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# 2018 National Survey of Children's Health

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## Methodology Report

The U.S. Census Bureau reviewed this data product for unauthorized disclosure of confidential information and approved the disclosure avoidance practices applied to this release. CBDRB-FY19-POP001-0029

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## Abstract

### Objectives

This report details the development, plan, and operation of the 2018 National Survey of Children's Health (NSCH). This survey is designed to provide national and state-level estimates on key indicators of the health and well-being of children, their families and their communities, as well as information about the prevalence and impact of special health care needs. Funding and direction for this survey was provided by the Health Resources and Services Administration's Maternal and Child Health Bureau (HRSA MCHB) within the U.S. Department of Health and Human Services. The U.S. Census Bureau conducted the survey on behalf of HRSA MCHB.

### Methods

A sample of 176,000 households was selected from the Census Master Address File and allocated across the 50 states and the District of Columbia. The sample was stratified by state and a child-presence indicator that allowed the Census Bureau to oversample households that were more likely to have children. The child-presence indicator was developed by the Census Bureau's Center for Administrative Records Research and Applications and builds on multiple sources of administrative data.

During data collection, a screener was first used to identify households with children. If children were present, the respondent created a roster of children in the household. The roster included the age and other demographics of each child as well as a battery of questions designed to identify children with special health care needs. After completing this screener component of the survey, one child was randomly selected from all children in each household to be the subject of an age-specific topical survey. The respondent was a parent or caregiver who knew about the child's health and health care needs.

### Results

The weighted Overall Response Rate for the 2018 NSCH was 43.1%. A total of 71,000 screener questionnaires were completed from June 2018 to January 2019, and 38,140 of those were eligible for topical questionnaire follow-up. Of those topical-eligible households, 30,530 completed a topical interview. Weighted estimates from the Topical file generalize to state and national resident child populations. Weighted estimates from the Screener file generalize to state and national resident child populations (using the child weight) and households with children by state and nationally (using the household weight).

## Introduction

The 2018 National Survey of Children’s Health (NSCH) was conducted by the U.S. Census Bureau for the Maternal and Child Health Bureau (MCHB), Health Resources and Services Administration (HRSA), Department of Health and Human Services. As stated in the Office of Management and Budget Clearance Package, the purpose of the NSCH is to “collect information on factors related to the well-being of children, including access to and quality of health care, family interactions, parental health, school and after-school experiences, and neighborhood characteristics.”<sup>1</sup> This document details the objectives, methodologies, and results of the 2018 NSCH. It is organized in 9 sections.

- Survey History. The 2018 NSCH is the third annual production following the redesign and merging of the previous NSCH and National Survey of Children with Special Health Care Needs (NS-CSHCN).
- Frame, Sample, and Subsampling Specifications. A screener instrument identified households with children and enumerated the children in those households. A topical instrument collected detailed information about one child selected at random from the household.
- Content Development and Instrument Specifications. Data were collected using a two-stage paper survey instrument and a single-stage web-based survey instrument.
- Data Collection. This section discusses the mail schedule and data capture methods for web, paper, and telephone questionnaire assistance operations.
- Response Analysis. This section discusses the calculation of response rates along with analysis of survey breakoffs, item nonresponse, and treatment group comparisons.
- Data Processing and Editing. Web and paper survey responses were unduplicated, standardized across modes, and prepared for analysis.
- Weighting Specifications. Weights allow for generalizations of state and national child resident populations (Screener and Topical file) and households with children (Screener file).
- Imputation Specifications. Missing values were imputed for a subset of variables used as controls in weighting and as inputs in estimating the family poverty ratio.
- Estimation and Data Usage. This section discusses best practices for data users and limitations of the 2018 NSCH.

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<sup>1</sup> The Office of Management and Budget Clearance Package is available at [https://www.reginfo.gov/public/do/PRAViewDocument?ref\\_nbr=201804-0607-001](https://www.reginfo.gov/public/do/PRAViewDocument?ref_nbr=201804-0607-001)

## Survey History

The Health Resources and Services Administration's Maternal and Child Health Bureau (HRSA MCHB), within the U.S. Department of Health and Human Services (HHS), has sponsored the National Survey of Children's Health (NSCH)<sup>2</sup> and its companion survey, the National Survey of Children with Special Health Care Needs (NS-CSHCN),<sup>3</sup> since 2001. HRSA MCHB has provided funding and direction for the two periodic surveys in order to provide both national and state estimates of key indicators of child health and well-being for children ages 0-17 years.

Together, these surveys provided critical data on key measures of child health; the presence and impact of special health care needs; health care access, utilization, and quality; and the family and community factors that impact child and adolescent health and well-being. Both surveys were fielded three times (NS-CSHCN 2001, 2005-06, and 2009-10; NSCH 2003, 2007, and 2011-12) as modules of the State and Local Area Integrated Telephone Survey (SLAITS) system by the Centers for Disease Control and Prevention's National Center for Health Statistics. As part of the SLAITS system, the surveys utilized a random-digit-dial sample of landline telephone numbers, with cell-phone supplementation in the last year of administration for both surveys.

While the geographic representation, sample size, and content breadth remained significant strengths of the surveys, over time HRSA MCHB and its stakeholders came to realize that a redesign of the two surveys was warranted. Declining response rates, along with the declining proportion of households in the U.S. with landline telephones, led to the decision to change the underlying sampling frame from telephone numbers to household addresses. Efforts were made to moderate this trend through the addition of a cell-phone frame to the last administrations of both the NSCH and the NS-CSHCN. However, consistent with industry-wide challenges, the inclusion of cell-phone samples proved to be both costly and inefficient.

In 2015, HRSA MCHB redesigned the NSCH and the NS-CSHCN into a single combined survey that utilized an address-based sampling frame. This newly consolidated survey incorporated questions from both of the former surveys and retained the NSCH name. The U.S. Census Bureau now conducts the NSCH annually on behalf of HRSA MCHB and HHS under Title 13, United States Code, Section 8(b), which allows the Census Bureau to conduct surveys on behalf of other agencies.

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<sup>2</sup> Blumberg SJ, Foster EB, Frasier AM, et al. 2012. Design and Operation of the National Survey of Children's Health, 2007. National Center for Health Statistics. *Vital Health Stat*, 1(55).

[http://www.cdc.gov/nchs/data/series/sr\\_01/sr01\\_055.pdf](http://www.cdc.gov/nchs/data/series/sr_01/sr01_055.pdf)

<sup>3</sup> Bramlett MD, Blumberg SJ, Ormson AE, et al. 2014. Design and Operation of the National Survey of Children with Special Health Care Needs, 2009–2010. National Center for Health Statistics. *Vital Health Stat*, 1(57).

[http://www.cdc.gov/nchs/data/series/sr\\_01/sr01\\_057.pdf](http://www.cdc.gov/nchs/data/series/sr_01/sr01_057.pdf)

### **Challenges faced by NSCH/NS-CSHCN and Subsequent Redesign**

The telephone interview methodology utilized for the former NSCH and NS-CSHCN allowed for a complex questionnaire as it ensured that skip patterns were properly followed. Furthermore, it protected against data entry error through preprogrammed range and logic checks on responses. Interviewers were able to address respondent questions and concerns as they arose, helping reduce response error. However, in recent years declining willingness of the public to participate in surveys and changes in household telephone use resulted in declining response rates for Computer-Assisted Telephone Interviewing surveys.<sup>4</sup> Of particular concern was the increasing prevalence of households substituting wireless service for their landline telephone. Efforts to include these non-landline households within the telephone sampling frames for the former NSCH and NS-CSHCN through the addition of cell-phones to the frame were ultimately not cost efficient or effective. Furthermore, because the former NSCH and NS-CSHCN were administered using the Centers for Disease Control and Prevention's National Immunization Surveys (NIS) sampling frame and followed behind the NIS interview, they experienced additional impacts in response rates when cases failed to move through the NIS itself.

The surveys were no longer sustainable in the face of declining response rates and rising costs. Therefore, considerable work was done to determine how to address these issues, and the decision was reached to utilize a two-phase multimode data collection design for a combined NSCH/NS-CSHCN survey, henceforth known as the NSCH. The proposed approach to data collection and nonresponse follow-up was based on previous project experience and recommendations made by Dillman and colleagues (2009).<sup>5</sup>

The redesigned NSCH consists of two questionnaires: (1) an initial household screener to assess the presence of children in the home and facilitate the selection of a target child within the household (with oversampling of children with special health care needs and young children ages 0-5 years), and (2) a substantive topical questionnaire that combines selected content from the former NSCH and NS-CSHCN questionnaires along with new content to address emerging public health topics.

In 2015, the U.S. Census Bureau conducted a pretest of the NSCH redesign on behalf of HRSA MCHB. The pretest was a one-time national data collection activity, based on a national sample of 16,000 addresses, to evaluate and refine survey methodology, the survey instruments, and the operational procedures and processes used in the 2016 production survey. The production survey designs in 2016, 2017, and 2018 were similar; key differences are noted in the discussion of the 2018 survey design below.

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<sup>4</sup> Blumberg SJ, Luke JV. 2010. Wireless Substitution: Early Release of Estimates from the National Health Interview Survey, January–June 2010. National Center for Health Statistics. Available from: <http://www.cdc.gov/nchs/nhis.htm>

<sup>5</sup> Dillman DA, Smyth JD, Christian LM. 2009. Internet, Mail and Mixed-Mode Surveys: The Tailored Design Method, 3rd edition. Hoboken, NJ: John Wiley & Sons.

## Frame, Sample, and Subsampling Specifications

Beginning in 2016, the NSCH has used an address-based sample covering the 50 states and the District of Columbia. Addresses are randomly selected within states. In 2016, a roughly equal number of addresses were selected in every state. In 2017 and 2018, sample was distributed across states with the goal of producing a roughly equal number of responses by state.

Administrative records from multiple sources are utilized to match a list of child identifiers to residential addresses. When a child identifier is matched to an address, the address is flagged and designated as 'Stratum 1'; the remaining addresses are designated as 'Stratum 2'. Starting in 2017, Stratum 2 addresses have been divided between those addresses with a higher probability of child presence, designated as 'Stratum 2a', and those addresses with a very low probability of child presence, designated 'Stratum 2b'. Addresses in Stratum 1 are sampled at a higher rate than those in Stratum 2a. Stratum 2b addresses are excluded from sampling due to the very low probability of those households having children in residence. The size of Stratum 2b in any state is constrained so that it represents no more than 5% of households with children.

If a household reports more than one child, the age and special health care needs status of those children are used to select a single child from the household and assign the household to receive one of the three age-based topical questionnaires: T1 for 0 to 5 year old children, T2 for 6 to 11 year old children, or T3 for 12 to 17 year old children. The subsampling of a single child from a household is random, but children with special health care needs and young children (0 to 5 years old) have a higher probability of selection. To limit respondent burden, no more than one child is sampled and no more than one topical survey is administered in any given household, and addresses can be included in the sample only once in any five year period.

The target population for the NSCH consists of children ages 17 years and younger. Addresses identified as having the highest probability of responding by paper and not by web ('High Paper', approximately 30% of addresses) are first mailed the paper screener as well as an invitation to respond to the survey using the web instrument. The remaining addresses ('High Web', approximately 70% of addresses) are first sent only the invitation to respond using the web instrument. High Web addresses are subsequently sent paper screeners beginning in the second nonresponse follow-up mailing. The methodology for assigning addresses to High Web and High Paper mailing groups is discussed in the Response Analysis section, Web Group Effectiveness sub-section (page 36).

In 2018, 90% of the sample received a small denomination dollar bill with the initial invitation as an incentive to complete the survey, half receiving a \$2 bill and the other half a \$5 bill. The other ten percent of the sample did not receive an incentive and represented the control group for testing the effectiveness of the incentive treatments. Finally, 50% of addresses were mailed their initial invitation by United State Postal Service (USPS) Certified Mail (without return receipt) in place of the standard First Class Mail that was used for the other 50% of addresses.

## Overview of the Key Sampling Processes

- Initial Sample Size and Treatment Groups
  - Sample Size: 176,000 addresses nationwide
  - Treatment Groups:
    - Incentive Groups (initial screener mailing)
      - \$0 (control): 10%
      - \$2 bill: 45%
      - \$5 bill: 45%
    - Web Groups
      - High Paper: 30%
      - High Web: 70%
    - Certified Mail Sticker Groups (initial screener mailing)
      - Certified Mail: 50%
      - First Class Mail: 50%
- Initial Sample Stratification and Selection:
  - 60% addresses from Stratum 1 (Flagged as households with children)
  - 40% addresses from Stratum 2a (Not flagged, but higher child presence probability than Stratum 2b)
- Selection of the Sample Child
  - Oversample children with special health care needs (CSHCN): 80%  
(Note that the 80% oversample was only applied for those households having both CSHCN and Non-CSHCN present.)
  - Oversample young children (0 to 5 years old): 60%  
(Note that the 60% oversample was only applied for those households having all or no CSHCN.)

## Frame Development

The 2018 NSCH utilized a sample of 176,000 household addresses randomly drawn from the Census Master Address File (MAF), a complete listing of all known living quarters in the 50 states and the District of Columbia. The Census MAF was supplemented with child-presence flags. Census developed these child indicators based on multiple sources of administrative data and small area geographic characteristics to identify households more likely to have children as a tool to improve sampling efficiency.

The child-presence flags were used to create three mutually exclusive sampling strata: Stratum 1 (addresses positively linked to a child using administrative records), Stratum 2a (addresses that could not be linked to a specific child using administrative records but had a high probability of child presence based on administrative records and small-area geographic characteristics), and Stratum 2b (addresses with a very low probability of child presence).

To identify Stratum 1 addresses, Census linked child Numident<sup>6</sup> records to addresses using a host of administrative records. These records included IRS 1040s and 1099s, the Medicare Enrollment Database, the Indian Health Service database, and the Selective Service System. Child records could be linked directly to an address or through a parent (i.e., administrative records linked the child to a parent and the parent to an address). In 2018, this process matched about 74 million child records to 38 million addresses. Approximately 79% of these addresses reported children in the 2016 American Community Survey (ACS).

Among the remaining addresses, a linear probability model was developed against ACS returns to predict child presence using block group<sup>7</sup> characteristics and administrative records associated with the address (e.g., presence of adults 20-50 years old and child-related tax deductions). Addresses were sorted on the probability of child presence by state. The delineating threshold between Strata 2a and 2b was determined by state so that no more than 5% of households with children were represented in Stratum 2b in any state.

Within strata, addresses were sorted by the block group<sup>7</sup> poverty rate (greater than 30% vs. less than or equal to 30%) to ensure a proportional representation of addresses from high poverty areas. As a result, addresses within states were listed in the following order for sampling:

- Stratum 1: Households with the ‘child present’ flag
  - Addresses in high poverty block groups
  - Remaining Stratum 1 households
- Stratum 2a: Households without the ‘child present’ flag
  - Addresses in high poverty block groups
  - Remaining Stratum 2a households

### Sample Size and Allocation

State sample sizes were determined to produce an equal number of completed topicals per state while summing to a total sample of 176,000 addresses nationwide (see Table 1).

For each state, sample sizes were allocated based on the relative sizes of Stratum 1 and Stratum 2a, and the efficiency of the Stratum 1 flag (i.e., the probability that a flagged household did have children). Nationally, 60% of the sample was drawn from Stratum 1; the sample size and strata distribution by state is listed in Attachment A.

For a sampled address to complete a topical, it must progress through each of the following stages: 1) be a valid residential address, 2) the residents must complete the screener, 3) the screener must report that children are present and report the age for at least one child, and 4) the topical-eligible household

<sup>6</sup>The Numident is the Social Security Administration’s database of United States Social Security number applicants.

<sup>7</sup>A Census block group is a geographical unit with 600 to 3,000 population. Census blocks are grouped into block groups; block groups, in turn, are grouped into Census tracts. The block group is the smallest scale geographical unit for which the Census Bureau publishes sample statistics, i.e., estimates based on a sample of residents in the block group. Consequently, it is the smallest scale geographical unit that could be used for this exercise.

must complete a topical questionnaire. Before mailing, we estimated valid address rates (representing an occupied residence) and screener and topical response rates using response rates from the 2016 and 2017 NSCH. Anticipated returns based on these estimates are presented in Table 1. Actual returns in 2018 were higher than anticipated following better than expected results from the Certified Mail Sticker and the \$5 screener cash incentive.

**Table 1. Anticipated Returns from the 2018 NSCH**

Initial Sample	Stratum	Valid Address	Screeners	Households with Children	Expected Completed Topicals
	Stratum 1: 60.1%	93.0%	38.1%	76.7%	72.4%
	Stratum 2a: 39.9%	76.4%	46.7%	12.0%	68.1%
176,000	1: 105,800	98,400	37,500	28,800	20,900
	2a: 70,200	53,600	25,000	3,000	2,000
Total		152,000	62,500	31,800	22,900

### Subsampling Specifications: Selection of Sampled Child

Eligible children within households that completed a screener were sampled for one of the three age-based topical surveys: T1 for 0 to 5 year old children, T2 for 6 to 11 year old children, or T3 for 12 to 17 year old children. Only one child per household was selected for a topical questionnaire in an effort to minimize respondent burden.

To select the sample child from a household, we first determined whether each eligible child was a Child with Special Health Care Needs (CSHCN) or a Child without Special Health Care Needs (Non-CSHCN). This determination was based on answers to a standard set of questions included in the screener questionnaire.<sup>8</sup>

Next, based on the count of children and the special health care needs (SHCN) status of those children, each household was assigned to a specific Household Type (HHTYP) (See Table 2). For households having both CSHCN and Non-CSHCN present (i.e., HHTYP=4, 6, and 7), an 80% oversample of CSHCN was applied. An additional 60% oversampling of children aged 0-5 years was applied in HHTYP=3 and 5. The second oversample was added in response to internal evaluations in 2016 that showed that approximately 4,433,000 households with children aged 0-5 years were potentially not included in Stratum 1 (versus 7,256,000 households in that age range that were correctly flagged). In other words, the child presence flag used to define Stratum 1 performed less well for the very youngest children

<sup>8</sup> Bethell CD, Read D, Neff J, Blumberg SJ, Stein RE, Sharp V, Newacheck PW. 2002. "Comparison of the Children with Special Health Care Needs Screener to the Questionnaire for Identifying Children with Chronic Conditions—Revised." *Ambulatory Pediatrics*, Jan-Feb 2(1): 49-57.

(aged 0-2 years) because some of the administrative records used are older than the children they need to identify.

For subsampling purposes, all eligible children on the household roster were sorted and assigned a line number. In most cases, children were sorted first by SHCN status (CSHCN then Non-CSHCN) and then by age (youngest to oldest). If there was only one child (HHTYP=2), the sort was not applicable. Finally, in households with four or more eligible children, children were sorted first on SHCN status, then alphabetically by name, and then by age. The line number to be selected in a given scenario was pre-assigned to each household for each of the eight household types consistent with the probabilities listed in the “% Probability of Selection” column in Table 2.

**Table 2. Strategies for Selecting the 2018 NSCH Sample Child**

Household Type (HHTYP)	Number of Eligible Children in Household	Number of Eligible Non-CSHCN, CSHCN	% Probability of Selection for Non-CSHCN	% Probability of Selection for CSHCN	Notes
1	0 or 'blank'	0,0		0%	No eligible children in household.
2	1	1,0 or 0,1		100%	Single child is always selected.
3	2	2,0 or 0,2			Includes 60% oversampling of children aged 0-5 years.
			If only 1 child is aged 0-5 years, that child's probability of selection is 62% and the other child's probability of selection is 38%. Otherwise, each child has an equal chance of selection of 50%.		
4	2	1,1	36%	64%	Includes 80% oversampling of CSHCN.
5	3	3,0 or 0,3			Includes 60% oversampling of children aged 0-5 years.
			If only 1 child is aged 0-5 years, that child's probability of selection is 44% and each of the other two children have an equal chance of selection of 28%. If 2 children are aged 0-5 years, each has a probability of selection of 38% and the other child has a probability of selection of 24%. If all 3 children are aged 0-5 years or all 3 children are aged 6-17 years, then each child has an equal chance of selection of 33%.		
6	3	2,1	52%	48%	Includes 80% oversampling of CSHCN.
7	3	1,2	22%	78%	Includes 80% oversampling of CSHCN.
8	4 or more	Any combination			Simple random selection of 1 of the first 4 (sorted)
			Before the sort, each of the first 4 children has an equal 25% probability of selection.		

Household Type (HHTYP)	Number of Eligible Children in Household	Number of Eligible Non-CSHCN, CSHCN	% Probability of Selection for Non-CSHCN	% Probability of Selection for CSHCN	Notes
					children, regardless of Non-CSHCN or CSHCN.

## Instrument Specifications

### Content Development

A key objective in developing the redesigned National Survey of Children’s Health (NSCH) instrument was to consolidate the former NSCH and the National Survey of Children with Special Health Care Needs (NS-CSHCN) content into one survey, reducing redundancy in the collection of data and the burden on households that accompanied the administration of two separate surveys. The selection and refinement of content for the redesigned survey reflected the need to retain critical content that was uniquely available through the NSCH while creating room for emergent priorities.

Every effort was made to retain survey items from the former NSCH and NS-CSHCN within the redesigned questionnaire. Revisions to existing items were generally made for the following reasons: 1) a desire for consistency with federal policies or programs and harmonization of content across U.S. Department of Health and Human Services surveys (e.g., the item on physical activity was edited to reflect the new Dietary Guidelines for Americans); 2) changes in the field or the understanding of a topic or issue (e.g., with direction and support from co-sponsors, content on attention deficit/hyperactivity disorder treatment was expanded to include separate items on behavioral and medication treatment); and 3) self-administered surveys require wording and framing that differs from interviewer-assisted surveys (i.e., instructional text throughout the instrument was refined and simplified).

Concomitantly, the addition (or deletion) of content was driven by four factors: 1) the need to include the most critical content from both former surveys; 2) the prioritization of topics highly relevant to HRSA MCHB investments (e.g., items required to track National Performance and Outcome Measures for the Title V Maternal and Child Health Services Block Grant program); 3) the commitment to improve methods for assessing key topics; and 4) the desire to address emergent priorities as identified by states and the broader maternal and child health field (e.g., the addition of items to assess readiness to learn among children aged 3-5 years).

A total of 18 items were added to the 2018 NSCH questionnaires and reported on the public use data files; one question (TENURE) was added to the screener, and the remaining questions were added to the topical questionnaire. These questions were:

- TENURE (“Is this house, apartment, or mobile home owned? rented?”)
- BLOOD\_SCREEN (“Was this condition [blood disorder] identified through a blood test done shortly after birth?”)
- CYSTFIB\_SCREEN (“Was this condition [Cystic Fibrosis] identified through a blood test done shortly after birth?”)
- GENETIC\_SCREEN (“Was this [genetic] condition identified through a blood test done shortly after birth?”)
- OVERWEIGHT (“Has a doctor or other health care provider ever told you that this child is overweight?”)
- HOSPITALSTAY (“DURING THE PAST 12 MONTHS, was this child admitted to the hospital to stay for at least one night?”)

- MEDHISTORY ("Did you and this child receive a summary of this child's medical history (for example, medical conditions, allergies, medications, immunizations)?")
- 11 questions were added to assess early language development:
  - ONEWORD ("Is this child able to do the following: Say at least one word, such as "hi" or "dog"?")
  - TWOWORDS ("Is this child able to do the following: Use 2 words together, such as "car go"?")
  - THREEWORDS ("Is this child able to do the following: Use 3 words together in a sentence, such as, "Mommy come now."?)")
  - ASKQUESTION ("Is this child able to do the following: Ask questions like "who," "what" "when" "where"?")
  - ASKQUESTION2 ("Is this child able to do the following: Ask questions like "why" and "how"?")
  - TELLSTORY ("Is this child able to do the following: Tell a story with a beginning, middle, and end?")
  - UNDERSTAND ("Is this child able to do the following: Understand the meaning of the word "no"?")
  - DIRECTIONS ("Is this child able to do the following: Follow a verbal direction without hand gestures, such as "Wash your hands."?)")
  - POINT ("Is this child able to do the following: Point to things in a book when asked?")
  - DIRECTIONS2 ("Is this child able to do the following: Follow 2-step directions, such as "Get your shoes and put them in the basket."?)")
  - UNDERSTAND2 ("Is this child able to do the following: Understand words such as "in," "on," and "under"?")

Four variables on the 2018 NSCH data file replace variables that were included on the 2017 NSCH: BULLIED\_R (Bullied, replaced BULLIED); BULLY (Bullies others, replaces K7Q71\_R); PLANNEEDS\_R (Plan of care addresses transitions, replaced PLANNEED); and SCREENTIME (Time spent with screens, replaces K7Q91\_R and K7Q60\_R). Compared to the variables they replaced, BULLIED\_R and BULLY have different response options and difference reference period but generally similar question wording, PLANNEEDS\_R changes the focus of the question from identifying specific health goals to preparing for the transition to adulthood, and SCREENTIME combines television (K7Q60\_R) and other screens (K7Q91\_R).

Additional differences between the 2016, 2017, and 2018 NSCH questionnaires are noted in the data crosswalk: <https://census.gov/programs-surveys/nsch/technical-documentation/codebooks.html>

### Survey Content

Consistent with all previous administrations, the 2018 NSCH retained a two-phase data collection approach: (1) an initial household screener to assess the presence, basic demographic characteristics, and special health care need status of any children in the home; and (2) a substantive topical questionnaire to be completed by a parent or caregiver of the selected child.

The screener questionnaire consisted of two sections. The first section contained four questions about the presence of children in the home, the primary language spoken, and home tenure (rent or own). The next section contained detailed questions about the demographics and health of up to four children,

from youngest to oldest. If there were more than four children in a household, the first name (or initials or nickname), age, and sex were asked for up to ten children.

There were three different topical questionnaires tailored to three age groups of the selected children: T1 for 0 to 5 year old children, T2 for 6 to 11 year old children, and T3 for 12 to 17 year old children. All three questionnaires contained 11 sections about the child, their family, and neighborhood, but the specific questions were tailored to be relevant to children in that age specific range. Copies of the screener and topical questionnaires can be found at <https://www.census.gov/programs-surveys/nsch/technical-documentation/questionnaires.html>. The questionnaire sections are summarized below:

**Section A. This Child's Health** – Questions about whether the child has current or lifelong physical, mental, behavioral, learning, or developmental conditions; if the child's health conditions affect their ability to do things.

**Section B: This Child as an Infant** – Birth-related questions including birth weight, breastfeeding, and use of formula. Infant feeding questions are only included on T1.

**Section C: Health Care Services** – Questions about source of a usual place for health care, need for and use of medical, dental, mental, and specialized health services in the last 12 months.

**Section D: Experience with This Child's Health Care Providers** – Questions about frequency of care and satisfaction with the child's health care providers. Also, questions about how the child's doctor or health care provider worked with the child. T3 includes questions about the child's preparation for transition into adult health care.

**Section E: This Child's Health Insurance Coverage** – Questions about whether the child has adequate health care insurance coverage, and whether there were any gaps in health care insurance coverage in the past 12 months, including at the time of the survey.

**Section F: Providing for this Child's Health** – Questions on cost of health care in the past 12 months and time spent providing and arranging for the child's health care.

**Section G: This Child's Learning/Schooling and Activities** – Questions on early language development and learning for children ages 1 to 5 years. For children ages 6 to 17 years, questions about experience at school, participation in organized activities, and physical activities.

**Section H: About You and This Child** – Questions about daily life and household activities, including the child's sleep habits, screen time, and the demands of parenting on the respondent.

**Section I: About Your Family and Household** – Questions about the frequency of family meals, the use of tobacco in the household, how the family copes with problems, and if any assistance is needed to provide food for the family. Also questions about the respondent's perception of their neighborhood

(e.g., amenities, safety), and questions about whether the child has ever experienced any adverse childhood experiences.

**Section J: Child’s Caregivers** – Questions on demographic information about up to two adults in the household who are the child’s primary caregivers.

**Section K: Household Information** – Questions on household count, family count, and family income.

### **Web Instrument Specifications**

All households selected to participate in the 2018 NSCH received a mailed invitation to respond to the survey by web. The invitation included the website URL and a unique 8-digit login ID. After logging in and reviewing the Privacy Act statement, respondents were asked to verify their address. If the respondent answered that the address selected for the sample (and displayed on screen) did not match their own, the survey was concluded and the address was removed from further mailings.

If the listed address matched the respondent’s residence, the case was assigned a PIN that the respondent would need to log back in to the survey. The respondent was also asked to provide answers to three security questions that could be used to verify the respondent’s identity if the PIN was lost.

After PIN creation, the respondent was asked about the number of children (0-17 years of age) that usually reside at that address. If there were no children that usually reside at the address, the survey was concluded and the address removed from further mailings. If the respondent answered that there were children that usually reside at the address, the respondent was presented with questions regarding the primary language spoken in their household and whether they own or rent their home followed by a battery of questions about each child (the screener portion of the survey). The respondent was required to provide at least a first name, initials, or nickname and age for each child on the household roster, as these elements were necessary for subsampling (discussed previously) and name fills in question wording. The respondent was also asked about the race and ethnicity of each child and English language ability for children age 4 and older. Finally, there was a series of questions to determine the special health care need status of each child.

After the respondent entered and confirmed this information about all children in the household, the web instrument applied the subsampling methodology to select one child from the household roster to be the subject of the topical portion of the instrument. Once a child was selected, the web instrument did not allow respondents to revise their answers to the screener portion of the instrument.

Respondents from households without children needed about 2 minutes, 6 seconds on average to complete the web instrument. Respondents from households with children completed the screener portion of the instrument in 6 minutes, the web topical portion in 31 minutes, 46 seconds, and the entire web instrument in 37 minutes, 46 seconds on average. Table 3 details the mean and median time needed to complete the web instrument.

**Table 3. Web Submission Times (in minutes)**

	Children		No Children	
	Mean	Median	Mean	Median
Screener	6.0	4.7	2.1	1.3
Topical	31.8	27.0	-	-
Total	37.8	32.5	2.1	1.3

After respondents answered all questions in the topical portion of the instrument, they were presented with the opportunity to review and edit any answers before submitting. Once the survey was submitted, a submission confirmation screen appeared with the date and time of completion. The instrument was then locked and the respondent was only able to view the submission confirmation screen if they logged back in.

### **Programming the Web Instrument**

The web survey was conducted using the U.S. Census Bureau’s Centurion system for internet data collection. This software presented the questionnaire on a computer screen or other electronic device, e.g., tablet or cell phone. The interview was self-administered by the respondent; the respondent logged in to the instrument with the login ID provided in the web invitation letter and a PIN was generated along with verification questions for additional security.

There were two hard edits programmed into the web instrument which required respondents to provide a valid answer before continuing. These answers were necessary for subsampling: child’s first name, initials, or nickname; and age. Respondents were able to skip all other questions and continue the survey. There were soft edits for some questions that prompted respondents to provide an answer or revise an existing answer, but respondents were able to continue past these edits without modifications to the relevant items. For example, if the reported number of children in the household is greater than the number of rostered children (e.g., the respondent reports that there are 3 children but only provides information for 2 children), the respondent was prompted to roster all children. The respondent was able to continue the survey without correcting the discrepancy. Online help screens and text were also available in the instrument to aid respondents. Submitted responses were saved in a survey data file.

The web instrument guided respondents through skip patterns, established legitimate ranges for numerical write-in items, and offered “pick lists” for some response categories. Also in an effort to reduce respondent burden, the instrument integrated the screener and topical instruments into a single self-administered interview. After the respondent completed the screener questions and the web instrument confirmed that the household was eligible to complete the topical questionnaire, the instrument applied the subsampling methodology to select one child from the household to receive the topical portion of the survey. The name and sex of the selected child was then prefilled into the topical survey questions.

Once programming of the instrument was completed, the various requirements of the instrument – respondent login, PIN generation, screener subsampling, topical selection, skip pattern implementation, fills, data output – were tested to ensure that the Centurion system was functioning correctly.

### **Paper Instrument Specifications**

High Paper addresses and High Web non-respondent addresses received a two-phase, self-administered mail survey (as described earlier in the Frame, Sample, and Subsampling Specifications section, page 8). In the first phase, households received (a) an invitation letter to participate in the NSCH, and (b) a paper screener instrument. Using the paper questionnaire, households were screened to determine if there were any children 17 years or younger who usually lived or stayed at the address. Resident children were rostered in the screener instrument. Detailed information was collected for up to four children, while basic information (name, age, sex) was collected for an additional six children.

If the respondent mailed back the screener, it was then processed to determine if eligible children usually reside at the address. If the respondent answered that the address selected for the sample did not match their own or that there were no children that usually reside at the address, the survey was concluded and the household was removed from further mailings. If the respondent listed children that usually reside at the address, Census Bureau staff applied the subsampling methodology to select one child from the household roster to be the subject of the topical questionnaire.

In the second phase, households that were deemed to have eligible children were mailed one of the three age-based topical questionnaires requesting more information about one selected child living at the address. Docuprint systems were used to print the selected child's first name, initials, or nickname, age, and sex if provided on the topical questionnaires and survey invitation letters in order to ensure that respondents answered the topical questions for the selected child.

The paper and web instruments were designed to be as similar as possible to minimize the influence of mode on responses. While automatic skips and soft edits could not be implemented in the paper instrument, the questionnaire did include skip instructions within the question wording to mimic the web instrument.

Paper questionnaires were created using Amgraf One Form Plus. Returned forms were processed by iCADE to capture responses through OMR (optical mark recognition), OCR (optical character recognition), and KFI (keying from image). Questionnaires were printed, trimmed, and stitched through an in-house print on-demand process using a Docuprint system that allowed personalization to each respondent.

## **Data Collection**

Data collection efforts for the 2018 National Survey of Children's Health (NSCH) began on June 29, 2018 and included up to four screener mailings, up to 2 reminder postcards, and up to four topical mailings. The dates for the label creation, late mail return (LMR) pulls (packages for addresses that responded

after the initial mailing list was created are pulled and destroyed shortly before the mailing), and mailout for each mailing are detailed in Table 4. Respondents also had the opportunity to initiate and complete the interview by phone via Telephone Questionnaire Assistance (TQA).

### **Mailout Specifications**

Each address had a total of four possible screener mailings that included web invitations and, in some cases, a paper screener questionnaire. Respondents also received up to two pressure-sealed reminder postcards, sent 5 to 7 days after a primary mailing.

All sampled addresses received an initial invitation letter with instructions to participate by web. The letter included the web survey URL along with a unique login ID. Most invitations also included an incentive, a \$2 bill (45% of addresses) or \$5 bill (45% of addresses); the remaining addresses (10%) represented the control group and did not receive an incentive. Addresses were randomly assigned to the incentive groups. High Paper addresses (30%) also received a paper screener questionnaire and paid-postage return envelope with the initial mailing. Additionally, half of each incentive group and High Paper/High Web group received their initial invitations in an envelope with an official USPS sticker indicating that the mail was USPS Certified. The certified service did not require return receipt (i.e., the recipient did not need to sign for the package to verify receipt). Other addresses were mailed their invitations by First Class Mail. One week later, all addresses received a pressure-sealed reminder postcard that again included the necessary details for the respondent to complete the survey by web.

If a household did not complete the survey by four weeks after the initial invitation was mailed, they were mailed a follow-up invitation. High web addresses received a second web invitation letter and High paper addresses received a follow-up letter and another paper questionnaire. This letter again included instructions for responding via web. All non-responding addresses again received a pressure-sealed reminder postcard 5 to 7 days after this first follow-up mailing.

Nonresponding addresses after the first follow-up mailing received a second follow-up mailing. High Web addresses received their first paper screener questionnaires in this mailing. All nonresponding addresses received paper screeners in this and all subsequent follow-up mailings.

Sampled addresses received up to four screener mailings; addresses received fewer mailings if the residents submitted a web survey, returned a complete paper screener, explicitly refused to participate, or if the address was out-of-scope (i.e., not an occupied residence). The address also received fewer mailings if the USPS determined the address to be undeliverable as addressed.

Respondents that returned a paper screener and did not submit a web survey were assigned to one of nine topical mailing groups. Group assignments were dependent on the date that the paper screener form was received at the National Processing Center. All forms that were received before the first topical label file was created were assigned to Topical Group B (Topical Group A was initially included in the schedule but later removed due to time constraints). Non-duplicate forms received from that time until the second topical label file was created were assigned to Group C, and so forth. Respondents received up to four topical survey packages; respondents received fewer packages if they returned a

topical form or explicitly refused to participate, the selected child no longer resided at the address when the topical form was received, or the household was assigned to a later topical group (due to time constraints based on survey closeout; see Table 5). In their first topical mailing, 90% of addresses received an unconditional \$5 bill as a token of appreciation for participating in the survey.

**Table 4. Screener Mailout Schedule**

<b>Screener Mailout Schedule</b>			
<b>Mailing</b>	<b>Label File</b>	<b>LMR File</b>	<b>Mail</b>
Initial Web Invitation Letter	05-16-2018	NA	06-29-2018
Pressure-Sealed Reminder Postcard	05-16-2018	NA	07-06-2018
First Follow-up, Web Invitation Letter (High Web)	07-18-2018	07-31-2018	08-02-2018
First Follow-up, Paper Screener (High Paper)	07-20-2018	08-01-2018	08-03-2018
Pressure-Sealed Reminder Postcard (High Web)	07-24-2018	08-03-2018	08-07-2018
Pressure-Sealed Reminder Postcard (High Paper)	07-27-2018	08-03-2018	08-10-2018
Second Follow-up, Paper Screener (High Web)	08-13-2018	08-22-2018	08-30-2018
Second Follow-up, Paper Screener (High Paper)	08-24-2018	09-05-2018	09-07-2018
Third Follow-up, Paper Screener (High Web)	09-17-2018	09-27-2018	10-01-2018
Third Follow-up, Paper Screener (High Paper)	09-28-2018	10-10-2018	10-12-2018

**Table 5. Topical Mailout Schedule**

<b>Mailing</b>	<b>Mail Groups</b>	<b>Label File</b>	<b>LMR File</b>	<b>Mail</b>
Mailing 1	B	08-02-2018	08-15-2018	08-17-2018
Mailing 2	C	08-16-2018	08-29-2018	08-31-2018
Mailing 3	B, D	08-30-2018	09-12-2018	09-14-2018
Mailing 4	C, E	09-13-2018	09-26-2018	09-28-2018
Mailing 5	B, D, F	09-27-2018	10-10-2018	10-12-2018
Mailing 6	C, E, G	10-11-2018	10-24-2018	10-26-2018
Mailing 7	B, D, F, H	10-25-2018	11-07-2018	11-09-2018
Mailing 8	C, E, G, I	11-08-2018	11-19-2018	11-21-2018
Mailing 9	D, F, H, J	11-30-2018	12-12-2018	12-14-2018

### **Telephone Questionnaire Assistance (TQA)**

A toll-free telephone line was provided to respondents to allow them to call if they had questions about the survey, wanted to complete the interview over the phone, or submit feedback. All invitation letters, pressure-sealed reminder postcards, the web instrument, and the paper instrument identified this toll-free number.

The telephone line was answered by trained interviewers at the Census Bureau call center in Tucson, AZ. During the course of data collection there were approximately 3,700 calls made to the toll-free line. If a

respondent requested to respond to the survey over the phone, the TQA interviewer would administer the survey using the Centurion web instrument. There were approximately 2,500 interviews completed over the phone for households without children and 250 interviews completed for households with children. Table 6 lists all possible TQA purpose codes that could be assigned during a call or interview.

**Table 6. TQA Purpose Codes used in ATAC System**

<b>TQA Purpose Codes</b>	<b>Definitions</b>
01	Internet instrument completed over the phone
02	Refusal to participate
04	Wrong address – Web respondent
05	Address is not a residence (out-of-scope)
06	Paper questionnaire status
20	Questions about monetary incentive
30	Request replacement survey (English)
31	Request Spanish language questionnaire
40	Trouble filling out the paper questionnaire
49	Respondent requested PIN
50	Respondent requested Login ID
51	Problem logging into Internet instrument
52	Other instrument issues
53	PIN/security question reset request
60	Question regarding the survey (General FAQ)
80	Comments

TQA interviewer training was conducted prior to the initial 2018 mailing. There were a total of 60 interviewers that assisted respondents with their questions about the NSCH and conducted interviews over the phone using the web instrument. A background of the survey was provided, along with details on the mailout schedule and incentives used. Interviewers were trained on how to determine and assign the correct purpose code in the ATAC (Automated Tracking and Control) system. They were given examples on how to search for the respondent's case in the web instrument and how to administer the survey over the phone. Finally, they were trained on how to properly close out the case and assign a purpose code to identify that the web questionnaire was completed over the phone. TQA interviewers were given a manual that included these details and answers to frequently asked questions that they were able to reference during the 2018 NSCH production cycle.

Call monitoring sessions of recorded TQA calls were scheduled throughout data collection. If any changes were needed to the ATAC TQA instrument based on comments received from interviewers, the survey team coordinated programming updates. All updates to procedures were communicated to the

TQA interviewers. Incoming call volumes were also monitored throughout data collection and scheduling of the interviewers was adjusted accordingly.

### **Email Questionnaire Assistance (EQA)**

In addition to the toll-free telephone line, respondents were able to interact with Census Bureau staff via email. An email address ([childrenshealth@census.gov](mailto:childrenshealth@census.gov)) was listed on all invitation letters and on the Centurion login page. Emails were answered by call center staff in Tucson, AZ. Staff checked the email inbox daily and replied to respondents' messages within 2 business days when possible. Emails were logged in a tracking spreadsheet and cases were assigned purpose codes similar to the TQA purpose codes in Table 6.

EQA agents employed scripted responses for common concerns and questions. These scripts ensured consistent and accurate information. When replying to the messages, agents removed any information in the response email that could be considered personally identifiable (e.g., address, phone number, name).

### **Respondent Demographics**

Web and mail survey instructions requested that the respondent be an adult who lived in the household and knew about the health and health care of the selected child. TQA interviewers were not permitted to conduct an interview with a respondent below the age of 18 years. Table 7 shows the proportion of respondents by their relationship with the selected child for the topical survey; 89% of topical survey respondents were biological or adoptive parents of the selected child.

**Table 7. Respondent Relation to Selected Child**

<b>Relationship</b>	<b>Relative Frequency</b>
Biological or Adoptive Parent	89.1%
Step-parent	2.2%
Grandparent	5.2%
Foster Parent	0.3%
Other Relative	1.0%
Other Non-Relative	0.3%
Response Missing	1.9%

### **Confidentiality**

Participation in the 2018 NSCH was voluntary, and all data collected that could potentially identify an individual person are confidential. Data are kept private in accordance with applicable law. Respondents are assured of the confidentiality of their replies in accordance with 13 U.S.C. Section 9. All access to Title 13 data from this survey is restricted to Census Bureau employees and those holding Census Bureau Special Sworn Status pursuant to 13 U.S.C. Section 23(c). In compliance with this law, all data released to the public are only in a statistical format. No information that could personally identify a

respondent or household may be released. The Census Bureau ensured that all HRSA MCHB staff obtained Special Sworn Status prior to receiving access to any confidential data. The Screener and Topical public use data files went through a thorough disclosure review process and were approved by the Census Disclosure Review Board prior to release.

### **Spanish Language Availability**

The NSCH paper and web instruments were available in both English and Spanish. The Spanish translation was originally provided by a contractor for the NSCH Pretest. For the 2018 NSCH, the Census Bureau reviewed and verified text from the 2017 Spanish-language questionnaires and provided new translations where necessary. Census also provided translations for the Spanish language invitation letters that were included in the mailings, printed on the back of each letter. The letters provided details about the survey and instructions for requesting a Spanish language paper questionnaire through the TQA line.

If a respondent returned a Spanish language paper screener questionnaire indicating the presence of children in the household, the Spanish language topical questionnaire was subsequently mailed to the household. Less than 30 cases requested and received a Spanish language paper screener. Approximately half returned a Spanish language paper screener, and half of those addresses returned a Spanish language topical questionnaire.

The web instrument offered a toggle on the login page that allowed respondents to select the English or Spanish language version of the instrument. Of the web respondents, approximately 450 completed the screener portion and 300 completed the topical portion of the instrument using the Spanish language version of the instrument.

Spanish-speaking respondents that called the TQA line were placed in a Spanish language calling queue; a trained Spanish language agent then answered any questions or administered the Spanish language web instrument over the phone. The agent flagged the case if a Spanish paper questionnaire was requested and informed the respondent that a questionnaire would arrive in the mail within three weeks. Even though the paper and web instruments were only available in English and Spanish, additional language support was available when calling into the TQA line.

### **Efforts to Maximize Response Rates**

Cash incentives, follow-up mailings, reminder postcards, toll-free telephone numbers, and translated questionnaires were used to maximize response. The NSCH screener and topical questionnaires were designed to encourage cooperation by prospective respondents. Questions were developed and grouped by subject area to create logical, clear questionnaires with concrete question wording and simple grammar. Both the paper and web versions of the questionnaires used design elements to enhance respondent comprehension and make instructions clear and simple. In addition, the respondent contact strategies and letters were carefully designed to capture the attention of the respondent and pique interest in the subject matter.

Data collection for the 2018 NSCH involved a series of mailings and nonresponse follow-up activities, emphasizing questionnaire completion. The approach to data collection and nonresponse follow-up was based on previous project experience and recommendations made by Dillman and colleagues (2009):<sup>9</sup>

- *Invitation letter.* An initial invitation letter was mailed to all potential respondents providing details about the study, a web URL with the login ID for accessing the web version of the questionnaire (which combined the screener and topical into a consolidated instrument), and a toll-free number and email address for individuals to contact if there were questions or comments. In addition to the invitation letter, 90% of the sample also received a one-time cash incentive to complete the survey in the amount of \$2 or \$5. 50% of the sample received their initial invitation in an envelope with a USPS Certified Mail sticker in place of the standard First Class Mail. Each household received up to four invitations and two reminders to participate in the survey.
- *Additional mailings.* Subsequent to the first invitation mailing, the Census Bureau sent all remaining non-respondents a second invitation letter. After the second mailing, all remaining non-respondents received a paper screener questionnaires in follow-up mailings. Only High Paper addresses received the paper questionnaire in the first two mailings. All addresses also received a reminder postcard after the initial mailing, and nonresponding addresses received a second reminder postcard after a follow-up mailing.
- *Paper topical questionnaire mailing.* For respondents who returned a paper screener, the topical questionnaire and accompanying cover letter were personalized to fill in the sample child's name and other identifying information to ensure that the survey was completed for the correct child. This level of personalization in the questionnaire improved data quality by reducing the opportunity for skip logic errors. It also resulted in a questionnaire that was as short as possible for the selected child, increasing the likelihood that the respondent would complete it. We also included a \$5 cash incentive in 90% of initial topical mailings as a token of appreciation.

These operational strategies both facilitated response and reduced differential response and nonresponse by mode.

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<sup>9</sup> Dillman DA, Smyth JD, Christian LM. 2009. *Internet, Mail and Mixed-Mode Surveys: The Tailored Design Method*, 3rd edition. Hoboken, NJ: John Wiley & Sons.

## Response Analysis

### Response Rates

For the purposes of calculating response rates, all sampled addresses were assigned screener and topical outcomes codes. These outcomes can generally be categorized as not eligible, eligible but not complete, or complete.

For some addresses, we did not receive sufficient correspondence to determine if the address was eligible to complete the screener or topical questionnaires. These addresses were classified as unresolved. Among these addresses, we estimated the share that were occupied residences using the Household Rate, which is the proportion of resolved addresses that are occupied residences.<sup>10</sup> We also estimated the Child Rate, which is the share of those households that include children, based on the proportion of households that have children by state and stratum in the 2016 American Community Survey (ACS). The product of the Household Rate and Child Rate is the Eligibility Rate (*e*), the estimated proportion of unresolved addresses that are households with children. Using this approach, we estimated that 86% (weighted) of unresolved addresses were households and 41% (weighted) of those households were households with children.

$$e = \text{Household Rate} * \text{Child Rate}$$

Three different response rates were calculated based on the estimated proportion of eligible addresses that completed the screener and topical questionnaires. Definitions of completion and calculation of these three response rates are detailed below.

A completed screener had to 1) be returned from a sampled address, and 2) indicate that there were no children present or provide a valid age for at least one child. Approximately 71,000 households completed a screener survey. Of those, 38,140 households with children completed the screener instrument and are included on the Screener data file. The remainder (approximately 32,000) were households without children that completed the screener instrument and are not included in any published data files.

Complete and sufficient partial topical surveys are included on the Topical data file. Of the 38,140 eligible screened-in households, 30,530 households with children returned a complete or sufficient partial topical survey. A returned topical survey was considered complete if at least 40 of 50 “check items” had valid answers, and 1) the respondent completed at least one item in Section K (family income, household and family count) or 2) the respondent submitted the topical web instrument. Check items are on-path for all respondents, are distributed across all sections of the survey, and offer an

<sup>10</sup> Specifically, we used the midpoint between the Household Rate including undeliverable addresses (the proportion of all resolved addresses that are occupied residences) and the Household Rate excluding undeliverable addresses (UAAs) by state and stratum. Because UAAs are identified by the United States Postal Service, it is assumed that UAAs are identified at a higher rate than other noneligible addresses (businesses, vacant residences, etc.) that must be self-identified. The midpoint assumes that there are some UAAs still unresolved but at a lower rate than they appear among the resolved addresses.

indication that the responses represent progress through those survey items. Of the 30,530 cases included in the Topical data file, 98% were complete topicals.

A returned topical survey was considered a sufficient partial if at least 25 of 50 check items had valid answers, and 1) the respondent completed at least one item in Section H or beyond or 2) the respondent submitted the topical web instrument. Of the 30,530 cases included in the Topical data file, 2% were sufficient partials.

**Table 8. Final Dispositions (Unweighted)**

<b>Final Disposition</b>	<b>Count</b>
Total Cases	176,000 <sup>a</sup>
Occupied Households (Est.)	142,000 <sup>a</sup>
Households with Children (Est.)	80,000 <sup>a</sup>
Completed Screeners <sup>a</sup>	71,000 <sup>a</sup>
Screeners with Children	38,140
Completed Topicals	30,530

<sup>a</sup> Rounded to the nearest thousand

The probability that a topical eligible household completed a topical questionnaire differed significantly by screener response mode. The delay between screener and topical questionnaires for paper screener respondents, and the additional effort required to return the completed questionnaire by mail reduced the probability that paper questionnaire respondents would complete the topical questionnaire. In 2018, 91.5% of web screener respondents completed the topical questionnaire versus 55.6% of paper screener respondents.

#### ***Screener Completion Rate***

The Screener Completion Rate is the estimated proportion of households (occupied residences) that completed a screener. The denominator includes both screened households and the number of unresolved addresses that are estimated to be households. This approach yielded a national weighted screener completion rate of 49.8%.

$$\frac{\text{Completed Screeners}}{\text{Screened HHs} + (\text{Unresolved Addresses} * \text{Household Rate})}$$

#### ***Topical Completion Rate***

The Topical Completion Rate is the estimated proportion of households with children that completed a topical questionnaire. The denominator includes both screened households with children and the number of unresolved addresses that are estimated to be households with children. This approach yields a national weighted topical completion rate of 36.9%.

$$\frac{\text{Completed Topicals}}{\text{Screened HHs with Children} + (\text{Unresolved Addresses} * e)}$$

### ***Interview Completion Rate and Overall Response Rate***

The Interview Completion Rate (ICR) and Overall Response Rate (ORR) are designed to account for the multi-stage design of the NSCH. They are the product of two (in the ICR) or three (in the ORR) response rate metrics that are each consistent with AAPOR standards. Specifically, the ICR is the product of the proportion of resolved households that completed the screener questionnaire (Screener Conversion Rate – 99.1%) and the proportion of screened households with children that completed the topical questionnaire (Topical Conversion Rate – 78.7%). The ORR is the product of the ICR and the proportion of addresses that were resolved (Resolution Rate – 55.3%). Equivalently, the ORR is the product of the Resolution Rate, the Screener Conversion Rate, and the Topical Conversion Rate. This approach yields a national weighted ICR of 78.0% and a weighted ORR of 43.1%.

$$\text{Resolution Rate} = \frac{\text{Resolved Addresses}}{\text{Total Addresses}}$$

$$\text{Screener Conversion Rate} = \frac{\text{Completed Screeners}}{\text{Resolved Households}}$$

$$\text{Topical Conversion Rate} = \frac{\text{Completed Topicals}}{\text{Screened Households with Children}}$$

### **Response Rates by State**

The probability of response varied by state (see Attachment C). Weighted ORRs ranged from 35.7% in Louisiana to 59.8% in Vermont.

### **Web Survey Breakoffs**

In addition to respondent answers, the web instrument produces data that can be used to analyze how respondents interact with the instrument. A set of events – link and button clicks, field entries, and page entries and exits – are recorded and time stamped. Collectively, web instrument paradata offers a valuable tool for evaluating instrument performance and identifying areas for instrument optimization.

The vast majority of respondents that accessed the web instrument completed the survey in the web instrument. Of the respondents that reached the first question in the web instrument, 90% completed the web survey. Effectively all households that reported no children by web completed the survey by web. Of the households that reported children by web, 87% met the requirements of a complete or sufficient partial topical.

Using the web instrument paradata, we can also track the experience of respondents that did not complete the web survey. For example, we can identify the last page viewed by each respondent. Respondents break off from an interview for many reasons, most of which are not tied to a particular element of the survey instrument. But if breakoffs accumulate on a particular page, it could be an indication of an off-putting set of questions or a difficult transition.

Particular sections of the instrument proved more difficult for some respondents to complete and were associated with higher breakoff rates. Table 9 lists the percent of respondent breakoffs by section as well as the percent of total survey time spent in each section.

**Table 9. Breakoffs by Survey Section**

<b>Section</b>	<b>% of Breakoffs</b>	<b>% of Resp. Time</b>
Login/PIN	11.2%	0.6%
Verify Household	15.0%	6.3%
Screen Household	4.3%	2.9%
Roster Children	13.4%	11.1%
A. This Child's Health	9.5%	14.3%
B. This Child as an Infant	3.9%	3.6%
C. Health Care Services	12.1%	14.1%
D. Health Care Providers	5.6%	6.6%
E. Health Insurance Coverage	4.1%	3.5%
F. Providing for Child's Health	3.1%	3.7%
G. School and Activities	2.1%	4.5%
H. About You and This Child	3.3%	6.2%
I. Family and Household	4.3%	9.8%
J. About You	1.2%	5.1%
K. Household Information	5.9%	5.9%
Review and Submission	0.4%	1.7%
Instructions and FAQs	0.4%	0.2%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>

More than a quarter of breakoffs happened during PIN creation and address verification. Once the respondent actually engages in the survey itself, there is a strong correlation between break offs in a section and time spent in a section.

Within individual web pages, there were portions of the survey that proved more challenging to respondents. Table 10 highlights the 10 (of 105) pages responsible for the most breakoffs. The first column lists a page number indicating the sequence in which respondents typically reach a particular page. Pages are listed in the table in descending order by the number of breakoffs.

Pages listed in Table 10 fall in one of two categories: 1) pages early in the instrument (regardless of content); 2) pages with write-in response questions (hcsheightweight, ihddbwwa, ayincome and ayhowmany). In these cases, the implied specificity of the question could increase cognitive burden and make the response feel more sensitive. These pages also included visual prompts that were triggered if the respondent attempted to leave the page without answering specific questions on that page.

Respondents were able to continue past the prompt, but approximately 3% respondents quit the survey after receiving a prompt.<sup>11</sup>

**Table 10. Breakoffs by Survey Web Page**

Pg#	Survey Web Page	Description	% of Breakoffs
1	assign_pin	PIN Assignment	10.4%
2	streetaddress	Street Address Verification	9.4%
2b	wrongaddress	Incorrect Address Page	5.6%
5	childdashboard	Children at this Address	5.5%
49	hcsheightweight	Height and Weight	4.6%
46	ihddbwm	Due Date and Birth Weight	3.2%
4	hhlanguage	Household Language	3.1%
6	childname	Child Name	3.1%
99	ayincome	Income	2.9%
98	ayhowmany	How Many People	2.9%

### Item Level Response and Skip Patterns

The item response rate is the proportion of item-eligible respondents that provided a valid response to a particular item. Many items were applicable to a subset of survey respondents only; for example, some questions were applicable to children in a specific age range. In that case, the denominator for the item response rate is the count of children in the eligible age range, and the numerator is the count of those children with valid responses.

In some cases, it is uncertain if the child was eligible for an item. For example, before asking about the severity of certain conditions, we asked if the child currently had the condition. The severity item was applicable if the child currently had the condition, and it was not applicable if the child did not currently have the condition. If the respondent chose to skip the current condition filter item, we cannot know definitively if the severity item was applicable or not.

We account for this situation in the item response rate by assigning eligibility to cases with unknown eligibility equal to the proportion of cases that were eligible when eligibility was known. For example, if 10% of respondents reported that the child did have the condition currently, and so were eligible for the severity follow-up question, the denominator for the severity item response rate becomes

$$\# \text{ Eligible} + (\# \text{ Eligibility Unknown} * .1)$$

Across all survey items, more than 98% of eligible items (estimated using this methodology) generated a valid response.

<sup>11</sup> When faced with a soft prompt (a prompt that does not require action from the respondent), 3% of respondents quit the survey, 83% of respondents revised an answer, and 14% continued the survey without revising an answer.

Only three items on the public use file have an item response rate below 95%: CYSTFIB\_SCREEN (Cystic Fibrosis Newborn Screening), A2\_LIVEUSA (Adult 2 - Come to Live in the United States (Year)), and K2Q35A\_1\_YEARS (Autism ASD - First Told Age in Years). Generally, items that require a write-in response, that require respondents to follow a skip pattern, and are near the end of the instrument tend to have higher nonresponse. A2\_LIVEUSA is the rare intersection of all three conditions, and K2Q35A\_1\_YEARS satisfies two of the three. CYSTFIB\_SCREEN is applicable to a small number of children (approximately 1 in 1,000), so the item response rate can fluctuate based on the choices of individual respondents

Table 11 lists the 40 variables with item response rates below 97%. The list is dominated by items that are at the end of a skip pattern and are on-path for few respondents (e.g., CYSTFIB\_SCREEN), items that require a write-in response (e.g., A2\_LIVEUSA), and items near the end of the survey (e.g., A2\_MARITAL).

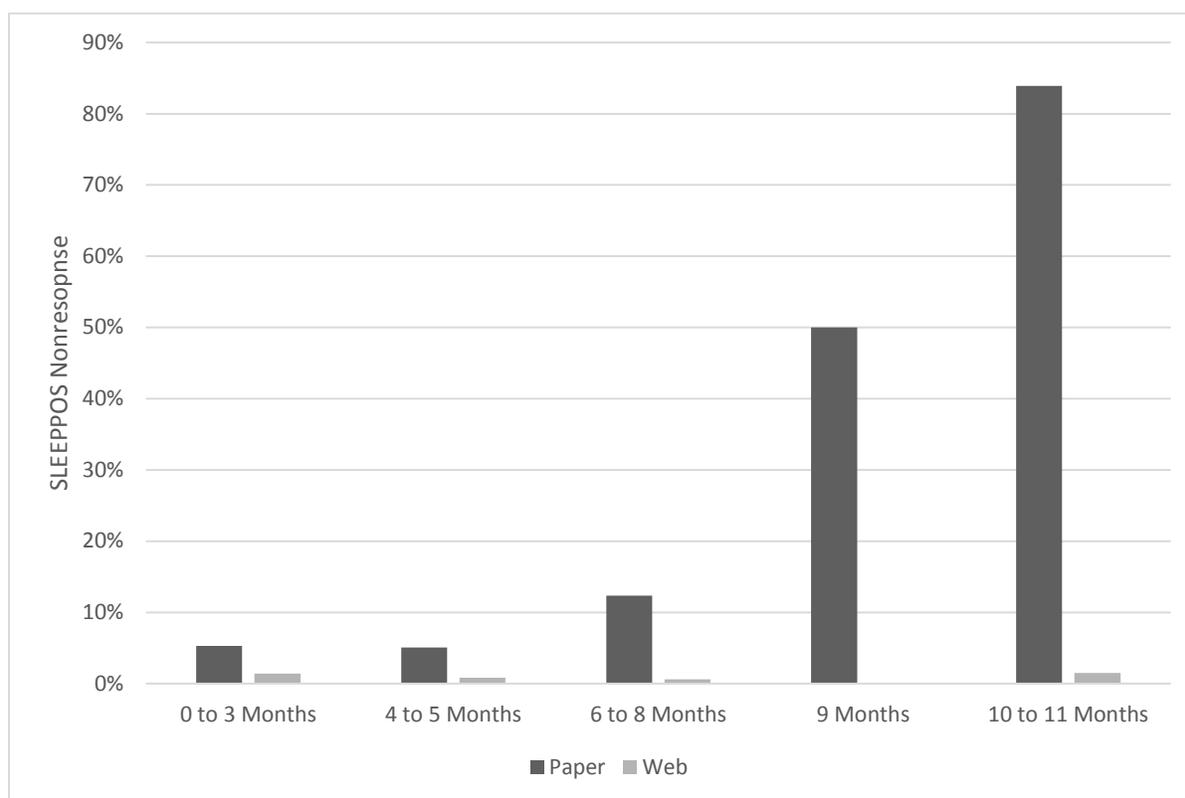
**Table 11. Item Response Rate, Response<.97**

<b>Variable</b>	<b>Description</b>	<b>Response Rate</b>	<b>On-Path (%)</b>
CYSTFIB_SCREEN	Cystic Fibrosis Newborn Screening	90.3%	0.1%
K2Q35A_1_YEARS	Autism ASD - First Told Age in Years	92.5%	2.5%
A2_LIVEUSA	Adult 2 - Come to Live in the United States (Year)	92.9%	11.7%
GENETIC_DESC	Genetic Condition Severity Description	95.0%	3.6%
K2Q41C	Diabetes Severity Description	95.5%	0.4%
SLEEPPPOS	Position Most Often Lay Your Baby Down to Sleep	95.7%	3.1%
GENETIC_SCREEN	Genetic Condition Newborn Screening	95.9%	3.7%
BLOOD_DESC	Blood Disorder Severity Description	96.0%	0.5%
A2_DEPLSTAT	Adult 2 - Deployment Status	96.1%	5.6%
K2Q38B	Tourette Syndrome Currently	96.1%	0.3%
SUBABUSE_CURR	Substance Use Disorder Currently	96.1%	0.2%
A2_K11Q50_R	Adult 2 - Employed 50 Out Of Last 52 Weeks	96.2%	82.5%
CERPALS_DESC	Cerebral Palsy Severity Description	96.3%	0.3%
K12Q01_G	Reason Not Covered - Other	96.3%	5.9%
K12Q01_F	Reason Not Covered - Application/Renewal Problems	96.3%	5.9%
K12Q01_E	Reason Not Covered - Inadequate Providers	96.3%	5.9%
K12Q01_D	Reason Not Covered - Inadequate Benefits	96.3%	5.9%
K12Q01_C	Reason Not Covered - Unaffordable	96.3%	5.9%
K12Q01_B	Reason Not Covered - Cancellation Overdue Premiums	96.3%	5.9%
K12Q01_A	Reason Not Covered - Change in Employer/Employment	96.3%	5.9%
BIRTHWT	Birth Weight Status	96.3%	96.3%
BIRTHWT_L	Birth Weight is Low (<2500g)	96.3%	96.3%
BIRTHWT_VL	Birth Weight is Very Low (<1500g)	96.3%	96.3%
BIRTHWT_OZ_S	Standardized Birth Weight, Ounces	96.3%	96.3%
A1_LIVEUSA	Adult 1 - Come to Live in the United States (Year)	96.3%	12.7%

BMICLASS	Body Mass Index, Percentile	96.3%	50.5%
SPCSERVMO	Received Special Services - Age in Months (use with K4Q37)	96.4%	15.9%
K4Q37	Received Special Services - Age in Years	96.4%	15.9%
LIVEUSA_MO	How Long Living in the United States - Months	96.5%	3.2%
LIVEUSA_YR	How Long Living in the United States - Years	96.5%	3.2%
A2_PHYSHEALTH	Adult 2 - Physical Health	96.5%	82.8%
A2_MARITAL	Adult 2 - Marital Status	96.6%	82.8%
BLOOD_SCREEN	Blood Disorder Newborn Screening	96.6%	0.5%
A2_ACTIVE	Adult 2 - Active Duty	96.6%	82.9%
A2_MENTHEALTH	Adult 2 - Mental or Emotional Health	96.6%	82.9%
A2_BORN	Adult 2 - Where Born	96.6%	82.9%
A2_GRADE	Adult 2 - Highest Completed Year of School	96.7%	83.0%
K2Q31B	ADD/ADHD Currently	96.8%	9.6%
A2_AGE	Adult 2 - Age in Years	96.9%	83.1%
K4Q26	Specialist Visit - Problem	96.9%	17.3%

One exception is SLEPPPOS. SLEPPPOS was asked only to respondents with children less than 12 months old. We determined eligibility based on the age of the child provided on the screener. In the web instrument, the instrument determined eligibility automatically based on the age of the child entered only moments earlier. In the case of the paper instrument, the respondent returned the screener by mail to be processed, and a topical survey form was then mailed out to the respondent. Respondents were asked to complete the question for children less than 12 months old, but the delay between screener and topical mailings meant that some children that were eligible for the question based on the screener instrument were no longer eligible by the time the respondent completed the topical because their child had turned 1 year of age in the interim. The net result was higher than anticipated nonresponse from paper respondents for children near 12 months of age on the screener instrument.

**Figure 1. Probability of Nonresponse to SLEEPPOS by Age of Child in Months (2016)**



### **Incentive Effort**

Survey research indicates that incentives are a necessary and cost-effective expense for achieving a response rate that minimizes nonresponse bias.<sup>12</sup> Due to a preponderance of such research, incentives were used in all previous administrations of the NSCH and National Survey of Children with Special Health Care Needs (NS-CSHCN), and the 2018 NSCH included an incentive in the screener and topical mailings.

### **Screener Incentive**

In the 2018 NSCH, sampled addresses received either a \$2 bill, a \$5 bill, or they were part of the control group that did not receive a cash incentive in the initial screener mailing. The treatment groups represented 90% of sample addresses, while the control group represented 10% of addresses. The sample distribution is presented in Table 12.

<sup>12</sup> Brick JM, Williams D, Montaquila JM. 2011. "Address-Based Sampling for Subpopulation Surveys". *Public Opinion Quarterly*, 75(3): 409-28; Foster EB, Frasier AM, Morrison HM, O'Connor KS, Blumberg SJ. 2010. "All Things Incentive: Exploring the Best Combination of Incentive Conditions". Paper presented at the American Association for Public Opinion Research annual conference, Chicago, IL.

**Table 12. Sample Share by Incentive Group and Web Response Likelihood**

Incentive Group	Web Group		Total
	High Paper	High Web	
Control (\$0)	3.0%	7.0%	10.0%
\$2	13.5%	31.5%	45.0%
\$5	13.5%	31.5%	45.0%
<b>Total</b>	30.0%	70.0%	100.0%

On the whole, providing an unconditional screener incentive in the initial mailing was an effective strategy for encouraging response. On average, the \$2 treatment group cost an additional \$1.67 per address than the control group, and the \$5 treatment group cost an additional \$4.16; the additional cost per case is less than the denominational value of the incentive because a) some incentives are recovered from undelivered envelopes and b) the incentivized treatment groups require fewer follow-up mailings.

Table 13 gives an overview of the cost effectiveness of each incentive strategy. As noted earlier, the incentive was effective at encouraging response – the share of eligible households that completed the screener (Completed Screeners/Eligible Household) and completed the topical (Completed Topicals/Eligible Household) was higher for the \$2 and \$5 incentive groups.

**Table 13. Data Collection Costs by Incentive Group**

Incentive Group	Cost/ Completed Screener	Completed Screeners/ Eligible Household	Cost/ Completed Topical	Completed Topicals/ Eligible Household
Total	\$27.29	49.4%	\$68.21	38.3%
No Incentive	\$23.72	43.8%	\$60.51	33.6%
\$2 Incentive	\$25.49	48.3%	\$64.71	37.1%
\$5 Incentive	\$29.65	51.6%	\$72.84	40.5%

The screener cash incentive has the additional benefit that it tends to be proportionately more effective among groups that are otherwise less likely to respond to the survey. For example, more educated households are more likely to respond to the NSCH. The cash incentive increases screener response across all education groups, but relatively more for less educated households. The \$5 incentive increased response by 14.8% (over control) among respondents with a graduate-level education and 20.5% among respondents with less than a high school education (see Table 14).

**Table 14. Screener Response Probability (Incentive versus No Incentive) by Education**

<b>Education</b>	<b>P(\$2 incentive) / P(control)</b>	<b>P(\$5 incentive) / P(control)</b>
Less than High School	112.5%	120.5%
High School	110.7%	118.5%
College	109.3%	116.5%
Graduate	108.3%	114.8%

**Topical Incentive**

The 2018 NSCH also included a \$5 cash incentive in the initial topical mailing. Approximately 10% of cases were assigned to the control group (no incentive), with the remaining cases receiving a \$5 incentive. Households were assigned to topical mail groups and began receiving topical mailings soon after returning a paper screener. They continued receiving mailings until they returned a topical questionnaire, a fourth topical questionnaire invite was sent, or the survey period came to a close.

As anticipated, response was higher for cases receiving the incentive (see Table 15). The \$5 incentive increased topical response by 12.2 percentage points (=56.3% - 44.1%). The incentive was also cost effective. The average cost for a completed topical was \$68.21 (see Table 13, 'Cost/Completed Topical'). Increasing the probability that an address completes a topical questionnaire has a monetary value proportional to the increase in probability of response; for example, increasing the probability of response from 0% to 10% is worth approximately \$6.82 (= \$68.21 x .1). The \$5 topical incentive increased response by 12.2 percentage points, an increase in response worth approximately \$8.30 (= \$68.21 x .122), more than the cost of the incentive itself.

**Table 15. Topical Response and Cost per Response by Incentive**

<b>Incentive Group</b>	<b>Completed Topical/ Case</b>	<b>Cost/ Completed Topical</b>
Total	55.1%	\$44.27
No Incentive	44.1%	\$46.99
\$5 Incentive	56.3%	\$44.03

**Certified Sticker Effectiveness**

The 2018 NSCH also included a USPS Certified Mail sticker test in the initial screener mailing. Half of addresses were mailed their initial invitation in a standard envelope, and half in a standard envelope with a sticker indicating Certified Mail without return receipt, meaning that the recipient was not required to sign for the package upon delivery.

Unfortunately, the packages were often handled by USPS as though a signature was required. In some cases, the packages were returned by USPS when they were unable to acquire a signature. In other cases, USPS did not attempt to deliver the package as they were addressed to “Dear Resident” and traditional Certified Mail requires a specific person be named as the recipient. As a result, 38% of packages were returned from the test group versus 11% from the control group (see Table 16).

On the other hand, when the envelopes with the certified stickers were delivered, respondents were 24% more likely to respond. USPS has discontinued the certified sticker product on envelopes addressed to “Dear Resident” therefore this mail treatment will not be available for future productions of the survey

**Table 16. Outcome to Initial Screener Mailing by Certified Mail Treatment**

<b>Outcome</b>	<b>Certified Test</b>	<b>Control</b>
Complete	21.4%	24.8%
Not Complete	40.8%	64.5%
Not Delivered	37.8%	10.7%
Total	100.0%	100.0%

### **Web Group Effectiveness**

We modified data collection procedures based on the estimated block group-level paper response likelihood. Since 2012, ACS respondents have been able to submit survey forms over the internet. Alternatively, ACS respondents can eschew the online option and respond by mail (or personal interview) instead. For the 2017 NSCH, we developed a paper-response probability index that used ACS response mode behavior and small-area geographic characteristics to identify block-groups with more residents that would opt against responding by web, but would ultimately respond by mail (versus not responding entirely). The index was updated for the 2018 NSCH.

NSCH mailable addresses were assigned a paper-response probability score and sorted. The highest scoring 30% of addresses were assigned to the High Paper group. To accelerate response and reduce respondent frustration, these addresses were provided a paper screener questionnaire in the initial contact. The remaining 70% of addresses were classified as High Web, and received a first paper screener in the second nonresponse follow-up. See Table 17 for an overview of the data collection procedures for both the High Web and High Paper groups.

**Table 17. Data Collection for High Web vs. High Paper Addresses**

	<b>High Web</b>	<b>High Paper</b>
Mailing 1	Web	Web+Paper
Reminder	Postcard	Postcard
Mailing 2	Web	Web+Paper
Reminder	Postcard	Postcard

Mailing 3	Web+Paper	Web+Paper
Mailing 4	Web+Paper	Web+Paper

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Screener response was significantly higher for the High Paper group, 47.3% of all addresses versus 36.5% of all High Web addresses. The mode of response correlated with our expectations: the High Paper group was four times as likely to respond by paper but 60% as likely to respond by web as the High Web group.

The additional response from the High Paper group came with a cost, approximately \$2.66 per case. The majority of this additional cost came from the paper topical follow-up effort after a household returned a paper screener indicating the presence of children. Consequently, the High Paper strategy was an efficient approach for collecting screener responses but slightly less cost effective than the High Web strategy for collecting topical interviews.

## Data Editing

We processed the data for inconsistent, out-of-range, and out-of-path responses, and we constructed new indicators from respondent answers that were useful for evaluation and analysis by end users. Finally, we applied a completeness test to label cases as completed interviews, sufficient partials, or insufficient partials, and we removed the insufficient partials from the data files.

### Unduplication

All nonresponding households were offered two modes, web and paper, for completing the survey. In some cases, respondents utilized both options. In these cases, we selected one response, web or paper, to include in the data file. We chose the response to include based on the type of return and the level of completeness. Completed web surveys were always chosen over completed paper returns. However, completed paper returns were chosen over partial web survey returns. The web/paper unduplication hierarchy is detailed in Table 18.

**Table 18. Unduplication Criteria for both Web and Paper Returns**

Order Chosen	Type of Return
1	Completed web survey - Household with children
2	Completed paper screener and topical
3	Completed web survey - Household w/o children
4	Completed paper screener - Household w/o children
5	Partially completed web survey
6	Out of scope paper return
7	Refusal paper return, Hard Refusal
8	Incomplete, Duplicate
9	Blank, Soft Refusal
10	Deceased
11	Undeliverable address (UAA) with address correction – mail forwarded, UAA with address correction
12	UAAs, Forwarding Order Expired, Moved out of U.S.
13	Default
14	Blank form

Multiple follow-up mailings including the screener and topical questionnaires were sent out so it was also possible that respondents received more than one paper questionnaire and sent back two paper submissions. In these cases, only one return was chosen to be included in the data file. A completed paper return for a household with children was always chosen first. Completed paper returns without children were then chosen. A blank form was always the last type of return to be chosen. If both returns were complete screeners without eligible children, the record with the most number of variables that contained data was chosen. For all other Automated Tracking and Control (ATAC) status codes, if there were two of the same code, the return with the earliest received date was chosen. The paper/paper unduplication hierarchy is detailed in Table 19.

**Table 19. Unduplication Criteria for Two Paper Returns**

Order Chosen	Type of Return
1	Completed paper screener/topical - Household with children
2	Completed paper screener - Household w/o children
3	Out of scope paper return
4	Refusal paper return, Hard Refusal
5	Incomplete, Duplicate
6	Blank, Soft Refusal
7	Deceased
8	UAA with address correction – mail forwarded, UAA with address correction
9	UAAs, Forwarding Order Expired, Moved out of U.S.
10	Default
11	Blank form

### Paper to Web Standardization

Responses were standardized across web and paper so they could be appended in a single data file. Although the majority of the survey questions had the same valid values for the paper and web instruments, sometimes the values output for the paper questionnaire did not match the output from the web survey instrument. For instance, any questions that included a list of checkboxes where the respondent was instructed to “mark ONE only” differed between paper and web. The difference in output between the two modes was due to the fact that the web had the ability to limit the selection of more than one checkbox via a radio button, whereas a paper respondent could mark more than one box even if the question explicitly said not to. Since all data from the paper instruments is captured for processing, each of the response option checkboxes have their own associated output variable. Therefore, prior to appending web and paper responses into a single data file, paper responses were reformatted to the proper valid values. In the instance of the mark multiple on the “mark ONE only”, this would then be handled during processing which is explained further in the next section. After the topical responses were combined, screener and sampling data were merged into the data file.

### Data Processing

The 2018 NSCH raw output was processed to manage inconsistent and invalid responses in nine sequential steps: stop process, not in universe, range, backfill, yes/no, consistency, legitimate skip, missing in error, and disclosure.

- Stop Process Edit. A case is removed from the data file if the case fails address verification (the respondent indicates that their address does not match the address on file), the respondent indicates that there are no children in the household, or the respondent does not complete a screener for a household with children. The cases are not eligible to be included on a NSCH data file, so are removed from processing.

- Not in Universe Edit. An item is not in universe if it is not included in the instrument the respondent received. Some items are unique to web or paper, and others are specific to a version of the topical instrument, T1, T2, or T3. The value for an item that is not in universe is set to '.N'.
- Range Edit. If a value falls outside the bounds of a defined minimum and maximum for that item, the value is replaced with an indicator that the response is missing. The minimum and maximum are selected to represent a reasonable range of possible responses to the item.
- Backfill Edit. The backfill edit imputes values to some items based on responses to subsequent items that necessarily indicate the correct response to the edited item. Backfill edits apply almost exclusively to paper questionnaires, which cannot prevent a respondent from skipping a root item but answering follow-up questions. For example, INCWAGES is a binary item that filters respondents on whether the family did (INCWAGES=1) or did not (INCWAGES=2) receive wage or salary income. If a respondent does not answer INCWAGES, but provides a valid and non-zero value for INCWAGES\_AMT, the dollar amount of wage and salary income, then it is necessarily correct that INCWAGES=1.
- Yes/No Edit. The NSCH includes several series that ask respondents to select all applicable items from a list. These series may or may not allow the respondent to answer in the negative, indicating that the item is not applicable. In most cases, if a respondent answers in the affirmative (=1) to at least one item in the series, it is assumed that all other items in the series do not apply (=2) unless otherwise noted. If a respondent is only able to respond in the affirmative, and the items in the series are not comprehensive (e.g., they do not include an "Other" option), then it is assumed that all unanswered items do not apply (=2) without imposing the requirement that at least one item is answered in the affirmative.
- Consistency Edit. If responses to two items in the survey are fundamentally inconsistent, one response is maintained and the other is removed and changed to missing. Most consistency edits require that a child does not experience a life event at an age greater than her current age. Because the instrument generally trends from more general, fundamental information to more specific, priority is given to the item that appears first in the instrument.
- Legitimate Skip Edit. Unlike the 'Not in Universe Edit', the legitimate skip edit applies to items that are on the respondent's instrument, but not on path. The value for an item that is in universe but not on path is set to '.L'.
- Missing in Error Edit. If an item is in universe (does not equal .N), is on path (does not equal .L), but does not hold a valid value, that item is missing in error, identified as '.M'.
- Disclosure Edit. Some survey responses, if published, could compromise a respondent's confidentiality. Disclosure edits involve removing entire items (e.g., child's name) or suppressing rare or unique values (e.g., top codes on the family poverty ratio). Census disclosure avoidance standards make reference to weighted and unweighted cell counts (i.e., the number of children with a characteristic or set of characteristics), the size of the underlying population (e.g., the number of children in Kentucky Metropolitan Statistical Areas), and the existence of outside

data sources that could be matched to the NSCH (e.g., a registry of children diagnosed with Cerebral Palsy).

Edits were applied in two stages. In the first stage, edits for screener items were applied to completed screeners with children. When these edits were completed, cases that did not return a completed topical were removed from edits, and the second stage edits to topical items were applied.

## Recoded and Standardized Variables

### *Standardized Variables*

Several questions in the 2018 NSCH allowed respondents to provide an answer using more than one unit (e.g., years and months) and to choose from two systems of units (e.g., imperial or metric). In these cases, we provide standardized variables that convert responses across units and systems to a single unit. See Table 20 for a list and description of these variables.

**Table 20. List of Standardized Variables**

<b>Variable</b>	<b>Description</b>	<b>Units</b>
BIRTHWT_OZ_S	Child birth weight	Ounces
BREASTFEDEND_DAY_S	Stopped breastfeeding	Days
BREASTFEDEND_WK_S	Stopped breastfeeding	Weeks
BREASTFEDEND_MO_S	Stopped breastfeeding	Months
FRSTFORMULA_DAY_S	First fed formula	Days
FRSTFORMULA_WK_S	First fed formula	Weeks
FRSTFORMULA_MO_S	First fed formula	Months
FRSTSOLIDS_DAY_S	First fed solids	Days
FRSTSOLIDS_WK_S	First fed solids	Weeks
FRSTSOLIDS_MO_S	First fed solids	Months

### *Derived and Recoded Variables*

A number of variables on the public use datasets are derived from a set of items on the survey or a recoded version of a single item. These variables are listed in Table 21.

**Table 21. List of Derived and Recoded Variables**

<b>Variable</b>	<b>Description</b>	<b>Derived from</b>
AGEPOS4	Birth position of the selected child relative to other children in household	C_AGE_YEARS C_AGE_MONTHS
TOTMALE	Count of male children in household	C_SEX
TOTFEMALE	Count of female children in household	C_SEX
C_CSHCN	Special Health Care Needs (SHCN) status	C_K2Q10 - C_K2Q23
SC_CSHCN	SHCN status of selected child	C_CSHCN
TOTCSHCN	Count of children with SHCN	CSHCN
TOTNONSHCN	Count of children that do not have SHCN	C_K2Q10 - C_K2Q23
TOTAGE_0_5	Count of children 0 to 5 years old in household	C_AGE_YEARS

Variable	Description	Derived from
TOTAGE_6_11	Count of children 6 to 11 years old in household	C_AGE_YEARS
TOTAGE_12_17	Count of children 12 to 17 years old in household	C_AGE_YEARS
SC_AGE_LT4	Age of selected child (less than 4 months)	SC_AGE_YEARS SC_AGE_MONTHS
SC_AGE_LT6	Age of selected child (less than 6 months)	SC_AGE_YEARS SC_AGE_MONTHS
SC_AGE_LT9	Age of selected child (less than 9 months)	SC_AGE_YEARS SC_AGE_MONTHS
SC_AGE_LT10	Age of selected child (less than 10 months)	SC_AGE_YEARS SC_AGE_MONTHS
C_RACER	Race of child	C_RACE_R
C_RACEASIA	Asian race category is included for the following states: CA, HI, MA, MD, MN, NJ, NV, NY, VA, WA	C_RACE_R
C_RACEAIAN	American Indian/Alaska Native race category is included for the following states: AK, AZ, NM, MT, ND, OK, SD	C_RACE_R
C_HISPANIC_R	Hispanic origin	C_HISPANIC
SC_RACER	Race of selected child	SC_RACE_R
SC_RACEASIA	Asian race category is included for the following states: CA, HI, MA, MD, MN, NJ, NV, NY, VA, WA (Selected Child)	SC_RACE_R
SC_RACEAIAN	American Indian/Alaska Native race category is included for the following states: AK, AZ, NM, MT, ND, OK, SD (Selected Child)	SC_RACE_R
SC_HISPANIC_R	Hispanic origin of selected child	SC_HISPANIC
HOUSE_GEN	Parental nativity	BORNUSA A1_RELATION A1_BORN A2_RELATION A2_BORN
FAMILY_R	Family structure	A1_RELATION A2_RELATION A1_MARITAL A2_MARITAL A1_SEX A2_SEX
CURRINS	Current health insurance coverage status	K3Q04_R CURRCOV K12Q03, K12Q04, K12Q12, TRICARE, HCCOVOTH, K11Q03R
INSTYPE	Type of insurance	CURRINS K12Q03, K12Q04, K12Q12, TRICARE, HCCOVOTH, K11Q03R

Variable	Description	Derived from
INSGAP	Health insurance coverage over the past 12 months	K3Q04_R, CURRINS
FPL_I1-FPL_I6	Family poverty ratio	FAMCOUNT TOTINCOME
HIGRADE	Highest level of education for reported adults (three categories)	A1_GRADE A2_GRADE
HIGRADE_TVIS	Highest level of education for reported adults (four categories)	A1_GRADE A2_GRADE
BIRTHWT	Birth weight status	BIRTHWT_OZ_S
BIRTHWT_L	Low birth weight (<2500g)	BIRTHWT_OZ_S
BIRTHWT_VL	Very low birth weight (<1500g)	BIRTHWT_OZ_S
BMICLASS	Body Mass Index	WEIGHT_* HEIGHT_*

### ***Specification of Select Derived Variables***

***Family Poverty Ratio (FPL)*** - The family poverty ratio is calculated as the ratio of total family income and the family poverty threshold, and reported as a rounded percentage. Respondents reported total family income in item K4 on the paper instrument: “The following question is about your 2017 income. Think about your total combined family income IN THE LAST CALENDAR YEAR for all members of the family. What is that amount before taxes?” Additional text instructed respondents to include all money incomes, for example, social security, dividends, and child support. Responses to K4 were edited for consistency against answers in K3, a series of questions about specific sources of income. Finally, missing or invalid responses were replaced with multiply imputed values.

The family poverty threshold is derived from the Census Bureau’s poverty thresholds. Thresholds vary by family size and the number of related children under 18 years old. They do not vary across geographies. Family size was reported in K2 of the paper instrument. Missing or invalid values were assigned using reported or multiply imputed values of household count adjusted for the number of nonfamily members in the household. The number of related children was determined by the number of children reported in the screener.

To protect the confidentiality of respondents, only FPL is reported in the Public Use File; total family income and the family poverty threshold are not included. Further, FPL is top and bottom coded. Reported values range from 50 (total family income is 50% of the family poverty threshold) to 400 (total family income is 400% of the family poverty threshold). Values beyond this range are reported as 50 or 400, respectively.

***Household Nativity (HOUSE\_GEN)*** - Household nativity is determined by the birth location of the child (BORNUSA) and parents (A1\_BORN and A2\_BORN). If the child was born outside of the U.S. and all reported parents were born outside of the U.S., the household is reported as a 1<sup>st</sup> generation household.

Second generation households have members born both inside and outside of the U.S. For example, the child was born in the U.S. and at least one parent was born outside of the U.S., or the child was born outside of the U.S. and one of two parents was born in the U.S.

Finally, in 3<sup>rd</sup>+ generation households, all parents were born in the U.S. The fourth category, “Other”, captures households with insufficient information about the nativity of the parents.

*Family Structure (FAMILY\_R)* - A family structure variable uses the reported information on the child’s primary caregivers to organize households into common types. Notably, the NSCH collects information on only two adults in the household and requires only that the two adults be primary caregivers of the child. As a result, in multigenerational households, this can mean that a biological, adoptive, or step parent is not reported.

Further, respondents do not report their relationship to other adult members of the household, only to the child; consequently, we may know that the two reported adults are married, but we do not know if they are married to each other. Instead of making assumptions about the relationship of the reported adults with each other, the family structure variable depends only on the number of adults, their relationship to the child, and their individual marital statuses. For example, a reported value of 1 for FAMILY means that the two reported adults are biological/adoptive parents of the child and they are currently married; one may assume that they are married to each other, but in some cases that will not be true.

Two family structure categories (FAMILY\_R=5 and 6) are also defined by the sex of the respondent. In these cases, it is specified that the responding caregiver is female (5) or male (6) and that no other parents (biological, adoptive, or step) are in the household.

*Insurance* - The 2018 NSCH reports several variables that include information on the child’s health insurance status and insurance type. We strongly recommend that data users interested in current health insurance status and insurance type use the derived variables CURRINS (Currently Insured), INSGAP (Gaps in Coverage), and INSTYPE (Insurance Type) in their analyses.

*Currently Covered (CURRINS)* - CURRINS is derived primarily from the respondent-reported values in K3Q04\_R (Health Insurance Coverage – Past 12 Months) and CURRCOV (Health Insurance Coverage – Currently Covered). We indicate that the child is currently insured (CURRINS=1) if the respondent reported that the child had coverage for all of the last 12 months (K3Q04\_R=1) or reported that the child is currently covered (CURRCOV=1), but with an important caveat. If the respondent reported that the child is currently insured but reported only Indian Health Service or health care sharing ministry as the type of coverage, we indicate that the child does not have current insurance coverage (CURRINS=2). Consequently, a respondent may report that a child is insured, but we consider that the child is not insured.

*Gaps in Coverage (INSGAP)* - INSGAP is derived primarily from the respondent reported values in K3Q04\_R (Health Insurance Coverage – Past 12 Months) and CURRCOV (Health Insurance Coverage –

Currently Covered). We indicate that the child had consistent coverage (INSGAP=1) if the respondent reported that the child had coverage for all of the last 12 months (K3Q04\_R=1) but with an important caveat. If the respondent reported that the child is currently insured but reported only Indian Health Service or health care sharing ministry as the type of coverage, we indicate that information as to the consistency of the child's coverage is missing (INSGAP=.M).

*Insurance Type (INSTYPE)* - INSTYPE is derived from CURRINS (Currently Insured) and respondent answers to questions on the coverage type: K12Q03 (Current/Former Employer or Union), K12Q04 (Directly Purchased), K12Q12 (Government Assistance Plan), TRICARE (TRICARE or other military health care), K11Q03 (Indian Health Service), and HCCOVOTH\_WRITEIN (Other Type, Write-in). Any insurance reported as coming from an employer or union, directly purchased, TRICARE or other military health care, or the Affordable Care Act is considered private. Coverage from any government assistance plan is considered public. Both the private and public coverage categories reflect a single reported source of coverage; a combined category for children with both public and private coverage is also included.

HCCOVOTH\_WRITEIN - Write-in responses were back-coded to flag public and private insurance types, religious health care sharing ministry, and Indian Health Service coverage. These flags were used in the derivation of CURRINS and INSTYPE. To protect respondent confidentiality, answers to HCCOVOTH\_WRITEIN are not reported in the Public Use File.

### **Suppressed Variables**

A number of variables had range caps or suppressed values to protect respondent confidentiality consistent with U.S. Census protocols. For example, a reported value must represent at least 10,000 children (weighted estimate). A list and description of these variables are detailed in Table 22.

**Table 22. List of Suppressed Variables**

<b>Variable</b>	<b>Description</b>	<b>Valid Values</b>
TOTKIDS_R	Number of children living in the household	1 = 1 2 = 2 3 = 3 4 = 4+
MOMAGE	Age of mother when child was born	18 = 18 years or younger 45 = 45 years or older
K2Q35A_1_YEARS	Age of child when first diagnosed with autism	1 = 1 year or younger 15 = 15 years or older
BIRTHWT_OZ_S	Birth weight	72 = 72 oz. or less 155 = 155 oz. or more
K11Q43R	Number of time the child has moved to a new address	15 = 15 or more times
A1_AGE	Age of Adult 1	75 = 75 years or older
A2_AGE	Age of Adult 2	75 = 75 years or older
A1_LIVEUSA	When Adult 1 came to live in the U.S.	1970 = Before or in 1970
A2_LIVEUSA	When Adult 2 came to live in the U.S.	1970 = Before or in 1970

Variable	Description	Valid Values
BREASTFEDEND_DAY_S	Stopped breastfeeding, age in days	Suppressed if > 6
BREASTFEDEND_WK_S	Stopped breastfeeding, age in weeks	Suppressed if > 12
BREASTFEDEND_MO_S	Stopped breastfeeding, age in months	30 = 30 or more
DOWNSYN_CURR	Down Syndrome Currently	Removed
DOWNSYN_DESC	Down Syndrome Severity Description	Removed
FRSTFORMULA_DAY_S	First fed formula, age in days	Suppressed if > 6
FRSTFORMULA_WK_S	First fed formula, age in weeks	Suppressed if > 10
FRSTFORMULA_MO_S	First fed formula, age in months	12 = 12 or more
FRSTSOLIDS_DAY_S	First fed solids, age in days	Suppressed if > 2
FRSTSOLIDS_WK_S	First fed solids, age in weeks	Suppressed if > 4
FRSTSOLIDS_MO_S	First fed solids, age in months	15 = 15 or more
FPL	Family poverty ratio	50 = 50% or less 400 = 400% or more
FAMCOUNT	Family Count	8 = 8 or more
HHCOUNT	Household Count	10 = 10 or more
K4Q37	Received Special Services - Age in Years	15 = 15 or more
SESPLANR	Special Education Plan - Age in Years	16 = 16 or more
SUBABUSE_DESC	Substance Use Disorder Severity Description	Removed

### **Geography Variables**

The 2018 NSCH includes four geographic variables on the Public Use File: FIPSST (State of Residence), CBSAFP\_YN (Core-Based Statistical Area Status), METRO\_YN (Metropolitan Statistical Area Status), and MPC\_YN (Metropolitan Principal City Status) (see Table 23). The intersection of CBSAFP\_YN and METRO\_YN also identifies children in Micropolitan Statistical Areas (see Table 24).

Core-Based Statistical Areas (CBSAs) are defined as a county or counties with at least one urbanized area or urban cluster (a core) of at least 10,000 population, plus adjacent counties that have a high degree of social and economic integration with the core (as measured through commuting ties). There are two types of CBSAs: Metropolitan Statistical Areas (MSAs) and Micropolitan Statistical Areas ( $\mu$ SAs). The differentiating factor between these types is that MSAs have a larger core, with a population of at least 50,000. Principal Cities include the largest incorporated place or census designated place (CDP) in a CBSA and any other incorporated place or CDP that meets specific population and workforce requirements.<sup>13</sup> The NSCH reports Principal City status only for addresses in MSAs.

The intersection of CBSAFP\_YN, METRO\_YN, and MPC\_YN identifies four geographic areas (see Table 26):

- Not in a CBSA (CBSAFP\_YN=2)
- Micropolitan Statistical Area (CBSAFP\_YN=1 and METRO\_YN=2)
- Metropolitan Statistical Area, not Principal City (METRO\_YN=1 and MPC\_YN=2)

<sup>13</sup> See [https://www.census.gov/geo/reference/gtc/gtc\\_cbsa.html](https://www.census.gov/geo/reference/gtc/gtc_cbsa.html)

- Metropolitan Principal City (MPC\_YN=1)

To protect respondent confidentiality, CBSAFP\_YN, METRO\_YN, and MPC\_YN are not reported in some states. If a variable or intersection of variables could be used to identify a geographic area within a state with a child population under 100,000, reported values for that variable were replaced with ".D", indicating "Suppressed for Confidentiality". Note that values identifying both the suppressed area and the counterpart area must be suppressed; for example, if the child population in non-MSAs for a particular state is less than 100,000, then any indicator of MSA status (i.e., both non-MSA and MSA) in that state is suppressed. CBSA status (CBSAFP\_YN) is suppressed in 27 states, MSA status (METRO\_YN) is suppressed in 16 states, and Metropolitan Principal City (MPC\_YN) status is suppressed in 21 states.

**Table 23. List of Geography Variables**

Variable	Description	Valid Values
CBSAFL_YN	Core Based Statistical Area (CBSA): County or counties associated with at least one core (urbanized area or urban cluster) of at least 10,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties.	.D = Suppressed for confidentiality 1 = Located within a CBSA 2 = Located outside a CBSA
METRO_YN	Metropolitan Statistical Area (MSA): County or counties associated with at least one urbanized area of at least 50,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties.	.D = Suppressed for confidentiality 1 = In MSA 2 = Not in MSA
MPC_YN	Metropolitan Principal City: An incorporated place or census designated place in a Metropolitan Statistical Area that meets specific population and workforce requirements.	.D = Suppressed for confidentiality 1 = In Metropolitan Principal City 2 = Not in Metropolitan Principal City

**Table 24. Geographies Identified at the Intersections**

Intersection	Geography Levels	Definitions
CBSAFP_YN x METRO_YN	In MSA	County or counties associated with at least one urbanized area of at least 50,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties.
	In Micropolitan Statistical Area	County or counties (or equivalent entities) associated with at least one urban cluster of at least 10,000 but less than 50,000 population, plus adjacent counties having a high degree of social and economic

Intersection	Geography Levels	Definitions
		integration with the core as measured through commuting ties.
	Not in CBSA (Metro or Micro)	
METRO_YN x MPC_YN	In Metropolitan Principal City	An incorporated place or census designated place in a Metropolitan Statistical Area that meets specific population and workforce requirements.
	In MSA, not in Principal City	In an MSA but not in a Principal City.
	Not in MSA	
CBSAFP_YN x METRO_YN x MPC_YN	In Metropolitan Principal City	An incorporated place or census designated place in in a Metropolitan Statistical Area that meets specific population and workforce requirements.
	In MSA, not in Principal City	In an MSA but not in a Principal City.
	In Micropolitan Statistical Area	County or counties (or equivalent entities) associated with at least one urban cluster of at least 10,000 but less than 50,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties.
	Not in CBSA	

Alternative and lower level geographic identifiers are not included with the public use data file. Access to these variables is restricted to the 29 Federal Statistical Research Data Centers (RDC). Researchers can apply for RDC access; proposed projects must demonstrate scientific merit, require non-public data, be feasible, pose no risk to respondent confidentiality, and provide benefit to Census Bureau programs. The currently open RDCs are listed at <https://www.census.gov/about/adrm/fsrdc/locations.html>, and additional information on the RDC application process is available at <https://www.census.gov/programs-surveys/ces/data/restricted-use-data/apply-for-access.html>.

## Weighting Plan

### Overview

To obtain population-based estimates, each selected child for whom an interview was completed was assigned a weight. The child's weight was composed of a base sampling weight, adjustments for both screener and topical nonresponse, an adjustment for the selection of a single child within the sample household, and adjustments used to control to population counts for various demographics obtained from the 2017 American Community Survey (ACS) one-year data. In addition to a final weight for selected children, household and child screener weights were assigned for all households and children with completed screeners. These additional weights were comprised mostly of a subset of the

adjustments used to assign final weights to selected children. The various steps in the production of the weights are described below.

### ***Base Sampling Weights***

The weighting process began with the base sampling weight for each sample household. The base weight (i.e., sampling interval) for each sample housing unit was the inverse of its probability of selection for the screener. Base weights were calculated separately for each of the two strata and each state, including the District of Columbia. If there had been no nonresponse and the survey frame was complete, using this weight would give unbiased estimates for the survey population.

### ***Adjustment for Screener Nonresponse***

Following the base weight, an adjustment for screener nonresponse was implemented to increase the weights of the households that responded to the screener in order to account for all of the households that did not respond to the screener. Households were put into one of sixteen cells defined by stratum, a block group poverty measure variable (yes or no) indicating the proportion of households with income less than 150% of the federal poverty level, web group (high paper or high web), and whether they reside inside or outside of a Core Based Statistical Metropolitan Area. The screener nonresponse adjustment factor was calculated within each cell using the following formula:

$$\left( \frac{\text{weighted sum of screener interviews} + \text{weighted number of screener non-interviews}}{\text{weighted sum of screener interviews}} \right)$$

where the number of screener non-interviews =

$$\left( \frac{\text{weighted sum of screener interviews}}{\text{weighted sum of screener interviews} + \text{weighted sum of screener ineligible households}} \right)$$

×

$$(\text{weighted sum of households with unknown screener eligibility})$$

In other words, the count of screener non-interviews was an estimate of the expected number of eligible households from those cases for which nothing was received back. The term “eligible” here refers to the address belonging to an occupied, residential household. The expected number of eligible cases was estimated by taking the eligibility rate among the known cases and applying it to the unknown cases. The screener nonresponse adjustment was the last step of the weight processing that included the households for which there was no screener interview and the screener-interviewed households that indicated no eligible children.

### ***Adjustment to Population Controls at the Household Level***

All households with children that completed a screener were given a household-level weight. In addition to the base weight and screener nonresponse adjustment, a household post-stratification adjustment was applied in order to achieve the final household screener weight. This factor consisted of ratio adjustments to population controls at the household level obtained from the 2017 ACS data.

Households were put into one of 255 cells defined by state, race of the child selected for the topical, and Hispanic origin (yes or no) of the selected child if the selected child's race was White. Within each cell, the household post-stratification adjustment was calculated as the ACS population count for the cell divided by the cell's weighted total. The product of the base weight, screener nonresponse adjustment, and this household post-stratification adjustment constituted the final household screener weight.

***First Raking to Population Controls: All Screener Children***

All eligible children (four at most) from completed screener interviews were given a child-level screener weight. The weights of children from completed screener interviews were adjusted to match the 2017 ACS estimates for the following characteristics:

- Dimension #1 – State by Child's Race (White alone; Black alone; Asian alone; Other, including two or more races)
- Dimension #2 – State by Child's Ethnicity (Hispanic, Non-Hispanic)
- Dimension #3 – State by Child's Sex by Child's Age Group (0-5, 6-11, 12-17 years)

Each iteration of this process consisted of calculating three ratio adjustments, one for each dimension, sequentially. The adjustment factor calculated for Dimension 1 was applied to the weights accordingly and this newly adjusted weight went into the calculation of the adjustment factor for Dimension 2. This iterative raking process continued until the difference between the sum of the weights and the control total associated with each cell was less than 1% of the control. The resulting weight from this process was the final child-level screener weight for each eligible child. Only the children selected for the topical continued in the weighting process to eventually receive a final interviewed child weight.

***Adjustment for Households with More than One Child***

In households with multiple children, the selected child represented all eligible children in their household. Thus, a within-household subsampling factor was applied to account for the selection of a single child, as well as the oversampling for young children and children with special health care needs (CSHCN). The value of this adjustment was the inverse of the probability of selection for the selected child. Probabilities varied by the number of children in the household, the presence of children aged 0-5, and the presence of CSHCN.

***Adjustment for Topical Nonresponse***

Similar to the screener nonresponse adjustment, the weights of the households responding to the topical needed to be increased to account for all of the households not responding to the topical. If the respondent reached Section H of the topical questionnaire and answered at least 50% of the key items, then it was considered a topical interview. A returned topical that did not meet these conditions was considered a topical non-interview.

All topical-eligible households were put into one of sixteen cells depending on imputed poverty/non-poverty status, web group (high paper vs. high web), tenure (owner occupied or not), and presence of CSHCN. The topical nonresponse adjustment was calculated within each of the sixteen cells as:

$$\left( \frac{\text{weighted sum of topical interviews} + \text{weighted sum of topical non-interviews}}{\text{weighted sum of topical interviews}} \right)$$

After this adjustment, the selected children from topical non-interview households were no longer involved in the weighting process and only interviewed children continued to the last steps.

***Second Raking to Population Controls: Topical Interviewed Children***

The final step of the weighting was accomplished through a second iterative raking process to ACS population controls. The process was equivalent to that of the child-level screener weight, with the exception of additional and different dimensions as well as a trimming step. The following eight analytical domains of interest were used:

- Dimension #1 – State by Family Poverty Ratio ( $\leq 100\%$ , 101-200%,  $> 200\%$ )
- Dimension #2 – State by Household Size ( $\leq 3$ , 4,  $> 4$ )
- Dimension #3 – State Groupings by Respondent’s Education ( $<$ High School, High School,  $>$ High School)
- Dimension #4 – State by Selected Child’s Race (White, Black, Asian, Other)
- Dimension #5 – State by Selected Child’s Ethnicity (Hispanic, Non-Hispanic)
- Dimension #6 – State by Selected Child’s Special Health Care Needs Status
- Dimension #7 – Selected Child’s Race by Ethnicity (at the national level)
- Dimension #8 – Selected Child’s Sex by Single Age (at the national level)

For Dimension #3, some states needed to be grouped due to the low number of respondents in each state with less than a high school degree. States were grouped with others that had similar education distributions based on ACS data. The states were first sorted by the ACS-derived percent of children in households where the respondent has less than a high school degree, followed by an additional sort by the percent of children in households where the respondent has a high school degree. State groupings were made with the intent of keeping these distributions similar within each group. The result was 16 state groupings and 10 stand-alone states. The following were the resulting groupings:

Group 1: Maine, New Hampshire, North Dakota, and Vermont

Group 2: Hawaii, Minnesota, and Utah

Group 3: Iowa, Montana, and Wyoming

Group 4: Connecticut, Massachusetts, and Virginia

Group 5: Idaho and South Dakota

Group 6: Maryland, Nebraska, and New Jersey

Group 7: Michigan and Wisconsin

Group 8: Colorado, Oregon, and Washington

Group 9: DC, Illinois, and Kansas

Group 10: Ohio, Pennsylvania, and Rhode Island

Group 11: Tennessee and West Virginia

Group 12: Florida and South Carolina

Group 13: Indiana and Kentucky

Group 14: Alabama and Delaware

Group 15: Mississippi and New York

Group 16: Alaska and Oklahoma

Stand-alone states: Missouri, North Carolina, Arkansas, Georgia, Louisiana, Arizona, New Mexico, Nevada, Texas, and California

### ***Trimming of Large Weights***

The resulting weights from each iteration of the raking process were checked for extreme values in order to prevent a small number of cases with large weights from having undue influence on estimates and increasing the variance. An extreme value was determined to be a weight that exceeded the median weight plus six times the interquartile range (IQR) of the weights in each state. These extreme weights were truncated to this cutoff (median plus six times the IQR of weights in that state) and the weights were checked for convergence to the controls. Convergence required the weighted total of each cell to be within 1% of the control for the cell. If convergence was not met for every cell, another iteration of the raking process was applied again. This process of raking and trimming was reiterated until convergence was met and there were few extreme weights left. In general, the remaining extreme weights were observed to be very close to the cutoff. The remaining extreme weights were truncated a final time to the median plus six times the IQR in the state and the process was complete.

### **Population Controls**

Population controls used throughout the weighting were derived from the 2017 ACS one-year estimates. By using the 2017 ACS data, the weighted totals were ensured to match the most up-to-date population control totals available for key demographic variables for children and households in the U.S. The controls were used in the household post-stratification adjustment, the raking to attain the child-level screener weights, and the raking to attain the final topical interviewed children weights. Almost all controls used were at the state level, with the exception of the last two dimensions where national-level controls were used in the second raking process.

For the household post-stratification adjustment, the NSCH household weights were adjusted so that the sum of the weights equaled the 2017 ACS estimates for the number of households in each state by race (White, Black, Asian, Other) and by Hispanic origin (yes or no) if the selected child's race was White. In the first raking process, up to four children from each screener received adjustments so that the sum of the weights of all children listed on screeners equaled the ACS estimates for the number of children in each state by race, state by Hispanic origin, and state by sex by age group (0-5, 6-11, 12-17 years). Finally, in the second raking process, the weights of the NSCH topical interviewed children were adjusted so that the sum of their weights equaled the ACS estimates for each state by family poverty ratio ( $\leq 100\%$ , 101-200%,  $>200\%$ ), household size ( $\leq 3$ , 4,  $>4$ ), respondent's highest level of education

(<High School, High School, >High School), race, Hispanic origin, and special health care needs status, as well as race by ethnicity and sex by age in years at the national level.

### Limitations

In order to minimize the variability of the weights caused by large adjustment factors, cells having fewer than 30 cases were collapsed with a neighboring cell. The adjustment factors were then calculated for the merged cells by combining the population controls and the sample cases for the two cells. Since the individual cells were combined, and only one adjustment factor was created per cell, only the weighted total for the *combined* cell will match the control following the raking procedure. Consequently, the weighted totals for the individual cells will most likely not match the population controls for the original individual cells.

As shown in Table 25, cells were collapsed in two of the dimensions in the last raking step.

**Table 25. Collapsed Dimensions and Affected States**

Dimension #4 - State by Selected Child's Race (White, Black, Asian, Other)	Black collapsed with Other in 26 states	Affected states: AK, AZ, CA, CO, HI, ID, IA, KS, ME, MA, MN, MT, NE, NH, NM, ND, OH, OR, RI, SD, UT, VT, WA, WV, WI, WY
	Asian collapsed with Other in 36 states	Affected states: AL, AZ, AR, CO, DC, FL, ID, IN, IA, KS, KY, LA, ME, MI, MN, MS, MO, MT, NE, NH, NM, NC, ND, OH, OK, OR, PA, RI, SC, SD, TN, UT, VT, WV, WI, WY
Dimension #5 - State by Selected Child's Ethnicity (Hispanic, Non-Hispanic)	Hispanic and Non-Hispanic collapsed in 10 states	Affected states: AL, ME, MI, MN, MT, NH, ND, SD, VT, WV

## Imputation

### Overview of Missing Data

Data from the 2018 NSCH can be missing due to a few reasons: a respondent did not answer a question, a question was not on path for a respondent, or a respondent's answer to a question was removed in order to protect their privacy. The SAS and Stata data files for the NSCH include special missing value codes for analysts who may wish to differentiate between different types of missing values.

- (.L) Legitimate Skip – The item is not applicable to the respondent, as determined by a previous answer to a root question.
- (.M) Missing in Error – The value is missing due to respondent or system errors, or the respondent did not provide a valid answer.
- (.N) Not in Universe – The item was not included on the respondent's age-appropriate version of the topical questionnaire.
- (.D) Suppressed for Confidentiality – The value is suppressed in order to protect respondent confidentiality.

### Imputed Variables and Flags

A small number of variables were imputed to be used in weighting (see Table 26). Race, ethnicity, and sex were imputed using hot-deck imputation for all children with missing values on those items. Adult 1 education, household size, and total family income were imputed using regression imputation methods.

In the 2018 NSCH, it appears that some respondents may have been confused by the response instructions for the second adult and completed these items using their own information a second time. These cases were identified based on matching responses from the Adult 1 (A1) and Adult 2 (A2) series of questions.<sup>14</sup> In 2018, 7.4% of cases met the criteria of having duplicated information for A1 and A2. In 2016 and 2017, less than 0.1% of cases met those same criteria. When it was determined that responses for the A2 series were duplicates of the A1 responses, the A2 responses were cleared and imputed from a donor that matched on key household and A1 characteristics. These cases are identified on the public use file using the flag variable A2\_IF.

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<sup>14</sup> A case was considered to have duplicate information for adult 1 and adult 2 if the responses for adult 1 and adult 2 were valid and matched on marital status, education, immigration status, age, sex, and relationship to the child, and valid values matched for employment status, deployment status and active duty status.

**Table 26. List of Imputed Variables**

<b>Variable</b>	<b>Description</b>	<b>Public Use File</b>
C_SEX	Child's sex	Screener
C_RACE_R	Child's race, detailed	Screener
C_HISPANIC_R	Child's Hispanic origin	Screener
TENURE	Residency tenure status	Screener
SC_SEX	Selected child's sex	Topical
SC_RACE_R	Selected child's race, detailed	Topical
SC_HISPANIC_R	Selected child's Hispanic origin	Topical
A1_GRADE	Adult 1 highest completed year of school	Topical
A2 variables (multiple)	Adult 2 characteristics	Topical
HHCOUNT	Household size	Topical
FPL_I1-FPL_I6	Family poverty ratio	Topical

The Public Use Files include imputation flags to indicate which records contain imputed values (see Table 27).

**Table 27. List of Imputation Flags and Frequencies**

<b>Flag Variable</b>	<b>Associated Variable(s)</b>	<b>Imputation Rate</b>
C_SEX_IF	C_SEX	0.2%
C_RACE_R_IF	C_RACER, C_RACE_R, C_RACEASIA, C_RACEAIAN	0.7%
C_HISPANIC_R_IF	C_HISPANIC_R	0.9%
TENURE_IF	TENURE	0.7%
SC_SEX_IF	SC_SEX	0.1%
SC_RACE_R_IF	SC_RACER, SC_RACE_R, SC_RACEASIA, SC_RACEAIAN	0.3%
SC_HISPANIC_R_IF	SC_HISPANIC_R	0.6%
A1_GRADE_IF	A1_GRADE_I	2.0%
A2_IF	A2 variables (multiple)	7.4%
HHCOUNT_IF	HHCOUNT	1.9%
FPL_IF	FPL_I1-FPL_I6	15.3%

### Multiple Imputation

Household size (HHCOUNT) and total family income (TOTINCOME\_I) were multiply imputed, creating six implicates of each. An estimated family count (FAMCOUNT) was derived from HHCOUNT and other household information when FAMCOUNT was not reported by the household. In turn, TOTINCOME\_I and FAMCOUNT were used to create six implicates of the Family Poverty Ratio (FPL). The imputation

was executed by sequential regression modeling imputation<sup>15</sup> using IVEWare.<sup>16</sup> The primary motivation for the multiple imputation is to allow interested researchers to appropriately account for uncertainty in estimates using FPL that is hidden when using a single imputation.<sup>17</sup>

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<sup>15</sup> Raghunathan TE, Lepkowski JM, Hoewyk JV, Solenberger PW. 2001. "A Multivariate Technique for Multiply Imputing Missing Values using a Sequence of Regression Models". *Survey Methodology*, 27: 85–95.

<sup>16</sup> Raghunathan TE, Solenberger PW, Hoewyk JV. 2016. IVEware: Imputation and Variance Estimation Software User's Guide (Version 0.3). Ann Arbor, MI: Institute for Social Research, University of Michigan.  
[www.isr.umich.edu/c/smp/ive/](http://www.isr.umich.edu/c/smp/ive/)

<sup>17</sup> Schaefer JL, Graham JW. 2002. "Missing Data: Our View of State of the Art". *Psychological Methods*, 7(2): 147-77.

## Estimation and Hypothesis Testing

### Variance Estimation

When survey weights are used, the resulting estimates from the 2018 NSCH are representative of all non-institutionalized children aged 0 to 17 years in the U.S. and in each state and the District of Columbia who live in housing units. These weighted estimates do not generalize to the population of parents, mothers, or pediatric health care providers. Analysts are advised to avoid statements such as “the percent of parents”.

Two stratum identifiers should be used to estimate variance: FIPSST (state of residence) and STRATUM (identifies households flagged with children). Each record in the data file is assigned a unique household identifier, HHID. Some analysts may be using statistical programs that only permit the specification of a single stratum variable. These users should define a new variable with 102 levels by crossing STRATUM (2 levels) with FIPSST (51 levels). This new variable can then be used as the stratum variable. For example, Stata users can specify only one variable in the strata() option of svyset. This new variable (named here as STRATACROSS) can be created using the following statement:

- `EGEN STRATACROSS = GROUP (FIPSST STRATUM)`

SUDAAN users can identify both FIPSST and STRATUM in the NEST statement. However, SUDAAN users should note that the first variable listed after the word NEST is assumed to be the stratum variable, and the second variable listed is assumed to be the PSU. To properly identify the PSU variable, the PSULEV option must be invoked in the NEST statement as shown here:

- `NEST FIPSST STRATUM HHID / PSULEV = 3;`

In both individual year and multi-year analyses, the NSCH sample size may be limited for smaller populations (e.g., American Indian or Alaska Native) and state-level subgroups or rare outcomes (e.g., adolescent CSHCN or autism in a particular state). Small sample sizes may produce unstable estimates. To minimize misinterpretation, we recommend only presenting statistics with a sample size or unweighted denominator of 30 or more. Further, if the 95% confidence interval width exceeds 20 percentage points or 1.2 times the estimate ( $\approx$  relative standard error  $>30\%$ ), we recommend flagging for poor reliability and/or presenting a measure of statistical reliability (e.g., confidence intervals or statistical significance testing) to promote appropriate interpretation.

State-level estimates may be compared to national estimates using a nested z-test to identify significant differences at a given alpha or Type 1 error level (e.g., 0.05, 0.01). The formula for this is as follows:

$$Z = \frac{\bar{X}_i - \bar{X}_j}{\sqrt{SE_i^2 + SE_j^2 - 2P * SE_j^2}}$$

Where  $j$  is a subset of  $i$  (e.g., Alabama as part of the Total US),  $\bar{X}$  is the mean or proportion, SE is the standard error, and  $P$  is the proportion of the weighted denominator for a given indicator that is specific to  $j$  (e.g., Alabama weighted denominator divided by the Total US weighted denominator). A simple independent Z-test would be a more conservative test that may increase Type II error—the probability of failing to reject the null of no difference when there is a difference.

### Combining Data across Survey Years

Data across multiple years of the redesigned NSCH (2016 and later) can be combined to increase the analytic sample size. By leveraging a larger sample, data users can analyze smaller population groups and rare outcomes that are not sufficiently represented in a single year sample and produce national and state-level estimates with smaller standard errors. Guidance for producing multi-year estimates is available at <https://www2.census.gov/programs-surveys/nsch/technical-documentation/methodology/NSCH-Guide-to-Multi-Year-Estimates.pdf>.

### Guidelines for Data Use

The U.S. Census Bureau is conducting the NSCH on the behalf of the Health Resources and Services Administration’s Maternal and Child Health Bureau (HRSA MCHB) within the U.S. Department of Health and Human Services (HHS) under Title 13, United States Code, Section 8(b), which allows the Census Bureau to conduct surveys on behalf of other agencies. Title 42 U.S.C. Section 701(a)(2) allows HHS to collect information for the purpose of understanding the health and well-being of children in the U.S. The data collected under this agreement are confidential under 13 U.S.C. Section 9. All access to Title 13 data from this survey is restricted to Census Bureau employees and those holding Census Bureau Special Sworn Status pursuant to 13 U.S.C. Section 23(c).

Any effort to determine the identity of any reported case is prohibited. The Census Bureau and HRSA MCHB take extraordinary measures to assure that the identity of survey subjects cannot be disclosed. All direct identifiers, as well as characteristics that might lead to identification, have been omitted from the data set. Any intentional identification or disclosure of a person or establishment violates the assurances of confidentiality given to the providers of the information. Therefore, users must:

- Use the data in this data set for statistical reporting and analysis only
- Make no use of the identity of any person discovered, inadvertently or otherwise
- Not link this data set with individually identifiable data from any other Census Bureau or non-Census Bureau data sets

Use of the data set signifies users’ agreement to comply with the previously stated statutory-based requirements. Before releasing any statistics to the public, the Census Bureau reviews them to make sure none of the information or characteristics could identify someone. For more information about the Census Bureau’s privacy and confidentiality protections, contact the Policy Coordination Office toll-free at 1-800-923-8282.

## Supporting Material

### References

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## Attachment A – 2018 NSCH Sample Sizes by State and Stratum

<b>State</b>	<b>Total Sample</b>	<b>Stratum 1 (Address linked to child admin record)</b>	<b>Stratum 2 (Not linked to child admin record, higher probability of child presence)</b>
Alabama	4,100	62.5%	37.5%
Alaska	4,100	53.5%	46.5%
Arizona	4,000	57.7%	42.3%
Arkansas	5,400	54.6%	45.4%
California	3,000	68.5%	31.5%
Colorado	2,800	62.0%	38.0%
Connecticut	2,700	65.7%	34.3%
Delaware	3,200	67.3%	32.7%
District of Columbia	3,400	64.4%	35.6%
Florida	4,400	60.8%	39.2%
Georgia	4,100	63.5%	36.5%
Hawaii	3,900	34.3%	65.7%
Idaho	3,000	58.8%	41.2%
Illinois	2,900	62.5%	37.5%
Indiana	3,100	63.1%	36.9%
Iowa	2,800	61.2%	38.8%
Kansas	3,000	67.6%	32.4%
Kentucky	4,000	59.8%	40.2%
Louisiana	5,100	61.2%	38.8%
Maine	3,200	58.2%	41.8%
Maryland	2,600	66.2%	33.8%
Massachusetts	2,600	69.3%	30.7%
Michigan	2,600	68.5%	31.5%
Minnesota	2,100	70.6%	29.4%
Mississippi	5,700	55.3%	44.7%
Missouri	3,100	66.2%	33.8%
Montana	3,400	52.5%	47.5%
Nebraska	2,800	61.4%	38.6%
Nevada	4,300	58.0%	42.0%
New Hampshire	3,100	63.4%	36.6%
New Jersey	2,800	65.3%	34.7%
New Mexico	5,200	50.8%	49.2%
New York	3,400	59.0%	41.0%
North Carolina	3,900	59.8%	40.2%
North Dakota	3,300	56.2%	43.8%

Ohio	3,100	64.0%	36.0%
Oklahoma	4,800	55.7%	44.3%
Oregon	2,700	65.1%	34.9%
Pennsylvania	2,700	68.1%	31.9%
Rhode Island	3,500	61.5%	38.5%
South Carolina	3,700	67.0%	33.0%
South Dakota	2,800	59.4%	40.6%
Tennessee	3,600	61.6%	38.4%
Texas	4,200	64.0%	36.0%
Utah	2,100	71.2%	28.8%
Vermont	2,900	56.9%	43.1%
Virginia	2,700	65.1%	34.9%
Washington	2,700	62.1%	37.9%
West Virginia	5,100	47.3%	52.7%
Wisconsin	2,300	66.9%	33.1%
Wyoming	4,200	50.0%	50.0%

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**Attachment B – Child with Special Health Care Needs Question Battery**

For an address that is eligible for topical sampling, the following is required to determine if an eligible child has special health care needs (CSHCN). One or more of the following five groups must have ‘Yes’ responses to all of its variable/questionnaire items.

- (1) *All of the following are marked "Yes":*  
K2Q10 - Does ... currently need or use medicine prescribed by a doctor, other than vitamins?  
K2Q11 - Is this child's need for prescription medicine because of ANY medical, behavioral, or other health condition?  
K2Q12 - If yes, is this a condition that has lasted or is expected to last 12 months or longer?
- (2) *All of the following are marked "Yes":*  
K2Q13 - Does ... need or use more medical care, mental health, or educational services than is usual for most children of the same age?  
K2Q14 - Is this child's need for medical care, mental health, or educational services because of ANY medical, behavioral, or other health condition?  
K2Q15 - If yes, is this a condition that has lasted or is expected to last 12 months or longer?
- (3) *All of the following are marked "Yes":*  
K2Q16 - Is ... limited or prevented in any way in his/her ability to do the things most children of the same age can do?  
K2Q17 - Is this child's limitation in abilities because of ANY medical, behavioral, or other health condition?  
K2Q18 - If yes, is this a condition that has lasted or is expected to last 12 months or longer?
- (4) *All of the following are marked "Yes":*  
K2Q19 - Does ... need or get special therapy, such as physical, occupational, or speech therapy?  
K2Q20 - Is this child's need for special therapy because of ANY medical, behavioral, or other health condition?  
K2Q21 - If yes, is this a condition that has lasted or is expected to last 12 months or longer?
- (5) *Both of the following are marked "Yes":*  
K2Q22 - Does ... have any kind of emotional, developmental, or behavioral problem for which he or she needs treatment or counseling?  
K2Q23 - If yes, has his or her emotional, developmental, or behavioral problem lasted or is it expected to last 12 months or longer?

For an address that is eligible for topical sampling, an eligible child is classified as Non-CSHCN if no group of questions listed above has “Yes” answers to all questions in the group.

## Attachment C - Weighted Response Rates by State

State	Resolution Rate	Screener Conversion Rate	Screener Completion Rate	Topical Interviews	Topical Conversion Rate	Topical Completion Rate	Interview Completion Rate	Overall Response Rate
<i>United States</i>	55.3%	99.1%	49.8%	30530	78.7%	36.9%	78.0%	43.1%
Alabama	55.3%	99.0%	48.0%	638	74.0%	34.7%	73.2%	40.5%
Alaska	67.9%	99.2%	57.6%	521	77.2%	39.3%	76.5%	52.0%
Arizona	57.7%	99.0%	49.4%	615	78.2%	35.6%	77.4%	44.7%
Arkansas	57.3%	99.5%	49.2%	769	79.0%	37.2%	78.7%	45.1%
California	47.1%	99.2%	43.1%	560	77.5%	33.5%	76.9%	36.2%
Colorado	58.2%	99.1%	52.2%	583	79.0%	41.5%	78.3%	45.5%
Connecticut	54.2%	98.9%	50.3%	537	73.5%	36.1%	72.7%	39.4%
Delaware	54.3%	99.2%	48.6%	579	78.7%	36.4%	78.0%	42.4%
District of Columbia	51.3%	99.0%	47.1%	520	76.3%	35.2%	75.5%	38.7%
Florida	53.7%	99.1%	47.4%	605	74.1%	31.6%	73.4%	39.4%
Georgia	50.0%	98.1%	43.6%	608	73.6%	32.1%	72.3%	36.1%
Hawaii	61.5%	99.5%	55.4%	547	79.4%	43.1%	79.1%	48.6%
Idaho	65.4%	99.1%	58.8%	674	82.4%	47.8%	81.7%	53.4%
Illinois	55.9%	98.5%	51.3%	555	74.6%	38.6%	73.5%	41.1%
Indiana	57.6%	99.2%	52.6%	578	76.9%	39.3%	76.2%	43.9%
Iowa	66.3%	99.7%	63.4%	595	78.4%	44.4%	78.2%	51.8%
Kansas	59.3%	99.2%	54.1%	662	79.7%	42.4%	79.1%	46.9%
Kentucky	59.9%	99.6%	54.8%	673	76.2%	38.3%	75.9%	45.4%
Louisiana	48.7%	99.2%	39.7%	642	73.9%	29.4%	73.2%	35.7%
Maine	68.8%	99.8%	60.8%	570	78.1%	40.6%	77.9%	53.6%
Maryland	55.3%	99.0%	51.1%	541	77.3%	38.0%	76.5%	42.3%
Massachusetts	55.8%	99.2%	52.3%	606	76.4%	40.3%	75.7%	42.2%
Michigan	60.1%	99.1%	54.9%	582	78.2%	41.3%	77.5%	46.5%
Minnesota	65.3%	99.2%	61.7%	617	79.7%	49.2%	79.1%	51.6%

Mississippi	52.4%	99.3%	44.7%	678	76.6%	32.6%	76.0%	39.8%
Missouri	59.8%	99.1%	54.2%	635	74.9%	38.5%	74.2%	44.4%
Montana	69.4%	99.8%	63.6%	532	77.4%	42.6%	77.2%	53.6%
Nebraska	64.7%	99.7%	61.7%	570	81.4%	43.2%	81.2%	52.6%
Nevada	49.6%	98.8%	43.7%	591	76.7%	32.5%	75.8%	37.6%
New Hampshire	64.1%	99.3%	56.9%	631	77.4%	42.6%	76.9%	49.3%
New Jersey	52.6%	98.3%	48.3%	563	74.9%	35.6%	73.6%	38.7%
New Mexico	62.5%	99.4%	54.5%	621	74.4%	38.0%	74.0%	46.2%
New York	50.0%	99.0%	45.3%	537	73.4%	32.3%	72.7%	36.3%
North Carolina	53.9%	98.6%	47.3%	655	78.2%	37.2%	77.1%	41.6%
North Dakota	66.9%	99.6%	61.7%	616	78.8%	46.3%	78.5%	52.5%
Ohio	57.6%	99.2%	52.7%	606	78.2%	40.9%	77.6%	44.7%
Oklahoma	58.9%	99.0%	52.3%	671	77.4%	37.2%	76.6%	45.2%
Oregon	59.0%	99.5%	54.9%	554	82.0%	42.0%	81.6%	48.2%
Pennsylvania	60.0%	99.2%	54.8%	578	75.8%	39.3%	75.2%	45.1%
Rhode Island	51.2%	99.3%	47.9%	608	76.3%	35.5%	75.8%	38.8%
South Carolina	53.8%	99.5%	47.6%	639	76.1%	36.3%	75.8%	40.8%
South Dakota	69.4%	99.5%	65.1%	553	78.2%	44.5%	77.8%	54.0%
Tennessee	54.3%	99.1%	49.4%	609	78.6%	37.3%	77.9%	42.3%
Texas	49.6%	98.2%	42.7%	620	73.9%	31.3%	72.6%	36.0%
Utah	58.7%	99.5%	54.6%	560	83.3%	46.5%	82.9%	48.7%
Vermont	74.1%	99.6%	65.1%	576	81.0%	48.1%	80.7%	59.8%
Virginia	55.9%	99.3%	51.7%	579	78.5%	40.4%	77.9%	43.5%
Washington	61.3%	99.4%	57.3%	548	78.9%	43.6%	78.4%	48.1%
West Virginia	66.3%	99.8%	58.7%	659	77.3%	40.6%	77.1%	51.1%
Wisconsin	65.2%	99.4%	61.1%	613	82.0%	50.1%	81.5%	53.2%
Wyoming	67.0%	99.7%	58.4%	551	75.6%	38.5%	75.4%	50.5%



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