



Adult, Nonmaternal Inpatient Stays Related to *Clostridioides difficile*:  
National Trends, 2011–2020

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## OVERVIEW

Healthcare-associated infections are a threat to patient safety and have become the most common complication of modern health care. In 2009, the Department of Health and Human Services (HHS) identified key actions needed to achieve and sustain progress in protecting patients from the transmission of serious and, in some cases, deadly infections in the *National Action Plan to Prevent Health Care-Associated Infections: Road Map to Elimination*.<sup>1</sup> The response to this call to action has been seen at the Federal, State, and local levels.

This report, funded by the Agency for Healthcare Research and Quality (AHRQ), focuses on the burden to hospitals of one type of healthcare-associated infection—*Clostridioides difficile* (*C. diff*). *C. diff* may develop during the process of a patient’s treatment for medical or surgical conditions in healthcare settings, including hospitals, clinics, nursing homes, and other health facilities.<sup>2,3</sup> *C. diff* may also be acquired in the community.<sup>4,5</sup> The original report ([Clostridium Difficile Hospitalizations: National and Regional Trends, 2011-2015](#)) and a reposting that includes national estimates for 2016 and 2019 ([Adult, Nonmaternal Inpatient Stays Related to Clostridioides difficile: National Trends, 2011-2016 and 2019](#)) are available on the HCUP-US website; this updated reposting of the reporting includes national estimates for 2016–2020. This report examines the changes in rates of hospitalizations related to *C. diff* from 2011–2020, including those in which *C. diff* is not present on admission (hospital-onset) and those present on admission (community-acquired).<sup>6</sup> Additionally, changes in rates of hospitalizations related to *C. diff* are presented for select patient and hospital characteristics.

*C. diff* includes a broad spectrum of illnesses, ranging from uncomplicated diarrhea in its mildest form to its most severe manifestation of fulminant sepsis. *C. diff* is recognized as a main cause of diarrhea in healthcare facilities, where it has been associated with excess lengths of stay and substantial increases in healthcare costs.<sup>7</sup> *C. diff* transmission occurs primarily via the hands of healthcare personnel or from a contaminated environment. A well-established risk factor for *C. diff* is previous antimicrobial therapy,

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<sup>1</sup> Details of the HHS Action Plan are available at [www.hhs.gov/ash/initiatives/hai/actionplan/](http://www.hhs.gov/ash/initiatives/hai/actionplan/). Accessed December 13, 2017.

<sup>2</sup> Centers for Disease Control and Prevention. CDC Features. Vital Signs: Stopping *C. difficile* Infections. March 2012. [www.cdc.gov/vitalsigns/hai/stoppingcdifficile/](http://www.cdc.gov/vitalsigns/hai/stoppingcdifficile/). Accessed December 13, 2017.

<sup>3</sup> Centers for Disease Control and Prevention. Morbidity and Mortality Weekly Report (MMWR). Vital Signs: Preventing *Clostridium difficile* Infections. March 9, 2012;61(09):157-162.

[www.cdc.gov/mmwr/preview/mmwrhtml/mm6109a3.htm?s\\_cid=mm6109a3\\_w](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6109a3.htm?s_cid=mm6109a3_w). Accessed December 13, 2017.

<sup>4</sup> Centers for Disease Control and Prevention. Morbidity and Mortality Weekly Report (MMWR). Surveillance for Community-Associated *Clostridium difficile* --- Connecticut, 2006, April 4, 2008;57(13):340-3.

[www.cdc.gov/mmwr/preview/mmwrhtml/mm5713a3.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5713a3.htm). Accessed December 13, 2017.

<sup>5</sup> Kuntz JL, Chrischilles EA, Pendergast JF, Herwaldt LA, Polgreen PM. Incidence of and risk factors for community-associated *Clostridium difficile* infection: a nested case-control study. *BMC Infect Dis*. 2011 Jul 15;11:194.

<sup>6</sup> Trending from ICD-9-CM to ICD-10-CM is typically not recommended because of the intrinsic differences in the two coding systems. In this case, there is only one diagnosis code under ICD-9-CM and two ICD-10-CM diagnosis codes that are similar to the ICD-9-CM diagnosis except for the identification of recurrence.

<sup>7</sup> Dubberke ER, Reske KA, Olsen MA, McDonald LC, Fraser VJ. Short- and long-term attributable costs of *Clostridium difficile*-associated disease in nonsurgical inpatients. *Clin Infect Dis*. 2008 Feb 15;46(4):497-504.

which may suppress the normal flora of the colon and allow growth of *C. diff* after exposure occurs. Treatment of severe cases may require a colectomy and may result in death.

Timely information on the burden of *C. diff* cases in the inpatient setting provides analysts and policymakers with baseline information and helps illustrate the need for quality improvement efforts. Therefore, information about national trends in the prevalence of adult inpatient discharges with *C. diff* is presented in this report.

## METHODS

Longitudinal inpatient discharge data from the Healthcare Cost and Utilization Project (HCUP) sponsored by AHRQ were used to provide estimates of *C. diff* hospitalization rates from 2011 through 2020. HCUP includes the largest collection of longitudinal hospital care data in the United States, with all-payer, encounter-level information beginning in 1988. In this report, national estimates of *C. diff* hospitalization rates were based on nationally weighted data from the HCUP State Inpatient Databases (SID) for 2011–2015 and/or the HCUP National Inpatient Sample (NIS) for 2011–2020. The HCUP SID in 2020 encompass about 97 percent of all U.S. community hospital discharges, made possible by the data collection efforts of State data organizations, hospital associations, private data organizations, and the Federal government. The HCUP Partner organizations are listed in Appendix A. The NIS is a 20-percent stratified sample of discharges from the SID, weighted to produce national and regional estimates of inpatient utilization, access, cost, quality, and outcomes. Background on the SID and NIS is provided in Appendix B.

For this report, *C. diff* hospitalizations discharged prior to October 2015 were identified by the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of intestinal infections due to *Clostridium difficile* (008.45), which were reported as either the principal or secondary diagnosis. An evaluation of surveillance for *C. diff* in 2003 found high sensitivity (78%) and specificity (99.7%) when using ICD-9-CM codes.<sup>8</sup> This study was based on one hospital. Coding practices will vary across hospitals and States. Starting in October 2015, the United States transitioned to reporting diagnoses using the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM). From October 2015 through September 2017, the ICD-10-CM diagnosis code for Enterocolitis due to *Clostridioides difficile* was A04.7. Starting in October 2017, there were two ICD-10-CM diagnosis codes that differentiated on recurrence: A04.71 for Enterocolitis due to *Clostridioides difficile*, recurrent, and A04.72 for Enterocolitis due to *Clostridioides difficile*, not specified as recurrent. These ICD-10-CM codes could be reported as either the principal or secondary diagnosis to identify *C. diff* hospitalizations.

The annual rates were calculated as the number of *C. diff* hospitalizations per 1,000 adult, nonmaternal discharges treated in community, nonrehabilitation hospitals in the year. *C. diff* cases that resolved without an inpatient stay are not captured in the trends. It should be noted that the origin of the infection may not be the inpatient hospital. It is possible that the *C. diff* infection originated in another type of healthcare setting, such as a nursing home, or in the community prior to the hospital admission.

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<sup>8</sup> Dubberke ER, Reske KA, McDonald LC, Fraser VJ. ICD-9 codes and surveillance for *Clostridium difficile*-associated disease. *Emerg Infect Dis*. 2006 Oct;12(10):1576-9.

In most of the SID, there was a data element that indicated whether the *C. diff* diagnosis was present on admission, rather than acquired during the hospital stay. This allowed the rate of *C. diff* hospitalizations to be reported for all stays related to *C. diff* and also by whether the *C. diff* diagnosis was present on admission or not. For rates of *C. diff* hospitalizations based on the NIS, the information on the diagnoses being present on admission was obtained from the SID. Additional details about the methods used for this report are contained in Appendix C.

## RESULTS

The following tables show national trends in the rate of adult, nonmaternal inpatient stays related to *C. diff*. Table 1 shows the rates for *C. diff* overall. Table 2 and 3 display the rates for *C. diff* reported as present on admission to the hospital (Table 2) and not present on admission to the hospital (Table 3). Tables 4 and 5 provide the overall rates for *C. diff* for select patient characteristics (Table 4) and hospital characteristics (Table 5).

**Table 1. Rate of Adult, Nonmaternal Inpatient Stays with Any Diagnosis of *Clostridioides difficile*, 2011–2020**

Year	Rate of Any Diagnosis of <i>C. Diff</i> per 1,000 Adult, Nonmaternal discharges	95% confidence interval
2011	13.0	(12.7, 13.3)
2012	13.6	(13.3, 13.9)
2013	13.8	(13.6, 14.1)
2014	14.0	(13.8, 14.2)
2015 Q1–Q3	14.2	(14.0, 14.5)
2016	13.4	(13.1, 13.6)
2017	12.1	(11.9, 12.3)
2018	11.3	(11.1, 11.5)
2019	9.9	(9.7, 10.1)
2020	9.0	(8.8, 9.2)

Note: Previously reported statistics using nationally weighted data from the State Inpatient Databases (SID) for 2016 (13.6 per 1,000, confidence interval: 13.4, 13.9) and 2019 (10.2 per 1,000, confidence interval: 9.9, 10.4) were updated to use data from the HCUP National Inpatient Sample (NIS).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID) nationally weighted analysis file, 2011–2015 and National Inpatient Sample (NIS), 2016–2020. ICD-9-CM Diagnoses from 2011 Q1–2015 Q3 and ICD-10-CM Diagnoses from 2016–2020.

**Table 2. Rate of Adult, Nonmaternal Inpatient Stays with Any Diagnosis of *Clostridioides difficile* Reported as Present on Admission to the Hospital, 2011–2020**

Year	Rate of Any Diagnosis of <i>C. Diff</i> Reported as Present on Admission per 1,000 Adult, Nonmaternal discharges	95% confidence interval
2011	9.8	(9.6, 10.1)
2012	10.4	(10.2, 10.6)
2013	10.6	(10.4, 10.8)
2014	10.9	(10.7, 11.0)
2015 Q1-Q3	11.3	(11.1, 11.5)
2016	10.6	(10.4, 10.8)
2017	9.6	(9.4, 9.8)
2018	9.0	(8.8, 9.2)
2019	8.0	(7.8, 8.2)
2020	7.2	(7.0, 7.3)

Note: Previously reported statistics using nationally weighted data from the State Inpatient Databases (SID) for 2016 (10.9 per 1,000, confidence interval: 10.7, 11.1) and 2019 (8.3 per 1,000, confidence interval: 8.1, 8.5) were updated to use data from the HCUP National Inpatient Sample (NIS).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID) nationally weighted analysis file, 2011–2015 and National Inpatient Sample (NIS), 2016–2020. ICD-9-CM Diagnoses from 2011 Q1–2015 Q3 and ICD-10-CM Diagnoses from 2016–2020.

**Table 3. Rate of Adult, Nonmaternal Inpatient Stays with Any Diagnosis of *Clostridioides difficile* Not Reported as Present on Admission to the Hospital, 2011–2020**

Year	Rate of Any Diagnosis of <i>C. Diff</i> Not Reported as Present on Admission per 1,000 Adult, Nonmaternal discharges	95% confidence interval
2011	3.2	(3.0, 3.3)
2012	3.2	(3.1, 3.3)
2013	3.2	(3.1, 3.3)
2014	3.2	(3.1, 3.2)
2015 Q1-Q3	3.0	(2.9, 3.1)
2016	2.8	(2.7, 2.9)
2017	2.5	(2.4, 2.6)
2018	2.3	(2.2, 2.4)
2019	1.9	(1.8, 2.0)
2020	1.8	(1.7, 1.9)

Note: Previously reported statistics using nationally weighted data from the State Inpatient Databases (SID) for 2016 (2.7 per 1,000, confidence interval: 2.6, 2.8) and 2019 (1.9 per 1,000, confidence interval: 1.8, 1.9) were updated to use data from the HCUP National Inpatient Sample (NIS).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID) nationally weighted analysis file, 2011–2015 and National Inpatient Sample (NIS), 2016–2020. ICD-9-CM Diagnoses from 2011 Q1–2015 Q3 and ICD-10-CM Diagnoses from 2016–2020.

**Table 4. Rate of Adult, Nonmaternal Inpatient Stays with Any Diagnosis of *Clostridioides difficile* by Patient Characteristics, 2011–2020**

Data year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Overall</b>										
Total U.S.	13.0	13.2	13.4	13.7		13.4	12.1	11.3	9.9	9.0
<b>Patient characteristics</b>										
<b>Age group, years</b>										
18–34	6.0	7.1	7.8	8.3		8.4	7.5	6.9	6.2	5.2
35–49	7.2	7.9	8.5	9.4		9.6	9.0	8.0	7.4	6.2
50–64	10.2	10.8	11.1	11.7		12.0	10.9	10.5	9.2	8.5
65–79	15.5	15.5	15.4	15.7		15.3	13.7	12.8	11.2	10.5
80+	21.0	20.4	19.9	19.3		17.7	16.0	14.3	12.4	11.0
<b>Sex</b>										
Male	11.6	11.6	11.8	11.9		11.7	10.7	9.9	8.6	7.7
Female	14.1	14.6	14.8	15.3		14.9	13.5	12.6	11.2	10.3
<b>Median income of patient's ZIP Code:</b>										
First quartile (lowest income)	11.4	11.6	12.2	12.5		12.4	11.3	10.6	9.2	8.2
Second quartile	12.5	12.9	13.2	13.6		13.5	12.3	11.6	10.1	9.0
Third quartile	13.6	14.1	13.9	14.3		13.8	12.5	11.7	10.2	9.5
Fourth quartile (highest income)	15.2	15.3	14.9	15.0		14.3	12.9	11.5	10.6	9.6
<b>Location of patient residence</b>										
Large central metropolitan	14.9	14.1	13.9	14.2		13.4	11.9	10.7	9.5	8.7
Large fringe metropolitan	14.3	14.7	14.5	14.6		13.8	12.3	11.3	10.2	9.4
Medium metropolitan	11.4	12.7	13.0	13.6		13.5	12.3	11.6	10.0	8.8
Small metropolitan	11.1	12.1	12.7	13.1		13.5	12.9	12.3	10.6	9.6
Micropolitan	10.8	11.6	12.3	12.2		12.8	12.1	11.5	10.2	9.1
Noncore	9.6	10.1	11.1	11.1		11.9	11.1	11.1	9.7	8.9
<b>Expected primary payer</b>										
Medicare	17.2	17.1	17.0	17.0		16.3	14.7	13.6	11.8	10.8
Medicaid	10.0	10.3	10.9	11.1		11.2	9.8	8.9	8.1	7.4
Private	8.4	9.0	9.4	9.9		10.0	9.3	8.7	7.8	7.1
Self-pay/No charge*	4.9	5.6	6.3	6.3		6.4	6.2	5.7	5.4	4.2
Other	7.2	7.3	7.7	8.4		8.9	7.8	7.6	6.9	6.3

Notes: National rates are not reported for 2015 because of the transition to ICD-10-CM clinical coding in October 2015. Information on age, sex, and expected primary payer is unavailable on less than 0.3 percent of NIS records. Information on median income of the patient's ZIP Code and location of the patient's residence is unavailable on 0.7–2.5 percent of NIS records, depending on the data year.

\* Self-pay/No charge: includes self-pay, no charge, charity, and no expected payment.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2011–2020. ICD-9-CM Diagnoses from 2011 Q1–2015 Q3 and ICD-10-CM Diagnoses from 2016–2020.

**Table 4b. Rate of Adult, Nonmaternal Inpatient Stays with Any Diagnosis of *Clostridioides difficile* by Hospital Characteristics, 2011–2020**

Data year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Overall</b>										
Total U.S.	13.0	13.2	13.4	13.7		13.4	12.1	11.3	9.9	9.0
<b>Hospital characteristics</b>										
<b>Census region</b>										
Northeast	14.2	14.6	14.6	14.2		13.1	11.8	11.1	10.1	9.2
Midwest	13.7	13.9	14.0	14.1		13.8	13.1	12.6	11.1	10.2
South	11.8	11.8	12.3	12.9		12.6	11.5	10.8	9.3	8.1
West	13.3	13.6	13.5	14.2		14.7	12.6	11.0	9.7	9.2
<b>Ownership/control</b>										
Government	10.4	11.8	11.9	12.6		12.9	12.0	11.4	9.8	9.0
Private, not-for-profit	13.5	14.0	14.1	14.4		13.9	12.6	11.8	10.5	9.5
Private, for-profit	12.3	10.2	10.9	10.9		11.2	9.9	8.8	7.4	6.1
<b>Teaching status</b>										
Nonteaching	12.7	12.5	12.7	12.7		12.9	11.9	10.9	10.0	9.0
Teaching	13.2	13.8	14.0	14.2		13.6	12.2	11.4	9.9	9.0
<b>Location of hospital</b>										
Large central metropolitan	14.4	13.9	13.8	14.2		13.4	12.0	10.8	9.6	8.7
Large fringe metropolitan	14.4	14.8	14.5	14.6		13.8	12.4	11.2	10.1	9.3
Medium metropolitan	11.6	12.5	12.9	13.5		13.5	12.2	11.6	9.9	8.7
Small metropolitan	10.7	11.9	12.5	12.9		13.4	12.8	12.3	10.7	9.4
Micropolitan	10.7	11.2	12.1	11.7		12.2	11.7	11.3	10.3	9.4
Noncore	8.4	8.5	10.0	9.3		10.6	10.5	10.7	9.7	9.5
<b>Bed size of hospital</b>										
1–99	12.7	10.3	10.8	10.8		11.5	10.9	10.4	9.7	9.3
100–299	12.6	13.1	13.3	13.7		13.5	12.2	11.2	10.0	9.0
300+	13.3	13.8	13.9	14.2		13.6	12.3	11.5	9.9	8.9

Note: National rates are not reported for 2015 because of the transition to ICD-10-CM clinical coding in October 2015.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2011–2020. ICD-9-CM Diagnoses from 2011 Q1–2015 Q3 and ICD-10-CM Diagnoses from 2016–2020.



## APPENDIX A. HEALTHCARE COST AND UTILIZATION PROJECT (HCUP) PARTNER ORGANIZATIONS

**Alaska** Department of Health¶  
**Alaska** Hospital and Healthcare Association  
**Arizona** Department of Health Services  
**Arkansas** Department of Health  
**California** Department of Health Care Access and Information  
**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** Laulima Data Alliance  
**Hawaii** University of Hawaii at Hilo  
**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** Health Authority  
**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  
**Wisconsin** Department of Health Services  
**Wyoming** Hospital Association

## APPENDIX B. HEALTHCARE COST AND UTILIZATION PROJECT (HCUP) STATE INPATIENT DATABASES (SID) AND NATIONAL INPATIENT SAMPLE (NIS)

The Healthcare Cost and Utilization Project (HCUP) is a family of healthcare 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 healthcare 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 healthcare 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 more than 95 percent of all U.S. community hospital discharges.

Sampled from the SID, the **National Inpatient Sample (NIS)** is designed to produce national and regional estimates of inpatient utilization, access, cost, quality, and outcomes. Starting in data year 2012, the NIS is a 20-percent stratified sample of discharges from U.S. community hospitals, excluding rehabilitation and long-term acute care hospitals. The number of States participating in the NIS has grown from 8 in the first year (1988) to 48, plus the District of Columbia, in 2020.

The HCUP databases 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.

More information is available on the HCUP User Support website ([www.hcup-us.ahrq.gov](http://www.hcup-us.ahrq.gov)).

## APPENDIX C. METHODS FOR CALCULATING NATIONAL ESTIMATES USING THE STATE INPATIENT DATABASES

This section describes the methods employed to calculate national, annual trends for the rates of *C. diff* hospitalizations per 1,000 adult, nonmaternal hospitalizations using the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) for data years 2011-2015.

Discharges were limited to those from hospitals that were open during any part of each calendar year and were designated as community hospitals by the American Hospital Association (AHA) Annual Survey of Hospitals, excluding rehabilitation hospitals. The definition of a community hospital was that used by the AHA: "all nonfederal short-term general and other specialty hospitals, whose facilities and services are available to the public." The population at risk included only adult, nonmaternal discharges aged 18 years and older. Nonmaternal is defined as not in the Major Diagnostic Category for pregnancy, childbirth, and the puerperium (MDC not equal to 14).

The analysis was limited to SID that included data elements indicating whether the principal and secondary diagnoses were present on admission (POA) rather than acquired during the hospital stay. Because the reporting of POA can vary across hospitals within and across States, the data were edited for consistent coding of POA using a scheme developed by HCUP.<sup>9</sup> There were two discharge-level and three hospital-level edit checks:

- Discharge was missing POA on the principal diagnosis.
- Discharge was missing POA on all secondary diagnoses.
- Hospital reported all diagnoses as present on admission on all discharges.
- Hospital reported POA only on Medicare discharges.
- Hospital had 15 percent or more of total discharges in the year missing POA on all diagnoses.

Discharges and hospitals failing any of the above edit checks were excluded from the analysis. All data from the SID were excluded if the overall failure rate for the POA edits was greater than 10 percent. Table C.1 lists the number of SID used for each data year. National weights were developed within stratum defined by five hospital characteristics (region, teaching status, size based on the number of beds, urban-rural location, and control) using the remaining SID discharges after POA edit checks and counts of total inpatient discharges from the AHA Annual Survey.

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<sup>9</sup> Barrett ML, Owens PL, Bolhack J, Sheng M. Examination of the Coding of Present-on-Admission Indicators in Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID). 2015. HCUP Methods Series Report #2015-06 ONLINE. September 1, 2015. U.S. Agency for Healthcare Research and Quality. Available: <http://www.hcup-us.ahrq.gov/reports/methods/methods.jsp>.

**Table C.1. Number of HCUP State Inpatient Databases (SID) Used Each Year to Create the Nationally Weighted Analysis File for 2011–2015 National Estimates**

Data Year	Total Number of HCUP Partners	Number of SID with POA data elements	Number of SID Used for Weighting to National Estimates (Less than 10 Percent of SID Discharges Failed POA Edit Checks)
2011	47	36	28
2012	47	37	31
2013	48	38	33
2014	48	41	37
2015	48	43	39

Abbreviations: HCUP, Healthcare Cost and Utilization Project; POA, Present on Admission; SID, State Inpatient Databases