



NATIONAL CENTER FOR HEALTH STATISTICS

Quality Profile

Round 4: Data collected April-May 2024



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Introduction

The National Center for Health Statistics (NCHS) Rapid Surveys System (RSS) is a platform that utilizes commercially available probability-based online panels to provide time-sensitive data about emerging and priority health concerns. RSS data differ in quality from NCHS' traditional household surveys and findings should be interpreted within this context. This quality profile reports on various aspects of data quality and provides transparency to data users about data collection, processing, and methodological limitations that may increase the risk of bias in RSS estimates. The quality profile is organized by various components of the data quality including data collection, data processing, weighting, and benchmarking.

RSS Round 4 (RSS-4) featured data collection from two commercial panels, which are referred to anonymously as Panel 1 and Panel 2 in this report. A separate document, the Round 4 Survey Description, which provides detailed information on the data collection weighting methodologies, recoding, and other data processing components is available at: <http://www.cdc.gov/nchs/data/rss/round4/survey-description.pdf>.

Data Collection

Sampling and Data Collection Dates

The target population of RSS-4 is U.S. adults ages 18 and older. Each panel provider drew a sample from their respective panels for RSS-4. Table 1 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) presents the targeted sample size, the number of persons sampled, and the number of respondents, overall and by panel provider. The target number of completed surveys was 4,000 for Panel Provider 1 and 4,000 for Panel Provider 2. To achieve the targeted number of completed interviews, samples of 8,129 (Panel Provider 1) and 5,846 (Panel Provider 2) adult panelists were drawn.

Data collection commenced on April 25, 2024, and finished on May 20, 2024, for Panel Provider 1. Data collection for Panel Provider 2 started on April 24, 2024, and finished on May 20, 2024. Of the 4,563 fully completed interviews for Panel Provider 1, 384 were completed by computer-assisted telephone interviewing (CATI), while all other completed interviews were self-administered via computer-assisted web interviewing (CAWI). For Panel Provider 2, all 4,142 interviews were completed via CAWI.

Response and Completion Rates

The survey completion rates shown in Tables 2 and 3 are based on American Association for Public Opinion Research (AAPOR) Response Rate Definition #5 or AAPOR RR5 (AAPOR, 2023), and reflect the percent of sample members who completed the survey. All panelists selected for the survey, for both panels, were deemed eligible to participate. Note that survey completes exclude any cases removed for data quality reasons (e.g., speeding, excessive item nonresponse).

The unweighted, combined survey completion rate for RSS-4 was 62.3%. Rates by panel provider slightly differed: 56.1% for Panel Provider 1 and 70.9% for Panel Provider 2 (Table 2, Quality profile tables, www.cdc.gov/nchs/rss/access.html). Panel Provider 1 had a higher survey completion rate in RSS-4 compared to previous rounds of RSS as the Panel Provider 1 sample was limited to include panelists who had participated in at least one survey in the past 12 months, while prior round samples included inactive panelists. A comparison of active and inactive panelists will be released in a forthcoming appendix to this report.

Final cumulative response rates (AAPOR CUMRR1) for RSS-4 are also shown in Table 2. Panel providers 1 and 2 compute the cumulative response rate differently. For Panel Provider 1, the final cumulative response rate of 9.9% is the product of a household panel recruitment rate, a household panel retention rate, and the RSS-4 survey completion rate. The final cumulative response rate for Panel Provider 2 was 4.1% and is the product of a household panel recruitment rate, a household profile rate, and the RSS-4 survey completion rate. (See Table 2 for definitions of household panel recruitment rate, household panel retention rate, and household profile rate.)

Unweighted completion rates, overall and by select demographic characteristics, are presented in Table 3 (Quality profile tables, www.cdc.gov/nchs/rss/access.html). Note that the subsequent comparisons of completion rates by panel provider were not subjected to tests for statistical significance. While completion rates were consistently higher for Panel Provider 2, patterns of completion rates by demographics were similar across the panel providers. For example, adults 65 years of age and older generally had the highest completion rate of all age groups for both providers, while adults aged 18-24 generally had the lowest completion rate. Differences in completion rates by race and Hispanic origin were observed for both providers, with completion rates generally higher among White, non-Hispanic adults and lower among Hispanic adults. Differences in completion rates by educational attainment and urbanization level were also observed for both panel providers. Adults with less than a high school diploma or a GED tended to have lower completion rates than adults in other education groups, while nonmetropolitan adults tended to have higher completion rates than metropolitan adults, although the difference for Panel Provider 2 was small (1 percentage point). Finally,

completion rates by sex differed by panel provider, with females generally completing the survey at a higher rate than males for Panel Provider 1, while males tended to complete the survey at a higher rate than females for Panel Provider 2.

Survey Duration

As shown in Table 4 (Quality profile tables, www.cdc.gov/nchs/rss/access.html), the median survey completion time among respondents who completed interviews in 60 minutes or less in one visit to the survey instrument was 11.5 minutes for Panel Provider 1, while the median completion time for Panel Provider 2 was 11.8 minutes. Completion times were only evaluated among respondents who completed interviews in 60 minutes or less in a single visit, as survey durations were calculated from the initial entry into the instrument until the survey was submitted, which could be over multiple hours or days for respondents who return to the instrument at another time. Completions in 60 minutes or less in a single visit accounted for 85.9% of all completed surveys. Section times were largely consistent between panel providers, with only three sections having a median completion time of longer than 1 minute (emerging coercive control (ECC); sexual violence – split 1 (SVA); and sexual violence – split 2 (SVB)). No section, for either panel provider, had a median completion time of 2 minutes or greater. A complete list of all questionnaire sections can be found here: www.cdc.gov/nchs/data/rss/round4/questionnaire.pdf.

Survey Breakoffs

Survey breakoffs for RSS-4 were defined as starting, but not fully completing, the survey. Panelists who broke off and did not fully complete the survey were considered nonrespondents for response and completion rate calculations and were not included on the final datafile. Overall, breakoffs were minimal across the two panel provider surveys. There was a total of 104 breakoffs (out of 4,667 panelists who started the survey) in the Panel Provider 1 survey, representing a breakoff rate of 2.2%, while 159 panelists (out of 4,301) broke off the Panel Provider 2 survey for a breakoff rate of 3.7% (Table 5, Quality profile tables, www.cdc.gov/nchs/rss/access.html).

The number and percentage distribution of breakoffs by section for each panel provider and combined are presented in Table 5. The questionnaire section producing the largest percentage of breakoffs for both panel providers was the introductory portion of the survey up through the first question on self-reported health status (HIS; Panel Provider 1 = 18.3%; Panel Provider 2 = 32.7%). Other notable producers of breakoffs were the health insurance section (EMP) for Panel Provider 1 (11.5%); sexual violence (split 1) for both providers (SVA; Panel Provider 1 = 8.7%; Panel Provider 2 = 8.8%); and difficulty with vision, hearing, communication, and cognition (DIS; 7.7%), and social and work limitations (SOC; 7.7%) for Panel Provider 1.

Item Nonresponse

Item nonresponse for RSS-4 was defined as don't know or refused responses entered by interviewers in the CATI mode, as well as skipping a question for which the panelist was eligible (soft refusal) in CAWI. Table 6 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) summarizes the number and percent of questions by level of item nonresponse. Of the 178 survey items, just over half had an item nonresponse rate of less than 1% for Panel Provider 1 (50.6%), Panel Provider 2 (55.1%), and in the combined file (52.2%). Panel Provider 1 had three questions (1.7%) with item nonresponse of 5% to less than 10%, while Panel Provider 2 had zero questions in this range. Combined, there were zero questions with item nonresponse of 5% to less than 10%. However, each panel provider had 12 questions (6.7%) with item nonresponse greater than 10%, which was also observed in the combined file.

Table 7 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) provides more detailed item nonresponse rates for the panel providers by questionnaire section (www.cdc.gov/nchs/data/rss/round4/questionnaire.pdf). Overall, item nonresponse averaged 1.3% per item in the combined datafile, 1.3% for Panel Provider 1 and 1.2% for Panel Provider 2 (Table 7, TOTAL row).

For both panel providers, the health insurance (EMP; 4.5% for Panel Provider 1, 2.7% for Panel Provider 2) and traumatic brain injury (TBI; 3.7% for Panel Provider 1, 3.0% for Panel Provider 2) sections had the highest item nonresponse rates. In addition, the sexual violence (split 1; SVA) section produced an item nonresponse rate of 2.3% for Panel Provider 2. All other sections produced item nonresponse rates of 1.8% or less for both panel providers.

For the combined dataset, 12 questions had an item nonresponse rate over 10%, with all coming from the TBI section and all focused on symptoms one might experience after a head or face injury. From lowest to highest item nonresponse, the items include: TBI_KNOCKOUT (12.5%; knocked out or lost consciousness, even briefly); TBI_HEADACHE (12.9%; headache); TBI_REMEMBER (15.1%; difficulty remembering); TBI_SICK (15.1%; felt sick to the stomach or vomited); TBI_DIZZY (15.2%; ever a time when dizzy, clumsy, or had balance problems); TBI_LEARN (15.5%; difficulty learning or remembering new things); TB_MOOD (16.4%; change in mood or temperament such as irritability); TBI_VISION (16.6%; blurred or double vision or other vision problems); TBI_SENSE (17.7%; more sensitive than usual to either light or noise); TBI_SLEEP (19.3%; trouble sleeping or more tired than usual); TBI_CONCEN (19.7%; trouble concentrating); and TBI_DAZED (19.8%; dazed, confused, or had trouble thinking straight).

The primary concern with high item nonresponse is the risk of nonresponse bias, which leads to biased survey estimates (Yan, 2021). Item nonresponse also increases the variance of a point estimate since the observed sample size is smaller than initially planned. For items with moderate to high item nonresponse (e.g., rates > 5%), data users may want to compare item nonrespondents to those who responded using other, more complete, sociodemographic and health variables on the file. If differences exist, the point estimate for the item under investigation may be biased. Data users may want to consider imputing the missing values or at least reporting the potential for bias in the estimate derived from the variable.

Summary

- Both panel providers exceeded their completion targets for RSS-4: Panel Provider 1 (target=4,000, completes=4,563) and Panel Provider 2 (target=4,000, completes=4,142). As a result, the final combined sample (n=8,656) exceeded the targeted number of completed interviews by 656 respondents.
- Panel Provider 2 had a higher overall completion rate than Panel Provider 1. However, similar patterns of completion rates were observed for both providers by select demographic characteristics such as age, race and Hispanic origin, educational attainment, and urbanization level.
- Survey completion time was largely consistent between the two panels, overall and by questionnaire section.
- Survey breakoff rates were low for both providers, albeit higher for Panel Provider 2. The questionnaire section producing the largest percentage of breakoffs for both panel providers was the introductory portion of the survey up through the first question on self-reported health status (HIS). The sexual violence (split 1; SVA) section also produced a large percentage of breakoffs for both panel providers, while the health insurance (EMP) section, the difficulty with vision, hearing, communication, and cognition (DIS) section, and the social and work limitations (SOC) section were large producers of breakoffs for Panel Provider 1.
- Item nonresponse rates were low for both panel providers, with over 50% of items having an item nonresponse rate of less than 1%, and over 90% of items having an item nonresponse rate of less than 5%. However, 12 items in the combined dataset had a double-digit item nonresponse rate, all located in the traumatic brain injury (TBI) section. As noted previously, data users may want to investigate these items further for potential nonresponse bias.

Question Evaluation

For RSS-4, cognitive interviews for several sections were conducted after the survey was fielded. Because of this, cognitive interviews should be understood as an examination of the RSS-4 items' construct validities, or how well a question captures the intended measurement, rather than as a method to evaluate question wording. The cognitive interviewing report, including a question-by-question analysis, will be available in Fall 2024 on the RSS Data Files and Documentation page (<https://www.cdc.gov/nchs/rss/data.html>) and on Q-Bank (<https://wwwn.cdc.gov/qbank>). Data users should consult this report to understand what information the survey questions captured and to frame their own analysis of the RSS-4 data.

Data Processing

Removed Interviews

Both panel providers applied standardized data cleaning procedures to the set of completed interviews to remove low-quality responses. Speeders and respondents with high refusal rates were removed. Speeders are defined as those who completed the survey in or less than one-quarter of the median duration and respondents with high refusal rates are those who skipped or refused to respond to more than 50% of the eligible questions. Table 8 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) reports the total speeders and respondents with high refusal rates as well as the percent of interviews removed by panel provider.

Harmonization

Data harmonization was performed to align the variables provided by the two panel providers. Harmonization includes aligning the variable labels and corresponding code for responses across the two panel providers as well as aligning the variable types. Discrepancies between variables submitted by the two panel providers were resolved during harmonization. One discrepancy that occurred in RSS-4 was related to the urban and rural coding. In previous rounds, the NCHS coding scheme for assigning urban and rural was applied to the provided Federal Information Processing Standards (FIPS) codes from the panel providers to determine metropolitan status. However, due to a change in the FIPS codes for Panel Provider 2, the NCHS urban-rural coding scheme was unable to be applied for certain records. In those cases, the provided metropolitan status information from the panel provider was used to logically impute metropolitan status.

Imputation

Variables used for weighting adjustments were imputed prior to weighting in two stages. First, the panel providers imputed variables needed for their own weighting procedures. Panel Provider 1 imputed missing panel data first logically, if household or other information was available, and then used hot deck imputation. Panel Provider 2 used hot deck imputation for imputing missing values in panel data. Second, after the data were delivered to NCHS, remaining panel and non-panel variables required for weight calibration to the National Health Interview Survey (NHIS) were imputed for respondents using conditional mean imputation. The weighting procedures to calibrate each panel provider's weights to NHIS totals on the selected variables are described in the Survey Description: www.cdc.gov/nchs/data/rss/round4/survey-description.pdf.

Table 9 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) reports the percent of missing values imputed in the two stages. While imputed values for the variables from the second stage imputation are not reflected on the data file, values imputed by the panel providers in the first stage appear on the data file. The corresponding imputation flags can be used to identify imputed values. Data users should consider the potential underlying measurement error of these variables when using them in analyses.

The imputed variables were used only for weighting to the NHIS. No other variables were imputed in the RSS-4 data.

Summary

- Data cleaning procedures were applied to remove low-quality responses. Overall, 1.3% of RSS-4 records were removed due to speeders or respondents with high refusal rates.
- Data from the two panel providers were harmonized prior to release. A change in the FIPS code for one panel provider resulted in a different approach for determining metropolitan status, which will be harmonized in future rounds of RSS.
- Variables were imputed by the panel providers for their internal weighting procedures and in post-processing for weighting to the NHIS. The percent of values imputed ranged from 0.0% to 5.2%. Imputation flags can be used to identify imputed values in the data file.

Weighting

At the conclusion of data collection, each panel provider developed final study weights that included calibration to select population control totals. Note that control totals varied somewhat by panel provider. Panel Provider 1, for example, calibrated to February 2024 Current Population Survey (CPS) estimates for age, sex, race and Hispanic origin, educational attainment, and Census division. Panel Provider 2 calibrated to age, sex, race and Hispanic origin, education, household income, language proficiency, Census region, and metropolitan statistical area (MSA) status. The weighted control total for language proficiency came from the 2022 American Community Survey (ACS), while all other totals were obtained from the March 2023 Annual Social and Economic (ASEC) Supplements to the CPS.

Next, each of the RSS-4 panel provider weights were separately calibrated to control totals based on the 2023 Quarter 4 NHIS Early Release (ER) Datafile for adults and then combined. In total, 12 variables producing 32 control totals were included in this weight calibration step (see Table 10). In addition to standard sociodemographic measures (age, sex, race and Hispanic origin, educational attainment, household income, employment status, region, and urbanization level), questions on ever diagnosed with high cholesterol, difficulty participating in social activities, any health information technology use, and adult has a working cell phone were added to the RSS-4 questionnaire specifically for calibration to NHIS control totals. The larger literature on coverage and nonresponse error associated with probability-based panels, as well as a special working group of the NCHS Board of Scientific Counselors, suggested adding non-demographic questions, such as measures of technology use and civic engagement, to the NHIS and other NCHS flagship surveys for panel weight calibration, given potential over-representation of certain individuals on panels (for example, panelists with higher technology use or civic engagement) (Mercer and Lau, 2023; Peytchev, 2022). Similarly, prior research with the NCHS Research and Development Survey (RANDS), conducted with NORC's AmeriSpeak Panel, has shown the utility of adding health questions to RANDS questionnaires for calibrating RANDS weights to NHIS control totals, thereby reducing nonresponse and coverage bias in RANDS health-related estimates (Irimata et al., 2023).

The complete set of calibration variables is available in the codebook: www.cdc.gov/nchs/data/rss/round4/codebook.pdf. A complete description of the weighting methodology for RSS-4 can be found here: www.cdc.gov/nchs/data/rss/round4/survey-description.pdf.

Panel Composition Prior to Calibration Weighting

Table 10 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) presents 2023 Quarter 4 NHIS ER estimates (32 estimates based on 12 calibration variables) that served as population control totals for calibration of RSS-4 panel provider weights. Also presented are panel provider estimates for the same calibration variables, but *prior* to calibration to NHIS control totals.

For most estimates presented in Table 10, differences between each panel provider and the NHIS were 3 percentage points or less. This can be attributed, in part, to each panel provider using a similar mix of calibration variables to the NHIS (e.g., age, sex, race and Hispanic origin, educational attainment, region, and urbanization level) in development of their final study weights. Minor differences observed between the panel provider and NHIS estimates for these variables are likely due to differences in the source and time period used for obtaining the control totals. For example, the NHIS used U.S. Census Bureau population projections and 2021 ACS estimates for control totals for calibration of 2023 Quarter 4 NHIS ER weights, while, as noted above, the panel providers primarily used CPS totals from the 2023 March ASEC Supplements or February 2024 survey in development of their final RSS-4 study weights.

Differences greater than 3 percentage points were observed for estimates of total household income, any health information technology (HIT) use, and ever diagnosed with high cholesterol for both panel providers, as well as employment status for Panel Provider 1 and age group for Panel Provider 2. Adults from households with incomes less than \$50,000 were over-represented in Panel 1 (38.3%) and under-represented in Panel 2 (26.4%), relative to the NHIS (30.9%). At the upper end of the income distribution, adults with household incomes of \$100,000 or more are under-represented in Panel 1 (29.1%) and over-represented in Panel 2 (45.2%) compared with NHIS adults (39.0%). Users should note the difference in income definitions among the three data sources which could contribute to the difference in the estimates. Panel Provider 1 collects total household income for the prior calendar year, while Panel Provider 2 collects total household income for the past 12 months. The NHIS collects total family income for the prior calendar year, which includes households with more than one family residing in the household (97.6% of sample adults in the 2023 Quarter 4 NHIS ER adult dataset resided in single-family households).

In addition, a greater percentage of RSS-4 adults reported any HIT use (Panel Provider 1=84.7%; Panel Provider 2=85.9%) and ever being diagnosed with high cholesterol (Panel Provider 1=38.4%; Panel Provider 2=33.0%) compared with NHIS adults (69.6% and 28.5%, respectively). The only remaining differences greater than 3 percentage points were panel provider- specific. Relative to the NHIS, employed adults are under-represented in Panel 1 compared to the NHIS (59.9% versus 64.1%) and

adults 50-64 years of age are over-represented in Panel 2 compared to the NHIS (26.9% versus 23.8%).

When comparing panel provider estimates to each other, differences greater than 3 percentage points were observed for age group, employment status, total household income, and ever diagnosed with high cholesterol. Compared with Panel Provider 1 adults, a greater percentage of Panel Provider 2 adults reported being ages 50-64 (26.9% vs. 23.8%, $p < 0.01$) and employed (63.2% vs. 59.9%, $p < 0.01$), while a greater percentage of Panel Provider 1 adults reported ever being diagnosed with high cholesterol compared with Panel Provider 2 adults (38.4% vs 33.0%, $p < 0.01$). Finally, Panel Provider 2 adults were skewed toward higher household incomes, with 45.2% of Panel Provider 2 adults having household incomes greater than \$100,000 compared with 29.1% of Panel Provider 1 adults ($p < 0.01$).

Post Calibration Weighting Evaluations

Table 11 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) reports the population control totals from the NHIS and the estimates and standard errors of the calibration variables after calibration weighting. Post calibration, all calibration variable estimates aligned with NHIS control totals for both panel provider weights.

Table 12 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) provides a summary of significant adjustment factors (p -value of F statistic < 0.05) by panel provider. The results show that more than random chance was involved in calibrating both panel providers' respondent samples to NHIS control totals.

As expected, based on the differences shown in Table 10, any HIT use and ever diagnosed with high cholesterol each had a significant influence on the calibration of each panel provider's weights. Adults with a working cell phone also had a significant impact on weight calibration for each provider, although differences with the NHIS shown in Table 10 were relatively small (2.2% or less). As previously noted, questions behind these three measures were added to the RSS-4 questionnaire for weight calibration. Income also had a significant impact on the calibration of panel provider weights to NHIS control totals, which is consistent with the observed differences in income distributions between the NHIS and the panel providers (see Table 10). Age, sex, educational attainment, and employment status had a significant impact on calibration of both providers weights. This is less consistent with the pattern of differences shown for the other calibration variables. Both providers calibrated their panel study weights to age and sex control totals from the CPS. The age distribution for Panel Provider 1, for example, was nearly identical to the age distribution of the NHIS prior to calibration to NHIS control totals. Differences between age for Panel Provider 2 and the NHIS were somewhat larger, but absolute differences were still 3.1 percentage

points or less. Similarly, the distribution of sex between the NHIS and each panel provider was consistent.

Race and Hispanic origin also had a significant impact on calibration to NHIS control totals for Panel Provider 1. Race and Hispanic origin was used in the weight calibration step for production of Panel Provider 1's study weights, making its influence, like age and sex, more difficult to understand. It is possible that different sources and time periods for control totals may explain some of the impact of these variables.

Table 13 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) reports selected descriptive statistics for the calibration adjustment factors for both panel providers. The adjustment factors for Panel Provider 2 were less variable, ranging from 0.117 to 2.751, compared with 0.042 to 2.858 for Panel Provider 1. A standard deviation of 0.599 was observed for Panel Provider 1 weights post-calibration, while the corresponding figure for Panel Provider 2 weights was 0.504. While larger adjustment factors were necessary for Panel Provider 1, adjustment factors were relatively small overall. No capping of adjustment factors or trimming of weights was necessary.

As noted in the RSS-4 Survey Description (www.cdc.gov/nchs/data/rss/round4/survey-description.pdf), the panel provider calibrated weights were combined into a final RSS-4 weight using a compositing factor based on the ratio of effective sample sizes. Table 14 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) shows the sample size, effective sample size, and composite factors (0.434 for Panel Provider 1 and 0.566 for Panel Provider 2) for both panel providers.

Table 15 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) presents descriptive statistics for the panel provider calibrated weights (P1_CALWT and P2_CALWT) and for the final, combined weight (WEIGHT). Focusing on the final combined weight, weight values ranged from 199 (minimum) to a maximum weight value of 289,017. The coefficient of variation was 87.72, producing a design effect of 1.77.

Impact of Calibration Weighting

While the panel provider final study weights are adjusted to population demographics, the calibration weighting to the NHIS controls for additional factors including ever diagnosed with high cholesterol, difficulty participating in social activities, and civic engagement. The impact of the calibration weighting was assessed by measuring the absolute bias of RSS estimates using the panel study weights and the final NHIS-calibrated weights compared with the 2023 Quarter 4 NHIS ER adult datafile for a set of benchmarking variables (see more details in the *Benchmarking* section

below). The absolute bias and standardized bias of the benchmarking variables based on the panel study weights and the final calibrated weights are reported by panel provider in Table 16 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) and the standardized bias is displayed in Figure 1. Standardized bias is computed for percentages as

$$|estimate_{panel} - estimate_{NHIS}| / \sqrt{estimate_{NHIS} * (100 - estimate_{NHIS})}$$

and for continuous variables as

$$|estimate_{panel} - estimate_{NHIS}| / (SE_{NHIS} * \sqrt{n_{NHIS} / deff_{NHIS}})$$

Of the 37 benchmark variables assessed, 28 had lower standardized and absolute bias using the final calibrated weights compared with the panel study weights for Panel Provider 1 while 18 had lower standardized and absolute bias compared with the panel study weights for Panel Provider 2. The magnitude of impact of the calibration weighting varied by panel provider, with larger decreases in bias seen for Panel Provider 1. While the bias for most benchmark variables decreased after calibration to the NHIS for Panel Provider 1, about half of the benchmark variables had an increase in bias as a result of calibration weighting for Panel Provider 2. Nine benchmark variables had an increase in bias compared to the NHIS for Panel Provider 1 while 19 benchmark variables had an increase in bias for Panel Provider 2. The measures with increased bias were from a range of health domains, with most of the measures in the healthcare access domain (4 measures) for Panel Provider 1 and in the disability domain (6 measures) for Panel Provider 2.

Summary

- Pre-calibration differences between panel provider estimates and NHIS estimates greater than 3 percentage points were observed for the following calibration variables for both panel providers: household income, any HIT use, and ever diagnosed with high cholesterol. Differences greater than 3 percentage points were also observed for estimates of employment status (Panel Provider 1) and age group (Panel Provider 2).
- Post calibration, all calibration variable estimates aligned with NHIS control totals for both panel provider weights.
- Adjustment factors were small for both panel providers, maxing out at 2.858 for Panel Provider 1. As a result, there was no need to cap adjustment factors or trim the weights.

- Overall, calibration weighting resulted in lower bias for most of the benchmark variables compared to the NHIS for Panel Provider 1 (28 variables) and for half of the benchmark variables for Panel Provider 2 (18 variables). Benchmark variables that had an increase in bias after calibration weighting were from a range of health domains, with most of the measures in the healthcare access domain (Panel Provider 1) and disability domain (Panel Provider 2). The calibration weighting procedure is evaluated in each round of RSS to improve bias reduction in the benchmarking estimates.
- The impact of the calibration weighting varied by panel provider, with larger decreases in bias seen for Panel Provider 1.

Benchmarking

On each round of RSS, a set of questions is included for the purpose of benchmarking to assess the bias of RSS estimates compared to other data sources. In RSS-4, questions from the 2023 NHIS measuring disability, health behaviors, health status, healthcare access, healthcare utilization, and social determinants of health were included for benchmarking. The complete set of benchmarking questions is available in the codebook: www.cdc.gov/nchs/data/rss/round4/codebook.pdf.

RSS benchmark variables measuring 37 health outcomes were compared to the 2023 Quarter 4 NHIS to evaluate the bias of estimates of health variables and domains in the RSS. The absolute and standardized bias was calculated for each benchmark variable and is reported in Table 17 (Quality profile tables, www.cdc.gov/nchs/rss/access.html). The standardized biases of the benchmark variables are displayed in Figure 2.

The absolute bias ranged from 0.02 percentage points (hearing difficulty (a lot of difficulty, cannot do at all)) to 16.24 percentage points (did difficulty begin before age 22?) and varied by topic. The standardized bias ranged from nearly 0 to 0.42 for the 37 health measures evaluated, with 26 measures having low bias (standardized bias less than 0.10), 10 measures having medium bias (standardized bias ranging from 0.10 to 0.30), and 1 measure having high bias (standardized bias ranging from 0.30 to 0.50) (Irimata et al., 2023).

To compare the accuracy of RSS by health domain, the average standardized bias of the benchmark variables was calculated for six health domains: Disability; Health Behaviors; Health Status: Chronic Health Conditions; Health Status: Mental and Self-

Rated Health; Healthcare Access; and Healthcare Utilization. Table 18 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) reports the average absolute bias and average standardized bias by health domain. Average standardized bias was calculated as the mean of the standardized biases of the benchmark variables in each health domain. Figure 3 displays the average standardized bias by health domain. The average standardized bias ranged from 0.02 (Health Behaviors) to 0.10 (Health Status: Mental and Self-Rated Health). Five health domains had standardized biases less than 0.10 (low bias), with only Health Status: Mental and Self-Rated Health categorized as having medium bias, on average.

Summary

- The absolute bias of the selected benchmark variables compared to the NHIS ranged from 0.02 to 16.24 with most variables reporting an absolute bias of less than 3 percentage points.
- Among the 37 health measures evaluated, 27 measures had low standardized bias, 9 measures had medium standardized bias, and 1 measure had high standardized bias.
- The average standardized bias of estimates from RSS-4 compared to the NHIS varied by health domain. On average, five health domains had low bias (Disability, Health Behaviors, Health Status: Chronic Health Conditions, Healthcare Access, and Healthcare Utilization) and one health domain had medium bias (Health Status: Mental and Self-Rated Health).
- Health estimates from the RSS differ in quality from traditional NCHS household surveys used to make official statistics and should be interpreted within the quality evaluation presented in this report. While most health outcomes were reported with low bias, the mental and self-rated health domain had notable bias compared to the NHIS.

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Figure 1. Standardized bias of panel study and final calibrated weights for benchmarking variables by panel provider compared to the 2023 Quarter 4 National Health Interview Survey: Rapid Surveys System Round 4

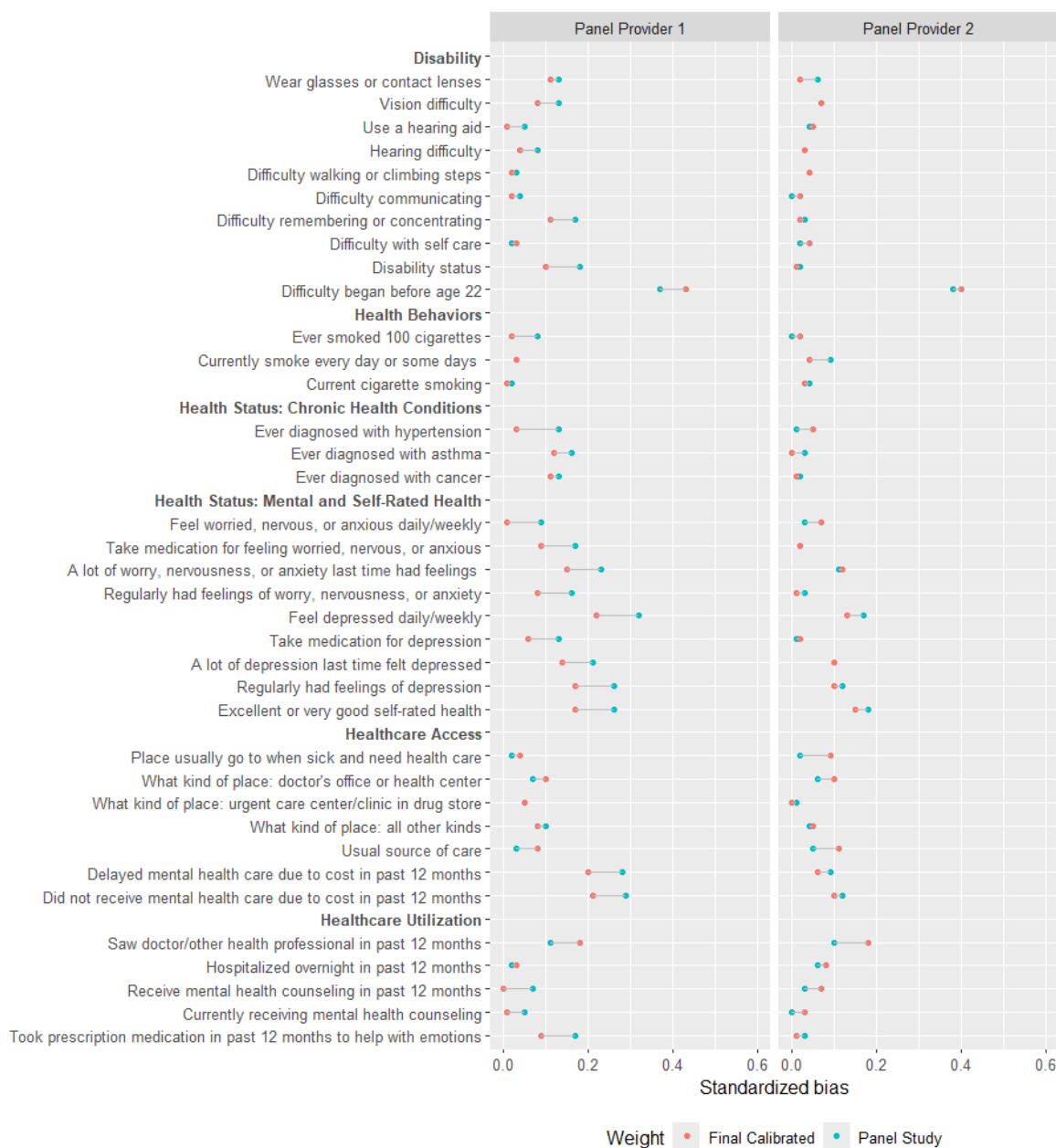
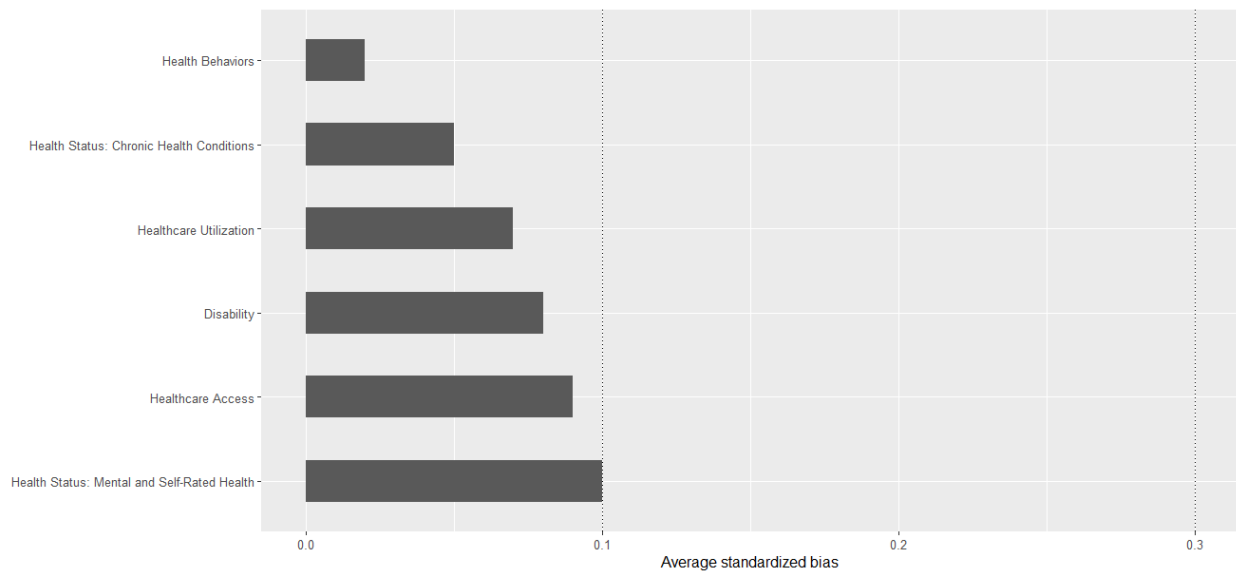


Figure 2. Standardized bias of benchmarking variables compared to the 2023 Quarter 4 National Health Interview Survey: Rapid Surveys System Round 4



Figure 3. Average standardized bias by health domain compared to the 2023 Quarter 4 National Health Interview Survey: Rapid Surveys System Round 4



Suggested citation

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