

COLORADO HEALTH ACCESS SURVEY

2015

Colorado Health Access Survey

Methodology Report

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Colorado Health Institute

NOVEMBER 2015

Introduction

CHAS Target Public Use Files

The 2015 Colorado Health Access Survey (CHAS) Target Public Use Files (PUF) are data files consisting of individual records from the 2015 CHAS. It is a free product provided by the CHAS project to researchers and data analysts for use in health-related research.

Users of the PUF must register before the file can be downloaded or delivered by mail. The PUF can only be used for statewide and urban-rural estimates and not for local-level (sub-state) estimates. Health statistics region (HSR), county, and zip code information has been intentionally excluded to reduce the risk of respondents being identified. Additional confidential survey information that is not accessible in the PUF is available through the research file. To access these data, please contact Rebecca Silvernale at SilvernaleR@ColoradoHealthInstitute.org.

CHAS sample weights (based on the 2015 Colorado Demography Office population projections) are included in the files. A complete data dictionary with a description of survey methods and a description of how to use the sample weights accompany these files. Limited technical assistance is also available from CHAS – please send email to SilvernaleR@ColoradoHealthInstitute.org.

Methods Report

Colorado Health Institute (CHI) contracted with Social Science Research Solutions (SSRS) to conduct the 2015 CHAS. The goal of the CHAS is to document health insurance coverage and access to and use of health care for the noninstitutionalized population in Colorado. This report provides information about the methods used to collect, clean, and document the data in the CHAS data files.

The study was conducted for CHI via a random digit dialing (RDD), computer-assisted telephone interview (CATI) by SSRS, an independent research company. Interviews were conducted from March 2, 2015 through June 25, 2015 among a representative sample of 10,136 households with at least one person age 18 and older. Interviews were stratified by 21 HSRs to ensure adequate representation within each of these important population aggregations within Colorado. Both landline and cell phone sample were included in the overall study design: 6,000 interviews were completed from the landline sample and 4,136 interviews were completed from the cell phone sample. For the 2009 and 2011 studies, cell phone interviews were conducted only with respondents who did not have a landline telephone (cell phone-only respondents). For the 2013 and 2015 studies, any cell phone respondent who lived in Colorado and was 18 or older was screened into the study.

This methods report is organized into subsections: sample design; field preparation, fielding and data processing; weighting procedures; survey response rates; and the data dictionary.

Study Design

The study employed a dual-frame sampling design that includes a landline and cell phone sample. The dual frame design seeks to ensure complete coverage of all households that own at least one type of phone (approximately 98 percent of all Colorado households are listed in telephone banks or own a cell phone). A 2012 report from the Centers for Disease Control and Prevention (CDC) that contains state-level data of wireless substitution estimates indicates that approximately 49.8 percent of all Colorado households own only a cell phone.¹

Of the 10,136 interviews, 2,508 were conducted with respondents who owned only a cell phone. This represents 24.7 percent of completed interviews. This, of course, is still an underrepresentation of cell phone-only households compared with CDC estimates. However, the higher cost of cell phone interviews, due to the need to screen out both children and people who do not live in Colorado, place a constraint on the number of cell phone-only interviews that can be completed. Determining the number of such interviews that will be included in a sample design generally requires creating a balance between cost concerns and keeping the design effect of the weights at an acceptable level. Weighting procedures described later in this report adjust for this underrepresentation.

The cell phone sample was screened to determine that the owner of the cell phone was at least 18 years old and a resident of Colorado. The cell phone sample yielded the terminations and completed interviews noted in Table 1.

¹ <http://www.cdc.gov/nchs/data/nhsr/nhsr070.pdf>

Table 1. Final disposition of the cell phone sample

Disposition	Sample Records	Percent
Completed interview	4,136	47%
Under 18 years of age	1,074	12%
Does not live in CO	2,506	28%
Can't answer health insurance questions for household	1,049	12%
Not a cell phone	49	1%
<i>Total completions and terminations</i>	<i>8,814</i>	<i>100%</i>

The overall sampling design contained several features, including sample stratification, household selection criteria, and selection criteria within households. These are described below:

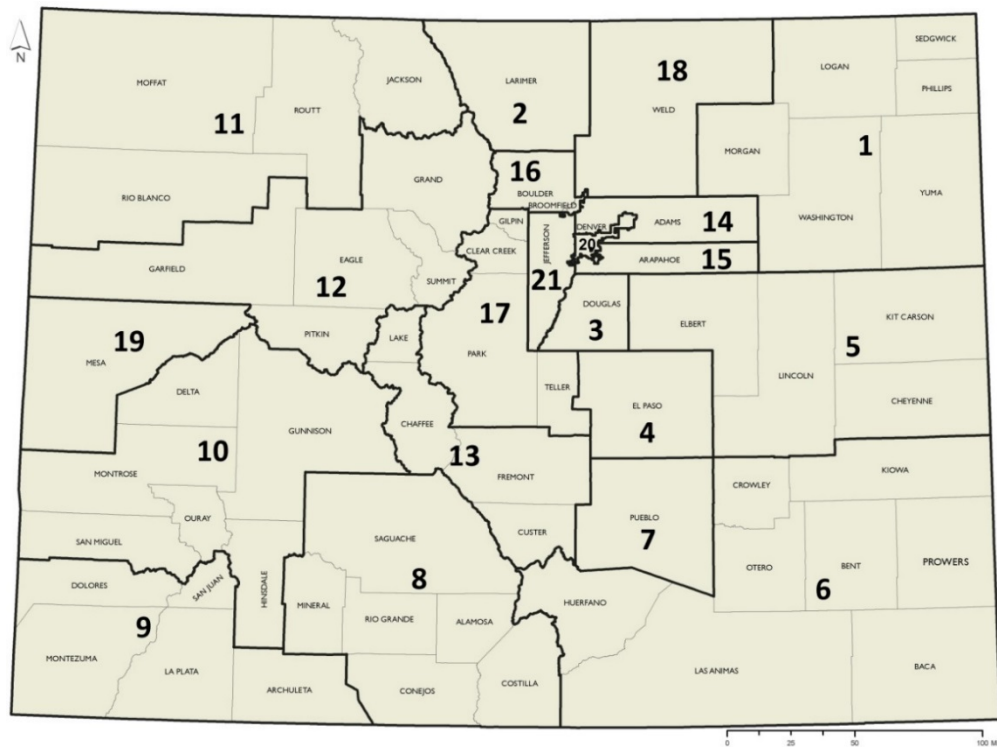
- 1) Landline sample stratification
 - Set interview targets per Colorado health statistics region (HSR).
 - Set interview targets within three selected regions by telephone exchange based on incidence of African American households.
- 2) Cell phone sample stratification
 - Set interview targets per Colorado health statistics region (HSR).
 - Set interview targets within selected regions by cell phone rate center.
- 3) Household-level selection
 - Screening to exclude out-of-state homeowners and vacation homes in both frames.
 - Within the cell phone frame, screening excluded respondents under 18 years of age.
 - Half of all landline households were screened to determine if any residents younger than 65 lived in the household. If nobody in the household fit this criterion, the household was terminated.
- 4) Individual-level (target) selection
 - Screening to include adults who can answer questions about health insurance for every member of the household.
 - A random selection of a "target" person. Throughout the entire field period, children in a household were weighted to provide a 60 percent increased likelihood of selection.

Sample stratification

The number of regional interviews was set by CHI to ensure adequate statistical power within each region. As we will describe later, each region was weighted to ensure within-region representation (see Table 2 for interviews completed by HSR).

Additionally, regions 4, 15 and 20 were further stratified by telephone exchange in the landline frame to maximize the number of African American interviews obtained. These three regions were selected because they are the only regions in Colorado with sufficient numbers of African American households to warrant an attempt at disproportionate stratification of telephone exchanges. Each of these three regions was disproportionately sampled with exchanges with higher incidences of African American households oversampled at the expense of exchanges with low incidence rates (see Table 3 below).

Map 1. Colorado Health Statistics Regions (HSRs)



The HSRs were developed by the Colorado Department of Public Health and Environment (CDPHE) for public health planning purposes. The boundaries for the regions were determined according to the size of the population in each county — counties with smaller populations were aggregated — and key demographic factors for each county, including the number of communities served by each county health department.

The landline sample for the project was stratified by these 21 HSRs. Since the landline sample includes the telephone exchange that is specific to where the owner of the landline phone actually lives, it is possible to stratify telephone numbers into small areas with relatively high levels of accuracy. However, since cell phone numbers do not necessarily correspond to where the owners reside, a different procedure is used to stratify cell phone sample.

The cell phone sample was stratified into the same 21 HSRs. However, cell phones cannot be stratified by exchange since there is no geographic linkage between exchange and geography. Rather, we stratified by rate center, a billing geography that is utilized by telephone companies for pricing purposes.

Table 2 shows the number of completes per HSR (or stratum) for the combined samples. Completed interviews were assigned to a region based on the respondent's zip code as reported during the survey interview.

Table 2. Completed interviews by health statistics region (HSR)

HSR	Landline	Cell	Total
1	258	153	411
2	238	166	404
3	274	130	404
4	498	285	783
5	206	194	400
6	240	167	407
7	210	192	402
8	246	169	415
9	220	180	400
10	251	149	400
11	231	173	404
12	246	154	400
13	255	150	405
14	356	225	581
15	361	367	728
16	240	218	458
17	265	136	401
18	225	186	411
19	252	149	401
20	443	335	778
21	485	258	743
<i>Total</i>	<i>6,000</i>	<i>4,136</i>	<i>10,136</i>

The stratification scheme illustrated in Table 3 was implemented to compensate for the expected bias created by telephone interviewing; that is, the distribution of most sampled populations tends to skew more heavily towards whites than the general population. As such, the goal was to ensure an adequate sample of African Americans comparable with their proportion in the Colorado population, and if possible, to obtain additional African American survey completes. The total number of African American completes in each of the three target regions is shown in Table 4.

Table 3. Sample stratification scheme for African American sample

Strata	Overall population	African Americans			Non-African Americans		
		Population	Interviews	Weight	Population	Interviews	Weight
HSR 20 (Denver County)							
Low	457,734	15,425	8	5.56	442,309	58	3.38
Medium	197,667	18,712	16	3.37	178,955	102	0.78
High	43,036	9,906	103	0.28	33,130	130	0.11
<i>Total</i>	<i>698,437</i>	<i>44,043</i>	<i>127</i>		<i>654,394</i>	<i>290</i>	
HSR 15 (Arapahoe County)							
Low	216,972	4,089	2	2.09	212,883	63	2.24
Medium	329,253	42,264	19	2.27	286,989	110	1.73
High	50,909	9,416	36	0.27	41,493	186	0.15
<i>Total</i>	<i>597,134</i>	<i>55,769</i>	<i>57</i>		<i>541,365</i>	<i>359</i>	
HSR 4 (El Paso County)							
Low	220,968	6482	5	1.21	214,486	135	1.20
Medium	236,347	14652	5	2.74	221,695	105	1.60
High	190,082	17367	26	0.62	172,715	220	0.59
<i>Total</i>	<i>647,397</i>	<i>38,501</i>	<i>36</i>		<i>608,896</i>	<i>460</i>	

Table 4. Incidence of African Americans in three regions relative to completed interviews

	<i>Completed African American interviews</i>
Region 20 (Denver County)	125
Region 15 (Arapahoe County)	58
Region 4 (El Paso County)	34
<i>Total</i>	<i>217</i>

The initial targets were exceeded to ensure that sufficient numbers of African American interviews were completed across the state. In the end, SRSS completed 390 African American interviews statewide.

Household-level selection

Screening questions included those that excluded anyone living out of state or at a place that was not their main residence. Overall, 1.7 percent of all working landline numbers were terminated if calls reached a household with residents who do not live in Colorado or respondents for whom the number was not their main residence. Results of cell phone screening were presented earlier in this report. Of working landline numbers, 2.3 percent were terminated because nobody in the household was younger than 65.

Individual-level target person selection

The survey was designed to collect data at the household level as well as the individual level. Therefore, it was important for the respondent to be able to answer questions about each person’s health insurance status in the house and necessary to randomly select one person as the “target” to serve as the household member for whom the entire battery of questions was asked, including health insurance status.

Because CHI had a goal of oversampling children in households for analytical purposes, a disproportionate number of targets under the age of 18 were randomly selected by the computer (60 percent) once the household roster had been established.

In addition, CHI expressed concern that the CHAS could have a greater proportion of completes from persons age 65 and older because, in general, RDD telephone surveys have a higher complete rate for individuals age

65 and older than in the general population. Therefore, one half of all households with only residents aged 65 and older were terminated. The target selection process was also adjusted so that residents age 65 and older were never selected in mixed households. By the end of the time in the field, 17 percent of targets were ages 65 and older compared with 12.2 percent of Colorado's population in this age cohort.

All of the sampling steps were taken into account during the weighting procedure to correct for the disproportionality in the selection of these subsamples each step created, as will be described in later sections.

Field Preparation, Fielding and Data Processing

The questionnaire was originally developed by CHI, based on questions contained in the 2008 Massachusetts, Oklahoma and Minnesota Household Surveys, which closely followed the State Health Access Data Assistance Center (SHADAC) model of health interview survey questionnaires.

Specific sections were modified for Colorado. Changes were made to the questionnaire for the 2015 study. Significant changes from the 2013 to the 2015 version of the CHAS instrument are as follows:

Questions Added:

- 1) Addition of questions asked of those who purchase insurance on their own or have it purchased for them to determine if the insurance was purchased through Connect for Health Colorado, the state's health insurance marketplace.
- 2) Addition of follow-up questions asking if those who purchased insurance through the marketplace received financial assistance to help pay the premium.
- 3) Addition of questions asking uninsured targets who said they do not need insurance whether they did not need insurance because they disagree with Obamacare or because he or she is in good health.
- 4) Addition of questions asking uninsured targets who said they do not know how to get insurance if that was because (1) they have trouble understanding how it works, (2) there are so many plans that it is difficult to pick the best one, (3) or they do not know where to go to get information about health insurance.
- 5) Addition of question asking insured targets whether they research different aspects of their health insurance policies when using their health plans (what is covered, which doctors are in network, etc.).
- 6) Addition of a question asking targets how confident they are in their understanding of health insurance terminology.
- 7) Addition of a question asking if each member of the immediate family has dental insurance.
- 8) Addition of a question asking if the target feels well protected when it comes to paying for health care needs.
- 9) Addition of a question asking insured targets with employer-sponsored insurance, Medicare, a railroad retirement plan, military insurance, student health insurance or individually purchased plans whether or not the target's insurance plan has a deductible and, if so, the amount of the deductible.

Questions Removed:

- 10) Removal of question H5d, "Thinking back to the time you got your current form of insurance, what was the main reason you got this coverage?"
- 11) Removal of question E3, "How many jobs do you/does target have?"
- 12) Removal of question E13 asking adult members of target's family if they are veterans of the military.
- 13) Removal of question E14 asking adult members of target's family if they are students.

- 14) Removal of question A4, "In the past 12 months, has target been a patient in a hospital overnight?"
- 15) Removal of question A8, "In the past 12 months, did target take any prescription drugs?"
- 16) Removal of question A10ab1, "How much was spent out-of-pocket for vision care?"
- 17) Removal of long-term care insurance questions (LT1 and LT2).
- 18) Removal of question D9a, "How many people in this household have a cell phone?"
- 19) Removal of question D11, "How long has target lived in Colorado?"

Questions Changed:

- 20) Question H5a was reworded to include more description of the types of health insurance transitions that someone might have experienced in the previous year (churn).
- 21) The wording for option 2 in question A2 was changed from "A community health center or public clinic" to "A community health center that offers a discounted fee."
- 22) Questions HR1 and HR2 were reworded for targets under the age of 18 years to ask the respondent's (or parent's) opinion on the current health care system instead of the target's opinion.

Table 5 presents a summary of the questionnaire domains in the survey. As illustrated in the table, the majority of questions were administered to the target household member, with some demographics, socioeconomic questions, and health insurance questions asked of all household members. In addition, employment questions and employer-based health insurance questions were asked of parents of targets under the age of 26, since there is a higher prevalence of dependency on parents for health insurance among this younger group. Spouses of targets are also included in these questions.

Table 5. Summary of questionnaire domains by respondent type

Topics	Survey respondent	All household members	Target	Target's Spouse and/or Parents (Target age<26)
Demographic characteristics	X	X	X	X
Race/ethnicity			X	
Employment status			X	X
Detailed employment questions			X	X
Educational attainment			X	
Health insurance coverage	X	X	X	X
Availability of employer-sponsored insurance			X	X
Health status (general, oral, and mental)			X	
Access to and use of health care			X	
Family income			X	
Home ownership	X			
Household telephone status	X			

Prior to going into the field, SSRS programmed the study into a Computer Assisted Telephone Interviewing (CATI) program. Extensive checking of the program was conducted, given the large number of logic patterns that the skip patterns could generate. Household roster surveys with a specific target person require 3-4 times more manual labor to check when compared with a survey design with simply "last birthday" as the target selection criterion because of the complexity of the skip patterns.

All telephone interviews were conducted from March 2 to June 25, 2015 using the CATI system, which ensures that questions follow the logical skip patterns and that listed attributes are automatically rotated to eliminate “question position” bias.

CATI interviewers received both written materials on the survey and formal training. The written materials were provided prior to the beginning of the field period and included:

- 1) An annotated questionnaire that contained information about the goals of the study as well as detailed explanations of why questions were being asked, the meaning and pronunciation of key terms, potential obstacles to be overcome in getting good answers to questions, and respondent problems that could be anticipated ahead of time as well as strategies for addressing them.
- 2) A list of frequently asked questions and the appropriate responses to those questions.
- 3) A script to use when leaving messages on answering machines.
- 4) Contact information for project personnel.

Interviewer training was conducted both prior to the study pretest (described below) and immediately before the survey was officially launched. Call center supervisors and interviewers were walked through each question in the questionnaire. Interviewers were given instructions to help them maximize response rates and ensure accurate data collection. Interviewers were instructed to encourage participation by emphasizing the social importance of the project and to reassure respondents that the information they provided was confidential.

The pretest for the 2015 CHAS took place from February 19 through February 23, 2015 and between the hours of 6:00 p.m. and 9:00 p.m. MDT on weeknights and from noon until 6:00 p.m. MDT on Saturday and Sunday. SSRS interviewers completed a total of 34 interviews. All interviews were conducted with a listed landline sample that had a flag indicating it was likely to be a household with an annual income of less than \$30,000. The purpose of this was to increase the likelihood of securing interviews with uninsured targets. In an effort to complete interviews with uninsured respondents or those who had purchased insurance through Colorado’s marketplace, we supplemented the sample with uninsured sample from the 2013 CHAS. We collected interviews with seven uninsured respondents. We were unable to secure an interview with a respondent who had purchased insurance through the marketplace, but we continued to monitor interviews through the early field period and delivered recordings of marketplace responders once the interviews had been secured.

Project managers monitored the pretest in real time and provided digital recordings for review by CHI project team members. Overall, the flow of the survey was good and the respondents remained interested throughout. New questions worked well. The following suggestions were made for changes to the instrument prior to fielding based on the results of the pretest:

- Minimizing the length of the introduction wherever possible to avert refusals and break offs.
- Asking about dental insurance for other family members only in cases where there is more than one member of the target’s family living in the household (other than the target).
- Adding an interviewer note that clarifies the definition of mental health at question MH1.

SSRS maintained a staff of Spanish-speaking interviewers who, when contacting a household, were able to offer respondents the option of completing the survey in Spanish or in English. A total of 144 interviews were conducted in Spanish.

SSRS treated this study as a “best practices” study given certain budgetary and methodological directives from CHI. The survey fielding enacted the following best practice procedures:

- As part of our goal of maximizing response rate on every study, SSRS has made power dialing (using a computer to dial the number, but not allowing the computer to “predict” the availability of interviewers as is done by all telemarketers and most survey researchers) the standard operating procedure on all of our studies.
- SSRS instituted a call rule of original plus up to 20 callbacks before considering a sampling unit “dead.”
- Varied the time of day and the day of the week when callbacks were placed using a programmed differential call rule.
- Explained the purpose of the study and stated as accurately as possible the expected length of the interview.
- Permitted respondents to set the schedule for a callback and encouraged them to phone back on our 800 number.
- Privacy managers were immediately called back on an open line. (CRT systems do not transmit caller ID information, so any record dispositioned to have a privacy manager are called back manually on phones that do relay caller ID information).
- Initial refused interviews were “put to bed” for a period of two weeks, when a refusal conversion attempt took place. Second refusals were put to bed for an additional 4 weeks, when a second conversion was attempted.

Two analytical data files were created from the raw survey data: 1) a person-level file that includes all data elements collected for all persons in the household as well as characteristics of the household, and 2) a target-level file that includes all data elements collected for the target person in the household along with data on the characteristics of the target’s family and household. CATI range and logic checks were used to check the data during the data collection process. Additional data checks were implemented as part of the data file development work, checking for consistency across variables and family members and developing composite measures of family and household characteristics.

Weighting Procedures

Survey data were weighted to: 1) adjust for the fact that not all survey respondents were selected with the same probability, and 2) account for gaps in coverage in the survey frame. Base weights (survey design weights) address the differential sampling rates described earlier in this report. Subsequently, the resulting base weights were post-stratified along several dimensions (raked) to reflect the control totals obtained from the 2013 estimates of the U.S. Census Bureau’s American Community Survey. These counts were indexed by region, gender, education, age, race/ethnicity and home ownership.

In the first stage, SSRS developed design weights to compensate for a range of known biases that occur in telephone interviewing in general and the CHAS sample design specifically. These are summarized below:

- NON-RESPONSE WEIGHT = Exchange weight * eligibility rate, where the exchange weight equals the number of telephones called /number of telephones available to call. The eligibility weight equals the number of completes /number eligible to be completed. These were adjusted separately for landline and cellphone.
- SUB-SAMPLING WEIGHT = Corrections for regions 4, 15, and 20 * race and strata.
- POST-STRATIFICATION WEIGHT = Rebalancing completes * region to population counts.
- NUMBER OF PERSONS WEIGHT = Correction for the number of persons in the household (capped at 3 or more).
- PHONE USE WEIGHT = Correction for dual cell phone and landline in the household. These households were given a weight of .5.
- AGE WEIGHT = 18 years and younger down-weighted by a factor of .6 to rebalance from oversampling.

- CELL PHONE-ONLY WEIGHT = 24.7% of the file is cell phone-only (these were weighted up to the statewide estimate of 49.8%).
- DESIGN WEIGHT = Nonresponse * sub-stratification * stratification * persons * phones * age * cell phone-only.

Each step was normalized to the sum of weights = unweighted number of completes. The final post-stratification procedures that followed included:

- FINAL WEIGHT = Design weight with a two-step raking procedure. The first raking occurs at the region level, where targets were set by age, educational attainment, gender, race and home ownership by 21 statistical regions. However, because the number of children (0-17 years) was given disproportionately large weights, the cell phone-only population became inflated to 66.2 percent; therefore, a final statewide rake was conducted to reapportion cell phone-only households to 49.8 percent. In addition, the final total population estimate was based on the U.S. Census Bureau's 2014 Current Population Survey.

The final weights were developed using a procedure known as *Iterative Proportional Fitting* (IPF) or "raking" using the statistical software SPSS. Post-stratification targets were entered for age, race/ethnicity, gender, region, tenure of home ownership and education based on U.S. Census Bureau's American Community Survey (ACS) estimates. The ACS reports data according to Public Use Microdata Area (PUMA), which is an area that defines the extent of territory for which the Census Bureau tabulates public use microdata sample data. The raking process was carried out at the regional level, for which population estimates had to be developed, since the ACS only provides super-PUMA and PUMA designations for in-state geography. A method for overlaying PUMA population estimates over the 21 statistical regions was developed by CHI. Each PUMA represents a proportion of the population for a certain county in Colorado. Allocation factors of PUMA-to-county population were obtained from the Missouri Census Data Center at the University of Missouri for all counties in Colorado, and an allocation of county to region was developed in order to calculate PUMA weights for each region. The regional PUMA weights were applied to the ACS data to generate regional population estimates of gender, education, race, etc. Final counts are provided below.

Table 6. Demographic characteristics by 21 health statistical regions (HSRs) in Colorado

HSR	Gender		Home Ownership		Educational Attainment			
	Male	Female	Rent	Own	Less than H.S.	H.S. diploma	Some college	College degree
1	51.4%	48.6%	68.2%	31.8%	10.2%	27.3%	27.7%	10.6%
2	50.4%	49.6%	65.2%	34.8%	4.7%	14.1%	29.6%	30.5%
3	49.6%	50.4%	83.9%	16.1%	2.6%	10.9%	21.1%	37.0%
4	50.0%	50.0%	63.3%	36.7%	5.7%	15.4%	29.0%	24.4%
5	50.6%	49.4%	76.4%	23.6%	6.4%	19.5%	24.9%	23.2%
6	50.1%	49.9%	70.1%	29.9%	12.8%	20.1%	29.3%	14.5%
7	48.9%	51.1%	60.6%	39.4%	9.9%	21.1%	29.5%	15.3%
8	49.9%	50.1%	70.5%	29.5%	14.2%	18.1%	29.2%	14.9%
9	50.9%	49.1%	63.3%	36.7%	8.4%	17.8%	25.9%	27.4%
10	49.4%	50.6%	72.3%	27.7%	8.5%	29.2%	22.6%	18.6%
11	51.5%	48.5%	63.5%	36.5%	9.3%	20.6%	21.1%	23.6%
12	53.8%	46.2%	66.8%	33.2%	7.1%	18.6%	23.1%	27.6%
13	48.4%	51.6%	71.2%	28.8%	6.3%	21.2%	33.2%	19.6%
14	50.7%	49.3%	64.2%	35.8%	12.4%	18.6%	24.6%	16.6%
15	48.9%	51.1%	63.3%	36.7%	7.5%	16.3%	24.7%	26.5%
16	50.1%	49.9%	69.9%	30.1%	5.1%	11.3%	22.8%	38.5%
17	51.3%	48.7%	72.4%	27.6%	4.6%	17.7%	28.3%	26.1%
18	49.7%	50.3%	68.3%	31.7%	9.4%	18.2%	25.3%	19.4%
19	48.1%	51.9%	66.9%	33.1%	7.7%	23.7%	27.1%	18.4%
20	50.3%	49.7%	53.5%	46.5%	11.1%	14.5%	20.0%	33.0%
21	50.0%	50.0%	70.7%	29.3%	5.5%	15.6%	26.6%	30.7%
<i>Total</i>	<i>50.0%</i>	<i>50.0%</i>	<i>65.8%</i>	<i>34.2%</i>	<i>7.7%</i>	<i>16.4%</i>	<i>25.2%</i>	<i>26.7%</i>

To handle missing data among some of the demographic variables we employed a technique called hot decking. Hot deck imputation replaces the missing values of a respondent randomly with another similar respondent without missing data. These are further determined by variables predictive of nonresponse that are present in the entire file. Using an SPSS macro detailed in "Goodbye, Listwise Deletion: Presenting Hot Deck Imputation as an Easy and Effective Tool for Handling Missing Data" (Myers, 2011), we imputed missing values for age, home ownership, education, and race.

We examined the distribution of the resulting target weights and determined that there was some large weights so we implemented trimming rules for trimming to .10 minimum and 8 maximum off the low and high end weights. We also included an untrimmed weight as well.

Table 7. Age and race/ethnicity distribution by 21 health statistic regions (HSRs) in Colorado

HSR	Age				Race/Ethnicity			
	0–17 years	18–34 years	35–64 years	65+ years	White	African American	Hispanic	Other
1	24.2%	19.1%	40.1%	16.6%	76.1%	0.3%	20.6%	3.0%
2	21.2%	27.1%	38.2%	13.4%	84.1%	0.6%	10.8%	4.6%
3	28.4%	16.6%	45.4%	9.5%	84.6%	0.4%	8.2%	6.8%
4	25.4%	24.4%	38.8%	11.4%	71.4%	5.2%	15.7%	7.6%
5	25.9%	19.1%	43.0%	12.0%	81.9%	0.4%	13.2%	4.6%
6	23.3%	19.3%	39.5%	17.8%	61.0%	0.1%	36.4%	2.6%
7	24.1%	21.7%	38.1%	16.0%	52.7%	0.8%	43.1%	3.5%
8	23.5%	20.0%	38.9%	17.5%	53.9%	0.0%	43.6%	2.5%
9	20.6%	21.7%	41.6%	16.1%	79.4%	0.0%	12.2%	8.3%
10	21.1%	17.1%	42.6%	19.1%	82.3%	0.4%	14.3%	3.0%
11	25.4%	20.4%	43.8%	10.5%	75.4%	0.1%	21.4%	3.1%
12	23.6%	23.3%	43.3%	9.7%	75.7%	0.3%	19.8%	4.3%
13	19.8%	14.1%	43.9%	22.3%	86.1%	0.0%	11.1%	2.8%
14	27.8%	24.8%	37.9%	9.5%	54.0%	2.8%	36.7%	6.4%
15	25.0%	22.9%	40.6%	11.5%	61.8%	9.3%	20.1%	8.8%
16	22.3%	25.3%	41.1%	11.3%	79.4%	0.7%	12.9%	7.1%
17	23.3%	19.2%	43.1%	14.4%	83.5%	2.2%	9.6%	4.7%
18	27.8%	23.3%	37.9%	11.0%	66.0%	1.8%	28.2%	4.0%
19	23.1%	23.9%	36.0%	17.0%	81.0%	1.0%	14.7%	3.2%
20	21.5%	30.6%	37.5%	10.4%	52.6%	9.6%	31.3%	6.4%
21	21.6%	21.8%	42.8%	13.8%	78.4%	1.0%	15.6%	5.1%
<i>Total</i>	<i>24.0%</i>	<i>23.7%</i>	<i>40.0%</i>	<i>12.2%</i>	<i>69.3%</i>	<i>3.6%</i>	<i>21.1%</i>	<i>6.0%</i>

Complex survey designs and post-data collection statistical adjustments affect variance estimates and resulting tests of significance and confidence intervals. The impact of the survey design on variance estimates is measured by the design effect, which represents the extent of departure from a simple random sample where all sample units respond. The design effect measures the variance inflation of the sample estimate relative to the variance of an estimate based on a hypothetical random sample of the same size. The design effect for the final full sample weight is 1.88. The design effect for the final trimmed sample weight is 1.59.

The weighting procedures detailed above were conducted for both the target file, using the target’s demographic data for post-stratification, and the person file, using each individual’s demographics as their own target. There were, however, some differences in the procedure used in the person file. First, the adjustments for sub-stratification and stratification were made based on number of persons rather than completed interviews. Secondly, the “number of persons” adjustment was not made to the person file since each case in the person file represents a person and not a randomly selected household member. Further, the age correction in the household file adjusts for the fact that targets under the age of 18 years were 60 percent more likely to be randomly selected by the computer as the target; this selection procedure did not apply to the person file.

Finally, because education and race were not collected for family members other than the target person, these variables could not be used in the raking process. Therefore, the target weight was divided by the number of people in the household in order to create a household-level version of the target weight. This weight was then merged into the person file and served as the base weight for the person weighting. Utilizing this base weight, the person file was then raked to the variables that were available, namely, age, gender, and home ownership, and then to cell phone use, as it has been in prior years.

Table 8. Design effects

	Estimate	Standard Error	95% Confidence Interval		Design Effect	Unweighted Count
			Lower	Upper		
<i>Gender</i>						
Male	50.2%	0.9%	48.5%	51.9%	2.9	5,395
Female	49.8%	0.9%	48.1%	51.5%	2.9	4,741
<i>Race/Ethnicity</i>						
White	70.1%	0.8%	68.5%	71.7%	3.3	7,585
African American	3.5%	0.3%	3.0%	4.2%	2.9	400
Hispanic	20.6%	0.8%	19.2%	21.1%	3.5	1,586
Other	5.8%	0.5%	5.0%	6.7%	3.7	415
<i>Home Ownership</i>						
Rent	66.5%	0.9%	64.8%	68.1%	3.3	7,767
Own	33.5%	0.9%	31.9%	35.2%	3.3	2,264
<i>Age</i>						
0-17	24.8%	0.7%	23.4%	26.3%	2.9	2,150
18-34	15.6%	0.7%	14.2%	17.0%	3.9	808
35-49	20.5%	0.7%	19.1%	22.0%	3.4	1,534
50-64	27.0%	0.7%	25.6%	28.4%	2.4	3,771
65+	12.2%	0.5%	11.3%	13.1%	2.0	1,703
<i>Educational Attainment</i>						
Under 18	21.6%	0.7%	20.2%	23.0%	3.0	1,820
No H.S. diploma	9.7%	0.6%	8.6%	10.8%	3.7	650
H.S. diploma	16.8%	0.6%	15.7%	18.1%	2.8	2,103
Some college	24.9%	0.7%	23.5%	26.4%	3.0	2,475
College degree	27.1%	0.7%	25.7%	28.5%	2.7	3,035
<i>Phone Ownership</i>						
Landline	51.1%	0.7%	49.7%	52.5%	2.0	7,628
Cell phone only	48.9%	0.7%	47.5%	50.3%	2.0	2,508

Survey Response Rate

The response rate for this study was 33.7 percent for the landline sample and 27.4 percent for the cell phone sample using AAPOR's RR3 formula. This translates into an overall response rate of 31.8 percent. Following is a full disposition of the sample selected for this survey.

Table 9. Response rates by 21 health statistics regions (HSRs) in Colorado – Landline

	HSR 1	HSR 2	HSR 3	HSR 4	HSR 5	HSR 6	HSR 7
Eligible, interview (Category 1)							
Complete	256	236	270	496	209	228	209
Eligible, non-interview (Category 2)							
Refusal	15	13	14	38	15	12	13
Break off (callback)	152	84	165	265	40	98	110
Answering machine household	201	265	450	606	66	61	183
Physically or mentally unable/incompetent	4	4	7	6	5	7	5
Language problem	10	8	5	16	6	2	2
Unknown eligibility, non-interview (Category 3)							
Always busy	272	65	112	178	42	322	81
No answer	528	646	1,189	1,386	125	395	514
Call blocking	1	2	36	17	0	2	2
No screener completed	912	1,282	1,726	3,252	979	1,025	884
Refusal, Unknown eligibility	290	504	607	1,098	312	240	347
Not eligible (Category 4)							
Fax/data line	318	374	715	706	311	209	222
Nonworking number	13,917	9,871	13,742	22,021	7,765	6,432	7,059
Business, government office, other organizations	160	280	389	490	143	90	105
No eligible respondent	96	121	69	144	61	88	71
Quota filled	105	0	0	0	92	0	0
RR3	38.0%	31.5%	25.4%	27.0%	38.7%	39.8%	31.2%

Table 9. Response rates by 21 health statistics regions (HSRs) in Colorado – Landline

	HSR 8	HSR 9	HSR 10	HSR 11	HSR 12	HSR 13	HSR 14
Eligible, interview (Category 1)							
Complete	244	221	246	231	241	260	358
Eligible, non-interview (Category 2)							
Refusal	9	19	15	8	18	10	22
Break off (callback)	85	81	46	45	78	157	159
Answering machine household	155	151	61	67	250	169	332
Physically or mentally unable/incompetent	9	9	4	3	2	6	4
Language problem	8	5	7	5	19	7	17
Unknown eligibility, non-interview (Category 3)							
Always busy	76	126	23	53	234	44	102
No answer	773	309	123	98	677	386	875
Call blocking	6	2	0	0	6	3	16
No screener completed	577	1,508	1,180	1,501	3,894	813	1,776
Refusal, Unknown eligibility	234	357	296	294	453	357	557
Not eligible (Category 4)							
Fax/data line	266	370	213	319	757	211	549
Nonworking number	8,182	11,448	6,658	6,982	19,637	6,239	13,883
Business, government office, other organizations	161	226	157	227	490	133	283
No eligible respondent	98	131	86	97	210	97	110
Quota filled	0	16	0	0	0	0	0
RR3	42.1%	38.0%	44.3%	44.9%	39.3%	34.3%	33.1%

Table 9. Response rates by 21 health statistics regions (HSRs) in Colorado – Landline

	HSR 15	HSR 16	HSR 17	HSR 18	HSR 19	HSR 20	HSR 21
Eligible, interview (Category 1)							
Complete	416	254	316	205	257	417	430
Eligible, non-interview (Category 2)							
Refusal	25	13	29	10	20	27	20
Break off (callback)	138	150	77	133	97	184	278
Answering machine household	278	418	138	125	209	464	518
Physically or mentally unable/incompetent	7	5	2	5	5	8	10
Language problem	61	4	3	4	0	27	4
Unknown eligibility, non-interview (Category 3)							
Always busy	44	102	71	92	36	112	192
No answer	386	875	625	853	295	373	325
Call blocking	3	16	9	10	0	7	0
No screener completed	813	1,776	3,512	1,433	1,351	1,092	848
Refusal, Unknown eligibility	357	557	750	486	522	279	414
Not eligible (Category 4)							
Fax/data line	211	549	623	436	247	279	315
Nonworking number	6,239	13,883	21,080	11,697	8,448	7,534	7,239
Business, government office, other organizations	133	283	474	290	200	133	131
No eligible respondent	97	110	137	78	101	55	97
Quota filled	0	0	0	0	8	0	29
RR3	34.3%	33.1%	34.1%	28.3%	35.5%	33.3%	33.6%

Table 9. Response rates by 21 health statistics regions (HSRs) in Colorado – Cell Phone

	HSR 1	HSR 2	HSR 3	HSR 4	HSR 5	HSR 6	HSR 7
Eligible, interview (Category 1)							
Complete	137	131	-	286	204	174	197
Eligible, non-interview (Category 2)							
Refusal	9	13	-	28	17	21	11
Break off (callback)	124	41	-	148	112	160	289
Answering machine household	125	156	-	310	179	143	222
Physically or mentally unable/incompetent	5	1	-	9	9	1	8
Language problem	0	1	-	1	0	0	0
Unknown eligibility, non-interview (Category 3)							
Always busy	2	0	-	0	1	1	12
No answer	291	358	-	795	411	411	753
Call blocking	2	0	-	2	1	0	2
No screener completed	328	358	-	1,133	422	455	729
Refusal, Unknown eligibility	280	331	-	846	456	292	381
Not eligible (Category 4)							
Fax/data line	14	12	-	26	18	9	7
Nonworking number	1,430	1,631	-	4,253	2,437	1,915	2,892
Business, government office, other organizations	58	92	-	201	74	47	80
No eligible respondent	103	166	-	429	189	112	192
Quota filled	0	0	-	0	0	0	0
RR3	26.1%	28.7%	-	27.9%	28.2%	24.4%	22.6%

Table 9. Response rates by 21 health statistics regions (HSRs) in Colorado – Cell Phone

	HSR 8	HSR 9	HSR 10	HSR 11	HSR 12	HSR 13	HSR 14
Eligible, interview (Category 1)							
Complete	176	206	133	195	148	119	-
Eligible, non-interview (Category 2)							
Refusal	11	24	13	13	11	9	-
Break off (callback)	307	68	49	115	79	75	-
Answering machine household	164	155	125	175	153	112	-
Physically or mentally unable/incompetent	3	2	4	1	4	2	-
Language problem	0	0	0	0	1	0	-
Unknown eligibility, non-interview (Category 3)							
Always busy	3	0	2	0	0	0	-
No answer	710	371	349	486	392	415	-
Call blocking	1	0	0	1	0	1	-
No screener completed	502	630	375	379	539	338	-
Refusal, Unknown eligibility	281	425	321	311	346	303	-
Not eligible (Category 4)							
Fax/data line	7	16	10	11	7	10	-
Nonworking number	2,416	2,137	1,905	5,254	2,095	1,551	-
Business, government office, other organizations	85	115	79	90	121	54	-
No eligible respondent	142	203	143	177	180	108	-
Quota filled	0	0	0	0	0	0	-
RR3	21.5%	31.0%	29.6%	35.0%	30.7%	24.8%	-

Table 9. Response rates by 21 health statistics regions (HSRs) in Colorado – Cell Phone

	HSR 15	HSR 16	HSR 17	HSR 18	HSR 19	HSR 20	HSR 21
Eligible, interview (Category 1)							
Complete	330	139	192	172	160	1,037	-
Eligible, non-interview (Category 2)							
Refusal	42	14	13	15	10	97	-
Break off (callback)	333	168	68	107	53	565	-
Answering machine household	376	198	196	189	135	1,212	-
Physically or mentally unable/incompetent	5	0	3	3	6	27	-
Language problem	42	0	0	0	3	16	-
Unknown eligibility, non-interview (Category 3)							
Always busy	3	0	0	1	2	6	-
No answer	596	739	484	489	358	2,729	-
Call blocking	7	0	1	0	0	5	-
No screener completed	1,915	554	827	480	395	3,932	-
Refusal, Unknown eligibility	1,032	396	434	411	367	2,845	-
Not eligible (Category 4)							
Fax/data line	63	13	15	18	6	74	-
Nonworking number	7,233	2,477	3,165	2,163	1,892	14,685	-
Business, government office, other organizations	208	135	121	124	79	799	-
No eligible respondent	649	191	197	178	152	1,227	-
Quota filled	0	0	0	0	0	0	-
RR3	28.7%	22.1%	32.1%	26.1%	30.1%	26.5%	-

Table 10. Response rate for landline and cell phone samples

	Landline	Cell Phone	Total
Eligible, Interview (Category 1)			
Complete	6,000	4,136	10,136
Eligible, non-interview (Category 2)			
Refusal	365	371	736
Break off (callback)	2,622	2,861	5,483
Answering machine household-no message left	5,167	4,325	9,492
Physically or mentally unable/incompetent	117	93	210
Language problem	220	64	284
Unknown eligibility, non-interview (Category 3)			
Always busy	2,359	33	2,392
No answer	13,451	11,137	24,588
Call blocking	168	23	191
No screener completed	35,281	14,291	49,572
Refusal Unknown eligibility	9,854	10,058	19,912
Not eligible (Category 4)			
Fax/data line	9,319	336	9,655
Nonworking number	249,892	61,530	311,422
Business, government office, other organizations	5,651	2,562	8,213
No eligible respondent	2,218	4,738	6,956
Quota filled	250	0	250
RR3	33.7%	27.4%	31.8%