: Russell Sage.

Garner, C., and S. Raudenbush. 1991. "Neighborhood effects on educational attainment: A multilevel analysis," *Sociology of Education* 64: 251-262.

Gephard, Martha A. 1997. "Neighborhoods and communities as contexts for development," in Jeanne Brooks-Gunn, Greg J. Duncan, and J. Lawrence Aber (eds.), *Neighborhood poverty: Policy implications in studying neighborhoods*, Volume I. New York: Russell Sage.

Jencks, C., and S. Mayer. 1990. "The social consequences of growing up in a poor neighborhood," in L.E. Lynn and M.F.H. McGeary (eds.), *Inner-city poverty in the United States.* Washington: National Academy Press.

Kish, L. 1965. *Survey Sampling.* New York: John Wiley & Sons, Inc.

Lee, B.A., R.S. Oropesa, and J.W. Kanan. 1994. "Neighborhood context and residential mobility," *Demography* 31: 249-270.

Liang, K.Y., and S.L. Zeger. 1986. "Longitudinal data analysis using generalized linear models," *Biometrika* 73: 13-22.

Mok, M. 1995. "Sample size requirements for 2-level designs in educational research," *Multilevel Modeling Newsletter* 7(2): 11-15.

O'Campo, P., A.C. Gielen, R.R. Faden, X. Xue, N. Kass, and M. Wang. 1995. "Violence by male partners against women during the childbearing year: A contextual analysis," *American Journal of Public Health* 85: 1092-1097.

Pebley, A.R., N. Goldman, and G. Rodriguez. 1996. "Prenatal and delivery care and childhood immunization in Guatemala: Do family and community matter?" *Demography* 33: 197-210.

Sampson, R.J., and W.B. Groves. 1989. "Community structure and crime: Testing social disorganization theory," *American Journal of Sociology* 94: 774-802.

Sampson, Robert J., and Jeffrey D. Morenoff. 1997. "Ecological perspectives on neighborhood context of urban poverty: Past and present," in Jeanne Brooks-Gunn, Greg J. Duncan, and J. Lawrence Aber (eds.), *Neighborhood poverty: Policy implications in studying neighborhoods*, Volume II. New York: Russell Sage.

Sampson, Robert J., Stephen W. Raudenbush, and Felton Earls. 1997. "Neighborhoods and violent crime: A multilevel study of collective efficacy," *Science* 277: 918-924.

Sastry, Narayan. 1996. "Community characteristics, individual and household attributes, and child survival in Brazil," *Demography* 33: 211-229.

Snijders, T.A.B., and R.J. Bosker. 1993. "Standard errors and sample sizes for two-level research," *Journal of Educational Statistics* 18: 237-259.

Wilson, W.J. 1987. *The truly disadvantaged: The inner city, the underclass, and public policy.* Chicago: Chicago University Press.

Wilson, W.J. 1996. *When work disappears: The world of the new urban poor.* New York: Knopf.

Wong, G.Y., and W.M. Mason. 1985. "The hierarchical logistic regression model for multilevel analysis," *Journal of the American Statistical Association* 80: 513-524.

Wong, G.Y., and W.M. Mason. 1991. "Contextually specific effects and other generalizations of the hierarchical linear model for comparative analysis," *Journal of the American Statistical Association* 86: 487-503.

Appendix A. Tracts Ineligible for L.A.FANS Sample

A total of 11 tracts representing ships-at-sea were dropped from sample. These tracts are identified by having codes ending with "99" or "98".

Table A.1. Ships-at-sea tracts dropped from sample

	Tract		Tract
1	294999	7	575699
2	295199	8	575799
3	296199	9	577699
4	296299	10	620099
5	297199	11	702999
6	555198		

A total of 13 tracts were dropped because they had a high percentage (over 80 percent) of people living in group quarters. Note that few of these tracts had any children and many had no children.

Table A.2. Tracts with high proportion in group quarters dropped from sample

	Tract		Tract
1	207400	8	551600
2	222700	9	574601
3	265301	10	574700
4	296100	11	575600
5	401901	12	701100
6	402404	13	920200
7	403200		

The following 4 tracts were dropped from the list of tracts eligible for the sample because one or more key variables was missing.

Table A.3. Tracts with missing variables dropped from sample

	Tract		Tract
1	320000	3	573500
2	555101	4	573901

A total of 28 tracts of the 1,652 tracts in Los Angeles County were dropped from the sample. Thus, there were 1,624 tracts eligible for selection for the L.A.FANS sample.