



*October 2018*

CHIS 2017 Methodology Report Series

# Report 1

# Sample Design

**CALIFORNIA HEALTH INTERVIEW SURVEY**

**CHIS 2017 METHODOLOGY SERIES**

**REPORT 1**

**SAMPLE DESIGN**

**OCTOBER 2018**

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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, 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.

**Suggested citation:**

California Health Interview Survey. *CHIS 2017 Methodology Series: Report 1 - Sample Design*. Los Angeles, CA: UCLA Center for Health Policy Research, 2018.

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The California Health Interview Survey is a collaborative project of the UCLA Center for Health Policy Research, the California Department of Public Health, and the Department of Health Care Services. Funding for CHIS 2017 came from multiple sources: the California Department of Health Care Services, the California Department of Health Care Services (Mental Health Services Division), the California Department of Public Health, The California Endowment, the California Health Benefit Exchange, the California Health Care Foundation, the California Wellness Foundation, First 5 California, Kaiser Permanente, San Diego County Health and Human Services Agency, and Imperial County Public Health Department.

## PREFACE

*Sample Design* is the first in a series of methodological reports describing the 2017 California Health Interview Survey (CHIS 2017). 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 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**

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. An appropriate sample design is a feature of a successful survey, and CHIS 2017 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 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 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.

- 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 data were collected between June and December, 2017. As in previous CHIS cycles, weights are included with the data files and are based on the State of California's Department of Finance population estimates and projections, adjusted to remove the population living in group quarters (such as nursing homes, prisons, etc.) and thus not eligible to participate in CHIS. When the weights are applied to the data, the results represent California's residential population during that year for the age group corresponding to the data file in use (adult, adolescent, or child). In CHIS 2017, data users will be able to produce single-year estimates using the weights provided.

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

<http://www.chis.ucla.edu/chis/design/Documents/whats-new-chis-2017.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 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 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 38 Korean, and 74 Vietnamese adult interviews based on self-identified ethnicity for the 2017 survey year.<sup>1</sup> Additional samples from both the landline and cell phone frames produced 635 interviews in 2017 within San Diego County. Furthermore, an address-based sample from the USPS Delivery Sequence File produced 332 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, all sample frames produced totals of 113 Korean, and 148 Vietnamese adult interviews.

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

Source: UCLA Center for Health Policy Research, 2017 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, 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 448 teen interviews and 1,600 child interviews were completed in CHIS 2017 with approximately 51% of teen interviews and 66% 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, 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.

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

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<sup>2</sup> <https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201806.pdf>

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.

#### **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, 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 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 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 interviews by type of sample and instrument

Type of sample <sup>1</sup>	Adult <sup>2</sup>	Child	Adolescent
Total all samples	21,153	1,600	448
Landline RDD <sup>3</sup>	9,831	501	206
Cell RDD	10,722	1,037	219
Vietnamese surname list landline	47	6	2
Vietnamese surname list cell phone	44	4	3
Korean surname list landline	133	9	3
Korean surname list cell phone	19	1	
Both Korean and Vietnamese Landline	18		
Imperial County ABS Oversample	339	42	15

Source: UCLA Center for Health Policy Research, 2017 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 69 of the 120 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 43 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 53 minutes for the adult interview, 31 minutes for the teen, and 21 minutes for the child. More than seven 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 seven percent of all adolescent interviews.

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

Table 1-3. CHIS 2017 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	✓		
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	✓		
Marijuana	✓	✓	
Opioid use	✓		
Alcohol, cigarette use, E-cigarette	✓	✓	
Sexual behaviors	✓	✓	
HIV testing, HIV prevention medication	✓	✓	
Sleep and technology		✓	
Sedentary time		✓	✓
Contraceptive use	✓	✓	
<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	✓		

(continued)

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

<b>Neighborhood and housing</b>	<b>Adult</b>	<b>Teen</b>	<b>Child</b>
Safety, social cohesion	✓	✓	✓
Homeownership, length of time at current residence	✓		
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	✓		
Timely appointment	✓		✓
Access to specialist and general doctors	✓		
Tele-medical care	✓		
<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	✓		
<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	✓		

(continued)



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

<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	✓		
<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 California Health Interview Survey.

## 1.5 Response Rates

The overall response rates for CHIS 2017 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, the landline/list sample household response rate was 9.3 percent (the product of the screener response rate of 13.2 percent and the extended interview response rate at the household level of 70.3 percent). The cell sample household response rate was 6.5 percent, incorporating a screener response rate of 10.0 percent household-level extended interview response rate of 65.2 percent. CHIS uses AAPOR response rate RR4 (see more detailed in *CHIS 2017 Methodology Series: Report 4 – Response Rates*).

Within the landline and cell phone sampling frames for 2017, the extended interview response rate for the landline/list sample varied across the adult (61.0 percent), child (63.3 percent) and adolescent (26.6 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 66.6 percent, the child rate was 63.9 percent, and the adolescent rate was 20.3 percent in 2017 (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 response rates - Conditional

Type of Sample	Screener	Household	Adult (given screened)	Child (given screened & eligibility)	Adolescent (given screened & permission)
Overall	11.0%	66.8%	63.0%	63.7%	23.4%
Landline RDD/List	13.2%	70.3%	61.0%	63.3%	26.6%
Cell RDD/List	10.0%	65.2%	66.6%	63.9%	20.3%

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

Table 1-4b. CHIS response rates - Unconditional

Type of Sample	Screener	Household	Adult (given screened)	Child (given screened & eligibility)	Adolescent (given screened & permission)
Overall	11.0%	7.1%	6.7%	6.7%	2.4%
Landline RDD/List	13.2%	9.3%	8.1%	8.4%	3.5%
Cell RDD/List	10.0%	6.5%	6.6%	6.4%	2.0%

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

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 36.5 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 36.9 percent of all fielded landline telephone numbers. For cell sample, an advance letter was mailed for 38.5 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 40.7 percent of all fielded cell telephone numbers. As in all CHIS cycles since CHIS 2005, a \$2 bill was included with the CHIS 2017 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, either a spouse/partner or adult child completed a proxy interview for 3 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 accomplish the following objectives:

- Compensate for differential probabilities of selection for phone numbers (households) and persons within household;
- Reduce biases occurring because nonrespondents 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 were created primarily from the California Department of Finance’s (DOF) 2017 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 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 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 nonrespondents 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, SPA, 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 were low, with most variables missing valid responses for less than 1% of the sample.

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 continuous 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 and region of California were imputed by SSRS. UCLA-CHPR began their imputation process by imputing household income and educational attainment, so that these characteristics are 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 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.

### 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 2009 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 from 2016 (50.0%) 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, 2017). As such, sampling from only a landline frame will introduce a large bias in the final

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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\\_201712.pdf](https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless_state_201712.pdf)

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 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. 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 42.6%.<sup>7</sup>

## **2.3 Supplemental Sampling**

Supplemental sampling was used to increase representation for certain Asian nationalities and for certain geographic areas. We discuss each below.

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

CHIS used two approaches to oversample Vietnamese and Koreans. First, we oversampled landline telephone exchanges and cellular rate centers that had a relatively high proportion of Asians. 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.

Second, surname list frames for both nationalities were oversampled, as has been done in many CHIS cycles since 2009. These frames, provided by MSG, were generated from listed landline telephone numbers with surnames likely to be associated with Asian persons. Use of the surname frames was

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<sup>7</sup> [https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless\\_state\\_201712.pdf](https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless_state_201712.pdf)



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. Similar to CHIS 2015-2016, all respondents with eligible adults were interviewed, whereas in the past only Vietnamese and Korean households would be interviewed.

Additional details on these oversample procedures are available in Sections 3.1.1 and 3.1.2 of *CHIS 2017 Methodology Series: Report 5 – Weighting and Variance Estimation*.

### **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. As well, to target an area within northern Imperial County, addresses were randomly selected from certain census tracts. Additional details on the sampling methodologies are provided in Section 3.3.

### 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 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 2016 National Health Interview Survey suggest that 2.6 percent of California households do not have either a landline or cell phone, and are therefore excluded from sampling for CHIS 2017 ([http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless\\_state\\_201712.pdf](http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless_state_201712.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 in Table 3-1.

Overall, CHIS 2017 was originally designed to yield 20,000 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) 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>	20,000
Landline sample, 50% of total	10,000
Cell phone sample, 50% of total	10,000
Teens (overall) <sup>b</sup>	1,175
Children (overall) <sup>b</sup>	2,100
Supplemental geographic samples (adults only):	
North Imperial County, CHIS 2016	350
San Diego County, CHIS 2016	675
State-wide, Asian Nationality	
Adults, Vietnamese	250
Adults, Korean	250

Source: UCLA Center for Health Policy Research, 2017 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 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>	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 (all) <sup>b</sup>	16. Sonoma	36. Nevada
2.1 North Coastal	17. Stanislaus	37. Mendocino
2.2 North Central	18. Santa Barbara	38. Sutter
2.3 Central	19. Solano	39. Yuba <sup>c</sup>
2.4 South	20. Tulare	40. Lake
2.5 East	21. Santa Cruz	41. San Benito
2.6 North Inland	22. Marin	42. Tehama-Glenn-Colusa
3. Orange	23. San Luis Obispo	43. Del Norte-Siskiyou-Lassen-Trinity-Modoc-Plumas-Sierra
4. Santa Clara	24. Placer	
5. San Bernardino	25. Merced	44. Tuolumne-Calaveras-Amador-Inyo-Mariposa-Mono-Alpine
6. Riverside	26. Butte	

Source: UCLA Center for Health Policy Research, 2017 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, 2017). Therefore, the continuation of the dual-frame methodology

for CHIS 2017, but with a higher sample allocation to cell phone numbers than used in CHIS 2013-2014 (equal vs. 80% landline), 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 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	10,000	10,000	20,000	
1 Los Angeles (total) <sup>a</sup>	1,924	1,924	3,847	Over 9 million
1.1 – Antelope Valley	125	125	250	
1.2 – San Fernando Valley	402	402	804	
1.3 – San Gabriel Valley	344	344	687	
1.4 – Metro	227	227	455	
1.5 – West	132	132	264	
1.6 – South	184	184	367	
1.7 – East	228	228	457	
1.8 – South Bay	282	282	564	
2 San Diego (total) <sup>b</sup>	777	777	1,553	3.2 million or greater
2.1 – North Coastal	130	130	259	
2.2 – North Central	130	130	259	
2.3 – Central	130	130	259	
2.4 – South	130	130	259	
2.5 – East	130	130	259	
2.6 – North Inland	130	130	259	
3 Orange	558	558	1,115	900,000 to
4 Santa Clara	384	384	768	3.2 million
5 San Bernardino	332	332	664	
6 Riverside	520	520	1,040	
7 Alameda	304	304	607	
8 Sacramento	350	350	700	
9 Contra Costa	269	269	537	
10 Fresno	224	224	448	

(continued)

Table 3-3. Initial 2017 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>
11 San Francisco	188	188	375	600,000 to
12 Ventura	143	143	285	900,000
13 San Mateo	178	178	355	
14 Kern	179	179	357	
15 San Joaquin	125	125	250	
16 Sonoma	125	125	250	Medium
17 Stanislaus	125	125	250	counties
18 Santa Barbara	125	125	250	100,000 to
19 Solano	125	125	250	500,000
20 Tulare	125	125	250	
21 Santa Cruz	125	125	250	
22 Marin	125	125	250	
23 San Luis Obispo	125	125	250	
24 Placer	125	125	250	
25 Merced	125	125	250	
26 Butte	125	125	250	
27 Shasta	125	125	250	
28 Yolo	125	125	250	
29 El Dorado	125	125	250	
30 Imperial	125	125	250	
31 Napa	125	125	250	
32 Kings	125	125	250	
33 Madera	125	125	250	
34 Monterey	125	125	250	
35 Humboldt	125	125	250	
36 Nevada	125	125	250	Small counties
37 Mendocino	125	125	250	Less than
38 Sutter	125	125	250	100,000
39 Yuba	125	125	250	
40 Lake	125	125	250	
41 San Benito	125	125	250	
42 Colusa-Glenn-Tehama	100	100	200	Small counties
43 Del Norte-Lassen-Modoc-Plumas-Sierra-Siskiyou-Trinity	100	100	200	combined
44 Amador-Alpine-Calaveras-Inyo-Mariposa-Mono-Tuolumne	100	100	200	

Source: UCLA Center for Health Policy Research, 2017 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 MSG 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, 24 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 CHIS 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 2017, 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. 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 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 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 total. 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 northern 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 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 California Health Interview Survey.

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

### 3.4 Sample Selection and Sample Releases

The revised 2017 adult interview targets including the two supplemental geographic samples (San Diego County, and the northern area of Imperial County) are shown in Table 3-7.

Table 3-7. Final 2017 targets for completed adult interviews by design strata

Stratum	Landline sample	Cell sample	ABS sample	Total
State Total	10,313	10,313	350	20,626
1 Los Angeles (total) <sup>a</sup>	1,924	1,924		3,848
1.1 – Antelope Valley	125	125		250
1.2 – San Fernando Valley	402	402		804
1.3 – San Gabriel Valley	344	344		687
1.4 – Metro	227	227		455
1.5 – West	132	132		264
1.6 – South	184	184		367
1.7 – East	228	228		457
1.8 – South Bay	282	282		564
2 San Diego (total) <sup>b</sup>	1,089	1,089		2,178
2.1 – North Coastal	182	182		364
2.2 – North Central	182	182		364
2.3 – Central	182	182		364
2.4 – South	182	182		364
2.5 – East	182	182		364
2.6 – North Inland	182	182		364
3 Orange	558	558		1,116
4 Santa Clara	384	384		768
5 San Bernardino	332	332		664
6 Riverside	520	520		1,040
7 Alameda	304	304		608
8 Sacramento	350	350		700
9 Contra Costa	269	269		538
10 Fresno	224	224		448
11 San Francisco	188	188		376
12 Ventura	143	143		286
13 San Mateo	178	178		356
14 Kern	179	179		358
15 San Joaquin	125	125		250
16 Sonoma	125	125		250
17 Stanislaus	125	125		250
18 Santa Barbara	125	125		250
19 Solano	125	125		250
20 Tulare	125	125		250
21 Santa Cruz	125	125		250
22 Marin	125	125		250
23 San Luis Obispo	125	125		250

(continued)

Table 3-7. Final 2017 targets for completed adult interviews by design strata (continued)

Stratum	Landline sample	Cell sample	ABS sample	Total
24 Placer	125	125		250
25 Merced	125	125		250
26 Butte	125	125		250
27 Shasta	125	125		250
28 Yolo	125	125		250
29 El Dorado	125	125		250
30 Imperial	125	125	350	250
31 Napa	125	125		250
32 Kings	125	125		250
33 Madera	125	125		250
34 Monterey	125	125		250
35 Humboldt	125	125		250
36 Nevada	125	125		250
37 Mendocino	125	125		250
38 Sutter	125	125		250
39 Yuba	125	125		250
40 Lake	125	125		250
41 San Benito	125	125		250
42 Colusa-Glenn-Tehama	100	100		200
43 Del Norte-Lassen-Modoc-Plumas-Sierra-Siskiyou-Trinity	100	100		200
44 Amador-Alpine-Calaveras-Inyo-Mariposa-Mono-Tuolumne	100	100		200

Source: UCLA Center for Health Policy Research, 2017 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 (Table 3-1). Table 3-8 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 1.5 million telephone numbers (Table 3-8) and 5,250 Imperial County addresses (Table 3-6). We purged 65.6% of the telephone sample for CHIS 2017 because of its non-working status.

Table 3-8. Number of telephone numbers selected and fielded by sampling frame

Sampling Frame	Generated	Fielded
Total	1,893,740	651,837
Landline	1,364,876	361,184
Listed	128,633	128,633
Unlisted	1,236,243	232,551
Cell Phone	518,116	279,905
Listed	111,950	111,950
Unlisted	406,166	167,955
Surname	10,748	10,748
Korean	5,488	5,488
Vietnamese	5,260	5,260

Source: UCLA Center for Health Policy Research, 2017 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

	CHIS 2017	pct <sup>a,b</sup>
Households with children (total)	2,758	100.0
Child-first procedure	206	7.5
Child interview	152	73.8
No child interview	54	26.2
No child-first procedure	2,552	92.5
Child interview	1,448	56.7
No child interview	1,104	43.3
Households with teens (total)	2,365	100.0
Child-first procedure	84	3.6
Teen interview	19	22.6
No Teen interview	65	77.4
No child-first procedure	2,281	96.4
Teen interview	429	18.8
No Teen interview	1,852	81.2

Source: UCLA Center for Health Policy Research, 2017 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.

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	
		n	pct
Equal	Only children 0 to 5 years	760	27.5
	Only children 6 to 11 years	1,301	47.0
Unequal	Children 0 to 5 and 6 to 11 years	705	25.5
	Total	2,766	100.0

Source: UCLA Center for Health Policy Research, 2017 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. 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 Methodology Series: Report 4 – Response Rates*.

Table 5-1 compares the number of completed interviews by sample and interview type. These goals were exceeded for the landline and cell phone samples combined (100.9%) and the ratio of landline to cell phone interviews was 0.93 (=10,025/10,789). The Imperial County ABS address goals were the hardest to meet, owing to for example limited time to recruit the sampled households.

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

Sample type/interview type	Completed interviews by year			2017 Target	
	2015	2016	2017	n	pct <sup>b</sup>
Landline <sup>a</sup> Adult	11,674	10,513	10,025	10,313	97.2
Child	1,033	693	513	-	-
Teen	387	399	211	-	-
Cell sample Adult	9,360	10,284	10,789	10,313	104.6
Child	1,124	1,412	1,045	-	-
Teen	367	429	222	-	-
ABS sample Adult	-	258	339	350	96.9
Child	-	31	41	-	-
Teen	-	12	15	-	-
All samples Adult	21,034	21,055	21,153	20,976	100.8
Child	2,157	2,136	1,600	-	-
Teen	754	840	448	-	-

Source: UCLA Center for Health Policy Research, 2017 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. 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 ranged from 10% to 47% with an average of 22.3%

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

Reported stratum	CHIS 2017		LL sample		Cell sample	
	n	% of target	n	% of target	n	% of target
State-wide	20,813	100.9	10,029	97.2	10,784	104.6
1 Los Angeles	3,675	95.5	1,819	94.5	1,856	96.5
2 San Diego	2,174	99.8	1,152	105.8	1,022	93.8
3 Orange	1,269	113.7	720	129.0	549	98.4
4 Santa Clara	772	100.5	364	94.8	408	106.3
5 San Bernardino	650	97.9	322	97.0	328	98.8
6 Riverside	1,099	105.7	514	98.8	585	112.5
7 Alameda	546	89.8	264	86.8	282	92.8
8 Sacramento	635	90.7	264	75.4	371	106.0
9 Contra Costa	516	95.9	201	74.7	315	117.1
10 Fresno	394	87.9	184	82.1	210	93.8
11 San Francisco	450	119.7	184	97.9	266	141.5
12 Ventura	312	109.1	163	114.0	149	104.2
13 San Mateo	337	94.7	172	96.6	165	92.7
14 Kern	338	94.4	160	89.4	178	99.4
15 San Joaquin	222	88.8	106	84.8	116	92.8
16 Sonoma	216	86.4	99	79.2	117	93.6
17 Stanislaus	249	99.6	106	84.8	143	114.4
18 Santa Barbara	259	103.6	106	84.8	153	122.4
19 Solano	243	97.2	79	63.2	164	131.2
20 Tulare	234	93.6	96	76.8	138	110.4
21 Santa Cruz	249	99.6	111	88.8	138	110.4
22 Marin	246	98.4	126	100.8	120	96.0
23 San Luis Obispo	246	98.4	135	108.0	111	88.8
24 Placer	223	89.2	115	92.0	108	86.4
25 Merced	269	107.6	106	84.8	163	130.4
26 Butte	278	111.2	159	127.2	119	95.2
27 Shasta	334	133.6	196	156.8	138	110.4
28 Yolo	251	100.4	123	98.4	128	102.4
29 El Dorado	258	103.2	117	93.6	141	112.8
30 Imperial	274	109.6	134	107.2	140	112.0
31 Napa	278	111.2	103	82.4	175	140.0
32 Kings	288	115.2	120	96.0	168	134.4

(continued)

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

Reported stratum	CHIS 2017		LL sample		Cell sample	
	n	% of target	n	% of target	n	% of target
33 Madera	287	114.8	138	110.4	149	119.2
34 Monterey	220	88.0	80	64.0	140	112.0
35 Humboldt	330	132.0	190	152.0	140	112.0
36 Nevada	272	108.8	137	109.6	135	108.0
37 Mendocino	280	112.0	89	71.2	191	152.8
38 Sutter	351	140.4	132	105.6	219	175.2
39 Yuba	214	85.6	122	97.6	92	73.6
40 Lake	242	96.8	92	73.6	150	120.0
41 San Benito	287	114.8	118	94.4	169	135.2
42 Colusa-Glenn-Tehama	181	90.5	118	118.0	63	63.0
43 Del Norte-Lassen-Modoc-Plumas-Sierra-Siskiyou-Trinity	186	93.0	92	92.0	94	94.0
44 Amador-Alpine-Calaveras-Inyo-Mariposa-Mono-Tuolumne	179	89.5	101	101.0	78	78.0

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

Note: n = sample size; ‘% of target’= percent of target excluding ABS; ABS = address based sample for Imperial County; LL/SUR = landline and surname samples combined

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

Reported stratum	CHIS 2017		
	Total <sup>a</sup>	LL	Cell
State-wide	1,600	539	1,060
1 Los Angeles	277	91	186
2 San Diego	149	53	96
3 Orange	74	30	44
4 Santa Clara	56	17	39
5 San Bernardino	59	24	35
6 Riverside	86	32	54
7 Alameda	60	17	43
8 Sacramento	40	10	30
9 Contra Costa	36	11	25
10 Fresno	28	7	21

(continued)

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

Reported stratum	CHIS 2017		
	Total <sup>a</sup>	LL	Cell
11 San Francisco	36	9	27
12 Ventura	30	12	18
13 San Mateo	23	12	11
14 Kern	33	5	28
15 San Joaquin	22	10	12
16 Sonoma	16	3	13
17 Stanislaus	22	6	16
18 Santa Barbara	16	8	8
19 Solano	20	8	12
20 Tulare	20	5	15
21 Santa Cruz	13	7	6
22 Marin	21	6	15
23 San Luis Obispo	18	7	11
24 Placer	12	0	12
25 Merced	28	11	17
26 Butte	14	7	7
27 Shasta	24	8	16
28 Yolo	18	4	14
29 El Dorado	21	7	14
30 Imperial	67	39	28
31 Napa	12	1	11
32 Kings	31	7	24
33 Madera	32	11	21
34 Monterey	15	2	13
35 Humboldt	23	6	17
36 Nevada	14	6	8
37 Mendocino	21	5	16
38 Sutter	25	8	17
39 Yuba	15	5	10
40 Lake	21	5	16
41 San Benito	19	8	11
42 Colusa-Glenn-Tehama	10	2	8
43 Del Norte-Lassen-Modoc-Plumas-Sierra-Siskiyou-Trinity	12	3	9
44 Amador-Alpine-Calaveras-Inyo-Mariposa-Mono-Tuolumne	10	4	6

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

<sup>a</sup> Includes interviews from ABS sample.



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

Reported stratum	CHIS 2017		
	Total <sup>a</sup>	LL/SUR	Cell
State-wide	448	223	225
1 Los Angeles	88	41	47
2 San Diego	35	13	22
3 Orange	22	14	8
4 Santa Clara	21	14	7
5 San Bernardino	11	7	4
6 Riverside	26	13	13
7 Alameda	11	3	8
8 Sacramento	14	6	8
9 Contra Costa	12	6	6
10 Fresno	13	5	8
11 San Francisco	5	4	1
12 Ventura	5	3	2
13 San Mateo	11	5	6
14 Kern	9	3	6
15 San Joaquin	2	1	1
16 Sonoma	6	5	1
17 Stanislaus	4	1	3
18 Santa Barbara	9	5	4
19 Solano	6	2	4
20 Tulare	4	3	1
21 Santa Cruz	5	3	2
22 Marin	2	1	1
23 San Luis Obispo	10	7	3
24 Placer	4	3	1
25 Merced	2	1	1
26 Butte	3	1	2
27 Shasta	6	2	4
28 Yolo	2	2	0
29 El Dorado	7	4	3
30 Imperial	26	19	7
31 Napa	6	3	3
32 Kings	4	1	3
33 Madera	6	1	5
34 Monterey	3	0	3
35 Humboldt	11	5	6
36 Nevada	2	0	2
37 Mendocino	2	0	2

(continued)

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

Reported stratum	CHIS 2017		
	Total <sup>a</sup>	LL/SUR	Cell
38 Sutter	3	2	1
39 Yuba	1	1	0
40 Lake	7	4	3
41 San Benito	9	3	6
42 Colusa, Glenn, Tehama	3	1	2
43 Del Norte-Lassen-Modoc-Plumas-Sierra-Siskiyou-Trinity	4	2	2
44 Amador-Alpine-Calaveras-Inyo-Mariposa-Mono-Tuolumne	6	3	3

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

<sup>a</sup> Includes interviews from ABS sample.

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
Landline	14	15
Cell	74	68
Surname frames		
Korean	0	25
Vietnamese	51	2
ABS	0	0
Total	139	110

Source: UCLA Center for Health Policy Research, 2017 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	
	n	pct
Adult only	19,208	90.9
Adult and child	1,361	6.4
Adult and teen	297	1.4
Adult, child and teen	120	0.6
Child only	110	0.5
Teen only	22	0.1
Child and teen only	9	0.0
Total	21,127	100.0

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

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

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## **APPENDIX A**

Appendix A contains supplemental information on the CHIS 2017 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 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 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

County	2015-2016, 2017 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	34
Lake	40	40	40	37

(continued)

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

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

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

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

Sampling stratum	Landline			Surname		
	LL	Ported	Total	Korean	Vietnamese	Total
State-wide	365,707	358	366,065	4,149	2,978	7,127
1 Los Angeles	86,901	82	86,983	1,437	599	2,036
2 San Diego	52,827	54	52,881	169	222	391
3 Orange	41,133	52	41,185	502	870	1,372
4 Santa Clara	12,644	15	12,659	369	565	934
5 San Bernardino	17,217	6	17,223	145	76	221
6 Riverside	22,517	19	22,536	161	70	231
7 Alameda	12,060	3	12,063	200	98	298
8 Sacramento	6,238	7	6,245	111	98	209
9 Contra Costa	6,390	2	6,392	114	49	163
10 Fresno	5,026	4	5,030	44	19	63
11 San Francisco	7,032	3	7,035	255	92	347
12 Ventura	9,293	8	9,301	68	19	87
13 San Mateo	7,369	5	7,374	161	36	197
14 Kern	4,472	7	4,479	22	10	32
15 San Joaquin	3,309	4	3,313	29	30	59
16 Sonoma	2,036	1	2,037	8	8	16
17 Stanislaus	2,826	2	2,828	12	7	19
18 Santa Barbara	2,685	3	2,688	11	3	14
19 Solano	2,785	0	2,785	29	7	36
20 Tulare	3,212	1	3,213	6	1	7
21 Santa Cruz	2,347	1	2,348	13	5	18
22 Marin	4,235	0	4,235	14	31	45
23 San Luis Obispo	741	0	741	3	0	3
24 Placer	960	0	960	7	5	12
25 Merced	3,297	8	3,305	21	8	29
26 Butte	885	0	885	5	0	5
27 Shasta	1,002	5	1,007	7	0	7
28 Yolo	699	0	699	17	6	23
29 El Dorado	816	0	816	7	3	10
30 Imperial	9,198	2	9,200	21	3	24
31 Napa	4,746	8	4,754	17	5	22
32 Kings	3,895	10	3,905	18	3	21
33 Madera	2,624	14	2,638	4	2	6
34 Monterey	3,124	3	3,127	28	6	34
35 Humboldt	786	0	786	0	0	0
36 Nevada	2,329	1	2,330	14	6	20
37 Mendocino	1,697	3	1,700	18	2	20
38 Sutter	2,890	7	2,897	12	5	17

(continued)



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

Sampling stratum	Landline			Surname		
	LL	Ported	Total	Korean	Vietnamese	Total
40 Lake	1,923	7	1,930	11	3	14
41 San Benito	4,732	3	4,735	12	3	15
42 Colusa, Glenn, Tehama	749	1	750	2	0	2
43 Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	710	0	710	1	0	1
44 Amador, Alpine, Calaveras, Inyo, Mariposa, Mono, Tuolumne	885	2	887	5	0	5

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

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

Sampling stratum	Cell	Surname		
		Korean	Vietnamese	Total
State-wide	280,276	942	2,679	3,621
1 Los Angeles	52,738	397	425	822
2 San Diego	29,585	37	262	299
3 Orange	17,854	162	781	943
4 Santa Clara	10,206	84	510	594
5 San Bernardino	9,905	26	53	79
6 Riverside	16,190	28	100	128
7 Alameda	8,761	37	139	176
8 Sacramento	10,328	29	103	132
9 Contra Costa	9,260	16	33	49
10 Fresno	5,725	7	49	56
11 San Francisco	6,892	26	67	93
12 Ventura	4,481	6	24	30
13 San Mateo	5,889	19	29	48
14 Kern	5,238	1	7	8
15 San Joaquin	3,227	11	26	37
16 Sonoma	2,361	0	2	2
17 Stanislaus	4,047	6	4	10
18 Santa Barbara	3,253	3	7	10
19 Solano	5,439	10	10	20
20 Tulare	2,850	4	6	10
21 Santa Cruz	2,440	2	2	4
22 Marin	3,824	0	3	3
23 San Luis Obispo	1,179	0	0	0
24 Placer	1,304	0	3	3
25 Merced	3,840	4	7	11
26 Butte	1,258	3	3	6
27 Shasta	1,265	1	3	4
28 Yolo	1,344	0	0	0
29 El Dorado	1,458	0	0	0
30 Imperial	4,853	1	4	5
31 Napa	4,583	5	3	8
32 Kings	3,941	1	2	3
33 Madera	3,910	0	2	2
34 Monterey	4,035	8	3	11
35 Humboldt	1,238	1	0	1
36 Nevada	3,160	0	0	0
37 Mendocino	3,569	0	1	1
38 Sutter	4,176	0	2	2
39 Yuba	3,145	3	4	7

(continued)

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

Sampling stratum	Cell	Surname		
		Korean	Vietnamese	Total
40 Lake	3,306	1	0	1
41 San Benito	4,469	3	0	3
42 Colusa, Glenn, Tehama	1,045	0	0	0
43 Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	1,081	0	0	0
44 Amador, Alpine, Calaveras, Inyo, Mariposa, Mono, Tuolumne	1,624	0	0	0

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

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

Sampling stratum	Landline			Cell Phones			Total
	LL	Korean	Vietnamese	Cell	Korean	Vietnamese	
State-wide	10,106	135	66	10,786	17	43	21,153
1 Los Angeles	1,772	32	14	1,824	9	13	3,664
2 San Diego	1,143	2	7	1,048	1	3	2,204
3 Orange	699	7	14	551	2	9	1,282
4 Santa Clara	344	8	12	383	1	2	750
5 San Bernardino	318	3	1	334	1	2	659
6 Riverside	505	6	2	588	1	2	1,104
7 Alameda	254	8	2	293	0	3	560
8 Sacramento	253	7	4	365	1	3	633
9 Contra Costa	192	8	1	324	0	1	526
10 Fresno	180	2	2	219	0	0	403
11 San Francisco	168	11	4	241	0	0	424
12 Ventura	158	4	1	165	0	1	329
13 San Mateo	166	6	0	164	0	1	337
14 Kern	155	3	2	191	0	0	351
15 San Joaquin	106	0	0	134	0	0	240
16 Sonoma	96	3	0	105	0	0	204
17 Stanislaus	106	0	0	138	1	1	246
18 Santa Barbara	106	1	0	141	0	0	248
19 Solano	79	1	0	176	0	0	256
20 Tulare	96	0	0	145	0	0	241
21 Santa Cruz	110	1	0	144	0	0	255
22 Marin	125	1	0	130	0	0	256
23 San Luis Obispo	134	1	0	106	0	0	241
24 Placer	113	2	0	123	0	1	239
25 Merced	107	1	0	148	0	0	256
26 Butte	158	0	0	112	0	0	270
27 Shasta	195	1	0	134	0	1	331
28 Yolo	120	3	0	117	0	0	240
29 El Dorado	116	1	0	141	0	0	258
30 Imperial	413	0	0	183	0	0	596
31 Napa	102	1	0	179	0	0	282
32 Kings	119	1	0	156	0	0	276
33 Madera	138	0	0	141	0	0	279
34 Monterey	79	1	0	149	0	0	229
35 Humboldt	190	0	0	131	0	0	321
36 Nevada	136	1	0	137	0	0	274
37 Mendocino	85	4	0	180	0	0	269
38 Sutter	131	1	0	176	0	0	308

(continued)

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

Sampling stratum	Landline			Cell Phones			Total
	LL	Korean	Vietnamese	Cell	Korean	Vietnamese	
39 Yuba	121	1	0	125	0	0	247
40 Lake	91	1	0	148	0	0	240
41 San Benito	118	0	0	159	0	0	277
42 Colusa, Glenn, Tehama	117	1	0	67	0	0	185
43 Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	92	0	0	93	0	0	185
44 Amador, Alpine, Calaveras, Inyo, Mariposa, Mono, Tuolumne	100	0	0	78	0	0	178

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

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

Sampling stratum	Landline			Cell Phones			Total
	LL	Korean	Vietnamese	Cell	Korean	Vietnamese	
State-wide	526	9	4	1,053	1	6	1,600
1 Los Angeles	89	1	1	181	1	4	277
2 San Diego	53	0	0	96	0	0	149
3 Orange	27	1	2	43	0	1	74
4 Santa Clara	17	0	0	38	0	1	56
5 San Bernardino	24	0	0	35	0	0	59
6 Riverside	31	1	0	54	0	0	86
7 Alameda	15	2	0	43	0	0	60
8 Sacramento	9	1	0	30	0	0	40
9 Contra Costa	11	0	0	25	0	0	36
10 Fresno	6	1	0	21	0	0	28
11 San Francisco	9	0	0	27	0	0	36
12 Ventura	12	0	0	18	0	0	30
13 San Mateo	11	1	0	11	0	0	23
14 Kern	4	1	0	28	0	0	33
15 San Joaquin	10	0	0	12	0	0	22
16 Sonoma	3	0	0	13	0	0	16
17 Stanislaus	6	0	0	16	0	0	22
18 Santa Barbara	8	0	0	8	0	0	16
19 Solano	8	0	0	12	0	0	20
20 Tulare	5	0	0	15	0	0	20
21 Santa Cruz	7	0	0	6	0	0	13
22 Marin	5	0	1	15	0	0	21
23 San Luis Obispo	7	0	0	11	0	0	18
24 Placer	0	0	0	12	0	0	12
25 Merced	11	0	0	17	0	0	28
26 Butte	7	0	0	7	0	0	14
27 Shasta	8	0	0	16	0	0	24
28 Yolo	4	0	0	14	0	0	18
29 El Dorado	7	0	0	14	0	0	21
30 Imperial	39	0	0	28	0	0	67
31 Napa	1	0	0	11	0	0	12
32 Kings	7	0	0	24	0	0	31
33 Madera	11	0	0	21	0	0	32
34 Monterey	2	0	0	13	0	0	15
35 Humboldt	6	0	0	17	0	0	23
36 Nevada	6	0	0	8	0	0	14
37 Mendocino	5	0	0	16	0	0	21
38 Sutter	8	0	0	17	0	0	25

(continued)

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

Sampling stratum	Landline			Cell Phones			Total
	LL	Korean	Vietnamese	Cell	Korean	Vietnamese	
38 Sutter	8	0	0	17	0	0	25
39 Yuba	5	0	0	10	0	0	15
40 Lake	5	0	0	16	0	0	21
41 San Benito	8	0	0	11	0	0	19
42 Colusa, Glenn, Tehama	2	0	0	8	0	0	10
43 Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	3	0	0	9	0	0	12
44 Amador, Alpine, Calaveras, Inyo, Mariposa, Mono, Tuolumne	4	0	0	6	0	0	10

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

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

Sampling stratum	Landline			Cell Phones		Total
	LL	Korean	Vietnamese	Cell	Vietnamese	
State-wide	218	3	2	222	3	448
1 Los Angeles	39	1	1	45	2	88
2 San Diego	13	0	0	22	0	35
3 Orange	13	0	1	8	0	22
4 Santa Clara	14	0	0	7	0	21
5 San Bernardino	7	0	0	4	0	11
6 Riverside	13	0	0	13	0	26
7 Alameda	3	0	0	8	0	11
8 Sacramento	6	0	0	8	0	14
9 Contra Costa	6	0	0	6	0	12
10 Fresno	4	1	0	8	0	13
11 San Francisco	3	1	0	1	0	5
12 Ventura	3	0	0	2	0	5
13 San Mateo	5	0	0	6	0	11
14 Kern	3	0	0	6	0	9
15 San Joaquin	1	0	0	1	0	2
16 Sonoma	5	0	0	1	0	6
17 Stanislaus	1	0	0	3	0	4
18 Santa Barbara	5	0	0	4	0	9
19 Solano	2	0	0	4	0	6
20 Tulare	3	0	0	1	0	4
21 Santa Cruz	3	0	0	2	0	5
22 Marin	1	0	0	1	0	2
23 San Luis Obispo	7	0	0	3	0	10
24 Placer	3	0	0	1	0	4
25 Merced	1	0	0	1	0	2
26 Butte	1	0	0	2	0	3
27 Shasta	2	0	0	3	1	6
28 Yolo	2	0	0	0	0	2
29 El Dorado	4	0	0	3	0	7
30 Imperial	19	0	0	7	0	26
31 Napa	3	0	0	3	0	6
32 Kings	1	0	0	3	0	4
33 Madera	1	0	0	5	0	6
34 Monterey	0	0	0	3	0	3
35 Humboldt	5	0	0	6	0	11
36 Nevada	0	0	0	2	0	2
37 Mendocino	0	0	0	2	0	2
38 Sutter	2	0	0	1	0	3

(continued)



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

Sampling stratum	Landline			Cell Phones		Total
	LL	Korean	Vietnamese	Cell	Vietnamese	
39 Yuba	1	0	0	0	0	1
40 Lake	4	0	0	3	0	7
41 San Benito	3	0	0	6	0	9
42 Colusa, Glenn, Tehama	1	0	0	2	0	3
43 Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	2	0	0	2	0	4
44 Amador, Alpine, Calaveras, Inyo, Mariposa, Mono, Tuolumne	3	0	0	3	0	6

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