



**Multiple Year
2019–2021**

Behavioral Risk Factor Surveillance System

**Child
Asthma Call-back Survey**

**Analysis Guidance
Supplement**



**National
Asthma
Control
Program**

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**Multiple Year 2019–2021
Behavioral Risk Factor Surveillance System:
Child Asthma Call-back Survey (ACBS)
Analysis Guidance Supplement**

The Child Asthma Call-back Survey (ACBS) follows the main survey of the Behavioral Risk Factor Surveillance System (BRFSS). The Child Asthma Call-back Survey (ACBS) requires use of the BRFSS Random Child Selection Module and the Childhood Asthma Prevalence Module during the BRFSS survey interview. BRFSS survey respondents are eligible for the Child ACBS if they reported that the randomly selected child in the household has ever been diagnosed with asthma (lifetime asthma). If both a randomly selected child and adult in one household have been diagnosed with asthma, then only one of them is eligible for the ACBS.

The number of children reported as being diagnosed with lifetime asthma during the BRFSS interview differs depending on each state's BRFSS sample size, and typically ranges from 200 to 1,000. To create a reliable single-year child ACBS weight, an ACBS child file must have a minimum of 75 completed child records. Beginning in 2009, the state child ACBS data were not weighted and were not included in the public release file if there were fewer than 75 completed interview records. For states with sufficient sample sizes (≥ 75), single-year data with final weights (CLLCPWT_F) are available at [CDC - BRFSS - BRFSS Asthma Call-back Survey](#). Due to sample loss between the BRFSS interview and the ACBS interviews, the number of completed child interviews for the ACBS ranged from 17 to 135 from 2019 through 2021 (Table A, p. 7). To keep consistency across the participating states, the data from 2019 through 2021 were combined and reweighted to represent an average individual year of lifetime asthma population for that state. All states included in the multiple year file contributed data for all three years 2019, 2020, and 2021. The child ACBS multiple year file sample sizes by year and state are shown in table A.

The child demographic information can be found in the BRFSS Random Child Selection Module. All the BRFSS variables are included in the data set; the BRFSS codebooks for each year are available at [BRFSS annual data set](#). The ACBS History and Analysis Guidance documents are available at [CDC - BRFSS -](#)

[BRFSS Asthma Call-back Survey](#). The details highlighted in this supplemental document are intended to assist data users in analyzing the combined 2019–2021 Child ACBS data set.

The annual child ACBS weighting process is based on the BRFSS final child weight for the randomly selected child (`_CLLCPWT`). The sum of the BRFSS child weights (`_CLLCPWT`) for records reporting children with lifetime asthma is an estimate of the total population of children in the state with lifetime asthma. For the ACBS weight, the BRFSS child weight for the randomly selected child is adjusted for loss to sample between the BRFSS interview and the ACBS interview. After adjusting for sample loss, demographic post-stratification group (age/sex/race) adjustments are made to account for differential non-response. As a result of the adjustment for sample loss and the post-stratification adjustment, for each state, the sum of the ACBS final weights for all ACBS child records is equal to the estimated total state population of children with lifetime asthma in that state. The final weight for multiple years (2019–2021) of ACBS data is `_CHILDWT_M_YEARS`.

The multiple years of data were adjusted to represent an average individual year lifetime asthma population for each state. The following is a summary of weighting multiple-year child ACBS data:

1. Three years BRFSS asthma population total: Sum of BRFSS Final Child Weight (`_CLLCPWT`) for `CASTHDX2=1` (“Yes” for BRFSS ever diagnosed asthma question).
2. Computed the yearly proportion ratio, applied the yearly proportion adjustment on BRFSS Final Child Weight (`_CLLCPWT`) before ACBS post-stratification.
3. Yearly Proportion Ratio:

$$\text{Proportion}_{20XX_Ratio} = \frac{20XX \text{ child asthma population}}{\text{Sum of child BRFSS asthma population total from 2018 to 2020.}}$$
4. Adjustment for ACBS sample loss (refused ACBS / lost to follow-up) based on agree-to-be-called-back rate.
5. Stratification for non-response: forces the sum of final weight (`_CHILDWT_M_YEARS`) for each demographic cell (age/sex/race) from the ACBS data to equal to the Sum of BRFSS final weight from each BRFSS “Yes” Lifetime Asthma respondent for each (age/sex/race) cell.

Estimation procedures for statistical analysis

1. Record Weights

- i. The unweighted data represent the number of actual responses. The final child weight for combined years 2019–2021 ACBS dataset is **_CHILDWT_M_YEARS**.

2. Calculated Variables

- i. The data for BRFSS variables are included with the Child ACBS data set. A new variable for child race (**CHILD_RACE_M_YEARS**) has been calculated for the combined child data set to account for differences in the race variable between individual years. A new variable for age (**CHILD_AGE_YEAR**) with imputed missing values has also been created for the combined data set to address variable differences in child age between individual years. For reported child age, please use **MNTHDIFF** (child age in months).

3. Variances

- i. The Child ACBS uses a complex survey design, and therefore statistical software such as SAS, SUDAAN, Epi Info, SPSS and STATA, or other analytical packages must be used that can account for complex sample designs. Accordingly, the statistical code must specify “with replacement” (**WR**) and include stratum variable (**_STSTR**), primary sampling unit (**_PSU**), sample design survey year (**SURVEY_YEAR**), and record weight (**_CHILDWT_M_YEARS**). See sample code in Section B.

B. Sample code

```

/* SUDAAN Code for 3 Age group and current asthma */
PROC CROSSTAB DATA=ACBS_CHILD_18_20 DESIGN=WR;
    NEST SURVEY_YEAR _STSTR _PSU / NOSORTCK MISSUNIT PSULEV=3;
    SUBPOPN __CUR_ASTH_C=1;WEIGHT _CHILDWT_M_YEARS;
    CLASS CAGE3CAT MGT_CLAS_CAT;
    TABLES CAGE3CAT*MGT_CLAS_CAT;
    TEST CHISQ;

    OUTPUT / TABLECELL=DEFAULT FILENAME=CAGE3CAT_GROUP REPLACE;

```

RUN;

/* SAS Code for 3 age Group */

```
PROC SURVEYFREQ DATA =ACBS_CHILD_18_20 NOMCAR;  
    STRATA SURVEY_YEAR _STSTR ;  
    CLUSTER _PSU ;  
    WEIGHT _CHILDWT_M_YEARS;  
    TABLES CAGE3CAT * MGT_CLAS_CAT / ROW CL CHISQ COL ;
```

Run;

/* SAS Code for CURRENT asthma only*/

```
PROC SURVEYFREQ DATA =ACBS_CHILD_18_20 NOMCAR;  
    STRATA SURVEY_YEAR _STSTR ;  
    CLUSTER _PSU ;  
    WEIGHT _CHILDWT_M_YEARS;  
    TABLES __CUR_ASTH_C * MGT_CLAS_CAT / ROW CL CHISQ COL;
```

Run;

Table A. Child Asthma Call-back Survey Sample Size by Year and State

States	2019 [§]	2020 ^β	2021 [¥]	Sample size
California	51	22	24	97
Connecticut	48	120	88	256
Florida	97	65	42	204
Georgia	20	81	62	163
Hawaii	42	42	37	121
Indiana	39	62	94	195
Kansas	62	44	60	166
Massachusetts	31	17	50	98
Michigan	97	67	86	250
Minnesota	77	76	104	257
Missouri	39	72	85	196
Nebraska	67	64	68	199
New Hampshire	41	63	57	161
New Mexico	34	52	17	103
New York	17	40	123	180
Ohio	42	61	56	159
Pennsylvania	37	35	25	97
Rhode Island	25	46	71	142
Texas	50	135	93	278
Utah	114	85	91	290
Vermont	42	85	86	213
Wisconsin	25	34	49	108
Total	1097	1368	1468	3933

Notes:

[§]Data quality response rate for 2019 is available at: [2019 Behavioral Risk Factor Surveillance System Asthma Call-back Survey Summary Data Quality Report \(cdc.gov\)](#).

^βData quality response rate for 2020 is available at: [2020 Behavioral Risk Factor Surveillance System Asthma Call-back Survey Summary Data Quality Report \(cdc.gov\)](#).

[¥]Data quality response rate for 2021 is available at: