

STATISTICAL BRIEF #137

July 2012

Obesity-Related Hospitalizations, 2004 versus 2009

Audrey J. Weiss, Ph.D. and Anne Elixhauser, Ph.D.

Introduction

Obesity is a significant public health problem, with more than one-third of adults in the United States being classified as obese (Body Mass Index [BMI] of 30 or greater)¹ and another one-third classified as overweight (BMI of 25–29.9).² Although the prevalence of obesity doubled for adults between 1980 and 2008,³ recent evidence suggests that the rate of increase has been slowing.⁴ From 2007–2008 to 2009–2010 there was no change in the prevalence of obesity in the United States. The prevalence of obesity in women has not changed significantly from 1999–2000 (33.4 percent) to 2009–2010 (35.8 percent), but the prevalence in men increased from 1999–2000 (27.5 percent) to 2009–2010 (35.5 percent).⁴ Men and women now have nearly identical rates of obesity.

Obesity is expensive, with medical care costs related to obesity estimated at nearly \$150 billion in 2008. Obese individuals have annual medical care costs that are almost \$1,500 higher than costs for those with normal weight.³ In addition, obesity is associated with an increased risk of serious medical conditions such as heart disease, type 2 diabetes, cancer, and stroke.³

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) on obesity-related hospitalizations in 2009, updating previously published information from 2004.⁵ Characteristics of patients, usage and costs of hospital stays, associated diagnoses, and procedures performed are examined for patients admitted primarily for obesity and for those with a secondary diagnosis—or comorbidity—of obesity. All differences between estimates noted in the text are statistically significant at the .001 level.

¹ <http://www.cdc.gov/obesity/data/adult.html>. (Accessed June 15, 2012).

² http://www.cdc.gov/nchs/data/hestat/overweight/overweight_adult_03.htm. (Accessed June 15, 2012).

³ <http://www.cdc.gov/chronicdisease/resources/publications/aag/obesity.htm>. (Accessed June 15, 2012).

⁴ Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity in the United States, 2009–2010. NCHS data brief, no 82. Hyattsville, MD: National Center for Health Statistics. 2012.

⁵ Elixhauser A, Steiner C. *Obese Patients in U.S. Hospitals, 2004*. HCUP Statistical Brief #20. December 2006. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb20.pdf>. (Accessed June 15, 2012).

Highlights

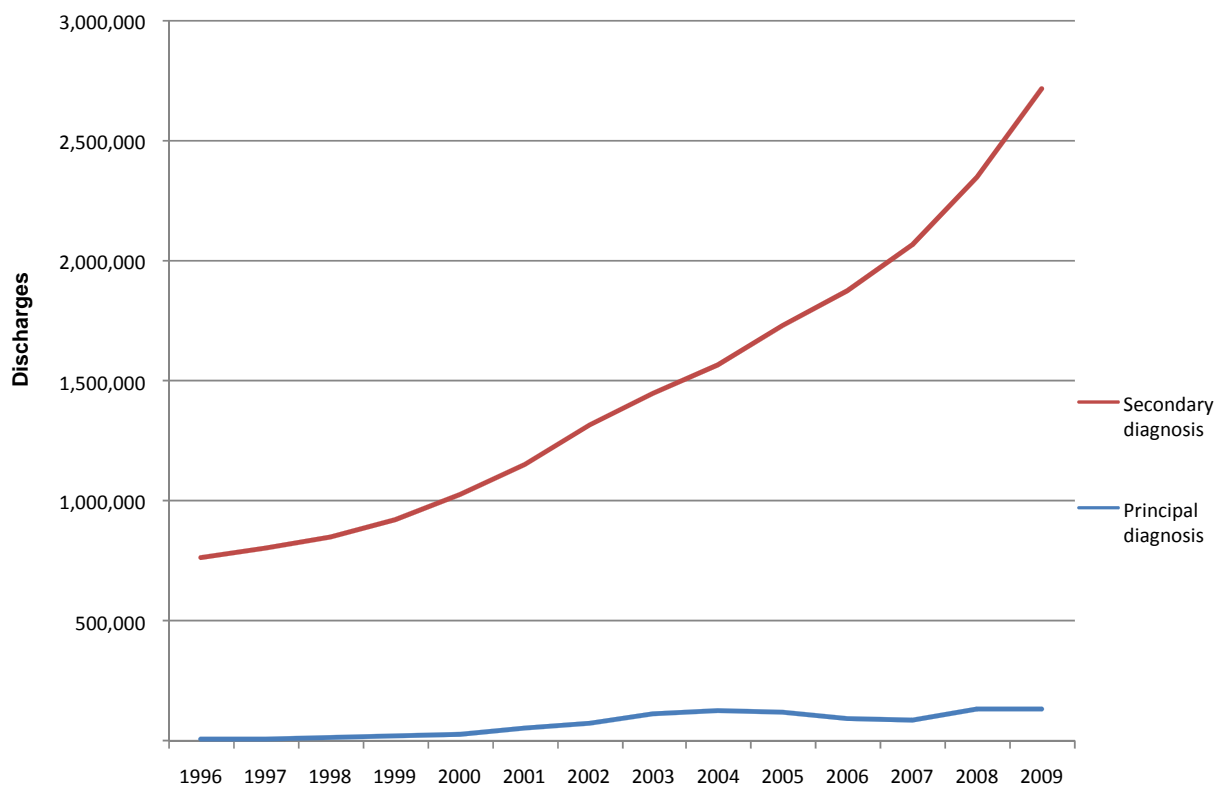
- In 2009, there were 2.8 million hospital stays in which obesity was a principal or secondary diagnosis, accounting for more than 9 percent of hospital stays. This represents an increase from about 3 percent of hospital stays in 1996 and 6 percent of stays in 2004.
- The vast majority of obesity-related hospitalizations in 2009 involved obesity as a secondary diagnosis (95 percent).
- Hospital stays with obesity as a principal diagnosis remained relatively stable at about 0.4 percent of stays between 2004 and 2009. The rate of hospitalization in 2009 was highest among females and patients ages 18–44 and 45–64.
- Hospital stays with obesity as a secondary diagnosis increased from 5.3 percent of stays in 2004 to 8.9 percent of stays in 2009. The rate of hospitalization in 2009 increased with age and was highest among females and patients in the Midwest.
- For hospital stays with obesity as a principal diagnosis, the most common procedure performed in 2009 was bariatric surgery (89.3 percent of stays), virtually unchanged from 2004.
- For hospital stays with obesity as a secondary diagnosis, the most common principal diagnosis in 2009 was osteoarthritis, accounting for 5.6 percent of stays. This represents an increase from 4.4 percent of stays in 2004.

Findings

Overall trends in hospital stays related to obesity

In 2009, there were approximately 2.8 million hospital stays for which obesity was either a principal or secondary diagnosis (excluding infants and maternal stays). The share of obesity-related hospitalizations increased from 3 percent of all stays in 1996 (data not shown) to more than 9 percent of all stays in 2009. As shown in figure 1, the vast majority of obesity-related hospitalizations involved obesity as a secondary diagnosis, increasing from 766,600 stays in 1996 to 2,716,200 stays in 2009 (a 3.5-fold increase). Hospitalizations with obesity as a principal diagnosis were much less common but also increased from 10,100 stays in 1996 to 132,900 stays in 2009 (a 13-fold increase). These increases are considerably higher than the increase in prevalence of obesity in the United States (48 percent increase from 1994 to 2008).⁶

Figure 1. Hospital stays with obesity as a principal or secondary diagnosis, 1996–2009



Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1996–2009

Differences in hospital stays related to obesity

Table 1 compares hospital stays with a principal diagnosis of obesity to stays with obesity as a secondary diagnosis and stays with no mention of obesity, excluding infant and maternal stays.

In 2009, there were 132,900 hospital stays (0.4 percent of all stays) with obesity as a principal diagnosis. Nearly all of these stays (99.6 percent) had a diagnosis of morbid obesity, which is defined as at least twice a person's ideal weight, 100 pounds overweight, or a body mass index that is greater than 39. The number of stays with a principal diagnosis of obesity remained relatively stable between 2004 and 2009.

There were 2.7 million hospital stays with obesity as a secondary diagnosis in 2009. Just over one-third of these stays (38.9 percent) had a diagnosis of morbid obesity. The number of hospital stays with obesity

⁶ http://www.cdc.gov/nchs/data/hestat/obesity_adult_07_08/obesity_adult_07_08.htm. (Accessed June 15, 2012).

as a secondary diagnosis increased from 1.6 million (5.3 percent of all stays) in 2004 to 2.7 million (8.9 percent of all stays) in 2009.

Table 1. Hospital stays¹ related to obesity compared to stays with no mention of obesity, 2004 versus 2009

	Obesity appears on the discharge record				No mention of obesity	
	As a principal diagnosis		As a secondary diagnosis		2004	2009
	2004	2009	2004	2009		
Number of discharges (stays)	126,200	132,900	1,567,200	2,716,200	27,756,400	27,632,300
Percentage of all stays	0.4%	0.4%	5.3%	8.9%	94.2%	90.7%
Rate per 10,000 population ²	4.3	4.3	53.5	88.5	947.2	900.1
Age distribution ² (rate per 10,000 population) ³						
18–44	6.2	5.6	33.0	48.4	470.9	428.4
45–64	7.7	7.8	102.7	157.6	1,100.1	1,046.4
65 and older	0.4	1.9	123.0	223.9	3,477.8	3,196.9
Sex ² (rate per 10,000 population)						
Female	6.9	6.6	66.9	107.0	990.4	926.6
Male	1.5	2.0	39.5	69.4	895.1	867.3
U.S. region ² (rate per 10,000 population)						
Northeast	5.8	4.8	45.3	74.1	1,056.1	1,055.9
Midwest	4.1	5.6	60.6	106.7	1,009.0	949.9
South	4.0	3.7	59.2	95.7	1,014.2	920.4
West	3.9	3.8	44.1	71.0	692.4	701.0
Patient's residence ⁴ (rate per 10,000 population)						
Urban areas	4.3	4.1	51.5	83.7	904.1	842.4
Rural areas	4.5	4.4	63.3	103.6	1,162.0	1,054.0
Community-level income (median household income for patient's ZIP Code) ⁴ (rate per 10,000 population)						
Lowest quartile	3.6	3.6	62.7	106.0	1,077.7	1,008.5
Other	4.4	4.4	48.7	79.7	873.8	826.4
Mean length of stay, days	3.1	2.2	4.9	5.2	5.1	5.0
Aggregate costs (billions) ⁵	\$1.7	\$1.6	\$15.6	\$31.8	\$283.0	\$294.9
Percentage of total aggregate costs	0.6%	0.5%	5.2%	9.7%	94.2%	89.8%
Mean cost per stay, dollars ⁵	\$13,200	\$12,400	\$10,000	\$11,700	\$10,200	\$10,700

¹ Infant and maternal stays were excluded from counts of discharges (stays).

² Population denominator data for the overall rate and rates for patient age, sex, and U.S. region were based on U.S. Census Bureau, Population Division, Annual Estimates of the Resident Population for the United States.

³ Ages 0–17 are not reported here. For complete information on this age group, see Wier LM, Encinosa W. *Obesity in Children: Hospitalizations from 2000 to 2009*. HCUP Statistical Brief #138. July 2012. Agency for Healthcare Research and Quality, Rockville, MD. Available at <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb138.pdf>.

⁴ Population denominator data for rates for patient's residence and community-level income were based on Claritas Population Estimates.

⁵ Aggregate costs and mean cost per stay in 2004 are inflation-adjusted to 2009 dollars.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004, 2009

In 2009, there were 4.3 hospital stays with obesity as a principal diagnosis per 10,000 population, with no change from 2004. Patients ages 18–44 and 45–64 had higher rates of hospitalization with obesity as a principal diagnosis (5.6 and 7.8 stays, respectively) compared to adults age 65 and older (1.9 stays). Females had a higher rate of hospitalization with obesity as a principal diagnosis (6.6 stays per 10,000) than did males (2.0 stays). There was no difference in the rate of hospitalization principally for obesity by region, urban/rural residence, or community-level income.

In 2009, there were 88.5 stays per 10,000 population with obesity as a secondary diagnosis. This represents a 65 percent increase from 53.5 stays per 10,000 in 2004. The rate of hospitalization with obesity as a secondary diagnosis increased with the patient's age. Females had a 54 percent higher rate of hospitalization with obesity as a secondary diagnosis (107.0 stays per 10,000) than did males (69.4 stays). The rate of hospitalization for stays with no mention of obesity was not significantly different for males and females.

The rate of hospitalization with obesity as a secondary diagnosis in 2009 was higher in the Midwest (106.7 stays per 10,000) than in the Northeast and West (74.1 and 71.0 stays, respectively). The rate for the South (95.7 stays) was not significantly different from the other regions. The rate of hospitalization with obesity as a secondary diagnosis also was higher among stays in communities from the lowest income quartile (106.0 stays) versus higher income communities (79.7 stays)—a 33 percent difference. There was no difference in the rate of hospitalization with obesity as a secondary diagnosis by patient's residence (rural versus urban).

The length of stay for hospitalizations with obesity as a principal diagnosis decreased from 3.1 days in 2004 to 2.2 days in 2009. The length of stay for hospitalizations with obesity as a secondary diagnosis increased from 4.9 days in 2004 to 5.2 days in 2009. There was no change in the length of stay for hospitalizations with no mention of obesity (5.1 days in 2004 versus 5.0 days in 2009).

In 2009, hospital stays with obesity as a principal diagnosis accounted for \$1.6 billion, essentially unchanged from 2004, and the mean cost per stay was \$12,400. Hospital stays with obesity as a secondary diagnosis cost \$31.8 billion in 2009, double the amount in 2004, and the mean cost per stay was \$11,700, up from \$10,000 in 2004. Compared with hospitalizations with no mention of obesity, the mean cost per stay for hospitalizations with obesity as a secondary diagnosis was 9 percent higher in 2009. Overall, hospital stays with any mention of obesity accounted for \$33.4 billion (10.2 percent) of aggregate hospital costs in 2009.

Procedures related to obesity

Table 2 lists the five most common procedures performed in 2009 during hospital stays for which obesity was the principal diagnosis. Approximately 89.3 percent of stays in 2009 involved bariatric surgery, virtually unchanged from 2004. Other common procedures performed in 2009 were upper gastrointestinal endoscopy and biopsy (14.4 percent) and diaphragmatic hernia repair (12.0 percent), which increased from 1.5 percent of procedures performed in 2004.

Table 2. Most common all-listed procedures for patients with obesity as a principal diagnosis, 2004 versus 2009

Rank		All-listed procedure	2004		2009	
2004	2009		Number of stays	Percentage	Number of stays	Percentage
1	1	Bariatric surgery	114,100	90.3	118,700	89.3
4	2	Upper gastrointestinal endoscopy; biopsy	13,100	10.4	19,200	14.4
16	3	Diaphragmatic hernia repair	1,900	1.5	15,900	12.0
11	4	Gastrectomy; partial and total	3,400	2.7	13,900	10.5
6	5	Excision; lysis peritoneal adhesions	10,200	8.1	13,700	10.3

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004, 2009

Conditions related to obesity

Table 3 lists the 10 most common principal diagnoses in 2009 for hospital stays where obesity was a secondary diagnosis (i.e., a coexisting condition). The most common principal diagnosis was osteoarthritis, which accounted for 5.6 percent of the hospital stays with obesity as a secondary diagnosis in 2009. Osteoarthritis was twice as common as a principal diagnosis among stays with obesity as a secondary diagnosis compared to stays with no mention of obesity (data not shown).

The most common principal diagnoses for stays with obesity as a secondary diagnosis were the same in 2004 as in 2009, with the exception of chronic obstructive pulmonary disease and bronchiectasis, which was not in the top 10 in 2004. There was also a change in 2009 in the rank order of the principal diagnoses. For example, osteoarthritis was the fourth most common principal diagnosis in 2004; it increased 27 percent to become the most common diagnosis in 2009. In 2004, coronary atherosclerosis was the most common principal diagnosis, accounting for 6.8 percent of all stays; it decreased 37 percent to become the third most common diagnosis in 2009.

Table 3. Principal diagnosis for hospital stays with a secondary diagnosis of obesity, 2004 versus 2009

Rank		Principal diagnosis	Percentage of stays with this principal diagnosis among stays with obesity as a secondary diagnosis		
2004	2009		2004	2009	Percentage change
4	1	Osteoarthritis	4.4	5.6	27%
3	2	Congestive heart failure; nonhypertensive	5.6	4.7	-15%
1	3	Coronary atherosclerosis and other heart disease	6.8	4.3	-37%
2	4	Nonspecific chest pain	5.8	3.7	-36%
5	5	Skin and subcutaneous tissue infections	3.6	3.7	3%
10	6	Cardiac dysrhythmias	2.5	3.1	20%
8	7	Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	2.9	3.1	6%
14	8	Chronic obstructive pulmonary disease and bronchiectasis	2.2	3.0	34%
6	9	Mood disorders	3.2	2.7	-14%
7	10	Acute myocardial infarction	3.1	2.7	-13%

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004, 2009

Data Source

The estimates in this Statistical Brief are based upon data from the HCUP Nationwide Inpatient Sample (NIS) for 2004 and 2009. Historical data were drawn from the 1996–2009 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/data/historical/2000s/vintage_2009/index.html).

Many hypothesis tests were conducted for this Statistical Brief. Thus, to decrease the number of false-positive results, we reduced the significance level to .001 for individual tests.

Definitions

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

The *principal diagnosis* is that condition established after study to be chiefly responsible for the patient’s admission to the hospital. *All-listed procedures* include all procedures performed during the hospital stay whether for definitive treatment or for diagnostic or exploratory purposes.

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

CCS categorizes ICD-9-CM diagnoses and procedures into a manageable number of clinically meaningful categories.⁷ This “clinical grouper” makes it easier to quickly understand patterns of diagnoses and procedures.

In “Table 2. Most common all-listed procedures for patients with obesity as a principal diagnosis, 2004 versus 2009,” two “Other” CCS categories were top-ranked in 2009: CCS 94 (Other OR upper GI therapeutic procedures) and CCS 86 (Other hernia repair procedures). Upon examination of the constituent ICD-9-CM codes for these two CCS categories, two types of procedures were identified as the predominant procedures for patients with obesity as a principal diagnosis: bariatric surgery (within CCS 94) and diaphragmatic hernia repair (within CCS 86). These procedure types were removed from these two CCS categories and analyzed separately. The associated ICD-9-CM codes are as follows:

- Bariatric surgery (procedure codes within CCS 94): 44.31, 44.38, 44.39, 44.68, 44.95, 44.96, 44.97, 44.98
- Diaphragmatic hernia repair (procedure codes within CCS 86): 53.7, 53.71, 53.72, 53.75, 53.80, 53.81, 53.83, 53.84

Case definition

The ICD-9-CM diagnosis codes defining obesity are 278.00 (obesity, unspecified) and 278.01 (morbid obesity). These codes were introduced in 1995. In 2005, diagnosis code 278.02 (overweight) was introduced. This new code is not included in the analyses, and there is no evidence that “overweight” cases were miscoded as “obesity” cases in prior years. Code 278.02 includes relatively few cases (less than 100,000 each year) and the trend in number of discharges for obesity (278.00 and 278.01) appears to be unaffected by the introduction of code 278.02 (smooth, increasing trend line for discharges with “overweight” as an included diagnosis code).

⁷ HCUP CCS. Healthcare Cost and Utilization Project (HCUP). U.S. Agency for Healthcare Research and Quality, Rockville, MD. Available at <http://www.hcup-us.ahrq.gov/toolsssoftware/ccs/ccs.jsp>. Updated March 2012. (Accessed June 15, 2012).

Types of hospitals included in HCUP

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

Unit of analysis

The unit of analysis is the hospital discharge (i.e., the hospital stay), not a person or patient. This means that a person who is admitted to the hospital multiple times in one year will be counted each time as a separate "discharge" from the hospital.

Costs and charges

Total hospital charges were converted to costs using HCUP Cost-to-Charge Ratios based on hospital accounting reports from the Centers for Medicare & Medicaid Services (CMS).⁸ *Costs* will reflect the actual expenses incurred in the production of hospital services, such as wages, supplies, and utility costs; *charges* represent the amount a hospital billed for the case. For each hospital, a hospital-wide cost-to-charge ratio is used. Hospital charges reflect the amount the hospital billed for the entire hospital stay and do not include professional (physician) fees. For the purposes of this Statistical Brief, costs are reported to the nearest hundred.

Location of patients' residence

Place of residence is based on the urban-rural classification scheme for U.S. counties developed by the National Center for Health Statistics (NCHS). For this Statistical Brief, we collapsed the NCHS categories into either urban or rural according to the following:

Urban:

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

Rural:

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

Median community-level income

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

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

⁸ 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. Available at <http://www.hcup-us.ahrq.gov/db/state/costtocharge.jsp>. Updated August 2011. (Accessed June 15, 2012).

- 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

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

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

Alaska State Hospital and Nursing Home Association
Arizona Department of Health Services
Arkansas Department of Health
California Office of Statewide Health Planning and Development
Colorado Hospital Association
Connecticut Hospital Association
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Health Information Corporation
Illinois Department of Public Health
Indiana Hospital Association
Iowa Hospital Association
Kansas Hospital Association
Kentucky Cabinet for Health and Family Services
Louisiana Department of Health and Hospitals
Maine Health Data Organization
Maryland Health Services Cost Review Commission
Massachusetts 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
New Mexico Department of Health
New York State Department of Health
North Carolina Department of Health and Human Services
Ohio Hospital Association
Oklahoma State Department of Health
Oregon Association of Hospitals and Health Systems
Oregon Health Policy and Research
Pennsylvania Health Care Cost Containment Council
Rhode Island Department of Health
South Carolina 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, nonrehabilitation hospitals). The NIS is a sample of hospitals and includes all patients from each hospital, regardless of payer. It is drawn from a sampling frame that contains hospitals comprising 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 <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, download *HCUP Facts and Figures: Statistics on Hospital-Based Care in the United States in 2009*, located at <http://www.hcup-us.ahrq.gov/reports.jsp>.

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

Introduction to the HCUP Nationwide Inpatient Sample, 2009. Online. May 2011. U.S. Agency for Healthcare Research and Quality. Available at http://hcup-us.ahrq.gov/db/nation/nis/NIS_2009_INTRODUCTION.pdf. (Accessed June 15, 2012).

Houchens R, Elixhauser A. *Final Report on Calculating Nationwide Inpatient Sample (NIS) Variances, 2001*. HCUP Methods Series Report #2003-2. Online. June 2005 (revised June 6, 2005). U.S. Agency for Healthcare Research and Quality. Available at <http://www.hcup-us.ahrq.gov/reports/methods/CalculatingNISVariances200106092005.pdf>. (Accessed June 15, 2012).

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. Available at http://www.hcup-us.ahrq.gov/reports/methods/2006_05_NISTrendsReport_1988-2004.pdf. (Accessed June 15, 2012).

Suggested Citation

Weiss AJ (Truven Health Analytics), Elixhauser A (AHRQ). *Obesity-Related Hospitalizations, 2004 versus 2009*. HCUP Statistical Brief #137. July 2012. Agency for Healthcare Research and Quality, Rockville, MD. Available at <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb137.pdf>.

Acknowledgments

The authors would like to acknowledge the contributions of Minya Sheng and Lindsay Terrel of Truven Health Analytics.

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:

Irene Fraser, Ph.D., Director
Center for Delivery, Organization, and Markets
Agency for Healthcare Research and Quality
540 Gaither Road
Rockville, MD 20850