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CHIS 2017-2018 Methodology Report Series

# Report 1

# Sample Design

**CALIFORNIA HEALTH INTERVIEW SURVEY**

**CHIS 2017-2018 METHODOLOGY SERIES**

**REPORT 1**

**SAMPLE DESIGN**

**OCTOBER 2019**

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[www.chis.ucla.edu](http://www.chis.ucla.edu)

This report provides analysts with information about the sampling methods used for CHIS 2017-2018, 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 2017-2018 California Health Interview Survey (CHIS 2017-2018). 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. SSRS was responsible for data collection and the preparation of five methodological reports from the 2017-2018 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 2017 - 2018

The methodological reports for CHIS 2017 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 2017-2018. An appropriate sample design is a feature of a successful survey, and CHIS 2017-2018 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 2017-2018 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](mailto:CHIS@ucla.edu).

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# 1. CHIS 2017-2018 SAMPLE DESIGN AND METHODOLOGY SUMMARY

## 1.1 Overview

A series of five methodology reports are available with more detail about the methods used in CHIS 2017-2018.

- 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](mailto:CHIS@ucla.edu). For methodology reports from previous CHIS cycles, go to <http://www.chis.ucla.edu/chis/design/Pages/methodology.aspx>

The CHIS is a population-based telephone survey of California's residential, noninstitutionalized population conducted every other year since 2001 and continually beginning in 2011. CHIS is the nation's largest state-level health survey and one of the largest health surveys in the nation. The UCLA Center for Health Policy Research (UCLA-CHPR) conducts CHIS in collaboration with the California Department of Public Health and the California 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 and optimized to meet 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 racial and 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 (visit UCLA-CHPR's publication page at <http://healthpolicy.ucla.edu/publications/Pages/default.aspx> for examples of CHIS studies).

## **1.2 Switch to a Continuous Survey**

From the first CHIS cycle in 2001 through 2009, CHIS data were collected during a 7 to 9 month period every other year. Beginning in 2011, CHIS data have been collected continually over a 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 2017-2018 data were collected between June 2017 and January 2019. 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 the two year period for the age group corresponding to the data file in use (adult, adolescent, or child). In CHIS 2017-2018, data users will be able to produce single-year estimates using the weights provided (referred to as CHIS 2017 and CHIS 2018, respectively).

**See what's new in the 2017-2018 CHIS sampling and data collection here:**

<http://www.chis.ucla.edu/chis/design/Documents/whats-new-chis-2017-2018.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 statistical code, is available at <http://www.chis.ucla.edu/chis/analyze/Pages/sample-code.aspx>.

Additional documentation on constructing the CHIS sampling weights is available in the *CHIS 2017-2018 Methodology Series: Report 5—Weighting and Variance Estimation* posted at <http://www.chis.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.

### 1.3 Sample Design Objectives

The CHIS 2017-2018 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 racial and 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 RDD sample was designed to achieve the required number of completed adult interviews by using approximately 50% landline and 50% cellular phone numbers. For the 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 same geographic stratification of the state has been used since CHIS 2005. The Los Angeles County stratum included eight sub-strata for Service Planning Areas, and the San Diego County stratum included six sub-strata for Health Service Districts. Most of the strata (39 of 44) consisted of a single county with no sub-strata (see counties 3-41 in Table 1-1). Three multi-county strata comprised the 17 remaining counties (see counties 42-44 in Table 1-1). A sufficient number of adult interviews were allocated to each stratum and sub-stratum to support the first sample design objective for the two-year period—to provide health estimates for adults at the local level. Asian surname sample list frames added 127 Korean, and 214 Vietnamese adult interviews based on self-identified ethnicity for the 2017-2018 survey year.<sup>1</sup> Additional samples from both the landline and cell phone frames produced 1,375 interviews in 2017-2018 within San Diego County. In 2018, an oversample of American Indian and Alaska Native residents of California added 317 completed interviews, and specific gender and ethnic oversamples in San Francisco provided an additional 498 interviews. Furthermore, an address-based sample from the USPS Delivery Sequence File produced 339 landline or cell phone interviews in 2017 within the northern part of Imperial County.

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 of the randomly selected parent/guardian were randomly selected; the adolescent was interviewed directly, and the adult sufficiently knowledgeable about the child's health completed the child interview.

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<sup>1</sup> For the 2017-2018, RDD landline and cell sample frames produced totals of 290 Korean, and 235 Vietnamese adult interviews.

Table 1-1. California county and county group strata used in the CHIS 2017-2018 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, Glenn, Tehama
3. Orange	23. San Luis Obispo	43. Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity
4. Santa Clara	24. Placer	44. Amador, Alpine, Calaveras, Inyo, Mariposa, Mono, Tuolumne
5. San Bernardino	25. Merced	
6. Riverside	26. Butte	

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

The CHIS RDD 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). However, given the smaller sample sizes of one-year data files, two or more pooled cycles years of CHIS data are generally required to produce statistically stable estimates for small population groups such as racial/ethnic subgroups, children, teens, etc. 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 increase the sample size further for Koreans and Vietnamese.

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 2017-

2018, the goal was to complete approximately 50% of all RDD interviews statewide with adults contacted via cell phone. Because the geographic information available for cell phone numbers is limited and not as precise as that for landlines, cell phone numbers were assigned to the same 44 geographic strata (i.e., 41 strata defined by a single county and 3 strata created by multiple counties) using a classification associated with the rate center linked to the account activation. 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. The adult owner of the sampled cell phone number was automatically selected for CHIS. Cell numbers used exclusively by children under 18 were considered ineligible. A total of 880 teen interviews and 3,186 child interviews were completed in CHIS 2017-2018 with approximately 48% of teen interviews and 65% of child interviews coming from the cell phone sample.

The cell phone sampling method used in CHIS has evolved significantly since its first implementation in 2007 when only cell numbers belonging to adults in cell-only households were eligible for sampling adults. These changes reflect the rapidly changing nature of cell phone ownership and use in the US.<sup>2</sup> There have been three 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 third, enacted in CHIS 2015-2016 was to increase the fraction of the sample comprised of cell phones from 20% to 50% of completed interviews. In 2017-2018, we additionally sampled out-of-area cell phone numbers. These are cell phone numbers with exchanges outside of California that can be matched to an address that is within California, indicating that the owner of the cell phone resides in California but purchased a cell phone in another state.

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.

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<sup>2</sup> <https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201906.pdf>

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 seven geographic sampling strata created using telephone area codes. In CHIS 2009 and 2011-2012, the number of cell phone strata was increased to 28. These strata were created using both area codes and the geographic information assigned to the number. Beginning in CHIS 2011, with the availability of more detailed geographic information, the number of strata was increased to 44 geographic areas that correspond to single and grouped counties similar to the landline strata. The use of 44 geographic strata continued in CHIS 2017-2018.

#### **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 Tagalog. Tagalog interviews were conducted for part of the CHIS 2013-2014 cycle, but 2015-2016 were the first cycle years that Tagalog interviews were conducted from the beginning of data collection. 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.

SSRS designed the methodology and collected data for CHIS 2017-2018, under contract with the UCLA Center for Health Policy Research. SSRS is an independent research firm that specializes in innovative methodologies, optimized sample designs, and reaching low-incidence populations. For all sampled households, SSRS 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. If 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 2017-2018 by the type of sample (landline RDD, surname list, cell RDD, and ABS). Note that these figures were accurate as of data collection completion for 2017-2018 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://www.chis.ucla.edu/chis/design/Pages/sample.aspx>.

Table 1-2. Number of completed CHIS 2017-2018 interviews by type of sample and instrument

Type of sample <sup>1</sup>	Adult <sup>2</sup>	Child	Adolescent
Total all samples	42,330	3,186	880
Landline RDD <sup>3</sup>	18,896	1,049	434
Cell RDD	21,554	1,996	409
Vietnamese surname list landline	188	10	5
Vietnamese surname list cell phone	80	10	3
Korean surname list landline	354	16	3
Korean surname list cell phone	56	5	1
Both Korean and Vietnamese landline	48	1	1
Imperial County ABS Oversample	339	42	15
AIAN Oversample landline	130	10	-
AIAN Oversample cell phone	187	20	3
San Francisco Oversample landline	148	4	1
San Francisco Oversample cell phone	350	23	5

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

<sup>1</sup> Completed interviews listed for each sample type refer to the sampling frame from which the phone number was drawn. Interviews could be conducted using numbers sampled from a frame with individuals who did not meet the target criteria for the frame but were otherwise eligible residents of California. For example, only 157 of the 190 adult interviews completed from the Vietnamese surname list involved respondents who indicated being having Vietnamese ethnicity.

<sup>2</sup> Includes interviews meeting the criteria as partially complete.

<sup>3</sup> Breakdown of completes by frame deviates slightly from original sample numbers due to numbers changing frames following post-sampling database processing.

Interviews in all languages were administered using SSRS’s computer-assisted telephone interviewing (CATI) system. The average adult interview took about 42 minutes to complete. The average child and adolescent interviews took about 19 minutes and 24 minutes, respectively. For “child-first” interviews, additional household information asked as part of the child interview averaged about 14 minutes. Interviews in non-English languages typically took longer to complete with an average length of about 50 minutes for the adult interview, 29 minutes for the teen, and 23 minutes for the child. More than eight percent of the adult interviews were completed in a language other than English, as were about 13 percent of all child (parent proxy) interviews and six percent of all adolescent interviews.

Table 1-3 shows the major topic areas for each of the three survey instruments (adult, child, and adolescent). If questions were asked in only one year of survey implementation, the specific year is indicated in the table.

Table 1-3. CHIS 2017-2018 survey topic areas by instrument

<b>Health status</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
General health status	✓	✓	✓
Days missed from work or school due to health problems		✓	✓
<b>Health conditions</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Asthma	✓	✓	✓
Diabetes, gestational diabetes, pre-diabetes/borderline diabetes	✓		
Heart disease, high blood pressure	✓		
Physical disability	✓		
Physical, behavioral, and/or mental conditions			✓
Developmental assessment, referral to a specialist by a doctor			✓
<b>Mental health</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Mental health status	✓	✓	
Perceived need, access and utilization of mental health services	✓	✓	
Functional impairment, stigma, three-item loneliness scale (2017)	✓		
Suicide ideation and attempts	✓	✓	
<b>Health behaviors</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Dietary and water intake, breastfeeding (younger than 3 years)	✓	✓	✓
Physical activity and exercise		✓	✓
Commute from school to home		✓	✓
Walking for transportation and leisure (2017)	✓		
Alcohol, cigarette, and E-cigarette use	✓	✓	
Marijuana use	✓	✓	
Opioid use	✓		
Chewing tobacco, tobacco flavors (2018)	✓	✓	
Exposure to second-hand smoke (2018)	✓		
Sexual behaviors	✓	✓	
HIV testing, HIV prevention medication	✓	✓	
Sleep and technology		✓	
Sedentary time		✓	✓
Contraceptive use	✓	✓	

(continued)



Table 1-3. CHIS 2017-2018 survey topic areas by instrument (continued)

<b>Women's health</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Pregnancy status, postpartum care	✓		
<b>Dental health</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Last dental visit, main reason haven't visited dentist	✓	✓	✓
Current dental insurance coverage	✓		✓
Condition of teeth	✓	✓	
<b>Neighborhood and housing</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Safety, social cohesion	✓	✓	✓
Homeownership	✓		
Length of time at current residence (2017)	✓		
Park use, park and neighborhood safety		✓	✓
Civic engagement	✓	✓	
<b>Access to and use of health care</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Usual source of care, visits to medical doctor	✓	✓	✓
Emergency room visits	✓	✓	✓
Delays in getting care (prescriptions and medical care)	✓	✓	✓
Communication problems with doctor	✓		✓
Discrimination (2017)	✓		
Timely appointment	✓	✓	✓
Access to specialist and general doctors	✓		
Tele-medical care	✓		
Care coordination (2018)	✓	✓	✓
<b>Voter engagement</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Voter engagement	✓		
<b>Food environment</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Access to fresh and affordable foods	✓		
Availability of food in household over past 12 months	✓		
Hunger	✓		
<b>Health insurance</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Current insurance coverage, spouse's coverage, who pays for coverage	✓	✓	✓
Health plan enrollment, characteristics and assessment of plan	✓	✓	✓
Whether employer offers coverage, respondent/spouse eligibility	✓		
Coverage over past 12 months, reasons for lack of insurance	✓	✓	✓
High deductible health plans	✓	✓	✓
Partial scope Medi-Cal	✓		
Medical debt, hospitalizations	✓		

(continued)

Table 1-3. CHIS 2017-2018 survey topic areas by instrument (continued)

<b>Public program eligibility</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Household poverty level	✓		
Program participation (CalWORKs, Food Stamps, SSI, SSDI, WIC, TANF)	✓	✓	✓
Assets, child support, Social security/pension	✓		
Medi-Cal eligibility, Medi-Cal renewal	✓		
Reason for Medi-Cal non-participation	✓	✓	✓
<b>Bullying</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Bullying, school safety		✓	
<b>Parental involvement/adult supervision</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Parental involvement			✓
Parental support, teach support		✓	
<b>Child care and school</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Current child care arrangements			✓
Paid child care	✓		
First 5 California: Talk, Read, Sing Program / Kit for New Parents			✓
Preschool/school attendance, school name		✓	✓
Preschool quality			✓
School instability, school programs and organizational involvement		✓	
<b>Employment</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Employment status, spouse's employment status	✓		
Hours worked at all jobs	✓		
Industry and occupation, firm size	✓		
<b>Income</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Respondent's and spouse's earnings last month before taxes	✓		
Household income, number of persons supported by household income	✓		
Placement on quality of life ladder (2018)	✓		
<b>Respondent characteristics</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Race and ethnicity, age, gender, height, weight	✓	✓	✓
Veteran status	✓		
Marital status, registered domestic partner status (same-sex couples)	✓		
Sexual orientation, gender identity	✓		
Gender expression		✓	
Living with parents	✓		
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, 2017-2018 California Health Interview Survey.

## 1.5 Response Rates

The overall response rates for CHIS 2017-2018 are composites 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). For CHIS 2017-2018, the landline/list sample household response rate was 5.6 percent (the product of the screener response rate of 10.8 percent and the extended interview response rate at the household level of 52.0 percent). The cell sample household response rate was 3.5 percent, incorporating a screener response rate of 7.1 percent and household-level extended interview response rate of 49.0 percent. CHIS uses AAPOR response rate RR4 (see more detailed in *CHIS 2017-2018 Methodology Series: Report 4 – Response Rates*).

Within the landline and cell phone sampling frames for 2017-2018, the extended interview response rate for the landline/list sample varied across the adult (43.8 percent), child (60.0 percent) and adolescent (25.6 percent) interviews. The adolescent rate includes the process of obtaining permission from a parent or guardian.

The adult interview response rate for the cell sample was 40.9 percent, the child rate was 57.5 percent, and the adolescent rate was 18.0 percent in 2017-2018 (see Table 1-4a). Multiplying these rates by the screener response rates used in the household rates above gives an overall response rate for each type of interview for each survey year (see Table 1-4b). As in previous years, household and person level response rates vary by sampling stratum. CHIS response rates are similar to, and sometimes higher than, other comparable surveys that interview by telephone.

Table 1-4a. CHIS 2017-2018 response rates – Conditional

Type of Sample	Screener	Household	Adult (given screened)	Child (given screened & eligibility)	Adolescent (given screened & permission)
Overall	8.0%	49.9%	42.3%	58.3%	21.3%
Landline RDD/List	10.8%	52.0%	43.8%	60.0%	25.6%
Cell RDD/List	7.1%	49.0%	40.9%	57.5%	18.0%

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Note. This table does not include the Imperial County, AIAN, and San Francisco oversamples.

Table 1-4b. CHIS 2017-2018 response rates – Unconditional

Type of Sample	Screener	Household	Adult (given screened)	Child (given screened & eligibility)	Adolescent (given screened & permission)
Overall	8.0%	4.0%	3.4%	4.6%	1.7%
Landline RDD/List	10.8%	5.6%	4.7%	6.4%	2.8%
Cell RDD/List	7.1%	3.5%	2.9%	4.1%	1.3%

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Note. This table does not include the Imperial County, AIAN, and San Francisco oversamples

To maximize the response rate, especially at the screener stage, an advance letter in six 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 39.1 percent of the landline RDD sample telephone numbers not identified by the sample vendor as business numbers or not identified by SSRS’s dialer software as nonworking numbers, and for 100 percent of surname list sample numbers. Combining these two frames, advance letters were sent to 41.0 percent of all fielded landline telephone numbers. From the onset of 2017 fielding until April of 2018, cell phone sample with matched telephone numbers also received an advance letter. However, after a randomized experiment confirmed that the accuracy of the matching for cell phone sample did not warrant continuing these mailings, they were discontinued (for full experiment details, see Section 7.1 in *CHIS 2017-2018 Methodology Series: Report 4 – Response Rates*). Overall, across the two years, for cell sample, an advance letter was mailed for 27.2 percent of the RDD sample telephone numbers not identified by the sample vendor as business numbers or not identified by SSRS’s dialer software as nonworking numbers, and for 100 percent of surname list sample numbers. Combining these two frames, advance letters were sent to 30.4 percent of all fielded cell telephone numbers. As in all CHIS cycles since CHIS 2005, a \$2 bill was included with the CHIS 2017-2018 advance letter to encourage cooperation. Unlike previous cycles, additional incentives were not offered to cell phone and nonresponse follow up (NRFU) respondents.

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.

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. In CHIS 2017-2018, either a spouse/partner or adult child completed a proxy interview for 20 adults. A reduced questionnaire, with questions identified as appropriate for a proxy respondent, was administered.

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

## **1.6 Weighting the Sample**

To produce population estimates from CHIS data, weights were 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 was weighted to represent the noninstitutionalized population for each sampling stratum and statewide. The weighting procedures used for CHIS 2017-2018 accomplish the following objectives:

- Compensate for differential probabilities of selection for phone numbers (households) and persons within household;
- Reduce biases occurring because non respondents may have different characteristics than respondents;
- Adjust, to the extent possible, for undercoverage 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 was used to compute a person-level weight, which includes adjustments for the within-household sampling of persons and for nonresponse. The final step was to adjust the person-level weight using weight calibration, a procedure that forced the CHIS weights to sum to estimated population control totals simultaneously from an independent data source (see below).

Population control totals of the number of persons by age, race, and sex at the stratum level for CHIS 2017-2018 were created primarily from the California Department of Finance’s (DOF) 2017 and 2018 Population Estimates, and associated population projections. The procedure used several

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), and education. 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 calibration.

The DOF control totals used to create the CHIS 2017-2018 weights are based on 2010 Census counts, as were those used for the 2015-2016 cycle. Please pay close attention when comparing estimates using CHIS 2017-2018 data with estimates using data from CHIS cycles before 2010. The most accurate California population figures are available when the U.S. Census Bureau conducts the decennial census. For periods between each census, population-based surveys like CHIS must use population projections based on the decennial count. 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.

## **1.7 Imputation Methods**

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

Three different imputation procedures were used by SSRS 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. The hot deck approach is one of the most commonly used methods for assigning values for missing responses. Using a hot deck, a value reported by a respondent for a specific item was 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 answered a survey item formed a pool of donors, while the item non respondents formed a group of recipients. A recipient was matched to the subset pool of donors based on household and individual characteristics. A value for the recipient was then randomly imputed from one of the donors in the pool. SSRS used hot deck imputation to impute the same items that have been imputed in all CHIS cycles since 2003 (i.e., race, ethnicity, home ownership, and education). The last technique was external data assignment. This method was used for geocoding variables such as strata, Los Angeles SPA, San Diego HSR, and zip where the respondent provided inconsistent information. For such cases geocoding information was used for imputation.

UCLA-CHPR imputed missing values for nearly every variable in the data files other than those imputed by SSRS and some sensitive variables for which nonresponse had its own meaning. Overall, item nonresponse rates in CHIS 2017-2018 were low, with most variables missing valid responses for less than 1% of the sample. Questions that go to fewer overall respondents or that ask about more sensitive topics can have higher nonresponse.

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 without donor replacement was used. This method replaced 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 corresponded to the nature of the variable being imputed (e.g. linear regression for continues variables, logistic regression for binary variables, etc.). Donors and recipients were 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, educational attainment and region of California were imputed by SSRS. UCLA-CHPR began their imputation process by imputing household income so that this characteristic was available for the imputation of other variables. Sometimes 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.

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



## 2. SAMPLING FRAMES AND METHODS

The sample design for CHIS 2017-2018 is summarily described as a stratified two-stage dual-frame design. The strata are consistent with prior years, and are defined by county with sub-county substrata for Los Angeles and San Diego counties, as summarized in Table A-1.

The sampling frames included oversamples of Korean and Vietnamese surnames and high Vietnamese/Korean incidence landline telephone exchanges and cellular rate centers. As was conducted in 2016, a supplemental address-based sampling (ABS) frame was utilized in Northern Imperial County in 2017. In 2018, supplemental interviews were also conducted of Hispanic men, African Americans, and Chinese men in San Francisco County, as well as of statewide American Indian/Alaska Natives (AIAN).

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

The landline frame consists of all working 100-number banks.<sup>3</sup> This frame includes listed and unlisted telephone numbers and random distribution. Overall, 29.5% of California landline numbers are estimated to be unlisted.<sup>4</sup> The frame excludes 100-number banks without at least one working number, a common practice in landline telephone sampling since the 1980s. Boyle, et al. (2009) estimate that undercoverage associated with excluding the non-working banks is approximately 5 percent on a national level and is more acute for “younger, lower income, [and] minority” adults and for rental households. That said, the inclusion of cellular telephones in the CHIS sample can largely cover these households insofar as household members own at least one cell phone. Landline samples were attained by Marketing Systems Group (MSG), the historic vendor of record for previous rounds of CHIS.

### 2.2 Households with only Cellular Phones

The cell phone frame was introduced to the CHIS in 2007 to accommodate changes in telephone use among the population. The National Center for Health Statistics (NCHS) estimated that 36.4% of the California households had become cell-phone-only households in 2013.<sup>5</sup> The modeled estimate for 2017 (53.0%) indicates that the rate of wireless-only households continues to increase consistently over time.<sup>6</sup> There are significant differences for adults who only use cell phones versus those with only access to a landline phone number, on metrics from age to poverty and race and ethnicity (Blumberg and Luke,

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<sup>3</sup> A 100-number bank contains 100 landline numbers with the same first eight digits; each 100-number bank is included in the frame if it has at least one working residential number that is matched to a listing in a public directory.

<sup>4</sup> Based on sample generated for the study.

<sup>5</sup> [https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless\\_state\\_201412.pdf](https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless_state_201412.pdf)

<sup>6</sup> [https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless\\_state\\_201903.pdf](https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless_state_201903.pdf)

2019). As such, sampling from only a landline frame will introduce a large bias in the final estimates. Few if any studies in the past five years have relied solely on a landline frame to produce reliable point estimates of populations.

Consistent with CHIS 2015-2016, the 2017-2018 study attained half of its interviews from cell phones. The cell phone frame contains all randomly generated numbers within 1,000-number banks (first seven digits) dedicated to cellular service. All banks are available for sampling regardless of their activation status (working, non-working, and unassigned) which ensure complete coverage especially of the cell-only households. A new feature in 2017 was the incorporation of cell phone sample that has an appended California zip code, even though the area codes are outside of California. A second new feature was the mailing of advance letters to listed cellular sample in 2017, though upon analysis of the efficacy of this practice, it was discontinued in 2018 due to a low rate of match accuracy (for more details see *CHIS 2017-2018 Methodology Series: Report 4 – Response Rates*). As such, the cellular sample was accounted for based on its status as listed or unlisted. Appended zip code “out of area” sample was counted as part of the listed sample universe.

Samples of landline and cell phone numbers were selected independently. The respective frames capture landline-only households (those without a cell phone) and cell-only households (those without a landline phone). They also cover dual-use households (those with both landline and cell phones). Therefore, CHIS is a dual-frame design with sampling frames that overlap; among all households with at least telephone numbers, this overlap is estimated to be 39.9%.<sup>7</sup>

## **2.3 Supplemental Sampling**

Supplemental sampling was used to increase representation for certain Asian nationalities, for American Indian/Alaska Natives (AIAN), and for certain geographic areas. We briefly discuss each below. Additional details on the sampling methodologies are provided in Section 3.3.

### **2.3.1 Vietnamese and Korean Nationalities**

CHIS used two approaches to oversample Vietnamese and Koreans. First, we identified landline telephone exchanges and cellular rate centers that had a relatively high proportion of Koreans and Vietnamese. These exchanges and rate centers were identified via data from the MSG Genesys sampling database, which overlays Census data with estimated geographies of landline exchanges, and data that combines Census data with the estimated coverage of geographies by cellular rate center.

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<sup>7</sup> [https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless\\_state\\_201903.pdf](https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless_state_201903.pdf)

Second, surname list frames for both nationalities were oversampled, as has been done in many CHIS cycles since 2001. These frames, provided by MSG, were generated from listed landline telephone numbers with surnames likely to be associated with Koreans and Vietnamese persons. Use of the surname frames was implemented in part to address shortfalls in the projected yield. Additionally, preliminary research conducted by UCLA suggested true differences between those listed and not listed on the surname frames. Thus, samples were selected from these specialized frames to enable further evaluation of differences between the Asian subpopulation listed on and excluded from the surname frame. As was the case in cycles from 2009 to 2014, surname records were sampled at a 2:1 sampling fraction. Different than past cycles, however, all respondents with eligible adults were interviewed, whereas in the past only Vietnamese and Korean households were screened into the survey.

### **2.3.2 Geographic Areas**

The CHIS design regularly includes additional sample for specialized analyses of certain geographic areas. In CHIS 2017, two geographic supplemental samples were chosen. As has been the case in prior years, San Diego County chose to oversample for additional statistical power. This was also done in 2018. As well, to target an area within northern Imperial County, in 2017 addresses were randomly selected from certain census tracts. In 2018, additional interviews of non-Caucasians were also attained in San Francisco County.

### **2.3.3 American Indian and Alaska Natives**

In 2018, additional statistical power was also requested for American Indians/Alaska Natives (AIAN). Since AIAN are less prevalent in the Northern and Central areas of the state, a stratified sampling design was created with special attention to these areas.

### 3. SAMPLING HOUSEHOLDS

In this chapter, we describe the random sampling methodology for the CHIS design. Section 3.1 contains a description of the CHIS population of interest (also referred to as a target population), along with those who were not eligible for the study. This information provides a link between the CHIS estimates and the inferential population within California. Details of the general sampling design used to select the CHIS households is contained in Section 3.2. Here, we provide an overview of the design, followed by details on supplemental samples needed to enhance analytic capabilities for certain domains. Tables are included to identify the targeted number of completed adult interviews by strata and sampling frame. Section 3.3 contains information on the size of the samples selected to achieve the targets and on procedures for sample release to maintain efficiency.

#### 3.1 Population of Interest

Estimates from CHIS represent the non-institutionalized population in California including adults (ages 18 years and older), children (ages 11 and younger), and adolescents (ages 12-17 years) living in residential households (i.e., non-group quarters). Residential households are randomly chosen either through a landline telephone frame, a cell phone frame, an address frame, or possibly a combination of two or more of these frames. Households without telephone service cannot be selected for CHIS through the telephone frames but are included as part of the target population through expansion of the survey weights (see *CHIS 2017-2018 Methodology Series: Report 5 – Weighting and Variance Estimation*).<sup>8</sup> Eligible residences include, for example, households, apartments, and mobile homes containing individuals with (multiple or) extended families or unrelated persons if they number less than nine. Telephone numbers, households and persons not eligible for the CHIS include

- cellular telephone numbers belonging to persons under the age of 18;
- telephone numbers belonging to households residing outside the state of California;
- institutionalized residences (e.g., prisons, jails, juvenile detention facilities, psychiatric hospitals, extended-stay treatment programs, and long-time care); and
- group quarters (those with nine or more unrelated persons).

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<sup>8</sup> Estimates from the 2017 National Health Interview Survey suggest that less than 2.9 percent of California households do not have either a landline or cell phone, and are therefore excluded from sampling for CHIS 2017-2018 ([https://www.cdc.gov/nchs/data/nhis/earlyrelease/Wireless\\_state\\_201903.pdf](https://www.cdc.gov/nchs/data/nhis/earlyrelease/Wireless_state_201903.pdf)).

### 3.2 Analytic Objectives

Sample designs cannot be constructed without specific objectives for analyses. The goal of CHIS is to provide the user community with data that will produce unbiased estimates with high precision of health and health-related metrics within each design stratum (county or groups of small counties) for adults residing in California overall and by racial/ethnic groups, including the Asian nationalities (Korean and Vietnamese) included in the oversample. We summarize the sample size for key groups to meet the analytic objectives for CHIS 2017-2018 in Table 3-1.

Overall, CHIS 2017-2018 was originally designed to yield 40,000 completed adult interviews in relatively equal proportions from landline and cell phone samples. Per projections from CHIS 2016, the targeted number of teen and child (proxy) interviews were established. As the study progressed, supplemental samples were selected to meet new analytic objectives by geographic areas (e.g., North Imperial County, San Francisco non-Caucasians, and statewide AIAN) beyond the initial targets shown in Table 3-1. Targets by design strata and for the supplemental samples are discussed in detail in Section 3.3.

Table 3-1. Initial targeted number of interviews by sample characteristics

Characteristics	Interviews (n)
State-wide, Main Study, Overall	
Adults (overall) <sup>a</sup>	40,000
Landline sample, 50% of total	20,000
Cell phone sample, 50% of total	20,000
Teens (overall) <sup>b</sup>	2,350
Children (overall) <sup>b</sup>	4,200
Supplemental geographic samples (adults only):	
North Imperial County, CHIS 2017	350
San Diego County, CHIS 2017-2018	1,350
San Francisco County, CHIS 2018	485
State-wide, American Indian Alaskan Native, CHIS 2018	400
State-wide, Asian Nationality	
Adults, Vietnamese	500
Adults, Korean	500

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

<sup>a</sup> Approximately 50% of the interviews ( $\pm 5\%$ ) was targeted for the landline phone sample.

<sup>b</sup> Teen and child targets were projected based on prior rounds of CHIS.

### 3.3 Sample Design

The sample design for CHIS 2017-2018 is summarily described as a stratified dual-frame design. The design strata were consistent with prior rounds of the study and are shown in Table 3-2.

Table 3-2. Design strata and subareas

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

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

<sup>a</sup> Service Planning Areas (SPAs) are analytically important substrata of Los Angeles county.

<sup>b</sup> Health Service Regions (HSRs) are analytically important substrata of San Diego county.

<sup>c</sup> Vendors assigned cellular telephone numbers to design strata using rate center information. Rate centers were available for the design strata except Yuba County.

When CHIS was first conducted, only a list-assisted RDD landline telephone frame was used to generate a telephone sample. However, due to telephone-use changes brought about by the introduction of cell phones, samples from a cell-phone frame have been included with the landline sample since 2007, making the CHIS a dual-frame survey. Today, cell phones are used by more people in California than landlines (Blumberg and Luke, 2019). Therefore, the continuation of the dual-frame methodology for CHIS 2017-2018, with a higher sample allocation to cell phone numbers than used in CHIS 2013-2014 (50% vs. 20%), was warranted.

In the subsections below, we discuss sampling related to each sampling frame highlighted in Section 2, beginning with the landline and cell phone RDD samples. Targeted number of adult interviews by design strata along with relative population size in California is shown in Table 3-3. Next, we provide details on supplemental sampling.

Table 3-3. Initial 2017-2018 targets for completed adult interviews by design strata (excluding supplemental samples)

Stratum	Landline sample	Cell sample	Total <sup>a,b</sup>	Population size <sup>c</sup>
State Total	20,000	20,000	40,000	
1 Los Angeles (total) <sup>a</sup>	3,847	3,847	7,694	Over 9 million
1.1 – Antelope Valley	250	250	500	
1.2 – San Fernando Valley	804	804	1,608	
1.3 – San Gabriel Valley	687	687	1,374	
1.4 – Metro	455	455	909	
1.5 – West	264	264	528	
1.6 – South	367	367	734	
1.7 – East	457	457	913	
1.8 – South Bay	564	564	1,128	
2 San Diego (total) <sup>b</sup>	1,553	1,553	3,106	3.2 million or greater
2.1 – North Coastal	259	259	518	
2.2 – North Central	259	259	518	
2.3 – Central	259	259	518	
2.4 – South	259	259	518	
2.5 – East	259	259	518	
2.6 – North Inland	259	259	518	

(continued)

Table 3-3. Initial 2017-2018 targets for completed adult interviews by design strata (excluding supplemental samples) (continued)

Stratum	Landline sample	Cell sample	Total <sup>a,b</sup>	Population size <sup>c</sup>
3 Orange	1,115	1,115	2,230	900,000 to
4 Santa Clara	768	768	1,536	3.2 million
5 San Bernardino	664	664	1,328	
6 Riverside	1,040	1,040	2,080	
7 Alameda	607	607	1,214	
8 Sacramento	700	700	1,400	
9 Contra Costa	537	537	1,074	
10 Fresno	448	448	896	
11 San Francisco	375	375	750	600,000 to
12 Ventura	285	285	570	900,000
13 San Mateo	355	355	710	
14 Kern	357	357	714	
15 San Joaquin	250	250	500	
16 Sonoma	250	250	500	Medium
17 Stanislaus	250	250	500	counties
18 Santa Barbara	250	250	500	100,000 to
19 Solano	250	250	500	500,000
20 Tulare	250	250	500	
21 Santa Cruz	250	250	500	
22 Marin	250	250	500	
23 San Luis Obispo	250	250	500	
24 Placer	250	250	500	
25 Merced	250	250	500	
26 Butte	250	250	500	
27 Shasta	250	250	500	
28 Yolo	250	250	500	
29 El Dorado	250	250	500	
30 Imperial	250	250	500	
31 Napa	250	250	500	
32 Kings	250	250	500	
33 Madera	250	250	500	Small counties
34 Monterey	250	250	500	Less than
35 Humboldt	250	250	500	100,000
36 Nevada	250	250	500	

(continued)



Table 3-3. Initial 2017-2018 targets for completed adult interviews by design strata (excluding supplemental samples) (continued)

Stratum	Landline sample	Cell sample	Total <sup>a,b</sup>	Population size <sup>c</sup>
37 Mendocino	250	250	500	
38 Sutter	250	250	500	
39 Yuba	250	250	500	
40 Lake	250	250	500	
41 San Benito	250	250	500	
42 Colusa, Glenn, Tehama	200	200	400	Small counties
43 Del Norte, et al.	200	200	400	combined
44 Amador, et al.	200	200	400	

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

<sup>a</sup> Service Planning Areas (SPAs) are analytically important substrata of Los Angeles county. Counts are rounded target allocations; the sum across and by SPA differ from the total targets due to rounding.

<sup>b</sup> Health Service Regions (HSRs) are analytically important substrata of San Diego county. Counts are rounded target allocations; the sum across and by HSR differ from the total targets due to rounding.

<sup>c</sup> Based on 2016 California Department of Finance estimates.

### 3.3.1 Landline Sample

Sample vendors selected a stratified simple random sample of landline telephone numbers from the frame of working 100-number blocks discussed in Section 2.1. Assignment of telephone numbers to the geographic design strata was made through area code. All sample was EPSEM (equal probability of selection method). Stratification was executed by identifying zip codes that were estimated by Marketing Systems Group to be majority covered by a given telephone exchange. That exchange was thus assigned to a stratum most exhaustively covered. This procedure was followed not just for main strata but substrata within Los Angeles and San Diego as well.

Samples were purchased on an as-needed basis from the updated RDD landline frame containing almost 33 million telephone numbers. The requested sample sizes by stratum was based on prior cycle productivity and thus overall past yields (sample records required to attain a single interview).

In an effort to reduce the number of interviews from older respondents, sample was flagged for households that have a person age 65 and 75% was randomly discarded prior to dialing. This strategy is meant to increase the probability of reaching households with children and fight the tendency of telephone surveys to skew toward older respondents. Overall, 27 percent of all California households have someone age 65 and older (U.S. Census Bureau, 2017). Only eight percent of all households with a person age 65 and older have a person also living there that is age 17 or younger.

### **3.3.2 Cell Phone Sample**

As with the landline sample, vendors randomly selected a stratified simple random sample of cellular telephone numbers quarterly from working 1000-number blocks dedicated to cellular service (see Section 2.2). Since 1000-blocks are specific to rate center, all sample was selected based on rate center. All but one design stratum (Yuba County) had at least one corresponding rate center. All sample was EPSEM (equal probability of selection method).

Samples were selected from an updated RDD cell phone frame containing over 109 million numbers. The requested sample sizes by stratum was based on prior cycle productivity and thus overall past yields (sample records required to attain a single interview). More so, SSRS analyzed “strata jumpers” in the 2016 and 2017 CHIS cycles to better understand the difference between strata based on rate center and self-reported county. Using these data, we modelled initial sample releases by strata to account for the fact that respondents will often live in different actual locations than might be suggested by rate center. A small oversample of listed cellular sample was utilized for Yuba County to attain additional interviews to meet overall targets.

According to analysis of the SSRS omnibus survey, a large scale simple random sample dual-frame survey of the U.S. (with over 125,000 interviews conducted in 2016), we found that 6.5 percent of California cell phone adults (about 6.2% of all Californian adults with phones) possess cell phones outside of California. Forty-seven percent of Californian adults were cell phone only in 2015, resulting in a non-coverage rate of about 3.1 percent due to Californians not owning landlines nor California-specific cellphones. Further analysis finds that there is listed address information for 7,666,211 cell phones in California (deduped to the household level), compared to 12,811,083 total households. A sample of non-California area code sample was added to the study to cover at least those persons living in California who do not possess a California area code but have a listed zip available.

### **3.3.3 Supplemental Ethnic Oversampling**

In an attempt to maximize interviews of Vietnamese and Koreans, CHIS has historically conducted oversampling of landline exchanges deemed to have a high incidence of these populations, as well as oversampling of landline Vietnamese or Korean surname sample. For CHIS 2017-2018, these strategies were extended to cell phone samples as well. In most past cycles, telephone exchanges that were estimated to reach at least six percent Korean or Vietnamese households were oversampled by a ratio of 2:1. These criteria were maintained for 2017 and 2018. Applying this procedure to cellphones contained a few challenges, since cellphones only viably cluster by cellular rate center, not telephone

exchange. This significantly reduces the efficacy of oversampling on cellphones given that while there are 10,673 landline telephone exchanges in California, there are only 735 cellular rate centers. An additional challenge is that there are as many non-cellular rate centers as there are cellular rate centers in California. For cell phone respondents living in areas with non-cellular rate centers, it is unclear which cellular rate center is their “home” cellular rate center. Thus, mapping Census data only to cellular rate centers comes with a certain, and sometimes significant, amount of imprecision. Nevertheless, as the CHIS continues to move a greater share of interviews to the cellphone frame, those landline frame strategies that have proven effective in the past are no longer so. It then becomes imperative to attempt to replicate the success of those landline strategies to cell phones.

In collaboration with MSG, SSRS mapped Census data onto cellular rate centers, and selected only those rate centers with which there was at least an 6 percent combined incidence of reaching Vietnamese or Korean respondents. Twenty-three rate centers in total were defined as high. Korean/Vietnamese rate centers. Table 3.4 summarizes the estimated coverage and incidence rates for both landline and cellphone high incidence strata.

Table 3-4. Estimated incidence and coverage by ethnic strata

Strata	Vietnamese Incidence	Korean Incidence	Vietnamese Coverage	Korean Coverage
High Landline	15%	10%	52%	33%
Low Landline	1%	1%	48%	67%
High Cell Phone	8%	4%	54%	37%
Low Cell Phone	1%	1%	46%	63%

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Table 3-5 provides summary counts of the two frames in total, and the number of surname counts and the number of sample records defined as high incidence Vietnamese/Korean.

Table 3-5. Total frame sizes, surname counts, and high ethnic estimates <sup>a</sup>

Stratum	Landline Not Listed, Not High Density	Landline Not Listed, High Density	Landline Listed, Not High Density	Landline Listed, High Density	Cell Not Listed, Not High Density	Cell Not Listed, High Density	Cell Listed, Not High Density	Cell Listed, High Density
1 – Los Angeles	7,577,951	1,091,513	82,903	48,732	15,315,077	936,108	103,324	64,211
2 – San Diego	2,503,840	232,345	12,756	4,159	5,132,569	79,151	34,031	4,971
3 – Orange	1,616,270	1,074,094	11,836	33,299	3,762,960	1,736,751	82,862	108,500
4 – Santa Clara	940,505	539,943	24,825	35,427	1,966,470	962,197	20,864	81,023
5 – San Bernardino	1,364,505	0	11,095	0	3,009,828	0	17,795	0
6 – Riverside	1,469,907	1,176	9,017	0	3,037,716	0	12,904	0
7 – Alameda	1,430,304	831	23,265	0	2,660,023	0	31,298	0
8 – Sacramento	1,052,277	102,442	20,189	2,991	2,161,305	0	14,770	0
9 – Contra Costa	941,503	0	16,797	0	1,302,577	0	7,472	0
10 – Fresno	633,234	0	5,166	0	1,588,094	0	8,256	0
11 – San Francisco	924,641	1,317	28,842	0	1,890,047	0	21,522	0
12 – Ventura	663,857	0	3,143	0	1,320,734	0	2,963	0
13 – San Mateo	784,766	747	10,987	0	901,280	0	4,236	0
14 – Kern	508,770	0	2,730	0	1,300,998	0	1,303	0
15 – San Joaquin	434,084	0	5,116	0	977,516	0	4,240	0
16 – Sonoma	455,988	0	2,912	0	678,933	0	826	0
17 – Stanislaus	349,663	0	1,237	0	753,540	0	2,394	0
18 – Santa Barbara	366,897	0	1,503	0	599,579	0	2,092	0
19 – Solano	314,525	0	3,275	0	575,348	0	1,105	0
20 – Tulare	257,738	0	562	0	591,168	0	431	0
21 – Santa Cruz	263,322	1,014	1,464	0	348,271	0	961	0
22 – Marin	324,912	0	1,688	0	410,957	0	1,286	0
23 – San Luis Obispo	239,032	0	968	0	373,378	0	1,260	0
24 – Placer	318,609	0	1,991	0	514,651	0	2,352	0

(continued)

Table 3-5. Total frame sizes, surname counts, and high ethnic estimates <sup>a</sup> (continued)

Stratum	Landline Not Listed, Not High Density	Landline Not Listed, High Density	Landline Listed, Not High Density	Landline Listed, High Density	Cell Not Listed, Not High Density	Cell Not Listed, High Density	Cell Listed, Not High Density	Cell Listed, High Density
25 – Merced	128,961	0	939	0	343,857	0	1,010	0
26 – Butte	168,946	0	954	0	313,502	0	921	0
27 – Shasta	144,467	0	433	0	295,664	0	1,091	0
28 – Yolo	143,683	0	617	0	193,195	0	1,022	0
29 – El Dorado	167,772	0	1,028	0	160,005	0	0	0
30 – Imperial	92,623	0	277	0	393,292	0	398	0
31 – Napa	114,816	0	484	0	141,811	0	130	0
32 – Kings	70,601	0	199	0	187,077	0	146	0
33 – Madera	85,504	33	163	0	181,757	0	99	0
34 – Monterey	345,138	0	2,762	0	595,916	0	1,624	0
35 – Humboldt	127,700	0	0	0	190,627	0	417	0
36 – Nevada	108,012	0	788	0	115,658	0	0	0
37 – Mendocino	79,286	0	514	0	125,802	0	0	0
38 – Sutter	59,351	0	349	0	234,863	0	55	0
39 – Yuba	52,182	0	318	0	16,199	0	0	0
40 – Lake	63,735	0	365	0	65,414	0	19	0
41 – San Benito	37,928	0	72	0	83,855	0	147	0
42 – Tehama, etc.	84,075	0	225	0	90,024	0	0	0
43 – Del Norte, etc.	185,938	0	262	0	167,377	0	0	0
44 – Tuolumne, etc.	246,806	0	1,394	0	216,839	0	389	0
<b>TOTAL</b>	<b>28,244,627</b>	<b>3,045,455</b>	<b>296,410</b>	<b>124,609</b>	<b>55,285,752</b>	<b>3,714,206</b>	<b>388,015</b>	<b>258,705</b>

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

<sup>a</sup> Marketing Systems Group (MSG) provided the surname frame samples.

### **3.3.4 Supplemental Samples for San Diego County**

Additional landline and cell phone samples were chosen to address increased targets for San Diego County after the initial sample design was planned. As with the primary sample design, the supplemental samples were selected based on yields from the CHIS 2016. Overall targets were increased to 364 interviews per San Diego strata per frame, for a total of 2,178 interviews in San Diego County in each year. Strata jumper analysis again was used to predict what strata sample would yield with regard to actual self-reported strata location.

### **3.3.5 Supplemental Imperial County ABS Sample**

Additional yield was requested for a northern area within Imperial County in late 2017. Because of the need to target a relatively small geographic area, addresses in comparison to telephone numbers were deemed a more efficient unit of sampling. Addresses were selected through a stratified simple random sampling design from a subset of eligible Census tracts listed on an Address Based Sampling (ABS) frame. This replicated the same approach for North Imperial County in 2016. The frame is based on the U.S. household population Postal Service's Computerized Delivery Sequence file and provides near-complete coverage of the household population (see, e.g., Iannacchione, 2011; Shook-Sa, 2014).

A sample of 5,250 addresses was selected and released for the northern Imperial County supplement. MSG identified an associated telephone number whenever available. Of the total sample, 58.9% had at least one landline or cell phone matched to the address for outbound calling (Table 3-6). Telephone interviewers confirmed the address prior to the start of the telephone interview; survey materials were sent to addresses without an associated telephone number. Additional details on the data collection procedures are found in the *CHIS 2017-2018 Methodology Series: Report 2 – Data Collection Methods*.

Table 3-6. Telephone match rate for northern Imperial County supplemental sample <sup>a</sup>

Wave and Matched Status	Sample	Interviews
<b>Wave One</b>		
Matched	1,511	135
Unmatched	988	61
<b>Wave Two</b>		
Matched	1,581	98
Unmatched	1,170	45
<b>Total</b>		
Matched	3,092	233
Unmatched	2,158	106
<b>Grand Total</b>	<b>5,250</b>	<b>339</b>

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

<sup>a</sup> All phone numbers were assigned by Marketing Systems Group (MSG).

### 3.3.6 Supplemental San Francisco Sample

Additional statistical power was requested for San Francisco County, specific to Hispanic males, African American males and females, and Chinese males. Because of the low incidence of these populations and small geographic footprint, a stratified sampling design was developed to attain the requisite interviews. We specifically developed a disproportionate, dual-frame stratified design that leveraged sample appends indicating that numbers were likely to reach African American or Hispanic households, as well as telephone exchanges also similarly that were more likely to reach non-Caucasian respondents. Attaining these interviews presented an extremely challenging task as survey incidences were exceedingly low given not only due to the low incidence nature of these populations but the stated requirement to attain specific numbers by gender, and the natural screen outs that occur because people report not living in the state, or the county, or in the case of cell phones, that they were not over the age of 17. Table 3-7 provides the sample plan utilized in the survey.

A sample of 141,059 telephones was selected and released for the San Francisco supplement. Additional details on the data collection procedures are found in the *CHIS 2017-2018 Methodology Series: Report 2 – Data Collection Methods*.

Table 3-7. San Francisco Oversample Strata

Landline		
Strata	Frame Size	Oversample
RDD residual	816,492	16,224
RDD high Hispanic	61,433	8,165
RDD high African American	20,347	4,441
Listed Hispanic	36,912	7,876
Listed African American	8,217	1,898
<b>Total</b>	<b>943,401</b>	<b>38,604</b>
Cell		
Strata	Frame Size	Oversample
RDD residual	937,012	9,693
Listed Zipcodes	613,387	27,736
RDD prepaid cellphones	203,180	18,532
Listed Hispanic	135,325	29,148
Listed African American	36,300	17,346
<b>Total</b>	<b>1,925,204</b>	<b>102,455</b>

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

### 3.3.7 Supplemental AIAN Sample

Additional statistical power was also requested for AIAN statewide. Furthermore greater sample size was needed in areas where AIAN are less prevalent in the state, namely the Northern and Central areas of the state. Due to the low incidence of the AIAN population, a stratified sampling design was developed to attain the requisite interviews. We specifically developed a disproportionate, dual-frame stratified design that leveraged sample appends indicating that numbers were likely to reach AIAN households, and stratified this sample further by predefined areas of the state (North, Central, and South). Attaining these interviews presented an extremely challenging task, as sample listed and appended to likely reach an AIAN household resulted in very poor incidences (less than 10% whereas similar appends for Asians, African Americans and others typically attain between 35% and 75%). Table 3-8 provides the sample plan utilized in the survey.

A sample of 96,074 telephones was selected and released for the AIAN supplement. Additional details on the data collection procedures are found in the *CHIS 2017-2018 Methodology Series: Report 2 – Data Collection Methods*.



Table 3-8. AIAN Oversample Strata

Landline					
Region	AIAN Strata	LL Universe	% Listed	AIAN Listed Numbers	Sample
Central	Low	6,901,918	0.1%	7,237	2,089
	Medium	27,353	75.1%	20,542	3,538
	High	11,329	80.6%	9,131	1,324
North	Low	5,599,994	0.2%	9,454	2,388
	Medium	42,171	89.6%	37,785	5,494
	High	8,635	50.0%	4,318	597
South	Low	18,251,130	0.1%	10,777	2,278
	Medium	28,831	96.6%	27,851	1,524
	High	18,839	78.7%	14,826	801
Total		30,890,200			20,033

  

Cell					
	AIAN Strata	Cell Universe	% Listed	AIAN Listed Numbers	Sample
Central	Low	12,862,581	0.1%	13,486	5,008
	Medium	37,228	66.5%	24,757	20,770
	High	16,858	78.7%	13,267	7,331
North	Low	9,404,593	0.2%	15,876	4,132
	Medium	60,638	84.3%	51,118	22,126
	High	11,623	32.0%	3,719	3,217
South	Low	37,904,133	0.1%	22,382	2,036
	Medium	53,022	95.8%	50,795	7,864
	High	20,507	55.9%	11,463	3,557
Total		60,371,183			76,041

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

### 3.4 Sample Selection and Sample Releases

The revised 2017-2018 adult interview targets including the two supplemental geographic samples for 2017 (San Diego County, and the northern area of Imperial County), and the supplemental oversamples for 2018 (San Diego County, San Francisco County, and AIAN) interview targets are shown in Table 3-9.

Table 3-9. Final 2017-2018 targets for completed adult interviews by design strata

Stratum	Landline sample	Cell sample	Oversamples	Total
State Total	20,626	20,626	1,235	42,487
1 Los Angeles (total) <sup>a</sup>	3,847	3,847		7,694
1.1 – Antelope Valley	250	250		500
1.2 – San Fernando Valley	804	804		1,608
1.3 – San Gabriel Valley	687	687		1,374
1.4 – Metro	455	455		909
1.5 – West	264	264		528
1.6 – South	367	367		734
1.7 – East	457	457		913
1.8 – South Bay	564	564		1,128
2 San Diego (total) <sup>b</sup>	2,178	2,178		4,356
2.1 – North Coastal	364	364		728
2.2 – North Central	364	364		728
2.3 – Central	364	364		728
2.4 – South	364	364		728
2.5 – East	364	364		728
2.6 – North Inland	364	364		728
3 Orange	1,115	1,115		2,230
4 Santa Clara	768	768		1,536
5 San Bernardino	664	664		1,328
6 Riverside	1,040	1,040		2,080
7 Alameda	607	607		1,214
8 Sacramento	700	700		1,400
9 Contra Costa	537	537		1,074
10 Fresno	448	448		896
11 San Francisco	375	375	485	1,235
12 Ventura	285	285		570
13 San Mateo	355	355		710
14 Kern	357	357		714
15 San Joaquin	250	250		500
16 Sonoma	250	250		500
17 Stanislaus	250	250		500
18 Santa Barbara	250	250		500
19 Solano	250	250		500
20 Tulare	250	250		500
21 Santa Cruz	250	250		500
22 Marin	250	250		500
23 San Luis Obispo	250	250		500

(continued)

Table 3-9. Final 2017-2018 targets for completed adult interviews by design strata (continued)

Stratum	Landline sample	Cell sample	Oversamples	Total
24 Placer	250	250		500
25 Merced	250	250		500
26 Butte	250	250		500
27 Shasta	250	250		500
28 Yolo	250	250		500
29 El Dorado	250	250		500
30 Imperial	250	250	350	850
31 Napa	250	250		500
32 Kings	250	250		500
33 Madera	250	250		500
34 Monterey	250	250		500
35 Humboldt	250	250		500
36 Nevada	250	250		500
37 Mendocino	250	250		500
38 Sutter	250	250		500
39 Yuba	250	250		500
40 Lake	250	250		500
41 San Benito	250	250		500
42 Colusa, et al.	200	200		400
43 Del Norte, et al.	200	200		400
44 Amador, et al.	200	200		400
AIAN Oversample			400	400

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

<sup>a</sup>Service Planning Areas (SPAs) are analytically important substrata of Los Angeles county.

<sup>b</sup>Health Service Regions (HSRs) are analytically important substrata of San Diego county.

To meet these targets, stratified samples were selected from a total of six sampling frames (see Table 3-10). Table 3-10 contains the total number of telephone numbers and addresses randomly chosen. Again, yields were based on past CHIS performance, which accounts for a range of nonresponse, such as those noted below:

- Nonworking telephone numbers,
- Screener nonresponse (noncontacts and verbal refusals);
- Interview nonresponse (refusals and incomplete questionnaires);
- Cellular telephones belonging to persons under age 18;
- Households with more than nine unrelated residents (group quarters); and
- Cell numbers for residents no longer living in California.

Samples were also inflated to account for:

- Landline telephone numbers ported to cellular status (to target an equal split between landline and cell phone interviews);
- Scrubbing of sample that was listed age 65 and older;
- Differences in sampled versus reported California county of residence (to meet stratum specific targets); and
- Supplemental sample needs.

Initial inflation rates were projected prior to finalizing the sample allocation. We used information from prior rounds of CHIS, cumulative results from the current two-year series, and model-based projections to inform these rates. This resulted in the selection of over 5 million telephone numbers (Table 3-10) and 5,250 Imperial County addresses (Table 3-6). We purged 65.6% of the telephone sample for CHIS 2017 and 53.7% for CHIS 2018 because of its non-working status.

Table 3-10. Number of telephone numbers selected and fielded by sampling frame

Sampling Frame	CHIS 2017		CHIS 2018	
	Generated	Fielded	Generated	Fielded
Landline	1,364,876	361,184	1,945,723	509,571
Listed	128,633	128,633	224,462	224,462
Unlisted	1,236,243	232,551	1,721,261	285,109
Cell Phone	518,116	279,905	1,225,528	956,294
Listed	111,950	111,950	261,275	261,275
Unlisted	406,166	167,955	964,253	695,019
Surname	10,748	10,748	27,532	27,532
Korean	5,488	5,488	13,442	13,442
Vietnamese	5,260	5,260	14,090	14,090
Total	1,893,740	651,837	3,171,251	1,465,865

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

## **4. WITHIN-HOUSEHOLD SAMPLING**

In this chapter, we describe the random sampling methodology for the second stage of selection in the CHIS design—persons within household. One adult was randomly chosen from each household. If the selected adult was the parent of at least one child less than the age of 12, then a proxy interview was conducted for one randomly chosen child. If the selected adult was a parent of at least one teen (age 12-17), then an interview was conducted with a randomly chosen teen after receiving parent permission.

Section 4.1 contains a description of the interview procedure implemented in this and prior rounds of CHIS to increase the number of child (proxy) interviews. Details of the sampling design to select one adult from each eligible CHIS household are provided in Section 4.2. Differential sampling within two child age groups is discussed in Section 4.3. Section 4.4 provides a discussion of procedures for choosing one teen for interview.

### **4.1 Child-First Procedure**

To increase the rate of proxy interviews for children aged less than 12 years, CHIS 2005 researchers introduced a method known as the child-first procedure for landline telephone numbers. This method allowed us to conduct the interview for the chosen child with the screener respondent who was not the randomly chosen adult. Per protocol the screener respondent had to be the parent of the child and be sufficiently knowledgeable to conduct the interview. Hence, under this procedure, the screener respondent was the spouse or partner of the selected adult chosen for a CHIS interview. Once the child interview was completed for landline households with an eligible teen, the screener respondent was asked to consent to the conducting of the teen interview.

For the cell phone sample, the adult answering the phone was assumed to be the owner and was automatically selected for the study. Because the screener respondent was always the selected adult, the child-first procedure was not implemented on the cell phone sample.

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

	2017	pct <sup>a,b</sup>	2018	pct <sup>a,b</sup>
Households with children (total)	2,758	100.0	3,171	100.0
Child-first procedure	206	7.5	362	11.4
Child interview	152	73.8	259	71.5
No child interview	54	26.2	103	28.5
No child-first procedure	2,552	92.5	2,809	88.6
Child interview	1,448	56.7	1,327	47.2
No child interview	1,104	43.3	1,482	52.8
Households with teens (total)	2,365	100.0	2,687	100.0
Child-first procedure	84	3.6	143	5.3
Teen interview	19	22.6	38	26.6
No teen interview	65	77.4	105	73.4
No child-first procedure	2,281	96.4	2,544	94.7
Teen interview	429	18.8	394	15.5
No teen interview	1,852	81.2	2,150	84.5

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey. Note: pct = unweighted percent.

<sup>a</sup> Unweighted percent by child-first procedure (Y/N) taken with respect to total child/teen households.

<sup>b</sup> Unweighted percent by interview complete (Y/N) taken with respect to households by child-first procedure (Y/N).

## 4.2 Adult Sampling

The procedure to select one adult 18 years of age or older from eligible households differed by type of telephone number. For the landline sample, the Rizzo method of selection (Rizzo et al., 2004) was used to select one adult. The Rizzo method is a modified next-birthday method that does not require enumerating all adults within a household. This method is intended to reduce screener duration and respondent burden, while giving each adult resident an equal probability of selection. The total number of adults in the household is collected in the screener. With this information in hand, the procedure works as follow:

- If only one adult lives in the household, then that adult was selected for CHIS.
- If two adults live in the household, each adult had a 50% chance of being selected. The computer assisted telephone interview (CATI) system generated a random number between 0 and 1. If the number was less than or equal to 0.5, then the screener adult was selected for the interview; otherwise, the other adult was selected for the CHIS interview.

- If more than two adults live in the household, then a more detailed procedure was implemented to select one adult with equal probability equal to the inverse of the number of adults. The CATI system generated a random number between 0 and 1.
  - If the generated number was less than or equal to the selection probability, then the screener respondent was selected for CHIS.
  - If the generated number was greater than the selection probability and the screener respondent could name the adult resident with the next birthday, then the “next birthday” adult was selected for CHIS.
  - Otherwise, the selected adult was chosen randomly from the adult household residents excluding the screener respondent.

If the screener respondent did not provide the number of adults in the house, then the interviewer attempted to roster the household. One adult was then randomly chosen from the list.

Cellular telephones were assumed to belong to one person. Thus, the sampling method for choosing the adult from the cell phone sample mimicked the one-person landline household noted above. In other words, the adult answering the cell phone was automatically invited to participate in CHIS.

### **4.3 Child Sampling**

A child is defined for CHIS as a person less than 12 years of age normally residing in the eligible household. Eligible children are those who are the legal child of the sampled adult; foster children are excluded from this definition. One child was selected from the eligible set rostered either in the screener under the child-first procedure (Section 4.1) or in Section G of the adult questionnaire. Children 0-5 years of the selected adult were sampled at twice the rate as older children 6-11 years to increase their representation in the sample. The probability of selecting a child in the 0-5 year group was defined as  $2n_{1ij} / (2n_{1ij} + n_{2ij})$ , where  $n_{1ij}$  was the number of eligible children ages 0-5 years and  $n_{2ij}$  was the number of children ages 6-11 years within household  $i$ . The corresponding selection probability for eligible children ages 6-11 years was  $n_{2ij} / (2n_{1ij} + n_{2ij})$ . Either the screener respondent or the sampled adult completed the “child interview” about the sampled child. Table 4-2 shows the distribution of households by child age category for CHIS 2017 and CHIS 2018.

Table 4-2. Distribution of households with children by child selection probability and year

Child selection probability	Age category of children in household <sup>a</sup>	CHIS 2017		CHIS 2018	
		n	pct	n	pct
Equal	Only children 0 to 5 years	760	27.5	796	27.1
	Only children 6 to 11 years	1,301	47.0	1,418	48.3
Unequal	Children 0 to 5 and 6 to 11 years	705	25.5	722	24.6
	<b>Total</b>	<b>2,766</b>	<b>100.0</b>	<b>2,936</b>	<b>100.0</b>

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Note: n = sample size; pct = unweighted percent.

<sup>a</sup> Includes all sampled households with eligible children regardless of the sampling frame and final response status.

#### 4.4 Teen Sampling

A teen is defined for CHIS as a person between the ages of 12 and 17 years normally residing in the sampled household. Like the child, the teen was eligible for the study only if they were the legal child of the selected sample adult. One teen was selected with equal probability, i.e., the selection probability was one over the number of eligible teens. The eligible teens were rostered either in the screener under the child-first procedure (Section 4.1) or in Section G of the adult questionnaire as with the selection of the eligible child (Section 4.3).



## 5. ACHIEVED SAMPLE SIZES

In this chapter, we detail the number of completed person-specific interviews by key characteristics for CHIS 2017-2018. Targets were set for the number of adult interviews by frame, Asian ethnicity, and design stratum (discussed below). The relationship between the targets and achieved numbers is summarized. The associated response rates are presented in *CHIS 2017-2018 Methodology Series: Report 4 – Response Rates*.

Table 5-1 compares the number of completed interviews by sample and interview type. In 2017, these goals were exceeded for the landline and cell phone samples combined (100.8%) and the ratio of landline to cell phone interviews was 0.93 (=10,025/10,789). The Imperial County ABS address goals were hard to meet, owing to limited time to recruit the sampled households. In 2018, we completed 95.4% of the target interviews and the ratio of landline to cell phone interviews was 0.88 (=9,309/10,595).

Attaining interviews for the SF and AIAN oversamples was extremely challenging due to respective low incidences. For the AIAN oversample, sample listed and appended to likely reach an AIAN household resulted in an incidences of less than 10%. For the SF oversample, attaining the required number of completes by the specific ethnicities was further complicated by the requirement to attain specific numbers by gender, with completing interviews with males proving more challenging than with females.

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

Sample type/interview type	Completed interviews by year			Two-year targets	
	2017	2018	Two-year	n	pct <sup>b</sup>
Landline <sup>a</sup>					
Adult	10,025	9,309	19,334	20,626	93.7
Child	513	559	1,072	-	-
Teen	211	232	443	-	-
Cell sample					
Adult	10,789	10,595	21,384	20,626	103.7
Child	1,045	970	2,015	-	-
Teen	222	191	413	-	-
ABS sample					
Adult	339	-	339	350	96.9
Child	41	-	41	-	-
Teen	15	-	15	-	-
San Francisco sample					
Adult	-	488	488	485	100.6
Child	-	27	27	-	-
Teen	-	6	6	-	-
AIAN sample					
Adult	-	314	314	400	78.5
Child	-	30	30	-	-
Teen	-	3	3	-	-
All samples					
Adult	21,153	20,706	41,859	42,687	98.1
Child	1,599	1,586	3,185	-	-
Teen	448	432	880	-	-

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Note: n = sample size; pct = unweighted percent; “-“ = not applicable.

<sup>a</sup> Details for the surname samples are found in Table 5-5.

<sup>b</sup> Unweighted percent is calculated as the number of completed adult interviews for the two-year interval divided by the two-year target within sample type.

Table 5-2 provides the distribution of completed adult interviews by stratum and RDD sampling frame (excluding AIAN and San Francisco oversample interviews). Note that the stratum information reported here corresponds to the design strata but is based on the location of the household as reported by the screener respondent. Differences between design and reported strata were minimal for the landline sample, and existed only for landline numbers ported to a cellular telephone. Conversely, differences between design and reported strata for the cell phone sample in CHIS 2017-2018 ranged from 10% to 47% with an average of 22.3%.

Table 5-3 and Table 5-4 contains the number of completed child and teen interviews distributed by reported stratum and RDD sampling frame. The reported stratum in these tables corresponds to the information provided by the screener respondent and is the same as reported in Table 5-2.

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

Reported stratum	CHIS 2017-2018		LL/SUR sample		Cell sample		CHIS 2017			CHIS 2018		
	n	% of target	n	% of target	n	% of target	Total	LL/SUR	Cell	Total	LL/SUR	Cell
State-wide	40,717	95.4	19,349	93.8	21,368	103.6	20,813	10,029	10,784	19,904	9,320	10,584
1 Los Angeles	7,416	96.4	3,591	93.3	3,825	99.4	3,675	1,819	1,856	3,741	1,772	1,969
2 San Diego	4,437	101.9	2,211	101.5	2,226	102.2	2,174	1,152	1,022	2,263	1,059	1,204
3 Orange	2,372	106.4	1,383	124.0	989	88.7	1,269	720	549	1,103	663	440
4 Santa Clara	1,476	96.1	671	87.4	805	104.8	772	364	408	704	307	397
5 San Bernardino	1,348	101.5	632	95.2	716	107.8	650	322	328	698	310	388
6 Riverside	1,919	92.3	900	86.5	1,019	98.0	1,099	514	585	820	386	434
7 Alameda	1,218	100.3	552	90.9	666	109.7	546	264	282	672	288	384
8 Sacramento	1,205	86.1	528	75.4	677	96.7	635	264	371	570	264	306
9 Contra Costa	943	87.8	391	72.8	552	102.8	516	201	315	427	190	237
10 Fresno	724	80.8	345	77.0	379	84.6	394	184	210	330	161	169
11 San Francisco	818	96.2	341	90.9	477	127.2	450	184	266	368	157	211
12 Ventura	615	107.9	307	107.7	308	108.1	312	163	149	303	144	159
13 San Mateo	588	82.8	279	78.6	309	87.0	337	172	165	251	107	144
14 Kern	615	86.1	286	80.1	329	92.2	338	160	178	277	126	151
15 San Joaquin	458	91.6	222	88.8	236	94.4	222	106	116	236	116	120
16 Sonoma	460	92.0	216	86.4	244	97.6	216	99	117	244	117	127
17 Stanislaus	499	99.8	223	89.2	276	110.4	249	106	143	250	117	133
18 Santa Barbara	496	99.2	203	81.2	293	117.2	259	106	153	237	97	140
19 Solano	501	100.2	195	78.0	306	122.4	243	79	164	258	116	142
20 Tulare	498	99.6	220	88.0	278	111.2	234	96	138	264	124	140
21 Santa Cruz	492	98.4	213	85.2	279	111.6	249	111	138	243	102	141
22 Marin	498	99.6	256	102.4	242	96.8	246	126	120	252	130	122

(continued)

Table 5-2. Number of completed adult interviews by RDD sample, self-reported stratum and year (continued)

Reported stratum	CHIS 2017-2018		LL/SUR Sample		Cell sample		CHIS 2017			CHIS 2018		
	n	% of target	n	% of target	n	% of target	Total	LL/SUR	Cell	Total	LL/SUR	Cell
23 San Luis Obispo	492	98.4	256	102.4	236	94.4	246	135	111	246	121	125
24 Placer	481	96.2	235	94.0	246	98.4	223	115	108	258	120	138
25 Merced	510	102.0	218	87.2	292	116.8	269	106	163	241	112	129
26 Butte	539	107.8	285	114.0	254	101.6	278	159	119	261	126	135
27 Shasta	588	117.6	305	122.0	283	113.2	334	196	138	254	109	145
28 Yolo	527	105.4	240	96.0	287	114.8	251	123	128	276	117	159
29 El Dorado	505	101.0	230	92.0	275	110.0	258	117	141	247	113	134
30 Imperial	516	103.2	252	100.8	264	105.6	274	134	140	242	118	124
31 Napa	551	110.2	232	92.8	319	127.6	278	103	175	273	129	144
32 Kings	525	105.0	233	93.2	292	116.8	288	120	168	237	113	124
33 Madera	540	108.0	267	106.8	273	109.2	287	138	149	253	129	124
34 Monterey	456	91.2	184	73.6	272	108.8	220	80	140	236	104	132
35 Humboldt	572	114.4	312	124.8	260	104.0	330	190	140	242	122	120
36 Nevada	527	105.4	252	100.8	275	110.0	272	137	135	255	115	140
37 Mendocino	518	103.6	218	87.2	300	120.0	280	89	191	238	129	109
38 Sutter	622	124.4	256	102.4	366	146.4	351	132	219	271	124	147
39 Yuba	462	92.4	223	89.2	239	95.6	214	122	92	248	101	147
40 Lake	495	99.0	225	90.0	270	108.0	242	92	150	253	133	120
41 San Benito	551	110.2	152	60.8	399	159.6	287	118	169	264	34	230
42 Colusa, et al.	386	96.5	221	110.5	165	82.5	181	118	63	205	103	102
43 Del Norte, et al.	379	94.8	190	95.0	189	94.5	186	92	94	193	98	95
44 Amador, et al.	379	94.8	198	99.0	181	90.5	179	101	78	200	97	103

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Note: Excludes ABS sample, and the AIAN and SF oversamples. n = sample size; ‘% of target’= percent of target; ABS = address based sample for Imperial County; LL/SUR = landline and surname samples combined

Table 5-3. Number of completed child interviews by RDD sample, self-reported stratum and year

Reported stratum	CHIS 2017-2018			CHIS 2017			CHIS 2018		
	Total	LL/SUR	Cell	Total	LL/SUR	Cell	Total	LL/SUR	Cell
State-wide	3,128	1,101	2,027	1,599	539	1,060	1,529	562	967
1 Los Angeles	567	222	345	277	91	186	290	131	159
2 San Diego	323	113	210	149	53	96	174	60	114
3 Orange	145	66	79	74	30	44	71	36	35
4 Santa Clara	114	34	80	56	17	39	58	17	41
5 San Bernardino	130	46	84	59	24	35	71	22	49
6 Riverside	155	55	100	86	32	54	69	23	46
7 Alameda	106	28	78	60	17	43	46	11	35
8 Sacramento	79	23	56	40	10	30	39	13	26
9 Contra Costa	64	23	41	36	11	25	28	12	16
10 Fresno	65	18	47	28	7	21	37	11	26
11 San Francisco	54	15	39	36	9	27	18	6	12
12 Ventura	48	18	30	30	12	18	18	6	12
13 San Mateo	41	16	25	23	12	11	18	4	14
14 Kern	54	16	38	33	5	28	21	11	10
15 San Joaquin	35	16	19	22	10	12	13	6	7
16 Sonoma	30	10	20	16	3	13	14	7	7
17 Stanislaus	49	16	33	22	6	16	27	10	17
18 Santa Barbara	27	10	17	16	8	8	11	2	9
19 Solano	47	17	30	20	8	12	27	9	18
20 Tulare	47	17	30	20	5	15	27	12	15

(continued)

Table 5-3. Number of completed child interviews by RDD sample, self-reported stratum and year (continued)

Reported stratum	CHIS 2017-2018			CHIS 2017			CHIS 2018		
	Total	LL/SUR	Cell	Total	LL/SUR	Cell	Total	LL/SUR	Cell
21 Santa Cruz	32	14	18	13	7	6	19	7	12
22 Marin	38	11	27	21	6	15	17	5	12
23 San Luis Obispo	30	12	18	18	7	11	12	5	7
24 Placer	32	9	23	12	0	12	20	9	11
25 Merced	50	20	30	28	11	17	22	9	13
26 Butte	33	11	22	14	7	7	19	4	15
27 Shasta	47	17	30	24	8	16	23	9	14
28 Yolo	40	13	27	18	4	14	22	9	13
29 El Dorado	41	14	27	21	7	14	20	7	13
30 Imperial	87	47	40	67	39	28	20	8	12
31 Napa	32	7	25	12	1	11	20	6	14
32 Kings	55	11	44	31	7	24	24	4	20
33 Madera	53	16	37	32	11	21	21	5	16
34 Monterey	29	6	23	15	2	13	14	4	10
35 Humboldt	44	18	26	23	6	17	21	12	9
36 Nevada	21	7	14	14	6	8	7	1	6
37 Mendocino	37	11	26	21	5	16	16	6	10
38 Sutter	50	16	34	25	8	17	25	8	17
39 Yuba	35	12	23	15	5	10	20	7	13
40 Lake	39	11	28	21	5	16	18	6	12
41 San Benito	35	10	25	19	8	11	16	2	14
42 Colusa, et al.	30	8	22	10	2	8	20	6	14
43 Del Norte, et al.	31	9	22	12	3	9	19	6	13
44 Amador, et al.	27	12	15	10	4	6	17	8	9

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Note: Includes interviews from ABS sample, but excludes interviews from the AIAN and SF oversamples. ABS = address based sample for Imperial County; LL/SUR = landline and surname samples combined.

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

Reported stratum	CHIS 2017 - 2018			CHIS 2017			CHIS 2018		
	Total	LL/SUR	Cell	Total	LL/SUR	Cell	Total	LL/SUR	Cell
State-wide	871	458	413	448	223	225	423	235	188
1 Los Angeles	150	79	71	88	41	47	62	38	24
2 San Diego	89	42	47	35	13	22	54	29	25
3 Orange	42	28	14	22	14	8	20	14	6
4 Santa Clara	36	24	12	21	14	7	15	10	5
5 San Bernardino	31	16	15	11	7	4	20	9	11
6 Riverside	42	24	18	26	13	13	16	11	5
7 Alameda	28	12	16	11	3	8	17	9	8
8 Sacramento	27	13	14	14	6	8	13	7	6
9 Contra Costa	22	12	10	12	6	6	10	6	4
10 Fresno	24	13	11	13	5	8	11	8	3
11 San Francisco	13	8	5	5	4	1	8	4	4
12 Ventura	15	9	6	5	3	2	10	6	4
13 San Mateo	17	6	11	11	5	6	6	1	5
14 Kern	12	5	7	9	3	6	3	2	1
15 San Joaquin	8	5	3	2	1	1	6	4	2
16 Sonoma	10	7	3	6	5	1	4	2	2
17 Stanislaus	10	5	5	4	1	3	6	4	2
18 Santa Barbara	10	5	5	9	5	4	1	0	1
19 Solano	13	6	7	6	2	4	7	4	3
20 Tulare	9	5	4	4	3	1	5	2	3

(continued)

Table 5-4. Number of completed teen interviews by RDD sample, self-reported stratum and year (continued)

Reported stratum	CHIS 2017 - 2018			CHIS 2017			CHIS 2018		
	Total	LL/SUR	Cell	Total	LL/SUR	Cell	Total	LL/SUR	Cell
21 Santa Cruz	11	7	4	5	3	2	6	4	2
22 Marin	10	3	7	2	1	1	8	2	6
23 San Luis Obispo	15	8	7	10	7	3	5	1	4
24 Placer	8	5	3	4	3	1	4	2	2
25 Merced	8	3	5	2	1	1	6	2	4
26 Butte	7	4	3	3	1	2	4	3	1
27 Shasta	10	5	5	6	2	4	4	3	1
28 Yolo	13	9	4	2	2	0	1	7	4
29 El Dorado	18	9	9	7	4	3	11	5	6
30 Imperial	34	24	10	26	19	7	8	5	3
31 Napa	11	6	5	6	3	3	5	3	2
32 Kings	6	2	4	4	1	3	2	1	1
33 Madera	11	3	8	6	1	5	5	2	3
34 Monterey	8	3	5	3	0	3	5	3	2
35 Humboldt	17	9	8	11	5	6	6	4	2
36 Nevada	6	3	3	2	0	2	4	3	1
37 Mendocino	3	1	2	2	0	2	1	1	0
38 Sutter	11	6	5	3	2	1	8	4	4
39 Yuba	8	3	5	1	1	0	7	2	5
40 Lake	9	6	3	7	4	3	2	2	0
41 San Benito	10	4	6	9	3	6	1	1	0
42 Colusa, et al.	9	2	7	3	1	2	6	1	5
43 Del Norte, et al.	11	5	6	4	2	2	7	3	4
44 Amador, et al.	9	4	5	6	3	3	3	1	2

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Note: Includes interviews from ABS sample, but excludes interviews from the AIAN and SF oversamples. ABS = address based sample for Imperial County; LL/SUR = landline and surname samples combined.



Table 5-5 shows the distribution of completed adult interviews by Asian nationality included in the CHIS supplemental samples and sampling frame.

Table 5-5. Number of completed adult interviews by ethnicity, sampling frame, and year

Sampling Frame	Vietnamese			Korean		
	2017-2018	2017	2018	2017-2018	2017	2018
Landline	80	14	66	57	15	42
Cell	134	74	60	228	68	160
Surname frames						
Korean	3	0	3	119	25	94
Vietnamese	209	51	158	9	2	7
ABS	0	0	-	0	0	-
AIAN	0	-	0	0	-	0
San Francisco	1	-	1	1	-	1
Total	427	139	288	414	110	304

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Table 5-6 contains the number of completed interviews by family structure. As shown, we accepted proxy interviews for children and teen interviews for households without a corresponding adult interview.

Table 5-6. Number of completed interviews by interview combinations and year

Interview combinations <sup>a</sup>	CHIS 2017-2018		CHIS 2017		CHIS 2018	
	n	pct	n	pct	n	pct
Adult only	38,314	91.0	19,208	90.9	19,106	91.1
Adult and child	2,598	6.2	1,361	6.4	1,237	5.9
Adult and teen	540	1.3	297	1.4	243	1.2
Adult, child, and teen	240	0.6	120	0.6	120	0.6
Child only	314	0.7	110	0.5	204	1.0
Teen only	66	0.2	22	0.1	44	0.2
Child and teen only	34	0.1	9	0.0	25	0.1
Total	42,106	100.0	21,127	100.0	20,979	100.0

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Note: n = sample size; pct = unweighted percent. <sup>a</sup> Includes completed and partial interviews.

## 6. REFERENCES

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## **APPENDIX A**

Appendix A contains supplemental information on the CHIS 2017-2018 sample design.

Table A-1 compares the definitions of the design strata since CHIS 2001 through the current study.

Table A-2 provides the size of the landline and surname telephone samples for CHIS 2017 and CHIS 2018 separately by sampling frame and design stratum. The corresponding information for the cell phone sample is shown in Table A-3.

Table A-4 provides the number of completed adult interviews by reported stratum and sampling frame by single year of the CHIS 2017-2018 cycle. The corresponding distributions for the child and teen interviews are shown in Table A-5 and Table A-6, respectively.

Table A-1. Design strata definitions for CHIS 2001, 2003, 2005, 2007, 2009, 2011-2012, 2013-2014, 2015-2016, and 2017-2018

County	2015-2016, 2017-2018 Strata	2013-2014 Strata	2005, 2007, 2009, 2011-2012 Strata	2001, 2003 Strata
Los Angeles	1	1	1	1
San Diego	2	2	2	2
Orange	3	3	3	3
Santa Clara	4	4	4	4
San Bernardino	5	5	5	5
Riverside	6	6	6	6
Alameda	7	7	7	7
Sacramento	8	8	8	8
Contra Costa	9	9	9	9
Fresno	10	10	10	10
San Francisco	11	11	11	11
Ventura	12	12	12	12
San Mateo	13	13	13	13
Kern	14	14	14	14
San Joaquin	15	15	15	15
Sonoma	16	16	16	16
Stanislaus	17	17	17	17
Santa Barbara	18	18	18	18
Solano	19	19	19	19
Tulare	20	20	20	20
Santa Cruz	21	21	21	21
Marin	22	22	22	22
San Luis Obispo	23	23	23	23
Placer	24	24	24	24
Merced	25	25	25	25
Butte	26	26	26	26
Shasta	27	27	27	27
Yolo	28	28	28	28
El Dorado	29	29	29	29
Imperial	30	30	30	30
Napa	31	31	31	31
Kings	32	32	32	32
Madera	33	33	33	33
Monterey	34	34	34	34
San Benito	41	41	41	41

(continued)

Table A-1. Design strata definitions for CHIS 2001, 2003, 2005, 2007, 2009, 2011-2012, 2013-2014, 2015-2016, and 2017-2018 (continued)

County	2015-2016, 2017-2018 Strata	2013-2014 Strata	2005, 2007, 2009, 2011- 2012 Strata	2001, 2003 Strata
Lake	40	40	40	37
Mendocino	37	37	37	
Sutter	38	38	38	39
Yuba	39	39	39	
Colusa	42	42	42	38
Glenn				
Tehama				
Nevada	36	36	36	40
Humboldt	35	35	35	35
Del Norte	43	43	43	
Lassen				
Modoc				
Plumas				
Sierra				
Trinity	43.2	43.2	43.2	40
Siskiyou				36
Amador	44	44	44	41
Alpine				
Inyo				
Mariposa	44.1	44.1	44.1	41
Mono				
Tuolumne				
Calaveras	44.2	44.2	44.2	

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey

Table A-2. Number of landline and surname telephone numbers selected by year, sampling frame, and design stratum

Sampling stratum	CHIS 2017						CHIS 2018					
	Landline			Surname			Landline			Surname		
	LL	Ported	Total	Korean	Vietnamese	Total	LL	Ported	Total	Korean	Vietnamese	Total
State-wide	365,707	358	366,065	4,149	2,978	7,127	490,860	1,880	492,740	10,396	6,435	16,831
1 Los Angeles	86,901	82	86,983	1,437	599	2,036	117,642	460	118,102	3,652	1,495	5,147
2 San Diego	52,827	54	52,881	169	222	391	74,605	228	74,833	668	715	1,383
3 Orange	41,133	52	41,185	502	870	1,372	48,821	272	49,093	1,139	1,627	2,766
4 Santa Clara	12,644	15	12,659	369	565	934	17,912	147	18,059	685	865	1,550
5 San Bernardino	17,217	6	17,223	145	76	221	18,760	46	18,806	311	146	457
6 Riverside	22,517	19	22,536	161	70	231	18,909	42	18,951	219	113	332
7 Alameda	12,060	3	12,063	200	98	298	13,745	54	13,799	650	368	1,018
8 Sacramento	6,238	7	6,245	111	98	209	9,288	29	9,317	163	112	275
9 Contra Costa	6,390	2	6,392	114	49	163	6,832	19	6,851	160	71	231
10 Fresno	5,026	4	5,030	44	19	63	6,832	19	6,851	80	30	110
11 San Francisco	7,032	3	7,035	255	92	347	6,556	63	6,619	1,340	427	1,767
12 Ventura	9,293	8	9,301	68	19	87	8,960	19	8,979	127	48	175
13 San Mateo	7,369	5	7,374	161	36	197	6,578	51	6,629	384	104	488
14 Kern	4,472	7	4,479	22	10	32	5,312	19	5,331	33	25	58
15 San Joaquin	3,309	4	3,313	29	30	59	5,047	20	5,067	59	67	126
16 Sonoma	2,036	1	2,037	8	8	16	3,625	19	3,644	14	6	20
17 Stanislaus	2,826	2	2,828	12	7	19	3,869	12	3,881	33	17	50
18 Santa Barbara	2,685	3	2,688	11	3	14	3,311	9	3,320	13	4	17
19 Solano	2,785	0	2,785	29	7	36	5,406	15	5,421	53	24	77
20 Tulare	3,212	1	3,213	6	1	7	5,044	14	5,058	30	8	38

(continued)

Table A-2. Number of landline and surname telephone numbers selected by year, sampling frame, and design stratum (continued)

Sampling stratum	CHIS 2017						CHIS 2018					
	Landline			Surname			Landline			Surname		
	LL	Ported	Total	Korean	Vietnamese	Total	LL	Ported	Total	Korean	Vietnamese	Total
21 Santa Cruz	2,347	1	2,348	13	5	18	4,720	13	4,733	23	3	26
22 Marin	4,235	0	4,235	14	31	45	5,327	4	5,331	35	18	53
23 San Luis Obispo	741	0	741	3	0	3	5,099	10	5,109	22	3	25
24 Placer	960	0	960	7	5	12	6,327	9	6,336	21	10	31
25 Merced	3,297	8	3,305	21	8	29	4,668	17	4,685	20	2	22
26 Butte	885	0	885	5	0	5	4,128	5	4,133	16	7	23
27 Shasta	1,002	5	1,007	7	0	7	4,034	11	4,045	33	3	36
28 Yolo	699	0	699	17	6	23	5,091	12	5,103	54	32	86
29 El Dorado	816	0	816	7	3	10	5,213	16	5,229	28	12	40
30 Imperial	9,198	2	9,200	21	3	24	5,558	7	5,565	38	10	48
31 Napa	4,746	8	4,754	17	5	22	5,792	19	5,811	31	11	42
32 Kings	3,895	10	3,905	18	3	21	5,632	23	5,655	31	8	39
33 Madera	2,624	14	2,638	4	2	6	3,137	42	3,179	20	2	22
34 Monterey	3,124	3	3,127	28	6	34	4,800	8	4,808	66	13	79
35 Humboldt	786	0	786	0	0	0	3,511	6	3,517	14	1	15
36 Nevada	2,329	1	2,330	14	6	20	2,836	10	2,846	5	1	6
37 Mendocino	1,697	3	1,700	18	2	20	2,502	9	2,511	12	4	16
38 Sutter	2,890	7	2,897	12	5	17	4,449	40	4,489	27	4	31
39 Yuba	2,465	5	2,470	39	3	42	3,091	7	3,098	23	3	26
40 Lake	1,923	7	1,930	11	3	14	2,829	13	2,842	14	1	15
41 San Benito	4,732	3	4,735	12	3	15	3,019	22	3,041	15	9	24
42 Colusa, et al.	749	1	750	2	0	2	3,925	11	3,936	13	3	16
43 Del Norte, et al.	710	0	710	1	0	1	3,733	5	3,738	9	2	11
44 Amador, et al.	885	2	887	5	0	5	4,385	4	4,389	13	1	14

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Note. Large increases in reported sample telephone numbers in 2018 reflect how some 2017 sample was retained into 2018 in an attempt to gain adult completes for child first and teen first cases, as well as to utilize sample with remaining active dials.

Table A-3. Number of cellular telephone numbers selected by year and design stratum

Sampling stratum	CHIS 2017				CHIS 2018			
	Cell phones	Surname			Cell phones	Surname		
	Total	Korean	Vietnamese	Total	Total	Korean	Vietnamese	Total
State-wide	280,276	942	2,679	3,621	945,593	3,046	7,655	10,701
1 Los Angeles	52,738	397	425	822	177,099	1,090	1,795	2,885
2 San Diego	29,585	37	262	299	117,577	198	871	1,069
3 Orange	17,854	162	781	943	42,932	229	1,086	1,315
4 Santa Clara	10,206	84	510	594	33,118	147	849	996
5 San Bernardino	9,905	26	53	79	28,289	74	154	228
6 Riverside	16,190	28	100	128	35,063	31	104	135
7 Alameda	8,761	37	139	176	29,452	258	662	920
8 Sacramento	10,328	29	103	132	14,422	42	292	334
9 Contra Costa	9,260	16	33	49	11,685	55	81	136
10 Fresno	5,725	7	49	56	8,953	7	27	34
11 San Francisco	6,892	26	67	93	14,772	541	1,126	1,667
12 Ventura	4,481	6	24	30	12,016	13	31	44
13 San Mateo	5,889	19	29	48	13,207	114	144	258
14 Kern	5,238	1	7	8	9,233	9	4	13
15 San Joaquin	3,227	11	26	37	12,116	10	67	77
16 Sonoma	2,361	0	2	2	3,682	4	7	11
17 Stanislaus	4,047	6	4	10	15,211	13	16	29
18 Santa Barbara	3,253	3	7	10	9,177	11	11	22
19 Solano	5,439	10	10	20	16,358	7	28	35
20 Tulare	2,850	4	6	10	6,886	9	7	16

(continued)



Table A-3. Number of cellular telephone numbers selected by year and design stratum (continued)

Sampling stratum	CHIS 2017				CHIS 2018			
	Cell Phones	Surname			Cell Phones	Surname		
	Total	Korean	Vietnamese	Total	Total	Korean	Vietnamese	Total
21 Santa Cruz	2,440	2	2	4	9,465	4	5	9
22 Marin	3,824	0	3	3	25,932	21	47	68
23 San Luis Obispo	1,179	0	0	0	9,018	5	9	14
24 Placer	1,304	0	3	3	10,469	7	23	30
25 Merced	3,840	4	7	11	13,171	8	28	36
26 Butte	1,258	3	3	6	6,954	4	10	14
27 Shasta	1,265	1	3	4	13,758	9	14	23
28 Yolo	1,344	0	0	0	16,572	30	24	54
29 El Dorado	1,458	0	0	0	15,466	8	7	15
30 Imperial	4,853	1	4	5	14,017	1	7	8
31 Napa	4,583	5	3	8	12,563	11	8	19
32 Kings	3,941	1	2	3	17,160	4	14	18
33 Madera	3,910	0	2	2	14,136	2	9	11
34 Monterey	4,035	8	3	11	7,659	24	18	42
35 Humboldt	1,238	1	0	1	6,082	1	1	2
36 Nevada	3,160	0	0	0	12,354	2	3	5
37 Mendocino	3,569	0	1	1	7,402	0	0	0
38 Sutter	4,176	0	2	2	41,266	23	20	43
39 Yuba	3,145	3	4	7	5,799	10	23	33
40 Lake	3,306	1	0	1	5,970	2	1	3
41 San Benito	4,469	3	0	3	53,616	7	16	23
42 Colusa, et al.	1,045	0	0	0	5,244	0	1	1
43 Del Norte, et al.	1,081	0	0	0	4,819	1	0	1
44 Amador, et al.	1,624	0	0	0	5,453	0	5	5

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Note. Large increases in reported sample telephone numbers in 2018 reflect how some 2017 sample was retained into 2018 in an attempt to gain adult completes for child first and teen first cases, as well as to utilize sample with remaining active dials.

Table A-4. Number of completed adult interviews by year, sampling frame, and self-reported stratum

Sampling stratum	CHIS 2017						CHIS 2018							
	Landline			Cell Phones			Total	Landline			Cell Phones			Total
	LL	Korean	Vietnamese	Cell	Korean	Vietnamese		LL	Korean	Vietnamese	Cell	Korean	Vietnamese	
State-wide	10,106	135	66	10,786	17	43	21,153	8,934	212	163	10,524	37	34	19,904
1 Los Angeles	1,772	32	14	1,824	9	13	3,664	1,679	65	28	1,953	13	3	3,741
2 San Diego	1,143	2	7	1,048	1	3	2,204	1,032	10	16	1,196	0	9	2,263
3 Orange	699	7	14	551	2	9	1,282	594	19	51	422	9	8	1,103
4 Santa Clara	344	8	12	383	1	2	750	269	16	22	392	1	4	704
5 San Bernardino	318	3	1	334	1	2	659	295	9	6	387	1	0	698
6 Riverside	505	6	2	588	1	2	1,104	378	6	1	433	1	1	820
7 Alameda	254	8	2	293	0	3	560	262	17	9	376	5	3	672
8 Sacramento	253	7	4	365	1	3	633	252	3	8	307	0	0	570
9 Contra Costa	192	8	1	324	0	1	526	185	4	1	236	1	0	427
10 Fresno	180	2	2	219	0	0	403	156	3	1	170	0	0	330
11 San Francisco	168	11	4	241	0	0	424	114	29	12	209	0	4	368
12 Ventura	158	4	1	165	0	1	329	141	3	0	158	0	1	303
13 San Mateo	166	6	0	164	0	1	337	102	5	0	143	1	0	251
14 Kern	155	3	2	191	0	0	351	124	1	1	150	1	0	277
15 San Joaquin	106	0	0	134	0	0	240	112	1	3	120	0	0	236
16 Sonoma	96	3	0	105	0	0	204	116	0	0	128	0	0	244
17 Stanislaus	106	0	0	138	1	1	246	116	0	1	132	1	0	250
18 Santa Barbara	106	1	0	141	0	0	248	97	0	0	140	0	0	237
19 Solano	79	1	0	176	0	0	256	116	0	0	141	1	0	258

(continued)

Table A-4. Number of completed adult interviews by year, sampling frame, and self-reported stratum (continued)

Sampling stratum	CHIS 2017							CHIS 2018						
	Landline			Cell Phones			Total	Landline			Cell Phones			Total
	LL	Korean	Vietnamese	Cell	Korean	Vietnamese		LL	Korean	Vietnamese	Cell	Korean	Vietnamese	
20 Tulare	96	0	0	145	0	0	241	123	1	0	140	0	0	264
21 Santa Cruz	110	1	0	144	0	0	255	101	1	0	141	0	0	243
22 Marin	125	1	0	130	0	0	256	129	0	1	121	1	0	252
23 San Luis Obispo	134	1	0	106	0	0	241	119	2	0	125	0	0	246
24 Placer	113	2	0	123	0	1	239	119	1	0	138	0	0	258
25 Merced	107	1	0	148	0	0	256	112	0	0	129	0	0	241
26 Butte	158	0	0	112	0	0	270	125	1	0	134	0	1	261
27 Shasta	195	1	0	134	0	1	331	108	1	0	145	0	0	254
28 Yolo	120	3	0	117	0	0	240	114	1	1	160	0	0	276
29 El Dorado	116	1	0	141	0	0	258	112	1	0	134	0	0	247
30 Imperial	413	0	0	183	0	0	596	116	2	0	124	0	0	242
31 Napa	102	1	0	179	0	0	282	128	1	0	144	0	0	273
32 Kings	119	1	0	156	0	0	276	111	2	0	124	0	0	237
33 Madera	138	0	0	141	0	0	279	128	0	0	125	0	0	253
34 Monterey	79	1	0	149	0	0	229	99	3	1	133	0	0	236
35 Humboldt	190	0	0	131	0	0	321	122	0	0	120	0	0	242
36 Nevada	136	1	0	137	0	0	274	115	0	0	140	0	0	255
37 Mendocino	85	4	0	180	0	0	269	128	1	0	109	0	0	238
38 Sutter	131	1	0	176	0	0	308	122	1	0	147	1	0	271
39 Yuba	121	1	0	125	0	0	247	99	2	0	147	0	0	248
40 Lake	91	1	0	148	0	0	240	132	0	0	121	0	0	253
41 San Benito	118	0	0	159	0	0	277	34	0	0	230	0	0	264
42 Colusa, et al.	117	1	0	67	0	0	185	103	0	0	102	0	0	205
43 Del Norte, et al.	92	0	0	93	0	0	185	98	0	0	95	0	0	193
44 Amador, et al.	100	0	0	78	0	0	178	97	0	0	103	0	0	200

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.

Table A-5. Number of completed child interviews by year, sampling frame, and self-reported stratum

Sampling stratum	CHIS 2017							CHIS 2018						
	Landline			Cell Phones			Total	Landline			Cell Phones			Total
	LL	Korean	Vietnamese	Cell	Korean	Vietnamese		LL	Korean	Vietnamese	Cell	Korean	Vietnamese	
State-wide	526	9	4	1,053	1	6	1,599	545	7	7	962	4	4	1,529
1 Los Angeles	89	1	1	181	1	4	277	128	0	2	159	1	0	290
2 San Diego	53	0	0	96	0	0	149	60	0	0	112	0	2	174
3 Orange	27	1	2	43	0	1	74	34	0	2	34	1	0	71
4 Santa Clara	17	0	0	38	0	1	56	16	0	1	41	0	0	58
5 San Bernardino	24	0	0	35	0	0	59	21	1	0	49	0	0	71
6 Riverside	31	1	0	54	0	0	86	23	0	0	46	0	0	69
7 Alameda	15	2	0	43	0	0	60	9	2	0	33	1	1	46
8 Sacramento	9	1	0	30	0	0	40	12	0	0	27	0	0	39
9 Contra Costa	11	0	0	25	0	0	36	11	1	0	16	0	0	28
10 Fresno	6	1	0	21	0	0	28	10	1	0	26	0	0	37
11 San Francisco	9	0	0	27	0	0	36	4	1	1	12	0	0	18
12 Ventura	12	0	0	18	0	0	30	6	0	0	11	0	1	18
13 San Mateo	11	1	0	11	0	0	23	4	0	0	14	0	0	18
14 Kern	4	1	0	28	0	0	33	11	0	0	10	0	0	21
15 San Joaquin	10	0	0	12	0	0	22	6	0	0	7	0	0	13
16 Sonoma	3	0	0	13	0	0	16	7	0	0	7	0	0	14
17 Stanislaus	6	0	0	16	0	0	22	10	0	0	17	0	0	27
18 Santa Barbara	8	0	0	8	0	0	16	2	0	0	9	0	0	11
19 Solano	8	0	0	12	0	0	20	8	0	0	18	1	0	27

(continued)

Table A-5. Number of completed child interviews by year, sampling frame, and self-reported stratum (continued)

Sampling stratum	CHIS 2017						CHIS 2018							
	Landline			Cell Phones			Total	Landline			Cell Phones			Total
	LL	Korean	Vietnamese	Cell	Korean	Vietnamese		LL	Korean	Vietnamese	Cell	Korean	Vietnamese	
20 Tulare	5	0	0	15	0	0	20	12	0	0	15	0	0	27
21 Santa Cruz	7	0	0	6	0	0	13	7	0	0	12	0	0	19
22 Marin	5	0	1	15	0	0	21	5	0	0	12	0	0	17
23 San Luis Obispo	7	0	0	11	0	0	18	5	0	0	7	0	0	12
24 Placer	0	0	0	12	0	0	12	9	0	0	11	0	0	20
25 Merced	11	0	0	17	0	0	28	9	0	0	13	0	0	22
26 Butte	7	0	0	7	0	0	14	4	0	0	15	0	0	19
27 Shasta	8	0	0	16	0	0	24	9	0	0	14	0	0	23
28 Yolo	4	0	0	14	0	0	18	8	1	0	13	0	0	22
29 El Dorado	7	0	0	14	0	0	21	7	0	0	13	0	0	20
30 Imperial	39	0	0	28	0	0	67	8	0	0	12	0	0	20
31 Napa	1	0	0	11	0	0	12	6	0	0	14	0	0	20
32 Kings	7	0	0	24	0	0	31	4	0	0	20	0	0	24
33 Madera	11	0	0	21	0	0	32	5	0	0	16	0	0	21
34 Monterey	2	0	0	13	0	0	15	3	0	1	10	0	0	14
35 Humboldt	6	0	0	17	0	0	23	12	0	0	9	0	0	21
36 Nevada	6	0	0	8	0	0	14	1	0	0	6	0	0	7
37 Mendocino	5	0	0	16	0	0	21	6	0	0	10	0	0	16
38 Sutter	8	0	0	17	0	0	25	8	0	0	17	0	0	25
39 Yuba	5	0	0	10	0	0	15	7	0	0	13	0	0	20
40 Lake	5	0	0	16	0	0	21	6	0	0	12	0	0	18
41 San Benito	8	0	0	11	0	0	19	2	0	0	14	0	0	16
42 Colusa, et al.	2	0	0	8	0	0	10	6	0	0	14	0	0	20
43 Del Norte, et al.	3	0	0	9	0	0	12	6	0	0	13	0	0	19
44 Amador, et al.	4	0	0	6	0	0	10	8	0	0	9	0	0	17

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey

Table A-6. Number of completed teen interviews by year, sampling frame, and self-reported stratum

Sampling stratum	CHIS 2017							CHIS 2018						
	Landline			Cell Phones			Total	Landline			Cell Phones			Total
	LL	Korean	Vietnamese	Cell	Korean	Vietnamese		LL	Korean	Vietnamese	Cell	Korean	Vietnamese	
State-wide	218	3	2	222	0	3	448	228	0	4	190	1	0	423
1 Los Angeles	39	1	1	45	0	2	88	38	0	0	24	0	0	62
2 San Diego	13	0	0	22	0	0	35	29	0	0	25	0	0	54
3 Orange	13	0	1	8	0	0	22	13	0	1	6	0	0	20
4 Santa Clara	14	0	0	7	0	0	21	8	0	2	5	0	0	15
5 San Bernardino	7	0	0	4	0	0	11	9	0	0	11	0	0	20
6 Riverside	13	0	0	13	0	0	26	11	0	0	5	0	0	16
7 Alameda	3	0	0	8	0	0	11	9	0	0	8	0	0	17
8 Sacramento	6	0	0	8	0	0	14	6	0	0	7	0	0	13
9 Contra Costa	6	0	0	6	0	0	12	6	0	0	4	0	0	10
10 Fresno	4	1	0	8	0	0	13	8	0	0	3	0	0	11
11 San Francisco	3	1	0	1	0	0	5	4	0	0	4	0	0	8
12 Ventura	3	0	0	2	0	0	5	6	0	0	4	0	0	10
13 San Mateo	5	0	0	6	0	0	11	1	0	0	5	0	0	6
14 Kern	3	0	0	6	0	0	9	2	0	0	1	0	0	3
15 San Joaquin	1	0	0	1	0	0	2	4	0	0	2	0	0	6
16 Sonoma	5	0	0	1	0	0	6	2	0	0	2	0	0	4
17 Stanislaus	1	0	0	3	0	0	4	4	0	0	2	0	0	6
18 Santa Barbara	5	0	0	4	0	0	9	0	0	0	1	0	0	1
19 Solano	2	0	0	4	0	0	6	4	0	0	2	1	0	7
20 Tulare	3	0	0	1	0	0	4	2	0	0	3	0	0	5

(continued)

Table A-6. Number of completed teen interviews by year, sampling frame, and self-reported stratum (continued)

Sampling stratum	CHIS 2017							CHIS 2018						
	Landline			Cell Phones			Total	Landline			Cell Phones			Total
	LL	Korean	Vietnamese	Cell	Korean	Vietnamese		LL	Korean	Vietnamese	Cell	Korean	Vietnamese	
21 Santa Cruz	3	0	0	2	0	0	5	4	0	0	2	0	0	6
22 Marin	1	0	0	1	0	0	2	2	0	0	6	0	0	8
23 San Luis Obispo	7	0	0	3	0	0	10	1	0	0	4	0	0	5
24 Placer	3	0	0	1	0	0	4	2	0	0	2	0	0	4
25 Merced	1	0	0	1	0	0	2	1	0	0	5	0	0	6
26 Butte	1	0	0	2	0	0	3	3	0	0	1	0	0	4
27 Shasta	2	0	0	3	0	1	6	3	0	0	1	0	0	4
28 Yolo	2	0	0	0	0	0	2	7	0	0	4	0	0	11
29 El Dorado	4	0	0	3	0	0	7	5	0	0	6	0	0	11
30 Imperial	19	0	0	7	0	0	26	5	0	0	3	0	0	8
31 Napa	3	0	0	3	0	0	6	3	0	0	2	0	0	5
32 Kings	1	0	0	3	0	0	4	1	0	0	1	0	0	2
33 Madera	1	0	0	5	0	0	6	2	0	0	3	0	0	5
34 Monterey	0	0	0	3	0	0	3	1	0	1	3	0	0	5
35 Humboldt	5	0	0	6	0	0	11	4	0	0	2	0	0	6
36 Nevada	0	0	0	2	0	0	2	3	0	0	1	0	0	4
37 Mendocino	0	0	0	2	0	0	2	1	0	0	0	0	0	1
38 Sutter	2	0	0	1	0	0	3	4	0	0	4	0	0	8
39 Yuba	1	0	0	0	0	0	1	2	0	0	5	0	0	7
40 Lake	4	0	0	3	0	0	7	2	0	0	0	0	0	2
41 San Benito	3	0	0	6	0	0	9	1	0	0	0	0	0	1
42 Colusa, et al.	1	0	0	2	0	0	3	1	0	0	5	0	0	6
43 Del Norte, et al.	2	0	0	2	0	0	4	3	0	0	4	0	0	7
44 Amador, et al.	3	0	0	3	0	0	6	1	0	0	2	0	0	3

Source: UCLA Center for Health Policy Research, 2017-2018 California Health Interview Survey.