Bariatric Surgery Utilization and Outcomes in 1998 and 2004

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Introduction

Morbid obesity is recognized as a major public health issue that contributes to serious health risks. Bariatric surgery has been demonstrated as a successful method of achieving dramatic weight loss among the morbidly obese. A recent meta-analysis found that 62–70 percent of excess weight was lost following gastric bypass surgery. Following successful weight loss, diabetes was completely resolved in 76.8 percent of patients. Bariatric surgery is recommended for patients with a body mass index (BMI) >=40, or a BMI >=35 with serious medical conditions (such as severe sleep apnea, obesity-related cardiomyopathy, or diabetes mellitus).

A recent AHRQ study found that the number of bariatric surgeries grew by 400 percent between 1998 and 2002. This Statistical Brief updates that research and presents data from the Healthcare Cost and Utilization Project (HCUP) on national estimates of bariatric surgery use and costs from 1998 to 2004.

Findings

Bariatric surgery utilization and costs, by payer

Table 1 presents national estimates of bariatric surgery utilization, costs, and costs per surgery by payer. From 1998 to 2004, the total number of surgeries increased nine times, from 13,386 to 121,055. In 2004, privately insured patients accounted for 78.4 percent of surgeries, up slightly from 76.0 percent in 1998. Medicare, Medicaid, and the uninsured accounted for 7.4, 5.4, and 5.3 percent, respectively, of surgeries in 2004. The remaining 3.4 percent of surgeries were paid by other payers, including government sources and charity.

From 1998 to 2004, the largest increase in surgeries was for the privately insured, a 9.3-fold increase. Surgeries among uninsured patients increased 9.1 times over the seven-year period. The number of bariatric surgeries for Medicare, Medicaid, and other payers increased 8.2, 7.0, and 8.8 times, respectively.

National inpatient hospital costs for bariatric surgeries (excluding physician costs) increased by more than eight times from $147 million in 1998 to $1.26 billion in 2004, in constant 2004 dollars. Hospital costs for the privately insured in 2004 was $982 million, accounting for 78.1 percent of all hospital bariatric costs across all payers. Between 1998 and 2004, the largest increase in total costs, an 8.9-fold increase, was found among the privately insured. The second largest increase was for uninsured patients, for whom total costs increased 8.6 times.

Nationally, the average cost for a hospital stay during which bariatric surgery was performed in 2004 was $10,395. From 1998 to 2004, hospital costs per bariatric surgery stay declined 5.2 percent. This is most likely explained by the 38.5 percent decline in the length of stay. The hospital cost per bariatric surgery stay was highest for Medicare in both years. The uninsured had the lowest average hospital cost per stay. In 2004, the average cost per bariatric surgery stay for Medicare was 25.9 percent higher than for uninsured patients. Compared to other payer groups, the average hospital cost per bariatric surgery stay for Medicare and uninsured patients increased the most from 1998 to 2004, at 9.2 percent and 7.9 percent, respectively. (The length of stay declined the most for uninsured patients and the privately insured, not shown.)

*Bariatric surgery utilization and outcomes, by age and sex*

Table 2 presents national estimates of the number of surgeries, lengths of stay, and inpatient death rates, by age and sex. In 2004, patients age 18–54 accounted for 85.2 percent of all surgeries, while the near elderly (age 55–64) accounted for 13.1 percent. Adolescents and the elderly accounted for the remaining 1.5 percent. Generally, the number of bariatric surgeries between 1998 and 2004 increased for all age groups. The fastest growth in bariatric surgeries occurred among the near elderly, for whom the number of surgeries increased more than 20 times. While length of stay and mortality decreased for all age groups over time, older patients had the highest length of stay and highest inpatient mortality rate.

More women underwent bariatric surgery than men. Women accounted for 82.0 percent of all surgeries in 2004. Between 1998 and 2004, the numbers of bariatric surgeries increased over nine times for women and over eight times for men. Length of stay and inpatient death rate remained higher among men. In 2004, the inpatient death rate for men was 2.8 times higher than the rate among women, down from six times higher in 1998.

Length of stay and the inpatient death rate declined for each age and sex group from 1998 to 2004. Overall, the length of stay declined 38.5 percent for all surgeries from nearly five days in 1998 to 3.1 days in 2004, and the inpatient death rate declined 78.7 percent from 0.89 percent to 0.19 percent. In 2004, 230 patients died in hospital stays during which bariatric surgery was performed.

Data Source

The estimates in this Statistical Brief are based on data from the HCUP 1998 and 2004 Nationwide Inpatient Sample (NIS).

Definitions

*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. They exclude long-term care, rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals, but these types of discharges are included if they are from community hospitals.

*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). 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 hundreds.

**Payer**
Up to two payers can be coded for a hospital stay in HCUP data. When this occurs, the following hierarchy was used:
- If either payer is listed as Medicaid, payer is "Medicaid."
- For non-Medicaid stays, if either payer is listed as Medicare, payer is "Medicare."
- For stays that are neither Medicaid nor Medicare, if either payer is listed as private insurance, payer is "private insurance."
- For stays that are not Medicaid, Medicare or private insurance, if either payer is some other third party payer, payer is "other," which consists of Worker's Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs.
- For stays that have no third-party payer and the payer is listed as "self-pay" or "no charge," the payer is "uninsured."

**Diagnoses, ICD-9-CM, and Diagnosis-Related Groups (DRGs)**
We identified bariatric surgeries with the following ICD-9-CM all-listed procedure codes:
- 4431 High gastric bypass
- 4438 Laparoscopic gastroenterostomy
- 4439 Other gastroenterostomy
- 4468 Laparoscopic gastroplasty
- 4495 Laparoscopic gastric restrictive procedure
- 4496 Laparoscopic revision of gastric restrictive procedure
- 4497 Laparoscopic removal of gastric restrictive device(s)
- 4498 Laparoscopic adjustment of size of adjustable gastric restrictive device
- 445 with DRG=288 Revision of gastric anastomosis
- 4499 with DRG=288 Other operations on stomach

Next, we excluded cases with stomach and intestinal cancers with the following ICD-9-CM diagnosis codes:
- 1500 to 1599 Stomach and intestinal cancers
- 2301 to 2309 In-situ cancers

Finally, we excluded cases without any of the following ICD-9-CM obesity diagnosis codes: 27801, 2780, 27800, and V778.

**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 88 percent of all discharges in the United States. The vast size of the NIS allows the study of topics at both the national and regional levels for specific subgroups of patients. In addition, NIS data are standardized across years to facilitate ease of use.

**About 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

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organizations, hospital associations, private data organizations, and the Federal government—to create a national information resource.

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

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 & Human Services
**California** Office of Statewide Health Planning & Development
**Colorado** Health & Hospital Association
**Connecticut** Integrated Health Information (Chime, Inc.)
**Florida** Agency for Health Care Administration
**Georgia** GHA: An Association of Hospitals & Health Systems
**Hawaii** Health Information Corporation
**Illinois** Health Care Cost Containment Council and Department of Public Health
**Indiana** Hospital Association
**Iowa** Hospital Association
**Kansas** Hospital Association
**Kentucky** Cabinet for Health and Family Services
**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
**Nebraska** Hospital Association
**Nevada** Division of Health Care Financing and Policy, Department of Human Resources
**New Hampshire** Department of Health & Human Services
**New Jersey** Department of Health & Senior Services
**New York** State Department of Health
**North Carolina** Department of Health and Human Services
**Ohio** Hospital Association
**Oregon** Office for Oregon Health Policy and Research and Oregon Association of Hospitals and Health Systems
**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 & Family Services

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

For More Information

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


Suggested Citation


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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:

Irene Fraser, Ph.D., Director  
Center for Delivery, Organization, and Markets  
Agency for Healthcare Research and Quality  
540 Gaither Road  
Rockville, MD 20850
Table 1. National estimates of bariatric surgery utilization and costs, by payer, 1998 and 2004

<table>
<thead>
<tr>
<th>Payer</th>
<th>1998</th>
<th>2004</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of surgeries</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>13,386 (2,021)</td>
<td>121,055 (11,609)</td>
<td>804%</td>
</tr>
<tr>
<td><strong>Private</strong></td>
<td>10,167 (1,528)</td>
<td>94,947 (9,228)</td>
<td>834</td>
</tr>
<tr>
<td><strong>Medicare</strong></td>
<td>1,106 (209)</td>
<td>9,015 (1,042)</td>
<td>715</td>
</tr>
<tr>
<td><strong>Medicaid</strong></td>
<td>940 (218)</td>
<td>6,560 (1,116)</td>
<td>598</td>
</tr>
<tr>
<td><strong>Uninsured</strong></td>
<td>704 (197)</td>
<td>6,408 (1,190)</td>
<td>810</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>469 (192)</td>
<td>4,125 (817)</td>
<td>780</td>
</tr>
<tr>
<td><strong>Hospital costs (millions)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$147 (22)</td>
<td>$1,258 (122)</td>
<td>756</td>
</tr>
<tr>
<td><strong>Private</strong></td>
<td>110 (17)</td>
<td>982 (98)</td>
<td>793</td>
</tr>
<tr>
<td><strong>Medicare</strong></td>
<td>14 (3)</td>
<td>106 (12)</td>
<td>657</td>
</tr>
<tr>
<td><strong>Medicaid</strong></td>
<td>11 (3)</td>
<td>72 (11)</td>
<td>555</td>
</tr>
<tr>
<td><strong>Uninsured</strong></td>
<td>7 (2)</td>
<td>60 (11)</td>
<td>757</td>
</tr>
<tr>
<td><strong>Mean cost per surgery</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>All Payers</strong></td>
<td>$10,970 (535)</td>
<td>$10,395 (474)</td>
<td>-5.2</td>
</tr>
<tr>
<td><strong>Private</strong></td>
<td>10,776 (568)</td>
<td>10,346 (510)</td>
<td>-4.0</td>
</tr>
<tr>
<td><strong>Medicare</strong></td>
<td>12,987 (990)</td>
<td>11,795 (511)</td>
<td>-9.2</td>
</tr>
<tr>
<td><strong>Medicaid</strong></td>
<td>11,982 (1,510)</td>
<td>11,051 (1,056)</td>
<td>-7.8</td>
</tr>
<tr>
<td><strong>Uninsured</strong></td>
<td>10,173 (1,142)</td>
<td>9,365 (672)</td>
<td>-7.9</td>
</tr>
</tbody>
</table>

Note: Standard errors are in parentheses. Costs are in 2004 dollars and include inpatient costs only.
Table 2. National estimates of bariatric surgery use and outcomes, by age and sex, 1998 and 2004

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Number of surgeries</th>
<th>Length of stay (days)</th>
<th>Inpatient death rate (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-17</td>
<td>--</td>
<td>349</td>
<td>(60)</td>
</tr>
<tr>
<td>18-34</td>
<td>4,336</td>
<td>30,445</td>
<td>(636)</td>
</tr>
<tr>
<td>35-44</td>
<td>4,825</td>
<td>36,748</td>
<td>(638)</td>
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<tr>
<td>45-54</td>
<td>3,320</td>
<td>35,904</td>
<td>(472)</td>
</tr>
<tr>
<td>55-64</td>
<td>772</td>
<td>15,806</td>
<td>(114)</td>
</tr>
<tr>
<td>65+</td>
<td>--</td>
<td>1,423</td>
<td>(207)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2,527</td>
<td>20,977</td>
<td>(365)</td>
</tr>
<tr>
<td>Female</td>
<td>10,859</td>
<td>99,310</td>
<td>(1,650)</td>
</tr>
<tr>
<td>Total</td>
<td>13,386</td>
<td>121,055</td>
<td>(2,021)</td>
</tr>
</tbody>
</table>

Note: Standard errors are in parentheses. The number of surgeries in age groups 12-17 and 65+ for 1998 is too small to provide a reliable estimate.