Healthcare Cost And Utilization Project (HCUP): Using Administrative Data For Disease Surveillance

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H·CUP
HEALTHCARE COST AND UTILIZATION PROJECT

Introduction

- The Healthcare Cost and Utilization Project (HCUP) is a family of powerful health care databases, software tools, and products for advancing research.
- HCUP data are compiled and evaluated by the U.S. Agency for Healthcare Research and Quality (AHRQ). As the largest collection of multi-year, all-payer, health care data available, HCUP provides the tools for conducting valuable health care research and policy analyses.
- HCUP databases are developed through a federal-state-industry partnership that brings together the data collection efforts of federal- and state-level organizations, including:
  - State data organizations
  - Hospital associations
  - Private data organizations
  - Federal government
- HCUP resources enable research on a broad range of health care issues at the national, regional, state, and local market levels, including:
  - Cost and quality of health services
  - Medical practice patterns
  - Access to health care programs
  - Outcomes of treatments
  - Disease surveillance
- HCUP data are unique and powerful, with:
  - Thirty-nine state-level partners, representing 90 percent of the U.S. population
  - Ninety percent of hospital discharges in U.S.
  - Census of hospital care in participating states—not a sample

HCUP Databases

- The State Inpatient Databases (SID) contain the universe of inpatient discharge abstracts from community hospitals in participating states. From the SID, two sample databases are created that provide national estimates:
  - The Nationwide Inpatient Sample (NIS) with inpatient data from a sample of over 1,000 hospitals.
  - The Kids' Inpatient Database (KID) with inpatient data from a sample of pediatric inpatient discharges.
- The State Ambulatory Surgery Databases (SASD) contain data from ambulatory care encounters from hospital-affiliated and, in some instances, freestanding ambulatory-surgery clinics.
- The State Emergency Department Databases (SEDD) contain data from hospital-affiliated emergency departments for visits that do not result in hospitalizations. Visits that result in hospitalizations are captured within the SID.

Objectives

- Demonstrate the application of HCUP data in disease surveillance efforts
- Describe trends in hospital utilization and patient characteristics for three diseases:
  - Influenza
  - Obesity
  - Birth defects

Data Source and Methods

Statistical Briefs

- The HCUP Statistical Briefs http://www.hcup-us.ahrq.gov/reports/statbriefs.jsp present simple, descriptive statistics on a variety of specific, focused topics.
- The estimates in many Statistical Briefs are based on data from the HCUP NIS.

The Nationwide Inpatient Sample (NIS)

- 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 that 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 NIS allows the study of topics at both the national and regional levels for specific subgroups of patients.
- NIS data are standardized across years to facilitate ease of use.

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

- The NIS contains 15 diagnosis fields.
- These diagnoses indicate:
  - The condition chiefly responsible for the patient's admission to the hospital
  - Any 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 12,000 ICD-9-CM diagnosis codes.
- CCS categorizes ICD-9-CM diagnoses into 260 clinically meaningful categories. This "clinical grouper" makes it easier to quickly understand patterns of diagnoses and procedures.

Case Definitions

- Influenza: ICD-9-CM diagnosis codes 487.0, 487.1, and 487.8
- Obesity: ICD-9-CM diagnosis codes 278.00 and 278.01
- Birth Defects: CCS categories 213, 214, 215, 216, and 217

Findings

Influenza

- In 2004, there were over 37,000 hospitalizations in which influenza was noted during the hospital stay, and more than 21,100 hospital admissions resulted principally from influenza—a 62 percent decrease from 2003, but twice the number of hospitalizations in 2001.
- The elderly were more likely than any other age group to be hospitalized for this condition—27.9 hospital stays per 100,000 population for ages 65 and above—compared with 8.1 stays per 100,000 for those younger than 18 years, 1.7 stays for 8–44 year olds, and 4.4 stays per 100,000 for 45–64 year olds.
- In 2004, hospitalizations for influenza were most likely to occur in the Midwest, with 11.1 hospital stays per 100,000 people, compared with 2.8 stays per 100,000 in the West, 7.1 in the South, and 8.1 in the Northeast.
- Nearly 67 percent of all admissions for influenza originated in the emergency department. The elderly were most likely to be admitted for influenza through the emergency department at a rate of 74 percent.
- The in-hospital death rate for patients 85 years and older with influenza was more than twice the in-hospital death rate for influenza patients between 65 and 84 years of age (7.9 percent versus 3.3 3percent).

Obesity

- In 2004, there were 1.7 million hospital stays during which obesity was noted, accounting for about 6 percent of all hospital stays—an increase of 112 percent since 1996.
- Among those principally hospitalized for obesity, 55.2 percent were age 18–44 and most of the remaining (42.9 percent) were age 45-64; only 1.2 percent were 65 or older. For those with obesity as a secondary diagnosis only, 23.7 percent were age 18-44 and 28.5 percent were 65 or older.
- Although just over 30 percent of both men and women were obese, about 82 percent of those with a principal diagnosis of obesity and 63.5 percent of those with obesity as a coexisting condition were women.
- The mean length of a hospital stay for obesity as a principal diagnosis was 3.1 days, but when obesity was a coexisting condition, the mean length of stay was 4.9 days.
- In the Northeast, 5.8 hospital stays per 10,000 were principally for obesity; in other regions, these stays ranged from 3.8 to 4.0 per 10,000. However, in the Northeast and West, 45 stays per 10,000 listed obesity as a secondary diagnosis, while rates were much higher in the Midwest and South, at 57 and 60 stays per 10,000.
- The most common principal diagnosis associated with obesity was coronary atherosclerosis, accounting for nearly 7 percent of all patients with obesity. This was 75 percent higher than among the non-obese hospitalized population.

Birth Defects

- In 2004, birth defects accounted for more than 139,000 hospitalizations, representing 47.4 stays per 100,000 persons. Hospital costs for these conditions totaled $2.6 billion.
- The highest aggregate costs were for stays related to cardiac and circulatory congenital anomalies, which accounted for about $1.4 billion—more than half of all hospital costs for birth defects. Cardiac and circulatory congenital anomalies, which include conditions such as atrial and ventricular septal defects, accounted for more than one-third of all hospital stays for birth defects and had the highest in-hospital mortality rate.
- Between 1997 and 2004, hospitalization rates increased by 28.5 percent for cardiac and circulatory congenital anomalies and 25.3 percent for digestive congenital anomalies (when noted as either the principal or a coexisting condition).
- Pyloric stenosis was the most common principal reason for birth defect hospital stays, accounting for 9.0 percent of all birth defect-related hospitalizations.

Figure 1. Trends in hospitalizations for influenza, all-listed diagnoses vs. principal diagnosis, 1994-2004

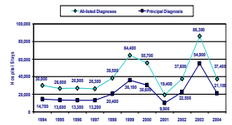
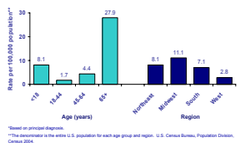
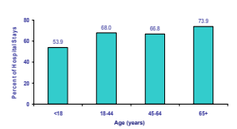


*Figure 2. The rate of hospitalization for influenza, by age and region, 2004**



**Based on principal diagnosis.*
***The denominator is the entire U.S. population for each age group and region. U.S. Census Bureau, Population Division, Census 2004.*

*Figure 3. Distribution of hospitalizations for influenza originating in the emergency department, by age, 2004**



**Based on principal diagnosis.*

Table 1. Differences in hospital stays related to obesity

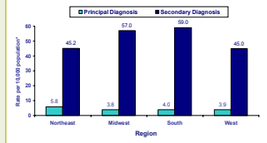
	Obesity as a principal diagnosis	Obesity as a secondary diagnosis	No mention of obesity
Number of discharges (percent)	126,240 (0.4%)	1,587,170 (5.3%)	27,756,372 (94.3%)
Age distribution			
17 and younger	0.4%	1.6%	7.4%
18-44	55.2%	23.7%	19.1%
45-64	42.9%	46.2%	28.0%
65 and older	1.2%	28.5%	45.4%
Percent female	81.9%	63.5%	53.1%
Mean length of stay, days	3.1	4.9	5.1
Mean costs, dollars	$11,700	$8,800	$9,000

Table 2. Principal diagnosis for hospital stays with a secondary diagnosis of obesity

Rank	Principal diagnosis	Number of stays with obesity as a secondary diagnosis	Percentage of obesity stays with this principal diagnosis	Percentage of non-obesity stays with this principal diagnosis
1	Coronary atherosclerosis (hardening of the arteries of the heart	106,600	6.8	3.9*
2	Nonspecific chest pain	91,400	5.8	2.7*
3	Congestive heart failure	87,200	5.6	3.7*
4	Osteoarthritis	69,300	4.4	2.1*
5	Skin and subcutaneous infections	56,200	3.6	1.9*
6	Acute myocardial infarction (heart attack)	48,100	3.1	2.3*
7	Affective disorders (depression and bipolar disorder)	46,400	3	2.4*
8	Pneumonia	45,300	2.9	4.2*
9	Intervertebral disc disorders and other back problems	41,600	2.7	2.1*
10	Cardiac dysrhythmias	39,900	2.6	2.4*

** Significant difference between stays with obesity and stays with no mention of obesity at p< 0.001.*

Figure 4. The rate of hospitalization for obesity, by region, 2004



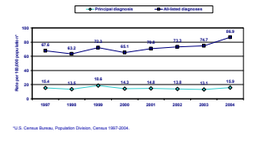
**The denominator is the entire U.S. population for each region. U.S. Census Bureau, Population Division, Census 2004.*

*Table 3. Birth defects commonly causing hospitalization, 2004**

Principal Diagnosis	Total Number of Hospital Stays	Percent of All Birth Defect Stays	Mean Length of Stay (days)	Mean Costs	Aggregate Costs (millions)	Percent Male	Mean Age	Percent Died
All cardiac and circulatory congenital anomalies	46,500	33.5%	8.2	$29,600	$1,369	50.9%	19.8	2.6%
All digestive congenital anomalies	25,800	18.5%	6.3	$11,700	$303	47.8%	7.5	0.4%
All genitourinary congenital anomalies	12,900	9.3%	4.1	$8,900	$115	52.0%	23.3	0.3%
All nervous system congenital anomalies	6,900	5.0%	7.5	$16,200	$112	44.8%	15.2	1.8%
All birth defects	**139,100**	**100.0%**	**6.3**	**$18,800**	**$2,586**	**53.3%**	**17.6**	**1.3%**

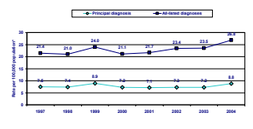
**Based on principal diagnosis.*

Figure 5. Hospitalization rates for cardiac and circulatory congenital anomalies, 1997-2004



**U.S. Census Bureau, Population Division, Census 1997-2004.*

Figure 6. Hospitalization rates for digestive congenital anomalies, 1997-2004

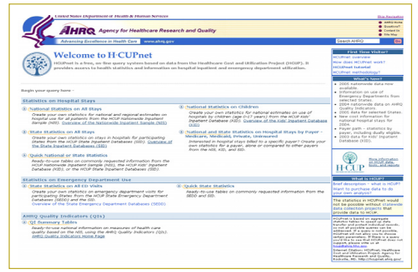


**U.S. Census Bureau, Population Division, Census 1997-2004.*

Additional HCUP Resources

HCUPnet

- Quick, free access to HCUP data: http://www.ahrq.gov/hcupnet/
- Free, interactive online query system
  - Users generate tables of outcomes by diagnoses and procedures.
  - Data can be cross-classified by patient and hospital characteristics.
- HCUPnet can answer a variety of questions, such as:
  - What percentage of hospitalizations for children are uninsured, by state?
  - What are the most expensive conditions treated in U.S. hospitals?
  - What is the trend in admissions for influenza?
  - Will there be sufficient cases to do my analysis?
  - How do my estimates compare with HCUPnet (validation)?



HCUP Technical Support

E-mail: hcup@ahrq.gov

Phone: (866) 290-HCUP (4287)

- Responds to inquiries about HCUP data, products, and tools
- Collects user feedback and suggestions for improvement

HCUP User Support Website

The HCUP User Support Website http://www.hcup-us.ahrq.gov/ helps you:

- Review extensive documentation about HCUP data, tools and products
- Access HCUPnet
- Connect with technical assistance
- Find a comprehensive listing of HCUP-related publications, reports, and Fact Books
- Obtain HCUP data

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