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CHIS 2013-2014 Methodology Report Series

Report 1

Sample Design

CALIFORNIA HEALTH INTERVIEW SURVEY

CHIS 2013-2014 METHODOLOGY SERIES

REPORT 1

SAMPLE DESIGN

MARCH 2016

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www.chis.ucla.edu

This report provides analysts with information about the sampling methods used for CHIS 2013-2014, including both the household and person (within household) sampling. This report also provides a discussion on achieved sample size and how it compares to the planned sample size.

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PREFACE

Sample Design is the first in a series of methodological reports describing the 2013-2014 California Health Interview Survey (CHIS 2013-2014). The other reports are listed below.

CHIS is a collaborative project of the University of California, Los Angeles (UCLA) Center for Health Policy Research, the California Department of Public Health, and the Department of Health Care Services. Westat was responsible for data collection and the preparation of five methodological reports from the 2013-2014 survey. The survey examines public health and health care access issues in California. The telephone survey is the largest state health survey ever undertaken in the United States.

Methodological Report Series for CHIS 2013-2014

The methodological reports for CHIS 2013-2014 are as follows:

- Report 1: Sample Design;
- Report 2: Data Collection Methods;
- Report 3: Data Processing Procedures;
- Report 4: Response Rates; and
- Report 5: Weighting and Variance Estimation.

The reports are interrelated and contain many references to each other. For ease of presentation, the references are simply labeled by the report numbers given above. After the Preface, each report includes an “Overview” (Chapter 1) that is nearly identical across reports, followed by detailed technical documentation on the specific topic of the report.

Report 1: Sample Design (this report) describes the procedures used to design and select the sample from CHIS 2013-2014. An appropriate sample design is a feature of a successful survey, and CHIS 2013-2014 presented many issues that had to be addressed at the design stage. This report explains why the design features of CHIS were selected and presents the alternatives that were considered and provides analysts information about the sampling methods used for both the household and person (within household) sampling. In general terms, once a household was sampled, an adult within that household was sampled. If there were children and/or adolescents in the household, one child and/or one adolescent was eligible for sampling. This report also provides a discussion on achieved sample size and how it compares to the planned sample size.

The purposes of this report are:

- To serve as a reference for researchers using CHIS 2013-2014 data;
- To document data collection procedures so that future iterations of CHIS, or other similar surveys, can replicate those procedures if desired;
- To describe lessons learned from the data collection experience and make recommendations for improving future surveys; and
- To evaluate the level of effort required for the various kinds of data collection undertaken.

For further methodological details not covered in this report, refer to the other methodological reports in the series at <http://healthpolicy.ucla.edu/chis/design/Pages/methodology.aspx>. General information on CHIS data can be found on the California Health Interview Survey Web site at <http://www.chis.ucla.edu> or by contacting CHIS at CHIS@ucla.edu.

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1. CHIS 2013-2014 SAMPLE DESIGN AND METHODOLOGY SUMMARY

1.1 Overview

This chapter provides a high-level summary of major design components of the California Health Interview Survey (CHIS) and appears at the beginning of each of the five detailed methodology reports for the cycle. You may need to reference those reports to find the level of detail you need. CHIS methodology reports and other methodological documentation and research is online at <http://healthpolicy.ucla.edu/chis/design/Pages/methodology.aspx>.

The CHIS is a population-based telephone survey of California's population conducted every other year since 2001 and continually beginning in 2011. CHIS is the largest state health survey and one of the largest health surveys in the nation. CHIS is conducted by the UCLA Center for Health Policy Research (UCLA-CHPR) in collaboration with the California Department of Public Health and the Department of Health Care Services. CHIS collects extensive information for all age groups on health status, health conditions, health-related behaviors, health insurance coverage, access to health care services, and other health and health related issues.

The sample is designed to meet and optimize two objectives:

- 1) Provide estimates for large- and medium-sized counties in the state, and for groups of the smallest counties (based on population size), and
- 2) Provide statewide estimates for California's overall population, its major racial and ethnic groups, as well as several Asian and Latino ethnic subgroups.

The CHIS sample is representative of California's non-institutionalized population living in households. CHIS data and results are used extensively by federal and State agencies, local public health agencies and organizations, advocacy and community organizations, other local agencies, hospitals, community clinics, health plans, foundations, and researchers. These data are used for analyses and publications to assess public health and health care needs, to develop and advocate policies to meet those needs, and to plan and budget health care coverage and services. Many researchers throughout California and the nation use CHIS data files to further their understanding of a wide range of health-related issues (for many examples of these studies, visit the Center's publication page (<http://healthpolicy.ucla.edu/publications/Pages/default.aspx>)).

This series of reports describes the methods used in collecting data for CHIS 2013-2014, the sixth CHIS data collection cycle. The previous CHIS cycles (2001, 2003, 2005, 2007, 2009, and 2011-2012) are described in similar series at <http://healthpolicy.ucla.edu/chis/design/Pages/methodology.aspx>.

1.2 Switch to a Continuous Survey

From the first CHIS cycle in 2001 through 2009, CHIS data collection was biennial, with data collected during a 7-9 month period every other year. Beginning in 2011, CHIS data have been collected continually over each 2-year cycle. This change was driven by several factors including the ability to track and release information about health in California on a more frequent and timely basis and to eliminate potential seasonality in the biennial data.

CHIS 2013-2014 data were collected between February 2013 and early January 2015. Approximately half of the interviews were conducted during the 2013 calendar year and half during the 2014 calendar year. As in previous CHIS cycles, weights are included with the data files and are based on the State of California's Department of Finance population estimates and projections, adjusted to remove the population living in group quarters (such as nursing homes, prisons, etc.) and thus not eligible to participate in CHIS. When the weights are applied to the data, the results represent California's residential population during that two year period for the age group corresponding to the data file in use (adult, adolescent, or child).

See what's new in the 2013-2014 CHIS sampling and data collection here:

<http://healthpolicy.ucla.edu/chis/design/Documents/whats-new-chis-2013-2014.pdf>

In order to provide CHIS data users with more complete and up-to-date information to facilitate analyses of CHIS data, additional information on how to use the CHIS sampling weights, including sample code, is available at: <http://healthpolicy.ucla.edu/chis/analyze/Pages/sample-code.aspx>

Additional documentation on constructing the CHIS sampling weights is available in CHIS 2013-2014 Methods Report #5—Weighting and Variance Estimation, available at: <http://healthpolicy.ucla.edu/chis/design/Pages/methodology.aspx>. Other helpful information for understanding the CHIS sample design and data collection processing can be found in the four other methodology reports for each CHIS cycle year, described in the Preface to this report above.

1.3 Sample Design Objectives

The CHIS 2013-2014 sample was designed to meet the two sampling objectives discussed above: (1) provide estimates for adults in most counties and in groups of counties with small populations; and (2) provide estimates for California's overall population, major racial and ethnic groups, and for several smaller ethnic subgroups.

To achieve these objectives, CHIS employed a dual-frame, multi-stage sample design. The random-digit-dial (RDD) sample included telephone numbers assigned to both landline and cellular service. The random-digit-dial (RDD) sample was designed to achieve completed adult interviews with approximately 80% landline and 20% cellular phone numbers. For the landline RDD sample, the 58 counties in the state were grouped into 44 geographic sampling strata, and 14 sub-strata were created within the two most populous counties in the state (Los Angeles and San Diego). The Los Angeles County stratum included 8 sub-strata for Service Planning Areas, and the San Diego County stratum included 6 sub-strata for Health Service Districts. Most of the strata (39 of 44) are made up of a single county with no sub-strata (counties 3-41 in Table 1-1), with three multi-county strata comprised of the 17 remaining counties (see Table 1-1). CHIS 2013-2014 also included supplemental geographic oversamples of landlines in 3 small counties (Calaveras, Siskiyou, and Tuolumne) that were part of multi-county strata. An address-based sample of an additional 500 households was conducted in Sonoma County and oversamples of about 130 Japanese Americans, 104 Korean Americans, and 120 Vietnamese Americans were completed using list samples. A sufficient number of adult interviews were allocated to each stratum and sub-stratum to support the first sample design objective—to provide health estimates for adults at the local level. The same landline geographic stratification of the state has been used since CHIS 2005. In the first two CHIS cycles (2001 and 2003) there were 47 total sampling strata, including 33 individual counties and one county with sub-strata (Los Angeles).

Within each geographic stratum, residential telephone numbers were selected, and within each household, one adult (age 18 and over) respondent was randomly selected. In those households with adolescents (ages 12-17) and/or children (under age 12), one adolescent and one child were randomly selected; the adolescent was interviewed directly, and the adult most knowledgeable about the child's health completed the child interview.

The RDD CHIS sample is of sufficient size to accomplish the second objective (produce estimates for the state's major racial/ethnic groups, as well as many ethnic subgroups). To increase the precision of estimates for Koreans and Vietnamese, areas with relatively high concentrations of these groups were sampled at higher rates. These geographically targeted oversamples were supplemented by

telephone numbers associated with group-specific surnames drawn from listed telephone directories to further increase the sample size for Koreans and Vietnamese. Surname and given name lists were used similarly to increase the yield of Californians of Japanese descent.

Table 1-1. California county and county group strata used in the CHIS 2013-2014 sample design

1. Los Angeles	7. Alameda	27. Shasta
1.1 Antelope Valley	8. Sacramento	28. Yolo
1.2 San Fernando Valley	9. Contra Costa	29. El Dorado
1.3 San Gabriel Valley	10. Fresno	30. Imperial
1.4 Metro	11. San Francisco	31. Napa
1.5 West	12. Ventura	32. Kings
1.6 South	13. San Mateo	33. Madera
1.7 East	14. Kern	34. Monterey
1.8 South Bay	15. San Joaquin	35. Humboldt
2. San Diego	16. Sonoma	36. Nevada
2.1 N. Coastal	17. Stanislaus	37. Mendocino
2.2 N. Central	18. Santa Barbara	38. Sutter
2.3 Central	19. Solano	39. Yuba
2.4 South	20. Tulare	40. Lake
2.5 East	21. Santa Cruz	41. San Benito
2.6 N. Inland	22. Marin	42. Colusa, Glen, Tehama
3. Orange	23. San Luis Obispo	43. Plumas, Sierra, Siskiyou, Lassen, Modoc, Trinity, Del Norte
4. Santa Clara	24. Placer	44. Mariposa, Mono, Tuolumne, Alpine, Amador, Calaveras, Inyo
5. San Bernardino	25. Merced	
6. Riverside	26. Butte	

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

To help compensate for the increasing number of households without landline telephone service, a separate RDD sample was drawn of telephone numbers assigned to cellular service. In CHIS 2013-2014, the goal was to complete approximately 8,000 interviews (20% of all RDD interviews statewide) with adults from the cell phone sample. Although the geographic information available for cell phone numbers is not as precise as that for landlines, cell phone numbers were assigned to the same 43 strata (i.e., 40 strata defined by a single county and 3 strata created by multiple counties). The cell phone stratification closely resembles that of the landline sample and has the same stratum names, though the cell phone strata represent slightly different geographic areas than the landline strata. As in CHIS 2011-2012, if a sampled cell number was shared by two or more adult members of a household, one household member was selected for the adult interview; otherwise the adult owner of the sampled number was selected. Cell numbers used exclusively by children under 18 were considered ineligible. About 480 teen interviews and 1,250 child interviews were completed from the cell phone sample in CHIS 2013-2014.

The cell phone sampling method used in CHIS has evolved since its first implementation in 2007 when only cell numbers belonging to adults in cell-only households were eligible for sampling adults. There have been two significant changes to the cell phone sample since 2009. First, all cell phone sample numbers used for non-business purposes by adults living in California were eligible for the extended interview. Thus, adults in households with landlines who had their own cell phones or shared one with another adult household member could have been selected through either the cell or landline sample. The second change was the inclusion of child and adolescent extended interviews.

The cell phone sample design and targets by stratum of the cell phone sample have also changed throughout the cycles of the survey. In CHIS 2007 a non-overlapping dual-frame design was implemented where cell phone only users were screened and interviewed in the cell phone sample. Beginning in 2009, an overlapping dual-frame design has been implemented. In this design, dual phone users (e.g., those with both cell and landline service) can be selected and interviewed from either the landline or cellphone samples.

The number of strata has also evolved as more information about cell numbers has become available. In CHIS 2007 the cell phone frame was stratified into 7 geographic sampling strata created using telephone area codes. In CHIS 2009 and 2011-2012, the number of strata was increased to 28. These strata were created using both area codes and the geographic information assigned to the number. In CHIS 2011-2013, with the availability of more detailed geographic information, the number of strata was increased to 43 geographic areas that correspond to single and grouped counties similar to the landline strata.

1.4 Data Collection

To capture the rich diversity of the California population, interviews were conducted in six languages: English, Spanish, Chinese (Mandarin and Cantonese dialects), Vietnamese, Korean, and, for the first time, Tagalog. These languages were chosen based on analysis of 2010 Census data to identify the languages that would cover the largest number of Californians in the CHIS sample that either did not speak English or did not speak English well enough to otherwise participate.

Westat, a private firm that specializes in statistical research and large-scale sample surveys, conducted CHIS 2013-2014 data collection under contract with the UCLA Center for Health Policy Research. For all samples, Westat staff interviewed one randomly selected adult in each sampled household, and sampled one adolescent and one child if they were present in the household and the

sampled adult was their parent or legal guardian. Thus, up to three interviews could have been completed in each household. Children and adolescents were generally sampled at the end of the adult interview. In landline, list, and ABS sample households with children where the screener respondent was someone other than the sampled adult, children and adolescents could be sampled as part of the screening interview, and the extended child (and adolescent) interviews could be completed before the adult interview. This “child-first” procedure was first used in CHIS 2005 and has been continued in subsequent CHIS cycles because it substantially increases the yield of child interviews. While numerous subsequent attempts were made to complete the adult interview for child-first cases, the final data contain completed child and adolescent interviews in households for which an adult interview was not completed. Table 1-2 shows the number of completed adult, child, and adolescent interviews in CHIS 2013-2014 by the type of sample (landline RDD, surname list, cell RDD, and Sonoma ABS). These numbers are provided in greater detail in Chapter 6 of this report/ *CHIS 2013-2014 Methodology Series: Report 2 – Data Collection*. Note that these figures were accurate as of data collection completion and may differ slightly from numbers in the data files due to data cleaning and edits. Sample sizes to compare against data files you are using are found online at <http://healthpolicy.ucla.edu/chis/design/Pages/sample.aspx>.

Table 1-2. Number of completed CHIS 2013-2014 interviews by type of sample and instrument

Type of sample	Adult*	Child	Adolescent
Total all samples	40,240 ¹	5,512	2,253
Landline RDD	31,615	4,164	1,738
Surname list	392	50	18
Cell RDD	7,752	1,256	482
Sonoma ABS	481	42	15

*Includes interviews meeting the criteria as partially complete

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

Interviews in all languages were administered using Westat’s computer-assisted telephone interviewing (CATI) system. The average adult interview took about 36 minutes to complete. The average child and adolescent interviews took about 16 minutes and 23 minutes, respectively. For “child-first” interviews, additional household information asked as part of the child interview averaged about 9 minutes. Interviews in non-English languages generally took longer to complete. More than 11 percent of the adult interviews were completed in a language other than English, as were about 23 percent of all child (parent proxy) interviews and 5 percent of all adolescent interviews.

¹Numbers in this table represent the data publicly released and available through our Data Access Center. Total sample sizes may differ for specific calculations within the five methodology reports, or for specific analyses based on CHIS data.

Table 1-3 shows the major topic areas for each of the three survey instruments (adult, child, and adolescent).

Table 1-3. CHIS 2013-2014 survey topic areas by instrument

Health status	Adult	Teen	Child
General health status	✓	✓	✓
Days missed from school due to health problems		✓	✓
Health conditions	Adult	Teen	Child
Asthma	✓	✓	✓
Diabetes, gestational diabetes, pre- /borderline diabetes	✓		
Heart disease, high blood pressure	✓		
Physical disability	✓		
Physical, behavioral, and/or mental conditions			✓
Mental health	Adult	Teen	Child
Mental health status	✓	✓	
Perceived need, access and utilization of mental health services	✓	✓	
Functional impairment, stigma	✓		
Suicide ideation and attempts	✓	✓	
Health behaviors	Adult	Teen	Child
Dietary intake, fast food	✓	✓	✓
Physical activity and exercise, commute from school to home		✓	✓
Walking for transportation and leisure	✓		
Doctor discussed nutrition/physical activity		✓	
Flu Shot	✓	✓	✓
Cigarette use, second-hand smoke, attitudes about smoking	✓	✓	
Alcohol use	✓	✓	
Sexual behavior	✓		
HIV/STI testing	✓		
Sedentary time		✓	✓
Dental health	Adult	Teen	Child
Last dental visit	✓	✓	✓
Main reason haven't visited dentist	✓	✓	
Current dental insurance coverage	✓	✓	✓
Neighborhood and housing	Adult	Teen	Child
Social cohesion	✓	✓	✓
Neighborhood safety	✓	✓	✓
Homeownership, length of time at current residence	✓		
Park use		✓	✓
Civic engagement	✓	✓	

Table 1-3. CHIS 2013-2014 survey topic areas by instrument (continued)

Access to and use of health care	Adult	Teen	Child
Usual source of care, visits to medical doctor	✓	✓	✓
Emergency room visits	✓	✓	✓
Inpatient hospital stays	✓		
Delays in getting care (prescriptions and medical care)	✓	✓	✓
Patient-centered care, timely appointments, care coordination	✓	✓	✓
Communication problems with doctor	✓		✓
Problems finding a doctor	✓		✓
Use of specialists	✓		
Advance directive (Sonoma County)	✓		
Internet use for health information	✓		✓
Contraception (counseling, prescription, male birth control)	✓		
Food environment	Adult	Teen	Child
Access to fresh and affordable foods	✓		
Fast food at school, School lunch consumption		✓	✓
Water availability		✓	
Water consumption	✓	✓	
Availability of food in household over past 12 months	✓		
Health insurance	Adult	Teen	Child
Current insurance coverage, spouse's coverage, who pays for coverage	✓	✓	✓
Health plan enrollment, characteristics and plan assessment	✓	✓	✓
Whether employer offers coverage, respondent/spouse eligibility	✓		
Coverage over past 12 months, reasons for lack of insurance	✓	✓	✓
Coverage through Covered California	✓	✓	✓
Difficulty finding private health insurance	✓	✓	✓
High deductible health plans	✓	✓	✓
Partial scope Medi-Cal	✓		
Public program eligibility	Adult	Teen	Child
Household poverty level	✓		
Program participation (CalWORKs, Food Stamps/CalFresh, SSI, SSDI, WIC, TANF)	✓	✓	✓
Assets, alimony/child support, social security/pension	✓		
Medi-Cal and Healthy Families eligibility	✓	✓	✓
Reason for Medi-Cal non-participation among potential beneficiaries	✓	✓	✓
Parental involvement/adult supervision	Adult	Teen	Child
Parental involvement			✓

Table 1-3. CHIS 2013-2014 survey topic areas by instrument (continued)

Child care and school attendance	Adult	Teen	Child
Current child care arrangements			✓
Paid child care	✓		
First 5 California: Kit for New Parents			✓
Preschool/school attendance, name of school		✓	✓
Preschool quality			✓
Special programs in school		✓	
Grades, college expectations		✓	
Organizational involvement, civic engagement		✓	
School instability		✓	
Employment	Adult	Teen	Child
Employment status, spouse's employment status	✓		
Hours worked at all jobs	✓		
Income	Adult	Teen	Child
Respondent's and spouse's earnings last month before taxes	✓		
Household income, number of persons supported by household income	✓		
Alimony/child support	✓		
Worker's compensation, Social Security, pensions	✓		
Respondent characteristics	Adult	Teen	Child
Race and ethnicity, age, gender, height, weight	✓	✓	✓
Veteran status	✓		
Marital status, registered domestic partner status (same-sex couples)	✓		
Sexual orientation	✓		
Language spoken with peers, language of TV, radio, newspaper used	✓		
Education, English language proficiency	✓		
Citizenship, immigration status, country of birth, length of time in U.S., languages spoken at home	✓	✓	✓

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

1.5 Response Rates

The overall response rate for CHIS 2013-2014 is a composite of the screener completion rate (i.e., success in introducing the survey to a household and randomly selecting an adult to be interviewed) and the extended interview completion rate (i.e., success in getting one or more selected persons to complete the extended interview). To maximize the response rate, especially at the screener stage, an advance letter in five languages was mailed to all landline sampled telephone numbers for which an address could be obtained from reverse directory services. An advance letter was mailed for 50.7 percent of the landline

RDD sample telephone numbers not identified by the sample vendor as business or nonworking numbers, and for 82.2 percent of surname list sample numbers. Addresses were not available for the cell sample. As in all CHIS cycles since CHIS 2005, a \$2 bill was included with the CHIS 2013-2014 advance letter to encourage cooperation.

The CHIS 2013-2014 screener response rate for the landline/list sample was 28.8 percent, and was higher for households that were sent the advance letter. For the cell phone sample, the screener response rate was 30.7 percent. The extended interview response rate for the landline/list sample varied across the adult (44.8 percent), child (68.9 percent) and adolescent (40.2 percent) interviews. The adolescent rate includes getting permission from a parent or guardian. The adult interview response rate for the cell sample was 52.1 percent, the child rate was 72.2 percent, and the adolescent rate 41.0 percent. Multiplying the screener and extended rates gives an overall response rate for each type of interview. The percentage of households completing one or more of the extended interviews (adult, child, and/or adolescent) is a useful summary of the overall performance of the landline sample. For CHIS 2013-2014, the landline/list sample household response rate was 14.8 percent (the product of the screener response rate and the extended interview response rate at the household level of 51.4 percent). The cell sample household response rate was 16.6 percent, incorporating a household-level extended interview response rate of 53.9 percent. All of the household and person level response rates vary by sampling stratum. For more information about the CHIS 2013-2014 response rates please see *CHIS 2013-2014 Methodology Series: Report 4 – Response Rates*.

Historically, the CHIS response rates are comparable to response rates of other scientific telephone surveys in California, such as the California Behavioral Risk Factor Surveillance System (BRFSS) Survey. However, comparing the CHIS and BRFSS response rates requires recomputing the CHIS response rates so they match the BRFSS response rate calculation methods. The 2013 California BRFSS landline response rate is 38.9 percent, the cell phone response rate is 39.3 percent, and the combined landline and cell phone rate is 39.0 percent.² Recalculating the CHIS response rates using the BRFSS method, the CHIS 2013-2014 landline response rate is 39.5, cell phone response rate is 32.1 percent, and the combined landline and cell phone response rate is 37.2 percent. California as a whole and the state's urban areas in particular are among the most difficult parts of the nation in which to conduct telephone interviews. For example, based on the last reported BRFSS refusal rates in 2011; the refusal rate for California (31.4%) was the highest in the nation and was twice the national median (16.0%). Survey response rates tend to be lower in California than nationally, and over the past decade response rates have been declining both nationally and in California.

² As reported in the Behavioral Risk Factor Surveillance System: 2013 Summary Data Quality Report. Retrieved May 22, 2015, available online at http://www.cdc.gov/brfss/annual_data/2013/pdf/2013_dqr.pdf

Further information about CHIS data quality and nonresponse bias is available at <http://healthpolicy.ucla.edu/chis/design/Pages/data-quality.aspx>.

After all follow-up attempts to complete the full questionnaire were exhausted, adults who completed at least approximately 80 percent of the questionnaire (i.e., through Section K which covers employment, income, poverty status, and food security), were counted as “complete.” At least some responses in the employment and income series, or public program eligibility and food insecurity series were missing from those cases that did not complete the entire interview. They were imputed to enhance the analytic utility of the data (see section 2.6 on imputation methods for more information).

Proxy interviews were conducted for any adult who was unable to complete the extended adult interview for themselves, in order to avoid biases for health estimates of chronically-ill or handicapped people. Eligible selected persons were re-contacted and offered a proxy option. For 248 adults, a proxy interview was completed by either a spouse/partner or adult child. A reduced questionnaire, with questions identified as appropriate for a proxy respondent, was administered.

1.6 Weighting the Sample

To produce population estimates from CHIS data, weights are applied to the sample data to compensate for the probability of selection and a variety of other factors, some directly resulting from the design and administration of the survey. The sample is weighted to represent the non-institutionalized population for each sampling stratum and statewide. The weighting procedures used for CHIS 2013-2014 accomplish the following objectives:

- Compensate for differential probabilities of selection for households and persons;
- Reduce biases occurring because non-respondents may have different characteristics than respondents;
- Adjust, to the extent possible, for under-coverage in the sampling frames and in the conduct of the survey; and
- Reduce the variance of the estimates by using auxiliary information.

As part of the weighting process, a household weight was created for all households that completed the screener interview. This household weight is the product of the “base weight” (the inverse

of the probability of selection of the telephone number) and a variety of adjustment factors. The household weight is used to compute a person-level weight, which includes adjustments for the within-household sampling of persons and nonresponse. The final step is to adjust the person-level weight using an iterative proportional fitting method, or “raking” as it is commonly called, so that CHIS estimates are consistent with the marginal population control totals. This iterative procedure forces the CHIS weights to sum to known population control totals from an independent data source (see below). The procedure requires iteration to make sure all the control totals, or raking dimensions, are simultaneously satisfied within a pre-specified tolerance.

Population control totals of the number of persons by age, race, and sex at the stratum level for CHIS 2013-2014 were created primarily from the California Department of Finance’s (DOF) 2014 Population Estimates and 2014 Population Projections. The raking procedure used 12 raking dimensions, which are combinations of demographic variables (age, sex, race, and ethnicity), geographic variables (county, Service Planning Area in Los Angeles County, and Health Region in San Diego County), household composition (presence of children and adolescents in the household), and socio-economic variables (home ownership and education). The socio-economic variables are included to reduce biases associated with excluding households without landline telephones from the sample frame. One limitation of using Department of Finance (DOF) data is that it includes about 2.4 percent of the population of California who live in “group quarters” (i.e., persons living with nine or more unrelated persons and includes, for example nursing homes, prisons, dormitories, etc.). These persons were excluded from the CHIS target population and, as a result, the number of persons living in group quarters was estimated and removed from the Department of Finance control totals prior to raking.

The 2014 DOF control totals used to create the CHIS 2013-2014 weights are based on 2010 Census counts, as were those used for the 2011-2012 cycle. Please pay close attention when comparing estimates using CHIS 2013-2014 data with estimates using data from CHIS cycles before 2010. The most accurate California population figures are available when the US population count is conducted (every 10 years). Population-based surveys like CHIS must use estimates and projections based on the decennial population count data between Censuses. For example, population control totals for CHIS 2009 were based on 2009 DOF estimates and projections, which were based on Census 2000 counts with adjustments for demographic changes within the state between 2000 and 2009. These estimates become less accurate and more dependent on the models underlying the adjustments over time. Using the most recent Census population count information to create control totals for weighting produces the most statistically accurate population estimates for the current cycle, but it may produce unexpected increases or decreases in some survey estimates when comparing survey cycles that use 2000 Census-based information and 2010 Census-based information. See *CHIS 2013-2014 Methodology Series: Report 5* –

Weighting and Variance Estimation for more information on the weighting process.

1.7 Imputation Methods

Missing values in the CHIS data files were replaced through imputation for nearly every variable. This was a massive task designed to enhance the analytic utility of the files. Westat imputed missing values for those variables used in the weighting process and UCLA-CHPR staff imputed values for nearly every other variable.

Two different imputation procedures were used by Westat to fill in missing responses for items essential for weighting the data. The first imputation technique was a completely random selection from the observed distribution of respondents. This method was used only for a few variables when the percentage of the items missing was very small. The second technique was hot deck imputation without replacement. The hot deck approach is one of the most commonly used methods for assigning values for missing responses. With a hot deck, a value reported by a respondent for a particular item is assigned or donated to a “similar” person who did not respond to that item. The characteristics defining “similar” vary for different variables. To carry out hot deck imputation, the respondents who answer a survey item form a pool of donors, while the item non-respondents form a group of recipients. A recipient is matched to the subset pool of donors based on household and individual characteristics. A value for the recipient is then randomly imputed from one of the donors in the pool. Once a donor is used, it is removed from the pool of donors for that variable. Westat used hot deck imputation to impute the same items in all CHIS cycles since 2003 (i.e., race, ethnicity, home ownership, and education).

UCLA-CHPR imputed missing values for nearly every variable in the data files other than those imputed by Westat and some sensitive variables in which nonresponse had its own meaning. Overall, item nonresponse rates in CHIS 2013-2014 were low, with most variables missing valid responses for less than 2% of the sample. However, there were a few exceptions where item nonresponse rate was greater than 20%, such as household income.

The imputation process conducted by UCLA-CHPR started with data editing, sometimes referred to as logical or relational imputation: for any missing value, a valid replacement value was sought based on known values of other variables of the same respondent or other sample(s) from the same household. For the remaining missing values, model-based hot-deck imputation with donor replacement was used. This method replaces a missing value for one respondent using a valid response from another respondent with similar characteristics as defined by a generalized linear model with a set of control variables (predictors). The link function of the model corresponds to the nature of the variable being imputed (e.g.

linear regression for continuous variables, logistic regression for binary variables, etc.). Donors and recipients are grouped based on their predicted values from the model.

Control variables (predictors) used in the model to form donor pools for hot-decking always included standard measures of demographic and socioeconomic characteristics, as well as geographic region; however, the full set of control variables varies depending on which variable is being imputed. Most imputation models included additional characteristics, such as health status or access to care, which are used to improve the quality of the donor-recipient match. Among the standard list of control variables, gender, age, race/ethnicity and region of California were imputed by Westat. UCLA-CHPR began their imputation process by imputing household income and educational attainment, so that these characteristics were available for the imputation of other variables. CHIS collects bracketed information about the range in which the respondent's value falls when the respondent will not or cannot report an exact amount. Household income, for example, was imputed using the hot-deck method within ranges defined by a set of auxiliary variables such as bracketed income range and/or poverty level. After all other variables are imputed, household income is re-imputed using a more detailed list of covariates to create a higher quality match between donors and recipients.

The imputation order of the other variables generally followed their order in the questionnaire. After all imputation procedures were complete, every step in the data quality control process is performed once again to ensure consistency between the imputed and non-imputed values on a case-by-case basis.

1.8 Methodology Report Series

A series of five methodology reports is available with more detail about the methods used in CHIS 2013-2014:

- Report 1 – Sample Design;
- Report 2 – Data Collection Methods;
- Report 3 – Data Processing Procedures;
- Report 4 – Response Rates; and
- Report 5 – Weighting and Variance Estimation.

For further information on CHIS data and the methods used in the survey, visit the California Health Interview Survey Web site at <http://www.chis.ucla.edu> or contact CHIS at CHIS@ucla.edu.

2. TELEPHONE SAMPLING METHODS

This chapter describes the sampling methods used in the CHIS 2013-2014 telephone survey. CHIS 2013-2014 employed a dual-frame with two main components and several supplemental samples. The main components are a landline random digit dialing (RDD) sample to yield approximately 80 percent of completed adult interviews and a cell phone RDD sample to yield the remaining 20 percent. The supplemental samples include geographic samples in San Diego County and three small rural counties (Calaveras, Siskiyou, and Tuolumne), an Address-Based Sample (ABS) in Sonoma County, and list samples to increase the yield of households with Korean, Vietnamese, and Japanese ancestry. The landline sample, cell phone sample, and geographic supplemental samples were drawn using RDD approaches while the list samples were randomly drawn from separate lists of telephone numbers. The supplemental ABS was drawn from a list of addresses of households in Sonoma County. CHIS 2013-2014 data were collected continuously across the two-year data collection cycle beginning February 5, 2013, and ending February 15, 2015.

The first section describes the list-assisted RDD sampling methodology for the landline sample and the potential for undercoverage of households with landlines. The second section describes the cell phone sampling methodology used to address the increasing undercoverage of landline samples. The third section describes the methods used to increase the efficiency of both the landline and cell samples. The final sections review the supplemental samples.

2.1. List-Assisted Random Digit Dial (RDD) Sampling of Landlines

List-assisted RDD sampling has been the primary method for landline telephone samples for all cycles of CHIS. This method was designed to produce an unclustered sample with good operational features (Tucker, Lepkowski, & Piekarski, 2002). In 100-series list-assisted sampling, the set of all landline telephone numbers in operating telephone prefixes is composed of groups (or *banks*) of 100 telephone numbers with the same first eight digits (e.g., 310-794-23XX). All 100-banks with at least one residential number listed in a published telephone directory comprise the sampling frame; 100-banks with no listed numbers are excluded. A simple random or systematic sample of telephone numbers is then selected from the landline frame. This method introduces a small amount of noncoverage because the excluded 100-banks do include some active residential numbers. Brick, Waksberg, Kulp, & Starer (1995) showed that the bias from this noncoverage was negligible for most estimates. However, recent changes in the U.S. telecommunications industry and assignment of residential exchanges have had a large impact on the 100-series list-assisted sampling methodology. Fahimi, Kulp, & Brick (2008) found that the exclusion of zero-banks could result in coverage losses of up to 20 percent of households with a landline.

Although there is no current research on the characteristics of the households with telephone numbers in the zero banks, these households may have different characteristics from those in the traditionally sampled banks, raising the possibility of bias. The CHIS 2013-2014 landline sample does not have a specific method to address this potential undercoverage bias directly; however, the weighting methods using control totals representing the entire population in California should mitigate its effects.

2.2. Households without Landline Telephones

In landline telephone surveys, households with only cellular telephones and households with no telephone service of any type are not sampled. For estimates correlated with socioeconomic measures such as health insurance coverage, food security, and poverty, this undercoverage introduces biases. The bias depends on the proportion of households without landline telephones and the difference in characteristics of persons in households with and without a landline telephone.

Households with only cellular service, which we will refer to as cell-only households, account for the vast majority of those without a landline. The proportion of households and individuals in the United States with cell phones has greatly increased in recent years. For the last 6 months of 2014, 45.4 percent of households in the U.S. were cell-only (Blumberg & Luke, 2015). Blumberg and Luke also reported that a sizeable proportion of households may be difficult to reach even though they have a landline because they rely on cell phones for most of their calls (34.8 percent of households based on the July-December 2014 data).

Persons in cell-phone-only households differ from those in households with landlines in important ways. For example, cell-phone-only adults are less likely to be insured than adults in households with landlines. Demographic differences such as age and gender are also associated with cell-phone-only households, although some of these differences are becoming smaller as more people use cell phones. Additionally, adults living in cell-only households are more likely than those in households with landlines to be renters or living with unrelated adults (Blumberg & Luke, 2015).

CHIS 2013-2014 included a cell-phone sample component that addresses the biases from excluding cell-phone-only households in landline telephone surveys. Similar to CHIS 2011-2012, the CHIS 2013-2014 used an overlapping dual frame design where information from adults, children and adolescents in households sampled from either frame was collected independently from type of telephone service. Additional details on the selection of the cell phone sample are presented in Section 3.2.2.

2.3. Increasing the Efficiency of Data Collection through Sample Processing

When landline telephone numbers are sampled, certain procedures are often implemented before data collection to reduce cost and increase data collection efficiency. These techniques have been used in all CHIS cycles, although some details have evolved over time.

As in previous CHIS cycles, the 2013-2014 landline sample was processed through the Comprehensive Screening Service (CSS) offered by Marketing Systems Group (MSG), the CHIS sample vendor. The CSS includes tritone tests (the distinctive three-bell sound heard when dialing a nonworking number) and purge methods to reduce the number of unproductive i.e., business and nonworking numbers. This process first removes all listed business telephone numbers, then dials the remaining numbers to screen out nonworking and additional business numbers. The process also identifies cell phone numbers that were ported from landline exchanges. These ported numbers have been included as part of the cell sample since CHIS 2009.

Table 2-1 shows the CSS result codes as well as the distribution of the sampled landline telephone numbers in CHIS 2013-2014. Approximately 61 percent of the sampled numbers (CSS result codes LB, FM, NR, NW, and some UB) were excluded from dialing, an a 6 percentage point increase over CHIS 2011-2012.

Table 2-1. CSS result codes and their distribution in the CHIS 2013-2014 sample

CSS result code	Description	Number of telephones	Percentage
CP	Agent identified cell phone	156	0.01
DK	Undetermined	267,869	25.34
FM	Fax/modem	24,144	2.28
LA	Language barrier	3,304	0.31
LB	Listed business	58,400	5.52
NR	No ring-back	8,285	0.78
NW	Nonworking	557,626	52.75
PM	Privacy manager	6,436	0.61
RS	Residence	85,054	8.05
UB	Unlisted business	35,391	3.35
WR	Wireless number	10,460	0.99
Total		1,057,125	100.00

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

Unlike the landline sample, unproductive numbers in the cell phone sample (i.e., nonworking and business telephone numbers) cannot be purged using directory matching because no cell phone directories exist. However, due to new agreements between cell phone service providers and sampling vendors, the activity status of a cell phone number can be determined without dialing for most cell phone numbers. This activity status may be used to increase the efficiency of dialing by eliminating or subsampling inactive numbers. The screening process offered by MSG is called Cellular Working Identification Number Service (Cell-WINS). Cell-WINS is a real-time, non-intrusive screening process that classifies cell phone numbers based on the cell phone activity into three groups: 1) cell phone numbers likely to be active, 2) cell phone numbers likely to be inactive, and 3) cell phone numbers with unknown activity status. Since this process became available during the CHIS 2013-2014 field period timetable, it was only incorporated into CHIS sample processing during the latter half of data collection. A total of 47,870 cell phone numbers released during 2014 was processed to determine activity flag status. These numbers represent 49 percent of all cell phone numbers sampled in CHIS 2013-2014. Table 2-2 shows the distribution of the activity flag for the cell phone sample drawn in 2014.

Since this process was new to CHIS, Westat conducted an initial evaluation study during the fall of 2013 to assess the accuracy of the activity flag. In this study, all cell phone numbers in the subsample from the three groups shown in Table 2-2 were dialed, and the result of call was compared with the flag value. The analysis showed there was misclassification in the assignment of the flag, but the misclassification rate was small. The same analysis also showed a potential increase in efficiency and reductions in cost of dialing cell phone numbers if the inactive and unknown status numbers were excluded from the sample. To be safe, we subsampled inactive cell phone numbers and cell numbers with unknown activity status at a rate of 50 percent because of concerns of introducing biases if these cases were excluded. An analysis of CHIS 2013-2014 cell phone data should guide changes to the activity flag subsampling rate in future implementations of CHIS.

Table 2-2. Cell-WINS result codes and their distribution in the CHIS 2013-2014 cell sample drawn in 2014

Cell-WINS result code	Description	Number of cell phone numbers	Percentage
1	Cell phone likely to be active	30,552	63.8
2	Cell phone likely to be inactive	15,924	33.3
3	Cell phone with unknown activity	1,394	2.9
Total		47,870	100.0

2.4. Supplemental Sampling

The first type of supplemental sample implemented in CHIS 2013-2014 was geographic sampling to increase the sample size in specified areas, including RDD samples in San Diego County and three small rural counties (Calaveras, Siskiyou, and Tuolumne). The supplemental sample in San Diego County included landline and cell phone components for a combined target of 4,200 completed adult interviews. In contrast, the supplemental samples for Calaveras, Siskiyou, and Tuolumne Counties included only landlines for a combined target of 400 completed adult interviews in each county. The selection of the geographic RDD samples is described in Section 3.2.3. An address-based supplemental sample (ABS) was drawn in Sonoma county, which is described in Section 3.2.5.

The second type of supplemental sampling increased the sample size and precision of estimates for Koreans, Vietnamese, and Japanese in California. In CHIS 2013-2014, a supplemental sample of Japanese American was included for the first time. These ethnic groups are important for analytic reasons, but constitute a small proportion of the total California population. The expected sample yield from the RDD samples was too small to support inferences for these groups at the desired level of precision. Since CHIS 2003, two sampling strategies have been used to meet a target sample yield of 500 adults of Korean descent and 500 of Vietnamese descent per cycle (Edwards, Brick, Flores Cervantes, DiSogra, & Yen, 2002): disproportionate stratified sampling and multiple frame sampling. These strategies are mainly used to oversample rare or small populations (Flores Cervantes & Kalton, 2007).

The first strategy for oversampling Korean and Vietnamese populations was geographic targeting with the same substrata used since 2003. These strata were created classifying telephone exchanges based on the concentration of Korean and Vietnamese residing in the geographic area covered by the telephone exchange³ within selected counties. Under disproportionate stratified sampling, telephone numbers in exchanges located in areas with a relatively high proportion of members (high-density strata) were sampled at a higher rate than the numbers in the other areas (low-density strata). Since the stratification was originally based on information from the 2000 Census, we have updated the exchanges using the sample distribution of these populations in previous CHIS cycles.

The second strategy to increase the number of Korean, Vietnamese, and Japanese interviews was supplemental samples from other frames (i.e., phone numbers associated with surnames and first names related to these ethnic groups). This strategy is based on the concept of multiple frame design. In this approach, the landline sample is supplemented with a much less expensive sample drawn from a list of

³ Refer to the *CHIS 2003 Methodology Series: Report 1 Sample Design* for additional details on the creation of the substrata.

telephone numbers likely to include members of the target group(s). The list frame does not have to be complete to be useful, although the more complete the list is, the greater the potential for increasing the precision of the estimates. The composition of the list affects its efficiency (that is, the proportion of sampled numbers that lead to a member of the target group), but not the ability to produce unbiased estimates. Unbiased estimates can be produced if the list membership of every sampled unit (telephone number) from the other frame (landline in our case) can be determined. The cost associated with the use of the surname lists is much lower than the cost for locating and interviewing members of the groups from the landline sample. These samples were also purchased from MSG.

For telephone numbers in the Korean and Vietnamese surname list samples, the initial screening interview included an additional question to determine whether a household included one or more individuals of the target ethnic groups:

Do any of these adults who live in your household consider themselves to be Korean or Vietnamese or of Korean or Vietnamese descent?

If the answer to this question was “No,” the sampled number was considered to be ineligible, and the screening interview was terminated. A similar screening question was included for the Japanese surname/given name sample, worded:

Do any of these adults who live in your household consider themselves to be Japanese or of Japanese descent?

This strategy was relatively simple to implement and has good statistical properties, except for any measurement error that may be introduced by asking a question about ethnicity at the beginning of the interview. Screening was not necessary for the cases sampled from the high/low density strata because these cases were part of the base landline sample where all households are eligible for further interviewing. Although the surname lists were an effective way to increase the number of completed interviews for these groups, the variance of estimates for these groups is not greatly reduced by this approach because the lists do not include a high proportion of all eligible population in California. More details on sampling from these supplemental frames are presented in the next chapter.

3. SAMPLING HOUSEHOLDS

This chapter describes the selection of households for CHIS 2013-2014. We begin by defining the target population and the persons included in and excluded from the survey. Target numbers of completed adult interviews by county and for the supplemental samples are then described. The remainder of the chapter describes the types of supplemental samples and the selection of telephone numbers in order to achieve the stated goals.

3.1. Population of Interest

As in previous CHIS cycles, the 2013-2014 sample was intended to represent the adult (age 18 and older) residential population of California, as well as adolescents (age 12-17) and children (age 11 and younger). Eligible residential households included houses, apartments, and mobile homes occupied by individuals, families, multiple families, extended families or multiple unrelated persons, if the number of unrelated persons was less than nine. Persons living temporarily away from home were eligible and enumerated at their usual residences. These include college students in dormitories, patients in hospitals, vacationers, business travelers, and so on. The survey excluded group quarters—any unit occupied by nine or more unrelated persons (e.g., communes, convents, shelters, halfway houses, or dormitories). Institutionalized persons (e.g., those living in prisons, jails, juvenile detention facilities, psychiatric hospitals and residential treatment programs, and nursing homes for the disabled and aged), the homeless, persons in transient or temporary arrangements, and those in military barracks were also excluded if that status was discovered in the screening process. Some individuals who were part of the residential population did not have a chance of selection. These include those living in households without any telephone service, and children and adolescents living in a household without a parent or legal guardian.

3.2. Sample Design

The principal goals of the CHIS 2013-2014 sample design were (1) to produce reliable statewide estimates for the total population in California and for its larger race/ethnic groups, as well as for several smaller ethnic groups (i.e., Koreans, Vietnamese, and Japanese), and (2) to produce reliable estimates at the county level for as many counties as possible. These goals required compromises in allocating the sample into strata and frame types. To achieve the most reliable statewide estimates, the optimal design is to allocate the sample to counties proportionately to their population. On the other hand, the optimal allocation for producing individual county-level estimates is to assign each county an equal sample size. Different allocations of the sample by stratum and telephone sample (i.e., landline or cell phone)

consistent with the available budget were evaluated at the beginning of the study. The UCLA CHIS staff consulted with various constituencies to assess the relative importance of particular types of estimates. Westat statistical staff helped evaluate each alternative and examined the consequences of the sample allocations.

The initial goal for CHIS 2013-2014 was to complete 42,073 adult interviews as shown in Table 3-1. This initial goal included a supplemental geographic sample in San Diego County for a total of 4,200 adult interviews and supplemental list samples for a total of 500 adult interviews each for Koreans and Vietnamese. As in CHIS 2011-2012, the landline and cell phone sample targets were defined separately by 44 geographic sampling strata as indicated in the table. The initial sample was allocated so 20 percent of the adult interviews would be completed from the cell phone sample.

Table 3-1 Initial targets for completed adult interviews by county/group of counties

	Stratum	Landline sample	Cell phone sample	Total	Population size
	State total	33,658	8,415	42,073	
1	Los Angeles	6,491	1,622	8,113	Over 9,000,000
2	San Diego	3,840	960	4,800	
3	Orange	1,990	497	2,487	
4	Santa Clara	1,216	304	1,520	
5	San Bernardino	1,228	307	1,535	1,200,000 or greater
6	Riverside	1,383	346	1,729	
7	Alameda	1,091	273	1,364	
8	Sacramento	1,031	258	1,289	
9	Contra Costa	754	189	943	800,000 to 1,200,000
10	Fresno	584	146	730	
11	San Francisco	692	173	865	
12	Ventura	535	134	669	
13	San Mateo	517	129	646	500,000 to 800,000
14	Kern	514	129	643	
15	San Joaquin	432	108	540	
16	Sonoma	400	100	500	
17	Stanislaus	400	100	500	
18	Santa Barbara	400	100	500	
19	Solano	400	100	500	
20	Tulare	400	100	500	Medium counties
21	Santa Cruz	400	100	500	100,000 to 500,000
22	Marin	400	100	500	
23	San Luis Obispo	400	100	500	
24	Placer	400	100	500	
25	Merced	400	100	500	
26	Butte	400	100	500	

27	Shasta	400	100	500	
28	Yolo	400	100	500	
29	El Dorado	400	100	500	
30	Imperial	400	100	500	
31	Napa	400	100	500	
32	Kings	400	100	500	
33	Madera	400	100	500	
34	Monterey	400	100	500	
35	Humboldt	400	100	500	
36	Nevada	400	100	500	
37	Mendocino	400	100	500	
38	Sutter	400	100	500	Small counties less than 100,000 population per county
39	Yuba	400	100	500	
40	Lake	400	100	500	
41	San Benito	400	100	500	
42	Colusa, Glenn, Tehama	320	80	400	
43	Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	320	80	400	Small counties combined
44	Amador, Alpine, Calaveras, Inyo, Mariposa, Mono, Tuolumne	320	80	400	

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

The initial overall goal was reduced by 2,573 adult interviews at the beginning of 2014 to a total of 39,000 interviews. The landline and cell phone targets in the largest counties (strata 1 through 16) were reduced proportionally. At the same time, several supplemental samples were added. These include geographic samples in Siskiyou, Tuolumne, and Calaveras Counties to reach a total of 400 completed adult interviews in each county (see Section 3.2.3), and one ABS supplemental sample to yield an additional 500 adult interviews in Sonoma County (see Section 3.2.5). The final goal was 40,000 adult interviews as shown in Table 3-2. Towards the end of data collection, a state-wide Japanese list supplemental sample with a goal of 140 adult interviews was added (see Section 3.2.4). The CHIS 2013-2014 final target was 40,140 interviews, which is 1,895 interviews fewer than the CHIS 2011-2012 target of 42,035.

Although the number of child and adolescent interviews was not predetermined, we expected to complete approximately 2,600 adolescent interviews (depending on compliance since parental consent and adolescent agreement are required) and approximately 7,000 child interviews based on CHIS 2011-2012.

Table 3-2. Final targets for completed adult interviews by sampling county/group of counties (excluding

the Japanese supplemental sample)

	Stratum	Landline sample	Cell phone sample	ABS sample	Total
	State total	31,780	7,720	500	40,000
1	Los Angeles	5,674	1,419	N/A	7,093
2	San Diego	3,360	840	N/A	4,200
3	Orange	1,739	435	N/A	2,174
4	Santa Clara	1,063	266	N/A	1,329
5	San Bernardino	1,074	268	N/A	1,342
6	Riverside	1,210	302	N/A	1,512
7	Alameda	954	239	N/A	1,193
8	Sacramento	902	225	N/A	1,127
9	Contra Costa	660	165	N/A	825
10	Fresno	510	128	N/A	638
11	San Francisco	605	151	N/A	756
12	Ventura	468	117	N/A	585
13	San Mateo	452	113	N/A	565
14	Kern	450	112	N/A	562
15	San Joaquin	400	100	N/A	500
16	Sonoma	400	100	500	1,000
17	Stanislaus	400	100	N/A	500
18	Santa Barbara	400	100	N/A	500
19	Solano	400	100	N/A	500
20	Tulare	400	100	N/A	500
21	Santa Cruz	400	100	N/A	500
22	Marin	400	100	N/A	500
23	San Luis Obispo	400	100	N/A	500
24	Placer	400	100	N/A	500
25	Merced	400	100	N/A	500
26	Butte	400	100	N/A	500
27	Shasta	400	100	N/A	500
28	Yolo	400	100	N/A	500
29	El Dorado	400	100	N/A	500
30	Imperial	400	100	N/A	500
31	Napa	400	100	N/A	500
32	Kings	400	100	N/A	500
33	Madera	400	100	N/A	500
34	Monterey	400	100	N/A	500
35	Humboldt	400	100	N/A	500
36	Nevada	400	100	N/A	500
37	Mendocino	400	100	N/A	500
38	Sutter	400	100	N/A	500
39	Yuba	400	100	N/A	500
40	Lake	400	100	N/A	500
41	San Benito	400	100	N/A	500
42	Colusa, Glenn, Tehama	320	80	N/A	400

43	Del Norte, Lassen, Modoc, Plumas, Sierra, Trinity	222	80	N/A	677
43.2	Siskiyou	375			
44	Amador, Alpine, Inyo Mariposa, Mono	161	80	N/A	1,022
44.1	Tuolumne	391			
44.2	Calaveras	390			

N/A = No Sample; ABS sampling was only used in Sonoma County

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

3.2.1. Landline Sample

The final CHIS 2013-2014 statewide landline goal was 31,780 adult interviews as shown in Table 3-3. This goal includes the landline portion of the geographic supplemental sample for San Diego County, the Korean and Vietnamese supplemental surname samples, and the landline supplemental samples in Siskiyou, Tuolumne, and Calaveras Counties. It excludes the Japanese supplemental sample, which was introduced late in the CHIS data collection process.

Because of the need to produce reliable estimates at the county level, the sample allocation was not proportional to the population in the counties. With a proportional allocation, the estimates from the smaller counties would be based on small samples and would not be adequate for the envisioned analyses. To achieve the goal of producing local or county estimates, the target sample sizes from medium and smaller counties was fixed either at 400 or 320 interviews. The remaining core sample was allocated proportionately by population size.

The initial stratification of the landline frame for the California's 58 counties for CHIS 2013-2014 was the same used since 2005. The original (2001) design consisted of 44 strata, with 41 single-county strata and 3 strata with multiple small counties in northern California. The multiple-county strata were created by grouping the small counties into three geographic areas. The stratum assignment was based on county population and proximity. Siskiyou, Tuolumne, and Calaveras Counties were originally part of multiple-county sampling strata; in CHIS 2005 these three became their own strata increasing the total number of strata was to 47. Table A-1 in the Appendix shows the assignment of counties to geographic strata across for CHIS 2013-2014 and previous cycles since 2005.

Table 3-3. Final targets for completed adult interviews from the landline sample by county (excluding the Japanese supplemental sample)

Stratum	Revised	Geographic	Final
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		landline goal	supplemental sample	landline goal
	State total	29,402	2,378	31,780
1	Los Angeles	5,674	N/A	5,674
2	San Diego	2,182	1,178	3,360
3	Orange	1,739	N/A	1,739
4	Santa Clara	1,063	N/A	1,063
5	San Bernardino	1,074	N/A	1,074
6	Riverside	1,210	N/A	1,210
7	Alameda	954	N/A	954
8	Sacramento	902	N/A	902
9	Contra Costa	660	N/A	660
10	Fresno	510	N/A	510
11	San Francisco	605	N/A	605
12	Ventura	468	N/A	468
13	San Mateo	452	N/A	452
14	Kern	450	N/A	450
15	San Joaquin	400	N/A	400
16	Sonoma	400	N/A	400
17	Stanislaus	400	N/A	400
18	Santa Barbara	400	N/A	400
19	Solano	400	N/A	400
20	Tulare	400	N/A	400
21	Santa Cruz	400	N/A	400
22	Marin	400	N/A	400
23	San Luis Obispo	400	N/A	400
24	Placer	400	N/A	400
25	Merced	400	N/A	400
26	Butte	400	N/A	400
27	Shasta	400	N/A	400
28	Yolo	400	N/A	400
29	El Dorado	400	N/A	400
30	Imperial	400	N/A	400
31	Napa	400	N/A	400
32	Kings	400	N/A	400
33	Madera	400	N/A	400
34	Monterey	400	N/A	400
35	Humboldt	400	N/A	400
36	Nevada	400	N/A	400
37	Mendocino	400	N/A	400
38	Sutter	400	N/A	400
39	Yuba	400	N/A	400
40	Lake	400	N/A	400
41	San Benito	400	N/A	400
42	Colusa, Glenn, Tehama	320	N/A	320
43	Del Norte, Lassen, Modoc, Plumas, Sierra, Trinity	222	N/A	222
43.2	Siskiyou	99	276	375
44	Amador, Alpine, Calaveras, Inyo, Mariposa, Mono, Tuolumne	161	N/A	161
44.1	Tuolumne	35	356	391

N/A = Not applicable; Geographic supplemental sampling of landline numbers was done only in 4 counties

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

The landline sampling frame was created by stratifying 100-banks with one or more listed telephone numbers into non-overlapping strata, each corresponding to a county or a group of counties as shown in Table 3-3. The procedure for assigning the numbers to strata was the same as that used in previous CHIS cycles. The geographic information required for stratification was available only at the exchange level,⁴ so 100-banks could not be assigned directly to a single stratum. All banks within an exchange were stratified indirectly by mapping the exchanges to a county represented by the stratum. However, some telephone exchanges actually serve households in more than one county.

To solve the stratification problem, the procedure used coverage reports for each county produced by MSG, the sampling vendor. The coverage reports listed all the exchanges in the county. For each exchange, the report showed the total number of listed households in the exchange and the proportion of listed households within the county. After combining information from the coverage reports for all 58 counties, we created a frame of exchanges with variables for the number of listed households in each county that the exchange covers. Each exchange was then assigned to the county with the most listed households.

The telephone exchanges in Los Angeles County were further split into eight substrata, each representing a Service Planning Area (SPA) using ZIP Code information. Telephone exchanges that crossed SPAs were assigned to the SPA with the most listed households. After the creation of the initial frame in 2013 at the beginning of the CHIS cycle, the landline frame was updated in 2014. The stratification process was repeated on the updated frame in order to reflect the changes of landline use in California.

The sample for Los Angeles County was allocated proportionally by these substrata SPAs, except for the sample for Antelope Valley which was oversampled so it would yield two times the number of adult interviews expected from proportional allocation. Without this oversample, the number of interviews would be too small for analysis at the SPA level. The oversampling of Antelope Valley has been implemented since CHIS 2003.

⁴ A telephone exchange consists of 10,000 consecutive telephone numbers with the same first six digits including area code (e.g., 310-794-0000 through 310-794-9999). An exchange is a set of area codes and prefixes serving the same geographic area.

As mentioned in Chapter 2, disproportionate stratified sampling was used to oversample Koreans and Vietnamese without increasing the sample size allocated to any stratum (the stratum sample size was fixed). An analysis done in CHIS 2003 to help with the allocation found that six percent or more Korean or Vietnamese in the exchanges was optimal for the creation of the substrata. In addition, the analysis showed that oversampling the substrata with high concentration at twice the rate of the low concentration strata did not inordinately inflate the design effect nor decrease the effective sample sizes for other race-ethnic groups of interest. See *CHIS 2003 Methodology Series: Report 1 - Sample Design* for additional details of the analysis for the creation of high- and low-density substrata.

Since the creation of the high/low density designation used information from Census 2000, the assignment of telephone exchanges has been revised in past cycles of CHIS using tabulations of the number of Korean or Vietnamese interviews by telephone exchange. Using this information, some exchanges have been reallocated to the high/low density strata depending on the number of interviews completed with adults of Korean or Vietnamese descent. High/low density subsampling strata were created in San Diego County, Orange County, and Santa Clara County. Thirteen substrata were created in Los Angeles County by classifying the SPAs into high/low density substrata.

Table 3-4 shows the definition of the substrata for Los Angeles County, San Diego County, Orange County, and Santa Clara County. The table also shows the number of telephone exchanges and the estimated number of households in the substrata. Table A-2 in the Appendix shows the total landline sample size drawn by sampling stratum in CHIS 2013-2014.

Table 3-4. Definition of sampling substratum, number of exchanges, and total number of households for Los Angeles County, San Diego County, Orange County, and Santa Clara County

Stratum	Substratum	SPA/Service region	Density	Number of telephone exchanges	Number of households
1. Los Angeles	1.12	San Fernando SPA	High	37	32,259
	1.13	San Gabriel SPA	High	79	66,211
	1.14	Metro SPA	High	125	46,587
	1.17	South SPA	High	29	19,794
	1.18	South Bay SPA	High	50	35,236
	1.21	Antelope Valley SPA	Low	55	48,534
	1.22	San Fernando SPA	Low	448	309,724
	1.23	San Gabriel SPA	Low	254	174,370
	1.24	Metro SPA	Low	176	96,450
	1.25	West SPA	Low	268	122,977
	1.26	South SPA	Low	171	121,576
	1.27	East SPA	Low	187	141,341
	1.28	South Bay SPA	Low	271	187,473
2. San Diego	2.12	North Central SR	High	64	33,136
	2.13	Central SR	High	39	37,576
	2.21	North Coastal SR	Low	88	76,237
	2.22	North Central SR	Low	104	54,203
	2.23	Central SR	Low	73	32,321
	2.24	South SR	Low	100	70,891
	2.25	East SR	Low	66	74,704
	2.26	North Inland SR	Low	127	85,251
3. Orange	3.1	N/A	High	275	149,092
	3.2	N/A	Low	427	295,383
4. Santa Clara	4.1	N/A	High	168	76,494
	4.2	N/A	Low	323	209,281
Total				4,004	2,597,101

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

3.2.2. Cell Phone Sample

The CHIS 2013-2014 cell phone sample had a final state-wide target of 7,720 adult interviews. Similar to CHIS 2011-2012, the CHIS 2013-2014 cell sample targets were set by stratum defined by county or groups of counties similar to those in the landline sample. The final targets and supplemental cell phone samples for the CHIS 2013-2014 are shown in Table 3-5.

Table 3-5. Final targets for completed adult interviews from the cell phone sample by sampling stratum

	Stratum	Initial target	Geographic supplemental sample	Final target
	State total	7,425	295	7,720
1	Los Angeles	1,419	N/A	1,419
2	San Diego	545	295	840
3	Orange	435	N/A	435
4	Santa Clara	266	N/A	266
5	San Bernardino	268	N/A	268
6	Riverside	302	N/A	302
7	Alameda	239	N/A	239
8	Sacramento	225	N/A	225
9	Contra Costa	165	N/A	165
10	Fresno	128	N/A	128
11	San Francisco	151	N/A	151
12	Ventura	117	N/A	117
13	San Mateo	113	N/A	113
14	Kern	112	N/A	112
15	San Joaquin	100	N/A	100
16	Sonoma	100	N/A	100
17	Stanislaus	100	N/A	100
18	Santa Barbara	100	N/A	100
19	Solano	100	N/A	100
20	Tulare	100	N/A	100
21	Santa Cruz	100	N/A	100
22	Marin	100	N/A	100
23	San Luis Obispo	100	N/A	100
24	Placer	100	N/A	100
25	Merced	100	N/A	100
26	Butte	100	N/A	100
27	Shasta	100	N/A	100
28	Yolo	100	N/A	100
29	El Dorado	100	N/A	100
30	Imperial	100	N/A	100
31	Napa	100	N/A	100
32	Kings	100	N/A	100
33	Madera	100	N/A	100
34	Monterey	100	N/A	100
35	Humboldt	100	N/A	100
36	Nevada	100	N/A	100
37	Mendocino	100	N/A	100
38	Sutter	100	N/A	100
39	Yuba	100	N/A	100
40	Lake	100	N/A	100
41	San Benito	100	N/A	100
42	Colusa, Glenn, Tehama	80	N/A	80
43	Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	80	N/A	80
44	Amador, Alpine, Calaveras, Inyo, Mariposa, Mono, Tuolumne	80	N/A	80

The cell phone sample design was different from the landline design and presented its own challenges. Unlike the landline sample where the numbers were drawn from banks with 100 numbers, the cell phone numbers were drawn from groups of 1,000 numbers (i.e., 1,000-series blocks) in California dedicated to wireless service.⁵ A 1000-bank is a series of numbers with the same first 4 digits (e.g., 310-784-0000 through 310-784-0999). Furthermore, the geographic area covered by the exchange does not necessarily indicate where the owner of the number resides. This is because the cell phone exchange generally corresponds to where the cell phone was purchased or activated. Thus, the cell sample is more difficult to stratify, so matching the stratification of the landline sample can be problematic.

The cell frame as defined for CHIS does not include California residents with cell phones in area codes outside of California. Thus, households that are only reachable by out-of-state cell phone numbers (e.g., people who have moved into California and kept their cell phone number). As an indication of the possible magnitude of this undercoverage, just over 2 percent of sampled cell phone numbers had a final disposition of residing outside of California. (See Table 6-1 in *CHIS 2013-2014 Methodology Series: Report 2— Data Collection*.) This result could have been determined at any point in the interview process, from initial contact through the end of the adult interview. The actual proportion of out-of-state residents may be a bit higher, since almost 20 percent of sampled numbers had no contact and some refusals or other nonresponse may have been from out-of-state residents.

Despite challenges with geographic assignment of cell phones, in CHIS 2013-2014 we used the sample-assigned FIPS county code to stratify the cell sample. This county code was assigned by the sampling vendor based on the location of the rate center of the cell phone. Rate centers are determined by cell phone companies and are related to the point of purchase of the cell phone (see Dutwin and Malarek, 2014, for more on rate centers in cell phone sampling) Using this information, 43 geographic sampling strata based on county were created in the cell phone sampling frame. This number is a major improvement over past CHIS sample designs in which larger geographic areas had to be used. In CHIS 2011-2012 design we defined 28 cell strata based on combinations of area code and counties, and CHIS 2007 and 2009 where the cell strata were based on seven California regions. Despite this improvement, the cell phone sampling strata do not exactly match the landline sampling strata in geographic coverage, since some of the landline strata included no rate centers. See Table 3-3 in *CHIS 2013-2014 Methodology*

⁵ There are some additional, technical restrictions in the sampling, such as making sure the number can be dialed into and that toll-free numbers are excluded.

Series: Report 3—Data Processing Procedures for a summary of self-reported residence versus sampled stratum for the cell sample.

When determining the total sample size to draw, we used the observed response rates within the sampling strata for the first release groups in 2013-2014 and the response rates in the cell sample in CHIS 2011-2012. In a similar way, the misclassification rate between the sampled stratum and the self-reported county observed in the first release groups and those observed in CHIS 2011-2012 was also incorporated when allocating the sample. Table A-2 in the Appendix shows the cell phone sample size drawn by sampling stratum.

Telephone numbers that were ported from a landline to a cell phone could not be selected from the cell phone sample exchanges because they were in exchanges assigned to landlines. To address this problem, telephone numbers identified as ported to cell phones in the base landline sample were included as part of the cell phone sample. The ported numbers were identified by disposition code in the CSS (see codes WR and CP in Table 2-1). There were close to 10,000 ported cell phone numbers identified in the landline sample. This represented a substantial increase from 2009 and 2011 where there were close to 3,000 ported numbers identified. The number of ported telephone number by landline sampling stratum is shown in Appendix A, Table A-2.

3.2.3. Supplemental Geographic Samples

In CHIS 2013-2014 four supplemental geographic samples were fielded. The first sample was added at the request of San Diego County as in previous cycles of CHIS. The final target was 700 completed adult interviews in each of the six Health and Human Services Agency Service regions in San Diego County⁶. The San Diego geographic sample had both landline and cell phone targets as shown in Table 3-2 and Table 3-3. Since the landline and cell phone components of the geographic sample covered an entire county, it was selected as part of the core landline and cell phone sample.

Three separate additional geographic supplemental samples were fielded in 2014 for Siskiyou, Tuolumne, and Calaveras Counties. These samples included only landlines. Since these three counties were part of strata formed by combining counties, the original sampling strata were split, creating three additional strata corresponding to the counties with supplemental samples. Previously drawn samples

⁶ Map of the six Health and Human Services Agency Service Regions in San Diego County available at http://www.sandiegocounty.gov/content/sdc/hhsa/programs/phs/community_health_statistics/maps.html

were re-stratified by these split strata. The initial sample size in the split strata took into account the misclassification between the sampling strata and the respondent's reported county in those areas. The final landline target for these counties was 400 completed adult interviews each as shown in Table 3-2. Unlike some supplemental geographic samples in previous cycles, screening was not used to determine if the case was in the county of interest. As a result, there was no difference between the main and the supplemental geographic sample instruments.

3.2.4. Supplemental Surname List Samples

Supplemental surname samples were used to increase the number of completed interviews of adults of Korean, Vietnamese, and Japanese descent. The statewide goal for the Korean and Vietnamese supplemental list samples was 500 completed adult interviews from each ethnic group from the combined landline, cell phone, and surname samples. As in previous cycles of CHIS, the Korean and Vietnamese supplemental samples were drawn from lists, maintained by the sampling vendor, of telephone numbers associated with likely Korean and Vietnamese surnames. We screened the telephone numbers in these samples to determine whether the household included eligible adults (i.e., adults of Korean or Vietnamese descent). If there were no eligible adults, the interview was terminated and the case was coded as ineligible. Table 3-6 shows the sampling goals for completed adult interviews with Koreans and Vietnamese in CHIS 2013-2014.

Table 3-6. Targeted number of completed adult interviews for the Korean and Vietnamese samples

Subgroup	Targeted number of adult interviews		
	Landline & Cell phone sample	Supplemental list sample	Total
Korean	325	175	500
Vietnamese	410	90	500
Total	735	265	1,000

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

The Korean and Vietnamese surname list frames were created by the sampling vendor from telephone directories in California. The vendor provided three non-overlapping surname frames; the first two frames included telephone numbers whose associated surnames were very likely to be Korean *only* or Vietnamese *only*, and not any other ethnic group. The last frame included those surnames likely to be either Korean or some other ethnic group, but not Vietnamese.

Separate samples were drawn from each of the three frames. A household was eligible for the extended interview if it included an adult who was either Korean or Vietnamese, regardless of which

frame the number was drawn from. Table 3-7 shows the size of the surname list frames used in CHIS 2013-2014 and the number of telephone numbers drawn from each frame.

Table 3-7. Korean and Vietnamese surname frame sizes

Surname frame	Number of records	Number of telephone numbers drawn
Korean only	31,316	1,750
Vietnamese only	71,111	1,600
Korean and some other race, but not Vietnamese	84,355	2,250

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

For the first time since 2001 CHIS 2013-2014 included a Japanese list supplemental sample to increase the representation of this group. The target was an additional 140 Japanese adult interviews. The Japanese sample was drawn from three frames: 1) Japanese surname and non-Japanese first name, 2) Japanese first name and non-Japanese surname, and 3) Japanese surname and first name. The Japanese sampling frames were created differently from the Korean and Vietnamese frames. First, a list with the most common Japanese first names was provided to the sampling vendor. Then the sampling vendor used this list, their proprietary list of Japanese surnames, and their directories of telephone numbers with names to create three separate list frames. Duplicate telephone numbers between the Japanese frames and the Korean and Vietnamese frames were removed from the Japanese frames. This deduplication was required to ensure that there was no overlap among the list frames. In this way, any of the telephone numbers from the supplemental list samples could be sampled from only one list frames. As with the Korean and Vietnamese supplemental samples, this supplemental list sample approach increased the number of Japanese cases, but the variance of estimates for these groups is not greatly reduced because the list includes only a small proportion of the target population. Table 3-8 shows the size of the list frames used and the number of telephone numbers drawn from each frame for the Japanese supplemental list sample. Table A-2 in the Appendix shows the distribution of the list samples by sampling stratum.

Table 3-8. Frame size and targeted number of completed adult interviews for the Japanese supplemental list sample

	Number of records	Number of telephone numbers drawn	Target
Japanese surname and non-Japanese first name	40,006	1,667	59
Japanese first name and non-	33,324	950	34

Japanese surname			
Japanese surname and first name	12,396	1,317	47
	Total	3,934	140

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

3.2.5. Sonoma ABS Sample

UCLA received funding to supplement the CHIS 2013-2014 sample in Sonoma County. Westat and UCLA determined that the most efficient approach to this increased the number of interviews in Sonoma County was an address-based sample (ABS), rather than a combination of a landline and a cell phone samples. The main reason was the large misclassification of the telephone sample drawn from the stratum used for Sonoma County where most of the cell phone respondents sampled in this stratum reported living in other counties. As a result, increasing the cell phone sample size and screening for Sonoma County residents was not a cost efficient way to increase the number of completed interviews.

The sampling frame for this Sonoma supplemental sample is different from the frames used in the telephone samples. The Sonoma ABS frame was composed of addresses within the boundaries of Sonoma County. The sampling frame was provided by the sampling vendor, MSG, who maintains a frame of postal addresses based on the US Postal Service's Computerized Delivery Sequence File (CDSF) which covers nearly 100% of all households in the US, and is based on mailing addresses used by the USPS. The CDS file contains a variety of address types such as city-style addresses, rural route addresses, P.O. Boxes, seasonal units, vacant units, and drop points. MSG has enhanced the CDS file by geocoding all addresses with Census Block and latitude/longitude coordinates for stratification and sampling based on geographic areas. A total of 5,394 addresses was drawn from the ABS sampling frame of the available 191,602 addresses in Sonoma County. Of these, 2,603 addresses (48 percent) were matched to telephone numbers using reverse telephone matching services also provided by MSG. Matched addresses were called as the first contact attempt. The remaining 2,791 addresses were sent a screening questionnaire to collect the respondent's telephone number. A total of 346 telephone numbers was obtained from the returned questionnaires, of which 199 were cell numbers. A total of 2,948 telephone numbers (2,603 matched telephone numbers and 346 mail returns) were called for the Sonoma supplemental ABS sample. Similar to the list samples, the screener interview confirmed that the reached household had the same sampled address. See *CHIS 2013-2014 Methodology Series: Report 2 - Data Collection Methods* for additional details.

3.3. Sample Selection and Sample Releases

The number of telephone numbers selected in any telephone survey has to be greater than the targeted number of completed interviews to account for a variety of factors. For example, a substantial percentage of the sampled telephone numbers are not residential. For CHIS 2013-2014 the sample of telephone numbers was inflated to deal with losses due to the following sources:

- Nonworking, nonresidential, and never answered numbers;
- Nonresponse to the screening interview;
- Nonresponse to the extended interview; and
- Cell numbers belonging to persons under 18 or not residing in California;
- Ineligible households in the supplemental list samples.

The first three sources noted above are typical of all telephone surveys, and the fourth of most surveys including cell phones and limited to a particular geographic area. To deal with these losses we used information from earlier CHIS cycles to estimate the percentage of telephone numbers that would not be residential, the percentage that would not respond to the screener and extended interviews, and the percentage of cell numbers that would be ineligible, and increased the sample sizes accordingly. Estimates of the eligibility rates for the Korean and Vietnamese surname samples were taken from the corresponding CHIS 2011-2012 samples. Estimates of the eligibility rates for the Japanese and Sonoma County ABS supplemental samples were estimated using the first released sample. The size of following sample releases were adjusted based on the observed eligibility in the first release and the observed rates thought data collection.

Taking all of these factors into consideration, 1,159,055 telephone numbers were sampled in CHIS 2013-2014 (main landline and cell phone samples, geographic supplemental samples, and supplemental list samples). Not all the telephone numbers were selected at the same time, as the sample design was modified several times during the field period to reflect the observed yield and changes in the targeted number of completed interviews. After each selection, duplicate telephone numbers (those numbers that had been previously sampled) were removed from the samples. Table 3-9 summarizes the size of each telephone sample. Note that not all of these numbers were called; besides the CSS-purged numbers and duplicates, some strata reached their targets before all of the sample had been called. The data collection procedures are discussed in *CHIS 2013-2014 Methodology Series: Report 2 - Data Collection Methods*.

Table 3-9. Number of telephone numbers drawn by sample type

Sample type	Number of telephone numbers drawn
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Landline sample*	1,047,591
Cell phone sample**	101,930
List samples	9,534
Korean only surname	1,750
Korean and other surname	2,250
Vietnamese only surname	1,600
Japanese surname and non-Japanese first name	1,667
Japanese first name and non-Japanese surname	950
Japanese surname and first name	1,317
Total	1,159,055

*Count includes the landline portion of the geographic supplemental sample for San Diego County, Siskiyou County, Tuolumne County, and Calaveras County and ported cell phone numbers.

**Count includes the cell phone portion of geographic supplemental sample for San Diego County and excludes ported cell phone numbers.

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

Release groups of telephone numbers were drawn and called throughout 2013 and 2014. Each release consisted of several replicates or random groups of telephone numbers drawn separately by sampling stratum and sample type (i.e., landline sample, cell phone) as indicated in Table 3-10. The size of the major releases was computed as the total telephone numbers needed to complete predetermined six-month interim targets. The smaller releases consisted of random groups of numbers in those strata with an expected shortage in the number of completed interviews. All telephone numbers in a random group were called before a new random group was released. There was one release for the Korean/Vietnamese surname supplemental samples, in 2013. There were two releases for the Japanese supplemental list sample in 2014 as it was funded toward the end of data collection.

Table 3-10. Release groups of telephone numbers by sample type

Sample type	Release	Date	Sample size
Landline*	1	1/23/2013	213,024
	2	5/6/2013	194,729
	3	9/23/2013	55,930
	4	11/12/2013	229,260
	5	1/3/2014	17,810
	6	3/20/2014	221,121
	7	7/29/2014	18,771
	8	9/25/2014	96,946
	Total		1,047,591
Cell sample	1	1/21/2013	54,060
	2	11/20/2013	36,325
	3	8/21/2014	11,545
	Total		101,930

List samples			
Korean/Vietnamese	1	5/30/2013	5,600
Japanese first release	2	9/9/2014	2,505
Japanese second release	3	10/31/2014	1,429
	Total		9,534
All telephone samples			1,159,055
ABS sample			
Total addresses drawn		1/31/2014	5,394
Total telephone numbers dialed		3/30/2014	2,948

* Landline releases include ported cell numbers

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

The sample selection and processing was different for the ABS supplemental sample in Sonoma County. The sample of addresses was selected and reverse matched in February 2014. For cases without a matched telephone number, a questionnaire was mailed beginning on April 30, 2014. Telephone calls for the ABS sample cases began May 24, 2014 and concluded on September 21, 2014.

4. WITHIN-HOUSEHOLD SAMPLING

Once the sample of telephone numbers was selected, interviewers called the numbers and conducted interviews with sampled persons within the household. This chapter describes the procedures for selecting the sample of persons within households for CHIS 2013-2014. Samples of adults, children, and adolescents within the households were selected using different sampling procedures, but one adult and up to one child and one adolescent were sampled within a given household. The within-household sampling procedures were developed to maximize the analytic utility of the data collected from the respondents.

The next section describes the within-household sampling alternatives we evaluated and the reasons for choosing the specific method of sampling. The second section describes the operational “child-first” procedure used to increase the number of child interviews. The last sections describe the methodology used for sampling adults, children, and adolescents in CHIS 2013-2014.

4.1. Sampling Alternatives

The general idea for the sample design over the CHIS cycles has been to sample one adult randomly from all the adults in a household associated with a sampled telephone number. In addition, in those households with adolescents (ages 12-17) and/or children (under age 12), one adolescent and one child were to be sampled and interviewed (a parent of the child was interviewed about the child). One approach to accomplishing these goals is simply to list all the persons in the age group (adult, child, and adolescent) in the household and select one person randomly from each group. We call this the *completely random* sampling method.

The completely random sampling method is not a problem in most households because most households have only one family. However, in households with two or more families, the completely random method could result in selecting persons who were not members of the same family. This situation is undesirable because the adult interview collects data about the family of the sampled adult. The data from the adult interview are of great value for the analysis of the data from the child and adolescent interviews. If the sampled child and/or sampled adolescent were not members of the same family as the sampled adult, then the data collected about them would be of very limited utility.

To solve this analytic problem, a second sampling alternative was adopted and has been used since CHIS 2001. We call this method the *linked* sampling approach. In this approach, children and/or

adolescents for whom the sampled adult was a genetic or adoptive parent or otherwise a legal guardian were considered as linked to or “associated” with that adult.

In the linked sampling method, persons are sampled in two phases. In the first phase, an adult is randomly sampled from all eligible adults in the household, whether or not those adults are related, and assuming there are fewer than nine unrelated adults living at the household reached. In the second phase, a child is sampled from all eligible children associated with the sampled adult. Since the sampling of children is a two-phase procedure, the probability of selection of the child is the product of the probability of selecting the adult (phase one) and the probability of selecting the child from all children associated with that adult (phase two). Adolescents are sampled in the same way, that is, one adolescent is selected from all adolescents associated with the adult sampled in the first phase.

To use the linked sampling method, information is needed to link children and adolescents in a household to the sampled adult and his/her spouse/partner (children or adolescents linked to both the sampled adult and spouse/partner could be selected if either adult was sampled). This information was collected during the screening interview or the adult interview in CHIS 2013-2014. In a very few households it would not be possible to link or associate a child or adolescent to an adult because of unusual household structures. A child or adolescent not associated with an adult did not have a chance of being selected with this constraint. Beginning in 2003, the UCLA Institutional Review Board (IRB) directed that only children and adolescents of the sampled adult could be interviewed. Therefore, to have a chance of selection from 2003 forward, children and adolescents needed to be relationally linked, rather than “randomly linked,” to the sampled adult. The bias due to excluding unassociated children and adolescents was expected to be very small; however, it is not possible to evaluate it in this survey.

4.2. Child-first Procedure

In the first two cycles of CHIS, children and adolescents were enumerated and sampled during the adult extended interview. The child and/or adolescent interviews were then conducted following the adult interview. If the adult did not complete the extended interview, the child and adolescent could not be interviewed. Beginning in 2005, the child and adolescent interviews could be conducted prior to the adult interview under certain conditions, using a “child-first” procedure. This procedure was an operational method (not a sampling method) used to increase the sample yield for child interviews.

The child-first procedure was used only when the screener respondent was the spouse or partner of the sampled adult and there were children in the household associated with the sampled adult. If these conditions were met, a child and/or adolescent could be sampled and the appropriate interview conducted

without waiting for the completion of the adult interview. When the child-first criteria were not met, the sampling for children or adolescents was not done until the adult was interviewed. Further, children and adolescents were selected in the cell sample for the first time in 2009; however, the child-first procedure has not been used for the cell sample, because almost all adults selected in the cell sample are also the screener respondent. We expect that the gains from the child first procedure will diminish as the allocation to the cell phone sample increases in future cycles of CHIS.

Table 4-1 shows the distribution of completed screener interviews for landline and surname list sample households with children associated with the sampled adult, and the number of those households where the child-first procedure was used (i.e., a child was sampled in the screener instead of during the adult interview) in CHIS 2013-2014. This table was produced using the variables created during the CATI interview; numbers may not match the final counts of households with children and adolescents shown in other places in this report and other documentation. In CHIS 2013-2014, there were 4,189 landline sample households reporting children associated with the sampled adult in the screener and where the screener was completed by someone other than the sampled adult. A child was sampled in the screener in 73.5 percent of these households; in the other households the screener respondent was not the spouse or partner of the sampled adult. A child interview was completed in 63.0 percent (1,938 interviews) of child-first households. In comparison, a child interview was completed in only 17.1 percent (190 cases) of these households where child sampling was not done in the screener. The cases not completing the child interview may not have completed the adult interview or not completed the child interview after the adult was completed.

Although the child-first procedure was intended to increase the number of child interviews, it also had an effect on the number of adolescent interviews. The child-first procedure was used in 74.1 percent (1,638 cases) of the households reporting children associated with the sampled adult where adolescents were also present in the household. In 29.2 percent of these households, the adolescent interview was completed. In contrast, in only 8.9 percent of these households where the child-first procedure was not used the adolescent interview was completed. See *CHIS 2013-2014 Methodology Series: Report 2 - Data Collection Methods* for more detail on the child-first procedures and further evaluation of the yields.

Table 4-1. Effect of the child-first procedure on completed child and adolescent interviews in the landline sample*

Households reporting children associated with the sampled adult in the screener	Count	Percentage
Total	4,189	100.0
Had a child sampled in the screener	3,077	73.5
<i>Completed the child extended interview</i>	1,938	63.0
<i>Did not complete the child extended interview</i>	1,139	37.0

Did not have a child sampled in the screener	1,112	26.5
<i>Completed the child extended interview</i>	190	17.1
<i>Did not complete the child extended interview</i>	922	82.9
<hr/>		
Households reporting children associated with the sampled adult and adolescents in the screener	Count	Percentage
<hr/>		
Total	1,638	100.0
Participated in the child-first procedure	1,213	74.1
<i>Completed the adolescent extended interview</i>	354	29.2
<i>Did not complete the adolescent extended interview</i>	859	70.8
Did not participate in the child-first procedure	425	25.9
<i>Completed the adolescent extended interview</i>	38	8.9
<i>Did not complete the adolescent extended interview</i>	387	91.1
<hr/>		

* Household counts include landline and surname sample cases completing the screener interview

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

4.3. Adult Sampling

For CHIS, an adult is defined as any person 18 years or older residing in the household. The procedure to select adults in CHIS 2013-2014 for the landline sample and the area sample was the same used since 2003, called the Rizzo method (see Rizzo, Brick, & Park, 2004, for a complete discussion of the method and its implementation). The principal advantage of this method is that the enumeration of adult household members is bypassed in most households, so it is less intrusive while still resulting in a valid probability sample. In this method, all adults in a household have an equal probability of selection. A sampled adult is selected using the following steps:

- Ask the screener respondent (who must be an adult living in the household) how many adults are in the household (i.e., N). The respondent answers $N = 1, 2, 3, \dots$;
- If there is only one adult in the household (i.e., $N = 1$), then that adult is selected;
- If there are two adults in the household (i.e., $N = 2$), then the CATI system accesses a pre-generated uniform random number between 0 and 1.
 - If the random number is less than or equal to 0.5 then the screener respondent is selected;
 - If the random number is greater than 0.5 then the other adult is selected;
- If there are more than two adults in the household (i.e., $N > 2$), then the CATI system accesses a pre-generated uniform random number between 0 and 1.
 - If the random number is less than or equal to $1/N$ (i.e., the inverse of the number of adults in the household), then the screener respondent is selected;

- If the random number is greater than $1/N$, then the screener respondent is asked which of the other adults is the next to have a birthday; and
 - If the screener respondent knows which of the other adults is next to have a birthday, then the adult with the next birthday is selected; or
 - If the screener respondent does not know which of the other adults is next to have a birthday then the screener respondent is asked to list the adults in the household (excluding himself/herself) and the CATI system randomly chooses one of the adults from this roster.

If the number of adults in the household is unknown, then the screener respondent is asked to list the adults in the household (including the screener respondent) and the CATI system randomly chooses one of the adults from this roster. No other sampling steps are necessary.

Procedures for sampling adults within cell-only households were developed and implemented in the CHIS 2005 cell-phone pilot and were based on principles similar to those used in landline RDD surveys (Brick, Edwards, & Lee, 2007). The same procedure was used in CHIS 2013-2014. In this approach adults were sampled during the screening interview.

In households with only one adult, no sampling was required. In households sampled from the cell frame with more than one adult, sampling adults depended on whether other adult household members shared the cell phone. If adults shared the cell phone, the same within-household sampling method used in the landline sample was implemented. That is the screener respondent (SR) is randomly selected for the adult interview with a probability equal to the inverse of the number of adults in the household. In case the SR is not selected, then one adult other than the SR is selected for the adult interview using the next birthday method. If the cell phone was not shared, then the SR is sampled.

This sampling approach assumes that, in cell households with more than one adult, each adult has a cell phone (or shares a different cell phone) if the sampled cell phone is not shared. This weakness in the sampling scheme was recognized during the CHIS cell phone pilot in 2005. However, the alternative approach required asking the full battery of items to ascertain the cell phone status of each adult in the household, which was viewed as a heavy burden that could detract from gaining cooperation. In other words, while the sampling scheme did not address all possible forms of within-household undercoverage, it was believed this was a good compromise between reducing the potential for increased nonresponse and coverage errors.

4.4. Child Sampling

Starting with CHIS 2005, the child sampling procedure was modified from equal probability for all children associated with the sampled adult. The goal was to increase the number of interviews for younger children (0 to 5 years old) while reducing the number of interviews for older children (6 to 11 years old). Previously all children were sampled at the same rate. The revised sampling procedure was used in all CHIS 2013-2014 samples. The probability assigned to child i in the household h , p_{hi} , was assigned as

$$p_{hi} = \begin{cases} \frac{2NC_{1h}}{2NC_{1h} + NC_{2h}}, & \text{if age of child } i \text{ in household } h \text{ is between 0 and 5 years old (younger child);} \\ \frac{NC_{2h}}{2NC_{1h} + NC_{2h}}, & \text{if age of child } i \text{ in household } h \text{ is between 6 and 11 years old (older child);} \end{cases}$$

where NC_{1h} is the number of younger children and NC_{2h} is the number of older children in the household h . For example, in a household with one young child and one older child, the young child was twice as likely to be selected as the older child. The disadvantage of this approach is that the number of interviews about older children was reduced and there was a slight increase in the design effect for estimates for all children due to the disproportionate sampling.

Table 4-2 shows the number of households with a completed screener interview in which the enumeration and selection of children were completed (either at the end of the extended interview for child-first cases or in section G of the adult extended interview) in CHIS 2013-2014. Children were selected with unequal probability of selection in 26.9 percent of the households with children.

Table 4-2. Distribution of households with children by type of child sampling

Type of child sampling	Type of household	Number of households*	Percentage
Equal probability	Household with children only 0 to 5 years old	7,054	40.7
	Household with children only 6 to 11 years old	5,622	32.4
Unequal probability	Household with children 0 to 5 and 6 to 11 years old	4,664	26.9
Total		17,340	100.0

* Household count include all samples

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

4.5. Adolescent Sampling

The sampling method used in CHIS 2013-2014 to select an adolescent did not change from that used from CHIS 2003 through CHIS 2011-2012. That is, an adolescent was sampled with equal probability from among all eligible adolescents associated with the sampled adult in a household. In the landline and list samples, adolescents were enumerated and sampled at the end of the screener interview if the child-first procedure was used or in section G of the adult extended interview otherwise. Since adolescents could be sampled and interviewed before the adult interview, there were some households with a completed adolescent interview where adult and/or child interviews were not completed.

Adolescents were also sampled for the first time in the cell phone sample in CHIS 2009. Similar to the child selection, adolescents were selected in section G of the adult extended interview and no child-first procedures were used in the cell phone sample. *CHIS 2013-2014 Methodology Series: Report 5 - Weighting and Estimation* describes how the probabilities of selection are computed for the sampled adults, children, and adolescents in the landline, surname, and cell phone samples.

5. ACHIEVED SAMPLE SIZES

This chapter summarizes the number of completed interviews in CHIS 2013-2014 for the landline, cell phone, and supplemental samples (e.g., list samples and ABS sample) and the relationship between the targeted and the achieved numbers. As mentioned in the previous chapters, the targeted goals for CHIS 2013-2014 were stated as the total number of completed adult interviews. The actual number of completed interviews is a function of the number of telephone numbers sampled, within-household person sampling, and different reasons for nonresponse. These reasons were discussed in more detail in Chapter 3. Detailed information about the response rates is presented in *CHIS 2013-2014 Methodology Series: Report 4 – Response Rates*.

Table 5-1 shows the number of completed interviews by sample type compared to the final completed adult interview targets for CHIS 2013-2014. The table shows the percentage of target completed only for those samples with defined targets. Some of the targets overlap; for example, the landline sample includes the interviews from the Korean and Vietnamese list samples, Korean completed interviews include interviews from the landline and cell phone sample. The table shows that, in general, target goals for adult interviews were met in CHIS 2013-2014 except for the Korean interviews and the ABS sample. For all samples, the total target of 40,140 adult interviews was exceeded by 0.2 percentage points (100 adult interviews).

Table 5-2 shows completed interviews as percentages of the targeted number of adult interviews at the stratum level for RDD samples in CHIS excluding the Japanese list and Sonoma ABS samples. A percentage of 100 or greater indicates the targeted number of adult interviews was reached in the stratum. The combined landline and cell phone targets were met or surpassed in 23 of the 47 strata based on the self-reported location of the respondent. Ninety five percent of the target or more was met in 40 strata based on the respondent's reported location. In Yuba and Contra Costa Counties, where the percentage of the completed cell phone target is less than 90 percent, the percentage of cell phone target completed is less than 65 percent. The source of the shortage is the lower than expected completed interviews in the cell phone sample. This highlights the difficulty of targeting small area in the cell phone frame. In contrast, in Contra Costa and the combined stratum that includes Alpine, Amador, Inyo, Mariposa, Mono, and Placer Counties, where the percentage of cell phone target completed is less than 80 percent, there were not as many completed adult landline interviews as expected. In Monterey, Sonoma, and San Joaquin Counties, the percentage of total target completed is between 94 and 95 percent.

Table 5-1. Number of completed interviews by type of sample*

Sample type/interview type	Number of completed interviews	Target	Percent of target completed
Landline sample**	37,791	—	—
Adults	31,845	31,780	100.2
Child	4,196	—	—
Adolescent	1,750	—	—
Cell phone sample	9,490	—	—
Adults	7,752	7,720	100.4
Child	1,256	—	—
Adolescent	482	—	—
Korean sample***	470	—	—
Adults	429	500	85.8
Child	29	—	—
Adolescent	12	—	—
Vietnamese sample***	624	—	—
Adults	530	500	106.0
Child	64	—	—
Adolescent	30	—	—
Japanese list sample	186	—	—
Adults	162	140	115.7
Child	18	—	—
Adolescent	6	—	—
ABS sample	538	—	—
Adults****	481	500	96.2
Child	42	—	—
Adolescent	15	—	—
All samples	48,005	—	—
Adults	40,240	40,140	100.2
Child	5,512	—	—
Adolescent	2,253	—	—

*Partially completed interviews (completed through at least Section J) are counted as nonrespondent for 2013 and as complete for 2014.

** Landline counts include adult interviews from the Korean and Vietnamese supplemental list samples.

*** Counts include Korean or Vietnamese interviews completed as part of the landline sample.

****Nineteen additional adult interviews were completed with the ABS sample, but the respondents reported living outside of Sonoma County.

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

Table 5-2. Number of completed adult interviews by RDD sample and by self-reported stratum*

	Stratum	Landline sample		Cell phone sample		All	
		Completed interviews	% of Target	Completed interviews	% of Target	Completed interviews	% of Target
	State	31,845	100.2	7,752	100.4	39,597	100.2
1	Los Angeles	5,700	100.5	1,448	102.0	7,148	100.8
2	San Diego	3,413	101.6	846	100.7	4,259	101.4
3	Orange	1,771	101.8	420	96.6	2,191	100.8
4	Santa Clara	1,077	101.3	281	105.6	1,358	102.2
5	San Bernardino	1,061	98.8	245	91.4	1,306	97.3
6	Riverside	1,213	100.2	235	77.8	1,448	95.8
7	Alameda	945	99.1	257	107.5	1,202	100.8
8	Sacramento	899	99.7	216	96.0	1,115	98.9
9	Contra Costa	612	92.7	111	67.3	723	87.6
10	Fresno	497	97.5	120	93.8	617	96.7
11	San Francisco	606	100.2	195	129.1	801	106.0
12	Ventura	487	104.1	115	98.3	602	102.9
13	San Mateo	449	99.3	93	82.3	542	95.9
14	Kern	443	98.4	99	88.4	542	96.4
15	San Joaquin	378	94.5	95	95.0	473	94.6
16	Sonoma	382	95.5	90	90.0	472	94.4
17	Stanislaus	411	102.8	87	87.0	498	99.6
18	Santa Barbara	398	99.5	92	92.0	490	98.0
19	Solano	418	104.5	96	96.0	514	102.8
20	Tulare	402	100.5	97	97.0	499	99.8
21	Santa Cruz	401	100.3	109	109.0	510	102.0
22	Marin	407	101.8	103	103.0	510	102.0
23	San Luis Obispo	389	97.3	89	89.0	478	95.6
24	Placer	345	86.3	91	91.0	436	87.2
25	Merced	383	95.8	111	111.0	494	98.8
26	Butte	386	96.5	91	91.0	477	95.4
27	Shasta	398	99.5	108	108.0	506	101.2
28	Yolo	395	98.8	118	118.0	513	102.6
29	El Dorado	432	108.0	102	102.0	534	106.8
30	Imperial	387	96.8	135	135.0	522	104.4
31	Napa	405	101.3	125	125.0	530	106.0
32	Kings	401	100.3	113	113.0	514	102.8
33	Madera	410	102.5	120	120.0	530	106.0
34	Monterey	382	95.5	89	89.0	471	94.2
35	Humboldt	394	98.5	97	97.0	491	98.2
36	Nevada	423	105.8	88	88.0	511	102.2
37	Mendocino	418	104.5	134	134.0	552	110.4
38	Sutter	399	99.8	249	249.0	648	129.6
39	Yuba	398	99.5	13	13.0	411	82.2
40	Lake	394	98.5	94	94.0	488	97.6
41	San Benito	403	100.8	126	126.0	529	105.8
42	Colusa, Glenn, Tehama	318	99.4	71	88.8	389	97.3

Table 5-3. Number of completed adult interviews by RDD sample and by self-reported stratum*
(continued)

43	Del Norte, Lassen, Modoc, Plumas, Sierra, Trinity	206	92.8	68	85.0	267	96.4
43.2	Siskiyou	435	116.0			442	110.5
44	Alpine, Amador, Inyo, Mariposa, Mono	124	77.0	70	87.5	190	85.6
44.2	Tuolumne	390	99.7			393	98.3
44.3	Calaveras	460	117.9			461	115.3

*Partially completed interviews (completed through at least Section J) are counted as nonrespondent for 2013 and as complete for 2014.

Targets exclude the Japanese sample because they do not have defined targets at the stratum level and Sonoma ABS samples

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

Table 5-3 and Table 5-4 show the number of completed child and adolescent interviews for the landline, cell phone, geographic, and surname samples. Because there were not predetermined targets by stratum for children and adolescents, columns for the percentages of the targeted number of interviews is not included in the table.

Table 5-5 shows the number of completed adult interviews by ethnicity and sample type. The target was exceeded for the number of completed Vietnamese and Japanese adult interviews but was not met for the Korean interviews.

Table A-4, Table A-5, and Table A-6 in Appendix A show additional details of the number of completed interviews by self-reported stratum for the adult, child, and adolescent samples by stratum and sample type.

Table 5-4. Number of completed child interviews by RDD sample and by self-reported stratum

	Stratum	Landline sample*	Cell sample	Total
	State	4,214	1,256	5,470
1	Los Angeles	810	230	1,040
2	San Diego	489	155	644
3	Orange	227	70	297
4	Santa Clara	146	44	190
5	San Bernardino	189	38	227
6	Riverside	157	39	196
7	Alameda	149	29	178
8	Sacramento	101	30	131
9	Contra Costa	77	20	97
10	Fresno	82	24	106
11	San Francisco	68	32	100
12	Ventura	74	17	91
13	San Mateo	55	13	68
14	Kern	62	18	80
15	San Joaquin	58	12	70
16	Sonoma	39	12	51
17	Stanislaus	45	14	59
18	Santa Barbara	46	12	58
19	Solano	43	18	61
20	Tulare	78	16	94
21	Santa Cruz	45	14	59
22	Marin	44	19	63
23	San Luis Obispo	35	15	50
24	Placer	39	16	55
25	Merced	63	25	88
26	Butte	47	16	63
27	Shasta	48	17	65
28	Yolo	69	20	89
29	El Dorado	41	7	48
30	Imperial	65	26	91
31	Napa	34	18	52
32	Kings	81	22	103
33	Madera	72	32	104
34	Monterey	54	21	75
35	Humboldt	42	13	55
36	Nevada	36	14	50
37	Mendocino	39	8	47
38	Sutter	46	40	86
39	Yuba	56	0	56
40	Lake	27	17	44
41	San Benito	56	23	79
42	Colusa, Glenn, Tehama	34	12	46
43	Del Norte, Lassen, Modoc, Plumas, Sierra, Trinity	27	7	34
43.2	Siskiyou	32	2	34
44	Alpine, Amador, Inyo, Mariposa, Mono	12	9	21
44.2	Tuolumne	37	0	37
44.3	Calaveras	38	0	38

* Landline counts include adult interviews from the Korean, Vietnamese, and Japanese supplemental list samples.

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

Table 5-5. Number of completed adolescent interviews by RDD sample and by self-reported stratum

	Stratum	Landline sample*	Cell sample	Total
	State	1,756	482	2,238
1	Los Angeles	366	80	446
2	San Diego	177	48	225
3	Orange	94	25	119
4	Santa Clara	62	17	79
5	San Bernardino	69	11	80
6	Riverside	75	21	96
7	Alameda	55	14	69
8	Sacramento	40	12	52
9	Contra Costa	32	4	36
10	Fresno	41	6	47
11	San Francisco	27	11	38
12	Ventura	17	6	23
13	San Mateo	19	5	24
14	Kern	24	12	36
15	San Joaquin	23	8	31
16	Sonoma	21	7	28
17	Stanislaus	16	3	19
18	Santa Barbara	13	12	25
19	Solano	22	8	30
20	Tulare	32	11	43
21	Santa Cruz	14	2	16
22	Marin	20	3	23
23	San Luis Obispo	11	4	15
24	Placer	20	9	29
25	Merced	35	14	49
26	Butte	24	5	29
27	Shasta	19	8	27
28	Yolo	29	2	31
29	El Dorado	16	6	22
30	Imperial	34	14	48
31	Napa	21	7	28
32	Kings	30	12	42
33	Madera	31	8	39
34	Monterey	22	9	31
35	Humboldt	22	5	27
36	Nevada	19	6	25
37	Mendocino	15	9	24
38	Sutter	18	15	33
39	Yuba	27	0	27
40	Lake	11	4	15
41	San Benito	24	7	31
42	Colusa, Glenn, Tehama	17	4	21
43	Del Norte, Lassen, Modoc, Plumas, Sierra, Trinity	7	3	10
43.2	Siskiyou	10	1	11
44	Alpine, Amador, Inyo, Mariposa, Mono	5	4	9
44.2	Tuolumne	12	0	12
44.3	Calaveras	18	0	18

* Landline counts include adult interviews from the Korean, Vietnamese, and Japanese supplemental list samples.

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

Table 5-6. Number of completed adult interviews by ethnicity and sample type*

Sample	Number of completed interviews		
	Korean only	Vietnamese only	Japanese only
Landline sample	241	329	277
Cell phone sample	84	81	49
Korean only list	82	2	2
Korean and other list	22	1	0
Vietnamese only list	0	117	0
Japanese surname and non-Japanese first name	0	0	69
Japanese first name and non-Japanese surname	0	0	19
Japanese surname and first name	0	0	71
Total	429	530	487
Target	500	500	140
Percentage of target	86	106	114**

*Partially completed interviews (completed through at least Section J) are counted as nonrespondent for 2013 and as complete for 2014.

** Percentage of target for the Japanese sample is computed using the Japanese interviews from the list samples

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

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Appendix A

Table A-1 . Main stratum definitions for CHIS 2001, 2003, 2005, 2007, 2009, 2011-2012, and 2013-2014

County	2013-2014 Stratum	2005 , 2007, 2009, and 2011-2012, Stratum	2001 and 2003 Stratum
Los Angeles	1	1	1
San Diego	2	2	2
Orange	3	3	3
Santa Clara	4	4	4
San Bernardino	5	5	5
Riverside	6	6	6
Alameda	7	7	7
Sacramento	8	8	8
Contra Costa	9	9	9
Fresno	10	10	10
San Francisco	11	11	11
Ventura	12	12	12
San Mateo	13	13	13
Kern	14	14	14
San Joaquin	15	15	15
Sonoma	16	16	16
Stanislaus	17	17	17
Santa Barbara	18	18	18
Solano	19	19	19
Tulare	20	20	20
Santa Cruz	21	21	21
Marin	22	22	22
San Luis Obispo	23	23	23
Placer	24	24	24
Merced	25	25	25
Butte	26	26	26
Shasta	27	27	27
Yolo	28	28	28
El Dorado	29	29	29
Imperial	30	30	30
Napa	31	31	31
Kings	32	32	32
Madera	33	33	33
Monterey	34	34	34
San Benito	41	41	
Lake	40	40	37
Mendocino	37	37	
Sutter	38	38	39
Yuba	39	39	

Table A-1. Stratum definitions for CHIS 2001, 2003, 2005, 2007, 2009, 2011-2012, and 2013-2014
(continued)

County	2013-2014 Stratum	2005 , 2007, 2009, and 2011-2012 Stratum	2001 and 2003 Stratum
Colusa Glen Tehama	42	42	38
Nevada	36	36	40
Humboldt Del Norte	35	35	35
Lassen Modoc Trinity Plumas Sierra	43	43	36
Siskiyou	43.2		36
Alpine Amador Inyo Mariposa Mono	44	44	41
Tuolumne	44.1		
Calaveras	44.2		

Table A-2. Number of telephone numbers drawn by sample frame and sampling stratum

Stratum	Landline		Total	Surname and list*						Total
	Non-ported landline	Landline ported to cell		Korean only	Korean and other	Vietnamese only	Japanese and non-Japanese first name	Japanese and non-Japanese surname	Japanese and first name	
State	1,037,015	10,576	1,047,591	1,750	2,250	1,600	1,667	950	1,317	1,057,125
1 Los Angeles	222,070	2,140	224,210	633	735	294	523	246	557	227,198
2 San Diego	120,743	1,301	122,044	77	66	111	97	76	56	122,527
3 Orange	80,105	1,010	81,115	223	181	387	149	66	152	82,273
4 Santa Clara	46,270	332	46,602	122	242	292	138	51	121	47,568
5 San Bernardino	35,377	350	35,727	54	54	37	53	40	15	35,980
6 Riverside	36,644	382	37,026	64	33	41	58	49	18	37,289
7 Alameda	33,688	285	33,973	107	243	100	84	49	66	34,622
8 Sacramento	28,581	271	28,852	61	71	95	78	37	41	29,235
9 Contra Costa	21,588	155	21,743	38	64	29	58	33	29	21,994
10 Fresno	16,438	162	16,600	25	20	14	46	17	25	16,747
11 San Francisco	27,412	200	27,612	87	293	63	49	44	59	28,207
12 Ventura	16,395	186	16,581	21	20	15	35	21	18	16,711
13 San Mateo	17,391	136	17,527	46	108	13	53	26	62	17,835
14 Kern	10,650	94	10,744	14	4	6	14	10	1	10,793
15 San Joaquin	11,224	138	11,362	14	15	24	30	17	15	11,477
16 Sonoma	9,510	82	9,592	21	9	9	18	20	9	9,678
17 Stanislaus	12,342	131	12,473	11	5	9	9	8	2	12,517
18 Santa Barbara	11,787	113	11,900	10	5	5	17	12	7	11,956
19 Solano	12,800	101	12,901	10	10	6	14	17	2	12,960
20 Tulare	10,516	120	10,636	5	5	2	9	8	2	10,667
21 Santa Cruz	11,189	112	11,301	9	3	2	14	7	11	11,347
22 Marin	11,843	79	11,922	12	11	5	13	9	10	11,982
23 San Luis Obispo	9,462	153	9,615	6	1	3	11	6	5	9,647
24 Placer	11,038	126	11,164	7	10	6	16	10	5	11,218
25 Merced	10,954	144	11,098	6	6	1	5	3	3	11,122
26 Butte	6,209	61	6,270	6	3	1	5	7	0	6,292
27 Shasta	6,203	59	6,262	4	1	3	3	4	2	6,279
28 Yolo	10,001	103	10,104	6	7	4	9	6	5	10,141
29 El Dorado	9,657	139	9,796	6	3	1	5	6	3	9,820
30 Imperial	8,579	61	8,640	2	1	1	4	3	0	8,651
31 Napa	11,973	107	12,080	2	1	1	3	5	1	12,093
32 Kings	13,081	196	13,277	1	0	0	4	1	0	13,283
33 Madera	10,215	198	10,413	2	1	0	4	2	1	10,423
34 Monterey	14,088	121	14,209	12	7	6	18	10	12	14,274
35 Humboldt	6,894	40	6,934	4	3	1	2	4	0	6,948
36 Nevada	8,502	81	8,583	4	2	3	2	2	1	8,597
37 Mendocino	7,809	112	7,921	2	0	1	1	3	0	7,928
38 Sutter	9,397	129	9,526	3	1	1	4	2	0	9,537
39 Yuba	10,279	134	10,413	0	3	2	0	1	0	10,419

40	Lake	7,995	82	8,077	1	0	2	1	1	0	8,082
41	San Benito	16,962	304	17,266	0	1	0	1	1	0	17,269
42	Colusa, Glenn, Tehama	6,842	99	6,941	3	2	0	0	2	1	6,949
43	Del Norte, Lassen, Modoc, Plumas, Sierra, Trinity	4,776	50	4,826	2	0	2	4	1	0	4,835
	Siskiyou	12,173	109	12,282	1	0	0	0	2	0	12,285
44	Alpine, Amador, Inyo, Mariposa, Mono	2,372	15	2,387	3	0	1	6	5	0	2,402
	Tuolumne	6,280	37	6,317	2	0	0	0	0	0	6,319
	Calaveras	10,711	36	10,747	1	0	1	0	0	0	10,749

* Not drawn by sampling stratum.

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

Table A-3. Number of cell telephone numbers drawn by sampling stratum

	Stratum	Cell sample
	State total	101,930
1	Los Angeles	19,036
2	San Diego	12,575
3	Orange	5,550
4	Santa Clara	3,991
5	San Bernardino	3,251
6	Riverside	2,939
7	Alameda	3,725
8	Sacramento	2,177
9	Contra Costa	1,586
10	Fresno	1,491
11	San Francisco	2,502
12	Ventura	1,563
13	San Mateo	1,157
14	Kern	1,073
15	San Joaquin	1,381
16	Sonoma	1,440
17	Stanislaus	1,170
18	Santa Barbara	831
19	Solano	1,312
20	Tulare	985
21	Santa Cruz	1,135
22	Marin	1,438
23	San Luis Obispo	1,006
24	Placer	1,254
25	Merced	1,348
26	Butte	914
27	Shasta	1,369
28	Yolo	1,503
29	El Dorado	1,177
30	Imperial	2,595
31	Napa	1,495
32	Kings	1,166
33	Madera	1,652
34	Monterey	1,116
35	Humboldt	996
36	Nevada	1,105
37	Mendocino	1,645
38	Sutter	3,668
39	Yuba	0
41	San Benito	1,186
42	Colusa, Glenn, Tehama	1,483
43	Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	876
44	Amador, Alpine, Calaveras, Inyo, Mariposa, Mono, Tuolumne	733

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

Table A-4. Number of adult completed interviews by sample type and self-reported stratum*

		Surname and list**								
							Japanese surname and non- Japanese first name	Japanese first non- surname and first name	Japanese surname and first name	Total
Stratum		Landline	Cell phone	Korean only	Korean and other	Vietname se only	Japanese first name	Japanese surname	Japanese and first name	
	State	31,615	7,752	86	25	119	70	19	73	39,759
1	Los Angeles	5,632	1,432	45	7	17	15	3	27	7,178
2	San Diego	3,397	832	3	0	13	1	4	1	4,251
3	Orange	1,682	426	14	2	40	6	1	5	2,176
4	Santa Clara	1,076	284	6	1	29	15	1	5	1,417
5	San Bernardino	1,059	260	3	0	1	3	1	1	1,328
6	Riverside	1,229	309	1	2	3	3	0	1	1,548
7	Alameda	899	238	5	2	5	4	2	7	1,162
8	Sacramento	900	238	2	1	2	4	2	4	1,153
9	Contra Costa	653	168	0	2	1	1	0	0	825
10	Fresno	495	139	1	0	0	1	0	2	638
11	San Francisco	594	162	1	1	3	3	0	3	767
12	Ventura	496	121	0	2	0	2	0	1	622
13	San Mateo	428	114	2	2	0	3	1	4	554
14	Kern	448	111	0	0	0	0	0	0	559
15	San Joaquin	376	97	0	0	2	2	0	2	479
16	Sonoma	387	115	0	0	0	1	1	2	506
17	Stanislaus	395	88	0	0	2	1	0	0	486
18	Santa Barbara	390	93	0	0	0	1	0	2	486
19	Solano	401	94	0	1	0	0	0	0	496
20	Tulare	399	103	0	0	0	0	0	2	504
21	Santa Cruz	386	101	0	0	0	0	1	1	489
22	Marin	413	87	0	0	0	0	0	0	500
23	San Luis Obispo	396	93	0	0	0	0	1	0	490
24	Placer	408	90	0	0	0	0	0	2	500
25	Merced	397	107	0	0	0	1	0	0	505
26	Butte	396	115	0	0	0	1	0	0	512
27	Shasta	389	99	0	1	0	0	0	0	489
28	Yolo	396	104	2	0	1	0	0	1	504
29	El Dorado	387	98	1	0	0	1	0	0	487
30	Imperial	388	101	0	0	0	0	0	0	489
31	Napa	420	106	0	0	0	0	0	0	526
32	Kings	399	99	0	0	0	0	0	0	498
33	Madera	406	102	0	0	0	0	0	0	508
34	Monterey	394	95	0	0	0	1	1	0	491
35	Humboldt	390	102	0	0	0	0	0	0	492
36	Nevada	403	89	0	0	0	0	0	0	492
37	Mendocino	419	106	0	0	0	0	0	0	525
38	Sutter	407	118	0	0	0	0	0	0	525

39	Yuba	372	91	0	0	0	0	0	0	463
40	Lake	390	96	0	0	0	0	0	0	486
41	San Benito	402	93	0	1	0	0	0	0	496
42	Colusa, Glenn, Tehama	329	83	0	0	0	0	0	0	412
43	Del Norte, Lassen, Modoc, Plumas, Sierra, Trinity	221	50	0	0	0	0	0	0	271
43.2	Siskiyou	445	29	0	0	0	0	0	0	474
44	Alpine, Amador Inyo, Mariposa, Mono	132	40	0	0	0	0	0	0	172
44.1	Tuolumne	369	20	0	0	0	0	0	0	389
44.2	Calaveras	425	14	0	0	0	0	0	0	439

* Not drawn by sampling stratum.

**Partially completed interviews (completed through at least Section J) are counted as nonrespondent for 2013 and as complete for 2014.

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

Table A-5. Number of child completed interviews by self-reported stratum*

	Stratum	Landline	Cell phone	Surname and list**						Total
				Korean only	Korean and other	Vietnamese only	Japanese surname and non-Japanese first name	Japanese and non-Japanese surname	Japanese and first name	
	State	4,164	1,256	13	4	15	11	5	2	5,470
1	Los Angeles	794	213	7	0	4	4	1	0	1,023
2	San Diego	487	143	0	0	1	0	2	0	633
3	Orange	214	76	4	0	5	0	0	0	299
4	Santa Clara	146	50	1	0	3	1	0	1	202
5	San Bernardino	183	47	0	1	1	1	0	0	233
6	Riverside	162	57	0	0	0	1	0	0	220
7	Alameda	146	31	0	1	0	0	1	0	179
8	Sacramento	96	35	0	0	0	1	0	0	132
9	Contra Costa	78	25	0	1	0	0	0	0	104
10	Fresno	82	30	0	0	0	0	0	0	112
11	San Francisco	66	24	0	0	0	0	0	0	90
12	Ventura	74	19	0	0	0	0	0	0	93
13	San Mateo	48	19	0	0	0	2	0	0	69
14	Kern	62	23	0	0	0	0	0	0	85
15	San Joaquin	55	12	1	0	1	0	0	0	69
16	Sonoma	39	21	0	0	0	0	0	0	60
17	Stanislaus	44	19	0	0	0	0	0	0	63
18	Santa Barbara	45	10	0	0	0	1	0	0	56
19	Solano	44	18	0	0	0	0	0	0	62
20	Tulare	77	14	0	0	0	0	0	0	91
21	Santa Cruz	44	10	0	0	0	0	0	0	54
22	Marin	44	7	0	0	0	0	0	0	51
23	San Luis Obispo	35	13	0	0	0	0	0	0	48
24	Placer	46	17	0	0	0	0	0	0	63
25	Merced	64	24	0	0	0	0	0	0	88
26	Butte	48	17	0	0	0	0	0	0	65
27	Shasta	45	15	0	1	0	0	0	0	61
28	Yolo	72	15	0	0	0	0	0	0	87
29	El Dorado	37	9	0	0	0	0	1	0	47
30	Imperial	65	22	0	0	0	0	0	0	87
31	Napa	34	14	0	0	0	0	0	0	48
32	Kings	81	18	0	0	0	0	0	0	99
33	Madera	72	30	0	0	0	0	0	0	102
34	Monterey	54	21	0	0	0	0	0	1	76
35	Humboldt	42	13	0	0	0	0	0	0	55
36	Nevada	33	13	0	0	0	0	0	0	46
37	Mendocino	39	10	0	0	0	0	0	0	49
38	Sutter	45	24	0	0	0	0	0	0	69
39	Yuba	56	12	0	0	0	0	0	0	68

40	Lake	27	17	0	0	0	0	0	0	44
41	San Benito	56	16	0	0	0	0	0	0	72
42	Colusa, Glenn, Tehama	36	14	0	0	0	0	0	0	50
43	Del Norte, Lassen, Modoc, Plumas, Sierra, Trinity	39	6	0	0	0	0	0	0	45
43.2	Siskiyou	58	4	0	0	0	0	0	0	62
44	Alpine, Amador, Inyo, Mariposa, Mono	9	4	0	0	0	0	0	0	13
44.1	Tuolumne	23	2	0	0	0	0	0	0	25
44.2	Calaveras	18	3	0	0	0	0	0	0	21

* Not drawn by sampling stratum.

** Partially completed interviews (completed through at least Section J) are counted as nonrespondent for 2013 and as complete for 2014.

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.

Table A-6. Number of adolescent completed interviews by self-reported stratum*

	Stratum	Landline	Cell phone	Surname and list**						Total
				Korean only	Korean and other	Vietnamese only	Japanese surname and non-Japanese first name	Japanese and non-Japanese surname	Japanese and first name	
	State	1,738	482	3	0	9	2	2	2	2,238
1	Los Angeles	357	82	1	0	1	1	0	0	442
2	San Diego	176	48	0	0	0	0	1	0	225
3	Orange	90	26	1	0	4	0	0	0	121
4	Santa Clara	60	19	1	0	2	0	0	0	82
5	San Bernardino	70	12	0	0	0	0	0	0	82
6	Riverside	76	20	0	0	1	0	0	0	97
7	Alameda	52	11	0	0	0	0	0	1	64
8	Sacramento	39	12	0	0	0	0	0	0	51
9	Contra Costa	34	8	0	0	0	0	0	0	42
10	Fresno	41	7	0	0	0	0	0	0	48
11	San Francisco	26	7	0	0	0	0	0	0	33
12	Ventura	19	6	0	0	0	0	0	0	25
13	San Mateo	18	5	0	0	0	1	0	0	24
14	Kern	24	15	0	0	0	0	0	0	39
15	San Joaquin	22	7	0	0	1	0	0	0	30
16	Sonoma	19	10	0	0	0	0	1	0	30
17	Stanislaus	16	4	0	0	0	0	0	0	20
18	Santa Barbara	13	10	0	0	0	0	0	0	23
19	Solano	18	7	0	0	0	0	0	0	25
20	Tulare	32	10	0	0	0	0	0	0	42
21	Santa Cruz	12	3	0	0	0	0	0	0	15
22	Marin	21	5	0	0	0	0	0	0	26
23	San Luis Obispo	11	5	0	0	0	0	0	0	16
24	Placer	23	9	0	0	0	0	0	0	32
25	Merced	35	16	0	0	0	0	0	0	51
26	Butte	25	4	0	0	0	0	0	0	29
27	Shasta	16	7	0	0	0	0	0	0	23
28	Yolo	30	3	0	0	0	0	0	0	33
29	El Dorado	15	9	0	0	0	0	0	0	24
30	Imperial	34	10	0	0	0	0	0	0	44
31	Napa	25	5	0	0	0	0	0	0	30
32	Kings	30	9	0	0	0	0	0	0	39
33	Madera	31	8	0	0	0	0	0	0	39
34	Monterey	23	9	0	0	0	0	0	1	33
35	Humboldt	22	4	0	0	0	0	0	0	26
36	Nevada	17	7	0	0	0	0	0	0	24
37	Mendocino	15	10	0	0	0	0	0	0	25
38	Sutter	16	6	0	0	0	0	0	0	22
39	Yuba	29	8	0	0	0	0	0	0	37

40	Lake	11	3	0	0	0	0	0	0	14
41	San Benito	24	3	0	0	0	0	0	0	27
42	Colusa, Glenn, Tehama	18	4	0	0	0	0	0	0	22
43	Del Norte, Lassen, Modoc, Plumas, Sierra, Trinity	9	3	0	0	0	0	0	0	12
43.2	Siskiyou	14	2	0	0	0	0	0	0	16
44	Alpine, Amador, Inyo, Mariposa, Mono	4	1	0	0	0	0	0	0	5
44.1	Tuolumne	11	2	0	0	0	0	0	0	13
44.2	Calaveras	15	1	0	0	0	0	0	0	16

* Not drawn by sampling stratum.

** Partially completed interviews (completed through at least Section J) are counted as nonrespondent for 2013 and as complete for 2014.

Source: UCLA Center for Health Policy Research, 2013-2014 California Health Interview Survey.