CHIS
california
health
interview
survey

March, 2009

CHIS 2007 Methodology Report Series

Report 4

Response Rates

CALIFORNIA HEALTH INTERVIEW SURVEY

CHIS 2007 METHODOLOGY SERIES

REPORT 4

RESPONSE RATES

MARCH 2009

www.chis.ucla.edu

This report provides analysts with information about the response rates in CHIS 2007. The response rates are estimates of the percentage of sampled persons that participated in the survey, where the sample may be across the entire state, restricted to a county, or some other subgroup. To estimate response rates, the probability of sampling persons is taken into account. Thus, the response rates are weighted percentages of the number responding rather than simple unweighted percentages. Procedures used to increase the response rates are also discussed and, where possible, evaluated.

Suggested citation:

California Health Interview Survey. *CHIS 2007 Methodology Series: Report 4 – Response Rates*. Los Angeles, CA: UCLA Center for Health Policy Research, 2009.

PREFACE

Response Rates is the fourth in a series of methodological reports describing the 2007 California Health Interview Survey (CHIS 2007). 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, the Department of Health Care Services, and the Public Health Institute. Westat was responsible for data collection and the preparation of five methodological reports for the 2007 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 2007 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 2007. 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 2007 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 2007.

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 2007 Methodology Series: Report 2 – Data Collection Methods*. These methods are summarized briefly to provide some context for the examination in this report.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

List of Tables

TABLE OF CONTENTS (Continued)

List of Figures

1. CHIS 2007 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, the Department of Health Care Services, and the Public Health Institute. 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 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 2007, the fourth CHIS data collection cycle, which was conducted between June 2007 and early March 2008. The previous CHIS cycles (2001, 2003, and 2005) 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 for CHIS 2007, 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 in CHIS 2005. In the first two CHIS cycles there were 41 total sampling strata, including 33 individual counties. The CHIS 2007 samples in Los Angeles and San Diego Counties were enhanced with additional funding by implementing further stratification within county.

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.

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 2007, the goal was to complete 800 interviews statewide with adults in cell-only households. 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. Sampled cellular numbers were screened to identify whether they belonged to cell-only households. Cellular numbers from households with landline telephone numbers were considered out of scope. 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. No interviews with adolescents or about children were conducted from the CHIS 2007 cell RDD sample.

Table 1-1. California county and county group strata used in the CHIS 2007 sample design

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

Source: UCLA Center for Health Policy Research, 2007 California Health Interview Survey.

In an attempt to assess nonresponse bias, CHIS 2007 also included an area probability sample in Los Angeles County, with a target of 800 completed adult interviews. A clustered sample was selected from US Postal Service address lists, stratified by Los Angeles County Service Planning Area (SPA). Within each SPA, a number of smaller geographic areas (*segments* composed of blocks or groups of blocks) were selected, and within each segment specific addresses were selected. Sampled addresses for which a telephone number could be matched were initially treated the same as landline RDD cases, except that adolescent and child interviews were not attempted. Matched addresses where a screening interview could not be completed by telephone and all unmatched addresses were then assigned to recruiters who visited the sampled addresses in person to attempt to obtain cooperation.

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 2007 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 substantially increased 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. For the cell RDD and area samples, only one randomly selected adult in each household was interviewed. Table 1-2 shows the number of completed adult, child, and adolescent interviews in CHIS 2007 by the type of sample (landline RDD, surname list, cell RDD, and area sample).

Table 1-2.   Number of completed CHIS 2007 interviews by type of sample and instrument

Type of sample	Adult	Child	Adolescent
Total all samples	51,048	9,913	3,638
Landline RDD	48,791	9,818	3,622
Surname list	451	95	16
Cell RDD	825	N/A	N/A
Area (Los Angeles County)	981	N/A	N/A

Source: UCLA Center for Health Policy Research, 2007 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 35 minutes to complete. The average child and adolescent interviews took about 17.5 minutes and 20 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 8 percent of the adult interviews were completed in a language other than English, as were almost 16 percent of all child (parent proxy) interviews and 7 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 2007 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 sampled telephone numbers for which an address could be obtained from reverse directory services. An advance letter was mailed for approximately 67 percent of the sampled telephone numbers. As in CHIS 2005, a $2 bill was included with the advance letter to promote cooperation.

        The CHIS 2007 screener completion rate for the landline sample was 35.5 percent, and was higher for households that were sent the advance letter. For the cell phone sample, the screener completion rate was 30.5 percent in cell-only households. For the area sample, the screener response rate was 32.0 percent, compared with 31.5 percent for the landline sample in Los Angeles County. The extended interview completion rate for the landline sample varied across the adult (52.8 percent), child (73.7 percent) and adolescent (44.1 percent) interviews. The adolescent rate includes getting permission from a parent or guardian. The adult interview completion rate for the cell sample was 52.0 percent, and for the area sample 69.0 percent. Multiplying the screener and extended rates gives an overall response rate for each type of interview. The percentage of households completing one or more of the extended interviews (adult, child, and/or adolescent) is a useful summary of the overall performance of the landline sample. For CHIS 2007, the landline sample household response rate was 21.1 percent (the product of the screener response rate and the completion rate at the household level of 57.9 percent). All of the household and person level response rates vary by sampling stratum. For more information about the CHIS 2007 response rates, please see *CHIS 2007 Methodology Series: Report 4 – Response Rates*.

Table 1-3.   CHIS 2007 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	✓		
Heart disease, high blood pressure	✓		
Infertility	✓		
Falls (elderly)	✓		
Attention deficit disorder (ADD/ADHD), developmental disorders			✓
Parental concerns with child development			✓

Mental health	Adult	Teen	Child
Mental health status	✓	✓	✓
Perceived need, use of mental health services	✓	✓	✓
Emotional functioning	✓	✓	✓

Health behaviors	Adult	Teen	Child
Dietary intake	✓	✓	✓
Physical activity and exercise	✓	✓	✓
Sedentary time		✓	
Parental influence over diet and exercise			✓
Parental exposure to messages about obesity, smoking			✓
Developmental screening tests			✓
Colon cancer screening	✓		
Flu Shot	✓	✓	✓
Alcohol and tobacco use	✓	✓	
Drug use		✓	
Sexual behavior, STD testing	✓	✓	
Birth control practices		✓	

Women's health	Adult	Teen	Child
Pap test screening, mammography screening, hormone replacement therapy	✓		
Emergency contraception	✓	✓	
HPV – knowledge and awareness; vaccine use and attitudes	✓	✓	
Pregnancy status	✓	✓	

Dental health	Adult	Teen	Child
Last dental visit		✓	✓
Not getting needed care		✓	✓
Days missed from school due to dental problems		✓	✓
Dental insurance coverage	✓	✓	✓

Table 1-3.　CHIS 2007 survey topic areas by instrument (Continued)

Food insecurity/hunger	**Adult**	**Teen**	**Child**
Availability of food in household over past 12 months	✓		

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, tests, treatment)	✓	✓	✓
Communication problems with doctor	✓		✓
Ability to understand medical instructions	✓		

Health insurance	**Adult**	**Teen**	**Child**
Current insurance coverage, spouse's coverage, who pays for coverage	✓	✓	✓
Health plan enrollment, characteristics of plan	✓	✓	✓
Whether employer offers coverage, respondent/spouse eligibility	✓		
Coverage over past 12 months	✓	✓	✓
Reasons for lack of insurance	✓	✓	✓

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	✓		
Eligible for Medi-Cal and healthy families	✓	✓	✓
Reason for Medi-Cal nonparticipation among potential eligibles	✓	✓	✓

Neighborhood	**Adult**	**Teen**	**Child**
Neighborhood safety, use of parks	✓	✓	✓
Mode of local transportation	✓		

Interpersonal Violence	**Adult**	**Teen**	**Child**
Experiencing violence from intimate partner, details of most recent experience	✓	✓	
Experiencing violence from acquaintance	✓	✓	

Parental involvement/adult supervision	**Adult**	**Teen**	**Child**
Adult presence after school		✓	
Child's activities with family			✓

Table 1-3.   CHIS 2007 survey topic areas by instrument (Continued)

Child care and school attendance	**Adult**	**Teen**	**Child**
Current child care arrangements			✓
Paid child care	✓		
Preschool/school attendance, name of school		✓	✓

Employment	**Adult**	**Teen**	**Child**
Employment status, spouse's employment status	✓		
Work in last week	✓		
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**
Age, gender, height, weight, education	✓	✓	✓
Race and ethnicity	✓	✓	✓
Marital status	✓		
Sexual orientation	✓	✓	
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, 2007 California Health Interview Survey.

The CHIS response rate is comparable to response rates of other scientific telephone surveys in California, such as the 2007 California Behavioral Risk Factor Surveillance System (BRFSS) Survey. Using calculations that are as comparable as possible to those of CHIS 2007, the combined screener and adult response rate for the 2007 BRFSS is 18.7 percent, exactly the same as that for the CHIS 2007 landline sample. 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. Survey response rates tend to be lower in California than nationally, and over the past decade response rates have been declining both nationally and in California. 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 168 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 2007 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 2007 were created primarily from the California Department of Finance's 2007 Population Estimates and 2007 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 excluding households without landline telephones from the sample frame. 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 a handful of 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 missing responses for items essential for weighting the data. The first imputation technique was a completely random selection from the observed distribution of respondents. This method was used only for a few variables when the percentage of the items missing was very small. The second technique was hot deck imputation without replacement. The hot deck approach is 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 and CHIS 2007 (i.e., race, ethnicity, home ownership, and education).

UCLA-CHPR imputed missing values for nearly every variable in the data files other than those handled by Westat and some sensitive variables in which nonresponse had its own meaning. Overall, item nonresponse rates in CHIS 2007 were low, with most variables missing valid responses for less than 2% of the sample. However, there were a few exceptions where item nonresponse rate was greater than 20%, such as household income.

The imputation process conducted by UCLA-CHPR started with data editing, sometimes referred to as logical or relational imputation: for any missing value, a valid replacement value was sought based on known values of other variables of the same respondent or other sample(s) from the same household. For the remaining missing values, hierarchical sequential 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 set of control variables. The control variables were ranked in order from the most to the least important. This procedure allowed control variables to be dropped if certain conditions (such as the minimum number of donors) were not met. The control variables were dropped sequentially, starting from the variable ranked least important. Once a responding case was used as a donor, it was dropped from the donor pool preventing using one donor multiple times.

Control variables used in forming 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 was done, logic checks and edits were 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 2007:

- 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. Although response rates do provide valuable information on the success of the survey at representing the population sampled, as suggested by Madow et al. (1983), 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 2007 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, 2008). For example, weighted response rates account for differing sampling rates by county (*CHIS 2007 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

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

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 2007 are a landline telephone sample, a Korean and Vietnamese oversample using geographic targeting and surname lists of landline numbers, a statewide cellular telephone sample, and an area probability sample for Los Angeles County. The sample design is described in detail in *CHIS 2007 Methodology Series: Report 1 – Sample Design*.

In CHIS 2007, three sets of weights were created. The first set combined the landline and Vietnamese and Korean surname list samples as in previous cycles of the survey. The second set of weights combined the cell phone sample with the landline-list samples. In these weights, the sampling weights reflect the multiple probabilities of selection from the different sampling frames. The last set of weights includes data from all samples and is restricted to only those cases in Los Angeles County. The weighting procedure is described in detail in *CHIS 2007 Methodology Series: Report 5 – Weighting and Variance Estimation*.

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, 2008). 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 2007 (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. AAPOR's RR4 definition is also used for the area probability sample in Los Angeles County.

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 first 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).

For CHIS 2001 and 2003 e was computed for the landline and surname samples based on the "survival method" described in Brick, Montaquila, and Scheuren (2002). In this method, a subsample of

the telephone numbers with unknown eligibility is dialed additional times to resolve eligibility. However, since 2005 the survival method was not used because the percentage of unknown eligibility cases appears to have increased substantially. This change calls into question a key assumption of the survival method that these cases can be resolved with an infinite number of calls.

The method used in CHIS 2005 to estimate e for the landline/list sample is similar to the method described in Shapiro et al. (1995), where calls were made to local telephone companies to determine with certainty the connectivity of unresolved telephone numbers. In the CHIS 2005 method, the proportion of estimated households among the undetermined cases was computed using newly available vendor services. A random sample of undetermined numbers was sent to a vendor to determine the connectivity status of the numbers. The vendor queries the telephone numbers through a nationwide network verified by the telephone central office (TELCO) with data created by various telecommunications partnerships. The query result indicates the connectivity status of a telephone number including information such as use and type of service. The results are thus used to compute e within several categories defined by urban status, mailable status of the telephone number, and the content of answering machine messages as determined by an interviewer (e.g., possible residential, possible nonresidential, or unknown). These categories are the same as those used in the survival method in CHIS 2003.

In CHIS 2007, the vendor query method to estimate e was not used because it appeared to result in a larger overestimate of the number of residential households than did the CASRO method. Because of these results, the CASRO method was used to estimate e in CHIS 2007 for the landline/surname samples. We also used CASRO for the cell phone and area sample.

Beginning in CHIS 2003, households in the telephone samples that refused to participate in the initial screening interview were subsampled and only those in the subsample were called again in a refusal conversion process. Subsampling of refusals for refusal conversion is a technique used to reduce costs and improve efficiency. Since only the subsampled cases are retained for the nonresponse analysis (along with those that did not refuse), they are weighted by the inverse of the subsampling rate. This procedure was also used in CHIS 2007 telephone samples and is described in detail later. Refusal conversion subsampling was not done in the cell phone or area samples.

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 2007.

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[1] 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. This rate only affects the landline and surname samples because only adults were sampled and interviewed in the cell phone and area samples in 2007. 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 2007.

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[1] A complete description of the child-first procedures is found in *CHIS 2007 Methodology Series: Report 2 – Data Collection.*

4. REVIEW OF CONTACT METHODS

CHIS 2007 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 35 minutes in length, the child interview about 17 minutes, and the adolescent interview about 20 minutes. The interviews in languages other than English generally took longer than these averages. Detailed interview timing information is given in *CHIS 2007 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 2007, 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, and the number was part of the first refusal subsample, additional attempts were made to complete the screener after waiting 1-3 weeks following the refusal.[2] 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. As noted above, this letter

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[2] Subsamples of the sampled telephone numbers were assigned first and second refusal conversion flags. Additional calls were attempted with refusals that were part of these subsamples. See Chapters 7 and 8 for additional details. This subsampling applied only to the screener. All cases were available for refusal conversion at the extended interview level.

was included in the sponsorship experiment. If the household refused again and they were a part of the second refusal conversion subsample, another telephone attempt was made at least another 2 weeks later.

A similar process was used at the extended level for the sampled adult. The sampled adult was asked to participate in the study up to three times—an initial attempt and two additional attempts at refusal conversion. If the adult refused, a letter was sent (if an address was available) urging him or her to participate. A second refusal conversion attempt for both the screener and the adult extended interview was done only for those cases where the review of interviewer reports on the previous refusals indicated that an additional attempt was warranted. For child and adolescent interviews, one refusal conversion attempt was made. 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 2007. 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; 168 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 is 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 and $25 for the adult extended interview, 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 interview; and

- There were no child or adolescent extended interviews.

4.3   Area Sample

Data collection methods for the area sample differed by whether the address was matched to a telephone number. Matched cases were initially treated the same as landline sample cases, except that there was no screener refusal conversion attempted on the telephone. If a telephone screener was completed, the case continued to be worked by telephone as with the landline sample. All cases, for which a telephone screener was not completed, except for especially hostile refusals, were designated for follow-up by in-person recruiters.

Sampled addresses without matched telephone numbers were sent advance letters somewhat different from those sent to landline and area cases with matched telephone numbers, and assigned to in-person recruiters. The recruiters visited the sampled addresses, multiple times as needed and identified screener respondents. They would then call the telephone center, either on the respondent's phone or their Westat-provided cell phone, and a telephone interviewer would complete the screener and adult interview if possible. Extended interview respondents were paid $25. If a recruiter encountered a refusal, the case was assigned to another recruiter for conversion.

Area sample cases worked initially on the telephone, but for which a screener was not completed, were treated similarly in the field. They were sent a second advance letter, acknowledging that telephone interviewers had not been able to reach them or to complete an interview, and then were

assigned to recruiters and worked the same way as cases without a telephone number. Child and adolescent interviews were not attempted for area sample cases.

5. RESPONSE RATE FORMULAS

This chapter describes the formulas used to compute the response rates for CHIS 2007. Response rates are calculated for the screener and extended interviews, including household and person overall response rates. Because of the refusal conversion subsampling, unweighted response rates are not comparable to the weighted rate and should not be used to assess response patterns. Unweighted response rates do not reflect the subsampling of refusal conversion cases. Although there was no refusal conversion in the cell phone sample, the unweighted response rate does not take into account the differential response rates based on cell phone use. The weighted response rate for this sample reflects the increased likelihood that the more one uses their cell phone (relative to their landline), the more likely they are to respond.

A screener response rate is calculated for each sampled stratum, where the stratum is a county or group of counties in the landline sample, Los Angeles Service Planning Areas (SPAs) in the area sample, or California regions in the cell phone sample. The formula for the screener response rate (rr_s) in a sample stratum is

$$ rr_s = \frac{\sum\limits_{i \in S_{resp}} w_i}{\sum\limits_{i \in S_{resid}} w_i} \ , \tag{3} $$

where w_i is the weight for household i in the stratum after adjusting for differential sampling rates, refusal conversion subsampling[3], and the assignment of households with unknown residential status. For the landline and area samples, 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 (or Los Angeles County for the area sample) 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.

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[3] Only for the landline and surname samples.

The screener response rate for the cell phone sample was computed differently. Here the domain of interest is adults who live in cell only households. There is a differential response rate that it is dependant upon how often a respondent uses their cell phone. Those adults who use their cell phone for all or most of their calls are more like to respond than those adults who receive most of their calls on a landline. The screener response rate for the cell phone sample reflects only the adults that live in cell only households. For more details see *CHIS 2007 Methodology Series: Report 5 – Weighting and Variance Estimation*.

The screener response rate for the cell phone sample, ($rr_{cel\ phonel}$) was computed as

$$rr_{cell\ phone} = \frac{\displaystyle\sum_{i \in S_{cell\ only\ resp}} w_i}{p_{cell\ only\ HH} \cdot \displaystyle\sum_{i \in S_{cell\ phone}} w_i \cdot} \qquad (4)$$

where, $S_{cell\ only\ resp}$ is the set of cell only households that responded to the screening interview and $S_{cell\ phone}$ is the set of all households with a cell phone in the cell sample, and $. \ p_{cell\ only\ HH}$ is the proportion of cell only households among all households with a cell phone in the sample. We used $p_{cell\ only\ HH} = 0.18$ that is the proportion of households with a cell only service among all households that have a cell phone (i.e., with or without a landline). The value of $p_{cell\ only\ HH}$ was based on information from the Early Release National Interview Survey January–June 2007 program for the West region[4].

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 53 such households) are not included: household-level data were not collected in these cases. The household extended interview response rate rr_h is computed as

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[4] The estimate was obtained through a special tabulation requested to CDC

$$rr_h = \frac{\sum\limits_{i \in H_{resp}} w_i^*}{\sum\limits_{i \in H_{scr}} w_i^{*\cdot}}$$ (5)

where w_i^* is the nonresponse adjusted weight for household i in the stratum[5]; 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 area and cell phone samples.

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[6], 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

$$rr_a = \frac{\sum\limits_{i \in A_{resp}} w_i'}{\sum\limits_{i \in A_{eligsamp}} w_i'},$$ (6)

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. It should also be noted that for the cell-phone and area samples only an adult extended interview was attempted, so the household and adult response rates for these sample are the same.

The extended response rate computation for children and adolescents is similar to the adult procedure; however, the child-first procedure adds some complexity. If the adult interview had to be done

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[5] A complete description of the poststratified household weight is found in Section 3-9 of the *CHIS 2007 Methodology Series: Report 5 – Weighting and Variance Estimation*.

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

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

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

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 $rr_{c,\overline{K}}$ 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

$$rr_t = \frac{\sum_{i \in T_{resp}} w_i'''}{\sum_{i \in T_{eligsamp}} w_i'''} , \tag{8}$$

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 $rr_{t,\overline{K}}$ 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 (8) 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

$$rr_{t-p} = \frac{\sum\limits_{i \in T_{resp}} w_i'''}{\sum\limits_{i \in T_{eligsamp-per}} w_i'''},$$ (9)

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

$$orr_h = rr_s \cdot rr_h$$ (10)

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

$$orr_a = rr_s \cdot rr_a$$ (11)

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

$$orr_c = rr_s \cdot \left(p_K \cdot rr_{c,K} + p_{\overline{K}} \cdot rr_{ac,\overline{K}} \cdot rr_{c,\overline{K}} \right)$$ (12)

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.

For adolescents, the 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

$$orr_t = rr_s \cdot \left(p_{Kt} \cdot rr_{t,K} + p_{\overline{K}t} \cdot rr_{at,\overline{K}} \cdot rr_{t,\overline{K}} \right), \tag{13}$$

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.

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 rate for the combined landline, surname and cell phone samples. This response rate is the weighted average of the overall response rates of adult in the landline or list samples and adults in the cell only sample. These overall rates are weighted by the adult population in landline and cell only households. The overall combined response rate for the landline, surname and cell phone sample, orr_{comb}, is computed as

$$orr_{comb} = p_{cell\ phone} \cdot orr_{cell\ phone} + \cdot \left(1 - p_{cell\ phone} \right) \cdot orr_{landline/list} \tag{14}$$

where $orr_{cell\ phone}$ is the overall response rate of the cell phone sample, $orr_{landline/list}$ is the overall response rate of the landline and list sample and $p_{cell\ phone}$ is the proportion of adults in cell –only households among all adults in California. In CHIS 2007 we used 15 percent based on the observed rate from the National Interview Survey July-December 2007 (Blumberg and Luke, 2008).

6. RESPONSE RATE TABLES

This chapter contains tables of response rates for the different samples in CHIS 2007. 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 and list 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, 85,715 households from these samples cooperated with this first step of the CHIS 2007 interview. In each of these households, one adult was sampled.

The overall screener response rate for the state, including the sample drawn from the surname lists, is 35.5 percent. 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 2007 gives an overall state-level cooperation rate of 41.7 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		Letter		No letter	
	Complete	Response rate	Complete	Response rate	Complete	Response rate
State total	85,715	35.5	70,701	36.3	15,014	32.0
Los Angeles	20,977	31.5	17,539	32.4	3,438	27.6
San Diego	8,567	34.7	6,745	35.5	1,822	32.0
Orange	5,282	32.5	4,257	33.8	1,025	27.9
Santa Clara	2,891	35.1	2,391	35.9	500	31.6
San Bernardino	3,075	37.9	2,394	38.6	681	35.7
Riverside	3,178	37.1	2,491	38.2	687	33.5
Alameda	2,578	36.2	2,135	36.5	443	34.9
Sacramento	2,373	38.0	1,938	39.5	435	32.6
Contra Costa	1,722	36.4	1,495	37.4	227	30.9
Fresno	1,408	36.3	1,148	36.9	260	33.6
San Francisco	1,575	26.3	1,314	26.1	261	27.4
Ventura	1,209	39.2	1,029	40.6	180	32.5
San Mateo	1,225	31.1	1,064	31.5	161	28.7
Kern	1,145	44.0	969	45.0	176	39.3
San Joaquin	1,140	36.8	948	38.0	192	31.8
Sonoma	909	38.8	785	38.8	124	38.8
Stanislaus	1,018	39.9	868	40.7	150	35.9
Santa Barbara	955	48.1	827	49.3	128	41.7
Solano	1,034	36.8	883	37.2	151	34.5
Tulare	1,085	41.5	911	42.4	174	37.5
Santa Cruz	934	39.6	758	39.1	176	41.8
Marin	883	38.7	783	39.2	100	35.0
San Luis Obispo	831	50.6	733	52.4	98	40.2
Placer	949	42.1	732	43.5	217	38.2
Merced	1,073	40.0	874	40.3	199	38.4
Butte	883	44.9	757	46.0	126	39.5
Shasta	879	50.1	716	50.9	163	46.9
Yolo	880	44.0	765	44.6	115	40.3
El Dorado	944	41.0	782	41.7	162	38.1
Imperial	1,118	34.8	960	35.2	158	32.8
Napa	972	36.4	831	36.8	141	34.3
Kings	1,043	40.1	851	40.5	192	38.8
Madera	1,053	41.8	775	42.5	278	40.1
Monterey	1,028	35.2	874	36.2	154	30.8
Humboldt	897	47.6	758	47.8	139	46.6
Nevada	890	38.2	710	39.7	180	33.4
Mendocino	919	43.2	809	44.5	110	35.7
Sutter	954	40.1	791	41.0	163	36.0

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		Letter		No letter	
	Complete	Response rate	Complete	Response rate	Complete	Response rate
Yuba	1,036	42.5	824	44.4	212	39.6
Lake	897	38.2	789	42.9	108	40.4
San Benito	1,075	45.4	911	39.2	165	33.4
Colusa, Glenn, Tehama	800	46.9	653	45.4	147	45.4
Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	688	42.2	561	47.4	127	45.1
Amador, Alpine, Calaveras, Inyo, Mariposa, Mono, Tuolumne	742	42.5	573	41.8	169	43.5

Source: UCLA Center for Health Policy Research, 2007 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 39.2 percent, and the highest response rate is 50.6 percent in San Luis Obispo County. San Francisco has the lowest response rate at 26.3 percent, which is clearly at the low end of the scale in Figure 6-1. The next lowest response rate (San Mateo) is about 4.8 percentage points higher than the San Francisco rate. The screener response rate in Los Angeles is 5.2 percentage points higher than the San Francisco rate yet four 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 36.3 percent. This is 5.2 percentage points lower than the 41.5 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 2005 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.
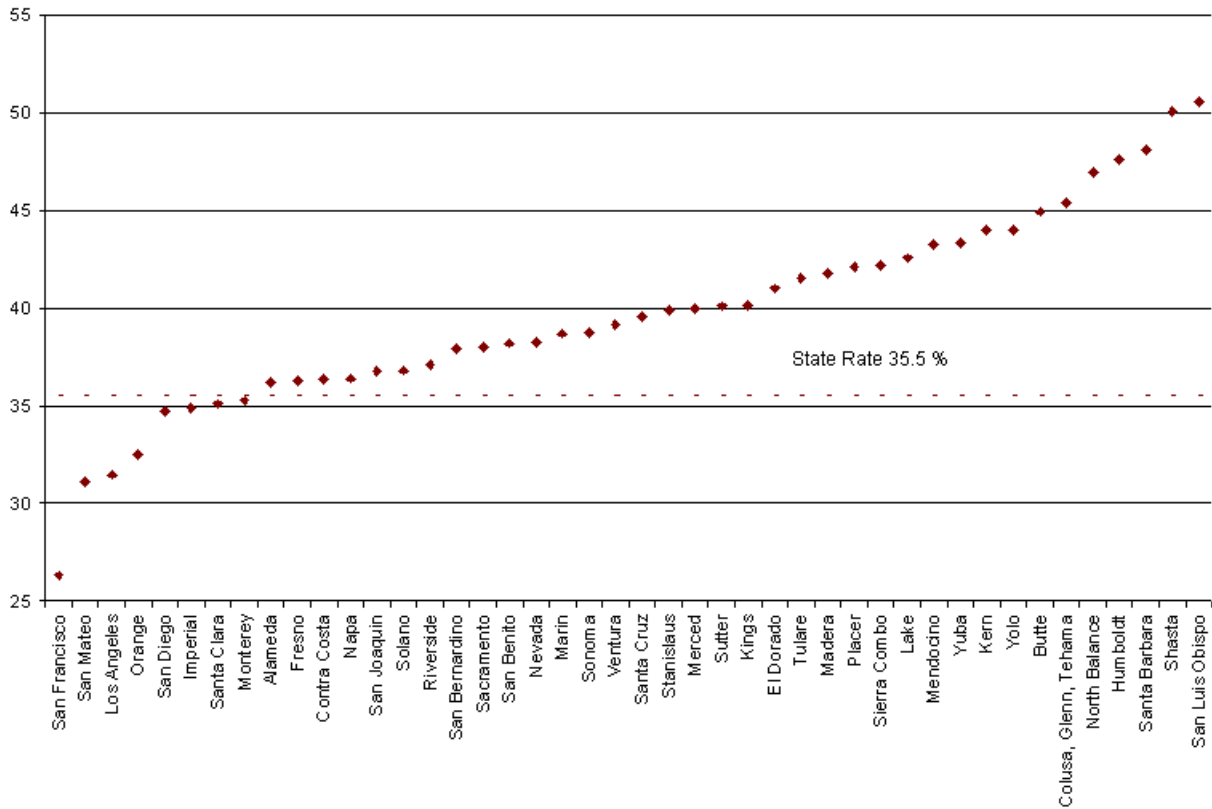
Source: UCLA Center for Health Policy Research, 2007 California Health Interview Survey.

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

Table 6.2 shows the screener response rates for households that were cell-only from the cell phone sample. Overall, 1,518 screener interviews were completed statewide and the state screener response rate was 30.5 percent. The response rates for the entire cell phone sample are lower than 30 percent because cell users that are cell-only respond at higher rates than those who rarely use their cell phone. Response rates based on region are also provided, and range from a low of 25 percent in the Sacramento Area to a high of 38.7 percent in the San Joaquin Valley. 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	1,518	30.5
Northern & Sierra Counties	87	36.9
Greater Bay Area	335	33.3
Sacramento Area	82	25.0
San Joaquin Valley	181	38.7
Central Coast	124	34.6
Los Angeles	344	27.6
Other Southern California	365	27.7

* For cell-only households

Source: UCLA Center for Health Policy Research, 2007 California Health Interview Survey.

Table 6.3 shows the screener response rates for the area sample. The screener response rate in this table is the combined response rate for all those households that were contacted by telephone along with those that were visited in person. The countywide screener response rate was about equal to the screener response rate for the landline sample. The response rate was variable within service area and varied from 24 to 43 percentage points.

Table 6-3. Number of completed screener interviews and screener response rates by Los Angeles County Service Planning Area for the area sample

Service Planning Area	Screener interview	
	Complete	Response rate
Los Angeles County Total	1,332	32.0
Antelope Valley	41	33.7
San Fernando	251	27.6
San Gabriel	285	40.1
Metro	163	28.0
West	95	26.5
South	155	43.7
East	188	40.1
South Bay	154	23.8

Source: UCLA Center for Health Policy Research, 2007 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 6-4, along with the number of completed interviews. There were 51,752 households where either an adult or child extended interview (or both) was completed, resulting in a statewide household level response rate of 59.4 percent. Additionally, 49,242 adult interviews, 9,913 interviews about children, and 3,638 adolescent interviews were completed.

The statewide response rate for the landline/list sample shown in Table 6-4 for the adult interview was 52.8 percent, a decrease of 1.2 percentage points from CHIS 2005. 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 53.9 percent, while for counties with less than 500,000 the median adult response rate is 57.7 percent. This difference may be attributable to a variety of reasons, including the different distribution of persons by age, education, etc., by county.

Table 6-4.   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	51,752	59.4	49,242	52.8	9,913	73.7	3,638	44.1
Los Angeles	11,798	55.4	11,201	48.7	2,179	70.7	806	41.9
San Diego	5,164	59.5	4,899	53.0	1,020	72.5	315	39.7
Orange	3,061	57.5	2,882	50.5	616	72.2	203	42.3
Santa Clara	1,793	62.6	1,689	55.7	403	75.1	118	46.3
San Bernardino	1,807	58.5	1,688	51.7	423	69.9	154	41.3
Riverside	1,849	57.7	1,749	50.4	361	71.7	146	45.2
Alameda	1,662	63.5	1,587	56.0	328	81.4	127	48.5
Sacramento	1,523	63.4	1,463	57.8	254	78.6	111	46.4
Contra Costa	1,115	64.5	1,055	56.9	220	76.3	76	48.5
Fresno	832	58.2	796	52.5	175	74.5	64	42.2
San Francisco	969	61.2	933	54.5	127	69.0	30	31.7
Ventura	771	62.6	729	54.1	164	78.9	64	48.6
San Mateo	762	61.2	733	55.3	139	78.4	58	52.4
Kern	709	60.1	676	53.9	147	73.6	60	46.2
San Joaquin	639	55.1	604	47.9	136	77.7	41	43.5
Sonoma	594	63.9	579	60.2	107	79.9	36	44.4
Stanislaus	629	61.0	581	52.5	148	79.6	65	51.1
Santa Barbara	624	64.8	594	58.8	121	74.7	41	46.5
Solano	594	57.5	569	53.0	127	79.7	45	45.9

Table 6-4.   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
Tulare	628	57.9	583	51.7	163	78.1	47	37.7
Santa Cruz	611	65.2	583	59.2	115	79.6	45	50.9
Marin	591	66.0	574	62.1	85	70.8	35	48.1
San Luis Obispo	591	70.0	578	65.3	71	82.3	39	54.5
Placer	598	61.9	572	55.6	110	81.8	43	44.4
Merced	614	56.9	577	50.6	134	68.2	50	37.8
Butte	616	68.4	595	65.6	97	79.7	40	60.0
Shasta	590	66.6	575	63.0	95	72.0	49	54.5
Yolo	608	67.1	588	61.2	111	78.4	53	55.5
El Dorado	601	62.5	580	57.7	109	73.3	54	54.4
Imperial	633	56.3	581	48.0	163	74.4	58	50.8
Napa	593	61.0	575	55.5	86	70.4	38	54.8
Kings	619	58.8	585	51.9	149	68.4	46	34.7
Madera	609	57.6	569	51.7	146	84.6	49	54.1
Monterey	605	58.5	574	52.2	123	69.9	40	44.1
Humboldt	621	68.9	602	64.6	102	87.7	44	61.7
Nevada	602	67.3	582	61.7	83	79.2	36	51.1
Mendocino	624	66.9	614	62.7	90	73.3	40	49.9
Sutter	603	62.3	576	56.5	107	66.8	52	49.7
Yuba	618	59.3	582	53.9	151	76.6	37	34.7
Lake	587	64.7	572	60.0	83	80.7	38	46.5
San Benito	614	56.9	574	51.6	147	71.1	60	45.1
Colusa, Glenn, Tehama	501	61.8	483	56.8	87	83.4	34	48.7
Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	489	70.0	476	66.2	61	90.5	32	54.5
Alpine, Amador, Calaveras, Inyo, Mariposa, Mono, Tuolumne	491	65.2	485	62.3	50	83.1	19	43.9

Source: UCLA Center for Health Policy Research, 2007 California Health Interview Survey.

Table 6-5 shows the extended interview response rate for the cell phone sample. A total of 825 extended interviews were completed and the response rate was 52 percent. Within region, there was a wide range of rates, with a low of 48 percent in Los Angeles to a high of 62.7 percent in the Sacramento area.

Table 6-5. Number of completed extended interviews and extended interview response rate by region for the cell phone sample*

	Extended interview	
	Complete	Response rate
State Total	825	52.0
Northern & Sierra Counties	53	61.3
Greater Bay Area	180	50.4
Sacramento Area	50	62.7
San Joaquin Valley	93	48.8
Central Coast	72	55.1
Los Angeles	167	48.0
Other Southern California	210	55.7

For cell-only households

Source: UCLA Center for Health Policy Research, 2007 California Health Interview Survey.

Table 6-6 shows the extended interview response rate for the area sample. Countywide 981 extended interviews were completed, and the response rate was 69 percent. The extended response rates are relatively consistent across the SPAs.

Table 6-6. Number of completed extended interviews and extended interview response rate by Los Angeles County Service Planning Area for the area sample

	Extended interview	
	Complete	Response rate
Los Angeles County Total	981	69.0
Antelope Valley	33	76.9
San Fernando	186	68.9
San Gabriel	219	73.3
Metro	118	67.6
West	73	72.4
South	110	62.4
East	126	60.9
South Bay	116	72.2

Source: UCLA Center for Health Policy Research, 2007 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 6-7 shows the adult response rates by these screener data items.[7] Results are shown separately for the combined landline and surname list sample, the cell sample, and the Los Angeles County area sample.

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[7] 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.

Table 6-7.   Adult response rates by characteristics of the sampled adult

Characteristic	Landline/List	Cell	Area
Total	52.8	52.0	69.0
Sex			
Male	47.0	51.5	66.1
Female	58.0	52.7	71.7
Age			
18 to 30 years	40.0	54.1	69.4
31 to 45 years	48.3	44.0	68.2
46 to 65 years	56.7	55.8	67.5
Over 65 years	63.5	50.0	74.2
Type of household			
With somebody less than 18 years old	46.9	52.0	68.8
Without somebody less than 18 years old	57.1	52.0	69.2
Number of adults in household			
1	72.2	50.5	90.0
2	56.0	51.0	71.3
3 or more	42.1	54.3	60.1
Adult was screener respondent			
Yes	70.1	54.3	86.3
No	35.6	20.2	52.9

Source: UCLA Center for Health Policy Research, 2007 California Health Interview Survey.

Women are traditionally more cooperative than men in landline RDD samples, and this pattern is borne out in the CHIS 2007 landline sample. This "gender response gap" is smaller in the area sample, and 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 25 point difference between the rates for those 18-30 and those over 65. Again, in the area sample the difference by age is much smaller, and the traditional pattern does not hold at all for the cell sample, with those 46-64 and 18-30 being the most cooperative.

Across CHIS cycles, response among households with children is declining faster than among those without (see *CHIS 2007 Methodology Series: Report 2 – Data Collection Methods*). In the landline and list samples, there is a 10 point difference in response rate between adults in households with children and those are other households. In the area and cell samples, there is essentially no difference in response rate between these two groups.

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 final rows of Table 6-7). 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 three or more adults is actually higher than that in smaller cell-only households, and is substantially higher than that in landline/list households with three or more 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 was virtually identical across samples.

These differences in response rates by respondent characteristics across samples have implications for the utility of the cell and area samples. In particular, 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. Because it is relatively richer than the landline sample in young adults and those in households with children, the area sample will help assess the implications of nonresponse among these groups.

Now, we examine the child extended interview response rates. Table 6-4 shows that the statewide child-level response rate is 73.7 percent, which is relatively high but still 2.5 percentage points lower than it was in CHIS 2005. The median rate in the more populous counties (74.5%) is 4.1 percentage points lower than the rate in smaller counties (78.4%).

Table 6-8 gives the child response rates by the characteristics of the child and household using data collected in the 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. *CHIS 2007 Methodology Series; Report 2 – Data Collection Methods* contains more detail on response to the child interview.

Table 6-8.   Child response rates by characteristics of the sampled child

Characteristic	Landline/List
Total	73.7
Sex	
Male	74.1
Female	73.3
Age	
Less than 4 years	74.8
4 to 7 years	75.1
8 to 11 years	71.5
Number of children in household	
1	74.6
2	74.0
3	71.5
4 or more	74.1

Source: UCLA Center for Health Policy Research, 2007 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 6-9 shows that the state-level adolescent response rate is 44.1 percent. If we exclude the nonresponse due to parents not giving permission to interview the adolescent, the cooperation rate rises 30.6 percentage points to 74.7 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 45.2 percent and the counties with fewer than 500,000 persons have a median response rate of 49.7 percent. Table 6-9 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 6-10 which is similar to Table 6-8 but excludes the sampled adolescents without parental permission from the denominator of the response rate computation. Even though the rates in Table 6-10 are 30.6 percentage points higher than those in Table 6-9, the respective

rates by the characteristics are relatively consistent across the tables with a couple of exceptions. One noticeable difference is the drop in the rate for households with older adolescents (15 to 17 years). The lower rate for older adolescents is probably a function of older adolescents being harder to contact and less likely to cooperate. On the other hand, parents are less likely to give permission for younger adolescents to be interviewed, so the combined rates shown in Table 6-9 are nearly identical for the two age groups. This result is consistent with what was observed in CHIS 2005.

Table 6-9.   Adolescent response rates by characteristics of the sampled adolescent

Characteristic	Landline/List
Total	44.1
Sex	
Male	43.2
Female	45.1
Age	
12 to 14 years	42.0
15 to 17 years	46.2
Number of adolescents in household	
1	43.0
2	45.5
3 or more	44.6

Source: UCLA Center for Health Policy Research, 2007 California Health Interview Survey.

Table 6-10.   Adolescent cooperation rates excluding parental permission nonresponse by characteristics of the sampled adolescent

Characteristic	Landline/List
Total	74.7
Sex	
Male	73.1
Female	76.4
Age	
12 to 14 years	77.5
15 to 17 years	72.5
Number of adolescents in household	
1	73.2
2	75.7
3 or more	78.6

Source: UCLA Center for Health Policy Research, 2007 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 6-6 were taken into account in the development of the weights as described in *CHIS 2007 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 2007. Table 6-11 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 6-2). 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 8.5 percentage points lower than it was in CHIS 2005.

Table 6-11. Overall response rates by sampling stratum and type of interview for the landline/list sample

Strata	Household	Adult	Child	Adolescent
State total	21.1	18.7	17.2	10.1
Los Angeles	17.4	15.3	13.7	7.8
San Diego	20.6	18.4	17.5	9.3
Orange	18.7	16.4	15.3	8.6
Santa Clara	22.0	19.6	19.1	11.7
San Bernardino	22.2	19.6	18.9	11.2
Riverside	21.4	18.7	16.3	10.9
Alameda	23.0	20.3	17.6	10.5
Sacramento	24.1	22.0	20.8	13.6
Contra Costa	23.5	20.7	21.3	12.3
Fresno	21.1	19.0	18.3	11.3
San Francisco	16.1	14.3	12.8	6.8
Ventura	24.5	21.2	19.4	8.8

Table 6-11. Overall response rates by sampling stratum and type of interview for the landline/list sample (continued)

Strata	Household	Adult	Child	Adolescent
San Mateo	19.0	17.2	16.8	10.2
Kern	26.5	23.7	21.6	14.9
San Joaquin	20.3	17.6	16.9	9.5
Sonoma	24.8	23.3	21.9	13.0
Stanislaus	24.3	20.9	18.1	12.7
Santa Barbara	31.1	28.3	25.8	15.5
Solano	21.1	19.5	19.8	9.7
Tulare	24.0	21.5	19.3	11.7
Santa Cruz	25.8	23.4	21.6	13.3
Marin	25.5	24.0	22.3	13.1
San Luis Obispo	35.4	33.1	29.4	17.1
Placer	26.1	23.4	23.8	12.5
Merced	22.7	20.2	18.5	11.2
Butte	30.7	29.5	25.8	17.4
Shasta	33.3	31.5	33.7	17.6
Yolo	29.5	26.9	22.1	18.0
El Dorado	25.6	23.7	23.4	14.4
Imperial	19.6	16.7	15.1	11.0
Napa	22.2	20.2	20.3	9.9
Kings	23.6	20.8	20.3	10.6
Madera	24.1	21.6	21.9	15.8
Monterey	20.6	18.4	16.7	10.9
Humboldt	32.8	30.7	30.1	14.4
Nevada	25.7	23.6	20.0	11.0
Mendocino	28.9	27.1	26.9	16.4
Sutter	25.0	22.7	20.3	14.4
Yuba	25.7	23.4	26.4	16.5
Lake	27.5	25.5	19.7	16.3
San Benito	21.7	19.7	16.6	13.3
Colusa, Glenn, Tehama	28.1	25.8	24.4	16.1
Del Norte, Lassen, Modoc, Plumas, Sierra, Siskiyou, Trinity	32.9	31.1	27.2	18.8
Alpine, Amador, Calaveras, Inyo, Mariposa, Mono, Tuolumne	27.5	26.3	23.4	14.0

Source: UCLA Center for Health Policy Research, 2007 California Health Interview Survey.

Table 6-12 shows the overall response rate for the cell phone sample. The lowest response rate was in Los Angeles (13.3%) while the highest was in the Northern and Sierra Counties (22.6%). The overall response rate was 15.9 percent, which is slightly lower than the 18.7 percent rate that was observed for adults in the landline/list sample. Combining these response rates will create an overall adult

landline/surname/cell response rate. Assuming a 15 percent rate for cell-only households, we have an overall adult response rate of 18.1 percent.

Table 6-12. Overall adult response rate for the cell phone sample by region*

	Overall Response rate
State Total	15.9
Northern & Sierra Counties	22.6
Greater Bay Area	16.8
Sacramento Area	15.7
San Joaquin Valley	18.9
Central Coast	19.1
Los Angeles	13.3
Other Southern California	15.4

* For cell-only households

Source: UCLA Center for Health Policy Research, 2007 California Health Interview Survey.

Table 6-13 shows the overall adult response rate for the county and by SPA for the area sample. The overall response rate for the area sample is 6.8 percentage points higher than the overall landline adult response rate and 4.7 percentage points higher than the overall household response rate for Los Angeles County.

Table 6-13. Overall adult response rate for the area sample by Los Angeles Service Planning Area

Service Planning Area	Overall Response rate
Los Angeles County Total	22.1
Antelope Valley	25.9
San Fernando	19.0
San Gabriel	29.4
Metro	18.9
West	19.2
South	27.3
East	24.4
South Bay	17.2

Source: UCLA Center for Health Policy Research, 2007 California Health Interview Survey.

Table 6-14 summarizes the overall response rates by mode. Among the three primary modes of administration, the area sample of Los Angeles County yielded the highest response rate, at 22.1. The adolescent landline/list sample had the lowest response rate (10.1 percent). The response rate for the cell phone sample was 15.9 percent.   The combined list/surname sample with the cell phone sample (assuming 15 percent of household are cell only) yielded a response rate of 18.3 percent.

Table 6-14. Overall response rate by mode

Sample	Overall Response rate			
	Adult	Household	Child	Adolescent*
Landline/list	18.7	21.1	17.2	10.1
Cell phone	15.9	N/A	N/A	N/A
Landline/list/cell-phone	18.3	N/A	N/A	N/A
Area	22.1	N/A	N/A	N/A

* Includes parent permission

Source: UCLA Center for Health Policy Research, 2007 California Health Interview Survey.

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7. DISCUSSION OF RESPONSE RATES

In this chapter, we discuss the response rates from CHIS 2007 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 2007 that effect response rates, mentioned in Chapter 4. A more complete discussion of these methods is provided in *CHIS 2007 Methodology Series: Report 2 – Data Collection Methods*. The response rates obtained in CHIS 2007 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, 2007), 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 2007 Methodology Series: Report 2 – Data Collection Method*. We summarize them here to provide some context for the CHIS 2007 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 2007 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 2007 Methodology Series: Report 1 – Sample Design*, it is clear that the procedure increased both the yield and response rates for the child interviews. Its effect on

the adult response rates is less clear, 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 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 2007, 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		
	Yes	No	Difference
Screener	36.3	32.0	+4.3
Adult interview	54.2	47.1	+7.1
Child interview	75.1	69.9	+5.2
Adolescent interview	45.3	40.0	+5.3
Household extended	60.7	54.3	+6.4

Source: UCLA Center for Health Policy Research, 2007 California Health Interview Survey.

Other methods for enhancing response rates in CHIS 2007 include:

■   Repeated Call Attempts: The procedures implemented in CHIS 2007 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).

■   Refusal Conversion: An effective method of increasing response rates in a landline survey is to recontact households and persons who refuse to participate in the initial interview and to ask them to reconsider and complete the interview. In CHIS 2001, attempts for refusal conversion were implemented for all screener nonrespondents. In CHIS 2007, these procedures were implemented for approximately 80 percent of first refusals and two-thirds of the second refusals. If a household refused but was not

selected for refusal conversion, then no further calls were made to convert it. Hansen and Hurwitz (1946) originally proposed this idea, and Srinath (1971) and Elliott, Little, and Lewitzky (2000) examined its use more recently. Due to refusal conversion subsampling, weighted response rates were computed in order to reflect the subsampling of cases that were converted.

- 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 2007. 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 9,900 households completed the screener using a language other than English, accounting for about 11 percent of all the completed interviews in CHIS 2007. Spanish is the most frequently used language, with about 80 percent of the non-English screeners being completed in Spanish. Korean 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 interviews by language and sample type

| Sample Type | English | Non-English | | | | | | Total |
		Spanish	Korean	Vietnamese	Cantonese	Mandarin	Total	
Screener								
Total	78,720	7,882	592	712	277	400	9,863	88,583
Landline	75,883	7,560	283	453	272	390	8,958	84,841
Korean only	45	0	0	162	0	0	162	207
Korean and other	3	0	0	1	0	0	1	4
Vietnamese only	213	0	278	1	1	5	285	498
Vietnamese and other	5	0	11	0	0	1	12	17
Korean & Vietnamese	35	0	20	93	0	0	113	148
Cell phone sample	1,476	55	0	0	0	0	55	1,531
Area	1,060	267	0	2	4	4	277	1,337
Adult								
Total	46,746	3,132	291	453	138	288	4,302	51,048
Landline	45,103	2,878	132	260	136	282	3,688	48,791
Korean only	12	0	0	123	0	0	123	135
Korean and other	75	0	143	1	0	1	145	220
Vietnamese only	3	0	7	0	0	0	7	10
Vietnamese and other	13	0	8	65	0	0	73	86
Korean & Vietnamese	801	24	0	0	0	0	24	825
Cell phone sample	739	230	1	4	2	5	242	981
Area								
Child	4,079	731	22	34	13	24	824	4,903
Total	4,063	731	11	27	13	24	806	4,869
Landline	7	0	0	0	0	0	0	7
Korean only	0	0	0	4	0	0	4	4
Korean and other	0	0	0	4	0	0	0	0
Vietnamese only	6	0	9	0	0	0	9	15
Vietnamese and other	0	0	1	0	0	0	1	1
Korean & Vietnamese	3	0	1	3	0	0	4	7
Permission								
Total	8,353	1,393	56	57	18	36	1,560	9,913
Landline	8,302	1,393	29	40	18	36	1,516	9,818
Korean only	7	0	0	11	0	0	11	18
Korean and other	0	0	0	4	0	0	0	0
Vietnamese only	38	0	22	0	0	0	22	60
Vietnamese and other	1	0	1	0	0	0	1	2
Korean & Vietnamese	5	0	4	6	0	0	10	15
Adolescent								
Total	3,393	215	5	15	3	7	245	3,638
Landline	3,383	215	2	12	3	7	239	3,622
Korean only	2	0	0	1	0	0	1	3
Korean and other	0	0	0	4	0	0	0	0
Vietnamese only	6	0	3	0	0	0	3	9
Vietnamese and other	0	0	0	4	0	0	0	0
Korean & Vietnamese	2	0	0	2	0	0	2	4

Source: UCLA Center for Health Policy Research, 2007 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 2007 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 2007 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 2007 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, 2003, and 2005.

Table 7-3.	Comparison of state-level response rates from CHIS 2001 to 2007

Type	2001	2003	2005	2007
Screener Interview	59.2	55.9	49.8	35.6
Extended Interview				
Household[1]	-	-	59.3	59.4
Adult	63.7	59.9	54.0	52.8
Child	87.6	81.4	75.2	73.7
Adolescent	63.5	57.3	48.5	44.1
Adolescent w/				
parental permission[2]	84.5	83.3	77.5	74.7
Overall				
Household	-	-	29.6	21.1
Adult	37.7	33.5	26.9	18.7
Child	33.0	27.3	25.2[3]	16.8[3]
Adolescent	23.9	19.2	14.2[3]	10.2[3]

[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, 2007 California Health Interview Survey.

7.3   Comparisons of Response Rates with Other Telephone Surveys

In this section we compare the response rates from CHIS 2005 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 (2008) are attempts to address this problem. This section includes only RDD surveys conducted in California after 2004. Earlier reports covered those conducted prior to 2007.

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 2007 BRFSS and its data quality is available from the CDC web site (ftp://ftp.cdc.gov/pub/Data/Brfss/2007SummaryDataQualityReport.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 2007 and does not have multiple interviews within the household. Nonetheless, it is probably more similar to CHIS than any other survey.

The 2007 BRFSS Summary Data Quality Report (Centers for Disease Control and Prevention, 2008) 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 2007 California BRFSS disposition codes unambiguously to the corresponding disposition codes used in CHIS 2007 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 2007 California BRFSS in Table 10 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 2007, the overall response rate is 24.07 percent for California. This response rate is almost identical to the CHIS 2007 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.

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.

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 18.7 percent in 2007 BRFSS, exactly the same as the weighted 2007 CHIS overall adult rate. As noted earlier in the report, the primary reasons that a weighted response rate is required for CHIS are the oversampling by county and subsampling for refusal conversion. Neither of these are features of the BRFSS design, so the comparison of the weighted CHIS rate with the unweighted BRFSS rate seems reasonable. If all partial completes are included in the denominator for BRFSS, the response rate increases to 20.9 percent, as compared with a CHIS overall household response rate of 21.1 percent.

Another study we examined was the California Women's Health Survey (Wayland, Induni, and Davis, 2008). 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 40 percent in 2003, 41 percent in 2004, 42 percent in 2005, and 41 percent in both 2006 and 2007. This pattern of stable response rates since 2003 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. County screener response rates from CHIS 2001 to CHIS 2007

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

*These strata included other counties in 2001 and 2003.

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

Table A-2.　County adult response rates from CHIS 2001 to CHIS 2007

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

*These strata included other counties in 2001 and 2003.

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

Table A-3.   County child response rates from CHIS 2001 to CHIS 2007

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

*These strata included other counties in 2001 and 2003.

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

Table A-4. County adolescent response rates from CHIS 2001 to CHIS 2007

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

*These strata included other counties in 2001 and 2003.

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