Agency for Healthcare Research and Quality
H·CUP HEALTHCARE COST AND UTILIZATION PROJECT

Nonventilator Hospital-Acquired Pneumonia: Prevalence and Hospital and Patient Characteristics, 2019-2023

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Introduction

Hospital-acquired pneumonia (HAP) is the most common healthcare-associated infection (HAI) in U.S. hospitals, with an estimated 176,700 infections occurring each year.[1] Efforts for HAP surveillance and prevention have focused largely on pneumonia associated with mechanical ventilation (known as ventilator-associated pneumonia or VAP), but nonventilator hospital-acquired pneumonia (NVHAP) is more common and has similarly poor outcomes. In 2015, a point prevalence survey conducted in 199 U.S. hospitals reported the prevalence of VAP and NVHAP to be 317 and 577 per 100,000 hospital admissions, respectively.[1] NVHAP has been associated with increased odds of in-hospital death, prolonged length of hospital stay, and increased rates of intensive care unit admission and mechanical ventilation.[2,3] Additional information on the national prevalence and outcomes of NVHAP, as well as hospital and patient characteristics associated with NVHAP, may contribute to efforts to prevent NVHAP among patients in U.S. hospitals.[4]

A previous AHRQ Healthcare Cost and Utilization Project (HCUP) Statistical Brief reported annual rates of VAP ranging from 40.2 to 125.4 per 100,000 adult inpatient stays between 2016 and 2021.[5] This brief presents statistics on inpatient stays involving NVHAP among patients one year of age and older. NVHAP was identified in the medical record by the presence of secondary diagnoses of pneumonia (i.e., not the principal reason for the stay) that were not present on admission (POA), excluding stays in which there was a diagnosis of VAP. Additional information on the clinical coding criteria for identifying NVHAP is included in the Definitions section. This brief uses the 2019-2023 HCUP State Inpatient Databases (SID) for 38 States with information that identifies a diagnosis as POA. These SID are drawn from nonfederal, acute care hospitals, excluding rehabilitation and long-term acute care facilities.

Because of the large sample size of the HCUP SID, small differences can be statistically significant but not clinically important. All differences noted in the text are greater than or equal to 10 percent.

Highlights

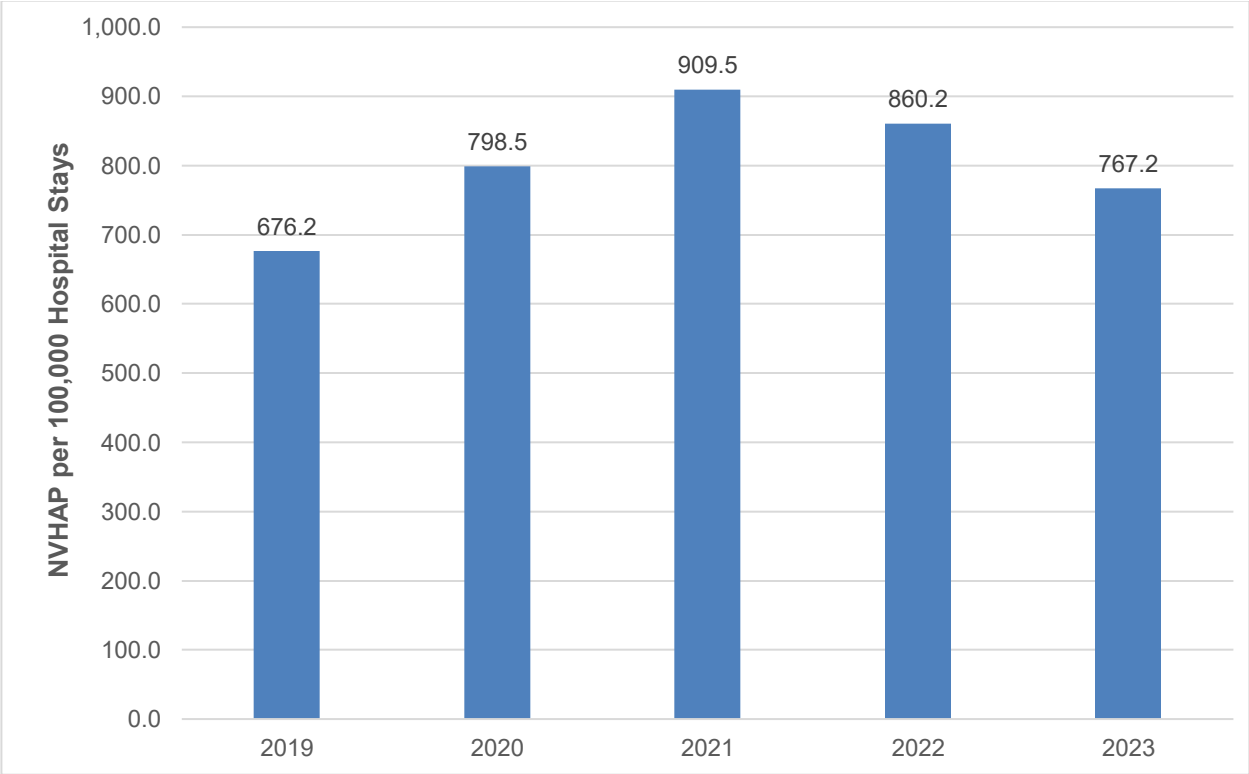
- From 2019 to 2021, the rate of NVHAP increased by 34.5 percent from 676 per 100,000 hospital stays in 2019 to 910 in 2021. From 2021 to 2023, the rate of NVHAP decreased by 15.6 percent, to 767.2 per 100,000 hospital stays in 2023.
- Rates of NVHAP increased as the number of comorbid conditions increased, with rates ranging from 179.6–275.0 per 100,000 hospital stays among patients with no comorbid conditions to 1,086.2–1,316.5 per 100,000 hospital stays among those with four or more comorbid conditions.
- NVHAP rates were higher among hospitalizations for males compared with those for females, by 56.4 to 66.0 percent.
- The percentage of NVHAP stays resulting in death increased from 13.8 percent in 2019 to 24.4 percent in 2021, then declined to 16.2 percent by 2023.
- Rates of NVHAP were higher among patients from rural locations than patients from urban locations, but lower in rural hospitals than in urban hospitals.

Findings

Annual Trends in the Rate of Nonventilator Hospital-Acquired Pneumonia per 100,000 Hospital Stays

Figure 1 presents trends from 2019-2023 across 38 states for rates of all inpatient stays with NVHAP per 100,000 hospital stays.

Figure 1. Trends in the rate of nonventilator hospital-acquired pneumonia (NVHAP) per 100,000 hospital stays, 38 States, 2019-2023



Abbreviations: NVHAP, nonventilator hospital-acquired pneumonia
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2019 to 2023, 38 States.

- The overall NVHAP rate per 100,000 hospital stays increased from 676.2 in 2019 to a peak of 909.5 in 2021, then declined to 767.2 by 2023.
- The largest year-to-year increase (18.1%) occurred between 2019 to 2020 whereas the largest year-to-year decrease (10.8%) occurred between 2022 and 2023.

Patient Characteristics Associated with Nonventilator Hospital-Acquired Pneumonia (NVHAP), 38 States, 2019-2023

Table 1 presents the number and rate per 100,000 hospital stays for NVHAP categorized by patient demographic characteristics for 2019-2023, across 38 states. Patient characteristics include age, sex, comorbid condition count, patient residence, and expected payer.

Table 1. Rate of NVHAP per 100,000 hospital stays, by patient characteristics, 38 States, 2019 to 2023

	2019	2020	2021	2022	2023
	Number of hospital stays				
Total hospital stays	25,074,633	22,865,468	23,592,485	23,128,953	23,932,293
Hospital stays with NVHAP	169,562	182,586	214,577	198,965	183,611
	Rate per 100,000 hospital stays				
Overall	676.2	798.5	909.5	860.2	767.2
Patient age group (in years)					
1-5	833.4	745.4	740.3	1,040.5	1,007.6
6-17	443.7	451.6	490.6	548.9	547.4
18-39	254.1	293.2	343.4	309.1	284.8
40-64	722.5	878.9	1,060.3	948.8	821.6
65-74	881.3	1,073.2	1,225.8	1,152.8	1,005.9
75+	868.3	1,010.8	1,070.4	1,061.2	955.6
Sex					
Female	543.8	624.9	705.2	675.2	609.4
Male	850.8	1,020.5	1,170.4	1,100.0	970.3
Count of comorbid conditions†					
None	179.6	212.4	275.0	236.8	188.6
1	354.7	444.5	549.1	457.1	368.2
2	538.7	667.4	807.9	679.2	540.8
3	725.7	871.3	998.3	892.1	733.7
4 or more	1,086.2	1,214.4	1,316.5	1,311.3	1,207.3
Location of patient residence					
Rural	819.0	981.0	1,162.0	1,064.1	918.9
Urban	664.9	784.3	890.2	844.9	753.1
Primary expected payer					
Medicare	851.8	1002.2	1111.7	1080.5	954.0
Medicaid	546.0	623.2	713.6	683.1	604.1
Private	485.1	595.9	731.8	641.2	582.4
Self-pay/No charge	489.1	600.0	729.0	645.3	562.2
Other*	778.6	1005.3	1077.0	924.0	875.3

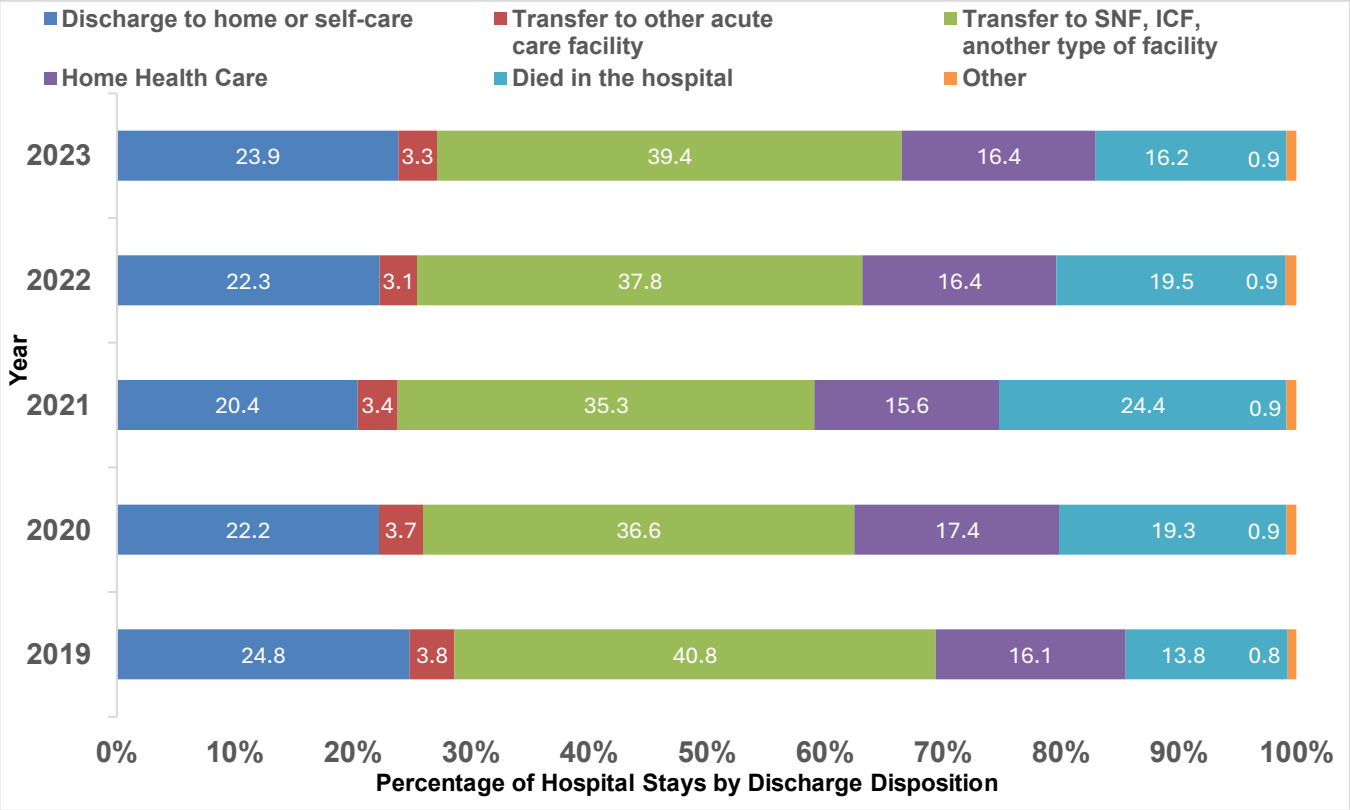
Abbreviations: NVHAP, nonventilator hospital-acquired pneumonia
Notes: †Comorbid condition count is based on the AHRQ Elixhauser Comorbidity Software Refined for ICD-10-CM v2025. *Other expected payers include other Federal and local government programs (e.g., TRICARE, CHAMPVA, Indian Health Service, Black Lung, Title V) and Workers' Compensation
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2019 to 2023, 38 States.

- Rates of NHVAP were highest among patients aged 65-74 years, followed by those 75 or older and 40-64 years. Rates among patients 18 years of age and older increased from 2019 to 2021, and then decreased from 2021 to 2023.
- Sex differences were persistent over time: NVHAP rates were higher among hospitalizations for males than females, by 56.4 to 66.0 percent.
- NVHAP rates increased with the number of comorbid conditions, ranging from 179.6–275.0 per 100,000 hospital stays for patients with no comorbidities to 1,086.2–1,316.5 per 100,000 hospital stays for those with four or more comorbidities. For each comorbidity count group, NVHAP rates peaked in 2021 and then declined by 2023, consistent with the overall trend.
- NVHAP rates were 22.0 to 30.5 percent higher among hospitalizations for patients who resided in rural locations compared to those who resided in urban locations.

Discharge Disposition for Hospital Stays for NVHAP

Figure 2 shows the discharge disposition (i.e., location to which the patient goes upon discharge or death in the hospital) of the patient among hospital stays with NVHAP from 2019-2023.

Figure 2. Discharge disposition of hospital stays with NVHAP, 2019-2023.



Abbreviations: NVHAP, nonventilator hospital-acquired pneumonia; ICF, intermediate care facility; SNF, skilled nursing facility
Notes: Other includes dispositions of against medical advice, discharged alive, missing, and invalid.
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2019-2023, 38 States.

- The percentage of stays with NVHAP resulting in death in the hospital increased from 13.8 percent in 2019 to 24.4 percent in 2021 (a relative 76.8 percent increase), then declined to 16.2 percent by 2023.
- The percentage of stays with NVHAP that resulted in discharge to home or self-care (routine discharge) decreased from 24.8 percent in 2019 to 20.4 percent in 2021, then increased to 23.9 percent in 2023.
- The percentage of stays with NVHAP requiring ongoing healthcare after discharge (i.e. sum of transfer to other acute care facility, transfer to SNF, ICF, or another type of facility, or discharge with home health care) ranged from 54 to 61 percent, depending on the year.

Hospital Characteristics Associated with Nonventilator Hospital-Acquired Pneumonia (NVHAP), 2019-2023

Table 2 presents the rate of NVHAP per 100,000 hospital stays categorized by select hospital characteristics, for 2019-2023 across 38 states. Hospital characteristics include bed size, ownership, teaching status, safety-net designation, critical access hospital designation, and hospital location.

Table 2. Rate of NVHAP per 100,000 hospital stays, by hospital characteristics, 38 States, 2019 to 2023

Hospital Characteristics	Rate per 100,000 hospital stays				
	2019	2020	2021	2022	2023
Hospital bed size					
Small	544.5	664.6	768.2	692.5	601.8
Medium	589.0	732.2	828.2	793.8	699.8
Large	760.9	873.7	992.6	948.2	853.7
Hospital ownership					
Government, nonfederal	796.4	940.1	1049.5	972.8	867.3
Private, not-for-profit	685.5	819.0	941.2	896.0	797.8
Private, investor-own	528.0	574.8	618.1	568.0	510.5
Hospital teaching status					
Nonteaching	590.3	651.8	755.3	679.0	584.2
Teaching	701.5	840.8	951.9	905.5	812.1
Safety-net hospital					
No	659.8	784.3	901.8	846.6	751.7
Yes	714.4	831.1	926.5	890.5	806.6
Critical access hospital					
Yes	560.6	770.3	926.3	666.4	550.9
No	678.4	799.0	909.1	863.7	772.0
Hospital location					
Rural	592.4	705.1	830.9	744.8	614.5
Urban	684.5	807.7	917.1	871.2	781.2

Abbreviations: NVHAP, nonventilator hospital-acquired pneumonia
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2019 to 2023, 38 States.

- Across all hospital characteristics, rates of hospitalizations with NVHAP increased from 2019 to 2021. Rates then decreased in all hospital types in 2022 and 2023, but by 2023, rates had returned to the 2019 rates only in nonteaching hospitals, private investor-owned hospitals, and critical access hospitals.
- In all five years, large hospitals, non-federal government hospitals, and teaching hospitals had higher rates of hospitalizations with NVHAP compared with their counterparts.
- Rates of NVHAP were highest in hospitals located in urban areas compared with hospitals located in rural areas. In contrast, rates of NVHAP were higher for patients from rural locations than those for patients from urban locations (Table 1).

Top Principal Diagnoses Among Hospital Stays with NVHAP, 38 States, 2019-2023

Table 3 presents the top 10 principal diagnoses among hospital stays with NVHAP in 2019 to 2023. The percentage of hospital stays with each principal diagnosis, grouped into smaller, clinically meaningful categories using the HCUP Clinical Classification Software Refined (CCSR) for ICD-10-CM diagnoses, are shown. This table includes the rank of each of the most common principal diagnosis, allowing for comparison of their prevalence over time.

Table 3. Top 10 principal diagnoses among hospital stays with NVHAP, 38 States, 2019 to 2023

Rank	2019	%	2020	%	2021	%	2022	%	2023	%
1	Septicemia	11.5	Septicemia	14.6	COVID-19	15.7	Septicemia	14.6	Septicemia	13.8
2	Heart failure	4.8	COVID-19	8.7	Septicemia	15.4	COVID-19	6.8	Heart failure	5.0
3	Respiratory failure; insufficiency; arrest	4.1	Heart failure	4.0	Heart failure	3.8	Heart failure	4.5	Respiratory failure; insufficiency; arrest	3.7
4	AMI	3.6	Respiratory failure; insufficiency; arrest	3.0	AMI	2.6	Respiratory failure; insufficiency; arrest	3.4	TBI; concussion, initial encounter	3.0
5	TBI; concussion, initial encounter	2.6	AMI	2.9	Respiratory failure; insufficiency; arrest	2.6	TBI; concussion, initial encounter	2.8	AMI	2.9
6	Fracture of the neck of the femur (hip), initial encounter	2.4	Traumatic brain injury (TBI); concussion, initial encounter	2.8	TBI; concussion, initial encounter	2.5	AMI	2.8	Cerebral infarction	2.6
7	Acute hemorrhagic cerebrovascular disease	2.4	Cerebral infarction	2.2	Cerebral infarction	2.1	Cerebral infarction	2.6	Acute hemorrhagic cerebrovascular disease	2.4
8	Cerebral infarction	2.3	Fracture of the neck of the femur (hip), initial encounter	2.2	Acute hemorrhagic cerebrovascular disease	2.0	Acute hemorrhagic cerebrovascular disease	2.2	Fracture of the neck of the femur (hip), initial encounter	2.3
9	Acute and unspecified renal failure	2.2	Acute hemorrhagic cerebrovascular disease	2.2	Fracture of the neck of the femur (hip), initial encounter	1.9	Fracture of the neck of the femur (hip), initial encounter	2.2	Acute and unspecified renal failure	2.1
10	COPD and bronchiectasis	1.8	Acute and unspecified renal failure	2.0	Acute and unspecified renal failure	1.8	Acute and unspecified renal failure	2.1	Diabetes mellitus with complication	1.6

Abbreviations: TBI, Traumatic Brain Injury; COVID-19, Coronavirus 2019; AMI, Acute Myocardial Infarction; COPD, Chronic Obstructed Pulmonary Disease
Notes: Diagnoses are grouped using the Clinical Classifications Software Refined (CCSR) for ICD-10-CM diagnoses. Under CCSR, septicemia is defined based on sepsis-related infection codes, without incorporating organ dysfunction criteria. In contrast, Sepsis-3 defines sepsis as life-threatening organ dysfunction caused by a dysregulated host response to infection (as established by the Third International Consensus Definition Task Force). Therefore, estimates for septicemia defined by the CCSR (INF002) may be different than for sepsis based on the Sepsis-3 definitions. Infections alone are sufficient for inclusion in INF002, whereas organ dysfunction is required for the Sepsis-3 definition.
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2019 to 2023, 38 States.

- The top 10 principal diagnoses among hospital stays with NVHAP accounted for approximately 37-50 percent of hospital stays with NVHAP.
- The 10 most common principal diagnoses among hospital stays with NVHAP were similar from 2019 to 2023.
- Septicemia was the most common principal diagnosis among hospital stays with NVHAP in all years except in 2021, when it was the second most common principal diagnosis.

- COVID-19 was the second most common principal diagnosis among hospital stays with NVHAP in 2020 and 2022, and the most common in 2021. In 2023, COVID-19 was not among the 10 most common principal diagnoses.
- In addition to septicemia and COVID-19, common principal diagnoses associated with NVHAP included cardiovascular disease, cerebrovascular disease, traumatic brain injury, and femoral neck fractures.

References

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[3] Micek S.T., Chew, B, Hampton N. and Kollef M.H. A Case-Control Study Assessing the Impact of Nonventilated Hospital-Acquired Pneumonia on Patient Outcomes. Chest 2016 Vol. 150 Issue 5 Pages 1008-1014

[4] Munro S. C. et al. Nonventilator hospital-acquired pneumonia: A call to action: Infect Control Hosp Epidemiol 2021 Vol. 42 Issue 8 Pages 991-996

[5] Miller M.A, Umscheid C., Dowell J., Schone E. Prevalence and Burden of Healthcare-Associated Infections (HAIs), 2016–2021. HCUP Statistical Brief #313. October 2024. Agency for Healthcare Research and Quality, Rockville, MD. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb313-prevalence-burden-HAIs-2016-2021.pdf.

Data Source

This brief uses data from the Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) from the following 36 states with reliable information on whether the diagnoses were present on admission (POA): Alaska, Arizona, Arkansas, Colorado, Florida, Georgia, Hawaii, Iowa, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, North Carolina, North Dakota, New Jersey, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, and Wisconsin. 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.

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.

For more information about the HCUP SID, see: https://hcup-us.ahrq.gov/sidoverview.jsp

Population Studied

The analysis focuses on hospital stays of patients aged 1 and older with any listed ICD-10-CM diagnosis of nonventilator hospital-acquired pneumonia (not present on admission). This analysis used up to 50 diagnoses, as available in the data for each year. Hospital stays with missing or invalid data on patient characteristics, including sex, patient county, and expected payer, were excluded from the corresponding stratified analysis.

We excluded records from hospitals that failed the following edit checks that serve as potential signals that inaccurate coding of POA may be occurring:

1. POA is reported as "yes/present" on all diagnoses on all discharges (HCUP data element POA_Hosp_Edit1).
2. POA is reported as missing on all non-Medicare discharges (HCUP data element POA_Hosp_Edit2).

3. POA is reported as missing on all nonexempt diagnoses for 15 percent or more of discharges in the hospital (HCUP data element POA_Hosp_Edit3). The percentage of discharges with all nonexempt diagnoses missing POA is provided in the HCUP data element POA_Hosp_Edit3_Value.

In addition, we excluded records where discharge is missing POA on all nonexempt secondary diagnoses (HCUP data element POA_Disch_Edit2).

Data come from approximately 3,025 (slight variation by year) non-Federal acute care hospitals each year 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.

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.

Identification of pneumonia diagnosis

The identification of hospital stays related to NVHAP was based on any of the following secondary ICD-10-CM diagnosis that are not present on admission (excluding stays with a diagnosis of Ventilator-Associated Pneumonia, ICD-10-CM J95851):

Non-ventilator hospital associated pneumonia

A3701	Whooping cough due to Bordetella pertussis with pneumonia
A3711	Whooping cough due to Bordetella parapertussis with pneumonia
A3781	Whooping cough due to other Bordetella species with pneumonia
A3791	Whooping cough, unspecified species with pneumonia
A481	Legionnaires disease
B012	Varicella pneumonia
B052	Measles complicated by pneumonia
B0681	Rubella pneumonia
B371	Pulmonary candidiasis
J09X1	Influenza due to identified novel influenza A virus with pneumonia
J1000	Influenza due to other identified influenza virus with unspecified type of pneumonia
J1001	Influenza due to other identified influenza virus with the same other identified influenza virus pneumonia
J1008	Influenza due to other identified influenza virus with other specified pneumonia
J1100	Influenza due to unidentified influenza virus with unspecified type of pneumonia
J1108	Influenza due to unidentified influenza virus with specified pneumonia
J120	Adenoviral pneumonia
J121	Respiratory syncytial virus pneumonia
J122	Parainfluenza virus pneumonia
J123	Human metapneumovirus pneumonia
J1281	Pneumonia due to SARS-associated coronavirus
J1282	Pneumonia due to coronavirus disease 2019
J1289	Other viral pneumonia

J129	Viral pneumonia, unspecified
J13	Pneumonia due to Streptococcus pneumoniae
J14	Pneumonia due to Hemophilus influenzae
J150	Pneumonia due to Klebsiella pneumoniae
J151	Pneumonia due to Pseudomonas
J1520	Pneumonia due to Staphylococcus, unspecified
J15211	Pneumonia due to Methicillin susceptible Staphylococcus aureus
J15212	Pneumonia due to Methicillin resistant Staphylococcus aureus
J1529	Pneumonia due to other Staphylococcus
J153	Pneumonia due to streptococcus, group B
J154	Pneumonia due to other streptococci
J155	Pneumonia due to Escherichia coli
J156	Pneumonia due to other Gram-negative bacteria
J1561	Pneumonia due to Acinetobacter baumannii
J1569	Pneumonia due to other Gram-negative bacteria
J157	Pneumonia due to Mycoplasma pneumoniae
J158	Pneumonia due to other specified bacteria
J168	Pneumonia due to other specified infectious organisms
J17	Pneumonia in diseases classified elsewhere
J18	Pneumonia, unspecified organism
J180	Bronchopneumonia, unspecified organism
J181	Lobar pneumonia, unspecified organism
J182	Hypostatic pneumonia, unspecified organism
J188	Other pneumonia, unspecified organism
J189	Pneumonia, unspecified organism
J851	Abscess of lung with pneumonia

Present on admission (POA)

There are eight POA indicator options and definitions: Y- Yes (present on admission); N- No (not present on admission); W- Clinically undetermined; U- Documentation is insufficient to determine if condition is present on admission, E, or 1- Exempt from POA reporting; and Blank- Missing information on nonexempt diagnoses. A pneumonia was considered non POA if pneumonia diagnosis code had a POA indicator of N or U.

Elixhauser Comorbidity Software Refined for ICD-10-CM Diagnoses

The Elixhauser Comorbidity Software Refined for ICD-10-CM, v2025.1, was used to identify comorbidities. This software tool assigns 38 data elements that identify different preexisting comorbid conditions based on secondary diagnoses listed on hospital administrative data. For more information on the CMR, see https://hcup-us.ahrq.gov/toolssoftware/comorbidityicd10/comorbidity_icd10.jsp

Location of patient residence

Place of residence is based on the urban-rural classification scheme for U.S. counties developed by the National Center for Health Statistics (NCHS) and based on the Office of Management and Budget (OMB) definition of a metropolitan service area as including a city and a population of at least 50,000 residents. For this Statical Brief, we collapsed the NCHS codes into the following two categories:

Urban area:

- Large Central Metropolitan: Counties in a metropolitan area with 1 million or more residents that satisfy at least one of the following criteria: (1) containing the entire population of the largest principal city of the metropolitan statistical area (MSA), (2) having their entire population contained within the largest principal city of the MSA, or (3) containing at least 250,000 residents of any principal city in the MSA
- Large Fringe Metropolitan: Counties in a metropolitan area with 1 million or more residents that do not qualify as large central metropolitan counties
- Medium Metropolitan: Counties in a metropolitan area of 250,000–999,999 residents
- Small Metropolitan: Counties in a metropolitan area of 50,000–249,999 residents
- Micropolitan: Counties in a nonmetropolitan area of 10,000–49,999 residents

Rural area:

- Noncore: Counties in a nonmetropolitan and non-micropolitan area

Primary expected payer

To make coding uniform across all HCUP data sources, the primary expected payer combines detailed categories into general groups:

- Medicare: includes fee-for-service and managed care Medicare
- Medicaid: includes fee-for-service and managed care Medicaid
- Private insurance: includes commercial nongovernmental payers, regardless of the type of plan (e.g., private health maintenance organizations [HMOs], preferred provider organizations [PPOs])
- Self-pay/No charge: includes self-pay, no charge, charity, and no expected payment
- Other payers: includes other Federal and local government programs (e.g., TRICARE, CHAMPVA, Indian Health Service, Black Lung, Title V) and Workers' Compensation

Discharge status

Discharge status reflects the disposition of the patient at discharge from the hospital and includes the following six categories: Routine (to home or self-care); Transfer to another short-term hospital; Transfer to skilled nursing facility (SNF), intermediate care (ICF), or another type of facility, such as a nursing home; Home health care; Died in the hospital; or Other, which includes against medical advice (AMA), discharged alive (destination unknown), missing, and invalid.

Hospital bed size

Hospital bed size categories are based on number of hospital beds and are specific to the hospital's location and teaching status (see Table 4 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 4. Hospital bed size categories

Location and Teaching Status	Small	Medium	Large
Region = Northeast			
Rural	1-49 beds	50-99 beds	100+ beds
Urban, nonteaching	1-124 beds	125-199 beds	200+ beds
Urban, teaching	1-249 beds	250-424 beds	425+ beds
Region = Midwest			
Rural	1-29 beds	30-49 beds	50+ beds
Urban, nonteaching	1-74 beds	75-174 beds	175+ beds
Urban, teaching	1-249 beds	250-374 beds	375+ beds
Region = South			
Rural	1-39 beds	40-74 beds	75+ beds
Urban, nonteaching	1-99 beds	100-199 beds	200+ beds
Urban, teaching	1-249 beds	250-449 beds	450+ beds
Region = West			
Rural	1-24 beds	25-44 beds	45+ beds
Urban, nonteaching	1-99 beds	100-174 beds	175+ beds
Urban, teaching	1-199 beds	200-324 beds	325+ beds

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 teaching status

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 0.25 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.

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.

Hospital location

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. Hospitals not categorized as rural were defined as urban hospitals.

Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses

The CCSR aggregates more than 73,000 ICD-10-CM diagnosis codes into over 530 clinically meaningful categories across 22 body systems. The CCSR capitalizes on the specificity of the ICD-10-CM coding scheme and allows ICD10-CM codes to be classified in more than one category. For this Statistical Brief, the principal diagnosis code is assigned to a single default CCSR based on clinical coding guidelines, etiology and pathology of diseases, and standards set by other Federal agencies. For this Statistical Brief, v2025.1 of the CCSR was used. For more information on the CCSR, see https://hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp

The top ten principal diagnoses were selected based on the frequency of the default CCSR category assigned to the principal diagnosis from CCSR v2025.1. Frequencies were calculated for each CCSR, and based on these frequencies, the CCSRs were ranked in descending order. The top ten most frequently occurring CCSRs were then selected.

Calculations

Rate of inpatient stays with NVHAP

The rate of inpatient stays with NVHAP per 100,000 inpatient stays was calculated using the number of hospital discharges with NVHAP in a given year in the numerator and the total number of hospital discharges included in this Statistical Brief in a given year in the denominator. The rate of inpatient stays with NVHAP was calculated using the following formula:

Rate of inpatient stays with NVHAP = (Number of hospital discharges in a given year/Total number of hospital discharges in a given year) x 100,000

Percentage difference

Percentage differences between groups were calculated using the following formula:

$$\text{Percentage difference} = \left(\frac{\text{Group 1 value} - \text{Group 2 value}}{\text{Group 2 value}}\right) \times 100$$

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 Suggested Citation
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

The HCUP-US website also offers readily available statistics in the form of reports, downloadable tables or interactive data visualizations. Examples include the following:

AHRQ HCUP Statistical Briefs present simple, descriptive reports on a variety of specific, healthcare related issues

AHRQ HCUPnet is a free, online query system that provides statistics and data tables based on AHRQ HCUP data

AHRQ HCUP Summary Trend Tables provide downloadable tables containing State-specific monthly trends in hospital utilization derived from the AHRQ HCUP State Inpatient Databases (SID) and State Emergency

Department Databases (SEDD)

AHRQ HCUP Fast Stats is an online query tool that uses visual displays to compare national or State statistics on a range of healthcare topics

AHRQ HCUP Methods Series Reports feature a broad array of methodological information on the HCUP databases and software tools

AHRQ HCUP Topical Reports provide information on various priority populations

AHRQ HCUP Findings-At-A-Glance provide snapshots covering a broad range of issues related to hospital use and costs

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 HCUP 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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