2022-2023 National Survey of Family Growth (NSFG):

Nonresponse Bias Analysis

Prepared Under Contract #75D30120C09732 for:

National Center for Health Statistics (NCHS)

Centers for Disease Control and Prevention

3311 Toledo Road

Hyattsville, MD 20782

Prepared by:

Andy Peytchev, Jennifer Cooney, Taylor Lewis

RTI International

3040 East Cornwallis Road

Research Triangle Park, NC 27709-2194

In collaboration with:

Joyce Abma, Gladys Martinez, Hee-Choon Shin

NCHS

April 2026

Table of Contents

1. Introduction

For background information on the purpose, content, and sponsorship of the NSFG, please see the main NSFG webpage, specifically the "About NSFG" section and the User's Guide for 2022-2023. Further details on the design and conduct of the 2022-2023 NSFG can be found in the Study Design and Data Collection Procedures report. The current report examines survey participation and potential for nonresponse bias for the 2022-2023 NSFG, and addresses an Office of Management and Budget (OMB) requirement when the unit response rate of 80% is not achieved (Office of Management and Budget 2006).

Sample design and data collection for the 2022-2023 NSFG were conducted by RTI International under a contract with NCHS, which covers 2020-2030, including 8 years of data collection 2022-2029. Data collection for the 2022-2023 survey began in January 2022 and continued through December 2023 yielding data files based on two years (or eight quarters) of completed surveys. Surveys were completed with a national probability sample of women and men 15-49 years of age living in households in the United States. The 9,957 completed surveys (5,586 with women and 4,371 with men) were administered by web on whatever device the respondent chose, or in person (face-to-face, or FTF) by trained interviewers using tablet computers, a procedure called computer-assisted personal interviewing (CAPI). Within FTF mode, a subset of the more sensitive questions was administered using computer-assisted self-interviewing (CASI) in which respondents answered the questions by themselves on the tablet computer. In the web mode, respondents completed the entire survey by themselves. In 2022-2023, the completed surveys for female respondents averaged 74 minutes in length, and those for male respondents averaged 48 minutes, both lower than the average survey lengths of 75 minutes for females and 50 minutes for males approved by the Office of Management and Budget (OMB No. 0920-0314). About 5% of main survey respondents (452 out of 9,957) completed the survey in Spanish, which is the other language accommodated in the NSFG protocol.

The 2022-2023 NSFG data collection marked the introduction of a web and FTF multimode data collection design. The continuous data collection approach with four quarters per year was retained from the 2011-2019 NSFG. To accommodate a 4-week web-only data collection phase at the start of each quarter and to allow time for multiple mail invitations and nonresponse follow-ups for the web survey, each quarterly data collection included three instead of two phases (as in 2011-2019) and continued for 16 weeks rather than 12 weeks. As a result, the four 16-week quarters each year overlapped by 4 weeks; for example, Phase 3 of quarter 1 overlapped with Phase 1 of quarter 2. This overlapping design also allowed for continuous workload for interviewers.

The web-only data collection in Phase 1 took place in the first four weeks of data collection. In-person data collection was introduced in Phase 2 in week 5 for 8 weeks, along with ongoing web data collection. Phase 3 started in week 13 for a subsample of screener and main survey nonrespondents, continuing to use web and in-person data collection, but with increased incentives. Screener and main survey data collection concluded at the end of week 16. These phases, durations, and schedule are shown in Figure 1.

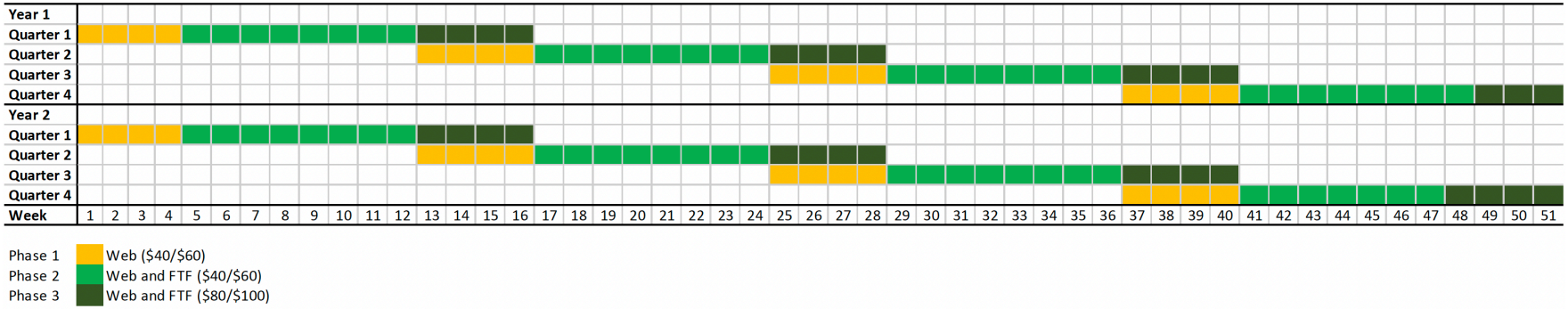

Figure 1. 2022-2023 NSFG Multimode Design

This report summarizes features of the design intended to mitigate nonresponse and nonresponse bias, and analyses that were conducted to investigate nonresponse patterns and assess potential nonresponse bias in the 2022-2023 NSFG. First, weighted response rates are presented, followed by several analyses, presenting a variety of approaches to assess nonresponse bias. These analyses reflect guidelines included in "Best Practices for Nonresponse Bias Reporting" (Madans et al. 2023) and in reports cited in that document. Analyses include comparison of socio-demographic characteristics to benchmark data for analogous characteristics, comparison of survey estimates to those from another survey, comparison to administrative data, and two strategies to reduce nonresponse that took place during data collection: an experiment on increased incentives, and a nonresponse follow-up study.

2. Response Rates

Survey nonresponse provides the potential for nonresponse bias—the degree to which the estimates based on the data collected from those who participated in the survey differ from those that would have been obtained if all sampled households and individuals had participated. While there is lack of evidence of a link between nonresponse rates and nonresponse bias (Groves and Peytcheva 2008), higher nonresponse rates provide *potential* for larger nonresponse bias in an estimate (Brick and Tourangeau 2017). Nonresponse bias in an estimate of the mean can be expressed as the product of the nonresponse rate and the difference between respondents and nonrespondents; on a given study, lower response rates can result in larger nonresponse bias, unless the difference between the respondent and nonrespondent means is reduced. While response rates have historically declined for household surveys (e.g., Williams and Brick 2018), including NSFG, the NSFG has implemented design features to reduce the differences between respondents and nonrespondents, hence reducing the risk of nonresponse bias. These features include: the inclusion of a phase (in this study, Phase 3) in each data collection quarter during which a subsample of nonrespondents from a prior phase (in this study, Phases 1 and 2) is offered an increased incentive; and an experiment to evaluate an increase in the *initial* incentive amount used in Phases 1 and 2. Experiments have shown that incentives can increase participation particularly among those who are less interested in the topic of the survey (Groves, Singer, and Corning 2000; Groves, Presser, and Dipko 2004; Groves et al. 2006).

The NSFG sampling design includes oversampling of areas (e.g., areas with greater concentration of non-Hispanic Black individuals) and individuals (e.g., females) that need to be accounted for in the calculation of response rates, which is done through weighting. For more details on the sampling design for the 2022-2023 NSFG, see the Sample Design report. The weighted household screener response rate for the 2022-2023 NSFG was 49.4% and among those individuals selected for the main survey, the weighted main survey response rate was 54.3%. The overall AAPOR Response Rate 4 (AAPOR 2023) is the product of the household screener and main survey response rates, 26.8%. For more details on the calculation of the response rates for the 2022-2023 NSFG, see the Study Design and Data Collection Procedures report and for weighting procedures, see the Weighting Methodology report.

Table 1. Weighted screener, main survey, and overall response rates.

	Screener	Main Survey	Overall
Weighted Response Rate (%)	49.4	54.3	26.8

The NSFG employs a national sampling design that permits estimates for the four regions of the U.S. but not smaller subnational units. Weighted response rates for Census regions ranged between 29.5% for the West region and 22.2% for the Northeast region that includes New York and New Jersey.

Table 2. Weighted overall response rates by Census Region.

	Screener (%)	Main Survey (%)	Overall (%)
1: Northeast	44.3	50.1	22.2
2: Midwest	50.5	55.0	27.8
3: South	49.6	54.5	27.0
4: West	53.1	55.6	29.5

Weighted response rates were calculated by sex and age group for the main survey conditional on screener completion, using sex and age reported in the screener, shown in Table 2. The largest differences in response rates were between those 15-19 years of age and those 20 and older. The vast majority of those 15-19 years of age were minors, requiring parental/legal guardian consent.

Table 3. Weighted main survey response rates by sex and age group.

Age group	Female (%)	Male (%)	Total (%)
15-19	48.0	47.0	47.2
20-49	55.8	55.3	55.6
Total	54.7	54.0	54.3

Table 4 shows that the lower main survey response rate for those 15-19 years of age is most pronounced during Phase 1 (16.7% compared to 25% for those 20 and older – a difference of 8.3 percentage points), when data collection—and parental consent—are only by web. The difference in main survey response rates for 15-19 years of age and those 20-49 is much smaller in Phase 2 (1.2 percentage points difference) and moderately smaller in Phase 3 (4.1 percentage points difference), when in-person data collection is introduced. A similar finding is observed for the West region for which the Phase 1 main survey response rate was lowest (18.2%, compared to 25.9%, 27.3%, and 25.4% for the other three regions). In Phase 2 and in Phase 3 the West region main survey response rates were the highest. However, the Northeast region's response rates, while somewhat average in Phase 1, were the lowest in Phases 2 and 3.

Table 4. Weighted main survey response rates by age group, region, and overall by phase.

	Phase 1 (%)	Phase 2 (%)	Phases 1&2 (%)	Phase 3 (%)	Overall (%)
Age group					
15-19	16.7	19.9	33.3	20.8	47.2
20-49	25.0	21.1	40.8	24.9	55.6
Region					
1: Northeast	25.9	18.2	39.4	17.7	50.1
2: Midwest	27.3	19.3	41.4	23.2	55.0
3: South	25.4	19.1	39.6	24.6	54.5
4: West	18.2	25.1	38.7	27.6	55.6
Overall	23.8	20.9	39.7	24.2	54.3

3. Demographic Characteristics and Other Estimates: Comparison to Benchmark Data, by Study Design Phase

Departures of respondent distributions from known population distributions on socio-demographic characteristics and even survey-related estimates do not necessarily imply nonresponse bias in key survey estimates but are helpful to identify groups that are less likely to respond. Estimates of socio-demographic characteristics and other variables for NSFG respondents at each phase of data collection, prior to any weighting adjustments for nonresponse, were compared to population-based estimates from the 2022 and 2023 American Community Survey (ACS), as shown in Table 5. The ACS replaced the Decennial Census long-form with a continuous data collection with approximately 3.5 million sampled addresses and 2 million responding households, with subsampling of nonrespondents similarly to NSFG. Like the Decennial Census, it is a mandatory survey, achieving high response rates and making it suitable for benchmark analyses for nonresponse. The ACS response rates were 84.4% in 2022 and 84.7% in 2023. To account for the sampling design which includes oversampling of females, teens, and non-Hispanic Black individuals, NSFG data were weighted using selection weights, but prior to applying nonresponse adjustments and calibration to known population demographic distributions.

Table 5. Selection-weighted socio-demographic characteristics of 2022-2023 NSFG respondents and 2022-2023 American Community Survey benchmark estimates.1-3

	Phase 1			Phase 1&2			Phase 1-3			ACS		Phase 1 vs. ACS		Phase 1&2 vs. ACS		Phase 1-3 vs. ACS	
Characteristic	**Count**	**%**	**SE**	**Count**	**%**	**SE**	**Count**	**%**	**SE**	**%**	**SE**	**Diff**	**p-value**	**Diff**	**p-value**	**Diff**	**p-value**
Sex																	
Male	2,118	48.7	0.98	3,743	48.6	0.86	4,371	48.5	0.73	50.3	0.01	-1.6	0.101	-1.7	0.053	-1.7	0.018
Female	2,791	51.3	0.98	4,730	51.4	0.86	5,586	51.5	0.73	49.7	0.01	1.6	0.101	1.7	0.053	1.7	0.018
Age Group																	
15-19	570	10.5	0.65	1,220	12.5	0.61	1,429	12.9	0.56	13.5	0.01	-3.0	0.000	-1.0	0.114	-0.6	0.321
20-29	1,198	25.1	0.80	2,085	25.0	0.75	2,486	25.6	0.70	28.4	0.01	-3.3	0.000	-3.4	0.000	-2.8	0.000
30-39	1,785	34.2	1.14	2,962	33.3	0.83	3,457	33.0	0.76	30.4	0.01	3.8	0.001	3.0	0.000	2.7	0.000
40-49	1,356	30.2	1.00	2,206	29.2	0.81	2,585	28.5	0.82	27.7	0.01	2.5	0.012	1.4	0.074	0.7	0.369
Race/Ethnicity																	
Hispanic	773	15.2	1.61	1,727	19.6	1.87	2,105	21.7	2.28	22.3	0.00	-7.1	0.000	-2.7	0.146	-0.6	0.779
Non-Hispanic White	2,949	63.7	2.19	4,477	57.0	2.27	5,148	54.7	2.47	52.8	0.01	10.9	0.000	4.2	0.063	2.0	0.429
Non-Hispanic Black	529	6.4	0.62	1,103	8.0	0.66	1,366	8.7	0.88	12.4	0.01	-6.0	0.000	-4.3	0.000	-3.7	0.000
Other[1]	658	14.7	1.59	1,166	15.3	1.60	1,338	14.8	1.59	12.5	0.01	2.2	0.165	2.9	0.073	2.4	0.138
Education																	
No high school diploma	524	9.7	0.61	1,242	13.4	0.78	1,506	14.4	0.78	17.1	0.02	-7.3	0.000	-3.6	0.000	-2.7	0.001
HS diploma or GED	800	16.6	1.01	1,543	17.9	0.84	1,900	19.1	0.77	23.7	0.03	-7.1	0.000	-5.9	0.000	-4.7	0.000
Some college	1,301	26.8	1.17	2,323	27.4	0.87	2,770	28.9	0.94	26.9	0.02	-0.1	0.945	0.6	0.525	2.0	0.036
Bachelor's or higher	2,284	46.9	1.66	3,365	41.2	1.80	3,781	37.7	1.78	32.3	0.04	14.5	0.000	8.9	0.000	5.4	0.003
Education - MALE																	
No high school diploma	226	10.0	0.88	584	14.9	1.20	714	16.3	1.13	18.3	0.02	-8.3	0.000	-3.4	0.004	-2.0	0.081
HS diploma or GED	394	19.2	1.48	770	20.1	1.06	940	21.5	0.98	26.7	0.03	-7.4	0.000	-6.6	0.000	-5.1	0.000
Some college	575	25.6	1.30	1,012	26.0	0.97	1,179	26.7	1.07	26.1	0.03	-0.4	0.736	-0.1	0.925	0.6	0.558
Bachelor's or higher	923	45.1	2.12	1,377	39.1	2.02	1,538	35.4	1.94	29.0	0.04	16.2	0.000	10.1	0.000	6.5	0.001
Education - FEMALE																	
No high school diploma	298	9.5	0.79	658	12.1	0.75	792	12.5	0.77	15.8	0.02	-6.3	0.000	-3.7	0.000	-3.3	0.000
HS diploma or GED	406	14.1	1.31	773	15.8	1.06	960	16.7	0.99	20.8	0.03	-6.7	0.000	-5.0	0.000	-4.0	0.000
Some college	726	27.9	1.47	1,311	28.8	1.14	1,591	30.9	1.21	27.7	0.03	0.2	0.889	1.1	0.329	3.2	0.008
Bachelor's or higher	1,361	48.5	1.95	1,988	43.3	1.93	2,243	39.8	1.97	35.7	0.05	12.8	0.000	7.5	0.000	4.1	0.038
Marital Status																	
Married	1,937	47.6	1.33	3,025	43.7	1.08	3,502	42.6	1.05	39.9	0.04	7.7	0.000	3.8	0.000	2.7	0.011
Not currently married	2,968	52.4	1.33	5,437	56.3	1.08	6,439	57.4	1.05	60.1	0.04	-7.7	0.000	-3.8	0.000	-2.7	0.011

Table 5. (continued)

Characteristic	Phase 1			Phase 1&2			Phase 1-3			ACS		Phase 1 vs. ACS		Phase 1&2 vs. ACS		Phase 1-3 vs. ACS	
	Count	%	SE	Count	%	SE	Count	%	SE	%	SE	Diff	p-value	Diff	p-value	Diff	p-value
Had a birth in the past 12 months - FEMALE Only																	
Yes	142	2.8	0.39	260	2.9	0.27	311	2.8	0.23	5.3	0.03	-2.5	0.000	-2.4	0.000	-2.5	0.000
No	4,767	97.2	0.39	8,213	97.1	0.27	9,646	97.2	0.23	94.7	0.03	2.5	0.000	2.4	0.000	2.5	0.000
Health insurance coverage																	
Yes	4,402	90.7	0.84	7,495	89.3	0.83	8,754	87.5	1.06	88.1	0.03	2.6	0.002	1.3	0.128	-0.6	0.580
No	507	9.3	0.84	978	10.7	0.83	1,203	12.5	1.06	11.9	0.03	-2.6	0.002	-1.3	0.128	0.6	0.580
Worked last week																	
Yes	3,459	73.6	1.22	5,798	71.6	0.95	6,833	72.2	0.82	75.9	0.02	-2.3	0.060	-4.3	0.000	-3.6	0.000
No	1,414	26.4	1.22	2,586	28.4	0.95	3,007	27.8	0.82	24.1	0.02	2.3	0.060	4.3	0.000	3.6	0.000
Region																	
Northeast	655	15.1	2.70	958	13.7	2.29	1,100	12.8	2.15	17.3	0.00	-2.3	0.404	-3.6	0.116	-4.6	0.034
Midwest	935	24.5	3.37	1,459	22.2	2.98	1,674	21.6	3.01	21.4	0.00	3.1	0.356	0.8	0.784	0.2	0.953
South	2,275	37.7	4.14	3,709	35.2	4.04	4,355	35.4	4.09	39.3	0.00	-1.5	0.710	-4.0	0.317	-3.9	0.343
West	1,044	22.7	3.27	2,347	28.8	3.99	2,828	30.3	3.98	22.0	0.00	0.7	0.836	6.8	0.087	8.3	0.038
Currently cohabiting with an opposite-sex partner																	
Yes	461	10.4	0.67	839	11.0	0.47	1,002	11.6	0.61	6.9	0.01	3.5	0.000	4.2	0.000	4.8	0.000
No	4,448	89.6	0.67	7,634	89.0	0.47	8,955	88.4	0.61	93.1	0.01	-3.5	0.000	-4.2	0.000	-4.8	0.000

[1] Non-Hispanic Asian, Pacific Islander, American Indican or Alaskan Native, multiracial, or other race/ethnicity groups.

While not all estimates saw reductions in differences with each consecutive data collection phase, several of the largest differences were substantially reduced after Phase 2 and further after Phase 3, including education and marital status. For example, individuals with a Bachelor's degree or higher were over-represented by 14.6 percentage points at the end of Phase 1, which was reduced to 8.9 percentage points at the end of Phase 2, and 5.4 percentage points at the end of Phase 3. For those reporting to be married, the difference was reduced from 7.7, to 3.8, and to 2.7 percentage points after each phase. For other estimates, such as for currently cohabiting with an opposite-sex partner, the difference increased in magnitude from 3.5 to 4.7 percentage points across the phases. For this variable, most of the difference between the NSFG selection-weighted estimate and ACS was present in Phase 1, and the estimate changed little after each successive phase (10.4%, 11.0%, and 11.6%). The questions in the two surveys are quite different, asking about marital status of the selected respondent in NSFG and asking about each household member's relationship to the person completing the ACS. For Region the difference increased with phase for West (0.7, 6.8, and 8.3 percentage points with successive phases) and Northeast (2.3, 3.6 and 4.5 percentage points with successive phases) regions, although those differences were not significantly different compared to the ACS (at the p<.01 level), and the difference decreased for the Midwest region (3.1, 0.8, and 0.2 with successive phases).

The next analysis shown in Table 6, presents the same socio-demographic characteristics of respondents, weighted with final weights, alongside analogous estimates from the 2022-2023 ACS. Since these are final weighted estmates, the differences are now referred to as bias.

Table 6. Final-weighted socio-demographic characteristics of 2022-2023 NSFG respondents and 2022-2023 American Community Survey benchmark estimates.

	NSFG			ACS		NSFG vs. ACS	
Characteristic	**Count**	**%**	**SE**	**%**	**SE**	**Bias**	**p-value**
Sex							
Male	4,371	50.3	0.62	50.3	0.01	0.0	0.979
Female	5,586	49.7	0.62	49.7	0.01	0.0	0.979
Age Group							
15-19	1,429	14.2	0.52	13.5	0.01	0.7	0.164
20-29	2,486	29.0	0.77	28.4	0.01	0.6	0.411
30-39	3,457	29.7	0.62	30.4	0.01	-0.7	0.276
40-49	2,585	27.1	0.67	27.7	0.01	-0.7	0.310
Race/Ethnicity							
Hispanic	2,105	22.0	1.98	22.3	0.00	-0.4	0.849
Non-Hispanic White	5,148	53.2	2.14	52.8	0.01	0.4	0.855
Non-Hispanic Black	1,366	12.4	1.02	12.4	0.01	0.0	0.969
Other[1]	1,338	12.4	1.29	12.5	0.01	-0.1	0.966
Education							
No high school diploma	1,506	17.2	0.73	17.1	0.02	0.1	0.861
High school diploma or GED	1,900	23.3	0.86	23.7	0.03	-0.4	0.656
Some college, no bachelor's degree	2,770	26.0	0.74	26.9	0.02	-0.9	0.236
Bachelor's degree or higher	3,781	33.5	1.62	32.3	0.04	1.1	0.486
Education - MALE							
No high school diploma	714	18.4	1.02	18.3	0.02	0.1	0.960
High school diploma or GED	940	26.3	1.13	26.7	0.03	-0.4	0.733
Some college, no bachelor's degree	1,179	24.7	0.90	26.1	0.03	-1.4	0.126
Bachelor's degree or higher	1,538	30.7	1.65	29.0	0.04	1.7	0.298

Table 6. (continued)

Characteristic	NSFG Count	NSFG %	NSFG SE	ACS %	ACS SE	NSFG vs. ACS Bias	NSFG vs. ACS p-value
Education - FEMALE							
No high school diploma	792	16.0	0.81	15.8	0.02	0.2	0.799
High school diploma or GED	960	20.4	0.99	20.8	0.03	-0.4	0.705
Some college, no bachelor's degree	1,591	27.4	0.90	27.7	0.03	-0.4	0.691
Bachelor's degree or higher	2,243	36.3	1.78	35.7	0.05	0.5	0.766
Marital Status							
Married	3,502	39.1	0.95	39.9	0.04	-0.8	0.391
Not currently married	6,439	60.9	0.95	60.1	0.04	0.8	0.391
Had a birth in the past 12 months - FEMALE Only							
Yes	311	2.7	0.19	5.3	0.03	-2.6	0.000
No	9,646	97.3	0.19	94.7	0.03	2.6	0.000
Health insurance coverage							
Yes	8,754	87.4	0.80	88.1	0.03	-0.6	0.418
No	1,203	12.6	0.80	11.9	0.03	0.6	0.418
Worked last week							
Yes	6,833	70.0	0.71	75.9	0.02	-5.8	0.000
No	3,007	30.0	0.71	24.1	0.02	5.8	0.000
Region							
Northeast	1,100	12.5	2.13	17.3	0.00	-4.8	0.025
Midwest	1,674	20.2	2.86	21.4	0.00	-1.2	0.681
South	4,355	38.2	4.00	39.3	0.00	-1.0	0.799
West	2,828	29.0	3.58	22.0	0.00	7.0	0.051
Currently cohabiting with an opposite-sex partner							
Yes	1,002	11.9	0.52	6.9	0.01	5.1	0.000
No	8,955	88.1	0.52	93.1	0.01	-5.1	0.000

[1] Non-Hispanic Asian, Pacific Islander, American Indian or Alaskan Native, multiracial, or other race/ethnicity groups.

As expected, the bias in the socio-demographic variables shown in the last two columns of Table 5 is almost eliminated in Table 6 by the adjustment for nonresponse and calibration of the weights to known population totals, for variables that were used in the adjustments. For sex, age group, race/ethnicity, overall education, and marital status categories, the bias ranged between 0 and 1.1 percentage point, including the category for Bachelor's degree or higher, which was over-represented by more than 5 percentage points in the selection-weighted data (Table 5) and reduced to 1.1 percentage point in the weighted data. For other estimates, not in the nonresponse and calibration weighting adjustments, such as having had a birth in the past 12 months (for women) and having ever cohabited with an opposite-sex partner, the bias was not reduced upon final weighting. For variables that were not used in the weight calibration, one estimate showed a larger change—worked last week—for which the difference from the ACS estimates increased. However, employment definitions are complex and it is possible that at least part of this difference can be due to measurement. The next analyses shift from socio-demographic characteristics to weighted key survey estimates, to further evaluate nonresponse bias.

4. Comparison of Survey Estimates to Another Survey

Analogous to the comparison of socio-demographic characteristics to benchmark population distributions, substantive survey estimates can be compared to those from another survey, ideally one with a higher response rate and with similar measurement methods (e.g., questions and modes). In such benchmark analyses, assumptions need to be made about the absence of competing explanations for any observed differences, such as having asked the questions in different contexts in the two surveys (e.g., Schwarz and Sudman 1992). The comparison survey data used here are from the 2022 and 2023 NHIS. Any interpretation of differences between estimates from these two surveys needs to consider that aforementioned measurement differences are likely. NSFG and NHIS focus on different topics, resulting in altered context for the questions selected for comparison, the questions themselves vary somewhat in wording between the surveys, and they are asked in different modes (web and in-person on NSFG and in-person and telephone on NHIS), among other differences.

Table 7 shows estimates for comparable age ranges from the 2022-2023 NSFG and NHIS, and comparisons between the two surveys for four variables overall and by sex, and for two female-only variables. Three of the variables showed statistically significant differences (true for overall and for males and females separately unless otherwise stated): self-rated health status; having a usual place to go when sick; and ever had a mammogram (female-only estimate). Three showed very similar percentages, with non-significant differences: ever smoked at least 100 cigarettes; ever told they had cancer; and ever had a hysterectomy (female-only estimate).

Table 7. Comparison of weighted estimates from 2022-2023 NSFG and NHIS, overall and by sex, ages 18-49

Characteristic	2022-2023 NSFG Percent	SE	2022-2023 NHIS Percent	SE	NHIS - NSFG Difference	p-value
OVERALL						
Has a usual place to go when sick	73.7	0.83	84.2	0.38	10.5	0.000
Ever had cancer	2.5	0.20	2.3	0.10	-0.2	0.429
Ever smoked at least 100 cigarettes	26.3	1.02	26.6	0.39	0.3	0.794
Self-Rated Health						
Excellent	21.6	0.69	27.8	0.37	6.2	0.000
Very Good	35.8	0.65	36.7	0.39	0.9	0.250
Good	31.3	0.65	26.4	0.37	-4.9	0.000
Fair	9.4	0.49	7.7	0.2	-1.7	0.001
Poor	1.9	0.22	1.4	0.09	-0.5	0.053
MALE						
Has a usual place to go when sick	71.1	1.17	79.8	0.51	8.7	0.000
Ever had cancer	1.7	0.25	1.6	0.13	-0.1	0.781
Ever smoked at least 100 cigarettes	30.9	1.25	31.8	0.53	0.9	0.531
Self-Rated Health						
Excellent	22.2	1.08	28.8	0.51	6.6	0.000
Very Good	34.9	0.89	37.1	0.53	2.2	0.031
Good	32.0	0.92	25.8	0.5	-6.2	0.000
Fair	9.1	0.57	7.1	0.29	-2.0	0.002
Poor	1.8	0.30	1.2	0.12	-0.6	0.071
FEMALE						
Has a usual place to go when sick	76.3	0.92	88.6	0.39	12.3	0.000
Ever had a mammogram (female only)	30.5	0.85	49.0	0.84	18.5	0.000
Ever had a hysterectomy (female only)	4.1	0.53	4.8	0.3	0.7	0.246
Ever had cancer	3.3	0.31	3.0	0.16	-0.3	0.433
Ever smoked at least 100 cigarettes	21.7	1.02	21.5	0.46	-0.2	0.875
Self-Rated Health						
Excellent	21.0	0.75	26.8	0.48	5.8	0.000
Very Good	36.8	0.93	36.3	0.52	-0.5	0.637
Good	30.6	0.90	27.0	0.48	-3.6	0.001
Fair	9.7	0.60	8.2	0.28	-1.5	0.026
Poor	1.9	0.25	1.6	0.13	-0.3	0.247

Note: Ever had a mammogram and ever had a hysterectomy were asked only in the 2023 NHIS.

5. Comparison to Administrative Data

Another type of benchmark analysis is comparison to an administrative source of data rather than a survey. The National Vital Statistics System (NVSS) contains data on registered births. The NSFG-based estimates are constructed from all births reported by female respondents over a period of five years to increase the statistical reliability of the NSFG estimates and to compare to the same period, 2017-2021, using the NVSS data tabulated by NCHS (https://www.cdc.gov/nchs/data/nsfg/quexnotes/2022-2023-NSFG-TopicSpecificNotes.pdf), some of which has been excerpted in Table 8. The NVSS counts fall within the 95% confidence intervals of the NSFG estimates for all six age groups shown.. The estimated totals are remarkably close, with the exception of the youngest and oldest age groups, which have the fewest numbers of births and therefore, sampling variance is highest.

Table 8. Number of births in 2017-2021 by age of mother, NSFG and NVSS, with NSFG 95% confidence intervals.

Age at Delivery	Number (in Thousands) of Births from NSFG	95% Confidence Interval	Number (in Thousands) of Births from Vital Records	Ratio of NSFG / Vital Records
15-19	732	(453-1,012)	851	0.86
20-24	3,615	(2,625-4,606)	3,509	1.03
25-49	14,196	(12,355-16,036)	14,298	0.99
25-29	4,847	(3,985-5,710)	5,350	0.91
30-39	8,564	(7,221-9,906)	8,307	1.03
40-49	785	(474-1,096)	641	1.22

Source: 2022-2023 NSFG Topic-Specific Notes (https://www.cdc.gov/nchs/data/nsfg/quexnotes/2022-2023-NSFG-TopicSpecificNotes.pdf)

6. Incentive Experiment

An incentive experiment was implemented from Quarter 3 of 2022 through Quarter 4 of 2023, with the main objective of increasing web participation in the multimode design. Similarly to the purpose of Phase 3 that includes an additional token of appreciation, another objective of a higher base incentive amount (starting in Phase 1 and extending through Phase 2) is to reduce nonresponse bias.

Sample addresses in Quarters 3 and 4 of 2022 were randomly assigned at equal rates to one of three incentive conditions for Phases 1 and 2: $40, $60, and $80. Response rates were monitored during data collection, finding that both $60 and $80 yielded significantly higher response rates in Phases 1 and 2 than the $40 condition, but of virtually the same magnitude. As a result, the experiment continued with two conditions in Quarters 1-4 of 2023, assigning one third of sample addresses to $40 for Phases 1 and 2, and two thirds to $60. For analysis of all six quarters of the experiment, the $60 and $80 conditions used in 2022 were combined. An additional $40 continued to be offered in Phase 3 in all experimental conditions.

The higher base incentive amount (used in Phases 1&2) increased the main survey weighted response rate by 6.6 percentage points, shown in Table 9. The overall response rate, accounting for the household screener response rate, was 2.9 percentage points higher in the $60/$80 incentive condition (29.2% vs. 26.3 in the $40 incentive condition)—a relative increase of 11% (2.9/26.3).

Table 9. Screener, main survey, and overall weighted response rates by incentive condition, NSFG 2022 Quarter 3 to 2023 Quarter 4.

	Base Incentive Condition (%)		Difference (%)	p-value
	$40 n=4,366	$60 & $80[1] n=9,312	$60/$80 - $40	
Screener	51.6	50.8	-0.8	0.119
Main Survey	50.9	57.5	6.6	<0.001
Overall Response Rate	26.3	29.2	2.9	<0.001

[1] The $80 condition was only used in Quarters 3 and 4 of 2022.

Apart from increasing response rates, another objective of an increased incentive is to bring in respondents who are different from those who are willing to participate at a lower incentive. If they are indeed different, it would provide evidence for reduction in nonresponse bias. Table 10 addresses this by presenting estimates for socio-demographic characteristics for both incentive conditions. In addition, it compares estimates for each condition to estimates from the ACS 2022-2023, to help assess whether the higher incentives bring the distributions closer to those from the benchmark.

Table 10 shows that for variables with estimates that were somewhat different from the ACS, some (education overall, education for males, worked last week, and region) showed some reduction of differences from the ACS with the higher incentives, and for the rest there was no or little change with the incentive, and for a few categories, a larger difference with the higher incentives. Education is a characteristic with one of the largest imbalances in survey participation, and the higher incentive amounts achieved much higher participation among those who participated at much lower rates (those with a high school diploma or less). For example, for the category "HS diploma or GED," the difference from the ACS percentage was reduced from 2.4 percentage points for the lower incentive, to 0.5 percentage points for the higher incentives. The distribution became more balanced for males' education in particular: For males with a Bachelor's degree or higher the bias was reduced from 10 to 8 percentage points. As another example, for having worked in the past week the bias was reduced from 8 to 4 percentage points.

Table 10. Weighted socio-demographic characteristics of 2022-2023 NSFG respondents, by incentive condition, compared to 2022-2023 American Community Survey benchmark estimates: 2022 Quarter 3 to 2023 Quarter 4.

	$40 Incentive			$60/80[1] Incentive			ACS		$40 Incentive vs. ACS		$60/80 Incentive vs. ACS	
Characteristic	**Count**	**%**	**SE**	**Count**	**%**	**SE**	**%**	**SE**	**Bias**	**p-value**	**Bias**	**p-value**
Sex												
Male	1,585	50.9	1.21	3,512	49.3	0.80	50.3	0.01	0.6	0.605	-1.0	0.211
Female	1,129	49.1	1.21	2,800	50.7	0.80	49.7	0.01	-0.6	0.605	1.0	0.211
Age Group												
15-19	371	13.2	0.94	929	14.5	0.64	13.5	0.01	-0.3	0.773	1.0	0.126
20-29	655	29.0	1.30	1,583	28.9	0.95	28.4	0.01	0.5	0.677	0.5	0.614
30-39	964	30.8	0.98	2,171	29.0	0.74	30.4	0.01	0.4	0.678	-1.4	0.060
40-49	724	27.0	1.16	1,629	27.6	0.90	27.7	0.01	-0.7	0.559	-0.1	0.928
Race/Ethnicity												
Hispanic	568	22.4	2.24	1,371	22.9	2.19	22.3	0.00	0.0	0.991	0.5	0.809
Non-Hispanic White	1,426	53.0	2.62	3,172	51.4	2.39	52.8	0.01	0.2	0.927	-1.4	0.559
Non-Hispanic Black	358	12.1	1.19	918	13.3	1.14	12.4	0.01	-0.3	0.828	0.9	0.412
Other[2]	362	12.5	1.90	851	12.4	1.47	12.5	0.01	0.0	0.998	-0.1	0.966
Education												
No high school diploma	382	16.4	1.30	988	17.7	0.86	17.1	0.02	-0.7	0.614	0.6	0.470
HS diploma or GED	471	21.3	1.31	1,246	24.2	1.09	23.7	0.03	-2.4	0.063	0.5	0.657
Some college	778	27.0	1.31	1,699	24.6	0.86	26.9	0.02	0.1	0.936	-2.2	0.009
Bachelor's or higher	1,083	35.3	2.22	2,379	33.5	1.87	32.3	0.04	3.0	0.180	1.1	0.541
Education - MALE												
No high school diploma	206	15.3	1.60	527	17.1	0.94	18.3	0.02	-3.0	0.063	-1.2	0.207
HS diploma or GED	241	18.1	1.55	628	21.3	1.25	26.7	0.03	-8.6	0.000	-5.4	0.000
Some college	463	27.4	1.58	963	25.9	1.09	26.1	0.03	1.4	0.384	-0.2	0.871
Bachelor's or higher	675	39.1	2.44	1,394	35.7	2.00	29.0	0.04	10.2	0.000	6.8	0.001
Education - FEMALE												
No high school diploma	176	17.5	1.95	461	18.2	1.18	15.8	0.02	1.7	0.382	2.4	0.039
HS diploma or GED	230	24.6	1.96	618	27.1	1.51	20.8	0.03	3.9	0.049	6.3	0.000
Some college	315	26.5	1.87	736	23.4	1.09	27.7	0.03	-1.2	0.526	-4.3	0.000
Bachelor's or higher	408	31.4	2.44	985	31.3	2.02	35.7	0.05	-4.4	0.073	-4.5	0.028
Marital Status												
Married	961	39.2	1.35	2,195	38.8	1.08	39.9	0.04	-0.7	0.588	-1.1	0.297
Not currently married	1,748	60.8	1.35	4,107	61.2	1.08	60.1	0.04	0.7	0.588	1.1	0.297
Had a birth in the past 12 months - FEMALE Only												
Yes	88	2.8	0.35	202	2.8	0.22	5.3	0.03	-2.4	0.000	-2.5	0.000
No	2,626	97.2	0.35	6,110	97.2	0.22	94.7	0.03	2.4	0.000	2.5	0.000

Table 10. (continued)

Characteristic	$40 Incentive Count	$40 Incentive %	$40 Incentive SE	$60/80[1] Incentive Count	$60/80[1] Incentive %	$60/80[1] Incentive SE	ACS %	ACS SE	$40 Incentive vs. ACS Bias	$40 Incentive vs. ACS p-value	$60/80 Incentive vs. ACS Bias	$60/80 Incentive vs. ACS p-value
Health insurance coverage												
Yes	2,397	87.2	1.25	5,551	88.0	0.79	88.1	0.03	-0.8	0.50.	-0.1	0.927
No	317	12.8	1.25	761	12.0	0.79	11.9	0.03	0.8	0.503	0.1	0.927
Worked last week												
Yes	1,807	67.8	1.28	4,379	71.4	0.84	75.9	0.02	-8.0	0.000	-4.4	0.000
No	881	32.2	1.28	1,845	28.6	0.84	24.1	0.02	8.0	0.000	4.4	0.000
Region												
Northeast	286	11.1	2.52	706	13.1	2.37	17.3	0.00	-6.2	0.013	-4.2	0.075
Midwest	453	19.5	3.30	989	18.3	3.22	21.4	0.00	-1.9	0.557	-3.1	0.330
South	1,205	39.2	4.21	2,835	39.3	4.43	39.3	0.00	0.0	0.994	0.0	0.993
West	770	30.2	3.87	1,782	29.3	3.97	22.0	0.00	8.2	0.034	7.3	0.065
Currently cohabiting with an opposite sex partner												
Yes	270	11.7	0.82	635	12.3	0.66	6.9	0.01	4.8	0.000	5.4	0.000
No	2,444	88.3	0.82	5,677	87.7	0.66	93.1	0.01	-4.8	0.000	-5.4	0.000

[1] The $80 condition was only used in Quarters 3 and 4 of 2022.

[2] Non-Hispanic Asian, Pacific Islander, American Indian or Alaskan Native, multiracial, or other race/ethnicity group.

7. Nonresponse Follow-up (NRFU)

One-page paper NRFU questionnaires were tested in quarters 1 and 2 of 2022, mailed to nonresponding households and nonresponding selected individuals. The NRFU was intended to assess how well it can be used to serve three objectives:

- identify ineligible households that can be removed from the denominator in response rate calculations,
- obtain measures of nonresponse bias for a select number of key variables, and
- consider using the select variables to inform another stage of main survey nonresponse weighting adjustments.

The NRFU was unsuccessful in accomplishing the three objectives due to a very low return rate for the questionnaires. A possible explanation is that even though the request was for very little information compared to the full survey, the mail mode is ineffective in the multimode design, particularly as households and individuals who have not responded by the end of Phase 3 have already been mailed survey invitations and reminders multiple times.

8. Summary

Consistent with the Best Practices for Nonresponse Bias Reporting (Madans et al. 2023), this report provides a summary of nonresponse in the 2022-2023 NSFG, followed by several nonresponse bias evalutions comparing sample composition and survey estimates to external data sources (from other surveys and administrative data), and two within-survey evaluations (experimental and nonexperimental). Each nonresponse bias evaluation has inherent and distinct strengths and limitations; using multiple analyses helps to alleviate the reliance on any one assumption to provide an understanding of the impact of survey nonresponse on the 2022-2023 NSFG data.

Response rates in household surveys have been declining, and this trend has been observed on NSFG, even prior to 2022-2023 NSFG. The NSFG response rates for 2022-2023 are markedly lower than the response rates for the last 2-year data collection period of 2017-2019. Some of the sharper decline in participation can be attributed to the effects on society of the COVID-19 pandemic, from respondents' willingness to participate to the ability to recruit and retain interviewers. Some subgroups' response rates were noticeably lower in 2022-2023 in comparison to others. For example, the main survey response rate was approximately 8 percentage points lower for those 15-19 years of age compared to those 20-49 years of age, a difference that can be the result of multiple factors, including the need to obtain parental permission for the majority of those in the 15-19 age group.

Comparing 2022-2023 NSFG respondent distributions on primarily socio-demographic characteristics to those from the ACS, there are a number of differences, which are eliminated or substantially reduced after weighting for nonresponse and calibration to the known population distributions. The distributions of 6 of the 10 variables compared did not differ significantly from the ACS distributions. One example from the remaining 4 that showed significant differences from the ACS was whether the respondent worked in the past week, yet unlike socio-demographic characteristics, this variable can be subjected to substantial measurement differences.

An important aspect of the 2022-2023 NSFG multimode design is the inclusion of three data collection phases, with the final phase offering higher incentives than in Phases 1 and 2. Response rates benefitted from the option of two different modes across phases, as well as the higher incentive in the final phase, particularly in the case of respondents aged 15-19. With regard to distributions on socio-economic variables, some of the largest biases estimated at the end of Phase 1 (web-only data collection), when compared to the ACS, were reduced at the end of Phase 2 (web or FTF data collection), and further reduced at the end of Phase 3 (web or FTF, with higher incentives offered), For example, the distribution on education was more in line with the ACS after phase 3.

Comparisons to estimates from the NHIS showed significant differences for half of the six examined estimates. An important assumption in this approach to evaluation of nonresponse bias is that these differences are not the result of other sources of error. This assumption is likely violated due to numerous differences. The 2022 and 2023 NHIS and the 2022-2023 NSFG use different multimode designs (in-person/telephone and web/in-person, respectively), along with survey questionnaires focused on different topics, for example, which may impact the estimates being compared. Comparisons of NSFG estimates for the estimated number of births in 2017-2021 by age of the mother to administrative data from vital records show substantial similarities, with the vital records count always falling within the 95% confidence interval of the NSFG estimate, bolstering confidence in the NSFG's accuracy and representativeness for this core content of the survey.

The 2022-2023 NSFG also included an incentive experiment for Phases 1 and 2 of data collection, which showed significant increases in the main survey and overall survey response rates for the groups offered higher incentives for the main survey. While not all results suggested nonresponse bias reduction with the higher incentive, for two of the variables with some of the the largest differences between NSFG and ACS, the higher incentive amount reduced the difference between the NSFG and ACS estimates. Again, this included education, and was particularly evident for males' education.

These results, while largely supportive of the NSFG data integrity and representativeness of the US household population ages 15-49, need to be taken with caution, just as any other set of nonresponse bias analyses. Each method calls for assumptions, necessary to estimate nonresponse bias. The nonresponse bias analyses in this report are, by necessity, limited to the variables examined. For example, comparisons were included to a limited set of estimates from the ACS, the NHIS, and NVSS birth data. Many of the variables on the NSFG are not candidates for examination due to the nature of the NSFG content, much of which is not duplicated in other data sources. Even within the examined estimates, results varied. Other NSFG estimates may be differentially affected by nonresponse.

In conclusion, these results show evidence of unbiasedness of key survey estimates, such as those benchmarked against national vital statistics estimates for births. The differences of socio-demographic characteristics from population distributions are not concerning as these characteristics are used in weighting. The analysis also shows that the multimode design works as expected, with potential nonresponse bias from web data collection being addressed in later phases of data collection allowing for in-person data collection, and increased incentives in the final phase. Users should use caution when comparing to NSFG survey periods prior to 2022 as the data collection design and implementation has changed, but these analyses do not find nonresponse bias to be a cause of concern.

References

American Association for Public Opinion Research. (2023). *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys (10th edition).* AAPOR. https://aapor.org/wp-content/uploads/2023/05/Standards-Definitions-10th-edition.pdf.

Brick, J. M. & Tourangeau R. (2017). Responsive survey designs for reducing nonresponse bias. *Journal of Official Statistics* 33(3), 735-752. https://doi.org/10.1515/jos-2017-0034. https://journals.sagepub.com/doi/abs/10.1515/jos-2017-0034.

Groves, R. M., Couper, M. P., Presser, S., Singer, E., Tourangeau R., Piani Acosta G., & Nelson, L. (2006). Experiments in producing nonresponse bias. *Public Opinion Quarterly* 70(5), 720-736. https://doi.org/10.1093/poq/nfl036. https://doi.org/10.1093/poq/nfl036.

Groves, R. M., & Peytcheva, E. (2008). The impact of nonresponse rates on nonresponse bias: A meta-analysis. *Public Opinion Quarterly* 72(2), 167-189. https://doi.org/10.1093/poq/nfn011. http://poq.oxfordjournals.org/cgi/content/abstract/72/2/167.

Groves, R. M., Presser, S., & Dipko, S., (2004). The role of topic interest in survey participation decisions. *Public Opinion Quarterly* 68(1), 2-31. https://doi.org/10.1093/poq/nfh002. https://doi.org/10.1093/poq/nfh002.

Groves, R. M., Singer, E., & Corning, A., (2000). Leverage-saliency theory of survey participation - Description and an illustration. *Public Opinion Quarterly* 64(3), 299-308. https://doi.org/10.1086/317990. https://doi.org/10.1086/317990.

Madans, J. H., Earp, M. S., Blumberg, S. J., Christopher, E. M., Thompson, K. J., Sivinski, R. G., Frenk, S. M., Fakhouri, T. H. I., & Piscopo, K. D. (2023). *Best Practices for Nonresponse Bias Reporting.* FCSM-23-01 Nonresponse Bias Subcommittee, Federal Committee on Statistical Methodology. June 2023.

Office of Management and Budget. (2006). *Standards and guidelines for statistical surveys*. Accessed December 4, 2006. https://georgewbush-whitehouse.archives.gov/omb/inforeg/statpolicy/standards_stat_surveys.pdf.

Schwarz, N.,& Sudman, S. (1992). *Context effects in social and psychological research*. New York: Springer-Verlag.

Williams, D., & Brick, J. M., (2018). Trends in U.S. face-to-face household survey nonresponse and level of effort. *Journal of Survey Statistics and Methodology* 6(2), 186-211. https://doi.org/10.1093/jssam/smx019. https://doi.org/10.1093/jssam/smx019.