

## STATISTICAL BRIEF #122

October 2011

### Septicemia in U.S. Hospitals, 2009

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#### Introduction

Septicemia<sup>1</sup> is a serious systemic illness caused by bacteria and bacterial toxins circulating in the bloodstream. During the past 30 years, it has become an increasingly common condition among hospitalized patients.<sup>2</sup> As recently reported by the National Center for Healthcare Statistics, findings from the National Hospital Discharge Survey indicate that the number of hospital stays for this condition more than doubled between 2000 and 2008; further, septicemia patients were more severely ill than patients hospitalized for other diagnoses.<sup>3</sup> The disease often originates with infections elsewhere in the body such as the lungs, urinary tract, and surgical sites and is of serious concern to health care providers, policy makers and patients because of the large numbers of cases, high mortality rates, and associated costs.<sup>4</sup>

In 2008, hospital stays with a principal diagnosis of septicemia accounted for 4.0 percent of all inpatient costs, making septicemia the most costly reason for hospitalization that year. Between 1997 and 2008, costs for this condition grew at almost three times the rate of costs for hospital stays overall (average annual growth of 11.9 percent versus average annual growth of 4.4 percent). The growth in the cost of these stays

<sup>1</sup> Other terms for septicemia include bacteremia (merely indicating the presence of bacteria in the blood), sepsis, and systemic inflammatory response syndrome (SIRS).

<sup>2</sup> Angus, D.C., Linde-Zwirble, W.T., Lidicker, J., Clermont, G., Carcillo, J., Pinsky, M.R. *Epidemiology of severe sepsis in the United States: analysis of incidence, outcome, and associated costs of care*. *Crit Care Med*. 2001 Jul;29(7):1303-10.

<sup>3</sup> Hall, M.J., Williams, S.N., DeFrances, C.J., Golosinskiy, A. *Inpatient care for septicemia or sepsis: A challenge for patients and hospitals*. NCHS data brief, no 62. Hyattsville, MD: National Center for Health Statistics. 2011.

<sup>4</sup> Martin, G.S., Mannino, D.M., Eaton, S., Moss, M. *The epidemiology of sepsis in the United States from 1979 through 2000*. *N Engl J Med*. 2003 Apr 17;348(16):1546-54.

#### Highlights

- Septicemia was the sixth most common principal reason for hospitalization in the U.S. with 836,000 hospital stays in 2009. There were an additional 829,500 stays with a secondary diagnosis of septicemia, for a total of 1,665,400 inpatient stays.
- Septicemia was the most expensive reason for hospitalization in 2009—totaling nearly \$15.4 billion in aggregate hospital costs.
- Nearly one out of every 23 patients in the hospital (4.2 percent) had septicemia. On average, 4,600 new patients per day were treated in U.S. hospitals for this condition.
- In 2009, the in-hospital mortality rate for septicemia was about 16 percent—more than 8 times higher than other stays (2.0 percent). This was unchanged from 2000.
- From 1993 to 2009, septicemia-related hospital stays more than doubled, increasing by 153 percent overall, for an average annual increase of 6 percent.
- Medicare was the predominant payer for septicemia-related hospital stays, covering 58.1 percent of patients with septicemia.
- The most common specifically-identified organism was *E. coli* for patients with a principal diagnosis of septicemia and MRSA for patients with a secondary diagnosis of septicemia; however, more than half of septicemia cases had no organism identified on the discharge record.
- Complication of device, implant, or graft was the most common principal reason for septicemia-related hospitalization and accounted for one of every five septicemia-related stays.

was due to both the increasing number of stays per population and an increase in the cost per stay.<sup>5</sup>

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) Nationwide Inpatient Sample (NIS) on hospital stays for septicemia in 2000 and 2009. In this Statistical Brief, characteristics of stays for septicemia hospitalizations, including utilization, cost, patient populations, and geographic locations are compared with the characteristics of all other hospital stays. All differences between estimates noted in the text are statistically significant at the 0.05 level or better. Cases reported here include any case of septicemia regardless of when the condition originated, prior to or during a hospital stay.

## Findings

In 2009, septicemia was the sixth most common principal reason for hospitalization (836,000 stays, or 2.1 percent of all hospitalizations), but was the single most expensive condition treated in U.S. hospitals. Aggregate costs for stays with a principal diagnosis of septicemia totaled nearly \$15.4 billion, or 4.3 percent of all hospital costs.

If all hospital inpatients with any mention of septicemia are included—those with a principal diagnosis and those with a secondary diagnosis of septicemia—nearly one out of every 23 patients in the hospital (4.2 percent) had septicemia. On average, 4,600 new patients per day were treated in U.S. hospitals for this condition.

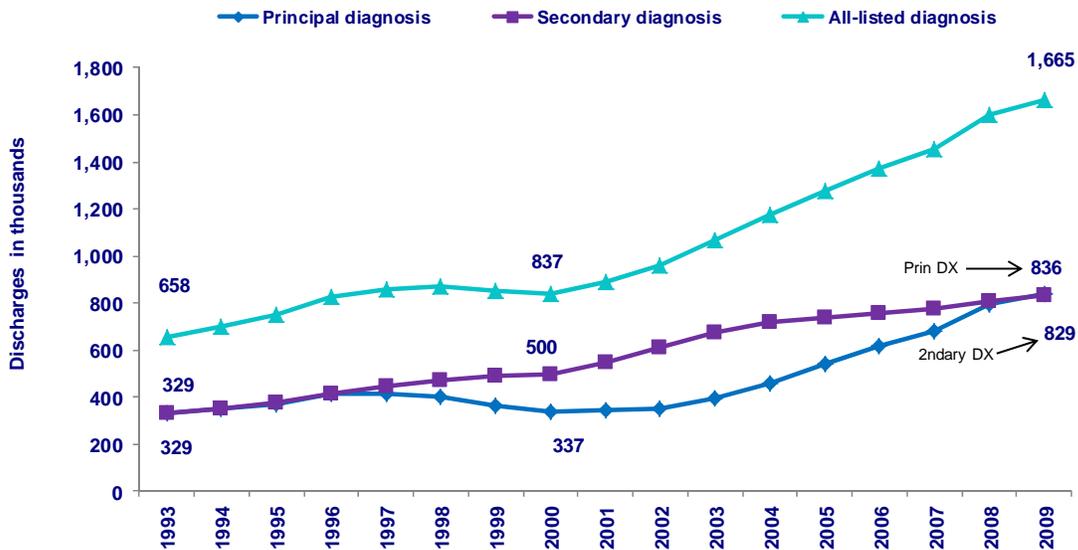
Figure 1 shows the trend in hospital stays for septicemia. Overall, septicemia cases increased from 1993 to 1998, declined slightly until 2000, and then rose steadily through 2009. Over the entire time period from 1993 to 2009, septicemia-related hospital stays more than doubled (cumulative growth of 153 percent), increasing by an average of 6.0 percent annually. From 2000 to 2009, septicemia-related hospital stays increased by 7.9 percent annually (cumulative growth of 99 percent). However, the rate of growth slowed between 2008 and 2009 when the number of septicemia hospital stays grew by only 3.9 percent.

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<sup>5</sup> Wier, L.M., Levit, K., Stranges, E., Ryan, K., Pfunter, A., Vandivort, R., Santora, P., Owens, P., Stocks, C., Elixhauser, A. *HCUP Facts and Figures: Statistics on Hospital-Based Care in the United States, 2008*. Rockville, MD: Agency for Healthcare Research and Quality, 2010 (<http://www.hcup-us.ahrq.gov/reports.jsp>).



**Figure 1. Trends in U.S. hospital stays with septicemia, 1993–2009**



Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1993-2009

Most of the increase in septicemia in recent years was attributable to an increase in the number of cases with septicemia as a principal diagnosis. Principal diagnoses of septicemia rose from 1993 to 1997, fell from 1998 to 2002, rose again from 2003 to 2008, and then showed slower growth between 2008 and 2009. In contrast, the number of cases with septicemia as a secondary diagnosis increased steadily from 1993 to 2003, and then increased at a relatively slower rate between 2003 and 2009. Between 2000 and 2009, stays with a principal diagnosis of septicemia increased 148 percent (10.6 percent annually), while those with secondary diagnoses of septicemia increased by only 66 percent (5.8 percent annually).

**Table 1. Numbers of discharges, resource use and discharge status for septicemia hospitalizations in the U.S., 2000 and 2009**

	2000*	2009
<i>Septicemia as a principal diagnosis</i>		
Number of discharges‡	337,100	836,000
Mean length of stay, days‡	8.2	8.8
Mean cost per stay, (in dollars)‡	12,800	18,500
Mean cost per day, (in dollars)‡	1,700	2,300
In-hospital mortality, (in percentages)‡	16.7%	16.3%
Discharge status, (in percentages)		
Routine discharge‡	40.5%	31.3%
Discharged to other short term hospital‡	3.2%	3.7%
Discharged to long term care‡	29.6%	33.9%
Discharged to home health care‡	9.4%	13.8%
<i>Septicemia as a secondary diagnosis</i>		
Number of discharges‡	499,500	829,500
Mean length of stay, days	15.7	15.8
Mean cost per stay, (in dollars)‡	30,900	33,900
Mean cost per day, (in dollars)‡	2,100	2,300
In-hospital mortality, (in percentages)‡	21.5%	14.7%

\*Costs per stay and costs per day in 2000 are inflation-adjusted to 2009 dollars.

‡ Differences between stays in 2000 and 2009 were statistically significant at  $p < 0.05$ .

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2000 and 2009

Table 1 provides details on stays with septicemia in 2000 and 2009. Between 2000 and 2009, the average length of stay and average inflation-adjusted cost of a stay with a principal diagnosis of septicemia both increased (from 8.2 days to 8.8 days; from \$12,800 to \$18,500), as did the cost per day (from \$1,700 to \$2,300).

The in-hospital mortality rate for stays with a principal diagnosis of septicemia was unchanged from 2000 to 2009 (over 16 percent) and was more than 8 times higher than for all stays (2.0 percent; data not shown). However, the pattern of discharge status for patients who left the hospital alive changed from 2000 to 2009. Over time, more patients were discharged to nursing homes and other long term care facilities and to home health care.

Cost per stay and cost per day for hospitalizations with a secondary diagnosis of septicemia also increased between 2000 and 2009 (from \$30,900 to \$33,900; from \$2,100 to \$2,300), although the average length of these stays remained relatively stable. The in-hospital mortality rate for these stays declined from 21.5 percent to 14.7 percent, but was still more than eight times higher than the overall inpatient mortality rate (data not shown).

Compared with stays in which septicemia was a principal diagnosis, stays with a secondary diagnosis of septicemia were longer (in 2000, 15.7 versus 8.2 days; in 2009, 15.8 versus 8.8 days) and more expensive (in 2000, \$30,900 versus \$12,800; in 2009, \$33,900 versus \$18,500). In 2000, the mortality rate for stays with a secondary diagnosis of septicemia was longer than that for stays with a principal

diagnosis (21.5 versus 16.7 percent), but by 2009, the reverse was true—the mortality rate was 16.3 percent for stays with a principal septicemia diagnosis and 14.7 percent for stays with a secondary septicemia diagnosis.

Table 2 shows the number of stays by detailed septicemia diagnosis in 2009. Over half of patients with septicemia (53.4 percent) had a non-specific code that does not provide information on the organism responsible for the infection. The most common specifically-identified organisms were E. coli for patients with a principal diagnosis of septicemia and Methicillin-Resistant Staphylococcus Aureus (MRSA) for patients with a secondary diagnosis of septicemia. About 15 percent of patients had a diagnosis of “bacteremia” (mostly as a secondary diagnosis) which indicates presence of bacteria in the blood, which is normally sterile, but without the systemic response associated with sepsis.

**Table 2. Stays for septicemia by specific diagnosis codes, 2009**

<b>ICD-9-CM Diagnosis</b>	<b>Stays with principal septicemia diagnosis</b>	<b>Stays with secondary septicemia diagnosis</b>
<b>Gram Negative Organisms</b>		
E. Coli Septicemia	73,800	23,800
Gram-Negative Septicemia Not Elsewhere Classified	39,300	28,100
Gram-Negative Septicemia Not Otherwise Specified	11,000	7,600
Pseudomonas Septicemia	10,800	9,900
Anaerobic Septicemia	5,900	3,200
<b>Staphylococcal Infections</b>		
Methicillin-Resistant Staphylococcus Aureus Septicemia	31,600	32,500
Methicillin Susceptible Staphylococcus Aureus Septicemia	21,700	25,200
Staphylococcus Septicem Not Elsewhere Classified	14,700	19,900
Staphylococcus Septicemia Not Otherwise Specified	5,800	7,500
<b>Other Organisms</b>		
Streptococcal Septicemia	37,300	28,200
Pneumococcal Septicemia	16,900	4,600
All Other Septicemia	4,300	5,500
<b>Organisms Not Specified</b>		
Septicemia Not Otherwise Specified	513,700	313,900
Bacteremia	26,900	213,600
Septicemia Not Elsewhere Classified	17,200	16,000
Septicemia of Newborn	5,000	109,200

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2000 and 2009

Table 3 provides a comparison of septicemia patients (both principal and secondary diagnoses) and all other patients in U.S. hospitals in 2009. Patients with septicemia averaged 60.3 years of age in 2009, while the average age of all other patients was 47.8 years. Over half (52.7 percent) of septicemia patients were 65 years of age or older; while older patients accounted for just over a third of all other stays.

Septicemia patients were more likely to be male than other patients (50.1 percent v. 41.3 percent), and stays for this condition were more likely to be billed to Medicare than were stays for other conditions (58.1 and 36.4 percent, respectively).

**Table 3. Characteristics of septicemia-related hospital stays in the U.S., 2009**

	<b>Stays for septicemia*</b>	<b>All other stays</b>
Number of discharges ( <i>N, % of all discharges</i> )	1,665,400 4.2%	37,769,500 95.8%
Mean age (years)	60.3	47.8
<i>Age, in categories (N, %)‡</i>		
<1	128,200 7.7%	4,549,600 12.0%
1–17	26,000 1.6%	1,585,100 4.2%
18–44	177,600 10.7%	9,744,100 25.8%
45–64	456,700 27.4%	9,171,800 24.3%
65–84	650,500 39.1%	9,817,900 26.0%
85+	226,200 13.6%	2,849,600 7.5%
<i>Gender (N, %)‡</i>		
Male	834,200 50.1%	15,605,800 41.3%
Female	831,000 49.9%	22,060,000 58.4%
<i>Primary payer (N, %)‡</i>		
Medicare	966,900 58.1%	13,741,500 36.4%
Medicaid	245,000 14.7%	7,782,300 20.6%
Private insurance	347,400 20.9%	12,610,400 33.4%
Uninsured	63,200 3.8%	2,324,800 6.2%
Other	40,100 2.4%	1,229,500 3.3%

\* Includes all cases with septicemia as principal or secondary diagnosis.

‡ Differences between stays for septicemia and all other stays were statistically significant at  $p < 0.05$ .

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

Table 4 presents rates of septicemia hospitalizations per 100,000 population by selected patient characteristics. In 2009, rates of hospital stays for septicemia varied by age group, region, urban-rural location, and median income of the patient's ZIP Code.

The highest rates of septicemia were seen among the elderly—in 2009, there were 1,920 hospital stays for septicemia per 100,000 people ages 65–84 and 4,020 septicemia stays per 100,000 people ages 85 and older. Compared with people 45–64 years old, 65–84 year olds were 3.3 times more likely to be hospitalized for septicemia, but only 2.5 times more likely to be hospitalized for all other conditions. People 85 and older were 7.0 times more likely to be hospitalized for septicemia, but only 4.4 times more likely to be hospitalized for all other conditions. Rates of septicemia did not vary by gender.

**Table 4. Rates of septicemia hospitalizations per 100,000 U.S. population, 2000 and 2009**

	Rate per 100,000 population	
	Stays for septicemia <sup>1</sup>	All other stays
Total U.S.	540	12,300
<i>Age, in categories</i>		
<1‡	3,010	106,760
1–17‡	40	2,260
18–44*	160	8,580
45–64‡	580	11,550
65–84‡	1,920	28,930
85+‡	4,020	50,610
<i>Gender</i>		
Male*	550	10,310
Female	530	14,170
<i>U.S. Region</i>		
Northeast*	550	13,320
Midwest	540	12,910
South	590	12,780
West‡	470	10,200
<i>Patient location</i>		
Large metropolitan area	550	12,110
Small metropolitan area*	470	10,930
Non-metropolitan area‡	580	13,660
<i>Median household income of patient's ZIP Code</i>		
First quartile‡ (poorest communities)	630	13,550
Second quartile‡	540	12,470
Third quartile	500	11,250
Fourth quartile (wealthiest communities)*	440	10,360

\* Includes all cases with septicemia as principal or secondary diagnosis.

‡ Differences between stays for septicemia and all other stays were statistically significant at  $p < 0.05$ .

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

Rates of hospitalization for septicemia were lower in the West than the Northeast (470 stays versus 550 stays per 100,000 population), while rates in the Midwest and South were similar to the Northeast. This was similar to the trend among all other hospital stays.

Persons residing in non-metropolitan areas were more likely to be hospitalized for septicemia than were those residing in small metro areas (580 stays versus 470 stays per 100,000 population). Persons from non-metropolitan areas were also more likely to be hospitalized for non-septicemia related conditions.

Individuals from lower income communities were hospitalized more frequently for septicemia (540 to 630 stays per 100,000 population for the two lowest quartiles) than were individuals from the wealthiest communities (440 stays per 100,000 population), again similar to the trend among all other hospital stays. Individuals from the poorest communities were hospitalized for septicemia 1.4 times more often than individuals from the wealthiest communities, a pattern again similar to all other stays.

Table 5 shows the conditions most commonly associated with septicemia hospitalizations. For patients with a principal diagnosis of septicemia, many of the secondary diagnoses represent systemic complications of such a grave illness—fluid and electrolyte disorders, acute renal failure respiratory failure, shock. Some of the conditions reflect the infectious process or potential causes of septicemia such as urinary tract infections; pneumonia; unspecified bacterial infections; chronic ulcer of skin; skin and subcutaneous tissue infections. Many of these conditions are chronic conditions of old age or comorbidities that may be exacerbated by septicemia—hypertension, diabetes, cardiac dysrhythmias, chronic renal failure, congestive heart failure, coronary atherosclerosis, disorders of lipid metabolism, COPD, and dementia.

**Table 5. Twenty most common secondary diagnoses associated with a principal diagnosis of septicemia, 2009**

Secondary CCS diagnoses	Stays with principal septicemia diagnosis	
	Number of discharges	Rate per 1,000 cases
Fluid and electrolyte disorders	459,000	549.0
Urinary tract infections	361,700	432.6
Acute and unspecified renal failure	319,100	381.8
Deficiency and other anemia	286,800	343.1
Pneumonia	270,600	323.7
Essential hypertension	268,200	320.8
Respiratory failure; insufficiency; arrest	239,900	286.9
Cardiac dysrhythmias	209,000	250.0
Shock	207,300	248.0
Chronic renal failure	185,900	222.4
Congestive heart failure; non-hypertensive	182,900	218.8
Diabetes mellitus without complication	180,400	215.8
Coronary atherosclerosis and other heart disease	180,100	215.4
Hypertension with complications and secondary hypertension	165,700	198.2
Disorders of lipid metabolism	165,400	197.8
Chronic obstructive pulmonary disease and bronchiectasis	162,500	194.3
Nutritional deficiencies	140,500	168.1
Delirium	140,500	168.0
Bacterial infection; unspecified site	137,200	164.2
Screening and history of mental health and substance abuse codes	133,900	160.2
Chronic ulcer of skin	132,800	158.9

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

For patients with a secondary diagnosis of septicemia, complication of device, implant, or graft was the most common principal diagnosis; complications of surgical procedures or medical care was the fourth

most common (table 6). Together, these two complication-related conditions were associated with 150,800 cases with a secondary diagnosis of septicemia. There were 96,100 newborn stays with a secondary diagnosis of septicemia.

**Table 6. Twenty most common principal diagnoses associated with a secondary diagnosis of septicemia, 2009**

Principal CCS diagnoses	Stays with secondary septicemia diagnosis	
	Number of discharges	Rate per 1,000 cases
Complication of device; implant or graft	117,400	141.5
Liveborn	96,100	115.9
Pneumonia	50,900	61.4
Respiratory failure; insufficiency; arrest	37,800	45.6
Complications of surgical procedures or medical care	33,400	40.3
Urinary tract infections	27,500	33.2
Aspiration pneumonitis; food/vomitus	19,000	23.0
Acute myocardial infarction	16,800	20.2
Congestive heart failure; nonhypertensive	16,800	20.2
Acute and unspecified renal failure	15,800	19.1
Skin and subcutaneous tissue infections	14,500	17.5
Diabetes mellitus with complications	14,100	17.1
Acute cerebrovascular disease	13,000	15.7
Biliary tract disease	12,400	14.9
Intestinal obstruction without hernia	10,300	12.4
Rehabilitation care; fitting of prostheses; and adjustment of devices	9,900	11.9
Peri-; endo-; and myocarditis; cardiomyopathy	9,000	10.8
Infective arthritis and osteomyelitis	8,700	10.5
Intestinal infection	8,300	10.0
Chronic obstructive pulmonary disease and bronchiectasis	8,200	9.9
HIV infection	7,900	9.5

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

## Data Source

The estimates in this Statistical Brief are based upon data from the 2009 HCUP Nationwide Inpatient Sample. Historical data were drawn from the 1993–2008 NIS.

## Definitions

### *Diagnoses, 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.

ICD-9-CM is the International Classification of Diseases, Ninth Revision, Clinical Modification, which assigns numeric codes to diagnoses. There are about 13,600 ICD-9-CM diagnosis codes.

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

*Case definition*

For this report, septicemia stays were identified as having an ICD-9-CM diagnosis code of 003.1, 036.2, 038.xx, 054.5, 449, or 790.7.

003.1	Salmonella Septicemia
036.2	Meningococemia
038.0	Streptococcal Septicemia
038.10	Staphylococcus Septicemia, Not Otherwise Specified
038.11	Staph Aureus Septicemia
038.11	Methicillin Susceptible Staphylococcus Aureus Septicemia (after Oct 1, 2008)
038.12	MRSA Septicemia
038.19	Staphylococ Septicemia, Not Elsewhere Classified
038.2	Pneumococcal Septicemia
038.3	Anaerobic Septicemia
038.40	Gram-Negative Septicemia, Not Otherwise Specified
038.41	H. Influenae Septicemia
038.42	E. Coli Septicemia
038.43	Pseudomonas Septicemia
038.44	Serratia Septicemia
038.49	Gram-Negative Septicemia, Not Elsewhere Classified
038.8	Septicemia, Not Elsewhere Classified
038.9	Septicemia, Not Otherwise Specified
054.5	Herpetic Septicemia
449	Septic Arterial Embolism
771.81	Newborn Septicemia
790.7	Bacteremia

*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 includes data from OB-GYN, ENT, 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), 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 and Medicaid Services (CMS).<sup>6</sup> Costs will reflect the actual expenses incurred in the production of hospital services, such as wages, supplies, and utility costs, while 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.

#### *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 Workers' 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.

#### *Region*

Region is one of the four regions defined by the U.S. Census Bureau:

- Northeast: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania
- Midwest: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas
- South: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas
- West: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, and Hawaii

#### *Urban-rural location*

Urban-rural location is defined as:

- Large Metro Area: Counties of metropolitan areas with a population of 1 million or greater
- Small Metro Area: Counties in metropolitan areas of 50,000–999,999 population
- Non-metro Area: All counties that are not classified as large or small metro areas.

### **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

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<sup>6</sup> HCUP Cost-to-Charge Ratio Files (CCR). Healthcare Cost and Utilization Project (HCUP). 2001–2008. U.S. Agency for Healthcare Research and Quality, Rockville, MD. [www.hcup-us.ahrq.gov/db/state/costtocharge.jsp](http://www.hcup-us.ahrq.gov/db/state/costtocharge.jsp).

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:

**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** Division of Health Care Finance and Policy  
**Michigan** Health & Hospital Association  
**Minnesota** Hospital Association  
**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 and Senior Services  
**New Mexico** Health Policy Commission  
**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  
**Pennsylvania** Health Care Cost Containment Council  
**Rhode Island** Department of Health  
**South Carolina** State 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, non-rehabilitation

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 about 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.

### **For More Information**

For more information about HCUP, visit [www.hcup-us.ahrq.gov](http://www.hcup-us.ahrq.gov).

For additional HCUP statistics, visit HCUPnet, our interactive query system, at [www.hcup.ahrq.gov](http://www.hcup.ahrq.gov).

For information on other hospitalizations in the U.S., download *HCUP Facts and Figures: Statistics on Hospital-Based Care in the United States in 2008*, 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, 2008*. Online. May 2010. U.S. Agency for Healthcare Research and Quality. [http://hcup-us.ahrq.gov/db/nation/nis/NIS\\_2008\\_INTRODUCTION.pdf](http://hcup-us.ahrq.gov/db/nation/nis/NIS_2008_INTRODUCTION.pdf)

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. <http://www.hcup-us.ahrq.gov/reports/CalculatingNISVariances200106092005.pdf>

Houchens RL, Elixhauser A. *Using the HCUP Nationwide Inpatient Sample to Estimate Trends. (Updated for 1988-2004)*. HCUP Methods Series Report #2006-05 Online. August 18, 2006. U.S. Agency for Healthcare Research and Quality. [http://www.hcup-us.ahrq.gov/reports/2006\\_05\\_NISTrendsReport\\_1988-2004.pdf](http://www.hcup-us.ahrq.gov/reports/2006_05_NISTrendsReport_1988-2004.pdf)

### **Suggested Citation**

Elixhauser, A. (Agency for Healthcare Research and Quality), Friedman, B. (Agency for Healthcare Research and Quality) and Stranges, E. (Thomson Reuters). *Septicemia in U.S. Hospitals, 2009*. HCUP Statistical Brief #122. October 2011. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb122.pdf>

### **Acknowledgments**

The authors would like to acknowledge Mika Nagamine, Minya Sheng, and Lindsey Terrel for their assistance on this Brief.

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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](mailto:hcup@ahrq.gov) or send a letter to the address below:

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