NCHS Rapid Surveys System

Quality Profile

Round 5: Data collected July 2024

Last revised November 26, 2024

Persons with disabilities experiencing problems accessing PDF files should contact nchsed@cdc.gov or call 301-458-4688

CDC
U.S. CENTERS FOR DISEASE CONTROL AND PREVENTION

Table of contents

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 5 (RSS-5) 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 5 Survey Description, which provides detailed information on the data collection, weighting methodologies, recoding, and other data processing components is forthcoming and will be available at: http://www.cdc.gov/nchs/data/rss/round5.

Data Collection

Sampling and Data Collection Dates

The target population of RSS-5 is U.S. children ages 17 and younger. Each panel provider drew a sample of U.S. adults ages 18 and older from their respective panels for RSS-5. Panelists eligible to participate were adult parents and legal guardians of children living in the same household. One panel member per household was selected to participate and complete a household roster. The household roster was used to identify all children under the age of 18 living in the household and whether the panel respondent was a parent or legal guardian of any identified children. If both criteria were met, one child was randomly selected and the eligible panelist was invited to complete the main survey about this child. Otherwise, the interview terminated. Table 1 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) presents the targeted sample size, the number of panelists sampled, as well as the number of completed household rosters, eligible panelists, and completed main interviews, 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. Both panel providers drew two samples, a main sample of adult panelists where profile data indicated that at least one child aged 0-17 resided in the household and a supplemental sample of panelists where there was no indication that a child resided in the household, or the information was missing. The supplemental

sample was designed to capture newborns, adopted children, and other living arrangements where children were added to the household since the last collection of profile data. Samples of 57,332 (Panel Provider 1) and 17,704 (Panel Provider 2) adult panelists were drawn and of the completed household rosters, 4,375 panelists from Panel Provider 1 and 4,258 panelists from Panel Provider 2 were deemed to be eligible.

Data collection commenced on July 1, 2024, and finished on July 29, 2024, for Panel Provider 1. Data collection for Panel Provider 2 started on July 8, 2024, and finished on July 31, 2024. Of the 4,166 fully completed interviews for Panel Provider 1, 43 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 3,935 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 #3 or AAPOR RR3 (AAPOR, 2023), and reflect the percent of sample members who completed the survey. Panelists selected for the survey, for both panels, were deemed eligible to participate based on their responses to questions in the household roster. A panelist needed to be a parent or legal guardian of at least one child, age 0-17, residing in the household. Based on these criteria, Panel Provider 1 had an eligibility rate of 25.3% (4,375 eligible panelists) and Panel Provider 2 had an eligibility rate of 34.0% (4,258 eligible panelists). 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-5 was 37.3%. Rates by panel provider differed considerably: 28.7% for Panel Provider 1 and 65.4% for Panel Provider 2 (Table 2, Quality profile tables, www.cdc.gov/nchs/rss/access.html). Note that Panel Provider 1 sampled a larger number of panelists to screen for parent/legal guardian eligibility compared to Panel Provider 2 (57,332 vs 17,704) and had a lower household roster completion rate (30.1% vs 70.8%). This resulted in a lower survey completion rate for Panel Provider 1.

Final cumulative response rates for RSS-5 are also shown in Table 2. Panel Provider 1 had a cumulative response rate of 4.9 percent and Panel Provider 2 had a cumulative response rate of 3.8 percent. The panel providers compute the cumulative response rate differently. For Panel Provider 1, the cumulative response rate of 4.9% is the product of a household panel recruitment rate, a household panel retention rate, the RSS-5 household roster completion rate, and the RSS-5 main interview completion rate. The final cumulative response rate of 3.8% for Panel Provider 2 is the product of a

household panel recruitment rate, a household panel profile rate, the RSS-5 household roster completion rate, and the RSS-5 main interview completion rate. See Table 2 for definitions of the response rates and differences in the calculations for the two panel providers. For more information on computing cumulative response rates for online probability-based panel surveys, see Callegaro and DiSogra (2008).

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 panelist 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 18-34 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, followed by Asian, non-Hispanic adults, Black, non-Hispanic adults, and Hispanic adults. Differences in completion rates by educational attainment and sex 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 males tended to have higher completion rates than females, although the difference for Panel Provider 1 was less than 1 percentage point. Finally, completion rates by urbanization level differed by panel provider, with adults in metropolitan areas generally completing the main interview at a higher rate than nonmetropolitan adults for Panel Provider 2 (albeit the difference was six-tenths of a percentage point), while nonmetropolitan adults tended to complete the main interview at a higher rate than metropolitan adults for Panel Provider 1.

Survey Duration

Median completion times for the household roster were comparable between the two panel providers: Panel Provider 1 = 1.7 minutes, Panel Provider 2 = 1.4 minutes. While the household roster took slightly longer to complete for Panel Provider 1 respondents, the main interview (after completion of the household roster) took about a minute longer for Panel Provider 2 respondents to complete. 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 13.8 minutes for Panel Provider 1, while the median completion time for Panel Provider 2 was 14.8 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 80.0% of all completed household rosters and 76.6% of all completed main interviews. Section times were largely consistent between panel providers, with only three sections having a median completion time of longer than 1 minute: child access/utilization (CAU); positive childhood experiences (PCE); and attitudes on childhood vaccines (VAX).

Survey Breakoffs

Survey breakoffs for RSS-5 could occur in two locations: the household roster or the main interview. A household roster breakoff was defined as a panelist starting, but not fully completing, the household roster. Similarly, a main interview breakoff was defined as a panelist starting, but not fully completing, the main interview. Breakoffs in either the household roster or the main interview survey were considered nonrespondents for response and completion rate calculations and were not included on the final datafile.

Focusing on the household roster, 17,483 Panel Provider 1 panelists started the roster, with 298 panelists breaking off before completion, for a household roster breakoff rate of 1.7%. For Panel Provider 2, 12,835 panelists started the roster, while 401 panelists broke off, resulting in a household roster breakoff rate of 3.1%. The combined household roster breakoff rate was 2.3%.

For the main interview (after completion of the household roster and the panelist was deemed eligible), the overall breakoff rate was small, albeit higher for Panel Provider 2. There were 132 breakoffs (out of 4,298 panelists who started the main survey) for Panel Provider 1, representing a breakoff rate of 2.7%, while 220 panelists (out of 4,155) broke off the Panel Provider 2 main interview for a breakoff rate of 5.3% (Table 5, Quality profile tables, www.cdc.gov/nchs/rss/access.html).

The number and percentage distribution of breakoffs by main interview section for each panel provider and combined are presented in Table 5. For both panel providers, the child disability (CDS) section was the largest producer of main interview breakoffs: 42.7% for Panel Provider 2 and 41.7% for Panel Provider 1. In this section, 49 of 55 breakoffs for Panel Provider 1 and 88 of 94 breakoffs for Panel Provider 2 occurred at the first question, suggesting that the transition between this section and the prior section (CDD: child developmental delays) provided a convenient breaking point. Other notable producers of breakoffs were the child access and utilization (CAU) section for Panel Provider 1 only (14.4%, the breakoff for Panel Provider 2 was 5.5%); the attitudes on childhood vaccines (VAX) section for Panel Provider 2 only (13.6%, the breakoff for Panel Provider 1 was 4.5%); and the positive childhood experiences (PCE) section for both panel providers (Panel Provider 1 = 9.1%; Panel Provider 2 = 10.5%).

Item Nonresponse

Item nonresponse for RSS-5 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 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 from the main interview, after completion of the household roster. Of the 183 survey items, just under half (48.6%) had an item nonresponse rate of less than 1% in the combined file, while another 47.0% of items had nonresponse rates of 1% to less than 5%. Differences, however, exist between the providers for these two categories of item nonresponse. While Panel Provider 2 had 116 items (63.4%) with nonresponse rates of less than 1%, Panel Provider 1 only had 72 items (39.3%) fall in this range. Conversely, Panel Provider 1 had 102 items (55.7%) with nonresponse rates of 1% to less than 5% compared to only 59 items (32.2%) for Panel Provider 2. Both providers, however, had less than 10 items with item nonresponse rates greater than 5%, with Panel Provider 1 having 2 items (1.1%) with item nonresponse greater than 10% and Panel Provider 2 having 3 items (1.6%) with item nonresponse greater than 10%. Combined, there were 6 items (3.3%) with nonresponse rates of 5% to less than 10%, and only 2 items (1.1%) with a rate of 10% or more.

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/round5/questionnaire.pdf). Overall, item nonresponse averaged 1.3% per item in the combined datafile, 1.6% for Panel Provider 1 and 1.1% for Panel Provider 2 (Table 7, TOTAL row).

For both panel providers, the child health insurance section (CHI; 5.4% for Panel Provider 1, 4.5% for Panel Provider 2) had the highest item nonresponse rate. Otherwise, all remaining main interview sections had item nonresponse rates of less than 2.0% for panel Provider 1 and less than 1.4% for Panel Provider 2.

Of the 8 items in the combined dataset with item nonresponse rates greater than 5%, 4 came from the child health insurance section (CHI) and 4 came from the sampled child characteristics (SCC) section. From lowest to highest item nonresponse, the items include: CHI_INSURF (5.2%; enrolled for VA health care); CHI_INSURE (5.4%; enrolled in TRICARE or other military health care); CHI_INSURC (5.7%; enrolled in Medicare); CHI_INSURH (6.2%; enrolled in any other type of health insurance or health coverage plan); SCC_WHITEG_TXT (6.4%; text entry for another White group, for example French, Swedish, Norwegian, etc.); SCC_MENAG_TXT (7.1%; text entry for another Middle Eastern or North African group, for example Moroccan, Yemeni, Kurdish, etc.); SCC_NHPIG_TXT (24.0%; text entry for another Native Hawaiian or Pacific Islander group, for example Chuukese, Palauan, Tahitian, etc.); and SCC_BLACKG_TXT

(33.0%; text entry for another Black or African American group, for example Trinidadian and Tobagonian, Ghanaian, Congolese, etc.).

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

- Panel Provider 1 exceeded the target number of completed interviews for RSS-5 (target=4,000, completes=4,166), while Panel Provider 2 fell just short of its target (target=4,000, completes=3,935). As a result, the final combined sample (n=8,101) exceeded the targeted number of completed interviews by 101 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, and educational attainment.
- 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 household roster and main interview breakoff rates for Panel Provider 1 were 1.7% and 2.7%, respectively. The corresponding rates for Panel Provider 2 were 3.1% and 5.3%. The main interview section producing the largest percentage of breakoffs for both panel providers was the child disability section (CDS), followed by the child access and utilization (CAU) and the positive childhood experiences (PCE) sections. The attitudes on childhood vaccines (VAX) section was a notable producer of breakoffs for Panel Provider 2.
- There were differences in item nonresponse rates between the providers. Panel Provider 2 had a greater percentage of items with nonresponse rates of less than 1%, while Panel Provider 1 had a greater percentage of items with nonresponse rates of 1% to less than 5%. Both providers, however, had less than 10 items with item nonresponse rates greater than 5%, with the combined file containing only 2

items with an item nonresponse rate of 10% or more, both being open-ended or text variables located in the sample child characteristics (SCC) section. As noted previously, data users may want to investigate these items further for potential nonresponse bias.

Question Evaluation

For RSS-5, 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-5 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 Winter 2025 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-5 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. In addition, upon review there were a few cases where the household roster contained invalid data for the selected child (e.g., the name was listed as "N/A") and these records were also removed. Table 8 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) reports the total and the percent of interviews removed for quality concerns 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.

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 percent of imputed values for the calibration variables in the second stage were relatively low, ranging from 0.0% to 1.5% for Panel Provider 1 and ranging from 0.0% to 1.1% for Panel Provider 2. 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, and not for analytic purposes. No other variables were imputed in the RSS-5 data.

Summary

- Data cleaning procedures were applied to remove low-quality responses. Overall, 2.2% of RSS-5 records were removed due to quality concerns.

- Data from the two panel providers were harmonized prior to release.

- 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 1.5% across both panel providers. 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. Both providers started with the development of a parent or household roster weight that was subsequently converted to a child weight. For Panel Provider 1, the

parent weight, produced for all main interview completes, included adjustments of the base weight to address survey nonresponse through a weighting class method. Raking adjustments were then applied to the nonresponse adjusted weights to align the survey sample to specific parent population benchmarks. Variables used in this raking step included age, sex, race and Hispanic origin, education, household or family type, number of related children in the household, and Census Division. Control totals came from the February 2024 Current Population Survey (CPS). A final child weight was created by assigning the parent weight to the child, adjusting for the number of parents and related children in the household, and then raking to select child characteristics (age, sex, and race and Hispanic origin) using February 2024 CPS totals.

Panel Provider 2 took a different approach to producing a final child weight. The base weights for all household roster respondents, regardless of eligibility to complete the main interview, were adjusted via a raking step to control totals for age, sex, race and Hispanic origin, education, household income, language proficiency, Census Region, and sample status (main vs. supplemental). Control totals were obtained from the March 2023 Annual Social and Economic (ASEC) Supplement of the CPS, except for language proficiency which was obtained from the 2022 American Community Survey (ACS). Sample status was derived from the full selected sample. To create a final child weight, all main interview completes were retained and their household roster weights were adjusted by the number of children aged 0-17 in the household and then raked to population totals for children ages 0-17 using the March 2023 ASEC Supplement of the CPS. The variables used in this adjustment included age, sex, and race and Hispanic origin.

Next, each of the RSS-5 panel provider weights were separately calibrated to control totals based on the 2023 NHIS Sample Child Datafile and then combined. In total, 11 variables producing 28 control totals were included in this weight calibration step (see Table 9). Calibration variables included standard sociodemographic measures (child age, child sex, child race and Hispanic origin, household income, housing tenure, region, metropolitan status) along with a child health status measure (ever diagnosed with asthma), two child health utilization measures (saw a doctor in the past 12 months, took prescription medication in the past 12 months), and one social determinant of health measure (worry about being able to pay medical bills of the child if they became sick or had an accident). Health variables that were anticipated to be correlated with the health outcomes and content on the survey were selected for calibration weighting. 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/round5/codebook.pdf.

Panel Composition Prior to Calibration Weighting

Table 9 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) presents 2023 NHIS Sample Child estimates (28 estimates based on 11 calibration variables) that served as population control totals for calibration of RSS-5 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 9, 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, region, and urbanization level) in development of their parent/roster and/or 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 2022 ACS estimates for control totals for calibration of 2023 NHIS Sample Child weights, while, as noted above, the panel providers primarily used CPS totals from the 2023 March ASEC Supplement or February 2024 survey in development of their final RSS-5 study weights.

Differences greater than 3 percentage points were observed for estimates of housing tenure and saw a doctor in the past 12 months for both providers, as well as worry about being able to pay medical bills of the child if they became sick or had an accident for Panel Provider 1 and household income and ever diagnosed with asthma for Panel Provider 2. Children from households that were owned or being bought were over-represented in Panel 1 (69.2%) and under-represented in Panel 2 (62.7%), relative to the NHIS (66.2%), while saw a doctor in the past 12 months was under-represented in both panels (Panel 1 = 86.6%; Panel 2 = 82.9%) compared to the NHIS (94.9%). The remaining differences greater than 3 percentage points were provider specific. For Panel Provider 1, worry about being able to pay medical bills of the child if they became sick or had an accident was under-represented (4.8%) compared to the NHIS (8.8%). For Panel Provider 2, children in households with incomes less than $50,000 (38.8%) were over-represented, while children in households with incomes of $100,000 or more (30.4%) were under-represented compared to the NHIS (26.9% and 45.0%, respectively). Users should note the difference in income definitions between Panel Provider 2 and the NHIS. Panel Provider 2 collects total household income *for the past 12 months*, while the NHIS collects total family income *for the prior calendar year*. When more than one family resides in the household (0.7% of sample children in the 2023

NHIS sample child dataset resided in multi-family households), household income will exceed any one family's income.

When comparing panel provider estimates to each other, differences greater than 3 percentage points were observed for household income, housing tenure, ever diagnosed with asthma, and saw a doctor in the past 12 months. Compared to Panel Provider 1, Panel Provider 2 estimates of household income tended to skew lower, with a greater percentage of children residing in households with incomes of less than $50,000 (38.8% vs. 28.1%, p<0.01) and a smaller percentage of children residing in households with incomes of $100,000 or more (30.4% vs. 46.9%, p<0.01). Relatedly, a smaller percentage of Panel Provider 2 children resided in households that were owned or being bought compared to Panel Provider 1 children (62.7% vs. 69.2%, p<0.01). As for the two health-related calibration variables, a greater percentage of Panel Provider 2 children were reported to have ever been diagnosed with asthma (14.1% vs. 10.9%, p<0.01), while a smaller percentage of Panel Provider 2 children saw a doctor in the past 12 months (82.9% vs. 86.6%, p<0.01).

Post Calibration Weighting Evaluations

Table 10 (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 11 (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 9, housing tenure, saw a doctor in the past 12 months, and worry about being able to pay medical bills of the child if they became sick or had an accident each had a significant impact on the adjustment factors for the panel provider's weights during the calibration weighting. Other variables that significantly impacted the calibration of both providers' weights included household income and took prescription medication in the past 12 months. As observed in Table 9, there were large differences in income distributions between Panel Provider 2 and the NHIS. The significant influence on Panel Provider 1's weights was somewhat unexpected given the much smaller difference in income distributions compared to the NHIS. More surprising was the influence of took prescription medications in the past 12 months given that estimates for both panel providers prior to calibration were within two percentage points of the NHIS estimate.

The remaining calibration variables with significant impacts on the adjustment of provider weights were provider specific. Urbanization level and ever diagnosed with asthma both had a significant influence on the weights for Panel Provider 1 when calibrating to the NHIS. While neither of these variables were used by the provider in the development of their internal final child study weight, the results are surprising given the estimates for both variables pre-calibration were close to NHIS estimates. For Panel Provider 2, race and Hispanic origin had a significant influence on weight calibration. This is surprising given that the panel provider raked their final child weight to control totals from the CPS and the resulting estimates were close to those reported for the NHIS 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 12 (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 0.182 to 2.414, compared with 0.048 to 2.640 for Panel Provider 1. A standard deviation of 0.503 was observed for Panel Provider 1 weights post-calibration, while the corresponding figure for Panel Provider 2 weights was 0.336. 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.

The panel provider calibrated weights were combined into a final RSS-5 weight using a compositing factor based on the ratio of effective sample sizes. Table 13 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) shows the sample size, effective sample size, and composite factors (0.512 for Panel Provider 1 and 0.488 for Panel Provider 2) for both panel providers.

Table 14 (Quality profile tables, www.cdc.gov/nchs/rss/access.html) presents descriptive statistics for the panel provider calibrated weights (P1_CALWT_CH and P2_CALWT_CH) and for the final, combined weight (WEIGHT_CH). Focusing on the final combined weight, weight values ranged from 103 (minimum) to a maximum weight value of 87,881. The coefficient of variation was 85.54, producing a design effect of 1.73.

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 asthma, took prescription medications in the past 12

months, saw a doctor in the past 12 months, and worry about being able to pay medical bills of child if become sick/have accident. 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 NHIS Sample Child 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 15 (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

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

and for continuous variables as

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

Of the 64 benchmark variables assessed, 52 had lower absolute bias using the final calibrated weights compared with the panel study weights for Panel Provider 1 while 28 had lower absolute bias compared with the panel study weights for Panel Provider 2. The magnitude of the 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, more than half of the benchmark variables had an increase in bias as a result of calibration weighting for Panel Provider 2. Twelve benchmark variables had an increase in bias compared to the NHIS for Panel Provider 1 while 36 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 social determinants of health domain for both panel providers (5 measures for Panel Provider 1 and 14 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: housing tenure and saw a doctor in the past 12 months. Differences greater than 3 percentage points were also observed for estimates of worry about being able to pay medical bills of the child if they became sick or had an accident (Panel Provider 1), as well as household income and ever diagnosed with asthma (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 2.640 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 Sample Child datafile for Panel Provider 1 (52 variables) and for less than half of the benchmark variables for Panel Provider 2 (28 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 social determinants of health domain for both panel providers. 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-5, questions from the 2023 NHIS Sample Child datafile measuring child developmental delays, child disability, chronic conditions, health status, healthcare access, healthcare utilization, mental health, social determinants of health, and stressful life events were included for benchmarking. The complete set of benchmarking questions is available in the codebook: www.cdc.gov/nchs/data/rss/round5/codebook.pdf.

RSS benchmark variables measuring 64 health outcomes were compared to the 2023 NHIS Sample Child 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 16 (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 0.03 percentage points (one emergency room visit in the past 12 months) to 14.34 percentage points (ever hungry but didn't eat in last 30 days because there wasn't enough money for food) and varied by topic. The

standardized bias ranged from nearly 0 to 0.42 for the 64 health measures evaluated, with 27 measures having low bias (standardized bias less than 0.10), 29 measures having medium bias (standardized bias ranging from 0.10 to 0.30), and 8 measures 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 nine health domains: child developmental delays; child disability; chronic conditions; health status; healthcare access; healthcare utilization; mental health; social determinants of health; and stressful life events. Table 17 (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 0.04 (Chronic Conditions) to 0.21 (Social Determinants of Health). Four health domains had standardized biases less than 0.10 (low bias), on average, and five health domains had standardized biases categorized as medium bias, on average.

Summary

- The absolute bias of the selected benchmark variables compared to the NHIS ranged from 0.03 to 14.34 with most variables having an absolute bias of less than 3 percentage points.

- Among the 64 health measures evaluated, 27 measures had low standardized bias, 29 measures had medium standardized bias, and 8 measures had high standardized bias.

- The average standardized bias of estimates from RSS-5 compared to the NHIS varied by health domain. On average, four health domains had low bias (Chronic Conditions, Mental Health, Stressful Life Events, and Healthcare Utilization) and five health domains had medium bias (Child Developmental Delays, Health Status, Healthcare Access, Child Disability, and Social Determinants of 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. More than half of the child health outcomes were reported with notable levels of bias (medium or high bias) compared to the NHIS.

References

The American Association for Public Opinion Research (AAPOR). (2023). Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys (10th edition). AAPOR.

Callegaro M, Disogra C. Computing response metrics for online panels. Public Opinion Quarterly, 72(5): 1008-1032. 2008.

Irimata KE, He Y, Parsons VL, Shin H-C, Zhang G. Calibration weighting methods for the National Center for Health Statistics Research and Development Survey. National Center for Health Statistics. Vital Health Stat 2(199). 2023. DOI: https://dx.doi.org/10.15620/ cdc:123463

Mercer A, Lau A. Comparing two types of online survey samples. Pew Research Center, September 7. 2023.

Peytchev A. Assessment of the use of panel survey data. Presentation given at the Meeting of the National Center for Health Statistics Board of Scientific Counselors, Hyattsville, MD, May 26. 2022.

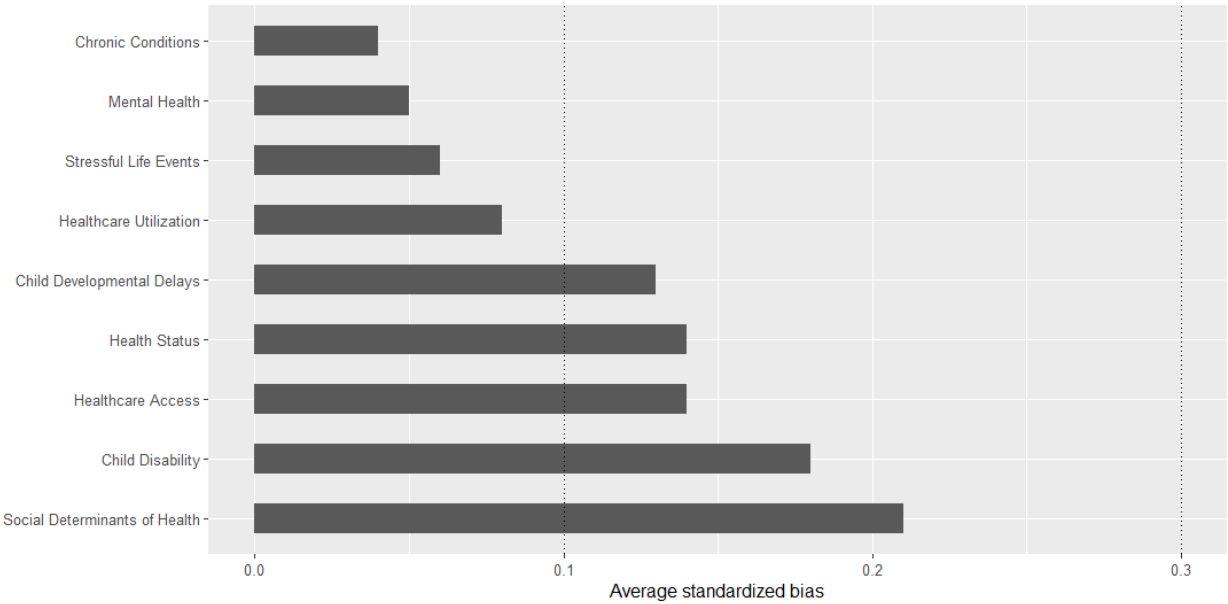Yan T. Consequences of asking sensitive questions in surveys. Annu. Rev. Stat. App., 8: 109-127. 2021.

Figure 1. Standardized bias of panel study and final calibrated weights for benchmarking variables by panel provider compared to the 2023 National Health Interview Survey Sample Child Datafile: Rapid Surveys System Round 5

Figure 2. Standardized bias of benchmarking variables compared to the 2023 National Health Interview Survey Sample Child Datafile: Rapid Surveys System Round 5

Figure 3. Average standardized bias by health domain compared to the 2023 National Health Interview Survey Sample Child Datafile: Rapid Surveys System Round 5