



November 2017

CHIS 2015-2016 Methodology Report Series

Report 4

Response Rates

CALIFORNIA HEALTH INTERVIEW SURVEY

CHIS 2015-2016 METHODOLOGY SERIES

REPORT 4

RESPONSE RATES

NOVEMBER 2017

This report was prepared for the California Health Interview Survey by Darryl Cooney, Doug Currivan, Julie Linville, Emilia Peytcheva, and Jamie Ridenhour of RTI International.



www.chis.ucla.edu

This report provides analysts with information about the response rates in CHIS 2015-2016. The response rates are estimates of the percentage of sampled persons that participated in the survey, where the sample may be across the entire state, restricted to a county, or some other subgroup. To estimate response rates, the probability of sampling persons is taken into account. Thus, the response rates are weighted percentages of the number responding rather than simple unweighted percentages. Procedures used to increase the response rates are also discussed and, where possible, evaluated.

Suggested citation:

California Health Interview Survey. *CHIS 2015-2016 Methodology Series: Report 4 – Response Rates*. Los Angeles, CA: UCLA Center for Health Policy Research, 2017.

Copyright © 2017 by the Regents of the University of California.

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 2015-2016 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 Tobacco Control Program and UC San Diego, the California Wellness Foundation, First 5 California, Kaiser Permanente, Keiro Senior HealthCare, San Diego County Health and Human Services Agency, the Williams Institute at UCLA Law School, Marin County Health and Human Services, Imperial County Public Health Department, and the California Immigration Research Initiative.

PREFACE

Response Rates is the fourth in a series of methodological reports describing the 2015-2016 California Health Interview Survey (CHIS 2015-2016). 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. RTI International was responsible for data collection and the preparation of five methodological reports from the 2015-2016 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 2015-2016

The methodological reports for CHIS 2015-2016 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.

The primary purpose of presenting these response rates is to provide information for analysts of the data. As a result, the response rates are also reported separately for the main analysis subgroups—adults (ages 18 and older), children (age less than 12), and adolescents (ages 12 to 17). The response rates are estimates of the percentage of sampled persons that participated in the survey, where the sample may be across the entire state, or it may be restricted to a county or another subgroup. To estimate response rates, the probability of sampling persons is taken into account. Thus, the response rates are weighted percentages of the number responding rather than simple unweighted percentages.

A secondary goal of this report is to examine procedures used in the survey to improve response. The specific operational methods are described more completely in *CHIS 2015-2016 Methodology Series*:

Report 2 – Data Collection Methods. These methods are summarized to provide some context for the examination in this report.

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.

TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
PREFACE	i
1. CHIS 2015-2016 SAMPLE DESIGN AND METHODOLOGY SUMMARY	1-1
1.1 Overview	1-1
1.2 Switch to a Continuous Survey	1-2
1.3 Sample Design Objectives	1-3
1.4 Data Collection	1-6
1.5 Responsive and Adaptive Design Elements	1-11
1.6 Response Rates	1-11
1.7 Weighting the Sample	1-14
1.8 Imputation Methods	1-15
2. USE OF RESPONSE RATES	2-1
3. DEFINING RESPONSE RATES	3-1
4. REVIEW OF CONTACT METHODS	4-1
4.1 Landline and Surname List Samples	4-1
4.2 Cell Phone Sample	4-2
5. RESPONSE RATE FORMULAS	5-1
6. RESPONSE RATE TABLES	6-1
6.1 Screener Response Rates	6-1
6.2 Person and Household Response Rates	6-7
6.3 Overall Response Rates	6-16
7. DISCUSSION OF RESPONSE RATES	7-1
7.1 Methods to Enhance Response Rates	7-1
7.2 Comparisons of Response Rates over the Cycles	7-4
7.3 Comparisons of Response Rates with Other Telephone Surveys	7-8
8. REFERENCES	8-1

List of Tables

<u>Table</u>	<u>Page</u>
1-1. California county and county group strata used in the CHIS 2015-2016 sample design	1-5
1-2. Number of completed CHIS 2015-2016 interviews by type of sample and instrument	1-7
1-3. CHIS 2015-2016 survey topic areas by instrument	1-8
1-4a. CHIS 2015 response rates – Conditional	1-12
1-4b. CHIS 2015 response rates – Unconditional	1-12
1-4c. CHIS 2016 response rates – Conditional	1-12
1-4d. CHIS 2016 response rates – Unconditional	1-13
1-5. 2015-2016 CHIS incentives by interview type	1-13
6-1. Number of completed screeners and screener response rates by sampling stratum and whether an advance letter was sent for the landline/surname list sample	6-3

6-2.	Number of completed screener interviews and screener response rates by sampling stratum for the cell phone sample	6-5
6-3.	Number of completed extended interviews and response rates by sampling stratum and type of interview for the landline/surname list sample (conditional on completed screener).....	6-8
6-4.	Number of completed extended interviews and extended interview response rate by cell phone sampling stratum for the cell phone sample.....	6-10
6-5.	Adult response rates by characteristics of the sampled adult.....	6-12
6-6.	Child response rates by characteristics of the sampled child.....	6-14
6-7.	Adolescent response rates conditional on parent permission by characteristics of the sampled adolescent	6-15
6-8.	Adolescent cooperation rates excluding parental permission nonresponse by characteristics of the sampled adolescent	6-15
6-9.	Overall response rates by sampling stratum and type of interview, landline/surname list sample	6-16
6-10.	Overall response rates for the cell phone sample by sampling stratum and type of interview	6-18
6-11.	Overall response rates by sample by sample type and type of interview.....	6-19
7-1.	Interview response rates by type of interview and advance letter	7-2
7-2.	Number of completed screener and extended interviews by sample type and language	7-3
7-3.	Unweighted response rates by interview type and phase for CHIS 2015-2016.....	7-4
7-4.	Comparison of state-level response rates for the landline/surname list sample from CHIS 2001 to 2015-2016	7-5

List of Figures

<u>Figure</u>	<u>Page</u>	
6-1.	Landline screener response rate distribution by sampling stratum	6-2
6-2.	Cell phone screener response rate distribution by sampling stratum.....	6-6
7-1.	CHIS overall response rates by sample type (landline LL and cell phone CP) and type of interview (adult, child, and adolescent)	7-7
7-2.	CHIS Overall response rates by type of interview (adult, child, and adolescent).....	7-7

1. CHIS 2015-2016 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 2015-2016.

- 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. For methodology reports from previous CHIS cycles, go to <http://healthpolicy.ucla.edu/chis/design/Pages/methodology.aspx>

The CHIS is a population-based telephone survey of California’s residential, non-institutionalized 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 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 2015 data were collected between May 2015 and mid-February 2016. CHIS 2016 data were collected between January and December 2016. Approximately half of the interviews were conducted during the 2015 calendar year and half during the 2016 calendar year. As in previous CHIS cycles, weights are included with the data files and are based on the State of California's Department of Finance population estimates and projections, adjusted to remove the population living in group quarters (such as nursing homes, prisons, etc.) and thus not eligible to participate in CHIS. When the weights are applied to the data, the results represent California's residential population during that year for the age group corresponding to the data file in use (adult, adolescent, or child). In CHIS 2015-2016, data users will be able to produce single-year estimates using the weights provided (referred to as CHIS 2015 and CHIS 2016, respectively).

See what's new in the 2015-2016 CHIS sampling and data collection here:

<http://healthpolicy.ucla.edu/chis/design/Documents/whats-new-chis-2015-2016.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://healthpolicy.ucla.edu/chis/analyze/Pages/sample-code.aspx>.

Additional documentation on constructing the CHIS sampling weights is available in the *CHIS 2015-2016 Methodology Series: Report 5—Weighting and Variance Estimation* posted at <http://healthpolicy.ucla.edu/chis/design/Pages/methodology.aspx>. Other helpful information for

understanding the CHIS sample design and data collection processing can be found in the four other methodology reports for each CHIS cycle year.

1.3 Sample Design Objectives

The CHIS 2015-2016 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 426 Japanese, 280 Korean, and 359 Vietnamese adult interviews based on self-identified ethnicity for the combined 2015 and 2016 survey years.¹ Additional samples from both the landline and cell phone frames produced 1,042 interviews in 2015 within Marin County and 2,388 interviews in 2016 within San Diego County. Furthermore, an address-based sample from the USPS Delivery Sequence File produced 258 landline or cell phone interviews in 2016 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

¹ For the 2015 and 2016 survey years combined, all sample frames produced totals of 667 Japanese, 497 Korean, and 597 Vietnamese adult interviews.

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.

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 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. Surname and given name lists were used similarly to increase the yield of Californians of Japanese descent.

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 2015 and 2016, 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 1,594 teen interviews and 4,293 child interviews were completed in CHIS 2015-2016 with approximately 58% 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.² 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

² <http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201605.pdf>

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.

Table 1-1. California county and county group strata used in the CHIS 2015-2016 sample design

1. Los Angeles	7. Alameda	27. Shasta
1.1 Antelope Valley	8. Sacramento	28. Yolo
1.2 San Fernando Valley	9. Contra Costa	29. El Dorado
1.3 San Gabriel Valley	10. Fresno	30. Imperial
1.4 Metro	11. San Francisco	31. Napa
1.5 West	12. Ventura	32. Kings
1.6 South	13. San Mateo	33. Madera
1.7 East	14. Kern	34. Monterey
1.8 South Bay	15. San Joaquin	35. Humboldt
2. San Diego	16. Sonoma	36. Nevada
2.1 N. Coastal	17. Stanislaus	37. Mendocino
2.2 N. Central	18. Santa Barbara	38. Sutter
2.3 Central	19. Solano	39. Yuba
2.4 South	20. Tulare	40. Lake
2.5 East	21. Santa Cruz	41. San Benito
2.6 N. Inland	22. Marin	42. Colusa, Glen, Tehama
3. Orange	23. San Luis Obispo	43. Plumas, Sierra, Siskiyou,
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, 2015-2016 California Health Interview Survey.

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 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 2015-2016.

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.

RTI International designed the methodology and collected data for CHIS 2015-2016, under contract with the UCLA Center for Health Policy Research. RTI is an independent, nonprofit institute that provides research, development, and technical services to government and commercial clients worldwide, with specialization in designing and implementing large-scale sample surveys. For all sampled households, RTI 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 2015-2016 by the type of sample (landline RDD, surname list, cell RDD, and ABS). Note that these figures were accurate as of data collection completion and may differ slightly from numbers in the data files due to data cleaning and

edits. Sample sizes to compare against data files you are using are found online at

<http://healthpolicy.ucla.edu/chis/design/Pages/sample.aspx>.

Interviews in all languages were administered using RTI’s computer-assisted telephone interviewing (CATI) system. The average adult interview took about 41 minutes to complete. The average child and adolescent interviews took about 19 minutes and 22 minutes, respectively. For “child-first” interviews, additional household information asked as part of the child interview averaged about 12 minutes. Interviews in non-English languages typically took somewhat longer to complete. More than 13 percent of the adult interviews were completed in a language other than English, as were about 24 percent of all child (parent proxy) interviews and 25 percent of all adolescent interviews.

Table 1-2. Number of completed CHIS 2015-2016 interviews by type of sample and instrument

Type of sample ¹	Adult ²	Child	Adolescent
Total all samples	42,089	4,293	1,594
Landline RDD	15,106	1,178	542
Vietnamese surname list	3,558	316	111
Korean surname list	1,772	130	64
Japanese surname list	631	34	25
Cell RDD	19,722	2,521	807
Marin County Oversample ³	1,042	83	33
Imperial County ABS Oversample	258	31	12

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

¹ 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. Interviews from the Marin County oversample include respondents who did not live in this county and interviews from the Vietnamese, Korean, or Japanese surname lists include respondents who do not have one of these ethnicities. For example, only 182 of the 3,558 adult interviews completed from the Vietnamese surname list involved respondents who indicated being having Vietnamese ethnicity.

² Includes interviews meeting the criteria as partially complete,

³ Completed interviews for the Marin County oversample do not include interviews completed via the Vietnamese surname list frame. These interviews are counted in the row for the Vietnamese surname list.

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

Table 1-3. CHIS 2015-2016 survey topic areas by instrument

Health status	Adult	Teen	Child
General health status	✓	✓	✓
Days missed from school due to health problems		✓	✓
Health-related quality of life (HRQOL)	✓	✓	
Health conditions	Adult	Teen	Child
Asthma	✓	✓	✓
Diabetes, gestational diabetes, pre- /borderline diabetes	✓		
Heart disease, high blood pressure, stroke	✓		
Physical, behavioral, and/or mental conditions			✓
Physical disabilities, blindness, deafness	✓		
Mental health	Adult	Teen	Child
Mental health status	✓	✓	
Perceived need, access and utilization of mental health services	✓	✓	
Suicide ideation and attempts	✓	✓	
Functional impairment, stigma	✓		
Health behaviors	Adult	Teen	Child
Dietary intake, fast food and soda intake	✓	✓	✓
Water Consumption		✓	
Physical activity and exercise, commute from school to home		✓	✓
Sedentary time		✓	✓
Walking for transportation and leisure	✓		
Doctor discussed nutrition/physical activity		✓	✓
Flu Shot	✓	✓	✓
Alcohol use	✓	✓	
Cigarette and E-cigarette use	✓	✓	
Sexual behavior	✓	✓	
Breastfeeding			✓
Women's health	Adult	Teen	Child
Mammography screening	✓		
Pregnancy	✓		
Dental health	Adult	Teen	Child
Last dental visit, main reason haven't visited dentist	✓	✓	✓

(continued)

Table 1-3. CHIS 2015-2016 survey topic areas by instrument (continued)

Neighborhood and housing	Adult	Teen	Child
Safety, social cohesion	✓	✓	✓
Homeownership, length of time at current residence	✓		
Park use		✓	✓
Civic engagement	✓	✓	
Building Healthy Communities	✓		
Access to and use of health care	Adult	Teen	Child
Usual source of care, visits to medical doctor	✓	✓	✓
Emergency room visits	✓	✓	✓
Delays in getting care (prescriptions and medical care)	✓	✓	✓
Medical home, timely appointments, hospitalizations	✓	✓	✓
Developmental screening			✓
Communication problems with doctor	✓		✓
Internet use for health information	✓		✓
Tele-medical care	✓		
Family planning	✓		
Change of usual source of care	✓		
Food environment	Adult	Teen	Child
Access to fresh and affordable foods	✓		
Where teen/child eats breakfast/lunch, fast food at school		✓	✓
Availability of food in household over past 12 months	✓		
Hunger	✓		
Health insurance	Adult	Teen	Child
Current insurance coverage, spouse's coverage, who pays for coverage	✓	✓	✓
Health plan enrollment, characteristics and plan assessment	✓	✓	✓
Whether employer offers coverage, respondent/spouse eligibility	✓		
Coverage over past 12 months, reasons for lack of insurance	✓	✓	✓
Difficulty finding private health insurance	✓		
High deductible health plans	✓	✓	✓
Partial scope Medi-Cal	✓		

(continued)

Table 1-3. CHIS 2015-2016 survey topic areas by instrument (continued)

Public program eligibility	Adult	Teen	Child
Household poverty level	✓		
Program participation (CalWORKs, Food Stamps, SSI, SSDI, WIC, TANF)	✓	✓	✓
Assets, alimony/child support, social security/pension, worker's compensation	✓		
Medi-Cal and Healthy Families eligibility	✓	✓	✓
Reason for Medi-Cal non-participation among potential beneficiaries	✓	✓	✓
Bullying and interpersonal violence	Adult	Teen	Child
Bullying, personal safety, school safety, interpersonal violence		✓	
Parental involvement/adult supervision	Adult	Teen	Child
Adult presence after school, role models, resiliency		✓	
Parental involvement		✓	
Child care and school attendance	Adult	Teen	Child
Current child care arrangements			✓
Paid child care	✓		
Preschool/school attendance, name of school		✓	✓
Preschool quality			✓
School instability		✓	
First 5 California: "Talk, Read, Sing Program"			✓
Employment	Adult	Teen	Child
Employment status, spouse's employment status	✓		
Hours worked at all jobs	✓		
Income	Adult	Teen	Child
Respondent's and spouse's earnings last month before taxes	✓		
Household income, number of persons supported by household income	✓		
Respondent characteristics	Adult	Teen	Child
Race and ethnicity, age, gender, height, weight	✓	✓	✓
Veteran status	✓		
Marital status, registered domestic partner status (same-sex couples)	✓		
Sexual orientation	✓		
Education, English language proficiency	✓		
Citizenship, immigration status, country of birth, length of time in U.S., languages spoken at home	✓	✓	✓
Education of primary caretaker			✓
Citizenship, immigration status, country of birth, and length of time in U.S. of parents			✓

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

1.5 Responsive and Adaptive Design Elements

The CHIS 2015 and 2016 data collection protocol included the following two responsive design protocols to maximize response rates, provide protection against nonresponse bias, and control data collection costs:

- 1) a propensity model experiment in the first phase of each quarterly data collection that identified a set of cases with low propensities to discontinue calling for the remainder of Phase 1
- 2) a second nonresponse follow-up (NRFU) phase in each quarterly data collection period where a different protocol was implemented to increase response rates and reduce the risk of nonresponse bias.

Additional documentation on the responsive design protocols and outcomes is available in the *CHIS 2015-2016 Methodology Series: Report 2—Data Collection Methods* posted at <http://healthpolicy.ucla.edu/chis/design/Pages/methodology.aspx>.

1.6 Response Rates

The overall response rates for CHIS 2015 and 2016 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 2015, the landline/list sample household response rate was 9.1 percent (the product of the screener response rate of 21.0 and the extended interview response rate at the household level of 43.2 percent). The cell sample household response rate was 9.8 percent, incorporating a screener response rate of 21.5 percent household-level extended interview response rate of 45.9 percent. For CHIS 2016, the landline/list sample household response rate was 6.8 percent (the product of the screener response rate of 15.5 and the extended interview response rate at the household level of 44.0 percent). The cell sample household response rate was 8.4 percent, incorporating a screener response rate of 18.5 percent household-level extended interview response rate of 45.4 percent. CHIS uses AAPOR response rate RR4 (see more detailed in *CHIS 2015-2016 Methodology Series: Report 4 – Response Rates*).

Within the landline and cell phone sampling frames for 2015, the extended interview response rate for the landline/list sample varied across the adult (41.8 percent), child (44.7 percent) and adolescent (17.1 percent) interviews. For 2016, the extended interview response rate for the landline/list sample varied across the adult (41.3 percent), child (69.6 percent) and adolescent (17.9 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 48.5 percent, the child rate was 43.9 percent, and the adolescent rate was 17.4 percent in 2015 (see Table 1-4a). The adult interview response rate for the cell sample was 46.9 percent, the child rate was 59.7 percent, and the adolescent rate was 21.6 percent in 2016 (see Table 1-4c). 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 Tables 1-4b and 1-4d, respectively). 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 2015 response rates – Conditional

Type of sample	Screener	Household	Adult (given screened)	Child (given screened)	Adolescent (given screened & permission)
Overall	21.4%	45.2%	47.2%	44.0%	17.3%
Landline RDD	21.0%	43.2%	41.8%	44.8%	17.1%
Cell RDD	21.5%	45.9%	48.5%	43.9%	17.4%

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

Table 1-4b. CHIS 2015 response rates – Unconditional

Type of sample	Screener	Household	Adult (given screened)	Child (given screened)	Adolescent (given screened & permission)
Overall	21.4%	9.7%	10.1%	9.4%	3.7%
Landline RDD	21.0%	9.1%	8.8%	9.4%	3.6%
Cell RDD	21.5%	9.8%	10.4%	9.4%	3.7%

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

Table 1-4c. CHIS 2016 response rates – Conditional

Type of sample	Screener	Household	Adult (given screened)	Child (given screened)	Adolescent (given screened & permission)
Overall	17.8%	45.1%	44.6%	63.0%	20.0%
Landline RDD	15.5%	44.0%	41.3%	69.6%	17.9%
Cell RDD	18.5%	45.4%	46.9%	59.7%	21.6%

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

Table 1-4d. CHIS 2016 response rates – Unconditional

Type of sample	Screener	Household	Adult (given screened)	Child (given screened)	Adolescent (given screened & permission)
Overall	17.8%	8.0%	7.9%	11.2%	3.6%
Landline RDD	15.5%	6.8%	6.4%	10.8%	2.8%
Cell RDD	18.5%	8.4%	8.7%	11.1%	4.0%

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

To maximize the response rate, especially at the screener stage, an advance letter in five languages was mailed to all landline sampled telephone numbers for which an address could be obtained from reverse directory services. An advance letter was mailed for 34.5 percent of the landline RDD sample telephone numbers not identified by the sample vendor as business numbers or not identified by RTI’s dialer software as

Table 1-5. 2015-2016 CHIS incentives by interview type

Type of interview	Adult
Cell Phone Screener	\$5
Cell Phone Adult Interview	\$20
Cell Phone Child Interview	\$10
Cell Phone Teen Interview	\$10
Nonresponse Follow-Up Adult Interview	\$40
Nonresponse Follow-Up Child Interview	\$20
Nonresponse Follow-Up Teen Interview	\$20

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

nonworking numbers, and for 92.3 percent of surname list sample numbers. Combining these two frames, advance letters were sent to 40.5 percent of all fielded landline telephone numbers. Addresses were not available for the cell sample. As in all CHIS cycles since CHIS 2005, a \$2 bill was included with the CHIS 2015-2016 advance letter to encourage cooperation. Additional incentives were offered to cell phone and Phase 2 nonresponse follow up (NRFU) respondents. Details on the incentives are provided in Table 1-5.

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 the 2015-2016 CHIS, either a spouse/partner or adult child completed a proxy interview for 274 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://healthpolicy.ucla.edu/chis/design/Pages/data-quality.aspx>.

1.7 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 non-institutionalized population for each sampling stratum and statewide. The weighting procedures used for CHIS 2015-2016 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;
- Reduce the variance of the estimates by using auxiliary information; and
- Account for the second-phase sampling that was part of the responsive and adaptive design (Phase 2 NRFU).

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 2015-2016 were created primarily from the California Department of Finance’s (DOF) 2015 and

2016 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 2015 and 2016 weights are based on 2010 Census counts, as were those used for the 2013-2014 cycle. Please pay close attention when comparing estimates using CHIS 2015-2016 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.

1.8 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. RTI imputed missing values for those variables used in the weighting process and UCLA-CHPR staff imputed values for nearly every other variable.

Two different imputation procedures were used by RTI 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. RTI 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).

UCLA-CHPR imputed missing values for nearly every variable in the data files other than those imputed by RTI and some sensitive variables for which nonresponse had its own meaning. Overall, item nonresponse rates in CHIS 2015 and CHIS 2016 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 RTI. 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. USE OF RESPONSE RATES

Response rates provide one indicator of the success of a survey at representing the population sampled. They are not sufficient for fully assessing data quality, because the bias in an estimate is related to both the response rate and the characteristics of those responding and not responding. Keeter, Miller, Kohut, Groves, & Presser (2000), Curtin, Presser, & Singer (2000 and 2003), Groves (2006), and Groves and Peytcheva (2008) have provided examples that show the correlation between response rates and nonresponse bias is often weak. More recently, Brick and Tourangeau (2017) reexamined the data compiled by Groves and Peytcheva (2008) and show evidence for a between-study component of variance in addition to the within-study variance identified by Groves and Peytcheva (2008). This finding implies that response rates could be correlated with nonresponse bias so that surveys with higher response rates have less nonresponse bias in their estimates. Alternative measures that are more related to nonresponse bias have been proposed (see Wagner, 2012), but response rates are still reported as an indicator of the overall success of a data collection effort.

The main objectives of this report are: (1) to present response rates to analysts of CHIS 2015-2016 data; (2) to explain the methods used to calculate the response rates; and (3) to provide information about variation in the response for subgroups of the California population that might be related to nonresponse bias. To accomplish these goals, the response rates are weighted so that they estimate proportions of the population responding to the survey. This procedure is consistent with the standards given by the American Association for Public Opinion Research (AAPOR) (The American Association for Public Opinion Research, 2016). For example, weighting accounts for differences in sampling rates by county and facilitates appropriate state-level response rate reporting.

Sample weights are used in computing response rates because the bias of a simple statistic, such as a mean based on respondent data (\bar{y}_r), is a function of the response rate and of the difference between respondents and nonrespondents on the characteristic being measured. If we assume the population is partitioned into a stratum of respondents (R) and a stratum of nonrespondents (NR), survey estimates are computed only with the observations from the respondent stratum. Each observation from a respondent is weighted by the inverse of its selection probability. In a probability sample survey, the bias attributable to nonresponse of \bar{y}_r would be:

$$bias(\bar{y}_r) = (1 - r)(\bar{Y}_R - \bar{Y}_{NR}) \quad (2-1)$$

where r is the appropriately weighted response rate and the quantity on the right is the difference in the means between the respondent and nonrespondent strata (Lessler & Kalsbeek, 1992). This formula shows that the bias increases as the response rate decreases, provided the difference between respondents and nonrespondents remains constant. If the response rate is not weighted, this relationship does not hold for a survey like CHIS where selection probabilities vary across sample units. If the county samples are not weighted by their selection probabilities, then the response rate cannot be used in this nonresponse bias equation.

3. DEFINING RESPONSE RATES

The term “response rate” is used in many ways across surveys and organizations, so its careful definition is important. Two organizations that describe response rates in a relatively consistent manner are the Council of American Survey Research Organizations (CASRO) (Council of American Survey Research Organizations, 1982) and AAPOR (The American Association for Public Opinion Research, 2016). The AAPOR report is periodically updated and is available on the organization’s website.

We used the definitions described in the AAPOR guidelines, which include several different response rate definitions. Among these, RR3 and RR4 are most commonly accepted in the current survey research field for telephone surveys like CHIS. The only difference between them is that RR3 does not include partial completes in the numerator while RR4 does. This report uses AAPOR’s RR4 for the telephone samples in CHIS 2015-2016 (landline, surname list, and cell phone samples). The 2016 address-based sample (ABS) in Imperial County is excluded from the computation of overall 2015-2016 CHIS response rates so that the rates are comparable with those reported in previous CHIS cycles. Since telephone numbers were sampled with different selection probabilities, we use the weighted number of telephone numbers rather than the number of cases (unweighted) for the response rate computation. This approach also compensates for differential sampling across geographic areas.

Both AAPOR and CASRO recommend that a survey response rate be defined as the ratio of completed interviews to eligible reporting units (i.e., residential households). This recommendation is more difficult to apply than it may appear, especially in telephone surveys. Determining eligibility is problematic because some telephone numbers, even after being called multiple times over a range of days and times of day, are never answered or are picked up only by voice mail or answering machines. These outcomes may occur for many reasons, as discussed by Shapiro et al. (1995). A voicemail message or answering machine may not indicate whether a number is used for a business or a residence and additionally, for those that are residential there is not enough information to know whether the residence is actually in California or not. The eligibility of numbers with these outcomes cannot be determined directly, adding ambiguity to the definition of a response rate.

The proportion of sample units (telephone numbers or addresses) that are eligible is denoted as ‘ e ’ in the AAPOR RR4 equation. Once the eligibility proportion is established, the response rate can be computed as the weighted ratio of the responding units to the total of known and estimated eligible units. The approach we used for estimating e was recommended by AAPOR (2016). This formula estimates e as the proportion of cases of known eligibility divided by all cases with known eligibility, both known

eligible and known ineligible (AAPOR, 2016). This approach was used to estimate e in the landline, list, and cell phone samples; this estimate of e is also used in the weighting process.

The next step in computing response rates depends on the specific extended interview being analyzed, such as the adult interview. For example, to compute the conditional response rate for the adult interview, the numerator is the weighted number of completed adult interviews and the denominator is the weighted number of eligible adults sampled in households that completed the screening interview. An overall or joint response rate can be computed by multiplying the screening and adult interview rates. This approach applies to all samples in CHIS 2015-2016.

In CHIS 2001 and 2003, the adult interview in the landline samples had to be completed before children or adolescents could be interviewed. Beginning in 2005, the child-first procedure has permitted child or adolescent interviews to be done before the adult interview under certain circumstances in the landline and surname list samples. This results in a computed household-level response rate that considers a household to be a respondent if either an adult or a child interview is completed. No child-first procedure is used in the cell phone sample. The specifics of the computations are discussed in Chapter 5.

Computing a response rate for a subgroup (e.g., females) requires that all the units in both the numerator and denominator of the rate can be classified as members of the subgroup. To do this, data must be available to classify all sampled units, not just respondents. At the screener level, data to identify subgroups from the sampled telephone numbers are limited. However, the telephone numbers can be classified by geography (county or stratum), and by whether an address could be matched to the telephone number. At the extended interview or person level, data from the screener can be used to classify households by characteristics that are known for virtually all completed households. Because the screening interview identifies the gender of selected persons, extended interview response rates can be computed separately for males and females. However, screener response rates cannot be computed by gender because data on gender are not available for every sampled telephone number. Therefore, the subgroup overall response rate must be computed by multiplying the extended interview response rate for the subgroup by the overall screener response rate. Data for subgroup classification collected at the screener interview are used to compute subgroup response rates in CHIS 2015-2016.

An alternative approach involves computing the response rate over both the screener and the extended interview as a single interview. This alternative approach is used in the Behavioral Risk Factor Surveillance System (BRFSS); the specifics of the computation of the response rate are given in the 2016 BRFSS Data Quality Summary report (Centers for Disease Control, 2017). In that report, the combined

response rate labeled “AAPOR response rate #4” is the alternative computation. The difference in the computed response rates is substantial. For example, the 2016 California BRFSS AAPOR response rate 4 for landline and cell phone sample combined was 31.1 percent, over 3 times higher than the overall response rate for CHIS 2016 of 9.7 percent. Chapter 7 in this report addresses differences between the BRFSS and CHIS response rate calculations that could explain some of the difference in overall response rates. As such, the BRFSS and CHIS overall response rates are not strictly comparable without accounting for these differences. In addition, comparing response rates between two surveys provides only a general sense of the relative representativeness of each survey. Specific differences in methods and protocols between surveys could produce different outcomes in nonresponse bias for key estimates that are not associated with lower or higher response rates (Groves and Peytcheva, 2008).

4. REVIEW OF CONTACT METHODS

4.1 Landline and Surname List Samples

CHIS includes both screening and extended interviews. For the landline and list samples, one adult was sampled from each household completing a screening interview. In households with persons under age 17, up to one child and one adolescent were also sampled. The screening interview took more than 3 minutes to conduct on average. A parent or legal guardian was interviewed about the sampled child and the sampled adolescent was interviewed if a parent or legal guardian gave permission. The adult extended interview averaged just under 40 minutes in English, the child interview just over 14 minutes, and the adolescent interview about 19 minutes. Interviews in languages other than English generally took longer than these averages. Detailed interview timing information is given in *CHIS 2015-2016 Methodology Series: Report 2 – Data Collection Methods*.

Before calling landline or surname list sample telephone numbers, RTI mailed a prenotification letter to those for which an address could be obtained from reverse directory services. The letter informed the household that they would be called to participate in CHIS 2015-2016, that their participation was voluntary but important to the success of the survey, and that the survey was legitimate. The letter contained a two-dollar bill to encourage the sampled household to respond. After the advance mailing, initial telephone calls were made to complete the screener interview with a household respondent at least 18 years old. Multiple attempts, up to at least 14 calls if needed, were made to establish the initial contact with the household. If the household refused to participate, additional attempts were made to complete the screener after waiting 1 to 3 weeks following the refusal. Prior to attempting to convert these refusals into participants, a letter was sent to the household (if an address was available) informing them again about the validity of the study and the importance of their participation. If a landline or surname list sample household refused again, another telephone attempt was made at least another 2 weeks later.

A similar process was used at the extended level for sampled adults in the landline and surname list samples, except that no second refusals in the landline and surname list samples were recontacted, and there was no attempt at refusal conversion for extended interviews in the cell sample. If the adult refused, a letter was sent (if an address was available) urging him or her to participate. For child and adolescent interviews, one refusal conversion attempt was also made, but no letters were sent for either the child or adolescent interview. However, if the parent refused permission for the adolescent to be interviewed before going through the full consent process, then a letter was mailed to the parent asking him or her to

reconsider. Attempts at refusal conversion were stopped at any point if the respondent expressed hostility at being called or specifically requested that they not be called again.

A variety of other methods were used to increase response rates in CHIS 2015-2016. A very important procedure involved translating and conducting the interview in Spanish, Chinese (Cantonese and Mandarin dialects), Korean, Vietnamese, and Tagalog to accommodate respondents who did not speak English. Another method was the use of proxy interviews for any adults who were unable to participate because of mental or physical limitations. Other adult household members knowledgeable about the sampled persons' health, usually a parent, spouse, or child of the sampled adult completed a proxy interview in these cases; 274 adult proxy extended interviews were completed. In addition to the efforts to encourage respondents to participate, other approaches were used to increase response rates. Interviewers were trained and given refresher training on methods to avoid refusals and to convert those who had refused. Only those interviewers who had above average response rates were trained and allowed to conduct refusal conversions. Multiple call attempts were made to contact sampled household members to complete the extended interviews.

Later in this report, we discuss some of these methods and describe the increases in the number of interviews that resulted, where possible. Some methods, such as interviewer training, cannot be assessed quantitatively without specially designed experiments.

4.2 Cell Phone Sample

Data collection methods for the cell phone sample were similar to those for the landline and surname list samples with a few important differences.

- It is not possible to obtain accurate addresses for telephone numbers assigned to cellular service through publicly-accessible databases, so prenotification letters could not be sent to cell phone sample units;
- Rather than a \$2 incentive in an advance letter, cell sample respondents were offered \$5 to complete the screener upon initial contact, \$25 for the adult extended interview at the time it was introduced, and \$10 for the child and adolescent interviews, in part to compensate for any charges they might be billed for air time;
- There was no conversion attempted for refusals to the adult, child or adolescent interviews.

5. RESPONSE RATE FORMULAS

This chapter describes the formulas used to compute the response rates for CHIS 2015-2016. Response rates are calculated for the **screener** and **extended interviews**, including **household** and **person** overall response rates. Because of the different subsampling rates by stratum, unweighted response rates are not comparable to the weighted rates and should not be used to assess response patterns.

A **screener response rate** is calculated for each sampling stratum by frame, where the stratum is a county or group of counties in the landline sample or California region in the cell phone sample. The formula for the screener response rate (rr_s) in a single stratum is

$$rr_s = \frac{\sum_{i \in S_{resp}} w_i}{\sum_{i \in S_{elig}} w_i} \quad (5-1)$$

where w_i is the weight for household i in the stratum after adjusting for differential sampling rates and the sub-sampling that occurred for the second phase of data collection (see *CHIS 2015-2016 Methodology Series: Report 2 – Data Collection Methods*.) It is also adjusted for the assignment of sampled units with unknown residential status and the assignment of households with unknown eligibility status. For both the cell and landline samples, S_{resp} is the set of households in the stratum that responded to the screening interview and S_{elig} is the set of households in the stratum that were eligible. As noted earlier, the estimated eligibility rates in all samples were determined using the CASRO method where the proportion of the sampled units with unknown residency status is estimated by the observed proportion of residency telephone numbers among the cases where residency status is known and then the proportion of sampled units with unknown eligibility status is estimated by the observed proportion of eligible telephone numbers among cases where eligibility status is known; these rates are computed separately for landline and cell.

The screener response rate for the state by frame type is computed in exactly the same way, except the sum is over the whole state rather than for the specific stratum. Thus, the state screener response rate in each sample is a weighted average of the stratum screener response rates for a specific frame type where the weights are equal to the population size in the stratum. As a result, the state response rate differs from what would be obtained from the unweighted average of the response rates of the strata.

As mentioned in the previous chapter, because of the child-first procedure, some sampled households in the landline samples completed a child or adolescent interview or both without completing an adult interview. Some household-level information normally collected as part of the adult interview was collected in child interviews in these situations. As a result, a **household-level response rate** for the extended interview can be calculated to represent the proportion of households cooperating in CHIS.

The household is counted as responding if an adult, child, or adolescent extended interview was completed. The small number of households with only an adolescent extended interview (there were only 69 such households in 2015-2016 combined) were considered respondents because these data were included in the CHIS 2015 and 2016 interview data. The household extended interview response rate is computed as

$$rr_h = \frac{\sum_{i \in H_{resp}} w_i^*}{\sum_{i \in H_{scr}} w_i^*} \quad (5-2)$$

where w_i^* is the phase 2 adjusted weight for household i in the stratum, H_{resp} is the set of households in the stratum where at least one adult or child extended interview was completed, and H_{scr} is the set of households where the screener interview was completed. In other words, the household response rate is conditioned on the completion of the screener interview, and thus should not be interpreted as overall survey response rate.

The next set of response rates is for each **extended interview**. The **extended response rate** for the **adult interview** in a stratum is the weighted percentage of the adults sampled in the screener who completed the adult extended interview. The weight is the inverse of the probability of selecting the adult within the household, while for the cell phone sample it is one because of the assumption that there is one adult user per cell phone number. Because of this weighting, adults sampled from landline households with more than one adult have a larger effect on the response rate than those in cell households and landline households with only one adult. The extended adult response rate (rr_a) is computed as

$$rr_a = \frac{\sum_{i \in A_{resp}} w_i'}{\sum_{i \in A_{elig}} w_i'} \quad (5-3)$$

where the numerator is summed over all adult respondents from both phases of data collection, and the denominator is summed over all eligible sampled adults. The weight being summed in this case, w_i^a is the adult weight that accounts for selecting the adult. The adult response rate is conditioned on the completion of the screener interview.

The **extended interview response rate** computation for **children and adolescents** is similar to the adult procedure; however, the child-first procedure adds some complexity in the landline samples. *If the adult interview was conducted before the child interview because the conditions for the child-first procedure were not met, then the child and adolescent extended response rates include only those households in which the adult extended interview is completed.* In this case, the child or adolescent rate is conditional on the adult interview. If the child first procedure was implemented, then the child response rate is conditioned only on the screener. The **extended child response rate** (rr_c) is

$$rr_c = \frac{\sum_{i \in C_{resp}} w_i^c}{\sum_{i \in C_{elig}} w_i^c} \quad (5-4)$$

where the numerator is summed over all completed child interviews across both phases of data collection, and the denominator is summed over all eligible sampled children. The weight being summed in this case, w_i^c , is the inverse of the probability of selecting the child within the household.

The exact same procedure is used for the **adolescent extended interview response rate** (rr_t), and it is computed as

$$rr_t = \frac{\sum_{i \in T_{resp}} w_i^m}{\sum_{i \in T_{elig}} w_i^m} \quad (5-5)$$

where the numerator is summed over all adolescent respondents across both phases of data collection, and the denominator is summed over all eligible sampled adolescents. The weight being summed in this case, w_i^m is the inverse of the probability of selecting the adolescent within the household. Again, w_i^m is used to identify the rate for adolescents sampled in the screener, and is for adolescents who were sampled in the adult interview. An important source of nonresponse for the adolescent interview was the parent's refusal to provide permission to conduct the interview with the adolescent. The response rate given by (5) includes the parent permission as a source of nonresponse (i.e., cases where parent permission is not

obtained where it is obtained but an adolescent interview is not completed are both included in the denominator).

The extended response rates defined above are conditional rates in the sense that they are defined for households participating at the screener stage of CHIS. We next calculate **overall response rates** to eliminate the conditioning. For example, the household response rate is conditioned only on the completion of the screener. The **overall household response rate** is the product of the screener and household response rates and is

$$orr_h = rr_s \bullet rr_h \quad (5-6)$$

Since the **adult response rate** is conditioned on the completion of the screener, like the household response rate, the product of the screener and adult response rate is an **unconditional or overall adult response rate**. Thus, the overall adult response is

$$orr_a = rr_s \bullet rr_a \quad (5-7)$$

In the landline/surname list samples, the **child response rate** is conditioned on the screener being completed and on the adult interview being completed for households with children where a child was not sampled in the screener. To discriminate between the different sampling situations, we add a subscript K to identify the procedure. The overall response rate for the child, is defined as

$$orr_c = rr_s \bullet (p_{Kc} \bullet rr_{c,K} + p_{\bar{K}c} \bullet rr_{ac,\bar{K}} \bullet rr_{c,\bar{K}}) \quad (5-8)$$

where $rr_{ac,\bar{K}}$ is the extended adult interview response rate for sampled adults in households with children where a child was not sampled in the screener, and p_{Kc} $p_{\bar{K}c}$ are the proportions of households with children in which the child-first procedure was used (i.e., a child was sampled in the screener) or not, respectively (i.e., $p_{Kc} + p_{\bar{K}c} = 1$). In the cell phone sample, where child-first procedures were not used, the overall child response rate is similar to (7), that is, the product of the screener response rate and the child extended interview response rate.

In the landline/surname list samples, the **adolescent overall response rate** accounting for all levels of response (completion of the screener, the completion of the adult interview in households with adolescents, and the use of the child-first procedure) is

$$ORR_t = rr_s \cdot (p_{Kt} \cdot rr_{t,K} + p_{\bar{K}t} \cdot rr_{at,\bar{K}} \cdot rr_{t,\bar{K}}) \quad (5-9)$$

where $rr_{at,\bar{K}}$ is the extended adult interview response rate for adults in households with adolescents where the child-first procedure was not used, and p_{Kt} and $p_{\bar{K}t}$ are the proportions of households with adolescents in which the child-first procedure was used or not, respectively (i.e., $p_{Kt} + p_{\bar{K}t} = 1$). The overall response rate for the adolescent excluding the permission request is not presented because it is not of much interest as an overall rate. As for the child response rate for the cell phone sample, the overall cell phone adolescent response rate is computed as the product of the screener response rate and the cell phone adolescent extended interview response rate.

Calculation of the child and adolescent response rates assumes that the screener response rate is the same in households where children and/or adolescents are present as in those without children or adolescents. This is a necessary assumption, since the household composition for screener interview nonrespondents cannot be verified.

We also computed the **overall response rates for the cell phone sample**. The expressions for the overall response rate for adults and households in the cell sample are similar to (6) and (7), respectively, use the sample screener response rate, household extended response rate, and adult response rate for the cell phone sample. Since there was no child-first procedure in the cell phone sample, the overall response rate for children in the cell phone sample is conditioned on the completion of the adult interview and is computed as

$$ORR_{c_cell} = rr_{s_cell} \cdot rr_{ac_cell} \cdot rr_{c_cell} \quad (5-10)$$

where rr_{s_cell} is the cell phone screener interview response rate, rr_{ac_cell} is the extended adult interview response rate for adults in households with children in the cell phone sample, and rr_{c_cell} is child extended interview response rate in the cell phone sample. The **overall adolescent response rate** in the cell phone sample is computed using a similar expression but using the extended adult interview response rate for

adults in households with adolescents in the cell phone, rr_{at_cell} , and the sample and the adolescent extended interview response rate in the cell phone sample rr_{t_cell} .³

In addition, we computed the **overall response rate for the combined landline/surname list and cell phone samples**. The adult response rate is the weighted average of the overall response rates of adults in the landline or surname list samples and adults in the cell sample. These overall rates are weighted by the weighted sample size. The overall combined response rate for the landline/surname list and cell phone adult sample, orr_{a_comb} , is computed as

$$orr_{a_comb} = p_{a_LL} \cdot rr_{a_LL} + p_{a_cell} \cdot rr_{a_cell} \quad (5-11)$$

where the proportions p_{a_LL} and p_{a_cell} are the weighted proportions of adults by sampling frame.

The overall combined response rate for the landline/surname list and cell phone child sample, orr_{c_comb} , is computed as

$$orr_{c_comb} = p_{c_LL} \cdot rr_{c_LL} + p_{c_cell} \cdot rr_{c_cell} \quad (5-12)$$

where the proportions p_{c_LL} and p_{c_cell} are the weighted proportions of children by sampling frame.

The overall combined response rate for the landline/surname list and cell phone adolescent sample, orr_{t_comb} , is computed as

$$orr_{t_comb} = p_{t_LL} \cdot rr_{t_LL} + p_{t_cell} \cdot rr_{t_cell} \quad (5-13)$$

where the proportions p_{t_LL} and p_{t_cell} are the weighted proportions of adolescents by sampling frame.

³ 2013-2014 CHIS Methodology Series: Report 4 – Response Rates used the subscript c_cell for the adolescent extended interview response rate, is element, but the subscript for this element should be t_cell , consistent with formulas 5 and 9.

6. RESPONSE RATE TABLES

This chapter provides tables of response rates for the different samples used in CHIS 2015-2016. The first section presents the screener response rates for the combined landline and surname list statewide and by sampling stratum, and the cell phone sample. We also computed the screener response rate for the combined landline, surname list, and cell phone samples. The second section presents the response rates for the screener interview, adult, child, and adolescent interviews for all samples. This section also presents the household response rates and response rates by respondent characteristics across all samples. Finally, the last section presents the overall response rates for each extended interview type. All the rates are weighted and use the formulas presented in the previous chapter.

6.1 Screener Response Rates

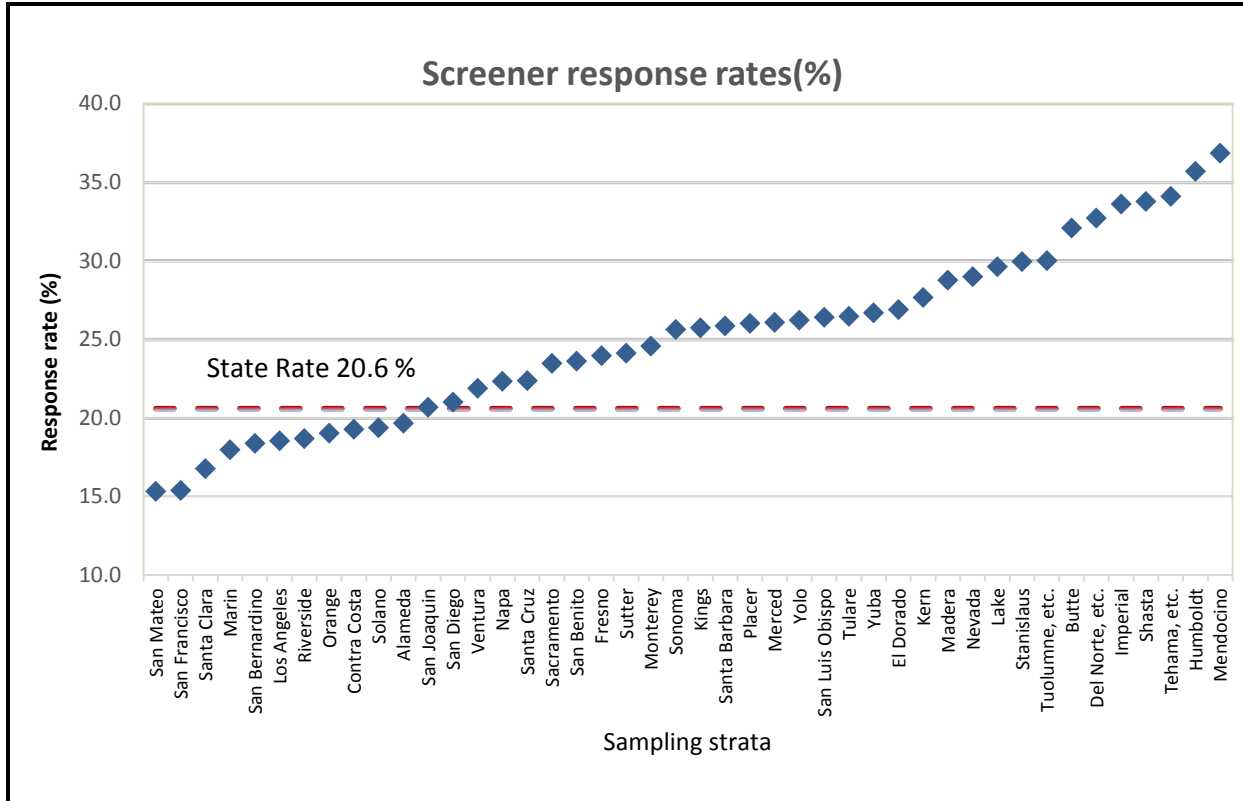
The screener response rates for the combined landline and surname list samples, by sampling stratum, are given in Table 6-1. The first column in the table gives the number of households in the landline/surname list samples that completed the screening interview. Overall, 42,009 households from these samples completed the CHIS 2015-2016 screener interview. In each of these households, one adult was sampled.

As Figure 6-1 shows, the overall weighted screener response rate for the state, including the sample drawn from the landline and surname lists, is 20.6 percent. As discussed in Chapter 3, this response rate was computed using the CASRO method to allocate the numbers whose eligibility cannot be determined (eq. those for which every call was not answered or went to voice mail/answering machine). Surveys vary in how they account for undetermined residential number status, and the method used can lead to very different estimates of response rates. One approach is to ignore the undetermined numbers in the computation of response rates. This approach gives a *cooperation rate*. This rate assumes that none of the undetermined cases were eligible households and produces the most liberal (i.e., highest) response rates. This assumption is not reasonable in most sample surveys, which is why CHIS uses the CASRO method for undetermined eligibility cases.

The table shows that the screener response rates for the landline/surname list samples vary by county, which is also illustrated in Figure 6-1. The median response across all counties is 25.7 percent, and the highest response rate is 36.9 percent in the stratum for Mendocino. San Mateo has the lowest response rate at 15.3 percent while the next lowest response rate (San Francisco, which has been the lowest in the past) is about 0.1 points higher than the San Mateo rate. The screener response rate in Los

Angeles is 3.1 points higher than the San Francisco rate and 2.1 points lower than the state response rate. The county rankings shown in Figure 6-1 are similar to those in previous CHIS cycles.

Figure 6-1. Landline screener response rate distribution by sampling stratum



The median response rate for counties with a population of more than 500,000 persons (as of January 1, 2016 which consists of the counties from Los Angeles through Stanislaus in Table 6-1) is 19.7 percent. This is 6.8 percentage points lower than the 26.5 percent median response rate for the smaller counties. Looking at the individual counties suggests that this difference may be a function of proximity to a metropolitan area or population density rather than the population size of the county. Small, highly urban counties have rates similar to those of the more populous counties.

Table 6-1 also tabulates the landline response rates by whether an advance letter was mailed to the household. We discuss these advance letter impacts later in chapter 7.

Table 6-1. Number of completed screeners and screener response rates by sampling stratum and whether an advance letter was sent for the landline/surname list sample

	Stratum ³	Advance letter mailed					
		Total		Yes		No	
		Complete ¹	Response rate ² (%)	Complete	Response rate (%)	Complete	Response rate (%)
	State total	42,009	20.6	16,486	22.9	25,523	19.5
1	Los Angeles (8 SPAs)	8,317	18.6	3,420	19.7	4,897	18.1
2	San Diego (6 HSRs)	3,885	21.0	1,644	23.8	2,241	20.0
3	Orange	2,572	19.0	1,122	22.6	1,450	17.2
4	Santa Clara	1,709	16.8	785	19.9	924	15.3
5	San Bernardino	1,361	18.4	500	19.1	861	17.9
6	Riverside	2,091	18.7	872	19.1	1,219	18.5
7	Alameda	1,286	19.7	503	24.7	783	17.1
8	Sacramento	1,300	23.5	434	30.2	866	21.0
9	Contra Costa	892	19.3	382	24.4	510	17.0
10	Fresno	867	24.0	254	27.8	613	22.3
11	San Francisco	798	15.4	390	18.3	408	14.2
12	Ventura	851	21.9	431	23.6	420	20.8
13	San Mateo	611	15.3	289	15.6	322	15.2
14	Kern	717	27.7	294	25.2	423	28.9
15	San Joaquin	471	20.7	184	23.2	287	19.2
16	Sonoma	429	25.7	113	28.9	316	24.3
17	Stanislaus	539	30.0	257	33.4	282	27.9
18	Santa Barbara	425	25.9	178	31.7	247	22.8
19	Solano	491	19.4	198	21.8	293	18.0
20	Tulare	499	26.5	204	28.3	295	25.4
21	Santa Cruz	420	22.4	176	20.9	244	23.3
22	Marin	1,576	18.0	150	23.4	1,426	15.3
23	San Luis Obispo	408	26.4	178	26.4	230	26.4
24	Placer	452	26.0	188	29.5	264	24.3
25	Merced	510	26.1	174	29.7	336	24.4
26	Butte	379	32.1	144	34.1	235	31.0
27	Shasta	455	33.8	193	36.3	262	32.4
28	Yolo	414	26.2	170	29.7	244	24.5
29	El Dorado	432	26.9	190	30.5	242	25.0

(continued)

Table 6-1. Number of completed screeners and screener response rates by sampling stratum and whether an advance letter was sent for the landline/surname list sample (continued)

Stratum ³	Total		Advance letter mailed				
	Complete ¹	Response rate ² (%)	Yes		No		
			Complete	Response rate (%)	Complete	Response rate (%)	
30	Imperial	588	33.6	225	37.3	363	31.3
31	Napa	477	22.3	208	24.0	269	21.4
32	Kings	577	25.8	231	27.3	346	24.9
33	Madera	472	28.8	146	31.3	326	27.7
34	Monterey	469	24.6	158	30.5	311	21.9
35	Humboldt	410	35.7	155	34.2	255	36.4
36	Nevada	435	29.0	202	30.3	233	28.2
37	Mendocino	412	36.9	147	43.7	265	34.5
38	Sutter	505	24.1	209	24.4	296	24.0
39	Yuba	448	26.7	126	29.7	322	25.7
40	Lake	416	29.6	154	28.2	262	30.4
41	San Benito	519	23.6	200	25.0	319	23.0
42	Tehama, etc.	366	34.1	126	33.6	240	34.4
43	Del Norte, etc.	327	32.7	81	43.2	246	30.5
44	Tuolumne, etc.	431	30.0	101	28.5	330	30.5

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

Note. Dividing line separates counties with a population of more than 500,000 persons as of January 1, 2016.

¹ A complete here includes any HH with a completed screening interview

² Response rate is calculated as the sum of completes and partial completes divided by the sum of eligible cases and unknown cases (adjusted by the eligibility rate).

³ Stratum displayed is the stratum as each household was sampled, not their reported strata

Table 6-2 shows the screener response rates for households from the cell phone sample for the state and sampling strata which is also illustrated in Figure 6-2. Overall, 37,870 screener interviews were completed statewide and the weighted state screener response rate was 19.6 percent. The screener response rate in CHIS 2013-2014 was 30.7 percent, so the response rate decreased by 11.1 percentage points in 2015-2016, although sampling and weighting approaches differ some. However, it is important to notice that although the strata have the same name they generally do not represent the exact same geographic area. This concept is introduced in *CHIS 2015-2016 Methodology Series: Report 1 – Sample Design* in Section 3.3.2 and further discussed in *CHIS 2015-2016 Methodology Series: Report 5 – Weighting and Variance Estimation* in Section 2.2.1.

Table 6-2. Number of completed screener interviews and screener response rates by sampling stratum for the cell phone sample

	Stratum ³	Screener interview	
		Complete ¹	Response rate ² (%)
	State total	37,870	19.6
1	Los Angeles (8 SPAs)	7,527	21.6
2	San Diego (6 HSRs)	3,701	18.2
3	Orange	1,680	17.1
4	Santa Clara	1,286	16.9
5	San Bernardino	973	19.8
6	Riverside	1,768	19.9
7	Alameda	885	18.6
8	Sacramento	731	18.5
9	Contra Costa	754	17.6
10	Fresno	669	23.1
11	San Francisco	601	15.0
12	Ventura	504	17.9
13	San Mateo	648	15.0
14	Kern	676	26.1
15	San Joaquin	442	20.3
16	Sonoma	289	20.1
17	Stanislaus	586	18.5
18	Santa Barbara	472	20.6
19	Solano	367	18.1
20	Tulare	538	21.6
21	Santa Cruz	480	20.2
22	Marin	1,939	12.2
23	San Luis Obispo	495	19.1
24	Placer	436	16.5
25	Merced	448	21.6
26	Butte	322	22.6
27	Shasta	480	19.0
28	Yolo	393	19.7
29	El Dorado	439	19.8
30	Imperial	574	24.6
31	Napa	519	17.8
32	Kings	523	22.9
33	Madera	533	23.4
34	Monterey	331	21.6

(continued)

Table 6-2. Number of completed screener interviews and screener response rates by sampling stratum for the cell phone sample (continued)

	Stratum ³	Screener interview	
		Complete ¹	Response rate ² (%)
35	Humboldt	344	23.6
36	Nevada	440	18.4
37	Mendocino	488	21.3
38	Sutter ⁴	1,643	18.6
39	Yuba ⁴	17	21.0
40	Lake	455	26.0
41	San Benito	579	21.4
42	Tehama, etc.	313	24.7
43	Del Norte, etc.	281	23.5
44	Tuolumne, etc.	301	20.6

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

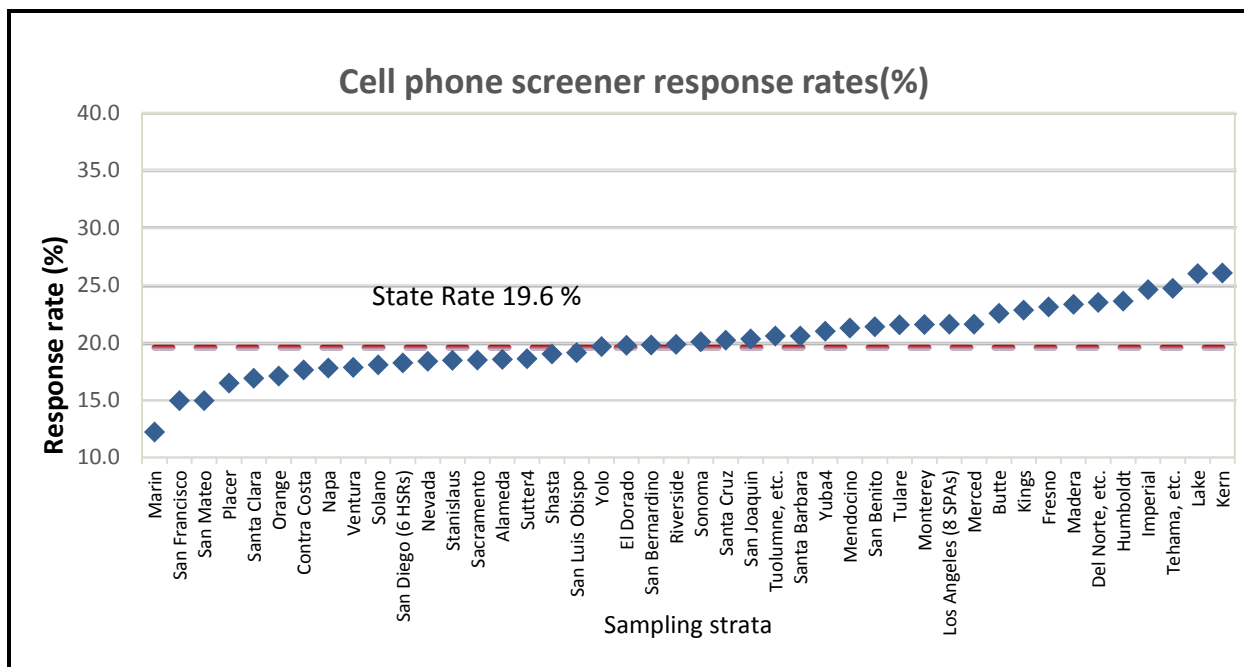
¹ A complete here includes any HH with any completed extended interview (adult, child, or teen) weighted by the HH weight

² Response rate is calculated as the sum of completes and partial completes divided by the sum of eligible cases and unknown cases (adjusted by the eligibility rate).

³ Stratum displayed is the stratum as each household was sampled, not their reported strata

⁴ Sutter/Yuba sampling stratum counts and response rates are extreme because there is one cell phone rate center for both, which is located in Sutter County

Figure 6-2. Cell phone screener response rate distribution by sampling stratum



Response rates in the cell phone sample range from a low of 12.2 percent in Marin County to a high of 26.1 percent in Kern County. The state level cell phone sample screener response rate is 19.6 percent, which is about 1 percentage point lower than the landline screener response rate. When looking at the telephone sample response rates, it should be noted that these are based on the sampling of telephone number assignment, not self-reported residence (which is not available for nonrespondents). For additional details, see *CHIS 2015-2016 Methodology Series: Report 2 – Data Collection Methods*, which presents a comparison of the final cell sample and landline sample screener dispositions in CHIS 2015- 2016.

6.2 Person and Household Response Rates

The household, adult, child, and adolescent extended interview response rates for each stratum of the landline and surname list samples are given in Table 6-3, along with the number of completed interviews. There were 21,949 households where either an adult, child or adolescent extended interview was completed, resulting in a statewide household level response rate of 43.6 percent. Additionally, 21,379 adult interviews, 1,677 interviews about children, and 760 adolescent interviews were completed in the landline and surname list samples.

The statewide adult response rate for the landline/surname list sample shown in Table 6-3 for the adult interview was 41.5 percent, a decrease of 3.3 percentage points from CHIS 2013-2014. As with the screener, counties with larger populations tended to have lower adult extended interview response rates. The median adult response rate for the counties with a population of more than 500,000 is 40.6 percent, while for counties with less than 500,000 the median adult response rate is 44.4 percent. This difference may be attributable to a variety of reasons, including the different distribution of persons by age, education among others, by county. The 2015-2016 child interview state level response rate was 57.0 percent, which is 11.9 percentage points lower than the child response rate observed in CHIS 2013-2014. The state level adolescent interview rate is 17.6 percent, which is 22.6 points lower than the rate observed in CHIS 2013-2014. Note that there were differences in how the sample was released and weighted between CHIS 2013- 2014 and CHIS 2015-2016. In addition, each of the response rates below use their own adjusted weights (household, adult, child and adolescent weights) that have differing nonresponse adjustments and calibration control totals.

Table 6-3. Number of completed extended interviews and response rates by sampling stratum and type of interview for the landline/surname list sample (conditional on completed screener)

	Stratum ³	Household		Adult		Child		Adolescent	
		Complete ¹	Response rate ² (%)	Complete	Response rate (%)	Complete	Response rate (%)	Complete	Response rate (%)
	State total	21,949	43.6	21,379	41.5	1,677	57.0	760	17.6
1	Los Angeles (8 SPAs)	4,115	41.6	4,002	40.9	325	57.4	154	14.6
2	San Diego (6 HSRs)	2,005	43.8	1,961	40.6	157	48.5	69	17.3
3	Orange	1,239	41.3	1,206	39.9	81	48.3	47	19.2
4	Santa Clara	940	46.8	911	46.3	79	51.3	38	18.6
5	San Bernardino	665	39.3	642	39.2	51	44.2	28	34.7
6	Riverside	1,056	41.5	1,019	35.6	88	70.6	33	11.6
7	Alameda	677	45.9	663	45.1	50	49.9	23	12.9
8	Sacramento	710	48.1	691	44.0	54	62.8	26	22.6
9	Contra Costa	501	46.1	489	42.9	31	68.7	18	20.0
10	Fresno	435	39.2	420	35.0	42	40.3	14	9.6
11	San Francisco	392	44.3	386	43.2	19	48.0	9	9.5
12	Ventura	443	41.2	430	39.7	32	38.3	15	15.7
13	San Mateo	332	48.9	324	46.3	27	74.4	9	20.6
14	Kern	374	42.4	352	37.3	46	58.9	22	26.6
15	San Joaquin	236	39.5	229	33.7	22	68.3	6	18.3
16	Sonoma	248	47.6	240	43.8	20	63.3	4	13.8
17	Stanislaus	271	40.4	263	38.5	18	54.2	9	15.4
18	Santa Barbara	247	47.9	241	44.4	12	62.9	12	37.9
19	Solano	253	42.6	247	42.5	14	50.6	6	4.4
20	Tulare	259	41.1	249	42.2	21	39.7	7	9.6
21	Santa Cruz	249	48.1	244	48.4	18	48.5	5	12.1
22	Marin	870	48.6	848	49.9	53	42.3	32	54.8
23	San Luis Obispo	242	47.0	238	44.7	10	72.9	8	23.3
24	Placer	238	43.6	235	42.3	13	63.1	6	19.1
25	Merced	247	38.4	240	33.5	22	56.8	9	15.9
26	Butte	230	54.2	227	54.3	22	82.4	5	7.7
27	Shasta	253	46.1	251	43.8	15	59.5	7	17.5
28	Yolo	244	48.4	237	48.1	22	51.4	11	19.8

(continued)

Table 6-3. Number of completed extended interviews and response rates by sampling stratum and type of interview for the landline/surname list sample (conditional on completed screener) (continued)

	Stratum ³	Household		Adult		Child		Adolescent	
		Complete ¹	Response rate ² (%)	Complete	Response rate (%)	Complete	Response rate (%)	Complete	Response rate (%)
29	El Dorado	251	50.8	247	50.5	12	48.2	9	28.9
30	Imperial	271	39.6	265	38.9	33	52.4	20	25.2
31	Napa	290	52.5	280	52.7	21	81.1	11	57.9
32	Kings	285	40.4	274	40.8	44	46.6	10	23.8
33	Madera	245	43.8	243	42.3	12	53.6	5	11.9
34	Monterey	254	44.2	245	41.2	24	70.8	10	25.2
35	Humboldt	251	52.2	246	48.9	13	42.2	5	18.0
36	Nevada	263	49.1	263	51.5	13	54.0	8	21.1
37	Mendocino	239	50.9	233	46.8	19	63.4	5	16.4
38	Sutter	242	37.7	237	33.5	24	49.2	9	12.7
39	Yuba	243	44.2	237	41.9	22	62.0	7	7.7
40	Lake	243	45.9	240	45.4	13	75.2	7	40.4
41	San Benito	286	47.2	282	45.4	24	62.1	10	19.0
42	Tehama, etc.	187	42.8	183	43.4	14	64.7	5	14.9
43	Del Norte, etc.	197	52.0	193	52.2	13	77.7	3	2.4
44	Tuolumne, etc.	231	46.4	226	45.1	12	40.4	4	30.9

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

¹ A complete here includes any HH with any completed extended interview (adult, child, or teen) weighted by the HH weight

² Response rate is calculated as the sum of completes and partial completes divided by the sum of eligible cases and unknown cases (adjusted by the eligibility rate).

³ Stratum displayed is the stratum as each household was sampled, not their reported strata

Table 6-4 shows the household, adult, child, and adolescent extended interview response rate for the cell phone sample. There were 20,501 households where either an adult, child or adolescent extended interview was completed, resulting in a statewide household level response rate of 45.7 percent. Within stratum, there was a wide range of rates, with a low of 41.2 percent in San Benito to a high of 56.4 percent in Humboldt County. Although the number of cases used to compute the household response rate is the same as the number of adult cases for the adult response rate in Table 6-4, the adult and household response rates are computed using different weights as described in Chapter 5. The adult response rate is computed using the adult base weight and reflects the probability of selection of the adult within the

household among other two-phase adjustments. As shown in Table 6-4, the adult response rate is higher than the household response rate because of these weight variations.

Table 6-4. Number of completed extended interviews and extended interview response rate by cell phone sampling stratum for the cell phone sample

Stratum ³	Household		Adult		Child		Adolescent	
	Complete ¹	Response rate ² (%)	Complete	Response rate (%)	Complete	Response rate (%)	Complete	Response rate (%)
State total	20,501	45.7	20,452	47.9	2,585	47.3	822	18.8
1 Los Angeles (8 SPAs)	3,957	45.1	3,945	47.1	485	49.4	150	19.5
2 San Diego (6 HSRs)	1,990	47.0	1,990	49.0	262	46.1	89	19.6
3 Orange	896	45.2	894	47.5	92	37.7	27	20.6
4 Santa Clara	673	43.4	672	45.6	78	43.7	14	10.0
5 San Bernardino	527	44.9	526	48.6	69	47.4	27	25.6
6 Riverside	942	43.6	942	46.6	131	49.8	52	23.2
7 Alameda	475	45.9	475	47.4	58	47.3	18	14.8
8 Sacramento	445	53.2	441	54.5	75	68.9	11	17.0
9 Contra Costa	408	46.3	407	47.9	39	34.0	10	9.3
10 Fresno	382	47.2	380	50.2	63	51.0	20	17.3
11 San Francisco	327	45.4	327	48.5	40	42.3	7	11.7
12 Ventura	262	45.9	260	47.3	43	56.0	11	13.9
13 San Mateo	335	44.5	335	45.6	36	44.1	14	22.7
14 Kern	360	42.3	358	44.9	60	37.9	29	23.2
15 San Joaquin	251	50.6	249	51.7	34	44.5	10	8.8
16 Sonoma	165	48.7	163	50.4	20	58.0	3	13.2
17 Stanislaus	323	44.5	322	47.4	37	36.4	17	22.7
18 Santa Barbara	255	42.8	255	45.7	41	44.5	18	28.4
19 Solano	206	47.3	206	47.6	21	44.9	5	22.6
20 Tulare	264	42.4	264	45.9	46	45.4	18	22.0
21 Santa Cruz	274	47.7	273	50.1	41	55.1	11	14.4
22 Marin	1,093	48.4	1,092	53.9	105	44.8	27	18.3
23 San Luis Obispo	257	44.4	256	45.0	34	39.9	8	16.9
24 Placer	246	48.3	245	51.4	24	43.5	12	24.3
25 Merced	253	48.9	253	50.0	39	46.9	17	20.7

(continued)

Table 6-4. Number of completed extended interviews and extended interview response rate by cell phone sampling stratum for the cell phone sample (continued)

	Stratum ³	Household		Adult		Child		Adolescent	
		Complete ¹	Response rate ² (%)	Complete	Response rate (%)	Complete	Response rate (%)	Complete	Response rate (%)
26	Butte	184	46.0	184	46.4	22	57.5	7	28.9
27	Shasta	284	49.6	284	49.2	39	55.5	9	18.7
28	Yolo	240	52.5	238	53.9	40	59.7	13	30.3
29	El Dorado	241	47.3	241	48.6	20	47.0	6	11.6
30	Imperial	293	41.7	292	42.6	44	41.5	20	18.2
31	Napa	281	46.1	281	48.3	31	49.7	15	20.0
32	Kings	277	46.1	276	46.4	47	45.9	12	13.1
33	Madera	282	44.9	282	46.1	44	37.7	6	7.3
34	Monterey	166	41.3	166	44.7	21	52.1	4	4.3
35	Humboldt	214	56.4	213	57.1	18	42.8	4	12.9
36	Nevada	232	44.5	232	48.7	16	36.9	13	36.8
37	Mendocino	275	46.9	275	50.8	26	41.4	8	12.3
38	Sutter	919	44.4	918	46.9	118	49.4	42	17.1
39	Yuba	9	48.6	9	46.7	1	36.2	1	100.0
40	Lake	249	46.1	246	47.7	31	36.3	9	13.7
41	San Benito	298	41.2	296	43.6	42	47.0	16	20.3
42	Tehama, etc.	168	46.7	168	47.6	16	46.5	6	23.2
43	Del Norte, etc.	166	51.9	166	52.5	18	61.5	4	21.6
44	Tuolumne, etc.	157	42.4	155	41.9	18	35.7	2	3.8

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

¹ A complete here includes any HH with any completed extended interview (adult, child, or teen) weighted by the HH weight

² Response rate is calculated as the sum of completes and partial completes divided by the sum of eligible cases and unknown cases (adjusted by the eligibility rate).

³ Stratum displayed is the stratum as each household was sampled, not their reported strata

Additionally, 20,452 adult interviews, 2,585 interviews about children, and 822 adolescent interviews were completed in the cell phone sample. The statewide response rate for the adult interview was 47.9 percent. This represents a decrease of 4.2 percentage points from CHIS 2013-2014. The cell phone child interview response rate was 47.3 percent, which is 24.9 points lower than the equivalent response rate observed CHIS 2013-2014. The cell phone sample adolescent response rate was 18.8 percent, which is 22.2 percentage points lower than the response rate observed in CHIS 2013-2014.

Data collected in the screener interview about the household and the sampled adult can be used to examine the adult extended response rates since the data are available for all sampled adults. Table 6-5 shows the adult response rates by these screener data items. Results are shown separately for the combined landline and surname list samples and the cell sample. Overall, the cell response rate is 6.4 percentage points higher than that for the landline/surname list samples. One explanation for this difference is evident in the final two rows of Table 6-5: the landline/surname list response rate is about 8.0 points higher than the cell rate if the screener respondent is sampled, and about 8.3 points higher if another adult is sampled. For the cell sample, within-household sampling of adults is done only if the sampled number is shared by two or more adults. The screener respondent was the sampled adult in 68 percent of landline/surname list households, compared with 98 percent of cell households. Since the response rate was dramatically lower when an adult other than the screener respondent was selected for

Table 6-5. Adult response rates by characteristics of the sampled adult

Characteristic	Sample type response rate (%)	
	Landline/Surname list	Cell phone
Total	41.5	47.9
Sex		
Male	36.8	46.7
Female	45.4	49.0
Age		
18 to 30 years	24.8	46.6
31 to 45 years	31.4	45.3
46 to 65 years	43.5	50.4
Over 65 years	51.2	53.4
Type of household		
With somebody less than 18 years old	37.1	44.2
Without somebody less than 18 years old	45.0	52.2
Number of adults in household		
1	61.4	50.8
2	42.2	48.2
3 or more	32.8	45.9
Sampled adult was screener respondent		
Yes	56.3	48.3
No	24.6	16.3

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

both samples, the higher proportion of screener respondents selected as the sampled adult translates to a higher overall response rate for the cell sample.

Another notable difference in the response rate pattern between the landline/surname list and cell samples is by sampled adult gender. Women are traditionally more cooperative than men in landline and surname list samples, and this pattern is borne out in CHIS 2015-2016. In contrast, this gender response gap is smaller in the cell sample (2.3 percent vs. 8.6 percent). Men also respond at a higher rate (46.7 percent) in the cell sample than in the landline/surname list sample (36.8 percent).

Older adults are also typically more cooperative than younger adults, and again this pattern is borne out in the landline/surname list sample, with a 26.4 percentage point difference between the rates for those 18-30 and those over 65. In the cell sample, which includes respondents with both cell phones and landlines and with only cell phone service, the difference between these groups is 6.8 percentage points.

In the landline/surname list sample, adult response rates decline substantially as more adults are present in the household. A major reason for this is that, as noted earlier, response rates are lower (and declining more rapidly) for sampled adults who are not the screener respondent (shown in the last rows of Table 6-5). The more adults in the household, the more likely the sampled adult is not the screener respondent. If the sampled adult is not home, a call-back is required, essentially creating a second contact attempt. In contrast, this response rate pattern does not hold in the cell sample, where sampling among adults is only needed when the cell phone is shared, which is a rare occurrence.

These differences in response rates, and in the proportions of adults sampled, by respondent characteristics across samples have implications for the utility of the cell phone sample. In addition to reducing the potential bias by including persons without a landline, the cell sample increases the representation of men, young adults, those in households with children, and those in multi-adult households compared with the landline sample alone.

Now, we examine the child extended interview response rates. Table 6-6 shows that the statewide child-level response rate is 57.0 percent for the landline/surname sample, which is 11.9 points lower than that in CHIS 2013-2014. The median rate in the more populous counties (51.3 %) is 5.5 points lower than the rate in smaller counties (56.8%). The statewide child-level response for the cell phone sample is 47.3 percent, which is 9.7 points lower than the response rate in the combined landline and surname samples, and 24.9 points lower than the rate for the cell phone child sample in CHIS 2013-2014.

Table 6-6 shows the child response rates by the characteristics of the child and household using data collected in the screener or adult interview where the children were enumerated for sampling. The child rates do not show much variation by sex in both the landline/surname list or cell phone samples. While age of children was asked in the screener, respondents were able to respond without specific ages which creates difficulty to create response rates for age. *CHIS 2015-2016 Methodology Series: Report 2 – Data Collection Methods* contains more detail on response to the child interview.

Table 6-6. Child response rates by characteristics of the sampled child

Characteristic	Sample type response rate (%)	
	Landline/Surname list	Cell phone
Total	57.0	47.3
Sex		
Male	56.9	47.3
Female	58.0	47.7
Number of children in household		
1	54.6	51.2
2	57.2	43.6
3	60.6	47.5
4 or more	53.5	49.9

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

The last person-level response rates presented are for the adolescent interview. Recall that the adolescent could not be interviewed unless a parent or guardian gave verbal permission. This requirement means that we had to contact and get permission from the parent or legal guardian, and then contact and interview the adolescent. Consequently, response rates for the adolescent interview are much lower than for the child interview, because the latter required only one person to agree. Table 6-7 shows that the state-level landline adolescent response rate is 17.6 percent. If we exclude nonresponse due to parents not giving permission, the landline cooperation rate rises to 56.5 percent. Similarly, the state-level adolescent response rate in the cell phone sample is 18.8 percent while the cell phone adolescent cooperation is 61.2 percent if the nonresponse due to parents not giving permission is excluded (see Table 6-8).

Table 6-7 gives the landline and cell phone adolescent response rates by the gender characteristics of the adolescent and household based on data collected in the adult interview or screener. There is also some minor difference between the landline/surname list and cell samples in gender distribution.

Table 6-7. Adolescent response rates conditional on parent permission by characteristics of the sampled adolescent

Characteristic	Sample type response rate (%)	
	Landline/Surname list	Cell phone
Total	17.6	18.8
Sex		
Male	17.5	18.0
Female	17.8	19.8

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

Table 6-8. Adolescent cooperation rates excluding parental permission nonresponse by characteristics of the sampled adolescent

Characteristic	Sample type response rate (%)	
	Landline/Surname list	Cell phone
Total	56.5	61.2
Sex		
Male	56.3	55.9
Female	56.7	67.9

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

To better understand the success rate for interviewing adolescents, we examine the response rates for the adolescent interview including only those adolescents the parents gave permission to interview (i.e., response rate conditional on parent permission). This rate is indicative of the ability to contact and interview the adolescents. These rates are given in Table 6-8, which is like Table 6-7 but excludes the sampled adolescents without parental permission from the denominator of the response rate computation, so the rates are much higher. The overall adolescent cooperation rate is 4.7 points higher for the cell sample than for the landline/surname list sample; one interpretation is that parents in the landline/surname list sample were more likely to give permission than those in the cell sample.

Differences in response rates can lead to nonresponse bias as suggested by the formula presented in Chapter 2 for the bias attributable to nonresponse. To reduce this potential for bias, geographic and demographic characteristics examined in Tables 6-1 through 6-8 were taken into account in developing the weights as described in *CHIS 2015-2016 Methodology Series: Report 5 – Weighting and Variance Estimation*. For example, nonresponse adjustments were done separately by county, thus accounting for

the differences in response rates noted above by the size and urbanicity of the counties. In addition, the weights were also adjusted to be consistent with data from the control totals to reduce residual biases.

6.3 Overall Response Rates

This section presents the overall, or unconditional, response rates for the household and for the adult, child, and adolescent interviews for the different samples in CHIS 2015-2016. Table 6-9 gives these response rates for the entire state and by county for the combined landline/surname list sample. As discussed in Chapter 5 (Response Rates), the overall rates are the product of screener and extended response rates. At the household level, the overall household response rate is the screener response rate (from Table 6-1) multiplied by the household response rate (from Table 6-3). This rate is computed using equation (6). The adult response rates are computed using equation (7). The child and adolescent overall rates are computed using equations (8) and (9), respectively.

Table 6-9. Overall response rates by sampling stratum and type of interview, landline/surname list sample

Stratum ²	Interview type overall response rate (%) ¹			
	Household	Adult	Child	Adolescent
State total	9.0	8.5	11.7	3.6
1 Los Angeles (8 SPAs)	7.7	7.6	10.6	2.7
2 San Diego (6 HSRs)	8.7	8.5	10.2	3.6
3 Orange	7.7	7.6	9.2	3.6
4 Santa Clara	7.4	7.8	8.6	3.1
5 San Bernardino	8.5	7.2	8.1	6.4
6 Riverside	8.4	6.7	13.2	2.2
7 Alameda	8.6	8.9	9.8	2.5
8 Sacramento	10.1	10.3	14.7	5.3
9 Contra Costa	8.4	8.3	13.2	3.9
10 Fresno	10.6	8.4	9.7	2.3
11 San Francisco	6.8	6.7	7.4	1.5
12 Ventura	8.4	8.7	8.4	3.4
13 San Mateo	6.9	7.1	11.4	3.2
14 Kern	11.2	10.3	16.3	7.4
15 San Joaquin	9.8	7.0	14.1	3.8
16 Sonoma	10.4	11.2	16.2	3.5
17 Stanislaus	8.9	11.5	16.2	4.6
18 Santa Barbara	9.6	11.5	16.3	9.8
19 Solano	8.5	8.3	9.8	0.8
20 Tulare	9.5	11.2	10.5	2.5

(continued)

Table 6-9. Overall response rates by sampling stratum and type of interview, landline/surname list sample (continued)

	Stratum ²	Interview type overall response rate (%) ¹			
		Household	Adult	Child	Adolescent
21	Santa Cruz	9.9	10.8	10.8	2.7
22	Marin	6.7	9.0	7.6	9.9
23	San Luis Obispo	9.5	11.8	19.3	6.2
24	Placer	8.9	11.0	16.4	5.0
25	Merced	10.4	8.7	14.8	4.2
26	Butte	12.2	17.4	26.5	2.5
27	Shasta	10.9	14.8	20.1	5.9
28	Yolo	10.9	12.6	13.5	5.2
29	El Dorado	10.8	13.6	13.0	7.8
30	Imperial	10.7	13.1	17.6	8.5
31	Napa	9.2	11.8	18.1	12.9
32	Kings	10.5	10.5	12.0	6.1
33	Madera	10.9	12.2	15.4	3.4
34	Monterey	9.3	10.1	17.4	6.2
35	Humboldt	14.7	17.5	15.1	6.4
36	Nevada	10.3	14.9	15.7	6.1
37	Mendocino	12.1	17.3	23.4	6.0
38	Sutter	8.4	8.1	11.9	3.1
39	Yuba	11.7	11.2	16.6	2.1
40	Lake	12.6	13.5	22.3	12.0
41	San Benito	9.2	10.7	14.7	4.5
42	Tehama, etc.	12.8	14.8	22.1	5.1
43	Del Norte, etc.	13.9	17.1	25.4	0.8
44	Tuolumne, etc.	11.1	13.5	12.1	9.3

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

¹ Overall response rate is calculated by multiplying the screener interview response rate by the extended interview response rate (where the extended response rate is conditional on a completed screener).

² Stratum displayed is the stratum as each household was sampled, not their reported strata

Since the response rates in these tables are the product of two or more interview-level rates, the previously described issues regarding the differences in response rates by county, type of household, and characteristic of the sampled person also apply here. The overall landline/surname list adult response rate is 4.4 percentage points lower than the overall landline/surname list adult response rate in CHIS 2013-2014.

Table 6-10 shows the overall response rate for the cell phone sample. The lowest adult response rate was in Marin County (6.6 percent) while the highest was in Humboldt County (13.5 percent). The overall adult response rate was 9.4 percent, which is about 1 percentage point higher than the overall 8.5 percent rate that was observed for adults in the landline/surname list sample.

Table 6-10. Overall response rates for the cell phone sample by sampling stratum and type of interview

	Stratum ²	Interview type overall response rate (%) ¹			
		Household	Adult	Child	Adolescent
	State total	8.9	9.4	9.3	3.7
1	Los Angeles (8 SPAs)	9.7	10.2	10.7	4.2
2	San Diego (6 HSRs)	8.6	8.9	8.4	3.6
3	Orange	7.7	8.1	6.4	3.5
4	Santa Clara	7.3	7.7	7.4	1.7
5	San Bernardino	8.9	9.6	9.4	5.1
6	Riverside	8.6	9.3	9.9	4.6
7	Alameda	8.5	8.8	8.8	2.7
8	Sacramento	9.8	10.1	12.7	3.1
9	Contra Costa	8.2	8.4	6.0	1.6
10	Fresno	10.9	11.6	11.8	4.0
11	San Francisco	6.8	7.3	6.3	1.7
12	Ventura	8.2	8.4	10.0	2.5
13	San Mateo	6.6	6.8	6.6	3.4
14	Kern	11.0	11.7	9.9	6.0
15	San Joaquin	10.3	10.5	9.1	1.8
16	Sonoma	9.8	10.1	11.6	2.7
17	Stanislaus	8.2	8.8	6.7	4.2
18	Santa Barbara	8.8	9.4	9.2	5.8
19	Solano	8.5	8.6	8.1	4.1
20	Tulare	9.1	9.9	9.8	4.7
21	Santa Cruz	9.6	10.1	11.1	2.9
22	Marin	5.9	6.6	5.5	2.2
23	San Luis Obispo	8.5	8.6	7.6	3.2
24	Placer	8.0	8.5	7.2	4.0
25	Merced	10.6	10.8	10.1	4.5
26	Butte	10.4	10.5	13.0	6.5
27	Shasta	9.4	9.4	10.6	3.6
28	Yolo	10.3	10.6	11.7	6.0
29	El Dorado	9.4	9.6	9.3	2.3
30	Imperial	10.3	10.5	10.2	4.5

(continued)

Table 6-10. Overall response rates for the cell phone sample by sampling stratum and type of interview (continued)

	Stratum ²	Interview type overall response rate (%) ¹			
		Household	Adult	Child	Adolescent
31	Napa	8.2	8.6	8.9	3.6
32	Kings	10.5	10.6	10.5	3.0
33	Madera	10.5	10.8	8.8	1.7
34	Monterey	8.9	9.6	11.2	0.9
35	Humboldt	13.3	13.5	10.1	3.1
36	Nevada	8.2	8.9	6.8	6.8
37	Mendocino	10.0	10.8	8.8	2.6
38	Sutter	8.3	8.7	9.2	3.2
39	Yuba	10.2	9.8	7.6	21.0
40	Lake	12.0	12.4	9.4	3.6
41	San Benito	8.8	9.3	10.0	4.3
42	Tehama, etc.	11.6	11.8	11.5	5.7
43	Del Norte, etc.	12.2	12.3	14.5	5.1
44	Tuolumne, etc.	8.7	8.6	7.3	0.8

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

¹ Overall response rate is calculated by multiplying the screener interview response rate by the extended interview response rate (where the extended response rate is conditional on a completed screener).

² Stratum displayed is the stratum as each household was sampled, not their reported strata

Table 6-11 summarizes the overall response rates by sample types. The cell phone sample has a lower overall response rate at the household and child level than landline and surname samples. The overall response rates are lower than the rates observed in CHIS 2013-2014 and it follows the trends of response rates in telephone surveys in the U.S.

Table 6-11. Overall response rates by sample by sample type and type of interview

Sample type	Overall response rate (%) ¹			
	Household	Adult	Child	Adolescent
Landline/surname list	9.0	8.5	11.7	3.6
Cell phone	8.9	9.4	9.3	3.7
Landline/surname list/cell-phone	8.9	9.1	9.7	3.7

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

¹ Overall response rate is calculated by multiplying the screener interview response rate by the extended interview response rate (where the extended response rate is conditional on a completed screener).

7. DISCUSSION OF RESPONSE RATES

This chapter presents a discussion of the response rates obtained in CHIS 2015-2016, including procedures used to increase response rates and comparison of these rates with other telephone surveys. The first section briefly reviews some of the methods used in CHIS 2015-2016 that effect response rates. A more complete discussion of these data collection methods is provided in *CHIS 2015-2016 Methodology Series: Report 2 – Data Collection Methods*.

7.1 Methods to Enhance Response Rates

Several methods to enhance response rates have been used across previous CHIS cycles. Methods for enhancing response rates in CHIS 2015-2016 included:

- **Repeated call attempts:** Most interviews were completed within the first few call attempts to a sample number, but the procedures implemented in CHIS 2015-2016 allowed for 9 calls for landline sample and 11 calls for cell sample when no contact had been made previously. These additional attempts were intended to maximize response rates among sample members who were less likely to answer phone calls from unknown callers. This procedure also has the potential to reduce nonresponse bias from this source of nonresponse by including at least some sample members who require more than a few call attempts to reach.
- **Recontacting initial refusals:** The refusal conversion protocol is described for landline and cell phone sample in Chapter 4.
- **Proxy reporting:** As in previous cycles, proxy respondents could report for sampled adults when the sampled adult was unable to answer for himself/herself due to illness or impairment. As indicated in Section 4.1, in CHIS 2015-2016, a total of 274 adult proxy interviews were completed. Proxy respondents had to be adult household members who were knowledgeable about the sampled person's health. The proxy respondent was typically a spouse or child of the sampled adult. While the number of interviews completed using the proxy interviews is relatively small, the proxy interviews add responses from adults who would otherwise be excluded from the survey and who likely have very different health characteristics than other adult respondents.
- **Advance letter:** Another method used to increase response rates was mailing an introductory letter in advance to all landline and surname list sampled cases with mailable addresses provided by sample vendors. The advance letter mailing appears to have increased response rates slightly. While no experimental data exist to support the effect of mailings in CHIS

2015-2016, the data summarized in Table 7-1 showing higher response rates by whether an advance letter was mailed are consistent with previous CHIS cycles and experiments from other studies.

Table 7-1. Interview response rates by type of interview and advance letter

Type	Response rate (%)			Difference (%)
	Advance letter mailed			
	Yes	No		
Screener	22.9	19.5	3.4	
Adult interview	42.1	40.9	1.2	
Child interview	59.5	56.0	3.5	
Adolescent interview	18.2	17.1	1.1	
Household extended	45.2	42.7	2.5	

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

- **In-language interviews:** A very important procedure incorporated to enhance the response rates was conducting the interviews in the language requested by the sampled person. The languages included in 2015-2016 were: Spanish, Chinese (Cantonese and Mandarin), Korean, Vietnamese, and Tagalog. In many cases, households that did not speak English would not have been included in CHIS had these additional languages not been offered to sample members. In addition, the quality of the screener and extended interview data are likely better for these households than if they had been only allowed to respond in English. Table 7-2 gives the number of interviews that were completed by language. More than 11,400 households completed the screener using a language other than English, accounting for about 14 percent of all the completed screener interviews in CHIS 2015-2016. Spanish was the most frequently used language, with 82 percent of the non-English screener interviews being completed in Spanish. Chinese was the second most frequently used language in the interviews.

Table 7-2. Number of completed screener and extended interviews by sample type and language

Interview type	Non-English						Total	Total
	English	Spanish	Korean	Chinese	Tagalog	Vietnamese		
Screeners Interviews								
Total	68,938	9,409	474	804	75	678	11,440	80,378
Landline	27,101	2,650	30	62	28	61	2,831	29,932
Cell phone sample	31,494	5,919	97	135	41	157	6,349	37,843
Korean surname	2,571	47	329	522	1	249	1,148	3,719
Vietnamese surname	6,406	493	18	84	5	210	810	7,216
Japanese surname	1,079	87	0	1	0	1	89	1,168
Imperial county	287	213	0	0	0	0	213	500
Adult Interviews								
Total	37,303	3,795	225	341	50	375	4,786	42,089
Landline	14,333	988	15	33	22	33	1,091	15,424
Cell phone sample	17,738	2,494	46	65	24	79	2,708	20,446
Korean surname	1,262	10	153	206	0	141	510	1,772
Vietnamese surname	3,220	165	11	37	4	121	338	3,558
Japanese surname	597	33	0	0	0	1	34	631
Imperial county	153	105	0	0	0	0	105	258
Child Interviews								
Total	3,376	866	5	19	2	25	917	4,293
Landline	965	228	0	2	1	2	233	1,198
Cell phone sample	2,004	566	2	5	1	6	580	2,584
Korean surname	103	7	1	10	0	9	27	130
Vietnamese surname	264	40	2	2	0	8	52	316
Japanese surname	24	10	0	0	0	0	10	34
Imperial county	16	15	0	0	0	0	15	31
Teen Permission Interviews								
Total	1,766	550	3	13	2	24	592	2,358
Landline	629	168	0	0	0	1	169	798
Cell phone sample	883	330	1	4	2	10	347	1,230
Korean surname	84	4	2	9	0	5	20	104
Vietnamese surname	129	22	0	0	0	8	30	159
Japanese surname	32	10	0	0	0	0	10	42
Imperial county	9	16	0	0	0	0	16	25
Teen Interviews								
Total	1,447	142	0	1	1	3	147	1,594
Landline	520	40	0	0	0	0	40	560
Cell phone sample	733	86	0	0	1	2	89	822
Korean surname	61	1	0	1	0	1	3	64
Vietnamese surname	102	9	0	0	0	0	9	111
Japanese surname	25	0	0	0	0	0	0	25
Imperial county	6	6	0	0	0	0	6	12

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

- Two-phase nonresponse follow-up:** In addition, the 2015-2016 CHIS featured a two-phase design with double sampling for nonresponse (Hansen & Hurwitz, 1946). Drawing a follow-up random subsample of Phase 1 nonrespondents (known as a nonresponse follow-up or double sampling for nonresponse) is increasingly recognized as a powerful tool for increasing response rates and decrease the threat of nonresponse bias (e.g., Peytchev, 2013; Valliant et al., 2013; Rosen et al., 2014). This approach facilitates reducing nonresponse rates and the potential for nonresponse bias without the cost burden of applying the costlier protocol to the full sample. The protocol used in Phase 2 was designed to appeal to sample members underrepresented in Phase 1. The data collection method (telephone) was the same, but the Phase 2 protocol offered doubled incentives to those sampled. Higher incentives have been found to appeal to sample members who are less interested in the survey topic (Groves et al., 2000; Groves et al., 2006). Analyses of the 2015 data showed increases in response rates in Phase 2, relative to Phase 1. Table 7-3 presents the unweighted response rates for 2015 and 2016 for each interview type by phase. We examine unweighted response rates here as the constructed weights account for phase 2 subsampling and phase-specific weighted response rates cannot be teased apart from weighted combined response rates. The penalty for the subsampling of nonrespondents is in terms of increased weight variation due to the additional subsampling. Despite the increased weight variation, however, this design can reduce the mean squared error of random digit dial (RDD) survey estimates, in addition to increasing response rates (Peytchev, Baxter, & Carley-Baxter, 2009).

Table 7-3. Unweighted response rates by interview type and phase for CHIS 2015-2016

Year	Phase	Screener	Adult	Child	Adolescent
2015	Phase 1	19.0%	51.0%	33.7%	14.9%
	Phase 2	5.4%	22.4%	18.7%	11.9%
	Combined	23.4%	62.0%	46.1%	25.0%
2016	Phase 1	14.1%	50.8%	54.3%	26.1%
	Phase 2	4.9%	21.7%	33.7%	16.8%
	Combined	18.3%	61.5%	69.7%	38.5%

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

7.2 Comparisons of Response Rates over the Cycles

While the sampling and content varies somewhat across CHIS cycles, the survey procedures are very similar. One adult is sampled from each household and asked to complete an interview of about 30

minutes. Other household members are sampled and interviewed if there are children and/or adolescents present in the household. The response disposition codes and formulas used to compute the response rates in CHIS 2015-2016 are similar to the ones used in previous cycles, although the child-first procedures have some implications for the response rates beginning in 2005, as noted earlier.

Table 7-4 summarizes the screener interview, extended interview, overall, and combined response rates by cycle for the CHIS samples. The same information is presented graphically in Figures 7-1 and 7-2. The state-level response rates for the landline/surname list sample have been declining steadily since the first cycle of CHIS in 2001. The screener response rate decreased 8.2 points, or about 28 percent, between 2013-2014 and 2015-2016 in the landline/surname list sample, and 11.1 points, or about 36 percent, in the cell phone sample.

Table 7-4. Comparison of state-level response rates for the landline/surname list sample from CHIS 2001 to 2015-2016

Type	CHIS cycle response rate (%)							
	2001	2003	2005	2007	2009	2011-2012	2013-2014	2015-2016
Landline/surname list sample								
Screener	59.2	55.9	49.8	35.6	36.1	31.6	28.8	20.6
Extended interviews								
Household	-	-	59.3	59.4	54.7	53.9	51.4	43.6
Adult	63.7	59.9	54.0	52.8	49.0	47.4	44.8	41.5
Child	87.6	81.4	75.2	73.7	72.9	73.2	68.9	57.0
Adolescent	63.5	57.3	48.5	44.1	42.8	42.7	40.2	17.6
Adolescent w/ parental permission	84.5	83.3	77.5	74.7	75.1	74.0	73.9	56.5
Overall landline/ surname list								
Household	-	-	29.6	21.1	19.7	17.0	14.8	9.0
Adult	37.7	33.5	26.9	18.7	17.7	15.0	12.9	8.5
Child	33.0	27.3	25.2	16.8	15.7	13.8	11.0	11.7
Adolescent	23.9	19.2	14.2	10.2	7.9	6.7	5.3	3.6

(continued)

Table 7-4. Comparison of state-level response rates for the landline/surname list sample from CHIS 2001 to 2015-2016 (continued)

Type	CHIS cycle response rate (%)							
	2001	2003	2005	2007	2009	2011-2012	2013-2014	2015-2016
Cell phone sample								
Screener	-	-	-	-	19.3	33.0	30.7	19.6
Extended interviews								
Household	-	-	-	-	57.6	55.5	53.9	45.7
Adult	-	-	-	-	56.2	53.8	52.1	47.9
Child	-	-	-	-	76.0	73.4	72.2	47.3
Adolescent	-	-	-	-	46.4	42.6	41.0	18.8
Adolescent w/ parental permission	-	-	-	-	75.6	69.9	69.7	61.2
Overall cell phone								
Household	-	-	-	-	11.1	18.3	16.6	8.9
Adult	-	-	-	-	10.8	17.8	16.0	9.4
Child	-	-	-	-	8.2	13.0	11.5	9.3
Adolescent	-	-	-	-	5.0	7.6	6.6	3.7
Combined landline/ surname list and cell phone sample								
Household	-	-	-	-	17.4	17.7	16.0	8.9
Adult	-	-	-	-	15.6	16.5	15.0	9.1
Child	-	-	-	-	14.1	13.3	11.4	9.7
Adolescent	-	-	-	-	7.5	7.1	6.1	3.7

Source: UCLA Center for Health Policy Research, 2015-2016 California Health Interview Survey.

Figure 7-1. CHIS overall response rates by sample type (landline LL and cell phone CP) and type of interview (adult, child, and adolescent)

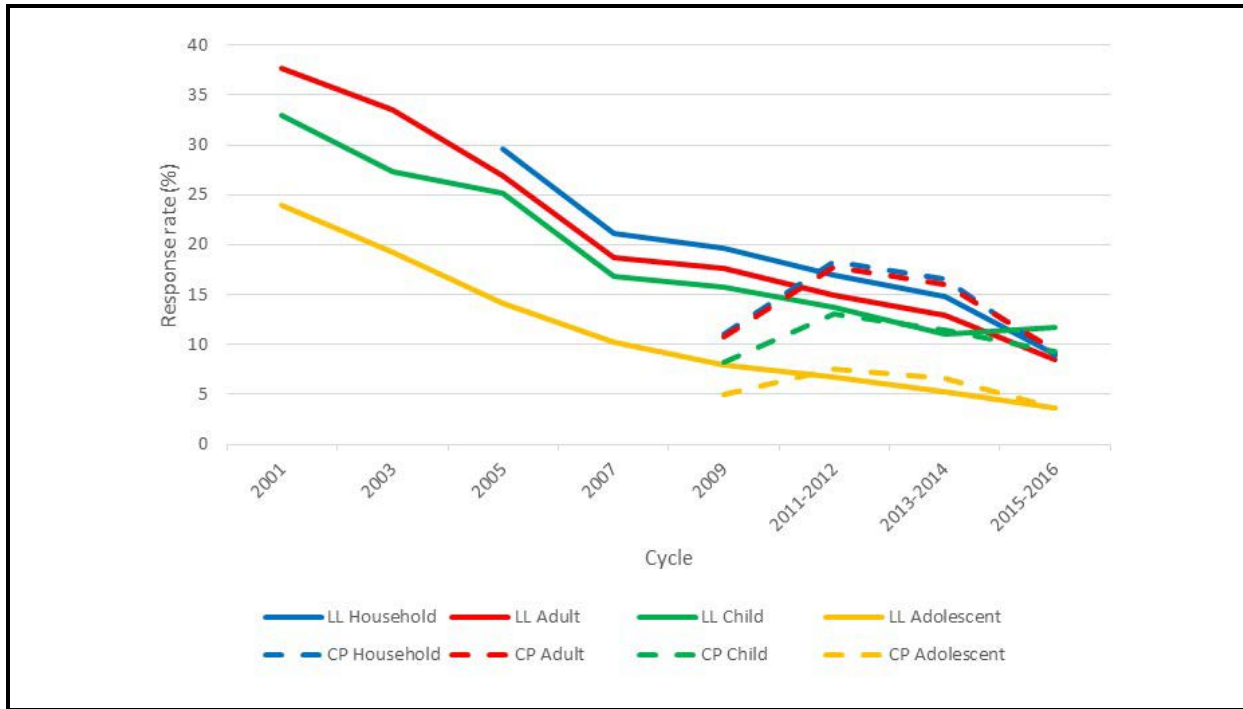
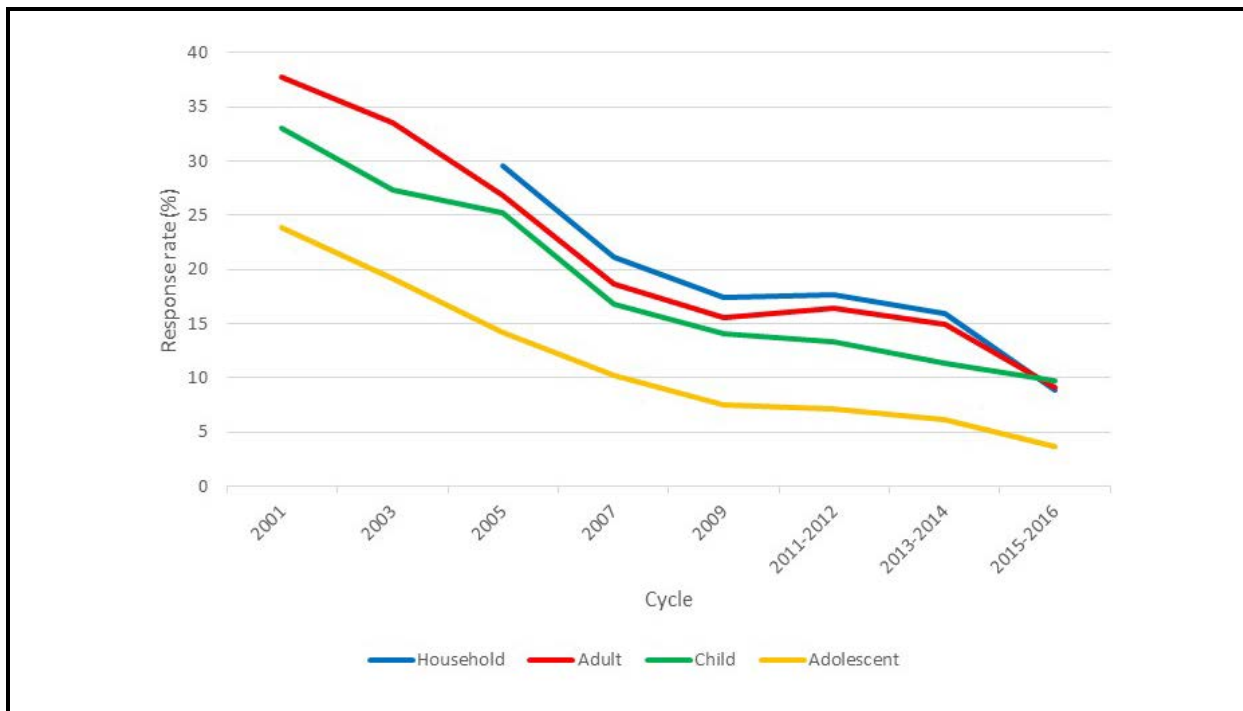


Figure 7-2. CHIS Overall response rates by type of interview (adult, child, and adolescent)



7.3 Comparisons of Response Rates with Other Telephone Surveys

This section compares the response rates from CHIS 2015-2016 to those from other telephone surveys of the adult population in California. These comparisons are not direct because other surveys may differ in sampling methods, the types of persons selected for interview, the length of interview, and other factors. A more generic reason for the difficulty of comparisons to other surveys involves the lack of detailed information on disposition codes available for most telephone surveys conducted in the United States as noted in several places, such as by McCarty (2003). Publications with definitions of response rates by AAPOR (The American Association for Public Opinion Research, 2016) are attempts to address this problem. This section compares two RDD surveys conducted in California between 2015 and 2016.

One RDD survey that has been compared to each cycle of CHIS is the California Behavioral Risk Factor Surveillance System (BRFSS). This is an annual survey conducted in each state as a cooperative venture with the Centers for Disease Control and Prevention (CDC). The documentation on the 2016 BRFSS and its data quality report with response rates is available from the CDC web site (https://www.cdc.gov/brfss/annual_data/2016/pdf/2016-sdqr.pdf). In the BRFSS, one adult in each household is sampled and asked to complete an interview of about 20 minutes on health-related topics. The BRFSS interview is about 15 minutes shorter than CHIS 2015-2016 and does not have multiple interviews within the household. Nonetheless, it is probably more like CHIS than any other survey for which detailed response rate information is available.

The 2016 BRFSS Summary Data Quality Report with Response Rates (Centers for Disease Control, 2017) includes information about its response rates. The report shows disposition codes that follow the spirit of the AAPOR recommendations. Despite the detail given, it is very difficult to map the 2016 California BRFSS disposition codes unambiguously to the corresponding disposition codes used in CHIS 2015-2016 because different survey organizations use different classification schemes to create the disposition codes. The codes from both systems provide much-needed information for survey operations, but they are not the same. Such differences make direct comparisons between surveys difficult.

One difference between the CHIS and BRFSS disposition classification systems is the definition of a “partial interview.” Each survey’s response rates include partial interviews per the survey’s own definition. The BRFSS definition appears to include many more cases than does the CHIS definition. The 2016 report does not distinguish between partial and full interviews. CHIS cycles have maintained a consistent rate of about 0.5 percent partial interviews. If this difference were taken into account, then the CHIS response rates would likely be higher, or the BRFSS rates would be lower.

The 2016 BRFSS Summary Data Quality Report includes AAPOR response rate 4 for the landline, cell phone, and combined samples. This rate, which is closest to the definition used in CHIS, is the overall response rate. However the overall response rates for the 2016 California BRFSS for landline and cell phone samples are over 20 percentage points higher than the response rates reported for CHIS 2015-2016 as detailed in the previous sections. It is essential to emphasize that the BRFSS and CHIS overall response rates are not comparable because of the numerous differences in the design and calculations.

In previous cycles, attempts have been made to create more comparable response rates to BRFSS (for example, see *CHIS 2013-2014 Methodology Series: Report 4 – Response Rates*). These comparable measures have historically found that CHIS achieves a similar response rate to BRFSS. No attempt to create comparable response rates is done here. Given similar declines in response rates for both BRFSS and CHIS over recent years, we assume that CHIS continues to maintain a similar response rate to BRFSS.

8. REFERENCES

- Brick, J. M. (2013). Unit nonresponse and weighting adjustments: A critical review. *Journal of Official Statistics*, 29, pp. 329-353.
- Centers for Disease Control. (2017). *Behavioral Risk Factor Surveillance System: 2016 Summary Data Quality Report*. Retrieved September 1, 2017, from https://www.cdc.gov/brfss/annual_data/2016/pdf/2016-sdqr.pdf.
- Council of American Survey Research Organizations. (1982). *Special Report: On the Definition of Response Rates*. Post Jefferson, NY: CASRO.
- Curtin, R., Presser, S., & Singer, E. (2000). The effects of response rate changes on the index of consumer sentiment. *Public Opinion Quarterly*, 64, 413-428.
- Groves, R. (2006). Nonresponse rates and nonresponse bias in household surveys. *Public Opinion Quarterly*, 70, 646-675.
- Groves, R. and Peytcheva, E. (2008). The impact of nonresponse rates on nonresponse bias. *Public Opinion Quarterly*, 72, 167-189.
- Groves, R. M., Singer, E., & Corning, A. (2000). Leverage-saliency theory of survey participation: Description and an illustration. *Public Opinion Quarterly*, 64, 288-308.
- Hansen, M. H. and Hurwitz, W. N. (1946). The problem of non-response in sample surveys. *Journal of the American Statistical Association*, 41, 517-529.
- Keeter, S., Miller, C., Kohut, A., Groves, R., & Presser, S. (2000). Consequences of reducing nonresponse in a national telephone survey. *Public Opinion Quarterly*, 64, 125-148.
- Lessler, J., & Kalsbeek, W. (1992). *Nonsampling errors in surveys*. New York: John Wiley and Sons.
- McCarty, C. (2003). Differences in response rates using most recent versus final dispositions in telephone surveys. *Public Opinion Quarterly*, 67, 396-406.
- Peytchev, A. (2013). Consequences of survey nonresponse. *The Annals of the American Academy of Political and Social Science*, 645, 88-111.
- Peytchev, A., Baxter, R. K., and Carley-Baxter, L. R. (2009). Not all survey effort is equal: Reduction of nonresponse bias and nonresponse error. *Public Opinion Quarterly*, 73, 785-806.
- Rosen, J. A., Murphy, J., Peytchev, A., Holder, T., Dever, J. A., Herget, D. R., & Pratt, D. J. (2014). Prioritizing low-propensity sample members in a survey: Implications for nonresponse bias. *Survey Practice*, 7(1).
- Shapiro, G., Battaglia, M., Massey, J., & Tompkins, L. (1995). Calling local telephone company business offices to determine the residential status of a wide class of unresolved telephone numbers in a random-digit-dialing sample. *Proceedings of the Survey Research Methods Section of the American Statistical Association* (pp. 975-98).

The American Association for Public Opinion Research. (2016). *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. 9th edition. AAPOR.

Valliant, R., Dever, J. A., & Kreuter, F. (2013). *Practical tools for designing and weighting sample surveys*. New York: Springer.

Wagner, J. (2012). A comparison of alternative indicators for the risk of nonresponse bias. *Public Opinion Quarterly*, 76, 555-575.