STATISTICAL BRIEF #194

July 2015

Trends in Observed Adult Inpatient Mortality for High-Volume Conditions, 2002–2012

*Anika L. Hines, Ph.D., M.P.H., Kevin C. Heslin, Ph.D.,
H. Joanna Jiang, Ph.D., and Rosanna Coffey, Ph.D.*

Introduction

Monitoring and improving health care quality in the United States is a key priority for health policymakers, payers, providers, and patient advocates. Hospital inpatient mortality is one quality measure that can reflect both improvements in health care and shifts in where end-of-life care takes place over time.

Previous trends in inpatient mortality suggest that rates have been decreasing for high-volume conditions, such as acute myocardial infarction (AMI), congestive heart failure (CHF), stroke, and pneumonia.[1,2] These declines in mortality vary not only by condition but also by patient and hospital characteristics. Continued study of these trends can help researchers and policymakers assess the impact of health care quality efforts. Further, examining trends across patient and hospital subgroups may inform strategies for addressing disparities in health care quality by identifying groups that are leading and lagging in improvement.

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief examines trends in observed inpatient mortality rates for AMI, CHF, stroke, and pneumonia for adults aged 18 years and older, as well as changes in these rates for select patient subgroups. Death following discharge from a hospital is not reflected in these data. Observed trends in inpatient mortality from 2002 to 2012 are presented. Percentage changes between 2002 and 2012 are compared by age, sex, expected primary payer, community income level, urban or rural location of patient residence, and hospital region. All differences between estimates noted in the text are statistically significant at the .01 level or better.

Highlights

- Observed inpatient mortality rates among adults declined between 2002 and 2012 for four high-volume conditions: 45 percent decrease for pneumonia, 41 percent decrease for acute myocardial infarction (AMI), 29 percent decrease for congestive heart failure (CHF), and 27 percent decrease for stroke.

- Inpatient mortality for pneumonia demonstrated the largest decrease of the four conditions across subgroups.

  - Decreases in the inpatient mortality rate for pneumonia were largest for Medicaid and uninsured patients (56 and 55 percent, respectively).

  - Pneumonia mortality decreased by nearly half for patients in all community income groups.

- Decreases in mortality for CHF and stroke were largest among patients from the poorest communities (34 percent decrease for CHF and 30 percent decrease for stroke).

- Uninsured patients had the largest decrease in inpatient mortality for stroke (42 percent) compared with Medicare, Medicaid, and privately insured patients.

- Inpatient mortality for AMI decreased by approximately 40 percent in rural (42 percent), metropolitan (41 percent), and micropolitan (40 percent) areas.

[1] Hines A, Stranges E, Andrews RM. Trends in Hospital Risk-Adjusted Mortality for Select Diagnoses by Patient Subgroups, 2000-2007. HCUP Statistical Brief #98. October 2010. Agency for Healthcare Research and Quality, Rockville, MD. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb98.pdf. Accessed February 17, 2015.
[2] Stepanova M, Venkatesan C, Altaweel L, Mishra A, and Younossi ZM. Recent trends in inpatient mortality and resource utilization for patients with stroke in the United States: 2005-2009. Journal of Stroke and Cerebrovascular Disease. 2013;22(4):491–9.

Inpatient mortality rate trends for four high-volume conditions, 2002–2012
Figure 1 presents observed inpatient mortality rates among adults aged 18 years and older for AMI, CHF, stroke, and pneumonia from 2002 through 2012. The average annual percentage decrease displayed is that by which the rate decreased per year on average during this period.

Figure 1. Trends in observed inpatient mortality rate per 1,000 hospital admissions for four high-volume conditions, 2002–2012
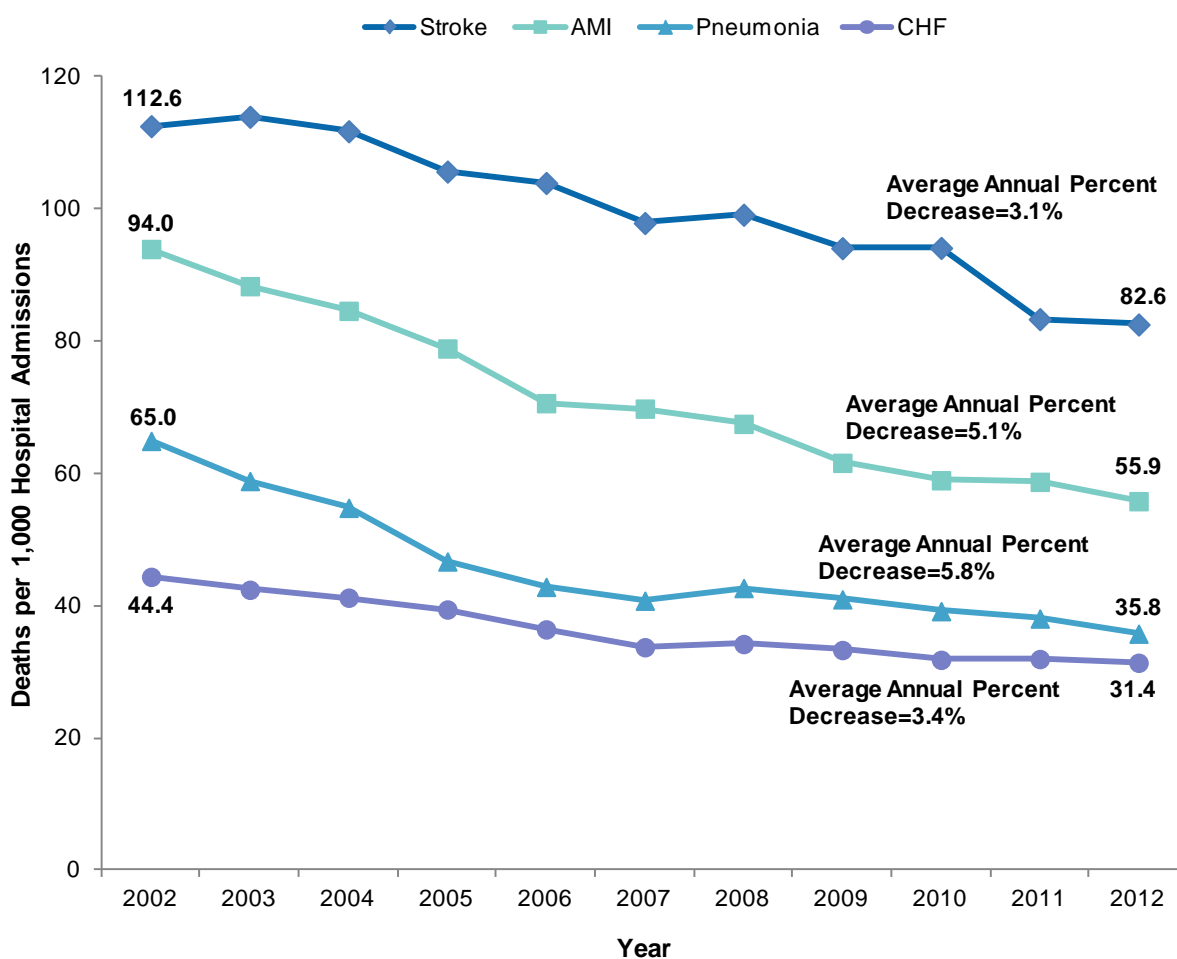
Abbreviations: AMI, acute myocardial infarction; CHF, congestive heart failure

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), Nationwide Inpatient Sample (NIS), 2002–2011; State Inpatient Databases (SID), 2012, weighted to provide national estimates using the same methodology as the 2002–2011 NIS; and the AHRQ Quality Indicators, version 4.4

- **Between 2002 and 2012, observed inpatient mortality rates decreased among patients admitted for all four high-volume conditions—AMI, CHF, stroke, and pneumonia.**

   Across all years, inpatient mortality was highest among patients admitted for stroke and lowest among patients admitted for CHF. From 2002 to 2012, inpatient mortality decreased the most among patients admitted for pneumonia (45 percent decrease, from 65.0 to 35.8 deaths per 1,000 admissions), followed by AMI (41 percent decrease, from 94.0 to 55.9 deaths per 1,000 admissions), CHF (29 percent decrease, from 44.4 to 31.4 deaths per 1,000 admissions), and stroke (27 percent decrease, from 112.6 to 82.6 deaths per 1,000 admissions).

   The average annual percentage decrease in mortality ranged from 3.1 percent for stroke to 5.8 percent for pneumonia.

2

Inpatient mortality rates for four high-volume conditions by patient and hospital characteristics, 2002 and 2012

Table 1 presents observed inpatient mortality rates among adults aged 18 years and older for AMI, CHF, stroke, and pneumonia by patient and hospital characteristics in 2002 and 2012.

Table 1. **Observed inpatient mortality rate per 1,000 hospital admissions for four high-volume conditions by subgroup, 2002 and 2012**

Subgroup		Acute myocardial infarction		Congestive heart failure		Stroke		Pneumonia	
		2002	2012	2002	2012	2002	2012	2002	2012
Overall total		94.0	55.9	44.4	31.4	112.6	82.6	65.0	35.8
Patient characteristics									
Age group, years	18–64	37.0	27.3	21.1	15.7	94.7	66.5	30.0	16.4
	65+	129.6	77.6	51.9	37.3	119.4	90.8	81.4	46.7
Sex	Male	79.2	49.9	46.8	32.1	110.7	76.1	70.6	37.7
	Female	114.6	65.3	42.5	30.7	114.1	88.7	60.0	34.2
Hospital characteristics									
Hospital region	Northeast	98.6	61.8	51.1	35.0	118.7	87.4	77.2	37.1
	Midwest	95.4	51.1	40.4	27.4	107.7	79.8	55.4	31.7
	South	91.5	54.6	43.2	31.1	111.4	78.7	64.8	37.4
	West	91.9	59.0	44.6	33.4	115.0	89.3	66.0	36.5

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), Nationwide Inpatient Sample (NIS), 2002, and State Inpatient Databases (SID), 2012, weighted to provide national estimates using the same methodology as the 2002 NIS; and the AHRQ Quality Indicators, version 4.4

- **Between 2002 and 2012, observed inpatient mortality rates for patients admitted for AMI, CHF, stroke, and pneumonia decreased across patient characteristics; however, the magnitude of the decreases varied by condition and subgroup.**

  The inpatient mortality rate for all four high-volume conditions decreased among younger and older patients. The largest declines in mortality were for patients aged 18–64 years with pneumonia (45 percent decrease, from 30.0 to 16.4 deaths per 1,000 admissions) and for patients aged 65 years and older with AMI and pneumonia (40 percent decrease, from 129.6 to 77.6 deaths per 1,000 admissions for AMI, and 43 percent decrease, from 81.4 to 46.7 deaths per 1,000 admissions, for pneumonia).

  Similar to trends by age, inpatient mortality decreased for both males and females during this time period, but in varying magnitude by condition and sex. The largest mortality declines were for males with pneumonia (47 percent decrease, from 70.6 to 37.7 deaths per 1,000 admissions) and for females with AMI and pneumonia (43 percent decrease each, from 114.6 to 65.3 and from 60.0 to 34.2 deaths per 1,000 admissions, respectively).

- **The inpatient mortality rate decreased for patients in all hospital regions; however, the magnitude of the decreases varied by condition and region.**

  From 2002 to 2012, the inpatient mortality rate for pneumonia decreased among patients in all regions—decreases ranged from 42 percent in the South to 52 percent in the Northeast. For AMI, decreases in mortality rate ranged from 36 percent in the West to 46 percent in the Midwest. For CHF, decreases ranged from 25 percent in the West to 32 percent in the Northeast and Midwest. The smallest decreases were observed for stroke, ranging from 22 percent in the West to 29 percent in the South.

Inpatient mortality also decreased by expected primary payer, community income level, and patients' location of residence. For each characteristic, percentage decreases in inpatient mortality between 2002 and 2012 are presented in Figures 2–4 and inpatient mortality rates for 2002 and 2012 are presented in Tables 2–4.

Figure 2. Percentage decrease in observed inpatient mortality rate per 1,000 hospital admissions for four high-volume conditions by expected primary payer, 2002–2012
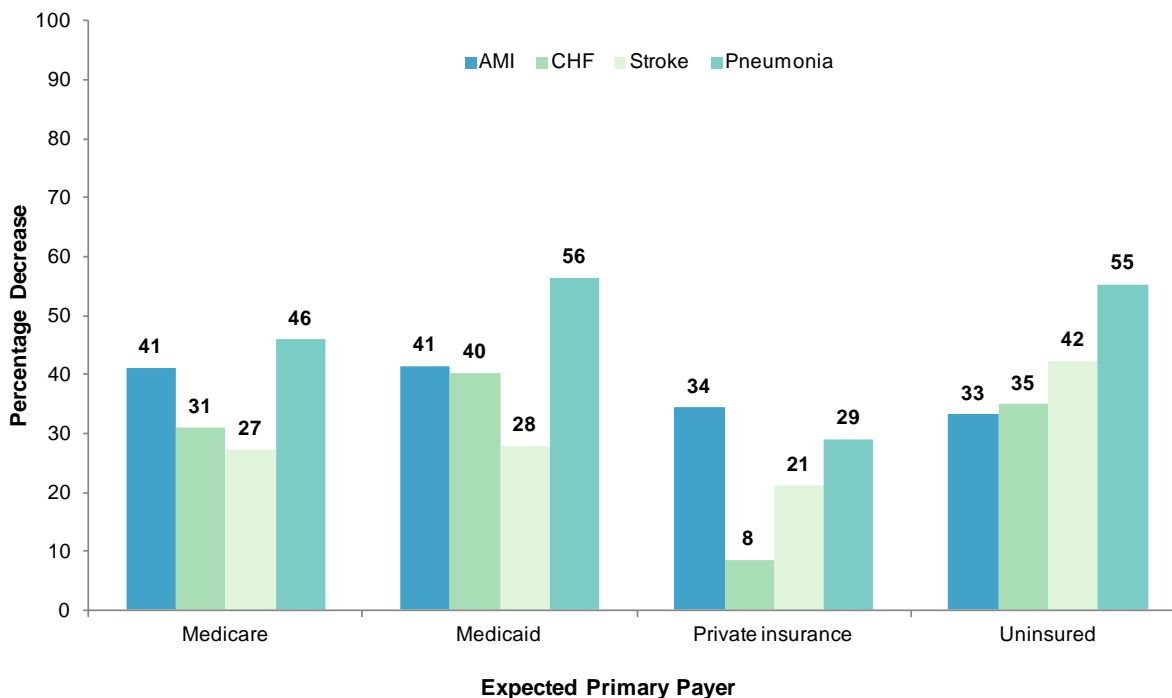
Abbreviations: AMI, acute myocardial infarction; CHF, congestive heart failure

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), Nationwide Inpatient Sample (NIS), 2002, and State Inpatient Databases (SID), 2012, weighted to provide national estimates using the same methodology as the 2002 NIS; and the AHRQ Quality Indicators, version 4.4

■ **Between 2002 and 2012, inpatient mortality decreased for AMI, stroke, and pneumonia across expected primary payers, but CHF mortality did not decrease significantly across all groups.**

The largest decreases in inpatient mortality were for pneumonia among Medicare patients (46 percent), Medicaid patients (56 percent), and uninsured patients (55 percent). Inpatient mortality decreased by 40 percent or more for four other groups: AMI among Medicare and Medicaid patients (41 percent), CHF among Medicaid patients (40 percent), and stroke among uninsured patients (42 percent). Notably, decreases in CHF mortality among privately insured and uninsured patients did not meet the <.01 standard for statistical significance.

Table 2. Observed inpatient mortality rate per 1,000 hospital admissions for four high-volume conditions by expected primary payer, 2002 and 2012

Expected primary payer	Acute myocardial infarction		Congestive heart failure		Stroke		Pneumonia	
	2002	2012	2002	2012	2002	2012	2002	2012
Medicare	126.4	74.4	48.6	33.6	115.6	84.2	77.0	41.7
Medicaid	68.1	39.8	25.1	15.0	109.7	79.1	37.0	16.1
Private insurance	39.3	25.8	33.0	30.2	94.0	74.2	38.1	27.0
Uninsured	52.8	35.3	20.9	13.6	144.4	83.4	27.9	12.5

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), Nationwide Inpatient Sample (NIS), 2002, and State Inpatient Databases (SID), 2012, weighted to provide national estimates using the same methodology as the 2002 NIS; and the AHRQ Quality Indicators, version 4.4

Figure 3. Percentage decrease in observed inpatient mortality rate per 1,000 hospital admissions for selected high-volume conditions by community-level income, 2002–2012
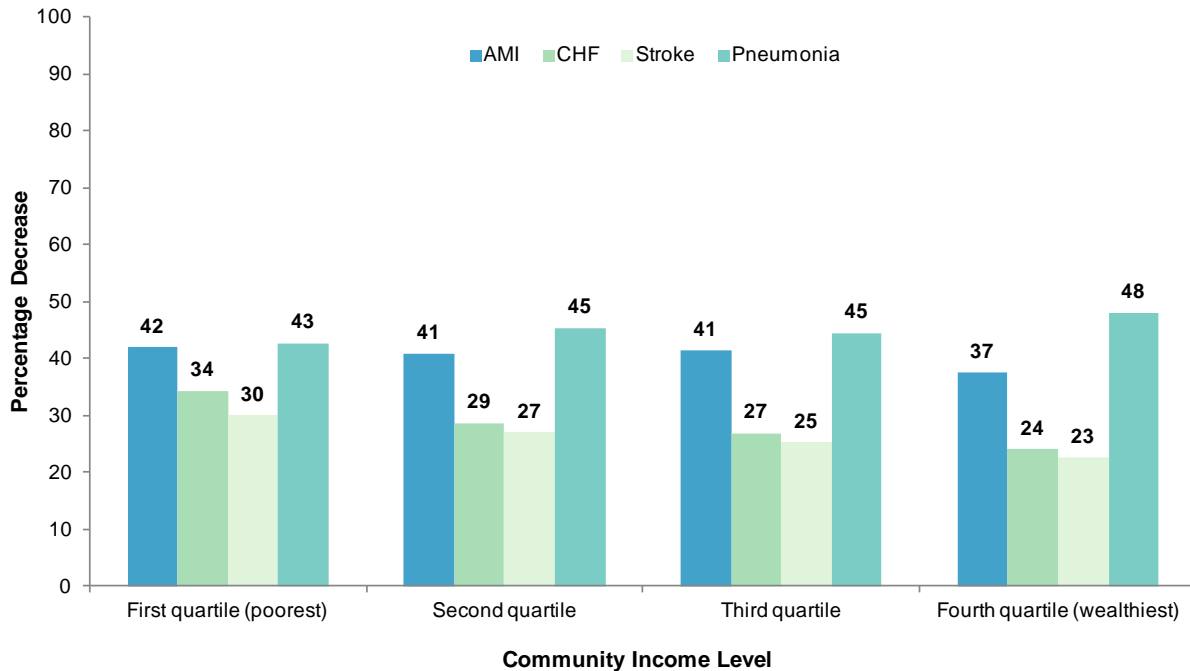
Abbreviations: AMI, acute myocardial infarction; CHF, congestive heart failure

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), Nationwide Inpatient Sample (NIS), 2002, and State Inpatient Databases (SID), 2012, weighted to provide national estimates using the same methodology as the 2002 NIS; and the AHRQ Quality Indicators, version 4.4

■ **Between 2002 and 2012, the inpatient mortality rate decreased for all four conditions among patients across community income levels. Compared with patients in higher-income communities, patients in the poorest communities demonstrated the largest decreases in mortality for AMI, CHF, and stroke.**

Rates of inpatient mortality for pneumonia decreased by nearly half for all community income levels: 43 percent among those in the poorest communities, 45 percent for those in the second and third quartiles, and 48 percent among patients in the wealthiest communities. Decreases in inpatient mortality for AMI represented the second largest decreases—ranging from 37 percent among patients in the wealthiest communities to 42 percent among those in the poorest communities. Decreases in CHF and stroke mortality were largest for patients in the poorest communities (34 and 30 percent, respectively) and smallest for those in the wealthiest communities (24 and 23 percent, respectively).

Table 3. Observed inpatient mortality rate per 1,000 hospital admissions for four high-volume conditions by community income level, 2002 and 2012

Community income level	Acute myocardial infarction		Congestive heart failure		Stroke		Pneumonia	
	2002	**2012**	**2002**	**2012**	**2002**	**2012**	**2002**	**2012**
First quartile (poorest)	99.4	57.7	41.6	27.3	114.3	80.0	61.6	35.3
Second quartile	96.2	56.9	43.7	31.2	111.4	81.3	63.6	34.7
Third quartile	91.6	53.7	46.5	34.0	112.7	84.3	65.7	36.4
Fourth quartile (wealthiest)	86.5	54.0	48.3	36.7	111.3	86.2	73.0	37.9

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), Nationwide Inpatient Sample (NIS), 2002, and State Inpatient Databases (SID), 2012, weighted to provide national estimates using the same methodology as the 2002 NIS; and the AHRQ Quality Indicators, version 4.4

Figure 4. Percentage decrease in observed inpatient mortality rate per 1,000 hospital admissions for four high-volume conditions by location of patient residence, 2002–2012
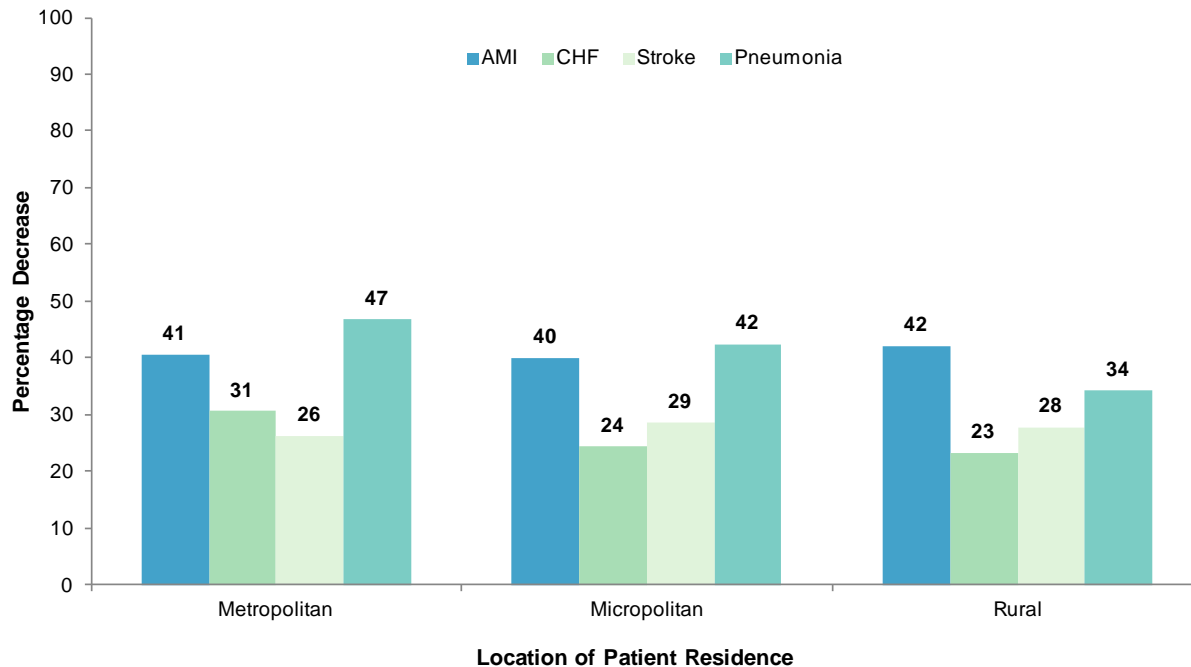
Abbreviations: AMI, acute myocardial infarction; CHF, congestive heart failure

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), Nationwide Inpatient Sample (NIS), 2002, and State Inpatient Databases (SID), 2012, weighted to provide national estimates using the same methodology as the 2002 NIS; and the AHRQ Quality Indicators, version 4.4

■ **Between 2002 and 2012, the inpatient mortality rate decreased for all four conditions across locations of patient residence.**

The largest decrease in inpatient mortality across locations of patient residence was for patients with pneumonia in metropolitan areas (47 percent). There were also decreases in inpatient mortality of 40 percent or more for patients with AMI in metropolitan (41 percent), micropolitan (40 percent), and rural (42 percent) areas as well as patients with pneumonia in micropolitan areas (42 percent).

Table 4. Observed inpatient mortality rate per 1,000 hospital admissions for four high-volume conditions by location of patient residence, 2002 and 2012

Location of patient residence	Acute myocardial infarction		Congestive heart failure		Stroke		Pneumonia	
	2002	2012	2002	2012	2002	2012	2002	2012
Metropolitan	93.2	55.4	44.3	30.8	110.9	81.8	66.5	35.4
Micropolitan	96.2	57.7	44.3	33.5	118.2	84.4	63.7	36.7
Rural	98.6	57.1	45.4	34.8	122.7	88.6	56.6	37.2

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), Nationwide Inpatient Sample (NIS), 2002, and State Inpatient Databases (SID), 2012, weighted to provide national estimates using the same methodology as the 2002 NIS; and the AHRQ Quality Indicators, version 4.4

Data Source

The estimates in this Statistical Brief are based upon data from the Healthcare Cost and Utilization Project (HCUP) 2002–2011 Nationwide Inpatient Sample (NIS). For data year 2012, we used an analysis file derived from the HCUP State Inpatient Databases (SID) that was designed to provide national estimates using weighted records from a sample of hospitals from 44 States using the same methodology employed for the 2002–2011 NIS. We did not use the 2012 NIS because the sampling design and universe definition was revised. At the time of this analysis, NIS trend weights for making national estimates compatible between 2002–2011 and 2012 were unavailable.

Numerous hypothesis tests were conducted for this Statistical Brief. Thus, to decrease the number of false-positive results, we reduced the significance to .01 for individual tests.

Definitions

Case definition
The study population of adults aged 18 years and older who were hospitalized for AMI, CHF, stroke, and pneumonia was defined using the AHRQ Inpatient Quality Indicator definitions for these conditions (http://www.qualityindicators.ahrq.gov/Modules/iqi_resources.aspx). Mortality rates for these conditions reflect deaths that occurred while a patient was in a hospital and do not reflect any postdischarge deaths.

Types of hospitals included in the HCUP Nationwide (National) Inpatient Sample
The National (Nationwide) Inpatient Sample (NIS) is based on data from community hospitals, which are defined as short-term, non-Federal, general, and other hospitals, excluding hospital units of other institutions (e.g., prisons). The NIS includes obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and academic medical hospitals. Excluded are long-term care facilities such as rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals. Beginning in 2012, long-term acute care hospitals are also excluded. 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.

Types of hospitals included in HCUP State Inpatient Databases
This analysis used State Inpatient Databases (SID) limited to data from community hospitals, which are defined as short-term, non-Federal, general, and other hospitals, excluding hospital units of other institutions (e.g., prisons). Community hospitals include obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and academic medical hospitals. Excluded for this analysis are long-term care facilities such as 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 was included in the analysis.

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 1 year will be counted each time as a separate discharge from the hospital.

Average annual percentage change
Average annual percentage change was calculated using the following formula:

$$\text{Average annual percentage change} = \left[\left(\frac{\text{End value}}{\text{Beginning value}} \right)^{\frac{1}{\text{change in years}}} -1 \right] \times 100$$

Location of patients' residences
Place of residence is based on the urban-rural classification scheme for U.S. counties developed by the National Center for Health Statistics (NCHS):

- Metropolitan: Central counties of metropolitan areas with 1 million or more residents; fringe counties of metropolitan areas with 1 million or more residents; counties in metropolitan areas of 250,000–999,999 residents; and counties in metropolitan areas of 50,000–249,999 residents
- Micropolitan: Nonmetropolitan counties areas of 10,000 or more residents
- Rural: Nonmetropolitan and nonmicropolitan counties.

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 the Nielsen Company. The income quartile is missing for patients who are homeless or foreign.

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 general groups:
- Medicare: includes patients covered by fee-for-service and managed care Medicare
- Medicaid: includes patients covered by fee-for-service and managed care Medicaid
- Private Insurance: includes Blue Cross, commercial carriers, and private health maintenance organizations (HMOs) and preferred provider organizations (PPOs)
- 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

About HCUP

The Healthcare Cost and Utilization Project (HCUP, pronounced "H-Cup") is a family of health care 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 health care 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 health care programs, and outcomes of treatments at the national, State, and local market levels.

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

District of Columbia 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
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 Office of Health Analytics
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 Health Care Authority
Wisconsin Department of Health Services
Wyoming Hospital Association

About Statistical Briefs

HCUP Statistical Briefs are descriptive summary reports presenting statistics on hospital inpatient and emergency department use and costs, quality of care, access to care, medical conditions, procedures, patient populations, and other topics. The reports use HCUP administrative health care data.

About the NIS

The HCUP National (Nationwide) Inpatient Sample (NIS) is a national (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 includes all payers. 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 the national and regional levels for specific subgroups of patients.

In addition, NIS data are standardized across years to facilitate ease of use. Over time, the sampling frame for the NIS has changed; thus, the number of States contributing to the NIS varies from year to year. The NIS is intended for national estimates only; no State-level estimates can be produced.

The 2012 NIS was redesigned to optimize national estimates. The redesign incorporates two critical changes:

- Revisions to the sample design—starting with 2012, the NIS is a *sample of discharge records from all HCUP-participating hospitals*, rather than a sample of hospitals from which all discharges were retained (as is the case for NIS years before 2012).
- Revisions to how hospitals are defined—the NIS now uses the *definition of hospitals and discharges supplied by the statewide data organizations* that contribute to HCUP, rather than the definitions used by the American Hospital Association (AHA) Annual Survey of Hospitals.

The new sampling strategy is expected to result in more precise estimates than those that resulted from the previous NIS design by reducing sampling error: for many estimates, confidence intervals under the new design are about half the length of confidence intervals under the previous design. The change in sample design for 2012 necessitates recomputation of prior years' NIS data to enable analyses of trends that use the same definitions of discharges and hospitals.

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 http://hcupnet.ahrq.gov/.

For information on other hospitalizations in the United States, refer to the following HCUP Statistical Briefs located at http://www.hcup-us.ahrq.gov/reports/statbriefs/statbriefs.jsp:

- Statistical Brief #180, Overview of Hospital Stays in the United States, 2012
- Statistical Brief #181, Costs for Hospital Stays in the United States, 2012
- Statistical Brief #186, Most Frequent Operating Room Procedures Performed in U.S. Hospitals, 2003–2012
- Statistical Brief #162, Most Frequent Conditions in U.S. Hospitals, 2011

For a detailed description of HCUP and more information on the design of the National (Nationwide) Inpatient Sample (NIS) and State Inpatient Databases (SID), please refer to the following database documentation:

Agency for Healthcare Research and Quality. Overview of the National (Nationwide) Inpatient Sample (NIS). Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated November 2014. http://www.hcup-us.ahrq.gov/nisoverview.jsp. Accessed April 8, 2015.

Agency for Healthcare Research and Quality. Overview of the State Inpatient Databases (SID). Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated November 2014. http://www.hcup-us.ahrq.gov/sidoverview.jsp. Accessed January 7, 2015.

Suggested Citation

Hines AL (Truven Health Analytics), Heslin KC (AHRQ), Jiang HJ (AHRQ), Coffey R (Truven Health Analytics). Trends in Observed Adult Inpatient Mortality for High-Volume Conditions, 2002–2012. HCUP Statistical Brief #194. July 2015. Agency for Healthcare Research and Quality, Rockville, MD. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb194-Inpatient-Mortality-High-Volume-Conditions.pdf.

* * *

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:

Virginia Mackay-Smith, Acting Director
Center for Delivery, Organization, and Markets
Agency for Healthcare Research and Quality
540 Gaither Road
Rockville, MD 20850