

## RANDS During COVID-19 Round 2 Probability Sample Technical Documentation

### Overview

The National Center for Health Statistics (NCHS) Division of Research and Methodology (DRM) contracted NORC at the University of Chicago (NORC) to collect timely information on COVID-19-related health outcomes from U.S. adults as a special iteration of the Research and Development Survey (RANDS). This special iteration of RANDS, referred to as RANDS during COVID-19, was conducted using both a probability-based panel and an opt-in commercial survey panel. RANDS during COVID-19 is a three-round survey, with a longitudinal design in Round 1 and Round 2 for the probability-based panel. This technical documentation describes the sampling methodology and weighting for the probability-based panelists in the second round of RANDS during COVID-19 (RANDS during COVID-19 Round 2 Probability Sample).

While RANDS has previously been collected for methodological research purposes, RANDS during COVID-19 was designed to collect and report timely information on COVID-19-related health measures. RANDS during COVID-19 was used to produce a set of experimental estimates for selected topics, including loss of work due to illness with COVID-19, telemedicine access and use, and health care access. The estimates are considered experimental as research is underway to improve the calibration method (see Sample Weighting below) and understand potential sources of measurement error. Experimental national and subnational estimates for the selected outcomes are published online (<https://www.cdc.gov/nchs/covid19/rands.htm>); remaining variables were collected for research purposes.

To evaluate the question-response pattern as in previous rounds of RANDS, RANDS during COVID-19 Round 2 included probe questions and five experiments. The five experiments were:

- 1) Unspecified vs. Specified COVID-19 Tests: Comparing between the following two ways of inquiring about receiving diagnostic tests for COVID-19: (a) a standalone question not specifying the type of the COVID-19 test the respondent received, and (b) a series of two questions with the first one inquiring about having a test for determining whether one having been infected with the COVID-19 virus *at the time of the test*, followed by another question inquiring about having an antibody test for determining whether one had been infected with the COVID-19 virus *in the past*. This experiment was also included in the Round 1 survey (RANDS during COVID-19 Round 1 Probability Sample Technical Documentation 2022).
- 2) Close-Ended Multi-Punch Probes vs. Open-Ended Probes: Comparing responses between close-ended response options with the “select-all-that-apply” style versus an open-ended probe on: (a) the respondent’s interpretation of quarantine/isolation behavior and (b) how the respondent became aware of whether his/her healthcare provider offered telemedicine. Panelists who received the close-ended multi-punch options for one question received the open-ended probe for another. Part (a) was also included in the Round 1 survey (RANDS during COVID-19 Round 1 Probability Sample Technical Documentation 2022).

- 3) Immunocompromised Test: Comparing between the following two ways of inquiring whether the panelist is immunocompromised: (a) a single close-ended question about whether the panelist currently has a health condition that weakens the immune system, and (b) a pair of questions, with one question about whether the panelist had any medical treatment that may weaken the immune system in the past 12 months, followed by the same question in (a).
- 4) Symptoms Probes: Comparing between the following two open-ended probes for panelists who indicated having any COVID-19 symptom: when indicating his/her severity of symptoms, (a) “what” was the respondent thinking about versus (b) “why” the respondent answered such severity.
- 5) Time-of-Reference: Comparing between the following two reference time frames: (a) last four weeks and (b) past 12 months, for three questions related to mental health and emotional well-being.

NORC conducted RANDES during COVID-19 Round 2 from August 3, 2020 to August 20, 2020. Panelists from the probability sample responded to either online web surveys or telephone interviews. This documentation describes the sampling approach, data collection timeline, response rate, and sample weighting for the survey.

## Sampling

Given with the longitudinal nature of the first two rounds of RANDES during COVID-19, the Round 2 survey shares the same sample selected for the Round 1 survey. The sample selection process is described as follows. The target population for this study consisted of the general population of the United States aged 18 and older. The source of the sample for this study was NORC’s AmeriSpeak® Panel (<http://amerispeak.norc.org/>). Funded and operated by NORC at the University of Chicago, AmeriSpeak® is a probability-based panel designed to be representative of the U.S. household population. Randomly selected U.S. households were sampled from the NORC National Sample Frame (<https://www.norc.org/Research/Projects/Pages/2010-national-sample-frame.aspx>) and then contacted by U.S. mail, telephone, and through face-to-face field interviews for recruitment to the Panel. As of early 2021, the AmeriSpeak® Panel included more than 40,000 U.S. households and provided sample coverage of 99% of the U.S. household population.

NORC collaborated with NCHS’ Division of Research and Methodology on a stratified sample design to obtain a random and representative sample of U.S. adults aged 18 and over from the AmeriSpeak® Panel. The target population was stratified by age (18-34, 35-49, 50-64, 65+), race/Hispanic ethnicity (Hispanic, Non-Hispanic Black, Non-Hispanic All Other), education (Associate’s degree/some college or less, Bachelor’s degree or above), sex (male, female) and annual household income (less than \$75,000, greater than or equal to \$75,000) for a total of 96 sampling strata. Then, NORC performed sampling independently within each stratum using simple random sampling. The sampling ratios varied by stratum to account for differential nonresponse for each stratum to ensure a representative sample of the target population. If more than one panelist were available in one household, random within-household sampling was carried out to ensure only one adult from the household was eligible for sampling. Moreover, in an effort to

improve the cumulative response rate without introducing bias into the estimates, NORC excluded certain panelists from sampling, including panelists added to AmeriSpeak® Panel from other probability samples, panelists with a past-year history of low completion rate, and panelists recruited in 2019, due to the fact that NORC did not conduct nonresponse follow-ups that year.

Among the 8,663 panelists sampled initially for Round 1, 12 panelists were withdrawn from the AmeriSpeak® panel between rounds (i.e., no longer active panelists) and thus were excluded from participating in the Round 2 survey.

## **Summary of Field Work**

The RANDES during COVID-19 Round 2 survey was administered in English via either online web surveys or phone interviews. On July 24, 2020, NORC invited a small sample of AmeriSpeak® web-mode panelists for a pretest and collected 39 pretest interviews. Following the pre-test, the wording of a probe question (PROBE\_AUTOIM) was updated, and an additional probe question (PROBE\_SUSPECT) was added to the survey. Moreover, the eligibility for responding to a question (SUSPECT) was updated.

For the sampled web-mode panelists, NORC sent e-mail invitations along with text messages in two batches. The soft-launch invitation was sent to some panelists on August 3, 2020. Additional invitations for the rest of the sample were sent on August 5, 2020. On August 7 and August 8, NORC sent reminders to the soft-launch sample and to the rest of the sample, respectively. More reminders were sent to the invited panelists who had not completed the survey on August 11 and August 17. Additionally, an invitation/reminder letter was sent via United States Postal Service (USPS) to 3,164 low-completion rate panelists (defined as having survey completion rates equal to or less than 50% in the last 6 months) on August 5, 2020. For the sampled phone-mode panelists, NORC dialed their numbers throughout the field period.

Among the 8,663 panelists that were probability-sampled for RANDES during COVID-19 Round 1, 8,651 were eligible to participate in Round 2 as 12 panelists were withdrawn from the panel between rounds. Of the eligible panelists in Round 2, 5,981 completed the RANDES during COVID-19 Round 2 survey. Thus, the overall completion rate was 69.1%, with the weighted cumulative response rate of 20.3%. For RANDES during COVID-19 Round 2, other than the 5,981 panelists completing the survey, additional 252 respondents started the survey but were removed from the dataset prior to post-stratification weighting. Among these 252 respondents, 135 started but did not complete the survey and 117 respondents either completed the survey in less than one third of the median duration and/or had high refusal/skipping rates (defined as refused/skipped more than 50% of eligible questions).

NCHS did not provide an incentive for participation in RANDES, although NORC offered a non-cash, point-based incentive for responding to surveys such as RANDES, which can be traded for gift cards or other non-cash prizes.

Table 1 reports the sample sizes and response rates by sampling strata.

### **Table 1. RANDES during COVID-19 Round 2 Response Rates of the Probability Sample by Sampling Strata**

<b>Race/Ethnicity</b>	<b>Education Level</b>	<b>Age Group (Year)</b>	<b>Gender</b>	<b>Income Group</b>	<b>Total Sample per Stratum</b>	<b>Completes per Stratum</b>	<b>Response Rate</b>
Non-Hispanic All Other	Associate degree/some college or less	35-49	Female	<\$75,000	216	182	84.26%
Non-Hispanic All Other	Bachelor degree or more	35-49	Male	<\$75,000	66	63	95.45%
Non-Hispanic All Other	Bachelor degree or more	35-49	Female	<\$75,000	86	78	90.70%
Non-Hispanic All Other	Associate degree/some college or less	50-64	Male	<\$75,000	291	187	64.26%
Non-Hispanic All Other	Associate degree/some college or less	50-64	Female	<\$75,000	288	254	88.19%
Non-Hispanic All Other	Bachelor degree or more	50-64	Male	<\$75,000	60	59	98.33%
Non-Hispanic All Other	Bachelor degree or more	50-64	Female	<\$75,000	67	63	94.03%
Non-Hispanic All Other	Associate degree/some college or less	65+	Male	<\$75,000	302	239	79.14%
Non-Hispanic All Other	Associate degree/some college or less	65+	Female	<\$75,000	423	361	85.34%
Non-Hispanic All Other	Bachelor degree or more	65+	Male	<\$75,000	112	101	90.18%
Non-Hispanic All Other	Bachelor degree or more	65+	Female	<\$75,000	101	94	93.07%
Non-Hispanic Black	Associate degree/some college or less	35-49	Female	<\$75,000	99	63	63.64%

Non-Hispanic Black	Bachelor degree or more	35-49	Male	<\$75,000	13	13	100.00%
Non-Hispanic Black	Bachelor degree or more	35-49	Female	<\$75,000	25	20	80.00%
Non-Hispanic Black	Associate degree/some college or less	50-64	Male	<\$75,000	92	51	55.43%
Non-Hispanic Black	Associate degree/some college or less	50-64	Female	<\$75,000	94	71	75.53%
Non-Hispanic Black	Bachelor degree or more	50-64	Male	<\$75,000	11	9	81.82%
Non-Hispanic Black	Bachelor degree or more	50-64	Female	<\$75,000	22	20	90.91%
Non-Hispanic Black	Associate degree/some college or less	65+	Male	<\$75,000	65	35	53.85%
Non-Hispanic Black	Associate degree/some college or less	65+	Female	<\$75,000	89	61	68.54%
Non-Hispanic Black	Bachelor degree or more	65+	Male	<\$75,000	7	7	100.00%
Non-Hispanic Black	Bachelor degree or more	65+	Female	<\$75,000	16	13	81.25%
Non-Hispanic All Other	Associate degree/some college or less	18-34	Male	<\$75,000	209	120	57.42%
Non-Hispanic All Other	Associate degree/some college or less	18-34	Male	≥\$75,000	72	33	45.83%
Non-Hispanic All Other	Associate degree/some college or less	18-34	Female	<\$75,000	313	187	59.74%

Non-Hispanic All Other	Associate degree/some college or less	18-34	Female	≥\$75,000	91	56	61.54%
Non-Hispanic All Other	Bachelor degree or more	18-34	Male	<\$75,000	130	84	64.62%
Non-Hispanic All Other	Bachelor degree or more	18-34	Male	≥\$75,000	103	70	67.96%
Non-Hispanic All Other	Bachelor degree or more	18-34	Female	<\$75,000	166	111	66.87%
Non-Hispanic All Other	Bachelor degree or more	18-34	Female	≥\$75,000	158	114	72.15%
Non-Hispanic All Other	Associate degree/some college or less	35-49	Male	<\$75,000	188	115	61.17%
Non-Hispanic All Other	Associate degree/some college or less	35-49	Male	≥\$75,000	124	75	60.48%
Non-Hispanic All Other	Associate degree/some college or less	35-49	Female	≥\$75,000	145	90	62.07%
Non-Hispanic All Other	Bachelor degree or more	35-49	Male	≥\$75,000	277	199	71.84%
Non-Hispanic All Other	Bachelor degree or more	35-49	Female	≥\$75,000	330	232	70.30%
Non-Hispanic All Other	Associate degree/some college or less	50-64	Male	≥\$75,000	173	126	72.83%
Non-Hispanic All Other	Associate degree/some college or less	50-64	Female	≥\$75,000	216	148	68.52%
Non-Hispanic All Other	Bachelor degree or more	50-64	Male	≥\$75,000	284	208	73.24%

Non-Hispanic All Other	Bachelor degree or more	50-64	Female	≥\$75,000	338	245	72.49%
Non-Hispanic All Other	Associate degree/some college or less	65+	Male	≥\$75,000	120	90	75.00%
Non-Hispanic All Other	Associate degree/some college or less	65+	Female	≥\$75,000	139	106	76.26%
Non-Hispanic All Other	Bachelor degree or more	65+	Male	≥\$75,000	360	288	80.00%
Non-Hispanic All Other	Bachelor degree or more	65+	Female	≥\$75,000	211	162	76.78%
Non-Hispanic Black	Associate degree/some college or less	18-34	Male	<\$75,000	67	30	44.78%
Non-Hispanic Black	Associate degree/some college or less	18-34	Male	≥\$75,000	11	3	27.27%
Non-Hispanic Black	Associate degree/some college or less	18-34	Female	<\$75,000	130	68	52.31%
Non-Hispanic Black	Associate degree/some college or less	18-34	Female	≥\$75,000	20	8	40.00%
Non-Hispanic Black	Bachelor degree or more	18-34	Male	<\$75,000	12	2	16.67%
Non-Hispanic Black	Bachelor degree or more	18-34	Male	≥\$75,000	5	3	60.00%
Non-Hispanic Black	Bachelor degree or more	18-34	Female	<\$75,000	40	29	72.50%
Non-Hispanic Black	Bachelor degree or more	18-34	Female	≥\$75,000	17	12	70.59%

Non-Hispanic Black	Associate degree/some college or less	35-49	Male	<\$75,000	66	29	43.94%
Non-Hispanic Black	Associate degree/some college or less	35-49	Male	≥\$75,000	17	8	47.06%
Non-Hispanic Black	Associate degree/some college or less	35-49	Female	≥\$75,000	18	5	27.78%
Non-Hispanic Black	Bachelor degree or more	35-49	Male	≥\$75,000	18	9	50.00%
Non-Hispanic Black	Bachelor degree or more	35-49	Female	≥\$75,000	42	24	57.14%
Non-Hispanic Black	Associate degree/some college or less	50-64	Male	≥\$75,000	19	10	52.63%
Non-Hispanic Black	Associate degree/some college or less	50-64	Female	≥\$75,000	29	14	48.28%
Non-Hispanic Black	Bachelor degree or more	50-64	Male	≥\$75,000	31	24	77.42%
Non-Hispanic Black	Bachelor degree or more	50-64	Female	≥\$75,000	27	15	55.56%
Non-Hispanic Black	Associate degree/some college or less	65+	Male	≥\$75,000	14	5	35.71%
Non-Hispanic Black	Associate degree/some college or less	65+	Female	≥\$75,000	15	6	40.00%
Non-Hispanic Black	Bachelor degree or more	65+	Male	≥\$75,000	20	13	65.00%
Non-Hispanic Black	Bachelor degree or more	65+	Female	≥\$75,000	13	11	84.62%



Hispanic	Associate degree/some college or less	18-34	Male	<\$75,000	152	65	42.76%
Hispanic	Associate degree/some college or less	18-34	Male	≥\$75,000	28	12	42.86%
Hispanic	Associate degree/some college or less	18-34	Female	<\$75,000	207	108	52.17%
Hispanic	Associate degree/some college or less	18-34	Female	≥\$75,000	39	22	56.41%
Hispanic	Bachelor degree or more	18-34	Male	<\$75,000	33	19	57.58%
Hispanic	Bachelor degree or more	18-34	Male	≥\$75,000	16	9	56.25%
Hispanic	Bachelor degree or more	18-34	Female	<\$75,000	46	29	63.04%
Hispanic	Bachelor degree or more	18-34	Female	≥\$75,000	22	14	63.64%
Hispanic	Associate degree/some college or less	35-49	Male	<\$75,000	56	32	57.14%
Hispanic	Associate degree/some college or less	35-49	Male	≥\$75,000	22	14	63.64%
Hispanic	Associate degree/some college or less	35-49	Female	<\$75,000	134	74	55.22%
Hispanic	Associate degree/some college or less	35-49	Female	≥\$75,000	32	17	53.13%

Hispanic	Bachelor degree or more	35-49	Male	<\$75,000	26	21	80.77%
Hispanic	Bachelor degree or more	35-49	Male	≥\$75,000	26	17	65.38%
Hispanic	Bachelor degree or more	35-49	Female	<\$75,000	36	25	69.44%
Hispanic	Bachelor degree or more	35-49	Female	≥\$75,000	42	29	69.05%
Hispanic	Associate degree/some college or less	50-64	Male	<\$75,000	35	19	54.29%
Hispanic	Associate degree/some college or less	50-64	Male	≥\$75,000	24	11	45.83%
Hispanic	Associate degree/some college or less	50-64	Female	<\$75,000	82	44	53.66%
Hispanic	Associate degree/some college or less	50-64	Female	≥\$75,000	30	21	70.00%
Hispanic	Bachelor degree or more	50-64	Male	<\$75,000	14	10	71.43%
Hispanic	Bachelor degree or more	50-64	Male	≥\$75,000	19	11	57.89%
Hispanic	Bachelor degree or more	50-64	Female	<\$75,000	19	15	78.95%
Hispanic	Bachelor degree or more	50-64	Female	≥\$75,000	30	22	73.33%
Hispanic	Associate degree/some college or less	65+	Male	<\$75,000	30	20	66.67%

Hispanic	Associate degree/some college or less	65+	Male	≥\$75,000	9	5	55.56%
Hispanic	Associate degree/some college or less	65+	Female	<\$75,000	56	30	53.57%
Hispanic	Associate degree/some college or less	65+	Female	≥\$75,000	10	3	30.00%
Hispanic	Bachelor degree or more	65+	Male	<\$75,000	14	10	71.43%
Hispanic	Bachelor degree or more	65+	Male	≥\$75,000	16	9	56.25%
Hispanic	Bachelor degree or more	65+	Female	<\$75,000	13	7	53.85%
Hispanic	Bachelor degree or more	65+	Female	≥\$75,000	10	6	60.00%

## Sample Weighting

The final RANDS during COVID-19 Round 2 Probability Sample was weighted to account for the sample design and was further weighted to U.S. population counts to account for differential nonresponse and under-coverage of some groups on the sample frame. Sample weights and survey design information must be used in the analysis of these data in order to produce results with meaningful population representativeness.

### *AmeriSpeak® Panel Weights*

Derivation of statistical weights first started with panel base sampling weights. Since the AmeriSpeak® Panel is a probability panel, the panel base sampling weights were computed as the inverse probability of selection from the NORC National Sample Frame or other address-based sample frames for the supplemental panel samples. NORC adjusted the panel sampling weights for nonresponse and under-coverage. The sample design and recruitment protocol for the AmeriSpeak® Panel involved subsampling initial non-respondent housing units for an in-person follow up. The subsample of housing units that were selected for nonresponse follow-up (NRFU) had their panel base sampling weights inflated by the inverse of the subsampling rate. The base sampling weights were further adjusted to account for unknown eligibility and nonresponse among eligible housing units. The household-level nonresponse-adjusted weights were then post-stratified to external counts of the number of households per census division obtained from the U.S. Census

Bureau Current Population Survey (CPS). Final household weights were then assigned to each eligible adult in the recruited household, with weight adjustment carried out at the person-level to account for non-responding adults within the household. Furthermore, the person-level panel weights were adjusted by raking to external population totals associated with age, sex, education, race/Hispanic ethnicity, housing tenure, household telephone status, and Census Division using information obtained from the CPS and the National Health Interview Survey (NHIS) on wireless substitution to obtain the final panel weights.

### *RANDS during COVID-19 Round 2 Probability Sample Weights*

The RANDS during COVID-19 Round 2 survey-specific base sampling weights were derived using a combination of the final panel weights (described above) and the probability of selection into RANDS associated with the sampled panel member. The overall survey sampling weights were calculated as the panel weights multiplied by the inverse probability of selection of an AmeriSpeak® Panel member to RANDS during COVID-19 Round 1 Probability Sample (and thus Round 2 Probability Sample as well), where the probability of selection of a panelist within a stratum (defined by race/ethnicity, age, sex, education, and household income) was  $n_h/N_h$ , the ratio of the number of panelists sampled ( $n_h$ ) and the total number of panelists available ( $N_h$ ) in that stratum ( $h$ ).

Since not all sampled panel members responded to the survey interview, an adjustment is needed to account for non-respondents. This adjustment decreases potential nonresponse bias associated with probability-sampled panel members who did not complete the RANDS during COVID-19 Round 2 survey. The nonresponse-adjusted survey weights for the study were calculated by raking the overall survey sampling weights to general population totals associated with the following socio-demographic characteristics: age, sex, education, race/Hispanic ethnicity and Census Division. Any extreme weights were trimmed based on a criterion of minimizing the mean squared error associated with key survey estimates and then weights were re-raked to the same population totals. Once weighting adjustment achieved the goal of matching the CPS population post-stratum totals, the weights provided by NORC (WEIGHT\_AmSp) were proportionally adjusted to sum to the total number of respondents in the RANDS during COVID-19 Round 2 Probability Sample (n=5,981).

The NORC-provided weights were further calibrated by NCHS to produce experimental estimates for selected COVID-19-related outcomes through raking using information from the 2018 National Health Interview Survey (NHIS). In order to correct for potential biases due to differences in demographic distribution and health statuses of probability-sampled respondents to RANDS during COVID-19 Round 2 and the 2018 NHIS, the weights were adjusted by raking to the percentage estimates of demographic and health variables from the 2018 NHIS (i.e. age, sex, education, race/Hispanic ethnicity, Census region, family income, marital status, diagnosed asthma, diagnosed hypertension, diagnosed diabetes, and diagnosed high cholesterol). The final calibrated weights (WEIGHT\_CALIBRATED) were proportionally adjusted to sum to the total number of respondents (n=5,981).

### **Notes about the Longitudinal Sample**

Rounds 1 and 2 of RANDS during COVID-19 using the AmeriSpeak® Panel were conducted with a longitudinal design. Out of the 6,800 panelists who completed Round 1, 5,452

completed Round 2 as well, resulting in the survey completion rate of 80.2% for the longitudinal study and the weighted cumulative response rate of 23.5%. Given the longitudinal nature of the first two rounds of RANDS during COVID-19, longitudinal sample weights need to be applied in place of the study-specific sample weights when one examines both Round 1 and Round 2 samples in a longitudinal study. Please note that longitudinal weights are not provided in the Round 1 Probability Sample and Round 2 Probability Sample public use files as the ID numbers (CaseID) for panelists have been randomly assigned for data confidentiality purposes and cannot be used to link records between rounds.

**Reference**

National Center for Health Statistics. RANDS during COVID-19 Round 1 Probability Sample Technical Documentation. Hyattsville, Maryland. 2022.

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National Center for Health Statistics. RANDS during COVID-19 Round 2 Probability Sample Technical Documentation. Hyattsville, Maryland. 2022.