HEALTHCARE COST AND UTILIZATION PROJECT

Agency for Healthcare Research and Quality

STATISTICAL BRIEF #70

April 2009

Hospitalizations for Eating Disorders from 1999 to 2006

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Introduction

Eating disorders are psychiatric disorders, such as anorexia nervosa and bulimia nervosa, in which the patient becomes obsessed with food, weight, and body image. Anorexia nervosa is diagnosed when the patient is at least 15 percent underweight and refuses to gain weight, either by not eating enough food, over-exercising, vomiting, or by using laxatives.[1] This can lead to severe starvation and weakening of the heart muscles, causing cardiac arrhythmias.[2] In contrast, patients with bulimia nervosa are not necessarily underweight, but engage in binge eating followed by purging either by vomiting or by using laxatives. This can lead to severe dehydration and gastrointestinal problems.[1] Thus, severe eating disorders can lead to inpatient hospitalizations. Little is known about recent trends in eating disorder hospitalizations.

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) on national estimates of hospitalizations for eating disorders from 1999–2000 to 2005–2006. First, eating disorder-related hospital stays are analyzed by payer, age, and sex, and hospital costs are provided for 1999–2000 and 2005–2006. Second, the national estimates of eating disorder-related hospital stays are provided for each specific eating disorder category. Third, we examine the serious secondary diagnoses for eating disorder inpatients. Although eating disorders may be under-reported in hospital discharge data, this information provides a baseline of information on these conditions. The statistical significance of all differences between estimates across years is indicated in all tables.

Findings

Estimates of Eating Disorders Discharges by Payer, Age, and Sex
Table 1 estimates annual nationwide discharges for eating disorders by payer, age, and sex in 1999–2000 and 2005–2006. The estimates in 1999–2000 presented in this Brief are the

Highlights

- Eating disorder related hospitalizations increased 18 percent from 1999–2000 to 2005–2006. Anorexia nervosa hospitalizations increased 17 percent, bulimia nervosa hospitalizations decreased 7 percent, and all other eating disorder hospitalizations increased 38 percent.
- For males, hospitalizations with eating disorders increased 37 percent from 1999–2000 to 2005–2006.
- Total hospital costs for eating disorders increased 61 percent from 1999–2000 to 2005–2006.
- Hospitalizations with eating disorders for children under age 12 increased 119 percent from 1999–2000 to 2005–2006, but this age group accounted for less than 5 percent of all cases.
- Hospitalizations with mental heath eating disorders increased 24 percent among the elderly.
- In 2005–2006, 24 percent of eating disorder patients had cardiac dysrhythmias, an increase of 125 percent from 1999–2000. Also, 4 percent had acute renal or liver failure, an increase of 118 percent.

[1] American Psychiatric Association (2005), http://www.healthyminds.org/factsheets/LTF-EatingDisorders.pdf
[2] Evelyn Attia, M.D., and B. Timothy Walsh, M.D. 2009. Behavioral Management for Anorexia Nervosa. New England Journal of Medicine 360;5, pages 500-506.

average of 1999 and 2000 estimates. In the same fashion, the estimates in 2005–2006 are the average of 2005 and 2006 estimates. The total hospital costs for eating disorders and the average hospital cost per hospital stay for eating disorders, as well as the inpatient death rate and the average hospital length of stay, are presented in table 1.

As shown in table 1, there were 28,155 eating disorder-related hospital stays in 2005–2006, an increase of 18 percent from 1999–2000.

In 2005–2006, the total hospital costs involving eating disorders were $271 million, a 61 percent increase compared with $168 million in 1999–2000. The average cost per hospital stay was $9,628 in 2005–2006 and $7,046 in 1999–2000.

The average length of hospital stay was about 8 days in either 1999–2000 or in 2005–2006. The inpatient death rate for eating disorder related hospitalizations was 0.6 percent in 2005–2006, unchanged since 1999–2000 (statistically insignificant difference).

In 2005–2006, privately insured patients accounted for 52 percent of the total eating disorder hospitalizations. Medicaid payers and Medicare payers accounted for 20 percent and 19 percent, respectively. Self-pay accounted for 5 percent of the cases. In 1999–2000, the payer distribution followed a similar pattern.

From 1999–2000 to 2005–2006, eating disorder hospitalizations increased in each payer group. Hospitalizations paid by Medicaid increased the most, by 22 percent. Self-paid hospitalizations for eating disorder increased the least, by 7 percent. Hospitalizations paid by Medicare and private insurance increased by 19 percent and 17 percent, respectively.

Across age groups, in 2005–2006, 4 percent of hospital stays involving eating disorders were for children under age 12. Young patients aged 12–19 accounted for 23 percent of stays. Patients aged 19–30 accounted for 27 percent, while patients aged 30–45 accounted for 25 percent of the cases. The remaining 15 percent and 6 percent were for patients aged 45–64, and the elderly (65 years or older), respectively.

Hospitalizations involving eating disorders for children under age 12 increased 119% from 1999–2000 to 2005–2006. All the other age groups in 2005–2006 had more hospital stays comparing to 1999–2000 except for the age group 30–45. While eating disorder-related hospital stays decreased 3 percent for patients aged 30–45, the hospital stays for patients aged 12–19 and for patients aged 19–30 increased 18 percent and 19 percent, respectively. A 48 percent increase of eating disorder-related hospital stays occurred for patients aged 45–65, and a 24 percent increase occurred for the elderly.

The majority of the eating disorder inpatients were female patients. In 2005–2006, 89 percent of the cases were female patients and 11 percent of the cases were male patients. Hospitalizations for eating disorders increased 37 percent from 1999–2000 to 2005–2006 for male patients and increased 16 percent for female patients.

Hospitalizations for Specific Eating Disorder Categories

Table 2 provides the national estimates of discharges involving eating disorders by types. The types of eating disorders shown in table 2 are based on the Clinical Classifications Software for ICD-9-CM. They are: anorexia nervosa, bulimia nervosa, psychogenic vomiting, pica, and other eating disorders. Pica is the condition in which patients eat non-food substances.

In 2005–2006, 37 percent of all eating disorder related hospital stays had a diagnosis of anorexia nervosa and 24 percent had a diagnosis of bulimia nervosa. There were 10,413 hospital stays involving anorexia nervosa in 2005–2006, which increased 17 percent from 8,932 in 1999–2000. However, hospital stays involving bulimia nervosa decreased by 7 percent from 7,286 in 1999–2000 to 6,770 in 2005–2006. In

2005–2006, 37 percent of hospitalizations for all eating disorders had a diagnosis of either "other eating disorders," "unspecified eating disorders," or "rumination disorders." Hospital stays with these diagnoses increased 41 percent from 7,328 in 1999–2000 to 10,338 in 2005–2006. Hospital stays with a diagnosis of pica increased 41 percent from 1999–2000 to 2005–2006. Only 5 percent of all eating disorder related hospitalizations had a diagnosis of pica and 3 percent had a diagnosis of psychogenic vomiting.

Serious Secondary Conditions for Eating Disorder Inpatients
Table 3 examines the secondary diagnoses for patients with eating disorder as a principal diagnosis. In 2005–2006, among 6,012 hospital stays with a principal diagnosis of eating disorder, 24 percent of these hospitalizations had a secondary diagnosis of cardiac dysrhythmias, an increase of 125 percent from 1999–2000. Twenty-nine percent of hospitalizations with eating disorders had fluid and electrolyte disorders, and 21 percent had nutritional deficiencies or other nutritional, endocrine and metabolic disorders. Eleven percent of the hospital stays for eating disorders had menstrual disorders. Seven percent had deficiency and other anemia and 2 percent had convulsions.

Although only 4 percent of the hospital stays for eating disorders had acute liver or kidney failure, eating disorder hospitalizations with a diagnosis of liver or kidney failure increased 118 percent from 99 in 1999–2000 to 216 in 2005–2006.

Data Source

The estimates in this Statistical Brief are based upon data from the HCUP 1999, 2000, 2005, and 2006 Nationwide Inpatient Sample (NIS).

Supplemental sources included the HCUP Cost-to-Charge Ratio files in 1999, 2000, 2005, and 2006 and data from the Labor Statistics of Consumer Price Index Tables, from the U.S. Census Bureau.

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.

Case Definition
The ICD-9-CM codes defining eating disorders include diagnosis codes in the following (CCS category 5.15.2 eating disorders):

- 307.1 Anorexia nervosa
- 307.50 Eating disorder, unspecified
- 307.51 Bulimia nervosa
- 307.52 Pica
- 307.53 Rumination disorder
- 307.54 Psychogenic vomiting
- 307.59 Other

The CCS categories defining serious conditions for eating disorder inpatients include the following codes:

- 52: Nutritional deficiencies
- 55: Fluid and electrolyte disorders
- 58: Other nutritional; endocrine; and metabolic disorders
- 59: Deficiency and other anemia

- 83: Epilepsy; convulsions
- 106: Cardiac dysrhythmias
- 151: Other liver diseases
- 157: Acute and unspecified renal failure
- 171: Menstrual disorders

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.

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 Worker's 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.

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:

Arizona Department of Health Services
Arkansas Department of Health
California Office of Statewide Health Planning & 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 Health Association
Iowa Hospital Association
Kansas Hospital Association
Kentucky Cabinet for Health and Family Services
Maine Health Data Organization
Maryland Health Services Cost Review Commission
Massachusetts Division of Health Care Finance and Policy
Michigan Health & Hospital Association
Minnesota Hospital Association
Missouri Hospital Industry Data Institute
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 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
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 and Family Services

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 90 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 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 2005, 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:

Steiner, C., Elixhauser, A., Schnaier, J. The Healthcare Cost and Utilization Project: An Overview. *Effective Clinical Practice* 5(3):143–51, 2002.

Introduction to the HCUP Nationwide Inpatient Sample, 2006. Online. May 14, 2008. U.S. Agency for Healthcare Research and Quality. http://www.hcup-us.ahrq.gov/db/nation/nis/2006NIS_INTRODUCTION.pdf

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

Suggested Citation

Zhao, Y., and Encinosa, W. *Hospitalizations for Eating Disorders from 1999 to 2006*. HCUP Statistical Brief #70. April 2009. Agency for Healthcare Research and Quality, Rockville, MD. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb70.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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Table 1: National Estimates of Eating Disorder Hospitalizations

	1999–2000 Average over 1999 and 2000	2005–2006 Average over 2005 and 2006	Percentage Change
	All Diagnoses		
Total Number of Eating Disorder Discharges	23,807	28,155	18%***
By Payer			
Medicare	4,501 (19%)	5,375 (19%)	19%
Medicaid	4,500 (19%)	5,512 (20%)	22%
Private Insurance	12,433 (52%)	14,587 (52%)	17%
Self-pay	1,433 (6%)	1,540 (5%)	7%*
By Age			
Under 12	520 (2%)	1,139 (4%)	119%***
12–19	5,433 (23%)	6,435 (23%)	18%
19–30	6,385 (27%)	7,626 (27%)	19%
30–45	7,269 (31%)	7,057 (25%)	-3%***
45–65	2,755 (12%)	4,083 (15%)	48%***
>=65	1,429 (6%)	1,779 (6%)	24%
By Sex			
Male	2,265 (10%)	3,100 (11%)	37%***
Female	21,524 (90%)	25,002 (89%)	16%***
Total Hospital Costs (millions)	$168	$271	61%***
Mean Cost per Discharge	$7,046	$9,628	37%***
Average Length of Stay (days)	8.1	8.4	4%***
Inpatient Death Rate	0.7%	0.6%	-14%

Note: Percentage changes are based on unrounded numbers. Costs are in 2006 dollars. Percentages in parentheses are the within-group distribution. ***Statistically different from zero at the 99 percent level. **Statistically different from zero at the 95 percent level. *Statistically different from zero at the 90 percent level.
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1999, 2000, 2005, and 2006.

Table 2: Hospitalizations for Specific Eating Disorder Categories			
	1999–2000 **Average over 1999 and 2000**	**2005–2006** **Average over 2005 and 2006**	**Percentage Change**
	All Diagnoses		
Total Discharges	23,807	28,155	18%***
Eating Disorder Categories:			
Anorexia Nervosa	8,932 (38%)	10,413 (37%)	17%
Bulimia Nervosa	7,286 (31%)	6,770 (24%)	-7%***
Psychogenic Vomiting	700 (3%)	707 (3%)	1%**
Pica	958 (4%)	1,350 (5%)	41%***
Other/Unspecified Eating Disorders	7,328 (31%)	10,338 (37%)	41%***

Note: Percentage changes are based on unrounded numbers. Percentages in parentheses are the within-group distribution. Note that the distribution percentages for specific categories may add up to more than 100% since a patient may have more than one eating disorder type. ***Statistically different from zero at the 99 percent level. **Statistically different from zero at the 95 percent level. *Statistically different from zero at the 90 percent level.
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1999, 2000, 2005, and 2006.

Table 3: Serious Secondary Conditions for Inpatients with an Eating Disorder Principal Diagnosis			
	1999–2000 **Average over 1999 and 2000**	**2005–2006** **Average over 2005 and 2006**	**Percentage Change**
Total Discharges with an Eating Disorder Principal Diagnosis	5,689	6,012	6%***
Serious Secondary Diagnoses			
Fluid and Electrolyte Disorders	1,508 (27%)	1,769 (29%)	17%**
Cardiac Dysrhythmias	650 (11%)	1,462 (24%)	125%***
Nutritional Deficiencies/ Other Nutritional, Endocrine and Metabolic Disorders	1,143 (20%)	1,241 (21%)	9%
Menstrual Disorders	446 (8%)	664 (11%)	49%***
Deficiency and Other Anemia	377 (7%)	425 (7%)	13%
Acute Renal or Liver Failure	99 (2%)	216 (4%)	118%***
Convulsions/Epilepsy	105 (2%)	142 (2%)	35%

Note: Percentage changes are based on unrounded numbers. Percentages in parentheses are the within-group distribution. ***Statistically different from zero at the 99 percent level. **Statistically different from zero at the 95 percent level. *Statistically different from zero at the 90 percent level.
Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1999, 2000, 2005, and 2006.