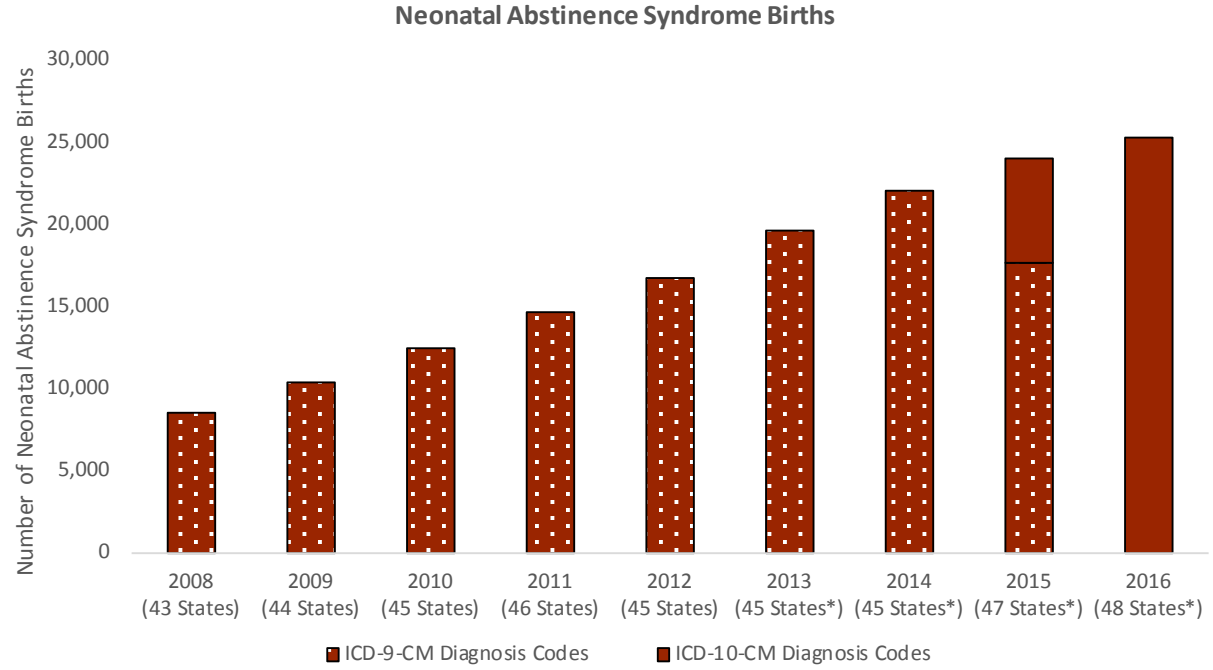
Trends in Neonatal Abstinence Syndrome Births in the United States

Updated: January 18, 2018

The following graph presents trends in the annual number of neonatal abstinence syndrome births using the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) for 2008–2016. 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 clinical criteria for identifying neonatal abstinence syndrome births in the SID is provided in Appendix C. The underlying data table for Figure 1 is provided in Appendix D.

Figure 1. Annual Number of Neonatal Abstinence Syndrome Births in the United States in Years 2008–2016 with the Number of HCUP Partner Organizations Varying by Year



Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases
* Count includes States and the District of Columbia.

Estimates for 2016 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.

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
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. Clinical Criteria for Identifying Neonatal Abstinence Syndrome Births

The HCUP State Inpatient Databases (SID) were limited to community hospitals, excluding rehabilitation facilities. Community hospitals are defined as short-term, non-Federal, general, and other hospitals open to the public, excluding hospital units of other institutions (e.g., prisons). Community hospitals included obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and academic medical hospitals. Excluded for this analysis were long-term care facilities such as rehabilitation hospitals.

On October 1, 2015, the United States transitioned code sets for reporting clinical diagnoses from International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) to International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM). The identification of neonatal abstinence syndrome births required that the discharge record in the SID include both of the following:

- A diagnosis of neonatal abstinence syndrome
- A diagnosis of in-hospital birth or a birth before admission to the hospital.

The coding for neonatal abstinence syndrome and birth varies across ICD-9-CM and ICD-10-CM.

Coding to identify neonatal abstinence syndrome births under ICD-9-CM (prior to October 1, 2015)

To identify neonatal abstinence syndrome under ICD-9-CM, the birth record must:

- Include any diagnosis of 779.5 (Drug withdrawal syndrome in newborn) and
- Not include an indication of a possible iatrogenic case, identified by any 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.

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

ICD-9-CM Diagnosis	Code Description
V30.00	Single liveborn, born in hospital, delivered without mention of cesarean section
V30.01	Single liveborn, born in hospital, delivered by cesarean section
V30.1	Single liveborn, born before admission to hospital
V31.00	Twin birth, mate liveborn, born in hospital, delivered without mention of cesarean section
V31.01	Twin birth, mate liveborn, born in hospital, delivered by cesarean section
V31.1	Twin birth, mate liveborn, born before admission to hospital
V32.00	Twin birth, mate stillborn, born in hospital, delivered without mention of cesarean section
V32.01	Twin birth, mate stillborn, born in hospital, delivered by cesarean section
V32.1	Twin birth, mate stillborn, born before admission to hospital
V33.00	Twin birth, unspecified whether mate liveborn or stillborn, born in hospital, delivered without mention of cesarean section
V33.01	Twin birth, unspecified whether mate liveborn or stillborn, born in hospital, delivered by cesarean section
V33.1	Twin birth, unspecified whether mate liveborn or stillborn, born before admission to hospital
V34.00	Other multiple birth (three or more), mates all liveborn, born in hospital, delivered without mention of cesarean section
V34.01	Other multiple birth (three or more), mates all liveborn, born in hospital, delivered by cesarean section

ICD-9-CM Diagnosis	Code Description
V34.1	Other multiple birth (three or more), mates all liveborn, born before admission to hospital
V35.00	Other multiple birth (three or more), mates all stillborn, born in hospital, delivered without mention of cesarean section
V35.01	Other multiple birth (three or more), mates all stillborn, born in hospital, delivered by cesarean section
V35.1	Other multiple birth (three or more), mates all stillborn, born before admission to hospital
V36.00	Other multiple birth (three or more), mates liveborn and stillborn, born in hospital, delivered without mention of cesarean section
V36.01	Other multiple birth (three or more), mates liveborn and stillborn, born in hospital, delivered by cesarean section
V36.1	Other multiple birth (three or more), mates liveborn and stillborn, born before admission to hospital
V37.00	Other multiple birth (three or more), unspecified whether mates liveborn or stillborn, born in hospital, delivered without mention of cesarean section
V37.01	Other multiple birth (three or more), unspecified whether mates liveborn or stillborn, born in hospital, delivered by cesarean section
V37.1	Other multiple birth (three or more), unspecified whether mates liveborn or stillborn, born before admission to hospital
V39.00	Liveborn, unspecified whether single, twin or multiple, born in hospital, delivered without mention of cesarean section
V39.01	Liveborn, unspecified whether single, twin or multiple, born in hospital, delivered by cesarean section
V39.1	Liveborn, unspecified whether single, twin or multiple, born before admission to hospital

Coding to identify neonatal abstinence syndrome births under ICD-10-CM (starting on October 1, 2015)

To identify neonatal abstinence syndrome under ICD-10-CM, the birth record must:

- Include any diagnosis of P96.1 (Neonatal withdrawal symptoms from maternal use of drugs of addiction)

Exclusions are not necessary under ICD-10-CM coding because iatrogenic cases would be reported using a different diagnosis code, P96.2 (Withdrawal symptoms from therapeutic use of drugs in newborn).

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

ICD-10-CM Diagnosis	Code Description
Z38.00	Single liveborn infant, delivered vaginally, born in hospital
Z38.01	Single liveborn infant, delivered cesarean, born in hospital
Z38.1	Single liveborn infant, born outside hospital
Z38.2	Single liveborn infant, unspecified as to place of birth
Z38.30	Twin liveborn infant, delivered vaginally, born in hospital
Z38.31	Twin liveborn infant, delivered by cesarean, born in hospital
Z38.4	Twin liveborn infant, born outside hospital
Z38.5	Twin liveborn infant, unspecified as to place of birth

ICD-10-CM Diagnosis	Code Description
Z38.61	Triplet liveborn infant, delivered vaginally, born in hospital
Z38.62	Triplet liveborn infant, delivered by cesarean, born in hospital
Z38.63	Quadruplet liveborn infant, delivered vaginally, born in hospital
Z38.64	Quadruplet liveborn infant, delivered by cesarean, born in hospital
Z38.65	Quintuplet liveborn infant, delivered vaginally, born in hospital
Z38.66	Quintuplet liveborn infant, delivered by cesarean, born in hospital
Z38.68	Other multiple liveborn infant, delivered by vaginally, born in hospital
Z38.69	Other multiple liveborn infant, delivered by cesarean, born in hospital
Z38.7	Other multiple liveborn infant, born outside hospital
Z38.8	Other multiple liveborn infant, unspecified as to place of birth

Appendix D. Data Table

Table 1. Annual Number of Neonatal Abstinence Syndrome Births in the United States in Years 2008–2016 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	*47**	*Calendar year*	*17,628*	*6,319*
2016	*48**	*Calendar year*	*0*	*25,213*

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 2016 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.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases, 2008–2016