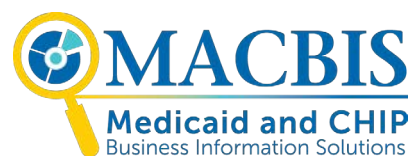# Neonatal Abstinence Syndrome: Identifying Newborn Beneficiaries in Medicaid and CHIP Administrative Data

Technical Specifications

January 2023

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Contents

Tables

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I. Description

This guide provides technical specifications with a general logic for using Medicaid and Children's Health Insurance Program (CHIP) administrative data to identify newborn beneficiaries diagnosed with neonatal abstinence syndrome (NAS). The Neonatal Abstinence Syndrome: Identifying Newborn Beneficiaries in Medicaid and CHIP Administrative Data Technical Specifications enables users to identify newborn beneficiaries who had NAS during the calendar year.

These specifications are designed to use one calendar year of data. The population of interest includes newborn beneficiaries whose birth was covered by Medicaid or CHIP during the calendar year. These specifications do not impose continuous enrollment requirements (that is, contiguous months of enrollment as a recipient of full Medicaid or CHIP benefits). Additionally, births may be eligible for Medicaid or CHIP coverage if the newborn's mother was eligible for coverage because she was pregnant but was not previously enrolled in either program. Users can impose limits on continuous enrollment at their discretion.

These specifications rely on a list of diagnosis codes to identify liveborn infants and NAS-related claims. (See the accompanying documentation: Neonatal Abstinence Syndrome: Identifying Newborn Beneficiaries in Medicaid and CHIP Administrative Data Reference Codes for a full list of relevant codes.) After identifying relevant header claims and creating claims-level indicator variables, users roll up to the beneficiary-level to calculate the number of beneficiaries with NAS. These specifications demonstrate how to count beneficiaries with NAS during a calendar year.

II. Logic overview

The technical specifications lay out the four-step algorithm to identify newborn beneficiaries with NAS using the Transformed Medicaid Statistical Information System (T-MSIS) Analytic Files (TAF) Research Identifiable Files (RIF), described in Table 1. At a high level, these specifications include the following steps:

1. Identify the population of interest (Step 1)

2. Identify newborn- and NAS-related claims (Steps 2 and 3)

3. Roll up claims-level variables to construct beneficiary-level variables that align with the NAS-related categories (Step 4)

For each step, the specifications provide the relevant data files needed, the logic and purpose for the step, and information about how to implement the step in the TAF RIF. The algorithm relies on the TAF annual Demographic and Eligibility (DE), Inpatient (IP), and Other Services (OT) files.

Table 1. Logic for identifying newborn beneficiaries with NAS

Steps	Relevant TAF RIF	Logic and purpose	Implementation using the TAF RIF
1. Identify beneficiaries in the enrollment file who qualify for inclusion	DE file	Identify beneficiaries in the population of interest whose birth was covered by Medicaid or CHIP in the calendar year and are under age 1.	Use the reference year (RFRNC_YR) to identify records that correspond to the calendar year of interest. Select the most recent file version using the variable DE_VRSN. Drop records that do not contain eligibility information (MISG_ELGBLTY_DATA_IND = 1) since these claim records do not contain enrollment information about the beneficiary. Calculate beneficiary age (BIRTH_DT) and limit to beneficiaries under the age of 1 (age < 1).
2. Merge claim headers and enrollment data to create an annual IP file and an annual OT file for beneficiaries who qualify for inclusion	IP, OT, and DE files	Only those claims matching to a beneficiary who qualifies for inclusion should be retained. To reduce run-time, we recommend creating a finder file of beneficiaries from Step 1 and only pulling claims that match their beneficiary ID.	Read in IP and OT header records for beneficiaries who qualify for inclusion in Step 1, based on MSIS identification number (MSIS_ID) and state (SUBMTG_STATE_CD). Select the most recent file version date for each month using the variables IP_VRSN and OT_VRSN. Drop records that represent payments and cannot be tied to specific services delivered to the beneficiary (CLM_TYPE_CD = 2, 4, B, D, V, X). Stack the monthly IP and OT claim files (keeping the files separate) to create an annual IP file and an annual OT file. Stack months for January through December of the calendar year (for example, 2020 would be 01012020 through 12312020).
3. Identify claims for newborns and NAS	IP and OT files	Identify and create claim-level flags for newborns and NAS using diagnosis codes.	Using the files created in Step 3, create a binary (0/1) claim-level flag for newborns and NAS using the Neonatal Abstinence Syndrome: Identifying Newborn Beneficiaries in Medicaid and CHIP Administrative Data Reference Codes list. In the IP file, look for claims with any of the newborn or NAS-related codes from the reference codes list in the diagnosis codes (DGNS_CD_1 to DGNS_CD_12) or admitting diagnosis codes (ADMTG_DGNS_CD). In the OT file, look for claims with any of the newborn or NAS-related diagnosis codes from the reference codes list in the DGNS_CD_1 and DGNS_CD_2 variables. If the user identifies a newborn or NAS-related claim, set the corresponding claim-level flag equal to 1 (for example, if the user identifies a code from the newborn code list on a claim line, set the flag for "newborn" to 1 for that claim). Otherwise, set the claim-level flag equal to 0. Drop all claim-level records where all flags are equal to 0.
4. Create beneficiary-level indicator variables	IP, OT, and DE files	Roll up claims to the beneficiary-level to identify and flag the newborn and NAS categories for Medicaid- and CHIP-covered births.	Stack the IP and OT files into a combined file, keeping only MSIS_ID, STATE_CD, CLM_ID and the constructed claim-level flags. Roll up the claims-level flags to create annual beneficiary-level variables for the following categories: 1. Category 1: Newborn. Equal to 1 if the beneficiary ever had a claim-level flag in either the IP or OT with "newborn" equals 1, otherwise set to 0. 2. Category 2: NAS. Equal to 1 if the beneficiary ever had a claim-level flag (in either the IP or OT) with "NAS" is equal to 1, otherwise set to 0. Limit the beneficiary-level file to beneficiaries identified as newborns by using the newborn flag.

a DE = Demographic and eligibility file; IP = inpatient file; OT = other services file; TAF= Transformed Medicaid Statistical Information System Analytic Files; RIF= research Identifiable files

III. Detailed technical specifications

The detailed technical specifications below describe how the algorithm to identify newborn beneficiaries diagnosed with NAS can be applied to the TAF RIF.

1. Identify beneficiaries in the DE file who qualify for inclusion

Conduct initial processing of the DE claims file to limit its size and to facilitate linking.

a. Read in the DE file and use RFRNC_YR to identify records that correspond to the four-digit calendar year of interest (for example, to analyze calendar year 2020, read in data where RFRNC_YR = 2020). Select the most recent file version date using the variable DE_VRSN.
b. Keep only the DE variables that are needed for the analysis (Table 2).
c. Remove records in which there is no eligibility data where MISG_ELGBLTY_DATA_IND = 1. These claim records do not contain information for how long a beneficiary was enrolled in Medicaid or CHIP.
d. Calculate a beneficiary's age during the calendar year by calculating January 1 in given year – BIRTH_DT. Limit the file to beneficiaries under the age of 1.

Table 2. DE variables to retain

TAF RIF variable name(s)	Description
BIRTH_DT	Beneficiary's date of birth; most recent in the calendar and all prior years
DE_VRSN	Indicator representing the iteration of the file
MISG_ELGBLTY_DATA_IND	A flag to indicate that the person had claims for the year but no eligibility information
MSIS_ID	A state-assigned unique identification number used to identify a Medicaid/CHIP-enrolled beneficiary
RFRNC_YR	The year of the data file
SUBMTG_STATE_CD	The numeric state code for the U.S. state, territory, or the District of Columbia that has submitted the data

2. Identify claim headers for beneficiaries who qualify for inclusion

Conduct initial processing of the IP and OT header claims files to limit their size and to facilitate linking.

a. Read in all monthly IP and OT header records for the year, restricting the set of variables retained to those identified in Tables 3 and 4 for the most recent version of the file (based on _VRSN). Only read in records for beneficiaries who qualify for inclusion in Step 1, based on MSIS identification number (MSIS_ID) and state (SUBMTG_STATE_CD).
b. Drop records that represent payments and cannot be tied to a specific service delivered to the beneficiary (CLM_TYPE_CD = 2, 4, B, D, V, X).
c. Stack the IP and OT claim files (keeping the files separate) so that all claims from all months are contained in a single, annual IP file and a single, annual OT file. Stack months for January through December of the calendar year (for example, 2020 would be 01012020 through 12312020).

Table 3. IP variables to retain

Variable name	Variable description
Header-level	
IP_VRSN	Indicator representing the iteration of the file
CLM_ID	The unique identification number for the claim
MSIS_ID	The encrypted state-assigned unique identification number used to identify a Medicaid/CHIP enrolled beneficiary and any claims submitted to the system
SUBMTG_STATE_CD	The ANSI numeric state code for the U.S. state, territory, or the District of Columbia that has submitted the data
ADMTG_DGNS_CD	ICD-10-CM admitting diagnosis code
CLM_TYPE_CD	A code indicating what kind of payment is covered in this claim
DGNS_CD_1 - DGNS_CD_12	ICD-10-CM code found on the claim

Table 4. OT variables to retain

Variable name	Variable description
Header-level	
OT_VRSN	Indicator representing the iteration of the file
CLM_ID	The unique identification number for the claim
MSIS_ID	The encrypted state-assigned unique identification number used to identify a Medicaid/CHIP enrolled beneficiary and any claims submitted to the system
SUBMTG_STATE_CD	The ANSI numeric state code for the U.S. state, territory, or the District of Columbia that has submitted the data
CLM_TYPE_CD	A code indicating what kind of payment is covered in this claim
DGNS_CD_1 - DGNS_CD_2	ICD-10-CM code on the claim

3. **Identify claims for newborns and NAS**

Identify and create claim-level flags for each of the newborn and NAS categories by using diagnosis codes.

a. Using the files created above, create a binary (0/1) claim-level flag for newborns and NAS using the Neonatal Abstinence Syndrome: Identifying Newborn Beneficiaries in Medicaid and CHIP Administrative Data Reference Codes list. If the claim has any of the diagnosis codes for the relevant category, set the claim-level flag equal to 1. Otherwise, set the claim-level flag equal to 0.

   i. In the IP file, look for claims with any of the newborn- or NAS-related codes from the reference codes list in the diagnosis codes (DGNS_CD_1 to DGNS_CD_12) or admitting diagnosis codes (ADMTG_DGNS_CD).

   ii. In the OT file, look for claims with any of the newborn or NAS-related diagnosis codes from the reference codes list in the DGNS_CD_1 and DGNS_CD_2 variables.

b. If the user identifies a newborn- or NAS-related diagnosis code, set the corresponding claim-level flag equal to 1 (for example, if the user identifies a code from the newborn code list on a claim line, then set the flag for "newborn" to 1 for that claim line). Otherwise, set the claim-level flag equal to 0.

c. Drop all claim-level records where all flags are equal to 0.

4. Create a beneficiary-level file

Roll up claims to the beneficiary-level to identify and flag the newborn and NAS categories for Medicaid and CHIP beneficiaries.

a. Stack the IP and OT claim-level variables into a combined file, keeping only the MSIS ID, STATE_CD, CLM_ID and the constructed claim-level flags.

b. Roll up the claims-level flags to create annual beneficiary-level variables for the following categories:

   i. Category 1: Newborn. Equal to 1 if the beneficiary ever had a claim-level flag in either the IP or OT with "newborn" equals 1, otherwise set to 0.

   iii. Category 2: NAS. Equal to 1 if the beneficiary ever had a claim-level flag (in either the IP or OT) with "NAS" is equal to 1, otherwise set to 0.

c. Limit the beneficiary-level file to beneficiaries identified as newborns by using the newborn flag.

IV. Limitations

These technical specifications have the following limitations:

- **The NAS category may inadvertently include a small number of beneficiaries who are not newborns.** Beneficiaries are flagged for the NAS category if they have at least one claim that has a delivery diagnosis code intended to be used for a newborn and are under the age of 1. If these codes are used on claims for non-newborn beneficiaries, they could be included in the NAS category.

- **Some beneficiaries with a claim that included a newborn diagnosis code could have a date of birth for the year before the calendar year.** We believe that these claims are included in the TAF because of the construction rules (delivery claims for beneficiaries who were born during the prior year but who were discharged during the measurement year would be included in TAF file for the calendar year of interest). Excluding such beneficiaries would cause underestimations in NAS diagnoses over time. The size of the newborn population may be underestimated if claims for births without complications are primarily submitted under the mother's ID and only include procedure or diagnosis codes related to the mother. Newborns who do not have a claim for their own birth according to the newborn-focused diagnosis code may be more likely to be healthy and not have a claim for NAS. This could lead to overestimated NAS counts.

- **Coding errors and data quality issues can affect the accuracy of the results.** The logic of the algorithm assumes that the procedure codes, diagnosis codes, and revenue codes are used correctly; however, there is evidence of coding errors and other limitations in some states' TAF RIF data. Errors in the data will result in the misclassification of beneficiaries. Further, data quality issues introduced by states during the reporting process may affect the accuracy of the results. States with serious data quality issues are not included in the final Medicaid public use file output.