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CHIS 2009 Methodology Report Series

Report 4

Response Rates

CALIFORNIA HEALTH INTERVIEW SURVEY

CHIS 2009 METHODOLOGY SERIES

REPORT 4

RESPONSE RATES

November 2011

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www.chis.ucla.edu

This report provides analysts with information about the response rates in CHIS 2009. 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.

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The California Health Interview Survey is a collaborative project of the UCLA Center for Health Policy Research, the California Department of Public Health, and the Department of Health Care Services. Funding for CHIS 2009 came from multiple sources: the California Department of Public Health, the Department of Health Care Services, the California Endowment, the National Cancer Institute, NIH Office of Behavioral and Social Sciences Research, Agency for Healthcare Research and Quality, the California Wellness Foundation, First 5 California, the California Department of Mental Health, the California Office of the Patient Advocate, Kaiser Permanente, Blue Shield of California Foundation, the California HealthCare Foundation, the San Diego County Human and Health Services Agency, Marin County Department of Health and Human Services, and the Humboldt County Department of Health and Human Services.

PREFACE

Response Rates is the fourth in a series of methodological reports describing the 2009 California Health Interview Survey (CHIS 2009). The other reports are listed below.

CHIS is a collaborative project of the University of California, Los Angeles (UCLA) Center for Health Policy Research, the California Department of Public Health, and the Department of Health Care Services. Westat was responsible for data collection and the preparation of five methodological reports for the 2009 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. The plan is to monitor these issues and examine changes over time by conducting surveys in the future.

Methodological Reports

The first five methodological reports for the 2009 CHIS 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.

This report describes the response rates from CHIS 2009. Response rates are the ratio of the number of units interviewed to the number of eligible sampled units. However, the computation of response rates for CHIS 2009 is involved because of the complexity of the survey. This report presents the rates and explains the rationale for the procedures used in computing the response rates from CHIS 2009.

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 increase the response rates. The specific operational methods are described more completely in *CHIS 2009 Methodology Series: Report 2 – Data Collection Methods*. These methods are summarized briefly to provide some context for the examination in this report.

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1. CHIS 2009 SAMPLE DESIGN AND METHODOLOGY SUMMARY

1.1 Overview

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

The sample is designed to meet and optimize two objectives:

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

The CHIS sample is representative of California's non-institutionalized population living in households.

This series of reports describes the methods used in collecting data for CHIS 2009, the fifth CHIS data collection cycle, which was conducted between September 2009 and April 2010. The previous CHIS cycles (2001, 2003, 2005, and 2007) are described in similar series, available at http://www.chis.ucla.edu/methods.html.

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. The data are widely 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.

1.2 Sample Design Objectives

To achieve the sample design objectives stated above, CHIS employed a multi-stage sample design. For the first time, the random-digit-dial (RDD) sample included telephone numbers assigned to both landline and cellular service. For the landline RDD sample, the state was divided into 44 geographic sampling strata, including 41 single-county strata and three multi-county strata comprised of the 17 remaining counties. Within each geographic stratum, residential telephone numbers were selected, and within each household, one adult (age 18 and over) respondent was randomly selected. In those households with adolescents (ages 12-17) and/or children (under age 12), one adolescent and one child were randomly selected; the adolescent was interviewed directly, and the adult most knowledgeable about the child's health completed the child interview.

Table 1-1 shows the 44 sampling strata, which include 41 independent county strata. A sufficient number of adult interviews were allocated to each stratum to support the first sample design objective—to provide health estimates for adults at the local level. The geographic stratification of the state was the same as that used since CHIS 2005. In the first two CHIS cycles there were 41 total sampling strata, including 33 individual counties. The CHIS 2009 samples in Humboldt, Marin, and San Diego Counties were enhanced with additional funding.

The main landline RDD CHIS sample size is sufficient to accomplish the second objective. To increase the precision of estimates for Koreans and Vietnamese, areas with relatively high concentrations of these groups were sampled at higher rates. These geographically targeted oversamples were supplemented by telephone numbers associated with group-specific surnames drawn from listed telephone directories to further increase the sample size for Koreans and Vietnamese. CHIS 2009 included additional Korean and Vietnamese oversamples conducted on behalf of the National Cancer Institute.

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 2009, the goal was to complete approximately 2,500 interviews statewide with adults from the cell-phone sample . The CHIS 2009 cell-phone sampled from the CHIS 2007 cell-phone sample in two significant ways. First, all cell-phone sample cases were eligible for the extended interview regardless of the presence of a landline phone. The landline and cell samples, therefore, overlap and contrasts to CHIS 2007 when cell-phone cases with a landline telephone were screened out to limit the cell-phone sample to "cell-phone only" cases. This change was made due to the large and potentially unique characteristics of telephone users who possess both a landline and cell-phone, but rely principally on their cell-phone for

communication and would otherwise be excluded from the sample. The second change to the cell-phone sample was the inclusion of child and adolescent extended interviews. About 200 teen interviews and nearly 500 child interviews were completed from the cell-phone sample in CHIS 2009. Because data are not available for numbers assigned to cellular service to support the same level of geographic stratification as the landline sample, the cell RDD sample was stratified by area code. If the sampled number was shared by two or more adult members of a cell-only household, one household member was selected for the adult interview. Otherwise, the adult owner of the sampled number was selected.

Table 1-1. California county and county group strata used in the CHIS 2009 sample design

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

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

1.3 Data Collection

To capture the rich diversity of the California population, interviews were conducted in five languages: English, Spanish, Chinese (Mandarin and Cantonese dialects), Vietnamese, and Korean. These languages were chosen based on analysis of 2000 Census data to identify the languages that would cover the largest number of Californians in the CHIS sample that either did not speak English or did not speak English well enough to otherwise participate.

Westat, a private firm that specializes in statistical research and large-scale sample surveys, conducted the CHIS 2009 data collection under contract with the UCLA Center for Health Policy Research. For the landline RDD sample, Westat staff interviewed one randomly selected adult in each sampled household, and sampled one adolescent and one child if present in the household and the sampled adult was the parent or legal guardian. Up to three interviews could have been completed in each household. In households with children where the sampled adult was not the screener respondent, 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 new for CHIS 2005 and has been continued in subsequent CHIS cycles; this procedure substantially increases the yield of child interviews. While numerous subsequent attempts were made to complete the adult interview, there were completed child and/or 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 2009 by the type of sample (landline RDD, surname list, and cell RDD).

Table 1-2. Number of completed CHIS 2009 interviews by type of sample and instrument

Type of sample	Adult	Child	Adolescent
Total all samples	47,614	8,945	3,379
Landline RDD	42,682	7,918	3,002
Surname list	1,885	545	178
Cell RDD	3,047	482	199

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

Interviews in all languages were administered using Westat's computer-assisted telephone interviewing (CATI) system. The average adult interview took about 40 minutes to complete. The average child and adolescent interviews took about 16 minutes and 18 minutes, respectively. For "child-first" interviews, additional household information asked as part of the child interview averaged about 9 minutes. Interviews in non-English languages generally took longer to complete. More than 12 percent of the adult interviews were completed in a language other than English, as were almost 24 percent of all child (parent proxy) interviews and 9 percent of all adolescent interviews.

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

1.4 Response Rates

The overall response rate for CHIS 2009 is a composite of the screener completion rate (i.e., success in introducing the survey to a household and randomly selecting an adult to be interviewed) and

the extended interview completion rate (i.e., success in getting one or more selected persons to complete the extended interview). To maximize the response rate, especially at the screener stage, an advance letter in five languages was mailed to all landline sampled telephone numbers for which an address could be obtained from reverse directory services. An advance letter was mailed for approximately 58 percent of the landline RDD sample telephone numbers, and 82 percent of list sample numbers. Addresses were not available for the cell sample. As in CHIS 2005 and 2007, a $2 bill was included with the advance letter to promote cooperation.

The CHIS 2009 screener completion rate for the landline and samples was 36.1 percent, and was higher for households that were sent the advance letter. For the cell phone sample, the screener completion rate was 19.3 percent in all households. The extended interview completion rate for the landline sample varied across the adult (49.0 percent), child (72.9 percent) and adolescent (42.8 percent) interviews. The adolescent rate includes getting permission from a parent or guardian. The adult interview completion rate for the cell sample was 56.2 percent. Multiplying the screener and extended rates gives an overall response rate for each type of interview. The percentage of households completing one or more of the extended interviews (adult, child, and/or adolescent) is a useful summary of the overall performance of the landline sample. For CHIS 2009, the landline sample household response rate was 19.7 percent (the product of the screener response rate and the completion rate at the household level of 54.7 percent). All of the household and person level response rates vary by sampling stratum. For more information about the CHIS 2009 response rates, please see *CHIS 2009 Methodology Series: Report 4 – Response Rates*.

Table 1-3. CHIS 2009 survey topic areas by instrument

Health status	**Adult**	**Teen**	**Child**
General health status, height and weight	✓	✓	✓
Days missed from school due to health problems	✓	✓	✓
Health conditions	**Adult**	**Teen**	**Child**
Asthma	✓	✓	✓
Diabetes, gestational diabetes, pre-diabetes/borderline	✓		
Heart disease, high blood pressure	✓		
Physical disability	✓		
Developmental assessment and developmental conditions			✓
Mental health	**Adult**	**Teen**	**Child**
Mental health status	✓	✓	✓
Perceived need, access and utilization of mental health services	✓	✓	✓
Suicide ideation and attempts	✓		
Health behaviors	**Adult**	**Teen**	**Child**
Dietary intake, fast food, high sugar diet	✓	✓	✓
Physical activity and exercise	✓	✓	✓
Walking for transportation and leisure	✓		
Sedentary time		✓	✓
Flu Shot	✓		✓
Alcohol and tobacco use	✓	✓	
Illegal drug use		✓	
Sexual behavior	✓	✓	
HIV/STI testing		✓	
Sun exposure	✓	✓	
Women's health	**Adult**	**Teen**	**Child**
Mammography screening, hormone replacement therapy	✓		
Age at menarche, live births, menopause, birth control medications	✓		
Pregnancy status	✓	✓	
Cancer history and prevention	**Adult**	**Teen**	**Child**
Family history	✓		
Colorectal cancer screening, prostate specific antigen (PSA) test	✓		
Dental health	**Adult**	**Teen**	**Child**
Last dental visit, main reason haven't visited dentist		✓	✓

Table 1-3. CHIS 2009 survey topic areas by instrument (Continued)

Food environment	**Adult**	**Teen**	**Child**
Availability of food in household over past 12 months	✓		
Brought lunch to school from home		✓	
Doctor discussed nutrition/physical activity		✓	✓
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	✓	✓	✓
Communication problems with doctor	✓		
Long-term care	✓		
Health insurance	**Adult**	**Teen**	**Child**
Current insurance coverage, spouse's coverage, who pays for coverage	✓	✓	✓
Health plan enrollment, characteristics and plan assessment	✓	✓	✓
Employer offers coverage, respondent/spouse eligibility	✓		
Coverage over past 12 months, reason for lack of insurance	✓	✓	✓
Medical debt, high deductible health plans	✓	✓	✓
Partial scope Medi-Cal, Medi-Cal deficit reduction act requirements	✓		
Public program eligibility	**Adult**	**Teen**	**Child**
Household poverty level	✓		
Program participation (TANF, CalWorks, Public Housing, Food Stamps, SSI, SSDI, WIC)	✓	✓	✓
Assets, alimony/child support/social security/pension	✓		
Medi-Cal and healthy families eligibility	✓	✓	✓
Reason for Medi-Cal non-participation among potential beneficiaries	✓	✓	✓
Neighborhood and housing	**Adult**	**Teen**	**Child**
Neighborhood safety, use of parks		✓	✓
Homeownership, length of time at current residence	✓		
Civic engagement		✓	✓
Social cohesion			✓
Emergency Preparedness	**Adult**	**Teen**	**Child**
Medication supply and basic preparedness	✓		
Interpersonal Violence	**Adult**	**Teen**	**Child**
Intrapersonal violence	✓		

Table 1-3. CHIS 2009 survey topic areas by instrument (Continued)

Parental involvement/adult supervision	**Adult**	**Teen**	**Child**
Adult presence after school/knowledge of teen's activities, role models		✓	
Parental concerns/involvement			✓
Child care and school attendance	**Adult**	**Teen**	**Child**
Current child care arrangements			✓
Paid child care	✓		
First 5 California: Parent kit, educational TV programming			✓
Preschool/school attendance, name of school		✓	✓
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 (annual before taxes)	✓		
Number of persons supported by household income	✓		
Respondent characteristics	**Adult**	**Teen**	**Child**
Race and ethnicity, age, gender, height, weight, education	✓	✓	✓
Veteran status	✓		
Marital status, registered domestic partner status	✓		
Sexual orientation	✓	✓	
Language spoken with peers, language of TV, radio, newspaper used	✓		
Citizenship, immigration status, country of birth, length of time in U.S., languages spoken at home, English language proficiency	✓	✓	✓

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

Historically, the CHIS response rates are comparable to response rates of other scientific telephone surveys in California, such as the California Behavioral Risk Factor Surveillance System (BRFSS) Survey. It has become increasingly difficult, however, to compare the CHIS and BRFSS response rates due to changes in the BRFSS response rate calculation methods. California as a whole and the state's urban areas in particular are among the most difficult parts of the nation in which to conduct telephone interviews. The 2009 BRFSS, for example, shows the refusal rate for the California (32.2%) is the highest in the nation and more than twice the national median (15.7%).[1] Survey response rates tend to be lower in California than nationally, and over the past decade response rates have been declining both

[1] As reported in the Behavioral Risk Factor Surveillance System 2009 Summary Data Quality Report (Version #1 – Revised: 04/27/2010, available online at ftp://ftp.cdc.gov/pub/Data/Brfss/2009_Summary_Data_Quality_Report.pdf

nationally and in California. Further information about CHIS data quality and nonresponse bias is available at http://www.chis.ucla.edu/dataquality.html.

Adults who completed at least approximately 80 percent of the questionnaire (i.e., through Section K (on employment, income, poverty status, and food security), after all follow-up attempts were exhausted to complete the full questionnaire, were counted as "complete." At least some items in the employment and income series or public program eligibility and food insecurity series are missing from those cases that did not complete the entire interview.

Proxy interviews were allowed for frail and ill persons over the age of 65 who were unable to complete the extended adult interview in order to avoid biases for health estimates of elderly persons that might otherwise result. Eligible selected persons were recontacted and offered a proxy option. For 283 elderly adults, a proxy interview was completed by either a spouse/partner or adult child. A reduced questionnaire, with questions identified as appropriate for a proxy respondent, was administered. (Note: questions not administered in proxy interviews are given a value of "-2" in the data files.)

1.5 Weighting the Sample

To produce population estimates from the CHIS data, weights are applied to the sample data to compensate for the probability of selection and a variety of other factors, some directly resulting from the design and administration of the survey. The sample is weighted to represent the non-institutionalized population for each sampling stratum and statewide. The weighting procedures used for CHIS 2009 accomplish the following objectives:

- Compensate for differential probabilities of selection for households and persons;
- Reduce biases occurring because nonrespondents may have different characteristics than respondents;
- Adjust, to the extent possible, for undercoverage in the sampling frames and in the conduct of the survey; and
- Reduce the variance of the estimates by using auxiliary information.
- As part of the weighting process, a household weight was created for all households that completed the screener interview. This household weight is the product of the "base weight" (the inverse of the probability of selection of the telephone number) and a variety of adjustment factors. The

household weight is used to compute a person-level weight, which includes adjustments for the within-household sampling of persons and nonresponse. The final step is to adjust the person-level weight using a raking method so that the CHIS estimates are consistent with population control totals. Raking is an iterative procedure that forces the CHIS weights to sum to known population control totals from an independent data source (see below). The procedure requires iteration to make sure all the control totals, or raking dimensions, are simultaneously satisfied within a specified tolerance.

Population control totals of the number of persons by age, race, and sex at the stratum level for CHIS 2009 were created primarily from the California Department of Finance's 2009 Population Estimates and 2009 Population Projections. The raking procedure used 11 raking dimensions, which are combinations of demographic variables (age, sex, race, and ethnicity), geographic variables (county, Service Planning Area in Los Angeles County, and Health Region in San Diego County), household composition (presence of children and adolescents in the household), and socio-economic variables (home ownership and education). The socio-economic variables are included to reduce biases associated with differential response rates from households with and without landline telephones. One limitation of using Department of Finance 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). These persons were excluded from the CHIS target population and as a result, the number of persons living in group quarters was estimated and removed from the Department of Finance control totals prior to raking.

1.6 Imputation Methods

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

Two different imputation procedures were used by Westat to fill in item nonresponse for items essential for weighting the data. The first imputation technique was a completely random selection from the observed distribution of respondents. This method was used only for a few variables when the percentage of the items missing was very small. The second technique was hot deck imputation without replacement. The hot deck approach is probably the most commonly used method for assigning values for missing responses. With a hot deck, a value reported by a respondent for a particular item is assigned or donated to a "similar" person who did not respond to that item. The characteristics defining "similar" vary for different variables. To carry out hot deck imputation, the respondents to a survey item form a pool of

donors, while the nonrespondents are a group of recipients. A recipient is matched to the subset pool of donors based on household and individual characteristics. A value for the recipient is then randomly imputed from one of the donors in the pool. Once a donor is used, it is removed from the pool of donors for that variable. Hot deck imputation was used to impute the same items in CHIS 2003, CHIS 2005, CHIS 2007, and CHIS 2009 (i.e., race, ethnicity, home ownership, and education).

UCLA-CHPR imputed missing values for nearly every variable in the data files other than those imputed by Westat and some sensitive variables in which nonresponse had its own meaning. Overall, item nonresponse rates in CHIS 2009 were low, with most variables missing valid responses for less than 2% of the sample. However, there were a few exceptions where item nonresponse rate was greater than 25% such as household income.

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

Control variables (predictors) used in the model to form donor pools for hot-decking always included the following: gender, age group, race/ethnicity, poverty level (based on household income), educational attainment, and region. Other control variables were also used depending on the nature of the imputed variable. Among the control variables, gender, age, race/ethnicity and regions were imputed by Westat. UCLA-CHPR then imputed household income and educational attainment in order to impute other variables. Household income, for example, was imputed using the hot-deck method within ranges from a set of auxiliary variables such as income range and/or poverty level.

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

1.7 Methodology Report Series

A series of five methodology reports is available with more detail about the methods used in CHIS 2009:

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

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

2. USE OF RESPONSE RATES

In recent years there has been a shift away from the use of response rates as a single measure of the quality of a survey or of nonresponse bias. Research by Keeter et al. (2000), Curtin, Presser, and Singer (2000), and Merkel and Edelman (2002) has questioned the practice of relying solely on response rates. Groves (2006) and Groves and Peytcheva (2008) show there is little correlation between response rates and nonresponse bias, further undermining this reliance. Research on alternatives to the use of response rates has begun, but is still in the initial stages of development See Schouten, Cobben and Bethlehem (2009), Särndal and Lundström (2005), and Groves et al. (2008) for some of this work.

Response rates do provide valuable information on the success of the survey at representing the population sampled, as suggested by Madow et al. (1983), but they are not sufficient for fully assessing data quality. This is because the bias in an estimate is related to both the response rate and the characteristics of those responding and not responding. This relationship is discussed below.

The main objective of this report is to present response rates to analysts of CHIS 2009 data and explain the methods used to calculate them. It also provides information about how well various subgroups of the California population are represented. To accomplish this goal, response rates are weighted so that they are estimated 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, 2009). For example, weighted response rates account for differing sampling rates by county (*CHIS 2009 Methodology Series: Report 1 – Sample Design)* and, thus, are appropriate when the state-level response rate is reported.

The rationale for using weights in computing the response rate is that 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 the difference between the respondents and nonrespondents. A simple way of conceptualizing this is by assuming the population is partitioned into a stratum of respondents (*R*) and a stratum of nonrespondents (*NR*). The survey estimates are computed with the observations from the respondent stratum, where each observation is weighted by the inverse of its selection probability. In a probability sample survey, the bias attributable to nonresponse of $\bar{y}_r$ is

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

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 and Kalsbeek, 1992). This formula

shows that the bias increases as the response rate decreases, provided that the difference between respondents and nonrespondents remains constant. If the response rates are not weighted, this relationship does not hold. Returning to the example, if the county samples are not weighted by their selection probabilities, then the response rate cannot be used in the bias equation (1).

While expression (1) suffices for many purposes, another approach aids in understanding the effect of response rates stochastically. This approach assumes each unit i in a population of size N has a response propensity or a likelihood of responding to the survey, denoted as ϕ_i. Nonresponse is treated much like a second phase of sampling, but the response propensities are unknown. The bias of the estimator of a mean is

$$N^{-1}\bar{\phi}^{-1}\sum(\phi_i - \bar{\phi})(y_i - \bar{y}), \tag{2}$$

where ϕ and y are the response probability and the value of the characteristic being estimated, respectively. Under this model, estimates from respondents are unbiased if there is no correlation between the response propensity and the characteristic being estimated. Both expressions (1) and (2) indicate bias is more likely when persons with certain characteristics have different rates of responding to the survey. We examine such relationships in later chapters.

The components of CHIS 2009 are a landline telephone sample, a Korean and Vietnamese oversample using geographic targeting and surname lists of landline numbers, and a statewide cellular telephone sample. The sample design is described in detail in *CHIS 2009 Methodology Series: Report 1 – Sample Design*.

3. DEFINING RESPONSE RATES

The term "response rate" is used in many different 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, 1982) and the American Association for Public Opinion Research (AAPOR, 2011). The AAPOR report is periodically updated and is available on the organization's website (http://www.aapor.org).

We use the definitions described in the AAPOR report, which includes several different response rate definitions. Among them are the RR4 and RR3 definitions that are most commonly accepted in the current survey research field. The only difference is that RR3 does not include partial completes while RR4 does. This report uses AAPOR's RR4 for the telephone samples in CHIS 2009 (landline, list, and cell phone samples). Since telephone numbers were sampled with different selection probabilities, we use the weighted number of telephone numbers rather than the number of cases (unweighted) to compute the response rate computation as discussed in Chapter 2. This approach also compensates for the under- and oversampling implemented in different 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 the eligibility of some sampled numbers 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 answering machines. This outcome may occur for many reasons, as discussed by Shapiro et al. (1995). The eligibility of these numbers 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. One of the approaches used for estimating *e* was suggested in CASRO (1982). CASRO estimates *e* as the proportion of the resolved or observed sample units that are residential (and occupied, for the area sample). This method is used in CHIS 2009 to estimate *e* in for the landline/surname samples, and cell phone sample.

The next step in computing response rates depends on the particular extended interviews being analyzed, such as the adult interview. For example, to compute the 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 applies to all samples in CHIS 2009.

In CHIS 2001 and 2003, the adult interview had to be completed before children or adolescents could be interviewed. Since 2005, the child-first procedure[2] permitted child or adolescent interviews to be done before the adult interview in some circumstances. As a result, we have computed a household-level response rate that considers a household to be a respondent if either an adult or a child interview is completed. Although children and adolescents were interview in the cell phone sample, no child first procedures were used in this sample. The specifics of the computations are discussed later.

Computing a response rate for a subgroup (e.g., female) 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 for mailing advance letters. At the extended interview or person level, data from the screener can be used to classify households by characteristics that are known for 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. These data are used to compute the subgroup response rates in CHIS 2009.

[2] A complete description of the child-first procedures is found in *CHIS 2009 Methodology Series: Report 2 – Data Collection.*

4. REVIEW OF CONTACT METHODS

CHIS 2009 Methodology Series: Report 2 – Data Collection Methods provides a detailed discussion of the methods used to contact and interview persons. Here we briefly review the key procedures to provide some background on the response rates and evaluation measures presented later in this report.

4.1 Landline and List Samples

As mentioned before, the survey contained both screening and extended interviews. In each household sampled from the landline sample, one adult was sampled for an extended interview. In households with persons under age 17, one child and one adolescent were also sampled in the landline and list samples. The screening interview took, on average, about 2 to 3 minutes to conduct. A parent or guardian was interviewed about the sampled child and the sampled adolescent was interviewed if a parent or guardian gave permission. The adult extended interview averaged about 38 minutes in English, the child interview about 16 minutes, and the adolescent interview about 18 minutes. The interviews in languages other than English generally took longer than these averages. Detailed interview timing information is given in *CHIS 2009 Methodology Series: Report 2 – Data Collection Methods.*

Before calling sampled telephone numbers, Westat mailed an advance or 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 2009, that their participation was voluntary but important to the success of the survey, and that the survey was legitimate. The letter contained a $2 cash incentive to encourage the sampled households 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, at most 14 attempts 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 1-3 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 list sample household refused again, another telephone attempt was made at least another 2 weeks later. No second refusals were recontacted for the cell sample.

A similar process was used at the extended level for sampled adults in the landline and list samples, except that no second refusals were recontacted. 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, 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 2009. A very important procedure involved translating and conducting the interview in Spanish, Chinese (Cantonese and Mandarin), Korean, and Vietnamese to accommodate households that did not speak English. Another method to increase response rates was the use of proxy interviews for adults who were over age 65 and unable to participate because of mental or physical limitations. Other adult household members knowledgeable about the sampled persons' health, usually a spouse or child of the sampled adult, completed a proxy interview in these cases; 283 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. On average, 14 call attempts were made to contact an adult before a case was classified as a nonrespondent.

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 list samples with a few important differences:

- Since it was not possible to get addresses for telephone numbers assigned to cellular service, there were no prenotification letters for the cell phone sample;

- Rather than a $2 incentive in the advance letter, cell sample respondents were offered $5 to complete the screener, $25 for the adult extended interview, and $10 for the child and adolescent interviews, in part to compensate for any charges they might be billed for air time;

- All sampled numbers were eligible for screener refusal conversion; however, conversion was not attempted for second refusals at the screener level;

- There was no conversion attempted for refusals of the adult, child or adolescent interviews.

5. RESPONSE RATE FORMULAS

This chapter describes the formulas used to compute the response rates for CHIS 2009. 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 rate and should not be used to assess response patterns.

A screener response rate is calculated for each sampled stratum, 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 sample stratum is

$$rr_S = \frac{\sum_{i \in S_{resp}} w_i}{\sum_{i \in S_{resid}} w_i}, \tag{3}$$

where w_i is the weight for household i in the stratum after adjusting for differential sampling rates, and the assignment of households with unknown residential status. For the landline sample, S_{resp} is the set of households in the stratum that responded to the screening interview and S_{resid} is the set of households in the stratum that were residential. As noted earlier, the estimated residential rates in all samples were determined using the CASRO method.

The screener response rate for the state is computed in exactly the same way, except the sum is over the whole state rather than in the specific stratum. Thus, the state screener response rate in each sample is a weighted average of the stratum screener response rates where weights are equal to the population 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.

The screener response rate for the cell phone sample, ($rr_{cel\ phone}$) was computed in the same way as the response rate for the landline sample using (3) but with residential households with both telephones services that responded to the screening interview. The estimated residential rates in all samples were also determined using the CASRO method.

As mentioned in the previous chapter, because of the child-first procedure, some sampled households in the landline and surname samples completed child or adolescent interviews without

completing an adult interview. Some household-level information normally collected as part of the adult interview was collected in child interviews where the adult interview had not yet been completed. As a result, a household-level response rate at the extended interview level is appropriate to measure the percent of households cooperating in CHIS. The household is counted as a respondent if either an adult or child extended interview was completed in the household. Those households with only an adolescent extended interview (there were only 73 such households) are considered as nonrespondents because household-level data were not collected in these cases. The household extended interview response rate rr_h is computed as

$$rr_h = \frac{\sum_{i \in H_{resp}} w_i^*}{\sum_{i \in H_{scr}} w_i^*} \tag{4}$$

where w_i^* is the nonresponse adjusted weight for household i in the stratum[3]; 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. The household response rate is conditioned on the completion of the screener interview. The household response rate is not computed for the cell phone sample.

The next set of response rates is at the extended interview level. 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[4], while for the cell phone sample it is the inverse of the probability of selecting the adult from among those that share the phone. Because of this weighting, adults sampled from households with more than one adult have a larger effect on the response rate than those in households with only one adult. The extended adult response rate (rr_a) is computed as

$$rr_a = \frac{\sum_{i \in A_{resp}} w_i'}{\sum_{i \in A_{eligsamp}} w_i'}, \tag{5}$$

[3] A complete description of the poststratified household weight is found in Section 3-9 of the *CHIS 2009 Methodology Series: Report 5 – Weighting and Variance Estimation*.

[4] In cell only households, we assume that every member shared the same cell phone

where the numerator is summed over all adult respondents, and the denominator is summed over all eligible sampled adults. The weight being summed in this case, w', 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 response rate computation for children and adolescents is similar to the adult procedure; however, the child-first procedure adds some complexity in the landline/list samples. If the adult interview had to be done 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

$$rr_c = \frac{\sum_{i \in C_{resp}} w_i''}{\sum_{i \in C_{eligsamp}} w_i''}, \tag{6}$$

where the numerator is summed over all child respondents, and the denominator is summed over all eligible sampled children. The weight being summed in this case, w'', is the inverse of the probability of selecting the child within the household. To discriminate between the different sampling situations we add a subscript K to identify the procedure; $rr_{c,K}$ is the child extended interview response rate for children who were interviewed using the child-first procedure, and $rr_{c,\bar{K}}$ is the child extended interview response rate otherwise.

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

$$rr_t = \frac{\sum_{i \in T_{resp}} w_i'''}{\sum_{i \in T_{eligsamp}} w_i'''}, \tag{7}$$

where the numerator is summed over all adolescent respondents, and the denominator is summed over all eligible sampled adolescents. The weight being summed in this case, w''', is the inverse of the probability

of selecting the adolescent within the household. Again, $rr_{t,K}$ is used to identify the rate for adolescents who were interviewed using the first child first procedure, and $rr_{t,\bar{K}}$ is for adolescents who were interviewed without using the child-first procedure.

An important source of nonresponse for the adolescent interview was the parent refusing to provide permission to conduct the interview with the adolescent. The response rate given by (7) includes the parent permission as a source of nonresponse. Another response rate of interest is the adolescent response rate conditioned on the parent giving permission to interview the adolescent. This fully conditional adolescent response rate is

$$rr_{t-p} = \frac{\sum_{i \in T_{resp}} w_i'''}{\sum_{i \in T_{eligsamp-per}} w_i'''}, \tag{8}$$

where the only difference is that the denominator is summed over only those adolescents for whom the parents gave permission for the adolescent interview.

The response rates defined above, except for the screener response rate, are conditional rates in the sense that they depend on the household participating in the screener stage of CHIS. We 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

$$orr_h = rr_s \cdot rr_h \tag{9}$$

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

$$orr_a = rr_s \cdot rr_a \tag{10}$$

In the landline/list samples, the child response rate is conditioned on the screener being completed and either the child interview being completed for households with children using the child-first procedure or

the adult interviews being completed for those not using the procedure. The overall response rate for the child, orr_c is defined as

$$orr_c = rr_s \cdot \left(p_{Kc} \cdot rr_{c,K} + p_{\overline{K}c} \cdot rr_{ac,\overline{K}} \cdot rr_{c,\overline{K}} \right) \tag{11}$$

where $rr_{ac,\overline{K}}$ is the extended adult interview response rate for adults in households with children who were sampled without the child-first procedure, and p_{Kc} and $p_{\overline{K}c}$ are the proportions of households with children in which the child-first procedure was used or not, respectively (i.e., $p_{Kc} + p_{\overline{K}c} = 1$). Notice that if the child-first procedure had not been used, the overall child response rate becomes $orr_c = rr_s \cdot rr_{ac} \cdot rr_c$ as in the first two cycles of CHIS. In contrast, in the cell phone sample, where child first procedures were not used, the overall child response rate is similar to (10), that is, the product of the screener response rate and the child extended interview response rate.

In the landline/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 child first procedure) is

$$orr_t = rr_s \cdot \left(p_{Kt} \cdot rr_{t,K} + p_{\overline{K}t} \cdot rr_{at,\overline{K}} \cdot rr_{t,\overline{K}} \right), \tag{12}$$

where $rr_{at,\overline{K}}$ 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 $p_{\overline{K}t}$ are the proportions of households with adolescents in which the child-first procedure was used or not, respectively (i.e., $p_{Kt} + p_{\overline{K}t} = 1$). The overall response rate for the adolescent excluding the permission request (which would involve using rr_{t-p}) is not presented because it is not of much interest as an overall rate. As in the child response rate in 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.

The 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 (9) and (10) respectively but using 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

$$orr_{c\_cell} = rr_{s\_cell} \cdot rr_{ac\_cell} \cdot rr_{c\_cell}, \tag{13}$$

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_{c_cell}.

We also computed the overall response rate for the combined landline, surname and cell phone samples. The adult response rate is the weighted average of the overall response rates of adult in the landline or list samples and adults in the cell sample. These overall rates are weighted by the adult population by type of telephone service (i.e., cell-only, both, landline-only telephone services). The overall combined response rate for the landline, surname and cell phone adult sample, orr_{a_comb}, is computed as

$$orr_{a\_comb} = p_{a\_cell\_only} \cdot orr_{a\_cell\_only} + q_{a\_both} \cdot orr_{a\_both} + r_{a\_landline\_only} \cdot orr_{a\_landline\_only} \tag{13}$$

where $orr_{a\_cell\_only}$ is the overall response rate of cell-only adults sampled in the cell phone sample; orr_{a_both} is the overall response rate of adults who have a cell phone and a landline from either cell phone and landline samples; and $orr_{a\_landline\_only}$ is the overall response rate of landline-only adults from the landline sample. The proportions $p_{a\_cell\_only}$, q_{a_both}, and $r_{a\_landline\_only}$, $\left(p_{a\_cell\_only} + q_{a\_both} + r_{a\_landline\_only} = 1\right)$, are the proportions of adults by type of telephone service and were estimated using the CHIS 2009 data. These proportions are 0.15, 0.65, and 0.20 respectively.

The overall cell-only adult response rates $orr_{a\_cell\_only}$ and $orr_{a\_landline\_only}$ are computed as the product of the corresponding screener response rate (i.e., cell or landline screener response rates) and the

corresponding adult extended response rate (i.e., cell-only adult extended interview rates or landline-only adult extended interview response rates). In contrast, since the overall adult response rate with both telephone services, orr_{a_both}, combines samples from the cell phone and landline samples, this response rate is computed as the weighted average of the overall response rates of adults with both telephone services from the two samples as

$$orr_{a\_both} = \lambda \cdot orr_{a\_both}^{landline\_smp} + (1-\lambda) \cdot orr_{a\_both}^{cell\_smp} \tag{14}$$

where $orr_{a\_both}^{landline\_smp}$ and $orr_{a\_both}^{cell\_smp}$ are the overall response rates for adults with both types of telephone in the landline and cell phone samples respectively and λ is the composite factor used to combine these rates form the two samples. In CHIS 2009 we use $\lambda = 0.9$ that is the same factor used to combine the cell phone and landline sample in weighting (see *CHIS 2009 Methodology Series: Report 5 – Weighting and Variance Estimation* for additional details).

The overall response rate for children and adolescents for the combined cell phone and landline/list samples is more complex because it takes into account the child first procedures used in the landline sample. The overall child response rate is computed using expression (13) with some differences. The proportions $p_{c\_cell\_only}$, q_{c_both}, and $r_{c\_landline\_only}$, are the proportions of children by telephone service estimated using the CHIS data. The overall response rate for children in landline-only households, $orr_{c\_landline\_only}$, is computed using (11) for this group. The overall response rate for children in cell-only households, $orr_{c\_cell\_only}$, is computed using as the product of the screener response rate, the adult extended interview in cell-only households, and the child extended interview response in cell-only households. The overall response rate for children in households with both telephone services, orr_{c_both}, is computed using (14) for this group. In this expression, the overall response rate in children with both telephone services in the landline sample, $orr_{c\_both}^{landline\_smp}$, is computed using (11) for this group because child first procedures were used in the landline sample; while the overall response rate in children in households with both telephone services in the cell sample, $orr_{c\_both}^{cell\_smp}$, is computed as the product of the cell phone screener response, the adult extended interview in households with both types of telephones in the cell phone sample, and the cell phone extended interview response rate for children in households with both types of telephone. A similar expression was used to compute the combined overall response rate for adolescents.

The expression of the overall child response for the combined landline, list and cell phone samples, orr_{c_comb}, is

$$\begin{aligned} orr_{c\_comb} = {} & p_{c\_cell\_only} \cdot rr_{cell\_s} \cdot rr_{ac\_cell\_only} \cdot rr_{c\_cell\_only} \\ & + q_{c\_both}\left(\lambda \cdot rr_{landline\_s}\left(p_{Kc} \cdot rr_{c,K} + p_{\overline{K}c} \cdot rr_{ac,\overline{K}} \cdot rr_{c,\overline{K}}\right) + (1-\lambda) \cdot rr_{cell\_s} \cdot rr_{ac\_both} \cdot rr_{c\_both}\right) \\ & + r_{c\_lanline\_only} \cdot rr_{landline\_s} \cdot \left(p_{Kc} \cdot rr_{c,K} + p_{\overline{K}c} \cdot rr_{ac,\overline{K}} \cdot rr_{c,\overline{K}}\right) \end{aligned} \tag{15}$$

where rr_{cell_s} is the cell phone sample screener interview response rate, $rr_{landline\_s}$ is the landline sample screener interview response rate, $rr_{ac\_cell\_only}$ is the adult extended interview response rate in cell-only

household with children, $rr_{c\_cell\_only}$ is the child extended interview response rate in cell-only households, rr_{ac_both} is the adult extended interview response rate in households with children with both types of telephones in the cell phone sample, rr_{c_both} is the child extended interview response rate in households with both types of telephones in the cell phone, and the other quantities have been defined before

Similarly, the expression of the overall adolescent response for the combined landline, list and cell phone samples, orr_{t_comb}, is

$$\begin{aligned} orr_{t\_comb} &= p_{t\_cell\_only} \cdot rr_{cell\_s} \cdot rr_{at\_cell\_only} \cdot rr_{t\_cell\_only} \\ &+ q_{t\_both}\left(\lambda \cdot rr_{landline\_s}\left(p_{Kt} \cdot rr_{t,K} + p_{\overline{K}t} \cdot rr_{at,\overline{K}} \cdot rr_{t,\overline{K}}\right) + \left(1-\lambda\right) \cdot rr_{cell\_s} \cdot rr_{at\_both} \cdot rr_{t\_both}\right) \\ &+ r_{t\_lanline\_only} \cdot rr_{landline\_s} \cdot \left(p_{Kt} \cdot rr_{t,K} + p_{\overline{K}t} \cdot rr_{at,\overline{K}} \cdot rr_{t,\overline{K}}\right) \end{aligned} \tag{16}$$

where $rr_{at\_cell\_only}$ is the adult extended interview response rate in cell-only household with adolescents, $rr_{t\_cell\_only}$ is the adolescent extended interview response rate in cell-only households, rr_{at_both} is the adult extended interview response rate in households with adolescents with both types of telephones in the cell phone sample, rr_{t_both} is the adolescent extended interview response rate in households with both types of telephones in the cell phone, and the other quantities have been defined before.

6. RESPONSE RATE TABLES

This chapter contains tables of response rates for the different samples in CHIS 2009. The first section shows the screener response rates for the combined landline and surname list statewide and by sampling stratum, the cell phone sample, and the area 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 the samples in which they were conducted. This section also presents the household rate for the landline, list, and cell samples and the rates by respondent characteristics across all samples. Finally, the last section presents the overall response rates for each extended interview type. All of 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 sample, by sampling stratum, are given in Table 6-1. The first column in the table gives the number of households that completed the screening interview. Overall, 85,435 households from these samples cooperated with this first step of the CHIS 2009 screener interview. In each of these households, one adult was sampled.

As Figure 6-1 shows, the overall screener response rate for the state, including the sample drawn from the surname lists, is 36.09 percent, about 0.5 percentage points higher than in 2007. As discussed in Chapter 3, this response rate was computed using the CASRO method to allocate the numbers whose eligibility cannot be determined (those for which every call was not answered or only answered by an answering machine). Alternative definitions for allocating these undetermined numbers used in some other surveys may give slightly different response rates. One approach used by some is to ignore the undetermined numbers in the computation of response rates. This approach gives a *cooperation rate*. Dropping all the undetermined numbers for CHIS 2009 gives a weighted overall state-level cooperation rate of 44.3 percent for the landline/surname sample.

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

	Total		Advance letter mailed			
			Yes		No	
	Complete	Response rate	Complete	Response rate	Complete	Response rate
State total	85,435	36.09	68,761	37.08	16,674	32.55
Los Angeles	18,502	34.91	14,884	36.27	3,618	30.32
San Diego	10,161	35.46	7,640	35.84	2,521	34.39
Orange	5,269	36.56	4,267	37.34	1,002	33.75
Santa Clara	2,981	31.99	2,495	33.19	486	27.49
San Bernardino	2,763	37.40	2,224	38.23	539	34.35
Riverside	3,018	35.48	2,357	36.77	661	31.61
Alameda	2,221	36.64	1,779	37.05	442	35.17
Sacramento	2,091	36.43	1,611	37.69	480	32.74
Contra Costa	1,605	35.85	1,361	37.96	244	27.38
Fresno	1,220	36.32	989	36.95	231	33.91
San Francisco	1,550	27.43	1,214	27.55	336	27.01
Ventura	1,617	35.45	1,339	36.37	278	31.69
San Mateo	1,095	32.58	928	33.81	167	27.20
Kern	1,136	40.51	948	41.35	188	36.73
San Joaquin	1,020	36.39	845	38.10	175	30.05
Sonoma	904	37.88	760	38.34	144	35.64
Stanislaus	887	38.70	740	39.20	147	36.38
Santa Barbara	1,056	36.93	894	38.71	162	29.48
Solano	993	32.34	810	33.08	183	29.45
Tulare	978	41.51	796	41.77	182	40.43
Santa Cruz	867	40.72	704	41.14	163	39.03
Marin	3,489	37.80	2,897	38.61	592	34.33
San Luis Obispo	771	42.38	662	43.36	109	37.27
Placer	848	37.73	632	38.18	216	36.46
Merced	942	39.58	726	39.81	216	38.83
Butte	853	45.94	710	46.15	143	44.92
Shasta	826	44.13	670	45.85	156	37.97
Yolo	909	36.94	725	37.64	184	34.44
El Dorado	874	35.94	715	36.15	159	35.03
Imperial	1,253	36.87	1,091	37.36	162	33.88
Napa	900	38.89	742	39.04	158	38.21
Kings	1,018	37.77	853	39.29	165	31.50
Madera	1,061	39.65	785	40.44	276	37.62
Monterey	824	40.10	686	40.45	138	38.47
Humboldt	1,270	47.96	1,073	48.47	197	45.32
Nevada	925	36.63	734	36.89	191	35.67
Mendocino	953	39.48	831	40.61	122	33.11
Sutter	893	40.82	740	41.35	153	38.43

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

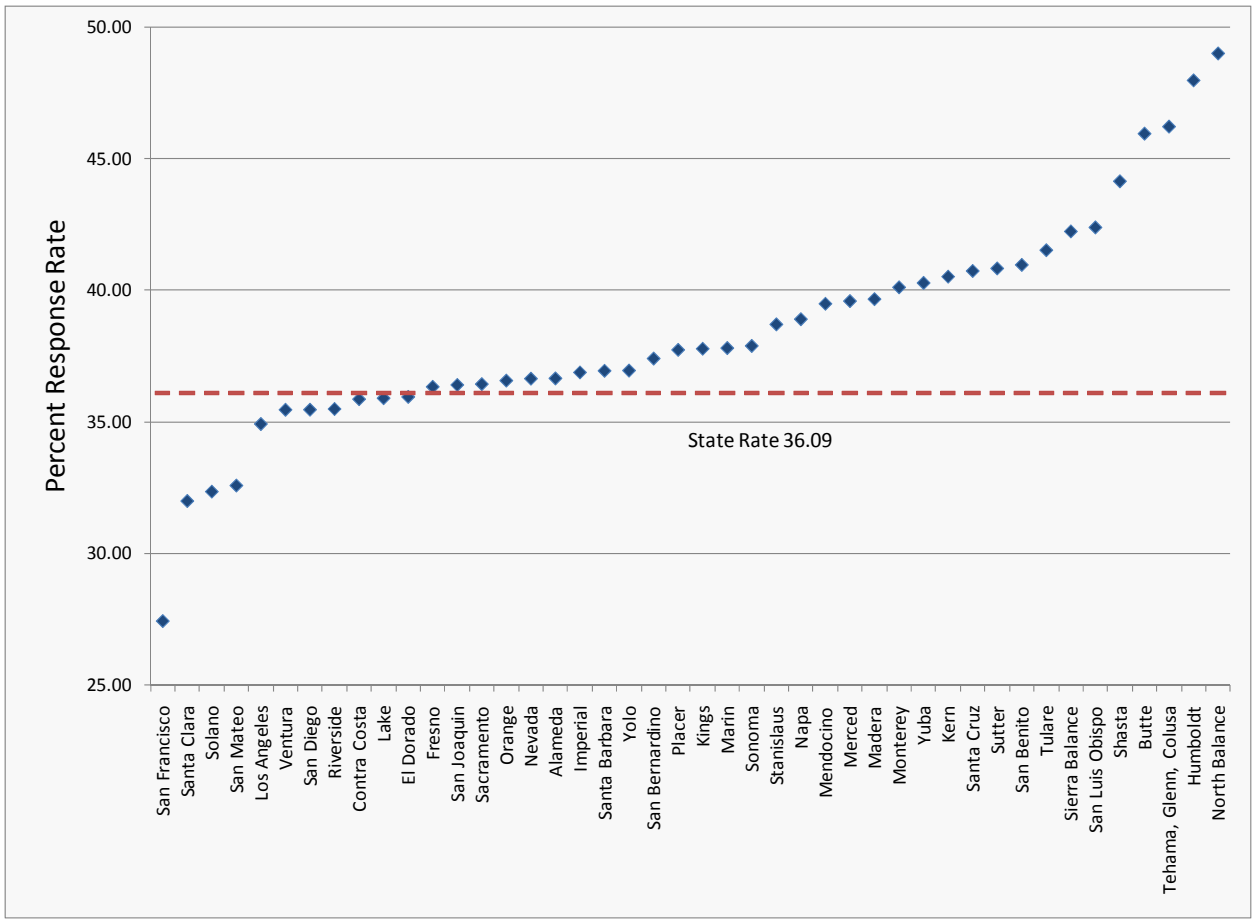
	Total		Advance letter mailed			
			Yes		No	
	Complete	Response rate	Complete	Response rate	Complete	Response rate
Yuba	931	40.27	696	39.75	235	41.87
Lake	877	35.89	717	35.91	160	35.81
San Benito	1,140	40.95	954	41.56	186	38.14
Colusa, Glenn, Tehama	667	46.20	547	46.90	120	43.27
Del Norte, Siskiyou, Lassen, Trinity, Modoc, Plumas, Sierra	650	48.98	512	50.44	138	44.26
Amador, Alpine, Calaveras, Inyo, Mariposa, Mono, Tuolumne	627	42.23	478	43.01	149	39.85

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

The table shows that the screener response rates for the landline/list samples vary by county, which is also illustrated in Figure 6-1. The median response across all counties is 37.7 percent, and the highest response rate is 49.0 percent in the stratum that includes the combined stratum with Del Norte County, Lassen County, Modoc County, Plumas County, Sierra County, Siskiyou County, and Trinity County. San Francisco has the lowest response rate at 27.4 percent, which is clearly at the low end of the scale in Figure 6-1. The next lowest response rate (Santa Clara) is about 4.6 percentage points higher than the San Francisco rate. The screener response rate in Los Angeles is 7.5 percentage points higher than the San Francisco rate and 1.7 percentage points lower than the state response rate. The county rankings shown in Figure 6-1 are relatively consistent from previous years, as discussed later.

The median response rate for counties with a population of more than 500,000 persons (the counties from Los Angeles through San Joaquin in Table 6-1) is 35.9 percent. This is 3.7 percentage points lower than the 39.5 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. This differential is not as large as was observed in the CHIS 2007 stratum-level response rates.

Table 6-1 also tabulates the response rates by whether an advance letter could be mailed to the household. We discuss these rates later.



Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

Figure 6-1. Screener response rate distribution by sampling stratum

Table 6-2 shows the screener response rates for households from the cell phone sample. Overall, 5,196 screener interviews were completed statewide and the state screener response rate was 19.29 percent. The screener response rate in CHIS 2007 was 30.5 percent; however, this rate is not directly comparable to the 2011 cell phone screener rate because only cell-only households were eligible in 2007.

Response rates based on region are also provided, and range from a low of 18.07 percent in the Other Southern California Area to a high of 22.50 percent in the Central Coast region. When looking at the regional rates for the cell phone sample, it should be noted that these are based on the region of telephone number assignment. If someone has moved to another region, but kept their telephone number, this change is not reflected.

Table 6-2. Number of completed screener interviews and screener response rates by region for the cell-only component of the cell phone sample

Region	Screener interview	
	Complete	Response rate
State Total	5,196	19.29
Northern & Sierra Counties	1,096	20.95
Greater Bay Area	817	19.04
Sacramento Area	344	19.90
San Joaquin Valley	920	21.61
Central Coast	693	22.50
Los Angeles	750	18.92
Other Southern California	576	18.07

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

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 46,720 households where either an adult or child extended interview (or both) was completed, resulting in a statewide household level response rate of 54.7 percent. Additionally, 44,567 adult interviews, 8,463 interviews about children, and 3,180 adolescent interviews were completed in the landline and list samples.

The statewide response rate for the landline/list sample shown in Table 6-3 for the adult interview was 49.0 percent, a decrease of 3.8 percentage points from CHIS 2007. As with the screener response rate, 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 50.9 percent, while for counties with less than 500,000 the median adult response rate is 54.5 percent. This difference may be attributable to a variety of reasons, including the different distribution of persons by age, education, etc., by county.

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

	Household		Adult		Child		Adolescent*	
	Complete	Response rate	Complete	Response rate	Complete	Response rate	Complete	Response rate
State total	46,720	54.7	44,567	49.0	8,463	72.9	3,180	42.8
Los Angeles	9,157	49.7	8,710	43.6	1,703	70.6	636	40.3
San Diego	5,270	51.9	5,014	46.0	932	70.2	339	42.7
Orange	2,789	54.1	2,636	48.7	530	71.4	182	38.2
Santa Clara	1,710	58.8	1,607	52.9	417	79.0	120	40.2
San Bernardino	1,537	55.5	1,460	50.4	305	72.9	108	36.2
Riverside	1,684	56.0	1,609	51.4	293	73.8	123	43.5
Alameda	1,270	57.7	1,191	52.0	264	73.9	98	50.4
Sacramento	1,265	61.0	1,226	55.0	222	77.3	72	46.2
Contra Costa	938	58.4	895	51.8	145	68.5	56	49.4
Fresno	700	57.4	667	53.3	153	71.7	57	46.5
San Francisco	785	50.8	757	47.2	99	65.6	21	42.3
Ventura	940	58.2	898	52.4	166	77.1	68	42.8
San Mateo	614	56.2	590	50.9	109	67.8	37	42.6
Kern	623	54.8	577	47.0	136	75.7	53	45.8
San Joaquin	546	53.5	517	48.8	113	80.2	46	42.8
Sonoma	542	59.7	512	52.8	96	82.0	40	56.0
Stanislaus	493	55.7	474	51.1	101	70.4	40	44.8
Santa Barbara	631	59.7	613	54.1	94	77.7	43	48.8
Solano	505	50.7	480	45.0	76	62.2	39	47.0
Tulare	496	50.6	473	45.2	102	64.4	42	43.7
Santa Cruz	525	60.7	503	55.7	102	79.6	38	47.7
Marin	2,137	61.2	2,048	56.1	325	75.1	127	45.8
San Luis Obispo	493	63.6	478	59.3	60	74.5	25	40.4
Placer	523	61.7	502	56.8	105	84.0	30	44.4
Merced	517	54.7	493	49.6	110	74.2	47	42.9
Butte	509	59.5	493	55.2	67	81.4	29	55.0
Shasta	514	61.8	502	58.7	73	85.5	23	56.7
Yolo	550	60.2	524	56.4	116	75.7	58	58.0
El Dorado	505	57.6	494	54.5	75	77.3	32	47.3
Imperial	577	46.1	539	40.6	138	72.7	51	47.4
Napa	507	56.4	485	50.5	66	72.0	22	33.4
Kings	514	50.3	478	45.5	122	69.0	41	40.3
Madera	567	53.3	535	48.4	136	79.0	44	43.5
Monterey	449	54.7	426	48.4	91	74.1	35	35.8
Humboldt	862	67.7	844	65.7	110	83.9	46	59.7
Nevada	554	59.9	537	56.8	73	87.9	30	48.9
Mendocino	617	64.2	600	60.4	79	75.9	36	44.8
Sutter	488	54.7	468	49.8	86	71.7	27	34.3
Yuba	490	52.4	466	47.2	97	71.0	45	53.0
Lake	540	61.0	525	57.9	77	84.0	42	66.8
San Benito	584	51.1	548	46.2	139	69.9	57	41.3
Colusa, Glenn, Tehama	395	59.0	382	55.1	67	68.0	34	45.8

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

	Household		Adult		Child		Adolescent*	
	Complete	Response rate	Complete	Response rate	Complete	Response rate	Complete	Response rate
Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	414	63.3	403	58.0	50	90.6	18	54.4
Alpine, Amador, Calaveras, Inyo, Mariposa, Mono, Tuolumne	394	63.0	388	59.1	43	78.8	23	52.5

* Includes parent permission

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

Table 6-4 shows the household, adult, child, and adolescent extended interview response rate for the cell phone sample. There were 3,047 households where either an adult or child extended interview (or both) was completed, resulting in a statewide household level response rate of 57.6 percent. The adult extended response rate was 56.2 percent. Within region, there was a wide range of rates, with a low of 53.3 percent in Los Angeles to a high of 61.0 percent in the Northern and Sierra Counties area.

Additionally, 3,047 adult interviews, 482 interviews about children, and 199 adolescent interviews were completed in the cell phone sample. The statewide response rate for the adult interview was 57.6 percent. Although this is an increase of 5.6 percentage points from CHIS 2007, it is important to note that in 2009 all adults were eligible for the extended interview in 2009 while only adults in cell-only households were eligible in 2007.

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

	Household		Adult		Child		Adolescent*	
	Complete	Response rate	Complete	Response rate	Complete	Response rate	Complete	Response rate
State Total	3,047	57.6	3,047	56.2	482	76.0	199	46.4
1 - Northern & Sierra Counties	669	60.9	669	61.0	91	85.7	52	62.3
2 -Greater Bay Area	490	58.7	490	57.1	69	73.8	40	59.2
3 -Sacramento Area	206	59.9	206	55.6	38	86.1	14	54.8
4 -San Joaquin Valley	525	58.1	525	56.9	109	83.7	34	38.0
5 -Central Coast	398	56.6	398	54.1	64	73.5	24	47.4
6 -Los Angeles	416	55.5	416	53.3	56	62.9	19	36.0
7 -Other Southern California	343	57.7	343	57.8	55	85.8	16	41.0

* Includes parent permission

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

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.[5] Results are shown separately for the combined landline and surname list sample and the cell sample.

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

Characteristic	Landline/List	Cell phone
Total	49.0	56.2
Sex		
Male	43.7	56.3
Female	53.8	56.1
Age		
18 to 30 years	36.0	52.3
31 to 45 years	42.6	57.6
46 to 65 years	52.1	57.0
Over 65 years	60.4	64.3
Type of household		
With somebody less than 18 years old	43.3	52.1
Without somebody less than 18 years old	53.1	59.5
Number of adults in household		
1	65.2	56.3
2	52.6	59.7
3 or more	39.5	51.3
Adult was screener respondent		
Yes	64.2	58.9
No	34.5	20.9

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

Women are traditionally more cooperative than men in landline and list samples, and this pattern is borne out in the CHIS 2009 landline sample. In contrast, this "gender response gap" is virtually nonexistent in the cell sample.

Older adults are also typically more cooperative than younger adults, and again this pattern is borne out in the landline/list sample, with almost a 24.4 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 12.1 percentage points.

Across CHIS cycles, response among households with children is declining faster than among those without (see *CHIS 2009 Methodology Series: Report 2 – Data Collection Methods*). In the

[5] In some cases the data from the screener interview and the adult interview may differ. For example, the age of the adult reported by the household member in the screener may be different from the age reported by the sampled adult. All of the data used in these tabulations are the screener data because no other data are available for the nonresponding adults.

landline and list samples, there is a 9.8 point difference in response rate between adults in households with children and those are other households. This difference is 7.4 percentage points in the cell phone sample.

In both the landline/list and area samples, adult response rates decline substantially the more adults are present in the household. A major reason for this is that 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. In the cell sample, where sampling among adults is only needed when the cell phone is shared, the response rate for those in households with two adults is actually higher than that in smaller households, and is higher than that in landline/list households with two adults. Where sampling among adults was required and the sampled adult was not the screener respondent, response in the cell sample less than half that for screener respondents. The absolute difference in rates between screener respondents and others is much larger for the cell phone sample.

These differences in response rates 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 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 6-3 shows that the statewide child-level response rate is 72.9 percent for the landline and surname samples, which is relatively high but still 5.2 percentage points lower than it was in CHIS 2007. The median rate in the more populous counties (72.9 %) is 2.8 percentage points lower than the rate in smaller counties (75.7%). The statewide child-level response for the cell phone sample is 76.0 percent, which is higher that the response rate in the combined landline and surname samples. Cell phone child interviews were conducted for the first time in 2009 so there is no response rate from previous cycles for comparisons.

Table 6-6 gives 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 or age of the child or the number of children in the household in the landline and surname samples. In contrast, in the cell phone sample there are differences by these groups. *CHIS 2009 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	Landline/List	Cell phone
Total	72.9	76.0
Sex		
Male	72.6	83.4
Female	73.3	65.9
Age		
Less than 4 years	73.0	79.6
4 to 7 years	73.4	69.7
8 to 11 years	72.4	79.4
Number of children in household		
1	73.8	82.2
2	73.6	73.6
3	70.5	73.1
4 or more	72.1	76.2

Source: UCLA Center for Health Policy Research, 2009 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 to conduct the interview. This requirement means that we had to contact and get permission from the parent or guardian and then contact and interview the adolescent. Consequently, response rates for the adolescent interview are lower than for the child interview. Table 6-7 shows that the state-level adolescent response rate is 42.8 percent. If we exclude the nonresponse due to parents not giving permission to interview the adolescent, the cooperation rate rises 32.3 percentage points to 75.1 percent.

As with the adult and child interviews, there are differences in response rates for the adolescent interview by the size of the county. The more heavily populated counties have a median response rate of 42.8 percent and the counties with fewer than 500,000 persons have a median response rate of 47.0 percent. Table 6-7 gives the adolescent response rates by the characteristics of the adolescent and household based on data collected in the adult interview. These rates, like the corresponding child rates, have little variation across sex, age, and the number of adolescents in the household.

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. This rate is indicative of the ability of the survey operations to contact and interview the adolescents. These rates are given in Table 6-8 which is similar to Table 6-7 but excludes the sampled adolescents without parental permission from the denominator of the response rate computation. The rates in Table 6-8 are 32.3 percentage points higher in the landline and surname sample than those in Table 6-7. For the cell sample, the difference is 29.2 percentage points. The respective rates by the characteristics in landline and surname samples are relatively consistent across the tables. On the other hand, there are noticeable differences in the cell phone sample such as the response rate by sex.

Table 6-7. Adolescent response rates by characteristics of the sampled adolescent

Characteristic	Landline/List	Cell phone
Total	42.8	46.4
Sex		
Male	42.6	41.2
Female	43.0	51.4
Age		
12 to 14 years	41.2	46.7
15 to 17 years	44.2	46.1
Number of adolescents in household		
1	41.3	49.3
2	43.1	43.0
3 or more	49.4	43.9

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

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

Characteristic	Landline/List	Cell phone
Total	75.1	75.6
Sex		
Male	74.5	68.0
Female	75.7	82.8
Age		
12 to 14 years	76.7	75.9
15 to 17 years	73.7	75.3
Number of adolescents in household		
1	73.7	80.7
2	75.3	71.0
3 or more	81.5	68.3

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

Differences in response rates can lead to nonresponse bias as suggested in equation (1). To reduce this potential for bias, geographic and demographic characteristics examined in Tables 6-1 through 6-8 were taken into account in the development of the weights as described in *CHIS 2009 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 2009. Table 6-9 gives these response rates for the entire state and by county for the combined landline/list sample. As discussed in Chapter 5, 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 (9). The adult response rates are computed using equation (10). The child and adolescent overall rates are computed using equation (11) and (12), respectively.

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 adult response rate is 1.4 percentage points lower than it was in CHIS 2007.

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

Strata	Household	Adult	Child	Adolescent*
State total	19.7	17.7	15.7	7.9
Los Angeles	17.4	15.2	13.4	6.7
San Diego	18.4	16.3	13.8	7.1
Orange	19.8	17.8	15.0	6.9
Santa Clara	18.8	16.9	17.1	7.1
San Bernardino	20.8	18.8	15.8	7.1
Riverside	19.9	18.2	16.6	8.6
Alameda	21.1	19.0	18.1	10.5
Sacramento	22.2	20.0	17.9	9.4
Contra Costa	20.9	18.6	16.0	9.3
Fresno	20.9	19.4	17.5	8.9
San Francisco	13.9	12.9	10.3	4.7
Ventura	20.6	18.6	17.2	8.3
San Mateo	18.3	16.6	13.7	6.7
Kern	22.2	19.0	18.0	9.9
San Joaquin	19.5	17.8	18.4	8.8
Sonoma	22.6	20.0	21.6	11.9
Stanislaus	21.6	19.8	17.6	9.1
Santa Barbara	22.1	20.0	16.3	9.8
Solano	16.4	14.5	10.9	7.9
Tulare	21.0	18.8	14.2	8.0
Santa Cruz	24.7	22.7	23.1	10.6
Marin	23.1	21.2	20.3	9.6
San Luis Obispo	27.0	25.1	19.3	9.9
Placer	23.3	21.4	22.5	9.3

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

Strata	Household	Adult	Child	Adolescent*
Merced	21.6	19.6	17.3	9.8
Butte	27.3	25.4	23.1	12.8
Shasta	27.3	25.9	24.6	13.5
Yolo	22.2	20.8	18.9	13.6
El Dorado	20.7	19.6	19.2	10.0
Imperial	17.0	15.0	15.1	7.7
Napa	21.9	19.6	17.9	7.1
Kings	19.0	17.2	15.1	8.1
Madera	21.1	19.2	19.6	8.5
Monterey	21.9	19.4	17.3	7.9
Humboldt	32.5	31.5	29.8	17.8
Nevada	21.9	20.8	21.8	10.7
Mendocino	25.3	23.8	22.0	11.9
Sutter	22.3	20.3	18.8	7.6
Yuba	21.1	19.0	15.4	10.5
Lake	21.9	20.8	20.5	13.4
San Benito	20.9	18.9	18.2	10.4
Colusa, Glenn, Tehama	27.3	25.5	21.0	13.2
Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	31.0	28.4	27.5	13.8
Alpine, Amador, Calaveras, Inyo, Mariposa, Mono, Tuolumne	26.6	24.9	21.6	12.5

* Includes parent permission

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

Table 6-10 shows the overall response rate for the cell phone sample. The lowest adult response rate was in Los Angeles (10.1%) while the highest was in the Northern and Sierra Counties (12.8%). The overall adult response rate was 10.8 percent, which is 6.9 percentage points lower than the 17.7 percent rate that was observed for adults in the landline/list sample.

Table 6-10. Overall response rate for the cell phone sample by region and type of interview

	Household	Adult	Child	Adolescent*
State Total	11.1	10.8	7.4	4.8
Northern & Sierra Counties	12.8	12.8	8.1	4.6
Greater Bay Area	11.2	10.9	5.2	3.5
Sacramento Area	11.9	11.1	7.2	3.4
San Joaquin Valley	12.6	12.3	7.9	1.8
Central Coast	12.7	12.2	5.5	2.6
Los Angeles	10.5	10.1	3.6	1.2
Other Southern California	10.4	10.4	7.1	1.7

* Includes parent permission

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

Table 6-11 summarizes the overall response rates by sample types. The landline and surname samples have a higher overall response rate than the cell phone sample.

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

	Household	Adult	Child	Adolescent*
Landline/list	19.7	17.7	15.7	7.9
Cell phone	11.1	10.8	7.4	4.8
Landline/list//cell-phone	17.4	15.6	13.9	7.5

* Includes parent permission

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

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7. DISCUSSION OF RESPONSE RATES

In this chapter, we discuss the response rates from CHIS 2009 in the context of procedures used to increase response rates and how these rates compare to those from other telephone surveys. The first section briefly reviews some of the methods used in CHIS 2009 that effect response rates, mentioned in Chapter 4. A more complete discussion of these methods is provided in *CHIS 2009 Methodology Series: Report 2 – Data Collection Methods*. The response rates obtained in CHIS 2009 are then compared to rates from other surveys. Earlier reports, the *CHIS 2001 Methodology Series: Report 4 – Response Rates* (UCLA Center for Health Policy Research, 2002), *CHIS 2003 Methodology Series: Report 4 – Response Rates* (UCLA Center for Health Policy Research, 2005), and *CHIS 2005 Methodology Series: Report 4 – Response Rates* (UCLA Center for Health Policy Research, 2009), contain many comparisons to other surveys, so this review is limited to new telephone surveys that have been conducted in California.

7.1 Methods to Enhance Response Rates

A number of methods to enhance response rates have been used in all four cycles of CHIS, although the details of how they were implemented may have changed over time, and other methods were only used in some of the cycles. The specifics of these methods can be found in *CHIS 2009 Methodology Series: Report 2 – Data Collection Methods*. We summarize them here to provide some context for the CHIS 2009 response rates.

One issue that has been the topic of considerable discussion in the telephone survey literature is the method of selecting adults within a household. Beginning in CHIS 2003, we have used the method proposed by Rizzo et. al. (2004) because it enables us to bypass the enumeration of adult household members in most households. This sample selection procedure not only is less intrusive but also results in a valid probability sample that is not obtained by some of the alternative selection methods. The specifics of this sampling algorithm are described in *CHIS 2009 Methodology Series: Report 1 – Sample Design*.

The child-first procedure was implemented beginning with CHIS 2005 with the express intent of increasing the yield and response rates for the child interviews. While the outcomes of the child-first approach are examined in detail in *CHIS 2009 Methodology Series: Report 1 – Sample Design*, it is clear that the procedure increased both the yield and response rates for the child interviews in the landline and list samples. Its effect on the adult response rates is less clear (see *CHIS 2009 Methodology Series:*

Report 2 – Data Collection Methods, Section 6.1.3*)*, but it is likely that the adult response rates were suppressed slightly by using this approach.

As in previous cycles of CHIS, a variety of interviewer training methods were developed and implemented to increase response rates. Since these methods were applied to all interviewers, no evaluation of the methods in terms of response rate improvement is available. Each interviewer was given the full set of training along with special training to help them to avoid refusals. Interviewers assigned to refusal conversion cases were also given special training before they were permitted to make contact with households or persons who previously refused.

Another method used to increase response rates was an advance mailing sent to all landline and list sampled cases with mailable addresses identified from vendors. As in the past, the advance letter mailing appears to have increased response rates slightly. While no experimental data exist to support the effect of mailings in CHIS 2009, the data summarized in Table 7-1 showing higher response rates by whether an advance letter was mailed are consistent with experiments from other studies.

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

Type	Advance letter mailed		Difference
	Yes	No	
Screener	37.1	32.6	+4.5
Adult interview	50.8	42.5	+8.4
Child interview	73.1	72.4	+0.7
Adolescent interview*	45.1	35.2	+9.8
Household extended	56.4	48.6	+7.8

* Includes parent permission

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

Other methods for enhancing response rates in CHIS 2009 include:

- Repeated Call Attempts: The procedures implemented in CHIS 2009 allowed many attempts to reduce the bias from this source of nonresponse. Most interviews were completed within a few call attempts, where the median number of call attempts for a completed screener is three and for an adult interview is two. However, each distribution has a long tail (the 75th percentile of the number of completed screeners is the sixth attempt).

- Recontacting initial refusals: The refusal conversion protocol is described in Chapter 4.

- Proxy Reporting: As in previous cycles, proxy respondents could report for sampled adults who were over 65 and unable to participate because of mental or physical

disabilities. No other types of proxy interviews were permitted in CHIS 2009. A total of 190 adult proxy interviews were done in the landline sample. Proxy respondents had to be adult household members who were knowledgeable about the sampled person's health. The proxy respondent was almost always a spouse or child of the sampled adult. While the number of interviews completed using the proxy interviews is relatively small, it does provide coverage for a group of adults with very different health characteristics that would not otherwise be included in the survey.

- In-Language Interviews: A very important procedure incorporated to enhance the response rate since the first cycle of CHIS was conducting the interviews in the language requested by the sampled person. The languages included were: Spanish, Chinese (Cantonese and Mandarin), Korean, and Vietnamese. In many cases, households that did not speak English would not have been included in CHIS had it not been for the additional languages. In some cases, the respondents would have tried to respond in English but the quality of the interviews would have been much lower if the other languages were not provided. The translation of the instruments provides a common basis for the interviewers that would not be available otherwise. Table 7-2 gives the number of interviews that were completed by language. Close to 15,000 households completed the screener using a language other than English, accounting for about 16 percent of all the completed screener interviews in CHIS 2009. Spanish is the most frequently used language, with about 78 percent of the non-English screeners being completed in Spanish. Vietnamese was the second most frequently used language in the interviews. Lee, Nguyen, Jawad, and Kurata (2008) describe the effects on the bias associated with this effort previous cycles of CHIS.

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

Sample Type	English	Non-English						Total
		Spanish	Vietnamese	Korean	Cantonese	Mandarin	Total	
Screener								
Total	75,742	11,566	1,546	1,091	357	329	14,889	90,631
Landline	69,149	11,013	292	331	298	292	12,226	81,375
Korean only	271	0	0	405	0	1	406	677
Korean and other	249	0	6	333	8	11	358	607
Vietnamese only	1,266	4	1,065	3	32	9	1,113	2,379
Vietnamese and other	212	0	174	0	9	2	185	397
Cell phone sample	4,595	549	9	19	10	14	601	5,196
Adult								
Total	44,891	5,904	887	616	166	187	7,760	47,614
Landline	38,421	3,622	144	168	148	179	4,261	42,682
Korean only	112	0	0	230	0	0	230	342
Korean and other	91	0	6	201	0	0	207	298
Vietnamese only	430	0	627	3	8	2	640	1,070
Vietnamese and other	65	0	108	1	1	0	110	175
Cell phone sample	2,796	222	2	13	8	6	251	3,047
Child								
Total	7,952	3,512	224	88	38	19	3,881	8,945
Landline	6,049	1,747	41	28	34	19	1,869	7,918
Korean only	42	0	0	41	0	0	41	83
Korean and other	34	0	1	16	1	0	18	52
Vietnamese only	199	1	159	0	2	0	162	361
Vietnamese and other	26	0	23	0	0	0	23	49
Cell phone sample	410	68	0	3	1	0	72	482
Permission								
Total	3,864	1,970	103	58	22	11	2,164	4,536
Landline	2,932	1,037	12	17	18	10	1,094	4,026
Korean only	17	0	0	22	0	0	22	39
Korean and other	14	0	0	18	1	0	19	33
Vietnamese only	67	0	72	0	2	0	74	141
Vietnamese and other	13	0	19	0	0	0	19	32
Cell phone sample	229	33	0	1	1	1	36	265
Adolescent								
Total	3,868	446	10	9	6	3	474	3,379
Landline	2,747	243	1	3	5	3	255	3,002
Korean only	26	0	0	4	0	0	4	30
Korean and other	24	0	0	2	0	0	2	26
Vietnamese only	93	0	6	0	1	0	7	100
Vietnamese and other	19	0	3	0	0	0	3	22
Cell phone sample	190	9	0	0	0	0	9	199

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

7.2 Comparisons of Response Rates Over the Cycles

While the sampling and content varies somewhat across the cycles of CHIS, 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 2009 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 7-3 summarizes the screener interview, extended interview, and overall response rates by cycle for the combined landline/list sample. The state-level response rates have been declining since the fist cycle of CHIS in 2001, with overall response rates decreasing 14.2 percentage points between 2005 and 2009 in the screener interview. The household level extended interview response rate is the same between these two years. The decrease in response rate between 2005 and 2009 was between 5 and 17 percent for the different types of interviews. This level of decrease in response rates is consistent with the decline in telephone response rates observed other telephone surveys (see Curtin, Presser, and Singer, 2003). Some of this downward trend could be explained by the increase in refusal rates following September 11, 2001 (DiSogra et al. 2003). Appendix A provides tables showing the rates for each stratum from 2001 to 2009 for the combined landline and list samples.

Table 7-3. Comparison of state-level response rates for the landline/list sample from CHIS 2001 to 2009

Type	2001	2003	2005	2007	2009
Screener Interview	59.2	55.9	49.8	35.6	36.1
Extended Interview					
Household[1]	-	-	59.3	59.4	54.7
Adult	63.7	59.9	54.0	52.8	49.0
Child	87.6	81.4	75.2	73.7	72.9
Adolescent	63.5	57.3	48.5	44.1	42.8
Adolescent w/ parental permission[2]	84.5	83.3	77.5	74.7	75.1
Overall					
Household	-	-	29.6	21.1	19.7
Adult	37.7	33.5	26.9	18.7	17.7
Child	33.0	27.3	25.23	16.83	15.73
Adolescent	23.9	19.2	14.23	10.23	7.93

[1] Available since 2005.

[2]Adolescent response rate with cases where permission was not granted removed from the denominator

[3]Overall response rate computation reflects the effect of the use of child first procedures.

Source: UCLA Center for Health Policy Research, 2009 California Health Interview Survey.

7.3 Comparisons of Response Rates with Other Telephone Surveys

In this section we compare the response rates from CHIS 2009 to those from other RDD surveys from the adult population in California. These comparisons are not direct because other surveys may differ in terms of the sampling methods, the types of persons selected for the interview, the length of interview, and other factors. A more generic reason for the difficulty of comparisons to other surveys has to do with the lack of detailed information on disposition codes available for most RDD surveys conducted in the United States as noted in several places, such as by McCarthy (2003). Publications with definitions of response rates by AAPOR (2011) are attempts to address this problem. This section includes only RDD surveys conducted in California in 2009. Earlier reports covered those conducted prior to 2009.

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 2009 BRFSS and its data quality is available from the CDC web site (http://ftp.cdc.gov/pub/data/brfss/2009_Summary_Data_Quality_Report.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 2009 and does not have multiple interviews within the household. Nonetheless, it is probably more similar to CHIS than any other survey.

The 2009 BRFSS Summary Data Quality Report (Centers for Disease Control and Prevention, 2010) stated above includes information about its response rates. The report shows detailed disposition codes, very much in the spirit of the AAPOR recommendations. Despite the detail given, it is very difficult to map the 2009 California BRFSS disposition codes unambiguously to the corresponding disposition codes used in CHIS 2009 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. This difference highlights the difficulty of making direct comparisons between surveys.

Several cooperation and response rates are reported for the 2009 California BRFSS in Table 11 of the BRFSS Summary Data Quality Report. The BRFSS response rate that is closest to the definition used in CHIS is the overall response rate (the CHIS rate is more conservative than this because it assumes that all likely households contain eligible adults rather than the 98 percent assumed in the

BRFSS computation). For 2009, the overall response rate is 27.10 percent for California. This response rate is 7.4 percentage points higher than the CHIS 2009 overall household response rate.

In an attempt to make the comparison with the BRFSS more useful, we worked to map the raw final disposition numbers for California in the BRFSS Summary Data Quality Report into categories as comparable to those used in CHIS as possible. The broad categories needed to calculate the CHIS-style response rate are (1) complete and partial complete, (2) nonresponse, (3) residential status not determined, and (4) ineligible (BRFSS disposition codes beginning with 1 through 4, respectively). Largely, the BRFSS codes and their mapping to these categories match CHIS, with three important differences.

BRFSS includes more detailed disposition codes than CHIS, and makes finer distinctions between those classified as nonresponse and those classified as residential status not determined. For example, if the person answering the phone simply hangs up without saying anything, CHIS counts the call as nonresponse, while BRFSS counts it as residential status not determined. The BRFSS codes 305-332 are considered nonresponse by CHIS, and were so classified for calculating the CHIS-like response rate.

If a telephone number becomes nonworking during the field period, after one or more attempts where the number appeared to be working, CHIS classifies the number as ineligible, while BRFSS considers it residential status not determined. Thus, the BRFSS code 355 was classified as ineligible for CHIS purposes.

With all of these adjustments, applying the AAPOR RR4 formula with the CASRO calculation of *e* results in an unweighted overall response rate of 25.4 percent in 2009 BRFSS, still higher that the weighted 2009 CHIS overall adult rate. We note that this rate in 2007 was calculated as 18.7 percent, so the 2009 rate appears to be substantially higher. As noted earlier in the report, the primary reasons that a weighted response rate is required for CHIS are the oversampling by county. Neither of these are features of the BRFSS design, so the comparison of the weighted CHIS rate with the unweighted BRFSS rate seems reasonable.

An anomaly in the BRFSS quality report for 2009 is that California, alone of all the states, did not have any partially completed interviews. As noted in *CHIS 2004 Methodology Series: Report 4 – Response Rates*:

> The BRFSS definition of "partial complete" is much more liberal than CHIS, with the result that 11 percent of all 2007 BRFSS completes in California are partial, as compared with half

of one percent in CHIS 2007. Therefore, we adjusted the BRFSS total for partial complete so that the proportion matched CHIS, and allocated the remainder to nonresponse, as they are classified in CHIS.

The difference in CHIS-calculated response rate for the CA BRFSS between 2007 and 2009 suggests that the absence of partial completes in the 2009 quality report may be significant – for example, all partial completes may have been classified as "regular" completes.

Another study we examined was the California Women's Health Survey (Parikh-Patel, Epstein, and Davis, 2010). The California Women's Health Survey (CWHS) is an on-going monthly telephone survey that collects information on a wide variety of health-related behaviors and attitudes from a sample of adult women. They reported CASRO response rates 43 percent in 2007, 49 percent in 2008, and 52 percent in 2009. This pattern of increasing response rates is very unusual and the documentation we have been able to locate does not identify any reasons for this pattern.

The sampling frame for CWHS is not an RDD frame and thus differs substantially from the CHIS, and BRFSS, landline frames. Wayland, Induni, and Davis (2008) reported that the CWHS used a screened landline sample purchased from a commercial sampling firm. There are several ways of interpreting this statement, so it is not clear how these response rates can be compared to rates from the other more standard landline surveys that base their response rates on all sampled telephone numbers. We suspect the response rates associated with the screening done by the commercial firm are not included in calculating the overall response rates in CWHS. If this is true, then the CWHS rates are inflated as compared with the other surveys discussed.

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APPENDIX A

Table A-1. Screener response rates for the landline/list sample by sampling stratum from CHIS 2001 to CHIS 2009

Stratum	Description	Cycle				
		2001	2003	2005	2007	2009
	State Total	59.2	55.9	49.8	35.5	36.1
1	Los Angeles	56.9	51.0	46.6	31.5	34.9
2	San Diego	59.9	56.8	48.1	34.7	35.5
3	Orange	59.0	54.2	46.8	32.5	36.6
4	Santa Clara	57.1	57.1	45.7	35.1	32.0
5	San Bernardino	63.7	61.0	53.7	37.9	37.4
6	Riverside	62.2	59.1	52.7	37.1	35.5
7	Alameda	57.6	54.9	49.4	36.2	36.6
8	Sacramento	61.3	60.3	53.0	38.0	36.4
9	Contra Costa	57.6	58.8	51.5	36.4	35.9
10	Fresno	64.0	59.5	57.2	36.3	36.3
11	San Francisco	50.7	44.2	43.1	26.3	27.4
12	Ventura	59.4	57.1	52.4	39.2	35.5
13	San Mateo	53.8	54.6	45.6	31.1	32.6
14	Kern	68.9	62.9	55.3	44.0	40.5
15	San Joaquin	64.7	58.1	55.7	36.8	36.4
16	Sonoma	61.3	56.6	52.4	38.8	37.9
17	Stanislaus	65.7	61.0	56.5	39.9	38.7
18	Santa Barbara	62.1	61.0	52.1	48.1	36.9
19	Solano	61.5	61.9	51.8	36.8	32.3
20	Tulare	67.7	66.2	57.5	41.5	41.5
21	Santa Cruz	57.7	57.7	55.4	39.6	40.7
22	Marin	54.7	54.5	49.0	38.7	37.8
23	San Luis Obispo	61.6	64.4	56.3	50.6	42.4
24	Placer	60.3	60.9	52.5	42.1	37.7
25	Merced	66.2	61.4	55.1	40.0	39.6
26	Butte	67.3	63.8	60.3	44.9	45.9
27	Shasta	65.7	63.2	61.8	50.1	44.1
28	Yolo	66.2	64.4	56.2	44.0	36.9
29	El Dorado	57.8	59.4	54.3	41.0	35.9
30	Imperial	67.0	62.0	51.3	34.8	36.9
31	Napa	59.0	56.4	47.3	36.4	38.9
32	Kings	65.5	60.1	58.7	40.1	37.8
33	Madera	67.8	62.2	57.4	41.8	39.7
34	Monterey*	60.7	58.1	47.5	35.2	40.1
35	Humboldt*	66.5	64.3	60.9	47.6	48.0
36	Nevada *	59.5	58.8	53.6	38.2	36.6
37	Mendocino*	60.9	61.8	51.6	43.2	39.5
38	Sutter*	66.2	67.3	55.4	40.1	40.8
39	Yuba*	66.2	67.3	57.3	42.5	40.3
40	Lake*	60.9	61.8	54.8	38.2	35.9
41	San Benito*	60.7	58.1	54.8	45.4	41.0
42	Tehama, Glen, Colusa	68.9	68.0	57.2	46.9	46.2
43	North Balance*	66.5	65.4	60.5	42.2	49.0
44	Sierra Balance*	58.0	57.2	53.0	42.5	42.2

*These strata included other counties in 2001 and 2003.

Source: UCLA Center for Health Policy Research, 2001, 2003, 2005 and 2009 California Health Interview Survey.

Table A-2. Adult response rates for the landline/list sample by sampling stratum from CHIS 2001 to CHIS 2009

Stratum	Description	Cycle				
		2001	2003	2005	2007	2009
	State Total	63.7	60.0	54.0	52.8	49.0
1	Los Angeles	60.0	55.1	50.5	48.7	43.6
2	San Diego	63.3	60.7	53.5	53.0	46.0
3	Orange	60.3	58.0	50.8	50.5	48.7
4	Santa Clara	61.2	64.3	55.9	55.7	52.9
5	San Bernardino	64.0	59.5	53.2	51.7	50.4
6	Riverside	64.7	58.7	52.0	50.4	51.4
7	Alameda	65.2	62.1	59.2	56.0	52.0
8	Sacramento	65.7	63.0	58.0	57.8	55.0
9	Contra Costa	64.9	66.3	59.6	56.9	51.8
10	Fresno	59.8	61.6	55.0	52.5	53.3
11	San Francisco	59.1	59.9	55.9	54.5	47.2
12	Ventura	63.7	60.3	49.5	54.1	52.4
13	San Mateo	60.4	61.4	58.3	55.3	50.9
14	Kern	66.6	65.5	51.9	53.9	47.0
15	San Joaquin	63.7	59.2	52.7	47.9	48.8
16	Sonoma	67.8	67.0	62.7	60.2	52.8
17	Stanislaus	64.2	62.4	56.3	52.5	51.1
18	Santa Barbara	66.1	64.6	53.5	58.8	54.1
19	Solano	63.9	60.8	53.9	53.0	45.0
20	Tulare	64.6	64.7	54.9	51.7	45.2
21	Santa Cruz	68.3	64.0	59.8	59.2	55.7
22	Marin	70.4	65.2	59.0	62.1	56.1
23	San Luis Obispo	69.7	64.9	62.1	65.3	59.3
24	Placer	68.2	63.0	56.6	55.6	56.8
25	Merced	64.0	57.7	57.7	50.6	49.6
26	Butte	67.6	69.5	61.2	65.6	55.2
27	Shasta	69.4	66.7	64.2	63.0	58.7
28	Yolo	69.3	66.3	59.5	61.2	56.4
29	El Dorado	67.6	64.4	60.7	57.7	54.5
30	Imperial	63.5	61.9	55.5	48.0	40.6
31	Napa	66.6	65.4	56.8	55.5	50.5
32	Kings	66.6	61.7	52.6	51.9	45.5
33	Madera	67.3	59.9	56.3	51.7	48.4
34	Monterey*	62.9	63.1	53.2	52.2	48.4
35	Humboldt*	69.6	71.0	64.9	64.6	65.7
36	Nevada *	70.5	66.1	64.0	61.7	56.8
37	Mendocino*	68.6	67.8	66.6	62.7	60.4
38	Sutter*	64.6	64.7	56.3	56.5	49.8
39	Yuba*	64.6	64.7	59.6	53.9	47.2
40	Lake*	68.6	67.8	58.4	60.0	57.9
41	San Benito*	62.9	63.1	48.0	51.6	46.2
42	Tehama, Glen, Colusa	65.9	63.0	63.9	56.8	55.1
43	North Balance*	69.6	72.3	67.7	66.2	58.0
44	Sierra Balance*	72.4	69.1	61.8	62.3	59.1

*These strata included other counties in 2001 and 2003.

Source: UCLA Center for Health Policy Research, 2001, 2003, 2005, 2007, and 2009 California Health Interview Survey.

Table A-3. Child response rates for the landline/list sample by sampling stratum from CHIS 2001 to CHIS 2009

Stratum	Description	Cycle				
		2001	2003	2005	2007	2009
	State Total	87.6	81.4	75.2	73.7	72.9
1	Los Angeles	83.7	80.2	72.1	70.7	70.6
2	San Diego	88.5	84.2	74.8	72.5	70.2
3	Orange	84.5	77.5	73.1	72.2	71.4
4	Santa Clara	92.2	80.7	77.6	75.1	79.0
5	San Bernardino	91.2	80.3	76.9	69.9	72.9
6	Riverside	90.8	83.2	73.2	71.7	73.8
7	Alameda	90.3	81.1	75.6	81.4	73.9
8	Sacramento	86.3	77.8	78.3	78.6	77.3
9	Contra Costa	88.9	79.7	80.7	76.3	68.5
10	Fresno	88.9	86.2	79.9	74.5	71.7
11	San Francisco	88.5	79.4	73.2	69.0	65.6
12	Ventura	85.4	88.7	78.6	78.9	77.1
13	San Mateo	84.5	80.6	76.3	78.4	67.8
14	Kern	89.2	79.9	79.7	73.6	75.7
15	San Joaquin	89.9	86.7	78.5	77.7	80.2
16	Sonoma	95.0	91.1	78.1	79.9	82.0
17	Stanislaus	85.8	84.7	67.1	79.6	70.4
18	Santa Barbara	89.7	86.2	76.7	74.7	77.7
19	Solano	87.0	73.3	79.5	79.7	62.2
20	Tulare	91.0	77.2	69.2	78.1	64.4
21	Santa Cruz	88.6	80.2	77.6	79.6	79.6
22	Marin	89.1	88.3	80.2	70.8	75.1
23	San Luis Obispo	93.1	87.6	82.8	82.3	74.5
24	Placer	90.5	79.4	85.9	81.8	84.0
25	Merced	86.7	80.9	73.8	68.2	74.2
26	Butte	89.6	93.2	78.9	79.7	81.4
27	Shasta	87.0	86.9	89.5	72.0	85.5
28	Yolo	95.2	82.1	73.4	78.4	75.7
29	El Dorado	92.5	81.6	77.7	73.3	77.3
30	Imperial	82.4	72.1	68.5	74.4	72.7
31	Napa	84.0	89.1	81.0	70.4	72.0
32	Kings	89.5	88.2	81.4	68.4	69.0
33	Madera	85.6	85.1	80.1	84.6	79.0
34	Monterey*	87.2	81.8	76.7	69.9	74.1
35	Humboldt*	92.9	84.9	84.1	87.7	83.9
36	Nevada *	90.0	82.0	72.7	79.2	87.9
37	Mendocino*	87.8	87.5	84.6	73.3	75.9
38	Sutter*	90.4	92.1	79.3	66.8	71.7
39	Yuba*	90.4	92.1	79.8	76.6	71.0
40	Lake*	87.8	87.5	64.5	80.7	84.0
41	San Benito*	87.2	81.8	67.5	71.1	69.9
42	Tehama, Glen, Colusa	90.7	80.0	78.1	83.4	68.0
43	North Balance*	96.1	92.0	90.8	90.5	90.6
44	Sierra Balance*	93.7	89.8	82.1	83.1	78.8

*These strata included other counties in 2001 and 2003.

Source: UCLA Center for Health Policy Research, 2001, 2003, 2005, 2007, and 2009 California Health Interview Survey.

Table A-4. Adolescent response rates for the landline/list sample by sampling stratum from CHIS 2001 to CHIS 2009

Stratum	Description	Cycle				
		2001	2003	2005	2007	2009
	State Total	63.5	57.3	48.5	44.1	42.8
1	Los Angeles	58.5	56.5	43.8	41.9	40.3
2	San Diego	62.1	59.8	46.8	39.7	42.7
3	Orange	52.3	49.1	47.9	42.3	38.2
4	Santa Clara	60.1	60.0	53.6	46.3	40.2
5	San Bernardino	68.0	55.4	50.0	41.3	36.2
6	Riverside	64.8	55.2	49.4	45.2	43.5
7	Alameda	57.9	56.2	45.3	48.5	50.4
8	Sacramento	65.3	53.3	55.9	46.4	46.2
9	Contra Costa	64.1	64.8	53.6	48.5	49.4
10	Fresno	64.3	57.5	51.8	42.2	46.5
11	San Francisco	51.4	58.0	46.2	31.7	42.3
12	Ventura	60.6	60.8	46.9	48.6	42.8
13	San Mateo	65.0	51.1	52.6	52.4	42.6
14	Kern	66.2	58.1	57.9	46.2	45.8
15	San Joaquin	65.7	52.3	48.9	43.5	42.8
16	Sonoma	65.3	56.7	48.9	44.4	56.0
17	Stanislaus	60.7	60.9	54.0	51.1	44.8
18	Santa Barbara	63.2	67.3	59.6	46.5	48.8
19	Solano	65.6	60.3	45.0	45.9	47.0
20	Tulare	63.7	62.4	46.7	37.7	43.7
21	Santa Cruz	70.5	68.6	56.5	50.9	47.7
22	Marin	61.2	58.4	54.8	48.1	45.8
23	San Luis Obispo	65.0	63.0	55.0	54.5	40.4
24	Placer	70.1	67.0	50.7	44.4	44.4
25	Merced	65.2	64.8	45.1	37.8	42.9
26	Butte	64.5	60.7	56.1	60.0	55.0
27	Shasta	63.2	54.5	50.7	54.5	56.7
28	Yolo	68.8	58.7	61.5	55.5	58.0
29	El Dorado	74.2	57.9	59.4	54.4	47.3
30	Imperial	70.6	66.4	49.5	50.8	47.4
31	Napa	61.1	68.5	41.8	54.8	33.4
32	Kings	70.1	64.4	46.8	34.7	40.3
33	Madera	70.4	68.6	58.8	54.1	43.5
34	Monterey*	66.4	56.0	46.5	44.1	35.8
35	Humboldt*	69.1	60.9	44.2	61.7	59.7
36	Nevada *	78.8	72.0	48.9	51.1	48.9
37	Mendocino*	67.9	62.4	59.4	49.9	44.8
38	Sutter*	65.9	70.8	62.0	49.7	34.3
39	Yuba*	65.9	70.8	57.7	34.7	53.0
40	Lake*	67.9	62.4	52.6	46.5	66.8
41	San Benito*	66.4	56.0	58.3	45.1	41.3
42	Tehama, Glen, Colusa	70.4	57.0	54.2	48.7	45.8
43	North Balance*	68.1	69.7	61.8	54.5	54.4
44	Sierra Balance*	75.2	62.5	49.7	43.9	52.5

*These strata included other counties in 2001 and 2003.

Source: UCLA Center for Health Policy Research, 2001, 2003, 2005, 2007, and 2009 California Health Interview Survey.