

STATISTICAL BRIEF #147

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Emergency Department Visits and Hospital Inpatient Stays for Seasonal and 2009 H1N1 Influenza, 2008–2009

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Introduction

Influenza is a serious respiratory disease that affects people of all ages. Although most people recover within one to two weeks without medical treatment, in certain populations such as the elderly and persons with certain high-risk medical conditions, influenza may lead to severe complications which may require emergency or inpatient treatment. It is estimated that annual influenza epidemics in the United States result in an average of 3.1 million hospitalized days, 31.4 million outpatient visits, and a total economic burden of \$87.1 billion per year.¹

In the United States, annual epidemics of influenza occur during the late fall through early spring; however, the severity of the epidemic varies each year depending on the circulating influenza virus strains. The Centers for Disease Control and Prevention estimate that between 1976 and 2007 influenza-related mortality ranged from 3,349 to 48,614.² Furthermore, new or substantially different influenza viruses to which humans have little or no previously existing immunity have the potential to cause worldwide pandemics.³ In April 2009, a novel influenza A (H1N1) virus was identified. This virus subsequently caused the first worldwide influenza pandemic since 1968.

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) on emergency department (ED) visits and hospital inpatient stays for seasonal and 2009 H1N1 influenza during 2008–2009. Characteristics of ED visits and hospitalizations for influenza in 2008, a typical epidemic year, are compared to visits in 2009, the year the 2009 H1N1 pandemic began. Influenza hospitalization rates are also depicted from 2005–2010. Age, patient residence, and

¹ Molinari NA, Ortega-Sanchez IR, Messonnier ML, et al. The annual impact of seasonal influenza in the U.S.: Measuring disease burden and costs. *Vaccine*. Jun 28, 2007;25(27):5086–5096.

² Thompson M, Shay D, Zhou H. Estimates of Deaths Associated with Seasonal Influenza—United States, 1976–2007. *MMWR*. 2010;59(33):1057–1062.

³ Centers for Disease Control and Prevention. Prevention and Control of Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2010. *MMWR*. 2010;59(rr08):1–62.

Highlights

- In 2009, the first year of the 2009 H1N1 pandemic, there were about twice as many emergency department (ED) visits (1,281,700 versus 491,900) and hospitalizations (163,200 versus 88,300) for influenza compared to 2008.
- ED visits for influenza occurred at a rate of 417.5 per 100,000 population in 2009 compared to 161.8 per 100,000 population in 2008. Hospitalizations for influenza occurred at a rate of 53.1 per 100,000 population in 2009 compared to 29.1 per 100,000 population in 2008.
- Inpatient stays for influenza were more expensive in 2009 compared to 2008 (\$11,000 cost per stay versus \$8,500 cost per stay). In 2009, a stay for influenza was more expensive than the average non-influenza stay (\$11,000 versus \$9,200).
- In 2009, the rate of ED visits for 6–11 year olds and 12–17 year olds was 5 times higher than in 2008.
- Monthly patterns of ED visits and hospitalizations for influenza differed significantly between 2008 and 2009. In 2008, peak activity occurred in February (79.9 ED visits per 100,000 population). In 2009, peak activity occurred in October (125.2 ED visits per 100,000 population).
- In the four influenza seasons prior to the 2009 H1N1 pandemic, the highest rate of influenza hospitalization occurred in the 2007–2008 season (25.9 stays per 100,000 population). During the second wave of the 2009 H1N1 pandemic, which occurred in the 2009–2010 influenza season, there were 36.8 stays per 100,000 population.
- In both 2008 and 2009, *fluid and electrolyte disorders* were the most common comorbid conditions associated with inpatient stays for influenza, accounting for 35–40 percent of all influenza stays.

utilization characteristics are explored, as well as the most common comorbid conditions and principal procedures associated with a diagnosis of influenza in hospital stays. All differences between estimates noted in the text are statistically significant at the 0.001 level or better.

Findings

Overview of ED visits for influenza

The number of ED visits for influenza more than doubled from 2008 to 2009 (491,900 versus 1,281,700). ED visits for influenza occurred at a rate of 161.8 per 100,000 population in 2008 compared to 417.5 per 100,000 population in 2009 (table 1).

The majority of patients visiting the ED for influenza were treated and released in both 2008 and 2009; however, the percentage of treated and released patients was higher in 2009 (90.4 percent) than in 2008 (86.8 percent). The percentage of patients admitted to the hospital from the ED for influenza decreased from 11.7 percent in 2008 to 8.2 percent in 2009.

Private insurance was the most common expected primary payer in 2008 (38.5 percent). In 2009, compared to 2008, a higher percentage of patients visiting the ED for influenza were covered by Medicaid (40.2 percent versus 29.3 percent) and a lower percentage were covered by Medicare (4.6 percent versus 12.2 percent).

There were no significant differences comparing males and females; however, the age distribution of patients visiting the ED for influenza differed significantly across the two years. In 2008, the ED visit rate for influenza among adults aged 65 years and older was significantly higher (130.7 visits per 100,000 population in 2008 compared to 83.0 visits in 2009). However, in younger age groups, ED visit rates for influenza were higher in 2009 compared to 2008. The most striking differences were seen for the 6–11 and 12–17 year age groups where the ED visit rate in 2009 was approximately 5 times higher than in 2008. In comparison, in both 2008 and 2009, rates for non-influenza visits were the highest among adults aged 65 years and older.

In 2008 and 2009, residents of rural areas were more likely than residents of urban areas to visit the ED for influenza (263.8 visits per 100,000 population versus 140.5 visits per 100,000 population in 2008; 539.3 visits per 100,000 population versus 391.3 visits per 100,000 population in 2009). In addition, individuals living in the lowest income communities were more likely to visit the ED for influenza compared to individuals living in higher income communities (224.7 visits per 100,000 population versus 136.9 visits per 100,000 population in 2008; 563.3 visits per 100,000 population versus 358.3 visits per 100,000 population in 2009).

Table 1. Characteristics of emergency department (ED) visits for all-listed influenza, 2008–2009

	2008	2009
Total number of visits	491,900	1,281,700
Rate per 100,000 population*	161.8	417.5
Utilization characteristics		
Disposition at discharge (percentage distribution)		
Treated and released	86.8	90.4
Admitted to the hospital	11.7	8.2
Died in ED	0.0	0.0
Other	0.5	0.6
Expected primary payer (percentage distribution)		
Medicare	12.2	4.6
Medicaid	29.3	40.2
Private Insurance	38.5	35.7
Uninsured	16.3	15.2
Other	3.2	3.7
Patient characteristics (rate per 100,000 population)*		
Gender		
Male	150.3	393.6
Female	172.5	439.4
Mean age (years)		
0–5	441.6	1,178.0
6–11	167.3	887.8
12–17	133.8	672.5
18–44	168.7	394.0
45–64	83.1	149.7
65 and older	130.7	83.0
Patient residence		
Urban areas	140.5	391.3
Rural areas	263.8	539.3
Community-level income		
Low income (lowest quartile)	224.7	563.3
Not low income	136.9	358.3

*Denominator data for rates were based on the U.S. Census Bureau, National Intercensal Estimates, 2000–2010 and Claritas Population Estimates, 2009.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Emergency Department Sample, 2008–2009

Overview of hospital stays for influenza

In a pattern similar to ED visits for influenza, the number of inpatient stays for influenza nearly doubled from 2008 to 2009 (88,300 versus 163,200). Hospitalizations for influenza occurred at a rate of 29.1 stays per 100,000 population in 2008 compared to 53.1 in 2009 (table 2).

Stays for influenza were more expensive in 2009 compared to 2008 (\$11,000 versus \$8,500 cost per stay, inflation-adjusted); however, the mean length of stay was not significantly different across the years, and patients were not more likely to die during an influenza stay in 2009 than in 2008. In 2009, a stay for

influenza was more expensive than the average non-influenza stay (\$11,000 versus \$9,200, data not shown).

Table 2. Characteristics of inpatient hospital stays for all-listed influenza, 2008–2009

	2008	2009
Total number of stays	88,300	163,200
Rate per 100,000 population*	29.1	53.1
Utilization characteristics		
Mean length of stay, days	4.9	5.1
Mean cost per stay**	8,500	11,000
Mean cost per day**	1,700	1,800
Aggregate costs (in billion dollars)**	0.8	1.8
Disposition		
Percentage died in hospital	2.3	2.4
Percentage routine discharge	72.0	84.2
Other	25.8	13.4
Expected primary payer (percentage distribution)		
Medicare	45.9	19.8
Medicaid	19.2	33.5
Private Insurance	28.0	35.7
Uninsured	4.4	7.4
Other	2.4	3.5
Patient characteristics (rate per 100,000 population)*		
Gender		
Male	27.3	50.2
Female	30.6	55.6
Mean age, years		
0–5	66.4	154.2
6–11	12.1	55.7
12–17	7.6	39.1
18–44	10.0	35.2
45–64	20.7	48.0
65 and over	100.9	56.3
Patient residence		
Urban areas	24.3	50.0
Rural areas	47.5	61.6
Community-level income		
Low income (lowest quartile)	38.3	67.1
Not low income	25.3	45.8

*Denominator data for rates were based on the U.S. Census Bureau, National Intercensal Estimates, 2000–2010 and Claritas Population Estimates, 2009.

**Costs have been inflation-adjusted to 2009 dollars.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Emergency Department Sample, 2008–2009

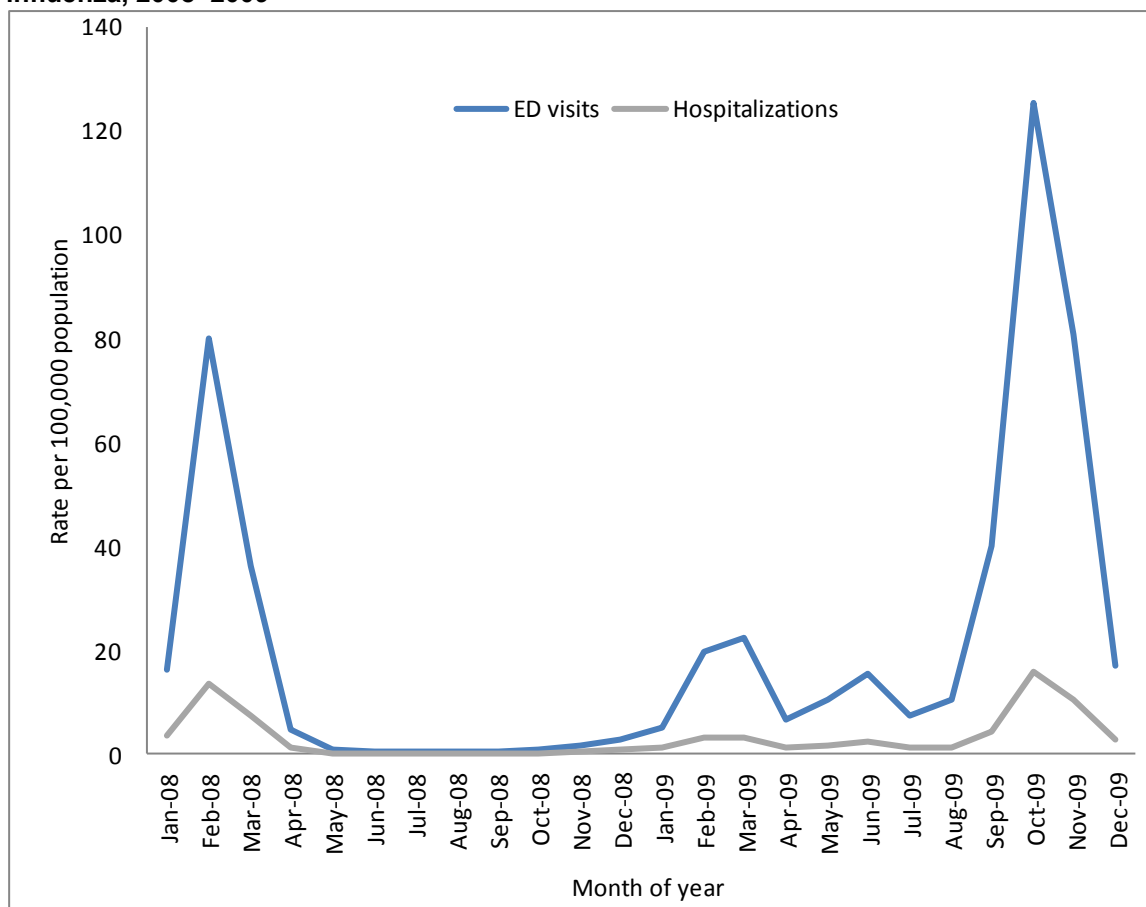
In 2008, Medicare was the most common expected primary payer (45.9 percent) for influenza hospitalizations but this dropped to 19.8 percent in 2009. In 2009, private insurance was the most common (35.7 percent). Differences in the payer distribution are further illustrated by the age distribution of patients with hospital stays for influenza across this time period. In 2008, adults over age 65 had the highest hospitalization rate for influenza (100.9 stays per 100,000 population), but this decreased by 44 percent in 2009 (56.3 stays per 100,000). Children, adolescents, young adults (ages 18–44) and middle-aged adults (ages 45–64) were more likely to be hospitalized for influenza in 2009 compared to 2008.

In 2008 and 2009, hospitalizations for influenza were more likely to occur among individuals with the lowest quartile of income compared to higher income (38.3 stays per 100,000 population versus 25.3 stays per 100,000 population in 2008; 67.1 stays per 100,000 population versus 45.8 stays per 100,000 population in 2009). There were no differences by urban-rural residence.

Monthly rates of ED visits and hospitalizations for influenza

Monthly patterns of ED visits and hospitalizations for influenza differed significantly between 2008 and 2009 (figure 1). In 2008, the peak in ED visits and hospitalizations occurred in February, with 13.4 hospitalizations for influenza per 100,000 population and 79.9 ED visits per 100,000 population. In contrast, in 2009 peak activity occurred in October, with 15.9 hospitalizations for influenza per 100,000 population and 125.2 ED visits per 100,000 population. In both years, influenza activity was at its lowest in the late spring and summer months (April to August).

Figure 1. Monthly rates* of emergency department (ED) visits and hospitalizations for all-listed influenza, 2008–2009

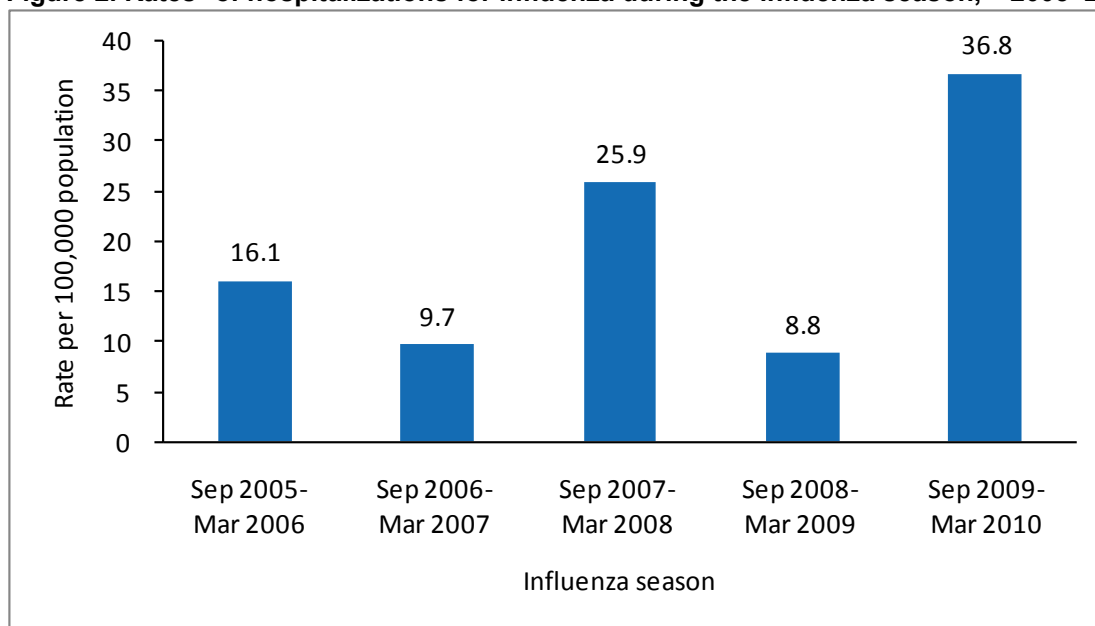


*Denominator data for rates were based on the U.S. Census Bureau, National Intercensal Estimates, 2000–2010. Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Emergency Department Sample, 2008–2009

Trends in hospitalizations for influenza

There was significant variation in the hospitalization rate for influenza from the 2005–2006 to the 2009–2010 influenza seasons (figure 2). Prior to the start of the 2009 H1N1 pandemic captured in the 2009–2010 season, the highest hospitalization rate for a typical epidemic season occurred in 2007–2008 (25.9 stays per 100,000 population). During the second wave of the 2009 H1N1 pandemic, which occurred in the 2009–2010 season, there were 36.8 stays per 100,000 population.

Figure 2. Rates* of hospitalizations for influenza during the influenza season, 2005–2010**



*The rates are based on hospitalizations that occurred September through March (influenza season). Denominator data for rates were based on the U.S. Census Bureau, National Intercensal Estimates, 2000–2010.

**Influenza season is defined as September through March.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2005–2010

Most common conditions and procedures associated with hospitalizations for influenza

In both 2008 and 2009, fluid and electrolyte disorders was the most common condition associated with influenza hospitalizations, accounting for 35–40 percent of all influenza stays (table 3). Other common conditions included asthma and pneumonia (14–23 percent). While respiratory intubation and mechanical ventilation was the most common procedure performed during influenza hospitalizations, no single procedure was performed in more than 7 percent of influenza stays from 2008–2009. However, the proportion of influenza hospitalizations with respiratory intubation and mechanical ventilation increased from 4 percent in 2008 to 7 percent in 2009.

Table 3. Most common comorbid conditions and procedures associated with a diagnosis of influenza* in inpatient hospital stays, 2008–2009

Conditions	Percentage of influenza cases	
	2008	2009
Fluid and electrolyte disorders (CCS 55)	40%	35%
Asthma (CCS 128)	14%	23%
Pneumonia (CCS 122)	14%	22%
Respiratory failure (CCS 131)	11%	16%
Chronic obstructive pulmonary disease and bronchiectasis (CCS 127)	18%	12%
Procedures		
Respiratory intubation and mechanical ventilation (CCS 216)	4%	7%
Diagnostic spinal tap (CCS 4)	3%	3%
Blood transfusion (CCS 222)	2%	2%
Hemodialysis (CCS 58)	1%	1%
Diagnostic bronchoscopy (CCS 37)	1%	1%

Abbreviation: CCS, Clinical Classifications Software.

*Includes all-listed diagnosis of influenza.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2008–2009

Data Source

The estimates in this Statistical Brief are based upon data from the HCUP 2005–2010 NIS and HCUP 2008–2009 NEDS. Supplemental sources included data from the U.S. Census Bureau, National Intercensal Estimates, 2000–2010 and Claritas Population Estimates, 2009–2010.

Many hypothesis tests were conducted for this Statistical Brief. Thus, to decrease the number of false-positive results, we reduced the significance level to 0.001 for individual tests.

Definitions

Diagnoses, procedures, ICD-9-CM and Clinical Classifications Software (CCS)

The *principal diagnosis* is that condition established after study to be chiefly responsible for the patient's admission to the hospital. *Secondary diagnoses* are concomitant conditions that coexist at the time of admission or that develop during the stay.

The *principal procedure* is the procedure that is performed for definitive treatment rather than performed for diagnostic or exploratory purposes (i.e., the procedure that was necessary to take care of a complication). If two procedures appear to meet this definition, the procedure most related to the principal diagnosis is selected as the principal procedure.

ICD-9-CM is the International Classification of Diseases, Ninth Revision, Clinical Modification, which assigns numeric codes to diagnoses. There are about 14,000 ICD-9-CM diagnosis codes and about 4,000 ICD-9-CM procedure codes.

CCS categorizes ICD-9-CM diagnoses into a manageable number of clinically meaningful categories.⁴ This "clinical grouper" makes it easier to quickly understand patterns of diagnoses. CCS categories

⁴HCUP Clinical Classifications Software (CCS). Healthcare Cost and Utilization Project (HCUP). U.S. Agency for Healthcare Research and Quality, Rockville, MD. Available at <http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp>. Updated March 2012. (Accessed January 7, 2013).

identified as “Other” are typically not reported; these categories include miscellaneous, otherwise unclassifiable diagnoses that may be difficult to interpret as a group.

Case definition

For this report, influenza diagnoses were defined as all-listed ICD-9-CM diagnosis codes:

- 487.0 – Influenza with pneumonia
- 487.1 – Influenza with other respiratory manifestations
- 487.8 – Influenza with other manifestations
- 488 – Influenza due to certain identified influenza viruses
- 488.0 – Influenza due to identified avian flu virus
- 488.01 – Influenza due to identified avian flu virus with pneumonia
- 488.02 – Influenza due to identified avian flu virus with other respiratory manifestations
- 488.09 – Influenza due to identified avian flu virus with other manifestations
- 488.1 – Influenza due to identified 2009 H1N1 influenza virus
- 488.11 – Influenza due to identified 2009 H1N1 influenza virus with pneumonia
- 488.12 – Influenza due to identified 2009 H1N1 influenza virus with other respiratory manifestations
- 488.19 – Influenza due to identified 2009 H1N1 influenza virus with other manifestations
- 488.81 – Influenza due to identified novel influenza A virus with pneumonia
- 488.82 – Influenza due to identified novel influenza A virus with other respiratory manifestations
- 488.89 – Influenza due to identified novel influenza A virus with other manifestations

Types of hospitals included in HCUP

HCUP is based on data from community hospitals, defined as short-term, non-Federal, general and other hospitals, excluding hospital units of other institutions (e.g., prisons). HCUP data include obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and academic medical hospitals. Excluded are long-term care, rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals. However, if a patient received long-term care, rehabilitation, or treatment for psychiatric or chemical dependency conditions in a community hospital, the discharge record for that stay will be included in the NIS.

Unit of analysis

The unit of analysis is the hospital discharge (i.e., the hospital stay) or emergency department visit, not a person or patient. 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.

Costs and charges

Total hospital charges were converted to costs using HCUP Cost-to-Charge Ratios based on hospital accounting reports from the Centers for Medicare & Medicaid Services (CMS).⁵ Costs will reflect the actual expenses incurred in the production of hospital services, such as wages, supplies, and utility costs; charges represent the amount a hospital billed for the case. For each hospital, a hospital-wide cost-to-charge ratio is used. Hospital charges reflect the amount the hospital billed for the entire hospital stay and do not include professional (physician) fees. For the purposes of this Statistical Brief, costs are reported to the nearest hundred. The 2008 costs were inflation-adjusted to 2009 dollars.

Mean cost per day is calculated as the mean cost per stay divided by the mean length of stay.

Location of patients’ 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). For this Statistical Brief, we collapsed the NCHS categories into either urban or rural according to the following:

⁵ HCUP Cost-to-Charge Ratio Files (CCR). Healthcare Cost and Utilization Project (HCUP). 2001–2009. U.S. Agency for Healthcare Research and Quality, Rockville, MD. Available at <http://www.hcup-us.ahrq.gov/db/state/costtocharge.jsp>. Updated August 2011. (Accessed January 7, 2013).

Urban:

- Large Central Metropolitan: includes metropolitan areas with 1 million or more residents
- Large Fringe Metropolitan: includes counties of metropolitan areas with 1 million or more residents
- Medium and Small Metropolitan: includes areas with 50,000 to 999,999 residents.

Rural:

- Micropolitan and Noncore: includes nonmetropolitan counties (i.e., counties with no town greater than 50,000 residents).

Median community-level income

Median community-level income is the median household income of the patient's ZIP Code of residence. The cut-offs for the quartile designation are determined using ZIP Code demographic data obtained from Claritas. The income quartile is missing for homeless and foreign patients.

Payer

Payer is the expected primary payer for the hospital stay. To make coding uniform across all HCUP data sources, payer combines detailed categories into more general groups:

- Medicare: includes fee-for-service and managed care Medicare patients.
- Medicaid: includes fee-for-service and managed care Medicaid patients. Patients covered by the State Children's Health Insurance Program (SCHIP) may be included here. Because most State data do not identify SCHIP patients specifically, it is not possible to present this information separately.
- Private Insurance: includes Blue Cross, commercial carriers, and private HMOs and PPOs.
- Other: includes Worker's Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs.
- Uninsured: includes an insurance status of "self-pay" and "no charge."

When more than one payer is listed for a hospital discharge, the first-listed payer is used.

Discharge status

Discharge status indicates the disposition of the patient at discharge from the hospital, and includes the following six categories: routine (to home); transfer to another short-term hospital; other transfers (including skilled nursing facility, intermediate care, and another type of facility such as a nursing home); home health care; against medical advice (AMA); or died in the hospital.

About HCUP

HCUP is a family of powerful health care databases, software tools, and products for advancing research. Sponsored by the Agency for Healthcare Research and Quality (AHRQ), HCUP includes the largest all-payer encounter-level collection of longitudinal health care data (inpatient, ambulatory surgery, and emergency department) in the United States, beginning in 1988. HCUP is a Federal-State-Industry Partnership that brings together the data collection efforts of many organizations—such as State data organizations, hospital associations, private data organizations, and the Federal government—to create a national information resource.

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

Alaska State Hospital and Nursing Home Association
Arizona Department of Health Services
Arkansas Department of Health
California Office of Statewide Health Planning and Development
Colorado Hospital Association
Connecticut Hospital Association
Florida Agency for Health Care Administration

Georgia Hospital Association
Hawaii Health Information Corporation
Illinois Department of Public Health
Indiana Hospital Association
Iowa Hospital Association
Kansas Hospital Association
Kentucky Cabinet for Health and Family Services
Louisiana Department of Health and Hospitals
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 Department of Health
Missouri Hospital Industry Data Institute
Montana MHA - An Association of Montana Health Care Providers
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
Ohio Hospital Association
Oklahoma State Department of Health
Oregon Association of Hospitals and Health Systems
Oregon Health Policy and Research
Pennsylvania Health Care Cost Containment Council
Rhode Island Department of Health
South Carolina Budget & Control Board
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 Health Care Authority
Wisconsin Department of Health Services
Wyoming Hospital Association

About the NIS

The HCUP Nationwide Inpatient Sample (NIS) is a nationwide database of hospital inpatient stays. The NIS is nationally representative of all community hospitals (i.e., short-term, non-Federal, nonrehabilitation hospitals). The NIS is a sample of hospitals and includes all patients from each hospital, regardless of payer. It is drawn from a sampling frame that contains hospitals comprising more than 95 percent of all discharges in the United States. The vast size of the NIS allows the study of topics at both the national and regional levels for specific subgroups of patients. In addition, NIS data are standardized across years to facilitate ease of use.

About NEDS

The HCUP Nationwide Emergency Department Database (NEDS) is a unique and powerful database that yields national estimates of emergency department (ED) visits. The NEDS was constructed using records from both the HCUP State Emergency Department Databases (SEDD) and the State Inpatient Databases (SID). The SEDD capture information on ED visits that do not result in an admission (i.e., treat-and-release visits and transfers to another hospital); the SID contain information on patients initially seen in the emergency room and then admitted to the same hospital. The NEDS was created to enable analyses of ED utilization patterns and support public health professionals, administrators, policymakers, and clinicians in their decisionmaking regarding this critical source of care. The NEDS is produced annually beginning in 2006.

For More Information

For more information about HCUP, visit <http://www.hcup-us.ahrq.gov/>.

For additional HCUP statistics, visit HCUPnet, our interactive query system, at www.hcup.ahrq.gov.

For information on other hospitalizations in the United States, download *HCUP Facts and Figures: Statistics on Hospital-Based Care in the United States in 2009*, located at <http://www.hcup-us.ahrq.gov/reports.jsp>.

For a detailed description of HCUP, more information on the design of the NIS, and methods to calculate estimates, please refer to the following publications:

Introduction to the HCUP Nationwide Inpatient Sample, 2009. Online. May 2011. U.S. Agency for Healthcare Research and Quality. Available at http://hcup-us.ahrq.gov/db/nation/nis/NIS_2009_INTRODUCTION.pdf. (Accessed January 7, 2013).

Introduction to the HCUP Nationwide Emergency Department Sample, 2009. Online. September 2011. U.S. Agency for Healthcare Research and Quality. Available at <http://hcup-us.ahrq.gov/db/nation/neds/NEDS2009Introductionv3.pdf>. (Accessed January 7, 2013).

Houchens R, Elixhauser A. *Final Report on Calculating Nationwide Inpatient Sample (NIS) Variances, 2001*. HCUP Methods Series Report #2003-2. Online. June 2005 (revised June 6, 2005). U.S. Agency for Healthcare Research and Quality. Available at <http://www.hcup-us.ahrq.gov/reports/CalculatingNISVariances200106092005.pdf>. (Accessed January 7, 2013).

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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 health care 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 e-mail us at hcup@ahrq.gov or send a letter to the address below:

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