



Preliminary Evaluation of Nonresponse Bias Due to the COVID-19 Pandemic on National Health Interview Survey Estimates, April-June 2020

James M. Dahlhamer, Matthew D. Bramlett, Aaron Maitland,
and Stephen J. Blumberg

Division of Health Interview Statistics
National Center for Health Statistics
Hyattsville, Maryland

Centers for Disease Control and Prevention
U.S. Department of Health and Human Services

February 2021

Suggested citation: Dahlhamer JM, Bramlett MD, Maitland A, Blumberg SJ. Preliminary evaluation of nonresponse bias due to the COVID-19 pandemic on National Health Interview Survey estimates, April-June 2020. Hyattsville, MD: National Center for Health Statistics. February 2021. Available from: <https://www.cdc.gov/nchs/data/nhis/earlyrelease/nonresponse202102-508>

Introduction

The National Health Interview Survey (NHIS) is in the field continuously, collecting survey responses throughout the year by making personal visits to respondents' homes. One sample adult and one sample child (if any children are present in the household) are randomly selected to be the subjects of the interview. Interviewing is divided into calendar year quarters, and each quarter's data are representative of the overall population. To produce each annual public data file, four quarters of data are combined and weighted to represent the civilian noninstitutionalized population of the United States. The NHIS Early Release (ER) Program publishes preliminary estimates of key indicators on a quarterly basis in advance of the eventual annual public-use data file release.

The COVID-19 pandemic significantly impacted NHIS data collection beginning in quarter 2 (Q2) of 2020. The U.S. Census Bureau collects data for the NHIS through an interagency agreement. The Census Bureau suspended all personal visits on March 19, 2020. Telephone interviews were used to conduct all NHIS interviews in Q2. The Census Bureau made extensive efforts to match telephone numbers to the addresses in the NHIS sample; however, collecting data by telephone rather than personal visit resulted in a reduction in the household response rate from 60.0% in quarter 1 (Q1) to 42.7% in Q2. The sample adult response rate declined from 57.9% in Q1 to 41.1% in Q2. The sample child response rate declined from 57.6% to 40.1%.¹

The reduction in the response rate has the potential to change the composition of the households in the responding sample, if specific subgroups of the population are less likely than others to respond to telephone recruitment efforts. Additionally, telephone numbers could not be identified for some addresses, including those households that do not have landlines or cell phones. The exclusion of these addresses from the interview procedures also had the potential to change the composition of the households in the responding sample.

This report presents a preliminary evaluation of the potential nonresponse bias associated with the shift to telephone-only interviewing in Q2/2020 and the subsequent decline in response rates compared to Q1/2020. Two analyses are presented. The first evaluates and identifies whether characteristics of the adult and child samples in Q2/2020 differed significantly compared to two previous time periods: Q2/2019 (the same time period from the prior year), and Q1/2020 (the previous three months in which normal data collection protocols were in place). The second examines the impact of the weighting adjustment for characteristics identified from the first analysis to mitigate the nonresponse bias associated with changes in the NHIS survey administration between Q1/2020 and Q2/2020.

Nonresponse Bias Assessment

Quarter 1 of 2020 data were collected using normal NHIS survey procedures, from January 1, 2020 to March 18, 2020, mostly occurring prior to the implementation of stay-at-home orders in many states to reduce the spread of COVID-19. Differences in respondent characteristics between Q1/2020 and Q2/2020 could be due to real changes in the health of the population. However as there was not much time for the population to change, it was assumed that significant differences between Q1/2020 and Q2/2020 were mainly attributable to nonresponse bias resulting from the modification to interviewing

¹ These response rates are preliminary. Final response rates may be lower following evaluation of missing values at the household level and other data quality checks.

procedures and the associated decrease in response rates. Therefore, Q1/2020 was treated as a benchmark against which to assess Q2/2020. To ensure that seasonal effects do not unduly influence the comparison, Q2/2020 was also compared to Q2/2019.

All statistical tests used a two-sided alpha level of 0.10 rather than the conventional 0.05 level to determine statistical significance. This decision leads to identification of more significant differences and more conservative conclusions. This approach is a reasonably cautious one, suitable for this look at preliminary data and the relatively small sample sizes available for comparison.

Table 1 presents select sociodemographic characteristics for Q2/2019, Q1/2020, and Q2/2020 among adults aged 18 and over. Significant differences were observed for eight of the 14 selected sociodemographic characteristics when comparing Q2/2020 adults with adults from the earlier time periods. Adults from Q2/2020 were less likely to be aged 18-29 compared with adults from Q2/2019 and Q1/2020, and more likely to be aged 65 and older than adults from the two earlier calendar quarters. Adults from Q2/2020 were also less likely to identify as non-Hispanic black than adults from Q1/2020. Differences were also observed for educational attainment with adults from Q2/2020 less likely to have less than a high school diploma and more likely to have a bachelor's degree or higher compared with adults from Q2/2019 and Q1/2020. In addition, Q2/2020 adults were less likely to have a high school diploma or general equivalency diploma (GED) compared with adults from Q2/2019.

Table 1. Comparisons of Select Sociodemographic Characteristics between Quarter 2, 2020, and Quarter 2, 2019, and between Quarter 2, 2020, and Quarter 1, 2020 Among Adults Aged 18 and Over: NHIS

Variable	Quarter 2, 2019		Quarter 1, 2020		Quarter 2, 2020	
	%	SE	%	SE	%	SE
Age group						
18-29	14.3	0.43	13.6	0.41	^{†,§} 11.1	0.47
30-44	24.0	0.57	23.8	0.52	23.1	0.72
45-64	33.2	0.51	33.9	0.59	34.3	0.67
65 and over	28.5	0.68	28.8	0.78	^{†,§} 31.5	0.84
Male	46.1	0.52	46.2	0.59	45.5	0.67
Race and Hispanic origin						
Hispanic	14.0	1.55	14.4	1.73	11.3	1.36
Non-Hispanic white	67.1	2.14	66.7	2.34	71.9	2.25
Non-Hispanic black	10.3	0.81	11.2	0.76	[§] 9.4	0.65
Non-Hispanic other	8.6	1.02	7.6	1.01	7.3	1.05
Educational attainment						
Less than a high school diploma	9.2	0.46	9.5	0.48	^{†,§} 6.7	0.46
High school diploma or GED	26.3	0.77	24.9	0.71	[†] 23.7	0.87
Some college	28.8	0.62	29.1	0.72	29.1	0.83
Bachelor's degree or higher	35.7	1.06	36.5	1.09	^{†,§} 40.5	1.27
Marital status						
Never married	20.7	0.54	21.1	0.66	20.4	0.68
Married or cohabitating	51.7	0.69	50.4	0.66	51.8	0.75
Divorced or separated	17.7	0.51	18.0	0.48	17.6	0.58
Widowed	9.9	0.39	10.5	0.50	10.2	0.45

Variable	Quarter 2, 2019		Quarter 1, 2020		Quarter 2, 2020	
	%	SE	%	SE	%	SE
U.S. born	84.0	1.84	83.0	1.82	85.6	1.65
U.S. citizen	93.9	0.57	93.5	0.68	^{†,§} 95.5	0.50
Veteran	9.7	0.43	9.7	0.50	10.3	0.58
Years at current residence						
Less than 1 year	12.7	0.48	13.0	0.46	^{†,§} 8.5	0.48
1 to 3 years	22.3	0.56	21.6	0.58	^{†,§} 20.0	0.75
4 to 10 years	23.9	0.56	24.8	0.47	24.8	0.61
11 to 20 years	19.2	0.46	19.2	0.55	^{†,§} 22.2	0.66
More than 20 years	21.9	0.69	21.4	0.62	^{†,§} 24.5	0.84
Own or buying residence	65.8	1.24	65.1	1.40	^{†,§} 73.1	1.35
Total family income						
Less than \$35,000	26.9	0.79	26.0	0.78	^{†,§} 20.5	0.75
\$35,000 - < \$75,000	28.6	0.70	27.6	0.71	28.5	0.79
\$75,000 - < \$100,000	11.6	0.40	11.3	0.42	^{†,§} 12.9	0.46
\$100,000 or more	24.6	0.89	26.6	1.07	^{†,§} 29.2	1.11
Unknown	8.3	0.52	8.4	0.48	8.9	0.49
Household size						
1 person	31.1	0.63	30.5	0.61	32.0	0.76
2 persons	35.1	0.60	34.6	0.63	35.5	0.62
3 persons	13.7	0.38	14.1	0.41	13.5	0.46
4 or more persons	20.2	0.62	20.8	0.60	[§] 18.9	0.62
Region						
Northeast	16.8	4.04	16.8	4.16	19.3	4.44
Midwest	21.6	3.37	21.8	3.44	21.3	3.75
South	36.8	4.25	36.2	4.21	33.2	4.14
West	24.8	4.86	25.2	4.87	26.2	4.98
Metropolitan statistical area (MSA) status						
Large MSA	43.3	2.01	43.2	2.07	42.1	2.09
Small MSA	42.0	1.59	42.6	1.60	45.3	1.64
Non-MSA	14.6	1.58	14.2	1.55	12.6	1.50

Notes. SE = standard error; GED = general equivalency diploma; estimates are weighted by the initial household base weight which represents the inverse of the probability of household selection.

[†] Significantly different from Quarter 2, 2019 estimate ($p < 0.10$).

[§] Significantly different from Quarter 1, 2020 estimate ($p < 0.10$).

Adults from Q2/2020 were more likely to be U.S. citizens compared to their Q2/2019 and Q1/2020 counterparts, and less likely to reside in a household with four or more persons than adults from Q1/2020. Adults from Q1/2020 were also longer tenured at their current residence compared with adults from the earlier quarters, as they were more likely to have been at their current residence for 11 or more years than adults from Q2/2019, as well as adults from Q1/2020. In turn, adults from Q2/2020 were less likely to have been at their current residence for less than one year and one to three years than adults from Q2/2019 and Q1/2020.

A marked difference in home ownership and total family income was observed when comparing adults from Q2/2020 with adults from the earlier quarters (a difference between seven and eight percentage points), suggesting an over-representation of more affluent households in the Q2/2020 sample. Adults from Q2/2020 were more likely to reside in households that were owned or were being bought than adults from Q2/2019 and Q1/2020. Compared with adults from Q2/2019 and Q1/2020, Q2/2020 adults were less likely to have family incomes of less than \$35,000. Adults from Q2/2020 were more likely, however, to have family incomes of \$75,000 to less than \$100,000 or \$100,000 or more than adults from Q2/2019 and adults from Q1/2020.

Table 2 presents results of comparisons of select sociodemographic characteristics among children under age 18 years for the three time periods under analysis. There were fewer significant differences among children compared to adults (four out of 11 characteristics). Children from Q2/2020 were more likely to be 12-17 years of age than children from Q2/2019 and children from Q1/2020. Similar to adults, Q2/2020 children were less likely to have lived at their current residence for less than one year than children from Q2/2019 and Q1/2020. In turn, children from Q2/2020 were more likely to have lived four to 10 years at their current residence compared with children from Q2/2019 and Q1/2020.

Consistent with findings for adults, large differences in home ownership (roughly 10 percentage points) and total family income were observed when comparing children from Q2/2020 to children from the two earlier calendar quarters. Children from Q2/2020 were less likely to reside in households that were owned or were being bought compared with children from Q2/2019 and Q1/2020. Similarly, children from Q2/2020 were more likely to be from families with incomes of \$100,000 or more compared with children from Q2/2019 and Q1/2020. Conversely, children from Q2/2020 were less likely to be from families with incomes less than \$35,000 than children from Q2/2019 and Q1/2020, and less likely to be from families with incomes from \$35,000 to less than \$75,000 compared with children from Q2/2019 (26.2%).

Finally, differences were also observed for household size when comparing Q2/2020 children to their counterparts from the earlier quarters. The Q2/2020 children were less likely to reside in two-person households and more likely to reside in households with four or more persons compared with Q2/2019 children.

Summary of Bias Assessment

A common theme emerged across the analysis of adult and child sociodemographic characteristics: lower socioeconomic status households appear to be under-represented in the responding Q2/2020 sample, most notably observed for home ownership and total family income. This finding is consistent with the expected bias resulting from omitting non-telephone households, and may also be related to increased nonresponse, if lower-income households are less likely to respond under the modified interviewing procedures. Nonresponse bias may also occur because efforts to identify telephone numbers associated with sampled addresses tend to be more difficult for renters and persons who have resided at their current address for only a short time.

Differences were also observed for measures such as age and educational attainment of adults. Younger adults and those with lower educational attainment appear to be under-represented in the responding Q2/2020 sample.

Table 2. Comparisons of Select Sociodemographic Characteristics Among Children Under 18 Years of Age between Quarter 2, 2020, and Quarter 2, 2019, and between Quarter 2, 2020, and Quarter 1, 2020: NHIS

Variable	Quarter 2, 2019		Quarter 1, 2020		Quarter 2, 2020	
	%	SE	%	SE	%	SE
Age group						
0-4	25.9	0.93	26.1	0.88	24.0	1.26
5-11	35.4	0.86	35.1	1.11	33.4	1.10
12-17	38.7	1.03	38.8	1.04	^{†,§} 42.6	1.31
Male	51.5	1.02	50.5	1.05	50.8	1.45
Race and Hispanic origin						
Hispanic	25.1	2.25	26.3	2.56	21.0	2.17
Non-Hispanic white	52.6	2.40	50.3	2.55	55.1	2.60
Non-Hispanic black	10.5	0.98	10.0	0.98	9.3	0.94
Non-Hispanic other	11.9	1.06	13.3	0.92	14.6	1.42
U.S. born	95.8	0.49	96.1	0.45	96.4	0.55
U.S. citizen	97.6	0.38	98.0	0.3	98.0	0.40
Years at current residence						
Less than 1 year	14.9	0.76	12.9	0.72	^{†,§} 9.6	0.75
1 to 3 years	34.5	1.24	34.9	1.04	32.6	1.37
4 to 10 years	34.7	1.12	36.4	0.99	^{†,§} 40.2	1.45
11 to 17 years	15.9	0.84	15.7	0.76	17.7	1.3
Own or buying residence	63.6	1.58	64.8	2.12	^{†,§} 74.7	1.86
Total family income						
Less than \$35,000	21.4	0.98	17.2	1.01	^{†,§} 11.6	0.92
\$35,000 - < \$75,000	26.2	1.05	22.8	1.06	[†] 22.4	1.40
\$75,000 - < \$100,000	13.1	0.78	10.9	0.69	11.7	0.90
\$100,000 or more	32.9	1.36	38.3	1.67	^{†,§} 42.5	1.70
Unknown	6.4	0.57	10.8	0.92	[†] 11.8	1.06
Household size						
2 persons	8.2	0.63	6.3	0.51	[†] 6.6	0.61
3 persons	28.2	0.86	27.5	1.05	26.5	1.14
4 or more persons	63.6	1.00	66.1	1.13	[†] 66.9	1.28
Region						
Northeast	16.2	3.90	16.4	4.24	18.7	4.55
Midwest	20.5	3.47	19.9	3.39	19.9	3.86
South	37.0	4.52	35.2	4.45	33.4	4.39
West	26.3	5.01	28.6	5.16	27.9	5.14
Metropolitan statistical area (MSA) status						
Large MSA	42.1	2.21	42.7	2.31	41.9	2.43
Small MSA	44.3	1.99	46.1	2.02	46.9	2.14
Non-MSA	13.5	1.57	11.2	1.37	11.2	1.58

Note. SE = standard error; estimates are weighted by the initial household base weight which represents the inverse of the probability of household selection.

[†] Significantly different from Quarter 2, 2019 estimate ($p < 0.10$).

[§] Significantly different from Quarter 1, 2020 estimate ($p < 0.10$).

Current NHIS weighting procedures include steps that calibrate the estimates to match U.S. Census Bureau population estimates for age and educational attainment, among other characteristics. No such adjustment presently exists for factors such as family income or housing tenure. Population estimates for both income and housing tenure are available as American Community Survey (ACS) 1-year estimates. However, given the high rate of missing responses to the NHIS total family income question, adding it as a calibration dimension was not considered. Housing tenure, however, has a far lower rate of item missingness and was therefore considered a candidate for calibration. The next section describes the impact of adding housing tenure to the NHIS sample weighting procedures.

The Impact of Housing Tenure

To examine the impact of including housing tenure in the weighting procedures, NHIS ER estimates from Q2/2020 were calculated using the current weighting procedures (in which sampling weights are adjusted for nonresponse and then raked to external population control totals by age, sex, race and Hispanic origin, Census division, and metropolitan statistical area (MSA) status for the sample adult and sample child weights, plus educational attainment for the sample adult weights). The Q2/2020 estimates were then recalculated using updated weights that additionally included housing tenure in the raking dimensions. Using Q1/2020 estimates as a benchmark (under the assumption that differences between Q2/2020 and Q1/2020 were due to the modified interviewing procedures), both sets of Q2/2020 estimates were compared to Q1/2020 estimates. Since some fluctuation in quarterly estimates is normal and expected, we provide context to some findings by noting the magnitude of differences between the same estimates for Q2 and Q1 of 2019. (ER estimates for Q1 and Q2/2019 can be found here: <https://www.cdc.gov/nchs/nhis/releases.htm>).

The top portion of Table 3 presents estimates of Health Insurance coverage, separately for adults (aged 18-64) and children (aged 0-17), for Q1/2020, Q2/2020 (without tenure), and Q2/2020 (with tenure). Compared to Q1/2020, there were no significant differences in either Q2 estimate for the various health insurance indicators among either adults or children. Among children, however, the Q2/2020 estimate of public coverage (without tenure) was 2.6 percentage points lower than the Q1 estimate, while the Q2 estimate of private coverage (without tenure) was 3.5 percentage points higher than the Q1 estimate. These differences are considerably larger than those observed between Q2 and Q1 of 2019 (1.7 and 1.0 percentage points, respectively). When tenure is added to the weighting procedures, the differences between Q2 and Q1 estimates are lower than those observed between Q1 and Q2/2019 (0.5 and 0.1 percentage points, respectively). Estimates of uninsurance differed little by quarter.

Health insurance estimates among 18-64-year-olds were less consistent. Private insurance was more consistent between Q1 and Q2 (tenure) compared to Q2 (no tenure), however the Q2 (tenure) estimate of public coverage (21.4%) was higher compared to Q1/2020 (20.3%) and Q2 (no tenure; 20.7%). Both Q2 estimates of uninsured (with tenure=13.0%, without tenure=12.7%) were lower compared to Q1/2020 (13.9%), although these differences were not statistically significant. In all, the magnitude of differences observed here are in line with differences observed from the same period in 2019.

Among the Health Status variables, estimates for disability, asthma episode, and diagnosed hypertension were generally consistent between Q1/2020 and both Q2 estimates. Estimates for six or more workdays missed was lower for both Q2 (no tenure) (10.9%) and Q2 (tenure) (11.0) compared to Q1 (12.1%) but these differences were not statistically significant. Conversely, regular feelings of anxiety

Table 3. National Health Interview Survey Early Release Program Estimates in Quarter 1, 2020 and in Quarter 2, 2020 by Housing Tenure Inclusion in Weighting Adjustments

ER Indicator	Quarter 1, 2020		Quarter 2, 2020 without Tenure		Quarter 2, 2020 with Tenure	
	%	SE	%	SE	%	SE
Health insurance						
Ages 0-17						
Public coverage	40.9	1.55	38.3	1.95	41.3	2.03
Private coverage	56.2	1.50	59.7	1.81	56.2	1.89
Uninsured	4.8	0.57	4.5	0.61	4.7	0.67
Ages 18-64						
Public coverage	20.3	0.71	20.7	0.93	21.4	0.96
Private coverage	67.9	0.85	68.8	1.05	67.8	1.04
Uninsured	13.9	0.59	12.7	0.87	13.0	0.87
Health status (ages 18 and older)						
Disability status	9.2	0.39	9.3	0.44	9.5	0.44
Six or more workdays missed due to health in the past 12 months	12.1	0.43	10.9	0.60	11.0	0.61
Asthma episode	3.6	0.26	3.3	0.25	3.4	0.26
Diagnosed hypertension	26.1	0.57	26.2	0.67	26.3	0.69
Regularly experienced chronic pain	22.6	0.54	[†] 20.9	0.73	21.3	0.73
Regularly had feelings of nervousness, worry, or anxiety	10.4	0.44	11.0	0.53	11.2	0.53
Regularly had feelings of depression	4.5	0.27	[†] 3.7	0.32	3.9	0.33
Health care service use (ages 18 and older)						
Counseled by a mental health professional	9.7	0.41	10.1	0.52	10.2	0.54
Dental exam or cleaning	64.0	0.62	64.5	0.82	63.9	0.83
Receipt of influenza vaccination	49.4	0.66	49.2	0.87	49.1	0.89
Doctor visit	84.7	0.56	83.8	0.72	83.7	0.71
Hospital emergency department visit	20.8	0.57	[†] 19.0	0.67	[†] 19.2	0.69
Health care service access (ages 18 and older)						
Did not get needed medical care due to cost	7.5	0.35	[†] 6.0	0.44	[†] 6.2	0.45
Did not get needed mental health care due to cost	4.7	0.30	4.0	0.40	4.1	0.41
Did not take medication as prescribed to save money	10.0	0.41	[†] 8.3	0.72	[†] 8.5	0.73
Health behaviors (ages 18 and older)						
Current cigarette smoking	13.8	0.47	[†] 11.9	0.68	[†] 12.2	0.69
Current electronic cigarette use	3.7	0.29	3.5	0.34	3.6	0.33

Notes. SE = standard error

[†] Significantly different from 2020, Quarter 1 estimate (p < 0.10).

were higher for both Q2 (no tenure) (11.0%) and Q2 (tenure) (11.2%) compared to Q1 (10.4%), but again differences were not statistically significant. However, Q2 estimates without tenure were significantly lower for regularly experienced chronic pain and regular feelings of depression compared to Q1. Adjusting for tenure resulted in estimates that were still lower than Q1 (21.1% vs. 22.6% for chronic pain, and 3.9% vs. 4.5% for depression) but were increased slightly compared to Q2 without tenure, and no longer statistically significant.

Of the five Health Care Service Use variables, only one significant difference was observed between Q2/2020 and Q1/2020: a lower percentage of Q2 adults reported a hospital emergency department (ED) visit, regardless if housing tenure was included in the weighting procedures. As for estimates of counseled by a mental health professional, receipt of the influenza vaccination, and a doctor visit in the past year, no significant differences emerged between Q1 and Q2 estimates. Furthermore, the addition of tenure had little to no impact on the Q2 estimate. Finally, while the percentage of adults reporting a dental exam and cleaning in the past year was not significantly different between Q1 (64.0%) and Q2 (without tenure=64.5%; with tenure=63.9%).

Of the three Health Care Service Access indicators, two significant differences were observed between Q2 and Q1. Q2/2020 adults were less likely to not get needed medical care (without tenure=6.0%, with tenure=6.2%) and less likely to not take medication as prescribed to save money (without tenure=8.3%, with tenure=8.5%) compared with Q1/2020 adults (7.5% and 10.0%, respectively). The addition of housing tenure moved the Q2 estimates slightly closer to the Q1 estimates, but the differences between Q1 and Q2 remained statistically significant.

Finally, for the two health behavior variables assessed, estimates of e-cigarette use were fairly consistent between Q1 and both Q2 estimates, whereas current cigarette smoking was significantly lower for Q2 (no tenure) (11.9%) and Q2 (tenure) (12.2%) compared to Q1 (13.8%). The addition of tenure brings the difference between Q2 and Q1 more in line with the difference observed between Q2 and Q1 of 2019 (0.7 percentage points).

Discussion

Across the indicators assessed in Table 3, there was some variation between Q1 and the initial Q2 estimates without adjustment for housing tenure. However, for most indicators (17 out of 23), estimates were either generally consistent or there were no statistically significant differences between Q1 and Q2 estimates either with or without adjustment for tenure, with differences between Q2 and Q1 largely in line with the magnitude of differences observed between the same quarters in 2019. Again, some fluctuation in estimates by quarter is normal as evidenced by differences between Q2 and Q1 of 2019. For the other six indicators, Q2 estimates without adjustment for tenure were significantly different (most were lower) compared to Q1 and further adjustment for housing tenure resulted in non-significant differences for two of these while the other four remained significantly different. For these four estimates, however, the additional adjustment for housing tenure reduced the difference in estimates between Q2 and Q1, moving closer to the magnitude of differences observed between Q2 and Q1/2019. Furthermore, while the average difference between Q2 (without tenure) and Q1 estimates was one percentage point, this dropped to seven-tenths of a percentage point with the addition of tenure, the same average difference in estimates between Q2 and Q1 of 2019. This suggests that on balance, adding housing tenure to the weighting procedure is beneficial, or does little to no harm, to the accuracy of the ER estimates.

In addition, NCHS considers the estimates of health insurance coverage to be among the most important estimates that NHIS produces. Although health insurance coverage differences for adults and children were not significant between Q1/2020 and Q2/2020, both with and without adjustment for housing tenure, there was an observed pattern of differences. The Q2 estimate for private coverage among children (without adjusting for housing tenure) was 3.5 percentage points higher than the Q1 estimate. Conversely, the Q2 estimate of public coverage was 2.6 percentage points lower compared to Q1. Both differences are larger than anticipated given the magnitude of differences observed for these estimates between Q2 and Q1/2019 (1.7 and 1.0 percentage points, respectively). With the addition of housing tenure to the weighting procedures, large differences were mitigated and brought more in line with differences observed for the same period in 2019. These findings were enough to determine that it was appropriate to include housing tenure in the weighting procedures.

For adults, rates of uninsurance, public coverage, and private coverage all varied between Q2 and Q1, with or without the addition of tenure in the weighting procedures, but all differences were similar in magnitude to those observed between Q2 and Q1 of 2019.

In all, the findings provide some indication that the inclusion of housing tenure in the weighting procedures may reduce nonresponse bias. However, the addition of tenure did not completely mitigate differences, suggesting that the Q2/2020 estimates may have been affected by changes in survey administration due to COVID-19 to such an extent that there remains some potential for bias.

Conclusion

Including housing tenure in the weighting procedures appears to reduce some of the bias that may have been introduced with the modified interviewing procedures that were undertaken in the beginning of the COVID-19 pandemic. Accordingly, the official Q2/2020 Early Release estimates are calculated using the modified weighting procedures, including housing tenure in the raking dimensions. However, the potential for bias remains, as suggested by lingering significant differences between Q2/2020 and Q1/2020 estimates for current cigarette smoking, hospital ED visit, did not get needed medical care due to cost, and did not take medication as prescribed to save money. Differences between Q1/2020 and Q2/2020 could also be due to real changes in health behaviors and health care seeking behaviors that were associated with other pandemic-related behavior changes. Data users should note that additional bias in these estimates may still exist and cannot be eliminated.