



**Neonatal Abstinence Syndrome Births:
Trends in the United States, 2008-2019**

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This report is updated as additional Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) become available.

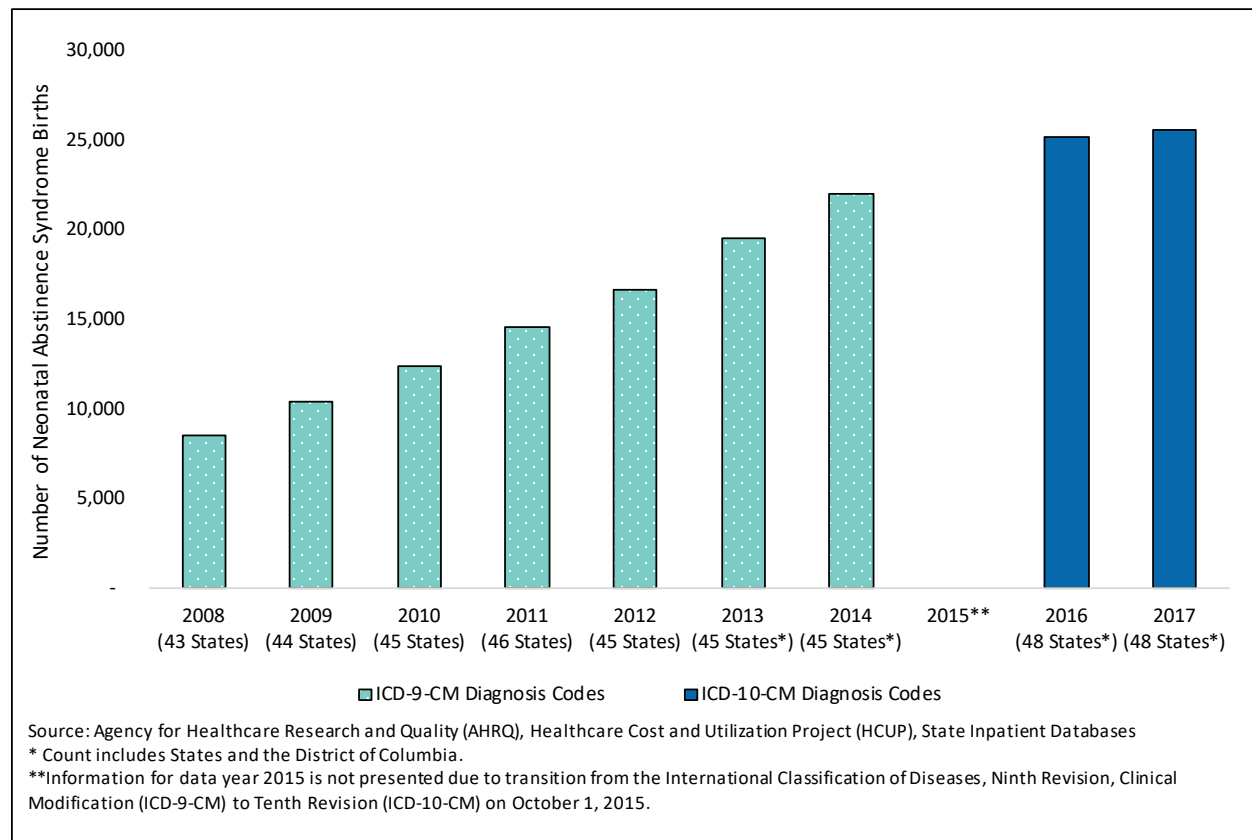
- January 17, 2020
 - Figure 1 was updated to include information from the 2017 SID from 47 States and the District of Columbia.
 - Figure 2 was updated to include the following:
 - Information from the 2018 SID from 47 States and the District of Columbia
 - Information from the 2018 SID for up to 41 States and the District of Columbia.
 - Figure 3 was updated to include information from the 2008–2019 SID for 12 States for which 2019 data were available.
- July 11, 2019
 - The next version added Figures 2 and 3, with Figure 1 unchanged from the January 2019 version.
 - Figure 2 included information from the 2008–2017 SID for up to 46 States and the District of Columbia. Figure 2a used all available SID in each year and Figure 2b used a consistent set of SID for each year.
 - Figure 3 included information from the 2008–2018 SID for 12 States for which 2018 data were available.
- January 18, 2019
 - The first version included information from the SID for 2008–2016 and contained only Figure 1. For data year 2016, there were SID from 47 States and the District of Columbia.

Neonatal Abstinence Syndrome Births: Trends in the United States, 2008-2019

Four views of the trends in neonatal abstinence syndrome (NAS) births in the United States are provided. The graphs differ by currency and the availability of State-level data.

The first trend graph provides final annual estimates using the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) for 2008–2017. The SID are developed through a Federal-State-Industry partnership sponsored by the Agency for Healthcare Research and Quality (AHRQ). The HCUP Partner organizations are listed in Appendix A. Background on the SID is provided in Appendix B. The coding criteria NAS births is provided in Appendix C. The underlying data table for each figure is provided in Appendix D.

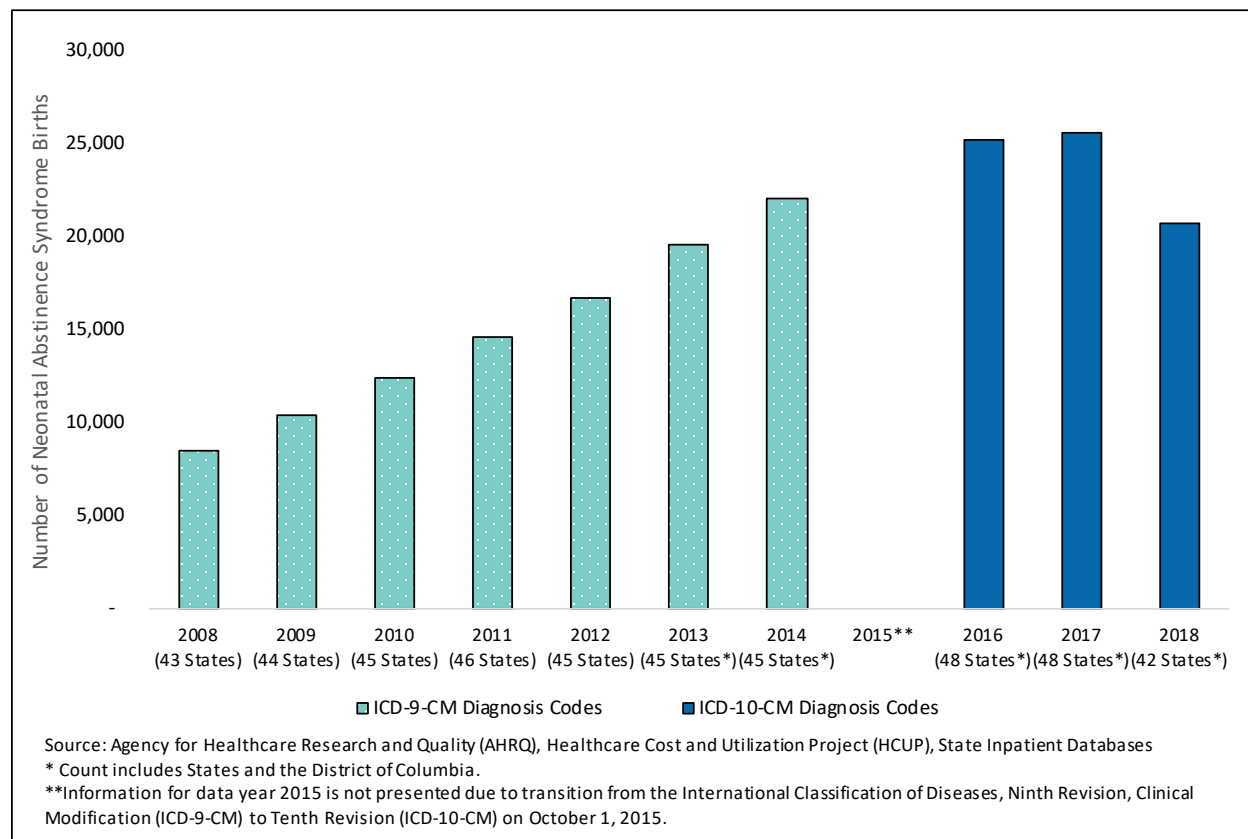
Figure 1. Annual Number of Neonatal Abstinence Syndrome Births in the United States in Years 2008–2017 with the Number of HCUP Partner Organizations Varying by Year



Estimates for 2017 include data from the following: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

Figure 2a includes annual counts for the next data year (2018), but the information is limited to 41 States and the District of Columbia for which HCUP has 2018 annual data. It should be noted that not all of these States have data for all years 2008–2018.

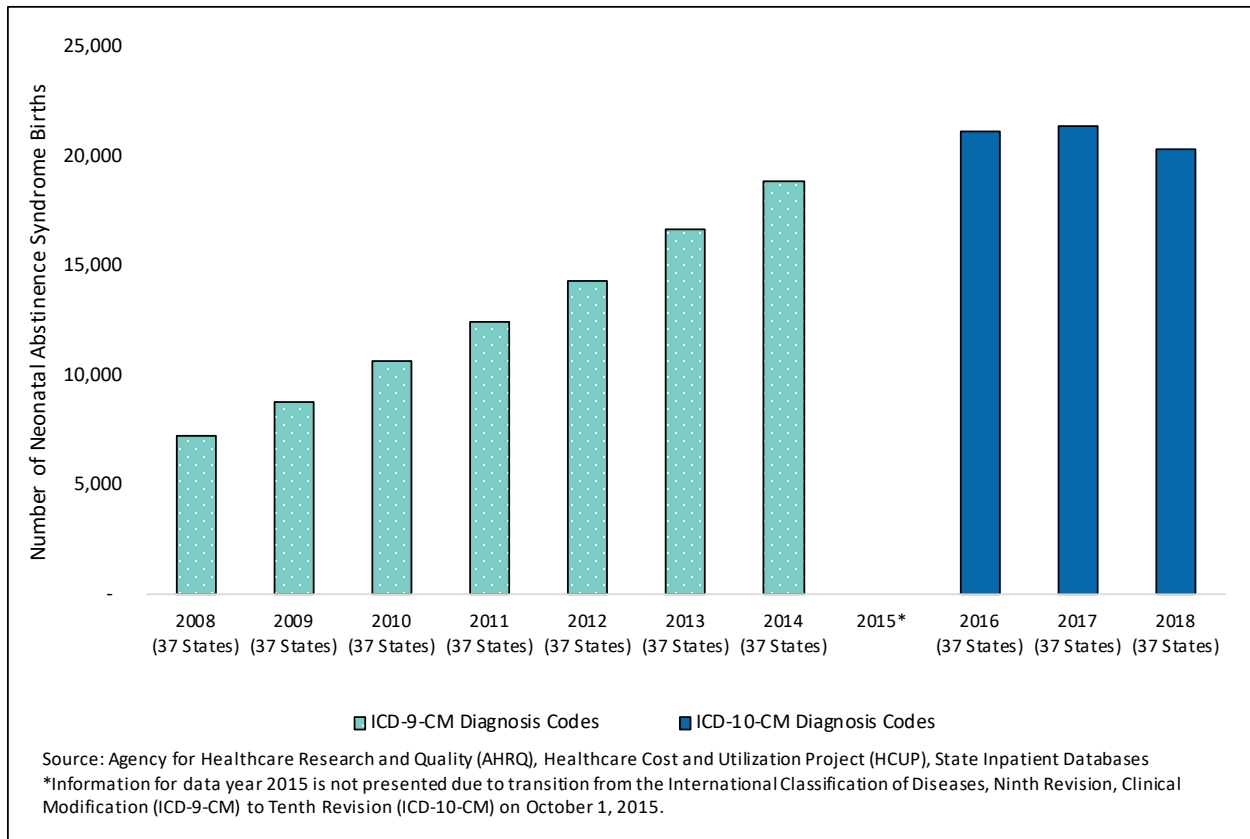
Figure 2a. Annual Number of Neonatal Abstinence Syndrome Births in the United States in Years 2008–2018 with the Number of HCUP Partner Organizations Varying by Year



Estimates for 2018 include data from the following: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, District of Columbia, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

In contrast, Figure 2b includes annual counts for the next data year (2018) with the information limited to 37 States for which HCUP data are available for all years 2008–2018.

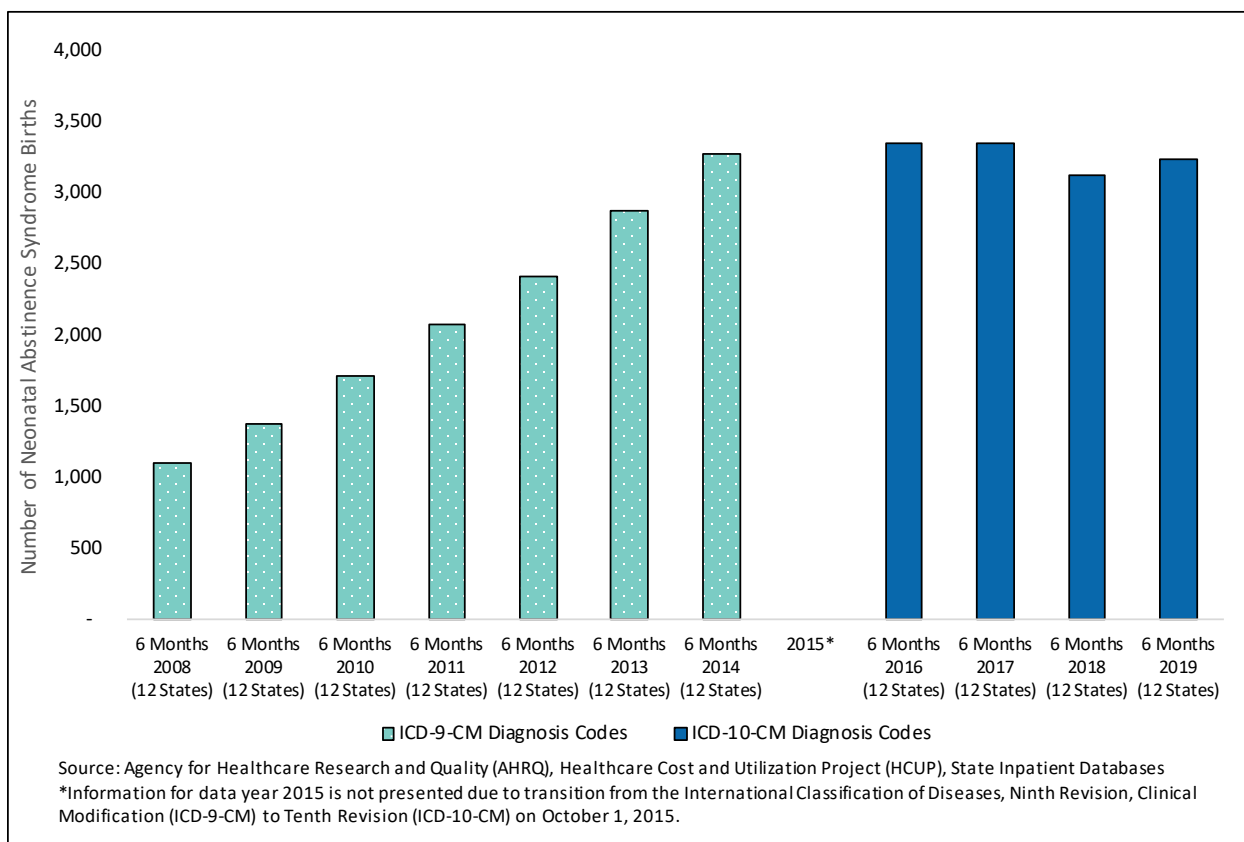
Figure 2b. Annual Number of Neonatal Abstinence Syndrome Births in the United States in Years 2008–2018, Same HCUP Partner Organizations in All Data Years



Estimates for 2008–2018 include data from the following in all years: Arizona, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Jersey, New Mexico, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

Figure 3 includes information from the first half of 2019 (Jan – June 2019). The information is limited to 12 States for which HCUP data are available for all years 2008–2019.

Figure 3. Number of Neonatal Abstinence Syndrome Births in the United States in Twelve Months of Years 2008–2019, Same States in All Data Years



Estimates for 2008–2019 include data from the following in all years: Arizona, Colorado, Georgia, Iowa, Kentucky, Maryland, Michigan, Minnesota, New Jersey, Ohio, Vermont, and Wisconsin.

Appendix A. HCUP Partner Organizations

Alaska Department of Health and Social Services
Alaska State Hospital and Nursing Home Association
Arizona Department of Health Services
Arkansas Department of Health
California Office of Statewide Health Planning and Development
Colorado Hospital Association
Connecticut Hospital Association
Delaware Division of Public Health
District of Columbia Hospital Association
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Health Information Corporation
Hawaii Lauima Data Alliance
Illinois Department of Public Health
Indiana Hospital Association
Iowa Hospital Association
Kansas Hospital Association
Kentucky Cabinet for Health and Family Services
Louisiana Department of Health
Maine Health Data Organization
Maryland Health Services Cost Review Commission
Massachusetts Center for Health Information and Analysis
Michigan Health & Hospital Association
Minnesota Hospital Association (provides data for Minnesota and North Dakota)
Mississippi State Department of Health
Missouri Hospital Industry Data Institute
Montana Hospital Association
Nebraska Hospital Association
Nevada Department of Health and Human Services
New Hampshire Department of Health & Human Services
New Jersey Department of Health
New Mexico Department of Health
New York State Department of Health
North Carolina Department of Health and Human Services
North Dakota (data provided by the Minnesota Hospital Association)
Ohio Hospital Association
Oklahoma State Department of Health
Oregon Association of Hospitals and Health Systems
Oregon Office of Health Analytics
Pennsylvania Health Care Cost Containment Council
Rhode Island Department of Health
South Carolina Revenue and Fiscal Affairs Office
South Dakota Association of Healthcare Organizations
Tennessee Hospital Association
Texas Department of State Health Services
Utah Department of Health
Vermont Association of Hospitals and Health Systems
Virginia Health Information
Washington State Department of Health
West Virginia Department of Health and Human Resources, West Virginia Health Care Authority
Wisconsin Department of Health Services
Wyoming Hospital Association

Appendix B. Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID)

The Healthcare Cost and Utilization Project (HCUP) is a family of health care databases and related software tools and products developed through a Federal-State-Industry partnership and sponsored by the Agency for Healthcare Research and Quality (AHRQ). HCUP databases bring together the data collection efforts of State data organizations, hospital associations, private data organizations, and the Federal government to create a national information resource of encounter-level health care data. HCUP includes the largest collection of longitudinal hospital care data in the United States, with all-payer, encounter-level information beginning in 1988. These databases enable research on a broad range of health policy issues, including cost and quality of health services, medical practice patterns, access to health care programs, and outcomes of treatments at the national, State, and local market levels.

The HCUP State Inpatient Databases (SID) contain the universe of the inpatient discharge abstracts from participating States that are translated into a uniform format to facilitate multistate comparisons and analyses. Together, the SID encompass over 95 percent of all U.S. hospital discharges.

The SID contain clinical and resource-use information that is included in a typical discharge abstract, with safeguards to protect the privacy of individual patients, physicians, and hospitals. The SID contain more than 100 clinical and nonclinical variables, such as:

- Principal and secondary diagnoses and procedures
- Admission and discharge status
- Patient demographics characteristics (e.g., sex, age, and, for some States, race/ethnicity)
- Expected payment source
- Total charges
- Length of stay.

Appendix C. Coding Criteria for Neonatal Abstinence Syndrome Births

Identification of neonatal abstinence syndrome (NAS) births require that the inpatient discharge record included both of the following:

- A diagnosis of NAS
- A diagnosis of in-hospital birth or a birth before admission to the hospital.

ICD-10-CM Codes Starting October 1, 2015

To identify NAS under ICD-10-CM, the birth record must include one of the following diagnosis codes:

- P96.1: Neonatal withdrawal symptoms from maternal use of drugs of addiction
- P04.14: Newborn affected by maternal use of opiates (valid as of October 1, 2018)

Birth records under ICD-10-CM are identified by any diagnosis of:

- Z38 Series: Liveborn infants according to place of birth and type of delivery.

ICD-9-CM Codes Prior to October 1, 2015

To identify NAS under ICD-9-CM, the birth record must include any diagnosis of:

- 779.5: Drug withdrawal syndrome in newborn.

Birth records under ICD-9-CM are identified by any diagnosis of:

- V30-V39 Series: Liveborn infants according to type of birth
 - Ending in 00 or 01: Indication of birth inside hospital
 - Ending in 1: Indication of birth before admission to hospital.

It should be noted that under ICD-9-CM, the identification of NAS must not include an indication of a possible iatrogenic case, which is defined by ICD-9-CM diagnosis codes of 765.00-765.05, 770.7, 772.10-772.14, 777.50-777.53, 777.6, and 779.7. Similar exclusions are not necessary under ICD-10-CM because iatrogenic cases would be reported under a different ICD-10-CM diagnosis code (P96.2: Withdrawal symptoms from therapeutic use of drugs in newborn), which is not included in the ICD-10-CM definition of NAS.

Appendix D. Data Tables

Table D.1. Annual Number of Neonatal Abstinence Syndrome Births in the United States in Years 2008–2017 with the Number of HCUP Partner Organizations Varying by Year

Year	Number of States and District of Columbia	Time Period	Number of Neonatal Abstinence Syndrome Births in the United States	
			Identified by ICD-9-CM Diagnosis Codes	Identified by ICD-10-CM Diagnosis Codes
2008	43	Calendar year	8,512	0
2009	44	Calendar year	10,380	0
2010	45	Calendar year	12,441	0
2011	46	Calendar year	14,575	0
2012	45	Calendar year	16,709	0
2013	45*	Calendar year	19,569	0
2014	45*	Calendar year	22,061	0
2015**				
2016	48*	Calendar year	0	25,213
2017	48*	Calendar year	0	25,619

Abbreviations: ICD-9-CM: International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10-CM: International Classification of Diseases, Tenth Revision, Clinical Modification.

Notes: Estimates for 2017 include data from the following: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

* Count includes States and the District of Columbia.

**Information for data year 2015 is not presented due to transition from the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) to Tenth Revision (ICD-10-CM) on October 1, 2015.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases, 2008–2017

Table D.2a. Annual Number of Neonatal Abstinence Syndrome Births in the United States in Years 2008–2018 with the Number of HCUP Partner Organizations Varying by Year

Year	Number of States and District of Columbia	Time Period	Number of Neonatal Abstinence Syndrome Births in the United States	
			Identified by ICD-9-CM Diagnosis Codes	Identified by ICD-10-CM Diagnosis Codes
2008	43	Calendar year	8,512	0
2009	44	Calendar year	10,380	0
2010	45	Calendar year	12,441	0
2011	46	Calendar year	14,575	0
2012	45	Calendar year	16,709	0
2013	45*	Calendar year	19,569	0
2014	45*	Calendar year	22,061	0
2015**				
2016	48*	Calendar year	0	25,213
2017	48*	Calendar year	0	25,619
2018	42*	Calendar year	0	20,718

Abbreviations: ICD-9-CM: International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10-CM: International Classification of Diseases, Tenth Revision, Clinical Modification.

Notes: Estimates for 2018 include data from the following: Alaska, Arizona, Arkansas, California, Colorado, Connecticut, District of Columbia, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

* Count includes States and the District of Columbia.

**Information for data year 2015 is not presented due to transition from the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) to Tenth Revision (ICD-10-CM) on October 1, 2015.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases, 2008–2018

Table D.2b. Annual Number of Neonatal Abstinence Syndrome Births in the United States in Years 2008–2018, Same HCUP Partner Organizations in All Data Years

Year	Number of States	Time Period	Number of Neonatal Abstinence Syndrome Births in the United States	
			Identified by ICD-9-CM Diagnosis Codes	Identified by ICD-10-CM Diagnosis Codes
2008	37	Calendar year	7,267	0
2009	37	Calendar year	8,788	0
2010	37	Calendar year	10,686	0
2011	37	Calendar year	12,426	0
2012	37	Calendar year	14,299	0
2013	37	Calendar year	16,682	0
2014	37	Calendar year	18,858	0
2015*				
2016	37	Calendar year	0	21,127
2017	37	Calendar year	0	21,412
2018	37	Calendar year	0	20,368

Abbreviations: ICD-9-CM: International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10-CM: International Classification of Diseases, Tenth Revision, Clinical Modification.

Notes: Estimates for 2008–2018 include data from the following in all years: Arizona, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Jersey, New Mexico, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

*Information for data year 2015 is not presented due to transition from the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) to Tenth Revision (ICD-10-CM) on October 1, 2015.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases, 2008–2018

Table D.3. Number of Neonatal Abstinence Syndrome Births in the United States in First Six Months of Years 2008–2019, Same States in All Data Years

Year	Number of States	Time Period	Number of Neonatal Abstinence Syndrome Births in the United States	
			Identified by ICD-9-CM Diagnosis Codes	Identified by ICD-10-CM Diagnosis Codes
2008	12	January-June	1,107	0
2009	12	January-June	1,381	0
2010	12	January-June	1,715	0
2011	12	January-June	2,071	0
2012	12	January-June	2,414	0
2013	12	January-June	2,871	0
2014	12	January-June	3,276	0
2015*				
2016	12	January-June	0	3,355
2017	12	January-June	0	3,344
2018	12	January-June	0	3,123
2019	12	January-June	0	3,238

Abbreviations: ICD-9-CM: International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10-CM: International Classification of Diseases, Tenth Revision, Clinical Modification.

Notes: Estimates for 2008–2019 include data from the following in all years: Arizona, Colorado, Georgia, Iowa, Kentucky, Maryland, Michigan, Minnesota, New Jersey, Ohio, Vermont, and Wisconsin.

*Information for data year 2015 is not presented due to transition from the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) to Tenth Revision (ICD-10-CM) on October 1, 2015.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases, 2008–2019