

STATISTICAL BRIEF #124

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***Clostridium difficile* Infections (CDI) in Hospital Stays, 2009**

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Introduction

Clostridium difficile is an anaerobic, spore-forming bacterium that is a common cause of healthcare-associated infectious colitis.¹ Symptoms of infection range from mild diarrhea to the sometimes-fatal pseudomembranous colitis and toxic megacolon.² *C. difficile* infections (CDI) often occur as a complication of antibiotic therapy; ampicillin, clindamycin, third-generation cephalosporins (such as cefotaxime and ceftazidime), and fluoroquinolones are commonly-identified high-risk drugs.³ The elderly are at highest risk of developing CDI.⁴ CDI is often associated with hospitalized patients⁵ who are frequently exposed to antibiotics, making them more susceptible to the disease. A previous report in this series described a doubling of CDI hospitalizations between 2001 and 2005, significant variation by region of the country, and high severity of illness among CDI patients.⁶

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) on CDI during U.S. hospital stays in 2009, updating information from 1993–2005. Characteristics of hospital stays with CDI are shown, along with rates of conditions associated with CDI hospital stays and population-based rates of CDI hospital stays. All differences between estimates noted in the text are statistically significant

¹ Bartlett, J. G. "Antibiotic-associated Diarrhea." *New England Journal of Medicine*. 2002; 346(5): 334–349.

² Cohen, S. H., Gerding, D. N., Johnson, S., Kelly, C.P., et al. "Clinical Practice Guidelines for *Clostridium difficile* Infection in Adults: 2010 Update by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA)." *Infection Control and Hospital Epidemiology*. 2010; 31(5): 431–455.

³ Blondeau, J. M. "What Have We Learned about Antimicrobial Use and The Risks for *Clostridium difficile*-Associated Diarrhoea?" *Journal of Antimicrobial Chemotherapy*. 2009; 63(2): 230–237.

⁴ McDonald, L. C., Owings, M., Jernigan, D. B. "*Clostridium difficile* Infection in Patients Discharged from U.S. Short-Stay Hospitals, 1996–2003." *Emerging Infectious Diseases*. 2006; 12(3): 409–415.

⁵ Gouliouris, T., Brown, N. M., Aliyu, S. H. "Prevention and Treatment of *Clostridium difficile* Infection." *Clinical Medicine*. 2011; 11(1): 75–79.

⁶ Elixhauser, A., Jhung, M. A. *Clostridium Difficile-Associated Disease in U.S. Hospitals, 1993–2005*. HCUP Statistical Brief #50. April 2008. Agency for Healthcare Research and Quality, Rockville MD. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb50.pdf>.

Highlights

- In 2009, there were 336,600 hospitalizations that involved CDI—nearly 1 percent of all hospital stays. After steady increases during the past decade, the number of CDI hospital stays leveled off between 2008 and 2009.
- Compared with all other hospital stays, patients hospitalized with CDI (as a principal or secondary diagnosis) were nearly 20 years older (67.9 years vs. 48.1 years) and their stays were more likely to be billed to Medicare (67.9 percent vs. 37.1 percent).
- Rates of hospital stays with CDI (as a principal or secondary diagnosis) differed by region, age group, and gender. Rates in the Northeast were highest (138 per 100,000 population) while rates in the West were lowest (89 per 100,000).
- The rate of hospital stays for CDI (principal or secondary) for females (124 per 100,000) was higher than for males (95 per 100,000). Patients 85 years and older had the highest rate (1,089 per 100,000 population), compared with only 11 per 100,000 for patients younger than 18 years.
- Patients with CDI as a secondary diagnosis were more severely ill than those with a principal diagnosis of CDI (68.3 percent had a major or extreme likelihood of dying compared to 40.5 percent of patients with CDI as the principal diagnosis). About 3 times more patients with a secondary diagnosis of CDI died (11.7 percent) compared to those with a principal diagnosis of CDI (3.7 percent).
- Dehydration and electrolyte disorders were the most common conditions associated with CDI stays, observed in 81.2 percent of stays. Other commonly-associated and severe conditions included septicemia (26.7 percent), renal failure (23.6 percent), septic shock (8.0 percent), and prolonged ileus (4.7 percent). Perforation of intestine was seen in an estimated 1,255 CDI stays, and toxic megacolon was seen in an estimated 184 stays.

at the 0.05 level or lower. Unless specified, CDI hospital stays include those hospitalizations with a principal or secondary diagnosis of CDI. CDI hospital stays reported here include any diagnosis coded as CDI regardless of when the condition originated.

Findings

In 2009, there were 336,600 CDI-related hospital stays in the U.S., or 0.9 percent of all hospital stays. Of these, nearly one-third, or 110,600, had CDI as a principal diagnosis (that is, the main reason for the hospital stay), and 226,000 stays involved CDI as a secondary diagnosis.

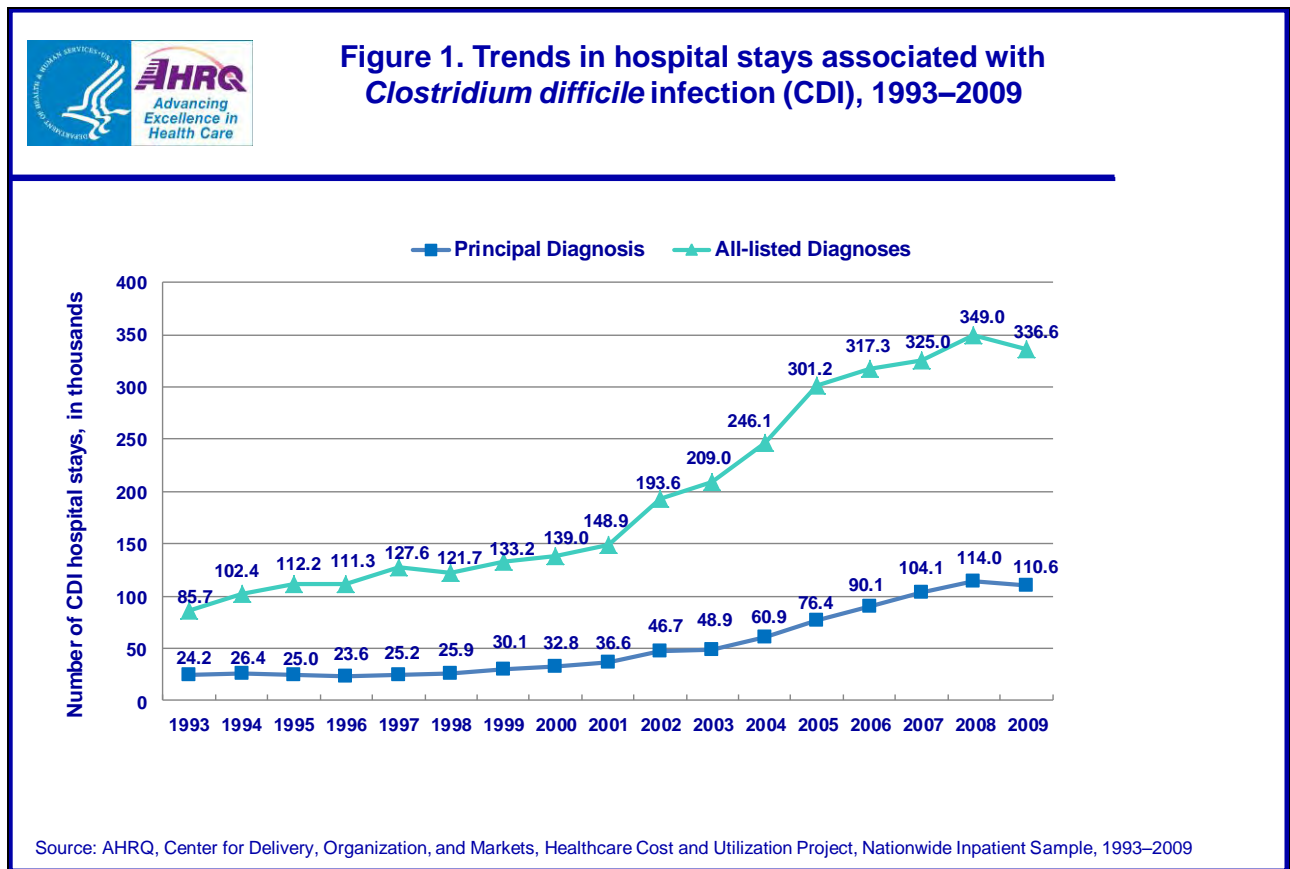
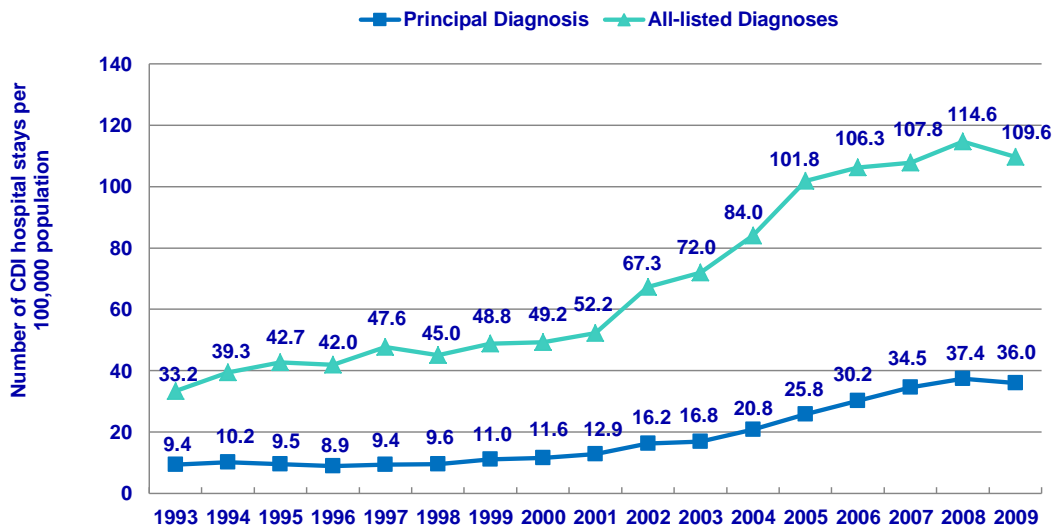


Figure 1 provides the number of CDI stays from 1993 to 2009, while figure 2 provides the trend in the rate of CDI stays over this time period. Hospital stays with CDI increased four-fold over this 16-year time period, while the rate of stays increased three-fold. After steady increases, especially in the past decade, the number of hospital stays leveled off between 2008 and 2009 (the apparent decline is not statistically significant).



Figure 2. Trends in hospital stays associated with *Clostridium difficile* infection (CDI), per 100,000 population, 1993–2009



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

Characteristics of CDI hospital stays

Patients hospitalized with CDI as a principal or secondary diagnosis averaged 67.9 years old, and 57.3 percent of stays were for females (table 1). A comparison of principal versus secondary diagnosis CDI stays shows that patients with CDI as a principal diagnosis were more likely to be female (64.0 percent vs. 54.0 percent).

Most CDI hospital stays (67.9 percent) were covered by Medicare, 18.8 percent of stays were privately insured, 9.1 percent were covered by Medicaid, and 2.3 percent were uninsured. The average cost for a CDI stay was \$24,400. The aggregate cost for all CDI stays was \$8.2 billion, or 2.3 percent of all hospital costs in the U.S. Hospital stays during which CDI was the secondary diagnosis were more than twice as long as for those with CDI as a principal diagnosis (16.0 days versus 6.9 days) and costs were more than three times higher (\$31,500 versus \$10,100).

Severity of illness

Patients with CDI hospital stays were more severely ill than hospitalized patients in general. Approximately 9.1 percent of CDI stays ended in death, compared with less than 2 percent for all other inpatients. CDI patients had higher severity of illness scores, were at higher risk of major or extreme loss of function, and were at higher risk of mortality (table 1). Patients with a secondary diagnosis of CDI were more severely ill than those with a principal diagnosis of CDI—a larger percentage died (11.7 percent versus 3.7 percent), risk of major or extreme loss of function was higher (93.0 percent vs. 61.2 percent) and the risk of mortality score was higher (68.3 percent vs. 40.5 percent).

Table 1. Characteristics of hospital stays with *Clostridium difficile* infections (CDI) in U.S. hospitals, 2009

	CDI stays			All other stays
	All-listed diagnoses	Principal diagnosis	Secondary diagnosis	
Number of stays	336,600	110,600	226,000	39,098,400
	0.9% of all stays	32.8% of all CDI stays	67.2% of all CDI stays	
Mean age, years	67.9	68.7	67.5	48.1
Female patients, percentage	57.3%	64.0%	54.0%	58.2%
Expected payer, percentage				
Medicare	67.9%	69.1%	67.4%	37.1%
Medicaid	9.1%	7.0%	10.1%	20.5%
Privately insured	18.8%	19.8%	18.3%	33.1%
Uninsured	2.3%	2.4%	2.3%	6.1%
Severity of illness				
Percentage died	9.1%	3.7%	11.7%	1.9%
APR-DRG severity of illness, mean score	3.2	2.7	3.5	2.0
Percentage with APR-DRG severity of illness score: major or extreme loss of function	82.5%	61.2%	93.0%	27.2%
APR-DRG risk of mortality, mean score	2.7	2.3	2.9	1.6
Percentage with APR-DRG risk of mortality score: major or extreme likelihood of dying	59.2%	40.5%	68.3%	16.8%
Resource use				
Mean length of stay (LOS), days	13.0	6.9	16.0	4.5
Mean cost, dollars	\$24,400	\$10,100	\$31,500	\$9,000
Aggregate costs, dollars	\$8,238,458,700	\$1,119,151,500	\$7,119,307,200	\$353,238,872,800

Note: Payer percentages do not add to 100 because the "other" category is not shown.

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

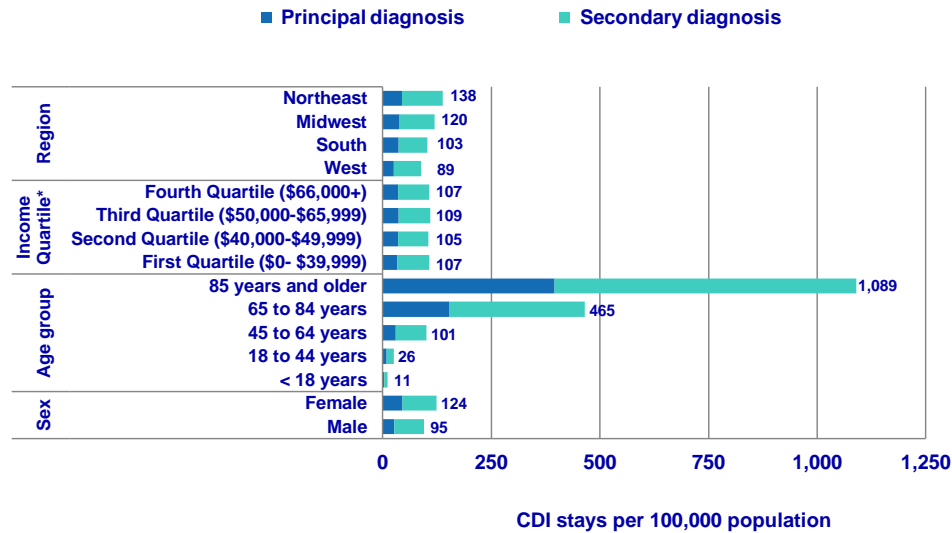
Rates of CDI stays

Figure 3 presents CDI hospitalization rates per 100,000 population while figure 4 provides information on the rate of CDI hospitalizations per 10,000 hospital discharges by region, income quartile, age, and sex.

Rates of CDI stays differed by region, age group, and sex (figure 3). The Northeast had 138 CDI stays per 100,000 population in 2009, the highest rate of the 4 regions. This rate was significantly higher than the rates observed in the South and West, which had 103 and 89 stays per 100,000, respectively. The Midwest had a rate of 120 per 100,000, which was not significantly different from the rates observed in the Northeast or South, but was greater than the rate observed in the West. Compared with 2005, the rate in the West increased, but rates in the other regions were not significantly different.



Figure 3. Rate of principal and secondary diagnosis *Clostridium difficile* infection (CDI) stays per 100,000 population, by region, income quartile, age group, and sex, 2009



Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2009
 *Income quartile is based on the median income of the patient's ZIP Code. Differences between income quartile group rates are not statistically significant.

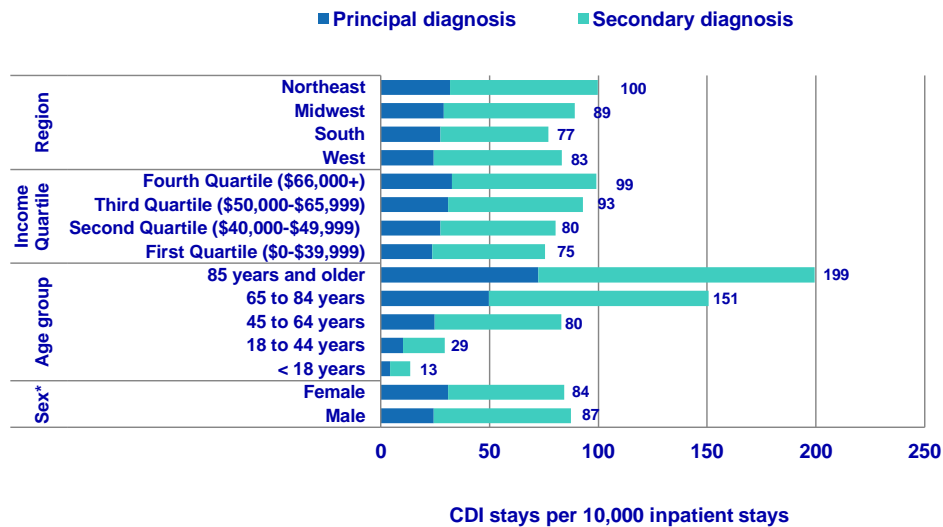
There were dramatic differences in CDI hospitalization rates by age. Those 85 years and older had the highest rate of CDI stays—1,089 per 100,000 population. This rate was significantly higher than the rates observed in all other age groups. Starting with the group under 18 years old, which had a rate of 11 per 100,000, each successive age group had a significantly higher rate of CDI stays than the next younger group.

The rate of CDI stays was different between males and females as well. Females had 124 CDI stays per 100,000, while males had only 95 CDI stays per 100,000. Rates by median income quartile were also examined, but there were no significant differences.

Comparable, though smaller differences were found when examining the number of CDI cases per 10,000 discharges, with some exceptions (figure 4). The Northeast, with 100 CDI stays per 10,000 stays, had a higher rate than the South, at 77 CDI stays per 10,000 stays, but no other regions showed significant differences. Unlike the population-based rates, there were significant differences by income quartile (the median household income of the patient's ZIP Code of origin). A lower rate of CDI was observed in hospital stays of patients residing in the lowest income areas; the first and second income quartiles had significantly lower rates than the two upper quartiles. Differences by age were similar to those seen when examining population-based rates, though less pronounced, but there were no differences by sex.



Figure 4. Rate of principal and secondary diagnosis *Clostridium difficile* infection (CDI) stays per 10,000 hospital stays, by region, income quartile, age group, and sex, 2009



Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2009
 Note: Income quartile is based on the median income of the patient's ZIP Code
 * Difference in rate between male and female groups is not statistically significant

Rates of conditions associated with CDI

CDI can be associated with life-threatening conditions, such as dehydration and electrolyte disorders, septicemia, septic shock, renal failure, hypoalbuminemia, prolonged ileus, peritonitis, ascites, perforation of the intestine, and toxic megacolon.^{2,7} These conditions were identified in the administrative data using diagnosis codes and were examined here as potential complications associated with CDI.

As with other diarrheal diseases, one of the most common conditions associated with CDI was dehydration and electrolyte disorders (table 2). During CDI stays in 2009, 92.3 percent of principal CDI stays included a secondary diagnosis of dehydration and electrolyte disorders, and 75.8 percent of secondary CDI stays had the same diagnosis.

Septicemia was the second most common condition associated with CDI, with 26.7 percent of stays affected. Septicemia was more common among secondary diagnosis CDI stays (36.7 percent) than among principal diagnosis CDI stays (6.2 percent). After septicemia, renal failure was the most frequent condition associated with CDI stays (23.6 percent) with the proportion slightly greater among secondary diagnosis stays than among principal diagnosis stays.

The fourth most common associated condition, observed in 8.0 percent of CDI stays, was septic shock. Septic shock was 8 times more common in secondary diagnosis CDI stays than in principal diagnosis CDI stays (11.3 percent vs. 1.4 percent).

⁷ Dallal, R. M., Harbrecht, B. G., Boujoukas, A. J., et al. "Fulminant *Clostridium difficile*: An Underappreciated and Increasing Cause of Death and Complications." *Annals of Surgery*. 2002;235 (3):363–372.

Toxic megacolon was only observed in 0.1 percent of all CDI stays (184 cases) and affected equal proportions of the principal and secondary diagnosis CDI stays. Perforation of the intestine was seen in 1,255 CDI stays. All other conditions associated with CDI were each observed in less than 5 percent of all CDI stays.

Table 2. Rates of conditions associated with *Clostridium difficile* infection (CDI) among CDI stays, 2009

Diagnoses*	Principal CDI		Secondary CDI		All CDI	
	N	Percentage of stays affected	N	Percentage of stays affected	N	Percentage of stays affected
Dehydration and electrolyte disorders	102,005	92.3%	171,315	75.8%	273,320	81.2%
Septicemia	6,876	6.2%	83,048	36.7%	89,924	26.7%
Renal failure	19,814	17.9%	59,747	26.4%	79,562	23.6%
Septic shock	1,501	1.4%	25,470	11.3%	26,971	8.0%
Prolonged ileus	3,474	3.1%	12,505	5.5%	15,979	4.7%
Ascites	3,057	2.8%	9,573	4.2%	12,629	3.8%
Hypoalbuminemia	2,754	2.5%	5,511	2.4%	8,265	2.5%
Peritonitis	545	0.5%	5,045	2.2%	5,590	1.7%
Perforation of intestine	118	0.1%	1,137	0.5%	1,255	0.4%
Toxic megacolon	56	0.1%	128	0.1%	184	0.1%

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

*For stays with CDI as the principal diagnosis, the diagnoses listed here are secondary diagnoses. For stays with CDI as a secondary diagnosis, the diagnoses listed here may be the principal diagnosis or other secondary diagnoses.

As shown in table 3, stays with CDI as a secondary diagnosis tended to have relatively complex principal diagnoses such as septicemia, pneumonia, respiratory failure, congestive heart failure, and renal failure. These top 10 conditions comprised nearly 75 percent of all principal diagnoses for hospital stays during which CDI was a secondary diagnosis.

Table 3. Principal diagnosis associated with *Clostridium difficile* infection (CDI) listed as a secondary diagnosis, 2009

	N	Percentage of stays affected
Septicemia	45,500	27.9%
Pneumonia	12,300	7.5%
Respiratory failure	10,700	6.5%
Rehabilitation care	8,900	5.5%
Complication of device, implant or graft	8,700	5.4%
Congestive heart failure	8,000	4.9%
Acute and unspecified renal failure	8,000	4.9%
Complications of surgical procedures or medical care	6,800	4.2%
Aspiration pneumonitis	6,000	3.7%
Urinary tract infection	5,700	3.5%

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 HCUP 2009 Nationwide Inpatient Sample (NIS). Historical data were drawn from the 1993–2007 NIS. Supplemental sources included data on regional population estimates from “Table 1: Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2000 to July 1, 2009 (NST-EST2009-01)”, Population Division, U.S. Census Bureau, Release date: December 2009 (<http://www.census.gov/popest/states/NST-ann-est.html>); data on population estimates by gender and age from “Table 2: Annual Estimates of the Resident Population by Sex and Selected Age Groups for the United States: April 1, 2000 to July 1, 2009 (NC-EST2009-02)”, Population Division, U.S. Census Bureau, Release Date: June 2010 (<http://www.census.gov/popest/national/asrh/NC-EST2009-sa.html>); and data on median household income from Claritas Population Estimates, 2001 to 2009.

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.⁸ This “clinical grouper” makes it easier to quickly understand patterns of diagnoses and procedures.

Case definition

The ICD-9-CM code defining CDI is 008.45, intestinal infections due to *Clostridium difficile*.

For this report, potential CDI complications were defined as follows:

Complication	ICD-9-CM codes
Dehydration and electrolyte disorders	276.0–276.9
Septicemia	003.1, 020.2, 022.3, 036.2, 038.0, 038.0-038.9, 054.5, 449, 771.81, 790.7
Renal failure	584.8, 584.9, 586
Septic shock	785.52
Prolonged ileus	560.1
Ascites	789.59
Hypoalbuminemia	273.8
Peritonitis	567.0, 567.21–567.29, 567.9
Perforation of intestine	569.83
Toxic megacolon	558.2

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 OB-GYN, ENT, orthopedic, cancer, pediatric, public, and academic medical hospitals. Excluded are long-term care, rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals. Please note, a discharge of this nature will be included in the NIS if it occurred in a community hospital.

⁸ HCUP CCS. Healthcare Cost and Utilization Project (HCUP). December 2009. U.S. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp

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. Of specific note for CDI, multiple hospitalizations can result from single episodes of CDI. On the other hand, hospitalization data can miss CDI cases that are health care associated but are treated outside acute care hospitals.

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).⁹ Costs will tend to reflect the actual costs of production, while charges represent what the hospital billed for the case. For each hospital, a hospital-wide cost-to-charge ratio is used because detailed charges are not available across all HCUP States. Hospital charges reflect the amount the hospital charged for the entire hospital stay and does 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

Patient severity of illness

Cases with the highest severity of illness are discharges with a score of 3 or 4 on the APR-DRG severity of illness scale. The four severity of illness subclasses are numbered sequentially from 1 to 4 indicating

⁹ 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

minor, moderate, major, or extreme severity of illness. The determination of severity of illness is disease-specific. Thus, the significance attributed to complicating or comorbid conditions is dependent on the underlying problem. For example, certain types of infections are considered a more significant problem in a patient who is immunosuppressed than in a patient with a fractured arm. In APR-DRGs, high severity of illness is primarily determined by the interaction of multiple diseases. Patients with multiple comorbid conditions involving multiple organ systems represent difficult-to-treat patients who tend to have poor outcomes. The assignment of a patient to a severity of illness subclass takes into consideration not only the level of the secondary diagnoses but also the interaction among secondary diagnoses, age, principal diagnosis, and the presence of certain OR procedures and non-OR procedures.

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 & Nursing Home Association (ASHNA)
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
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 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.

For additional HCUP statistics, visit HCUPnet, our interactive query system, at 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

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>

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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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