

Hospital Differences in Adult Inpatient Stays with Healthcare-Associated Infections, 2019 and 2021

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Introduction

Healthcare-associated infections (HAIs) develop while a patient is receiving healthcare for another condition.¹ HAIs are a significant cause of harm and mortality in the United States: in 2015, 1 in 31 inpatients had an HAI at any given time.² HAIs include, but are not limited to, central line-associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI), ventilator-associated pneumonia (VAP), non-ventilator hospital-acquired pneumonia (NVHAP), surgical site infections (SSI), and methicillin-resistant *Staphylococcus aureus* (MRSA) infections and *Clostridioides difficile* (*C. difficile*) infections.³ Healthcare providers and agencies can help prevent HAIs by screening for HAI risk, participating in surveillance networks, following infection prevention and patient safety guidelines, and implementing antimicrobial stewardship.⁴ Information on the prevalence of HAIs and their impact on the healthcare system provides important guidance for these efforts.³ Further, understanding hospital-level variation in HAI rates can inform efforts to improve care in hospitals.

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents the rate of adult inpatient stays involving one or more of five HAIs—CLABSI, CAUTI, VAP, MRSA infection, and *C. difficile* infection—by select hospital characteristics. This Statistical Brief uses the 2019 and 2021 State Inpatient Databases (SID) from non-Federal acute-care hospitals for 38 States with information on the diagnoses present on admission (POA). These HAIs were based on the presence of secondary diagnoses of infections (i.e., not the principal reason for the stay) that were not POA. Additional information on the clinical coding criteria used to identify HAIs is included in the Definitions section.

HAI prevalence is shown as the rate of HAIs per 100,000 adult inpatient stays for each year. These statistics are hospital-level averages of HAI rates in non-Federal acute-care hospitals (2,828 hospitals in 2019 and 2,800 hospitals in 2021). This Statistical Brief excludes data from rehabilitation and long-term acute-care facilities. Statistical Brief #313 describes the methodology used and provides an overall summary of HAI prevalence and outcomes. In this Statistical Brief, findings are stratified by select hospital characteristics. Data from 2019 and 2021 are compared to assess the potential impact of the COVID-19 pandemic.

Because of the large sample size of the SID, small differences can be statistically significant but not clinically important. For this reason, only differences greater than or equal to 10 percent are discussed in the text.

Highlights

- Large, public non-Federal, teaching, and metropolitan hospitals consistently had higher rates of healthcare-associated infections compared with their counterparts in 2019 and 2021.
- From 2019 to 2021, rates of all examined healthcare-associated infections combined, central line-associated bloodstream infections, ventilator-associated pneumonia (VAP), and methicillin-resistant *Staphylococcus aureus* infection increased among most hospital types. Rates of VAP increased the most, by over 100 percent.
- From 2019 to 2021, rates of *C. difficile* infection decreased among all hospital types.
- From 2019 to 2021, central line-associated bloodstream infections increased in some hospital types and ventilator-associated pneumonia rates increased in all hospital types among stays not involving COVID-19. However, these increases were smaller than those seen when COVID-19 stays were included.

Findings

Rate of Healthcare-Associated Infections per 100,000 Adult Inpatient Stays, by Hospital Characteristics, 2019 and 2021

Table 1 presents the rate of any examined HAI per 100,000 adult inpatient stays in 2019 and 2021 and the percent change in rate from 2019 by hospital characteristics. The rate of any examined HAI per 100,000 adult inpatient stays is based on hospital stays during which any of the following infections were diagnosed during the stay (i.e., secondary diagnoses that were not POA): CLABSI, CAUTI, VAP, MRSA infection, and/or *C. difficile* infection. Tables 2 through 6 present individual HAI rates for adult inpatient stays in 2019 and 2021, as well as the percent change in the rate from 2019 by hospital characteristics. For 2021, rates are presented for all inpatient stays and for stays without COVID-19 to understand the influence of the COVID-19 pandemic.⁵

Table 1. Rate of any examined healthcare-associated infection (HAI) per 100,000 adult inpatient stays, by hospital characteristics, 2019 and 2021

Hospital characteristics		Rate (per 100,000 adult inpatient stays)			Percent change from 2019 to 2021	
		All stays (2019)	All stays (2021)	Stays without COVID-19 (2021)	All stays	Stays without COVID-19
Ownership	Public non-Federal	422.5	550.5	434.9	30.3%	2.9%
	Private not-for-profit	305.9	405.2	325.1	32.5%	6.3%
	Private for-profit	156.8	193.4	146.4	23.4%	-6.6%
Bed size	Small	161.6	203.9	163.0	26.1%	0.8%
	Medium	221.5	285.8	219.8	29.1%	-0.7%
	Large	366.0	484.9	389.2	32.5%	6.3%
Teaching status	Teaching	330.9	437.8	349.6	32.3%	5.6%
	Nonteaching	194.8	238.5	184.9	22.5%	-5.0%
Location	Rural	195.6	257.3	197.4	31.6%	0.9%
	Urban	309.6	407.8	325.5	31.7%	5.1%
Safety-net designation	SNH	325.2	443.9	349.3	36.5%	7.4%
	non-SNH	287.8	372.9	299.1	29.6%	3.9%
Critical access hospital	CAH	251.9	226.0	227.3	-10.3%	-9.8%
	non-CAH	298.7	395.4	314.3	32.4%	5.2%

Abbreviations: CAH, critical access hospital; SNH, safety-net hospital

Notes: HAIs include CLABSI, CAUTI, VAP, MRSA infection, and *C. difficile* infection. In 2021, 16 hospitals were missing safety-net status (refer to Table 7 for more information on the number of hospitals with each characteristic).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2019 and 2021, 38 States.

- In both 2019 and 2021, public hospitals, large hospitals, teaching hospitals, urban hospitals, safety-net hospitals, and non-critical access hospitals had higher rates of any examined HAI compared with their counterparts.
- From 2019 to 2021, with one exception, the rate of any examined HAI per 100,000 adult inpatient stays increased for all hospital types, ranging from 22.5 percent (nonteaching hospitals) to 36.5 percent (safety-net hospitals). The rate of HAIs per 100,000 adult inpatient stays decreased 10.3 percent among critical access hospitals from 2019 to 2021.
- When stays with COVID-19 were excluded, no hospital type experienced a 10.0 percent or greater change in the overall rate of the examined HAIs between 2019 and 2021.

Table 2. Rate of central line-associated bloodstream infection (CLABSI) per 100,000 adult inpatient stays, by hospital characteristics, 2019 and 2021

Hospital characteristics		Rate (per 100,000 adult inpatient stays)			Percent change from 2019 to 2021	
		All stays (2019)	All stays (2021)	Stays without COVID-19 (2021)	All stays	Stays without COVID-19
Ownership	Public non-Federal	33.0	41.9	35.2	26.9%	6.7%
	Private not-for-profit	18.0	24.9	19.5	38.1%	8.5%
	Private for-profit	7.8	12.4	8.8	58.4%	12.7%
Bed size	Small	4.7	9.4	5.9	98.4%	25.4%
	Medium	11.4	18.0	12.5	58.2%	9.9%
	Large	24.6	31.7	26.2	28.9%	6.3%
Teaching status	Teaching	21.4	28.5	23.0	33.3%	7.5%
	Nonteaching	8.5	13.4	8.8	58.4%	4.2%
Location	Rural	6.6	12.6	7.4	92.2%	13.4%
	Urban	19.6	26.5	21.2	35.1%	8.1%
Safety-net designation	SNH	22.0	29.8	23.3	35.5%	6.2%
	non-SNH	16.9	23.4	18.6	38.2%	9.8%
Critical access hospital	CAH	--	2.4	--	--	--
	non-CAH	18.6	25.5	20.2	37.3%	8.5%

Abbreviations: CAH, critical access hospital; SNH, safety-net hospital

Notes: In 2021, 5 hospitals were missing safety-net status (refer to Table 7 for more information on the number of hospitals with each characteristic). Statistics based on a cell size less than or equal to 10 are suppressed (denoted with "--").

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2019 and 2021, 38 States.

- In both 2019 and 2021, public hospitals, large hospitals, teaching hospitals, urban hospitals, and safety-net hospitals had higher rates of CLABSI compared with their counterparts.
- From 2019 to 2021, the rate of CLABSI per 100,000 adult inpatient stays increased for all hospital types, ranging from 26.9 percent (public hospitals) to 98.4 percent (small hospitals).
- From 2019 to 2021, excluding stays with a diagnosis of COVID-19, the rate of CLABSI per 100,000 adult inpatient stays increased among private for-profit hospitals (12.7 percent), small hospitals (25.4 percent), and rural hospitals (13.4 percent).

Table 3. Rate of catheter-associated urinary tract infection (CAUTI) per 100,000 adult inpatient stays, by hospital characteristics, 2019 and 2021

Hospital characteristics		Rate (per 100,000 adult inpatient stays)			Percent change from 2019 to 2021	
		All stays (2019)	All stays (2021)	Stays without COVID-19 (2021)	All stays	Stays without COVID-19
Ownership	Public non-Federal	44.4	41.5	35.2	-6.5%	-20.7%
	Private not-for-profit	34.1	38.2	33.0	12.1%	-3.3%
	Private for-profit	18.7	17.6	14.6	-5.9%	-21.9%
Bed size	Small	19.7	25.4	21.4	29.3%	9.0%
	Medium	27.4	32.6	26.7	18.8%	-2.9%
	Large	38.6	39.2	34.4	1.5%	-10.8%
Teaching status	Teaching	35.5	37.9	32.7	6.8%	-7.9%
	Nonteaching	25.5	28.5	23.8	11.5%	-6.9%
Location	Rural	25.9	31.4	25.2	21.2%	-2.6%
	Urban	33.9	36.2	31.3	6.9%	-7.6%
Safety-net designation	SNH	33.9	31.3	26.5	-7.7%	-21.9%
	non-SNH	32.7	36.8	31.8	12.5%	-2.8%
Critical access hospital	CAH	29.7	31.0	31.3	4.5%	5.5%
	non-CAH	33.1	35.8	30.7	8.1%	-7.4%

Abbreviations: CAH, critical access hospital; SNH, safety-net hospital

Notes: In 2021, 5 hospitals were missing safety-net status (refer to Table 7 for more information on the number of hospitals with each characteristic).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2019 and 2021, 38 States.

- In both 2019 and 2021, public hospitals, large hospitals, teaching hospitals, and urban hospitals had higher rates of CAUTI compared with their counterparts.
- From 2019 to 2021, the rate of CAUTI per 100,000 adult inpatient stays increased among private not-for-profit hospitals, small hospitals, medium hospitals, nonteaching hospitals, rural hospitals, and non-safety-net hospitals. Increases ranged from 11.5 percent (nonteaching hospitals) to 29.3 percent (small hospitals).
- From 2019 to 2021, excluding stays with a diagnosis of COVID-19, the rate of CAUTI per 100,000 adult inpatient stays decreased among public hospitals, private for-profit hospitals, large hospitals, and safety-net hospitals. Decreases in the rate of CAUTI ranged from 10.8 percent (large hospitals) to 21.9 percent (private for-profit hospitals and safety-net hospitals).
- Non-critical access hospitals had higher rates of CAUTI than critical access hospitals in 2019 and 2021 among all stays (including those with a diagnosis of COVID-19); however, critical access and non-critical access hospitals had similar rates of CAUTI (difference of less than 10.0 percent) when stays with COVID-19 were excluded.

Table 4. Rate of ventilator-associated pneumonia (VAP) per 100,000 adult inpatient stays, by hospital characteristics, 2019 and 2021

Hospital characteristics		Rate (per 100,000 adult inpatient stays)			Percent change from 2019 to 2021	
		All stays (2019)	All stays (2021)	Stays without COVID-19 (2021)	All stays	Stays without COVID-19
Ownership	Public non-Federal	92.6	217.6	133.1	135.1%	43.8%
	Private not-for-profit	46.7	122.4	70.8	162.0%	51.6%
	Private for-profit	21.8	66.3	39.7	203.7%	81.6%
Bed size	Small	7.4	35.4	13.0	377.7%	74.9%
	Medium	22.2	68.2	32.6	207.4%	46.9%
	Large	70.7	173.3	106.3	144.9%	50.3%
Teaching status	Teaching	60.0	149.1	89.0	148.5%	48.4%
	Nonteaching	12.0	45.2	19.6	276.9%	63.2%
Location	Rural	12.1	51.6	20.9	326.8%	72.7%
	Urban	52.5	133.8	79.3	154.8%	51.0%
Safety-net designation	SNH	74.0	174.2	109.7	135.4%	48.2%
	non-SNH	38.8	107.1	60.0	175.8%	54.4%
Critical access hospital	CAH	8.7	20.4	14.5	133.9%	66.5%
	non-CAH	49.0	127.3	74.5	159.6%	52.0%

Abbreviations: CAH, critical access hospital; SNH, safety-net hospital

Notes: In 2021, 9 hospitals were missing safety-net status (refer to Table 7 for more information on the number of hospitals with each characteristic).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2019 and 2021, 38 States.

- In both 2019 and 2021, public hospitals, large hospitals, teaching hospitals, urban hospitals, safety-net hospitals, and noncritical access hospitals had higher rates of VAP compared with their counterparts.
- From 2019 to 2021, the rate of VAP for all stays (including those with a diagnosis of COVID-19) increased over 100.0 percent for all hospital types, ranging from 133.9 percent (critical access hospitals) to 377.7 percent (small hospitals).
- From 2019 to 2021, excluding stays with a diagnosis of COVID-19, the rate of VAP per 100,000 adult inpatient stays increased for all hospital types, although not to the extent experienced among all stays (including those with a diagnosis of COVID-19). When excluding stays with a diagnosis of COVID-19, increases ranged from 43.8 percent (public hospitals) to 81.6 percent (private for-profit hospitals).

Table 5. Rate of methicillin-resistant *Staphylococcus aureus* (MRSA) infection per 100,000 adult inpatient stays, by hospital characteristics, 2019 and 2021

Hospital characteristics		Rate (per 100,000 adult inpatient stays)			Percent change from 2019 to 2021	
		All stays (2019)	All stays (2021)	Stays without COVID-19 (2021)	All stays	Stays without COVID-19
Ownership	Public non-Federal	89.6	117.9	91.1	31.6%	1.7%
	Private not-for-profit	56.4	85.6	63.1	51.9%	11.9%
	Private for-profit	37.3	50.4	36.6	35.3%	-1.9%
Bed size	Small	38.6	49.6	36.6	28.5%	-5.2%
	Medium	44.3	67.1	45.0	51.6%	1.7%
	Large	68.4	100.1	76.7	46.4%	12.2%
Teaching status	Teaching	61.8	91.5	68.9	48.1%	11.5%
	Nonteaching	43.7	60.4	40.7	38.3%	-6.8%
Location	Rural	46.1	68.1	46.5	47.5%	0.8%
	Urban	58.7	86.3	64.3	47.0%	9.7%
Safety-net designation	SNH	63.7	98.9	74.4	55.2%	16.7%
	non-SNH	55.0	79.0	58.2	43.5%	5.7%
Critical access hospital	CAH	97.5	78.9	80.7	-19.1%	-17.3%
	non-CAH	56.7	84.5	62.3	49.1%	9.9%

Abbreviations: CAH, critical access hospital; SNH, safety-net hospital

Notes: In 2021, 9 hospitals were missing safety-net status (refer to Table 7 for more information on the number of hospitals with each characteristic).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2019 and 2021, 38 States.

- In both 2019 and 2021, public hospitals, large hospitals, teaching hospitals, urban hospitals, and safety-net hospitals had higher rates of MRSA infection compared with their counterparts.
- From 2019 to 2021, with the exception of critical access hospitals, the rate of MRSA infection per 100,000 adult inpatient stays increased for all hospital types, ranging from 28.5 percent (small hospitals) to 55.2 percent (safety-net hospitals). The rate of inpatient stays with a MRSA infection among critical access hospitals decreased by 19.1 percent.
- In 2019 and 2021, excluding stays with a diagnosis of COVID-19, critical access hospitals had a higher rate of MRSA infection than noncritical access hospitals; however, in 2021 among all stays (including inpatient stays in 2021 with a diagnosis of COVID-19), non-critical access hospitals had a higher rate of MRSA infection than critical access hospitals.
- From 2019 to 2021, excluding stays with a diagnosis of COVID-19, the change in the rate of MRSA infection per 100,000 adult inpatient stays varied among different hospital types. The rate of MRSA infection among critical access hospitals decreased by 17.3 percent. Private not-for-profit hospitals, large hospitals, teaching hospitals, and safety-net hospitals had increased rates of at least 10.0 percent.

Table 6. Rate of *C. difficile* infection per 100,000 adult inpatient stays, by hospital characteristics, 2019 and 2021

Hospital Characteristics		Rate (per 100,000 adult inpatient stays)			Percent change from 2019 to 2021	
		All stays (2019)	All stays (2021)	Stays without COVID-19 (2021)	All stays	Stays without COVID-19
Ownership	Public non-Federal	183.2	172.9	167.5	-5.6%	-8.6%
	Private not-for-profit	161.7	156.0	152.6	-3.6%	-5.7%
	Private for-profit	75.4	56.7	52.8	-24.7%	-29.9%
Bed size	Small	94.2	91.8	90.2	-2.6%	-4.3%
	Medium	122.5	113.8	110.3	-7.1%	-10.0%
	Large	179.0	170.4	165.6	-4.8%	-7.5%
Teaching status	Teaching	165.5	157.0	153.0	-5.2%	-7.6%
	Nonteaching	109.4	101.1	97.3	-7.7%	-11.1%
Location	Rural	109.4	104.6	102.2	-4.4%	-6.6%
	Urban	156.8	148.7	144.8	-5.1%	-7.7%
Safety-net designation	SNH	147.1	140.9	136.2	-4.2%	-7.4%
	non-SNH	153.7	145.7	142.4	-5.2%	-7.3%
Critical access hospital	CAH	120.3	100.2	106.1	-16.7%	-11.8%
	non-CAH	152.5	145.0	141.2	-4.9%	-7.4%

Abbreviations: CAH, critical access hospital; SNH, safety-net hospital

Notes: In 2021, 13 hospitals were missing safety-net status (refer to Table 7 for more information on the number of hospitals with each characteristic).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2019 and 2021, 38 States.

- In both 2019 and 2021, public hospitals, large hospitals, teaching hospitals, urban hospitals, non-safety-net hospitals, and noncritical access hospitals had higher rates of *C. difficile* infection compared with their counterparts.
- From 2019 to 2021, the rate of *C. difficile* infection per 100,000 adult inpatient stays decreased for private for-profit hospitals (24.7 percent) and critical access hospitals (16.7 percent).
- From 2019 to 2021, excluding stays with a diagnosis of COVID-19, the rate of *C. difficile* infection per 100,000 adult inpatient stays decreased for private for-profit hospitals, medium hospitals, nonteaching hospitals, and critical access hospitals, ranging from 10 percent (medium hospitals) to 29.9 percent (private for-profit hospitals).

References

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- ⁵ Lastinger LM, Alvarez CR, Kofman A, Konnor RY, Kuhar DT, Nkwata A, Patel PR, Pattabiraman V, Xu SY, and Dudeck MA. “Continued Increases in the Incidence of Healthcare-Associated Infection (HAI) during the Second Year of the Coronavirus Disease 2019 (COVID-19) Pandemic.” *Infection Control & Hospital Epidemiology* 44, no. 6 (June 2023): 997–1001. <https://doi.org/10.1017/ice.2022.116>.

Data Sources

This Statistical Brief uses data from the 2019 and 2021 HCUP State Inpatient Databases (SID) for 38 States. States include Arizona, Arkansas, California, Florida, Georgia, Hawaii, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, Virginia, Washington, Wisconsin, and West Virginia. The HCUP SID contain record-level billing data on every hospitalization in non-Federal acute care hospitals within a participating State. Each record includes detailed information on the patient’s demographic (age, race and ethnicity, area of residence, community-level income), clinical detail (ICD-10-CM/PCS diagnoses, comorbidities, procedures), expected payer (including self-pay or no charge), resources used (revenue codes, length of stay, charges and costs), and information on the facility where care was provided. Although sensitivity and specificity of ICD-10-CM diagnosis codes for detection of HAI may differ from those of other HAI surveillance and detection methods, the availability of these additional data elements allows the HCUP SID to provide complementary information to that provided by existing surveillance programs. For additional information about the HCUP SID, see: <https://hcup-us.ahrq.gov/db/state/siddbdocumentation.jsp>.

These SID were selected because they have information on whether the diagnoses were present on admission, which is needed to identify whether an infection was healthcare-associated. Some States were not used, based on agreements with HCUP and whether sufficient present-on-admission data existed for this analysis. The data were limited to States with valid POA data for at least 90 percent of stays for 2019 and 2021, excluding 6.2 percent and 5.4 percent, respectively, of stays from each year of the SID.

Number and types of hospitals included in HCUP SID

This analysis used data from approximately 2,800 (slight variation by year) non-Federal acute care hospitals in the 38 States with valid information on the status of present on admission. Non-Federal acute care hospitals include academic medical centers, tertiary care hospitals, suburban community hospitals, short-term community hospitals, obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and critical access hospitals. They exclude hospital units of other institutions (e.g., prisons), Department of Veterans Administration hospitals, Indian Health Service hospitals, Department of Defense facilities, rehabilitation and long-term care facilities, specialty psychiatric facilities and substance use disorder treatment facilities.

Population Studied

This analysis focused on adult (18+ years) inpatient stays with ICD-10-CM/PCS diagnoses and procedures indicating CLABSI, CAUTI, VAP, MRSA infection, and *C. difficile* infection. The analysis did not include all types of HAIs and causative pathogens. For example, surgical site infections were not included due to their coding complexity and NVHAP was not included due to lack of consistency in coding practices for the condition.

The unit of analysis is a hospital with summary statistics calculated on the hospital discharges (i.e., the hospital stays), not individual persons or patients. This means that a person who is admitted to the hospital multiple times in one year will be counted each time as a separate discharge from the hospital.

Case definition of hospital-associated infections (HAI)

The identification of inpatient stays with an HAI was based on whether the infection was reported only as a secondary diagnosis (i.e., not the reason for the stay) and was not present at the time of admission (POA). The ICD-10-CM/PCS diagnosis and procedure codes used to identify infections and HAIs are included in Appendix A, Table A.1.

Identification of inpatient stays for COVID-19

The identification of inpatient stays related to COVID-19 was based on any of the following ICD-10-CM diagnoses:

- J1282, Pneumonia due to coronavirus disease 2019
- U071, COVID-19
- U099, Post COVID-19 condition, unspecified.

Table 7 provides statistics on the number of hospitals by hospital characteristic in 2019 and 2021.

Table 7. Number of hospitals by hospital characteristic, 2019 and 2021

Hospital characteristics	Any examined HAI		CLABSI		CAUTI		VAP		MRSA		C. difficile	
	2019	2021	2019	2021	2019	2021	2019	2021	2019	2021	2019	2021
Total hospitals	2,828	2,800	1,175	1,400	1,675	1,648	1,326	1,814	2,053	2,171	2,580	2,467
Ownership												
Public non-Federal	447	419	135	151	218	211	158	208	302	290	365	332
Private not-for-profit	1,932	1,962	889	1,058	1,225	1,240	981	1,329	1,435	1,557	1,811	1,788
Private for-profit	449	419	151	191	232	197	187	277	316	324	404	347
Bed Size												
Small	1,002	988	83	152	294	319	119	294	434	512	796	742
Medium	1,135	1,119	519	639	764	728	591	858	947	980	1,097	1,041
Large	691	693	573	609	617	601	616	662	672	679	687	684
Teaching status												
Teaching	1,449	1,497	874	1,024	1,080	1,091	977	1,208	1,244	1,334	1,396	1,409
Nonteaching	1,379	1,303	301	376	595	557	349	606	809	837	1,184	1,058
Location												
Rural	957	932	108	170	344	348	165	329	473	525	772	702
Urban	1,871	1,868	1,067	1,230	1,331	1,300	1,161	1,485	1,580	1,646	1,808	1,765
Safety-net designation												
SNH	759	757	346	402	443	423	373	513	554	579	696	667
non-SNH	2,069	2,027	829	993	1,232	1,220	953	1,292	1,499	1,583	1,884	1,787
Critical access hospital												
CAH	385	363	6	9	90	92	7	28	166	147	283	252
non-CAH	2,443	2,437	1,169	1,391	1,585	1,556	1,319	1,786	1,887	2,024	2,297	2,215

Abbreviations: CLABSI, central line-associated bloodstream infection; CAUTI, catheter-associated urinary tract infection; VAP, ventilator-associated pneumonia; MRSA, methicillin-resistant *Staphylococcus aureus* infection; *C. difficile*, *Clostridioides difficile* infection; CAH, critical access hospital; HAI, healthcare-associated infection; SNH, safety-net hospital

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2019 and 2021, 38 States.

Definitions

Diagnoses

The *principal diagnosis* is that condition established after study to be chiefly responsible for the patient's admission to the hospital. *Secondary diagnoses* are conditions that are observed during the hospital stay and that require or affect patient care treatment or management.

ICD-10-CM Coding System

ICD-10-CM is the *International Classification of Diseases, Tenth Revision, Clinical Modification*. There are over 70,000 ICD-10-CM diagnosis codes. In October 2015 (Fiscal Year 2016), ICD-10-CM replaced the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) diagnosis coding system for use with medical records.^a

Urban-rural location of hospital

Hospital urban-rural location is based on the Health Resources and Services Administration (HRSA) Federal Office of Rural Health Policy (FORHP) definition of rurality. For this Statistical Brief, rural hospitals were categorized based on rural ZIP Codes identified in the FORHP ZIP files.^b Hospitals not categorized as rural were defined as urban hospitals.

Hospital ownership

Data on hospital ownership were obtained from the American Hospital Association (AHA) Annual Survey of Hospitals. Hospital ownership/control includes categories for government non-Federal (public), private not-for-profit (voluntary), and private investor-owned (proprietary).

Hospital bed size

Hospital bed size categories are based on number of hospital beds (see Table 8 below). Bed size assesses the number of short-term acute beds in a hospital. Hospital information was obtained from the AHA Annual Survey of Hospitals.

Table 8. Hospital bed size categories

Size	Number of beds
Small	1–99 beds
Medium	100–299 beds
Large	300 or more beds

Teaching hospital

A hospital is considered a teaching hospital if it has one or more Accreditation Council for Graduate Medical Education (ACGME) approved residency programs, is a member of the Council of Teaching Hospitals (COTH), or has a ratio of full-time equivalent interns and residents to beds of .25 or higher.

Safety-net hospital

Using data from all non-Federal acute-care hospitals, excluding rehabilitation and long-term acute-care hospitals, in the SID, the number of discharges expected to be billed to Medicaid, self-pay, or no charge was divided by the total number of discharges at each hospital. Certain expected payers were recategorized from the HCUP category for Other payer (e.g., indigent care programs) to self-pay/no charge, for this purpose. Hospitals were ranked within the State by this percentage, and those hospitals falling in the top 25 percent were defined as safety-net hospitals. The remaining hospitals were defined as non-safety-net hospitals.

^aCenter for Medicare and Medicaid Services. ICD-10-CM Official Guidelines for Coding and Reporting FY 2024. <https://www.cms.gov/files/document/fy-2024-icd-10-cm-coding-guidelines.pdf>. Accessed December 7, 2023.

^bHealth Resources and Services Administration. Federal Office of Rural Health Policy (FORHP) Data Files. Updated March 2022. www.hcup-us.ahrq.gov/db/state/costtocharge.jsp. Accessed January 10, 2024.

Critical access hospital

A hospital is considered a critical access hospital if it meets one of the following criteria: (1) be located in a county or equivalent unit of local government in a rural area, (2) be located more than a 35-mile drive from a hospital or another facility, or (3) be certified by the State as being a necessary provider of healthcare services to residents in the area. Hospital information was obtained from the AHA Annual Survey of Hospitals.

Calculations

HAI rate per 100,000 adult inpatient stays

The HAI rates per 100,000 adult inpatient stays were calculated as follows:

- Numerator of inpatient stays with HAIs for a given year, hospital characteristic, and COVID-19 status.
- Denominator of inpatient stays for a given year, hospital characteristic, and COVID-19 status.

About HCUP

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, and private data organizations (HCUP Partners) 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. For more information about HCUP, see: <https://hcup-us.ahrq.gov/>.

HCUP would not be possible without the contributions of the following data collection Partners from across the United States:

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 Hawai'i 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
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

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For More Information

For more information on this and other topics, please visit our HCUP Statistical Briefs topic area page located at www.hcup-us.ahrq.gov/reports/statbriefs/sbtopic.jsp.

For additional HCUP statistics, visit:

- HCUP Fast Stats at <https://datatools.ahrq.gov/hcup-fast-stats> for easy access to the latest HCUP-based statistics for healthcare information topics
- HCUPnet, HCUP's interactive query system, at <https://datatools.ahrq.gov/hcupnet>
- HCUP Summary Trend Tables at www.hcup-us.ahrq.gov/reports/trendtables/summarytrendtables.jsp for monthly information on hospital utilization

AHRQ welcomes questions and comments from readers of this publication who are interested in obtaining more information about access, cost, use, financing, and quality of healthcare in the United States. We also invite you to tell us how you are using this Statistical Brief and other HCUP data and tools, and to share suggestions on how HCUP products might be enhanced to further meet your needs. Please email us at hcup@ahrq.gov or send a letter to the address below:

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