2005 Health Insurance Survey

Survey Methodology Report

Princeton Survey Research Associates International for
the Commonwealth Fund

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SUMMARY

The 2005 Health Insurance Survey, sponsored by The Commonwealth Fund, obtained telephone interviews with a nationally representative sample of 4,350 adults age 19 and older living in the continental United States. Interviews were completed in both English and Spanish, according to the preference of the respondent. The interviews were conducted by Princeton Data Source during the period of August 18, 2005 through January 5, 2006. The sample was designed to target low-income, African-American and Hispanic households. Statistical results are weighted to correct for the disproportionate sample design and to make the final total sample results representative of all adults age 19 and older living in the continental U.S. The margin of sampling error for the complete set of weighted data is ±2.0%.

Details on the design, execution and analysis of the survey are discussed below.

DESIGN AND DATA COLLECTION PROCEDURES

Sample Design

The sample was designed to generalize to the U.S. adult population age 19 and older, and to allow separate analyses of responses by low-income, African-American and Hispanic households. PSRAI employed a stratified low-income sample design to achieve these objectives in a cost effective manner. This design uses random-digit dialing (RDD) methods, but telephone numbers are drawn disproportionately from area code-exchange combinations with higher than average density of low-income households. Since lower income exchanges also tend to have a higher density of African-American and Hispanic households, the sample also achieves the goal of over-sampling these groups of interest.

The telephone sample was provided by Survey Sampling, Inc. (SSI) according to PSRAI specifications. The sample was drawn using standard *list-assisted random digit dialing* methodology and was divided into six strata, or sub-samples, based on average household

income. Within each stratum, every *active block* of telephone numbers (area code + exchange + two-digit block number) that contained three or more residential directory listings was equally likely to be selected; after selection two more digits were added randomly to complete the number. This method guarantees coverage of every assigned phone number regardless of whether that number is directory listed, purposely unlisted, or too new to be listed. After selection, the numbers were compared against business directories and matching numbers were purged.

Questionnaire Development and Testing

The questionnaire was developed by PSRAI in collaboration with The Commonwealth Fund. In order to improve the quality of the data, the questionnaire was pretested with a small number of respondents using listed telephone numbers. Pretest interviews were monitored by PSRAI staff and conducted using experienced interviewers who could best judge the quality of the answers given and the degree to which respondents understood the questions. Some final changes were made to screening procedures, question wording and question order based on the monitored pretest interviews. The final questionnaire was translated into Spanish by Princeton Data Source. All interviews, both English and Spanish, were conducted using a fully-programmed CATI instrument.

Contact Procedures

Interviews were conducted during the period August 18, 2005 through January 5, 2006. As many as 20 attempts were made to contact a person at every sampled telephone number. Sample was released for interviewing in replicates, which are representative subsamples of the larger sample. Using replicates to control the release of sample ensures that complete call procedures are followed for the entire sample.

Calls were staggered over times of day and days of the week to maximize the chance of making contact with potential respondents. Each household received at least one daytime call in an attempt to find someone at home. In each contacted household, interviewers conducted an interview with a randomly selected household member. Specifically, interviewers asked how many people age 19 or older live in the household. If there was only one eligible household member, interviewers conducted an interview with that person. If there were two eligible household members, interviewers conducted an interview with either the younger or older, depending on a computer-generated random selection. If there were three or more eligible

household members, interviewers conducted an interview with the person who had the most recent birthday.

WEIGHTING AND ANALYSIS

Weighting is generally used in survey analysis to adjust for planned effects of the sample design and to compensate for patterns of non-response that might bias results. The weighting for this project was accomplished in four stages: a first stage sampling weight to adjust for the designed oversampling in low-income areas; a second stage weight to adjust household characteristics of region and working phone status; a third stage weight to adjust for the number of eligible household members; and a fourth stage weight to account for demographic distortions due to non-response.

First Stage - Sample Design Weight

All completed interviews were given a first-stage sample weight based on the level of disproportionality imposed by the sample design. All telephone exchanges were divided into *strata* based on the average household income associated with that exchange. Phone numbers from lower-income exchanges were oversampled relative to those from higher-income exchanges. The first-stage weight for each stratum is computed by dividing the proportion of active blocks in each stratum by the proportion of phone numbers in our dialed sample. The weighted distribution of cases contacted across strata will no longer show effects of the designed oversampling. Table 1 documents household and sample distributions across strata along with the first-stage weights.

Table 1: Sample Design and First Stage Weights

Stratum	Mean HHD income	Active Block Distribution	Sample Distribution	First Stage Weight
1	Under $20K	3.3%	30.2%	0.11
2	$20-24.9K	3.2%	8.9%	0.36
3	$25-29.9K	4.6%	6.4%	0.72
4	$30-$39.9K	15.0%	13.9%	1.08
5	$40-$54.9K	28.2%	19.6%	1.44
6	$55K+	45.7%	21.1%	2.17

Second Stage – Household Demographic Adjustment

The second stage of weighting corrects for differential non-response across the household characteristics of region and working phone status. These parameters came from a special analysis of the Census Bureau's 2005 Annual Social and Economic Supplement (ASEC) that included all households in the continental United States. Households with a past interruption in telephone service were weighted to represent all households with past telephone service interruption (from survey question D21) plus those households without telephone service (from ASEC data). This stage of weighting, which incorporates the first stage weight, was accomplished using Sample Balancing, a special iterative sample weighting program that simultaneously balances the distributions of all variables using a statistical technique called the *Deming Algorithm*.

Third Stage – Person Selection Adjustment Factor (PSAF)

The third stage of weighting corrects for the fact that people in different size households (measured by the number of eligible respondents) have different probabilities of being included in the sample. For example, an eligible respondent who lives alone has a 100 percent chance of being included in the sample once household contact is made. In a household with two eligible respondents, each has a 50 percent chance of being selected for the sample. Thus, people in households with few people have a greater probability of being included in the sample than people in larger households.

For the purposes of this survey, all respondents were given a PSAF of 1 if they were the only eligible person living in the household. Respondents who lived in households containing more than one eligible respondent were given a PSAF of 2. The third-stage weight is the product of the second-stage weight and the PSAF.

Fourth Stage – Demographic Adjustment

In the fourth and final weighting stage, the demographic composition of the sample was weighted to match national parameters for sex, age, education, race/ethnicity and marital status. These parameters came from an analysis of the 2005 ASEC data.

This stage of weighting, which incorporated each respondent's previous weight, was accomplished using Sample Balancing. The fourth stage weight adjusts for non-response that is related to particular demographic characteristics of the sample. This weight ensures that the demographic characteristics of the sample closely approximate the demographic characteristics of the national population age 19 and older. Weights from this stage were *trimmed* to prevent

individual interviews from having too much influence on the final results. As a final step, all weights were multiplied by a constant so the final weighted sample size equals approximately the total number of adults age 19 and older living in the continental United States (in thousands). Table 2 compares sample demographics at each stage of weighting to population parameters.

In addition to the weight described above (FINALWT) a household weight was also computed. This weight (HHWT) was the weight after the second stage of weighting multiplied by a constant so the final weighted sample size equals approximately the total number of households in the continental United States (in thousands).

Table 2: Sample Demographics

	Population Parameter	Unweighted Sample	First Stage	Second Stage	Third Stage	Fourth Stage
Household Parameters						
Census region						
Northeast	18.8%	16.9%	18.4%	18.8%	18.2%	18.0%
Midwest	23.1%	20.2%	24.8%	23.1%	23.4%	24.0%
South	36.5%	33.9%	36.9%	36.5%	36.3%	36.4%
West	21.6%	29.0%	19.9%	21.6%	22.1%	21.6%
Phone Service						
Yes	85.2%	90.2%	92.6%	85.2%	85.2%	87.5%
No	14.8%	9.8%	7.4%	14.8%	14.8%	12.5%
Person Parameters						
Sex						
Male	48.3%	37.6%	39.1%	38.8%	40.0%	46.2%
Female	51.7%	62.4%	60.9%	61.2%	60.0%	53.8%
Age						
19-24	11.2%	6.7%	5.5%	5.6%	6.1%	8.6%
25-34	18.4%	16.5%	15.5%	16.3%	17.3%	17.7%
35-44	20.3%	18.5%	18.5%	18.7%	18.8%	20.1%
45-54	19.7%	20.3%	21.2%	21.1%	21.5%	20.7%
55-64	13.8%	16.0%	17.7%	17.5%	17.3%	14.9%
65+	16.5%	22.1%	21.6%	20.8%	19.0%	18.0%
missing		1.1%	1.0%	1.0%	0.8%	0.7%
Education						
LT HS	14.9%	17.9%	10.7%	11.4%	11.2%	14.2%
HS grad	32.1%	30.4%	28.3%	28.8%	28.9%	31.1%
Some college	27.4%	25.2%	26.1%	26.0%	26.0%	26.8%
College grad	25.6%	26.5%	35.0%	33.8%	33.9%	27.9%
missing		0.9%	0.7%	0.7%	0.7%	0.5%
Race/Ethnicity						
White, not Hispanic	70.3%	53.7%	73.9%	72.0%	72.0%	71.0%
Black, not Hispanic	11.2%	20.3%	9.5%	9.9%	8.9%	10.8%
Hispanic	12.6%	20.3%	11.5%	13.0%	13.8%	12.6%
Other, not Hispanic	5.8%	5.7%	5.1%	5.2%	5.3%	5.6%
missing		1.4%	1.5%	1.5%	1.4%	1.5%
Marital Status						
Married	57.4%	53.7%	60.2%	59.6%	68.7%	59.3%
Not married	42.6%	46.3%	39.8%	40.4%	31.3%	40.7%
missing		0.7%	0.6%	0.6%	0.5%	0.6%

EFFECTS OF SAMPLE DESIGN ON STATISTICAL INFERENCE

Specialized sampling designs and post-data collection statistical adjustments require analysis procedures that reflect departures from simple random sampling. PSRAI calculates the effects of these design features so that an appropriate adjustment can be incorporated into tests of statistical significance when using these data. The so-called "design effect" or *deff* represents the loss in statistical efficiency that results from a disproportional sample design and systematic non-response. PSRAI calculates the composite design effect for a sample of size *n*, with each case having a weight, w_i as:

$$deff = \frac{n\sum_{i=1}^{n} w_i^2}{\left(\sum_{i=1}^{n} w_i\right)^2}$$

In a wide range of situations, the adjusted standard error of a statistic should be calculated by multiplying the usual formula by the square root of the design effect ($\sqrt{deff}$). Thus, the formula for computing the 95% confidence interval around a percentage is:

$$\hat{p} \pm \left(\sqrt{deff} \times 1.96 \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} \right)$$

where $\hat{p}$ is the sample estimate and *n* is the unweighted number of sample cases in the group being considered.

The formula for computing the 95 percent confidence interval around the difference between two percentages, p_1 and p_2, of sizes n_1 and n_2, is:

$$(\hat{p}_1 - \hat{p}_2) \pm 1.96 \sqrt{\frac{deff_1\ \hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{deff_2\ \hat{p}_2(1-\hat{p}_2)}{n_2}}$$

where $\hat{p}_1$ is the estimate of p_1, $\hat{p}_2$ is the estimate of p_2, and $deff_1$ and $deff_2$ are the design effects for each group.

The survey's *margin of error* is the largest 95% confidence interval for any estimated proportion based on the total sample—one around 50%. For example, the margin of error for the total sample is ±2.0%. This means that in 95 out every 100 samples using the same methodology, estimated proportions based on the entire sample will be no more than two percentage points away from their true values in the population. It is important to remember that sampling fluctuations are only one possible source of error in a survey estimate. Other sources, such as measurement, may contribute additional error of greater or lesser magnitude. Table 3 shows sample sizes, design effects and margins of error for the sample overall and for major target subgroups. See Appendix A for confidence intervals around percentages, and tolerances for differences between percentages.

Table 3: Sample Sizes, Design Effects and Margins of Error

	n=	Design Effect	Margin of Error
Total Sample	4350	1.75	2.0%
Race/Ethnicity			
White, not Hispanic	2303	1.38	2.4%
Black, not Hispanic	871	2.77	5.5%
Hispanic	870	2.47	5.2%
2004 Family Income			
Less than $20,000	1130	2.11	4.2%
$20,000 to under $39,000	1028	1.80	4.1%
$40,000 to under $60,000	647	1.61	4.9%
$60,000 or more	925	1.44	3.9%

RESPONSE RATE

Table 4 reports the disposition of all sampled telephone numbers ever dialed from the original telephone number sample. The *response rate* estimates the fraction of all eligible respondents in the sample that were ultimately interviewed. At PSRAI it is calculated by taking the product of three component rates:[1]

[1] PSRAI's disposition codes and rate formulas are consistent with standards of the American Association for Public Opinion Research.

- Contact rate – the proportion of working numbers where a request for interview was made – of 82 percent[2]
- Cooperation rate – the proportion of contacted numbers where a consent for interview was initially obtained, versus those refused – of 59 percent
- Completion rate – the proportion of initially cooperating and eligible interviews that were completed – of 97 percent

Thus the response rate for this survey is 47 percent.

Table 4 Sample Disposition

	Final
Total Numbers dialed	22097
Business	3004
Computer/Fax	1770
Cell phone	37
Other Not-Working	5741
Additional projected NW	451
Working numbers	11094
Working Rate	**50.2%**
No Answer	57
Busy	38.25
Answering Machine	829
Callbacks	62
Other Non-Contacts	989
Contacted numbers	9119
Contact Rate	**82.2%**
Initial Refusals	831
Second Refusals	2926
Cooperating numbers	5362
Cooperation Rate	**58.8%**
No Adult in HH	47
Language Barrier	185
Ineligible - screenout/over quota	663
Eligible numbers	4467
Eligibility Rate	**83.3%**
Interrupted	117

[2] We assume that 75 percent of cases that result in a disposition of "No answer" and/or “Busy” over all attempts are actually not working numbers.

Completes	4350
Completion Rate	**97.4%**
Response Rate	**47.1%**

APPENDIX

Table 5: Recommended Allowances for Sampling Error of a Percentage (at 95% confidence level, *deff*=1.75)

	For Percentages at or near				
	50%	40/60%	30/70%	20/80%	10/90%
Sample Size					
4350	2.0%	1.9%	1.8%	1.6%	1.2%
4000	2.0%	2.0%	1.9%	1.6%	1.2%
3500	2.2%	2.1%	2.0%	1.8%	1.3%
3000	2.4%	2.3%	2.2%	1.9%	1.4%
2500	2.6%	2.5%	2.4%	2.1%	1.6%
2000	2.9%	2.8%	2.7%	2.3%	1.7%
1500	3.3%	3.3%	3.1%	2.7%	2.0%
1400	3.5%	3.4%	3.2%	2.8%	2.1%
1300	3.6%	3.5%	3.3%	2.9%	2.2%
1200	3.7%	3.7%	3.4%	3.0%	2.2%
1100	3.9%	3.8%	3.6%	3.1%	2.3%
1000	4.1%	4.0%	3.8%	3.3%	2.5%
900	4.3%	4.2%	4.0%	3.5%	2.6%
800	4.6%	4.5%	4.2%	3.7%	2.8%
700	4.9%	4.8%	4.5%	3.9%	2.9%
600	5.3%	5.2%	4.9%	4.2%	3.2%
500	5.8%	5.7%	5.3%	4.6%	3.5%
400	6.5%	6.4%	5.9%	5.2%	3.9%
300	7.5%	7.3%	6.9%	6.0%	4.5%
200	9.2%	9.0%	8.4%	7.3%	5.5%
100	13.0%	12.7%	11.9%	10.4%	7.8%
50	18.3%	18.0%	16.8%	14.7%	11.0%

Table 6: Recommended Allowances for Sampling Error of a Difference between Percentages near 50%
(at 95% confidence level, *deff*=1.75)

Sample Size	4000	3500	3000	2500	2000	1500	1000	900	800	700	600	500	400	300	200	100	50
4000	3%																
3500	3%	3%															
3000	3%	3%	3%														
2500	3%	3%	4%	4%													
2000	4%	4%	4%	4%	4%												
1500	4%	4%	4%	4%	4%	5%											
1000	5%	5%	5%	5%	5%	5%	6%										
900	5%	5%	5%	5%	5%	5%	6%	6%									
800	5%	5%	5%	5%	5%	6%	6%	6%	6%								
700	5%	5%	5%	6%	6%	6%	6%	7%	7%	7%							
600	6%	6%	6%	6%	6%	6%	7%	7%	7%	7%	7%						
500	6%	6%	6%	6%	6%	7%	7%	7%	7%	8%	8%	8%					
400	7%	7%	7%	7%	7%	7%	8%	8%	8%	8%	8%	9%	9%				
300	8%	8%	8%	8%	8%	8%	9%	9%	9%	9%	9%	9%	10%	11%			
200	9%	9%	9%	10%	10%	10%	10%	10%	10%	10%	11%	11%	11%	12%	13%		
100	13%	13%	13%	13%	13%	13%	14%	14%	14%	14%	14%	14%	14%	15%	16%	18%	
50	18%	18%	18%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	20%	20%	22%	26%

Table 7: Recommended Allowances for Sampling Error of a Difference between Percentages near 40% or 60%
(at 95% confidence level, *deff*=1.75)

Sample Size	4000	3500	3000	2500	2000	1500	1000	900	800	700	600	500	400	300	200	100	50
4000	3%																
3500	3%	3%															
3000	3%	3%	3%														
2500	3%	3%	3%	4%													
2000	3%	4%	4%	4%	4%												
1500	4%	4%	4%	4%	4%	5%											
1000	4%	5%	5%	5%	5%	5%	6%										
900	5%	5%	5%	5%	5%	5%	6%	6%									
800	5%	5%	5%	5%	5%	6%	6%	6%	6%								
700	5%	5%	5%	5%	6%	6%	6%	6%	7%	7%							
600	6%	6%	6%	6%	6%	6%	7%	7%	7%	7%	7%						
500	6%	6%	6%	6%	6%	7%	7%	7%	7%	7%	8%	8%					
400	7%	7%	7%	7%	7%	7%	8%	8%	8%	8%	8%	9%	9%				
300	8%	8%	8%	8%	8%	8%	8%	8%	9%	9%	9%	9%	10%	10%			
200	9%	9%	9%	9%	9%	10%	10%	10%	10%	10%	10%	11%	11%	12%	13%		
100	13%	13%	13%	13%	13%	13%	13%	13%	13%	14%	14%	14%	14%	15%	16%	18%	
50	18%	18%	18%	18%	18%	18%	18%	18%	19%	19%	19%	19%	19%	19%	20%	22%	25%

Table 8: Recommended Allowances for Sampling Error of a Difference between Percentages near 30% or 70%
(at 95% confidence level, *deff*=1.75)

Sample Size	4000	3500	3000	2500	2000	1500	1000	900	800	700	600	500	400	300	200	100	50
4000	3%																
3500	3%	3%															
3000	3%	3%	3%														
2500	3%	3%	3%	3%													
2000	3%	3%	3%	4%	4%												
1500	4%	4%	4%	4%	4%	4%											
1000	4%	4%	4%	4%	5%	5%	5%										
900	4%	4%	5%	5%	5%	5%	5%	6%									
800	5%	5%	5%	5%	5%	5%	6%	6%	6%								
700	5%	5%	5%	5%	5%	5%	6%	6%	6%	6%							
600	5%	5%	5%	5%	6%	6%	6%	6%	6%	7%	7%						
500	6%	6%	6%	6%	6%	6%	7%	7%	7%	7%	7%	8%					
400	6%	6%	6%	6%	7%	7%	7%	7%	7%	7%	8%	8%	8%				
300	7%	7%	7%	7%	7%	8%	8%	8%	8%	8%	8%	9%	9%	10%			
200	9%	9%	9%	9%	9%	9%	9%	9%	9%	10%	10%	10%	10%	11%	12%		
100	12%	12%	12%	12%	12%	12%	12%	13%	13%	13%	13%	13%	13%	14%	15%	17%	
50	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	18%	18%	18%	19%	21%	24%

Table 9: Recommended Allowances for Sampling Error of a Difference between Percentages near 20% or 80%
(at 95% confidence level, *deff*=1.75)

Sample Size	4000	3500	3000	2500	2000	1500	1000	900	800	700	600	500	400	300	200	100	50
4000	2%																
3500	2%	2%															
3000	3%	3%	3%														
2500	3%	3%	3%	3%													
2000	3%	3%	3%	3%	3%												
1500	3%	3%	3%	3%	4%	4%											
1000	4%	4%	4%	4%	4%	4%	5%										
900	4%	4%	4%	4%	4%	4%	5%	5%									
800	4%	4%	4%	4%	4%	5%	5%	5%	5%								
700	4%	4%	4%	4%	5%	5%	5%	5%	5%	6%							
600	5%	5%	5%	5%	5%	5%	5%	5%	6%	6%	6%						
500	5%	5%	5%	5%	5%	5%	6%	6%	6%	6%	6%	7%					
400	5%	5%	6%	6%	6%	6%	6%	6%	6%	7%	7%	7%	7%				
300	6%	6%	6%	6%	6%	7%	7%	7%	7%	7%	7%	8%	8%	8%			
200	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	9%	9%	9%	10%		
100	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	12%	12%	13%	15%	
50	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	16%	16%	16%	18%	21%

Table 10: Recommended Allowances for Sampling Error of a Difference between Percentages near 10% or 90%
(at 95% confidence level, *deff*=1.75)

Sample Size	4000	3500	3000	2500	2000	1500	1000	900	800	700	600	500	400	300	200	100	50
4000	2%																
3500	2%	2%															
3000	2%	2%	2%														
2500	2%	2%	2%	2%													
2000	2%	2%	2%	2%	2%												
1500	2%	2%	2%	3%	3%	3%											
1000	3%	3%	3%	3%	3%	3%	3%										
900	3%	3%	3%	3%	3%	3%	4%	4%									
800	3%	3%	3%	3%	3%	3%	4%	4%	4%								
700	3%	3%	3%	3%	3%	4%	4%	4%	4%	4%							
600	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%						
500	4%	4%	4%	4%	4%	4%	4%	4%	4%	5%	5%	5%					
400	4%	4%	4%	4%	4%	4%	5%	5%	5%	5%	5%	5%	6%				
300	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	6%	6%	6%	6%			
200	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	7%	7%	7%	8%		
100	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	9%	9%	9%	10%	11%	
50	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	12%	12%	12%	12%	13%	16%