The Healthcare Cost and Utilization Project (HCUP)

Where we came from
Where we are
Where we’re going
What we’ve learned

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Presentation Overview

• A little history: National hospital data sources weren’t widely available in the US.
  ► How did HCUP happen?

• The Data and the Tools
  ► The state of HCUP in 2016

• HCUP challenges along the way

• What can the APCD community learn from HCUP?
What is the Agency for Healthcare Research and Quality (AHRQ)?

The Agency for Healthcare Research and Quality (AHRQ) is a federal agency under the Department of Health and Human Services.
AHRQ’s Mission

Create and fund research
Invest in tools and training
Invest in data and measures

Work with HHS and other partners to make sure that the evidence is understood and used
The HCUP Partnership: Voluntary and Cooperative
What is HCUP?

HCUP is a comprehensive set of publicly available all-payer healthcare databases. It includes multiyear inpatient and outpatient data based on hospital billing records.

- **HCUP Databases**: SID, SEDD, SASD, NEDS, NIS, KID, NRD
- **Research Tools**
- **Research Publications**
- **User Support**
HCUP Partners: Inpatient Data for the 1988 Data Year

Updated 2/24/16
HCUP Partners: Inpatient Data for the 2015 data year

97% of U.S. population

Updated 2/24/16
HCUP Partners Providing Emergency Department Data

Updated 2/24/16
Current HCUP Data Partners

Alaska  State Hospital and Nursing Home Association
Arizona  Department of Health Services
Arkansas  Department of Health
California  Office of Statewide Health Planning & Development
Colorado  Hospital Association
Connecticut  Hospital Association
District of Columbia  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
Current HCUP Data Partners

- 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 Center for Health Information and Analysis
- 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
Current HCUP Data Partners

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
North Dakota Minnesota Hospital Association
Ohio Hospital Association
Oklahoma State Department of Health
Oregon Association of Hospitals and Health Systems
Oregon Office of Health Analytics
Pennsylvania Health Care Cost Containment Council
Rhode Island  Department of Health
South Carolina  Revenue and Fiscals Affairs Office
South Dakota  Association of Health Care 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
Continuous Growth

• Originally one database released through HCUP
  ▶ Added more databases over time: national, state, inpatient, ED, ambulatory surgery
  ▶ Since 1999: 45,000 HCUP databases distributed
  ▶ 6,900 databases sold in 2015 alone

• 2,200,000 web visits last year to HCUP-US—online documentation system

• Over 4,500 peer reviewed papers published using HCUP
Types of Topics HCUP Can Address

- Use and cost of care
- Uncommon conditions
- Trends
- Readmissions and revisits
- Subgroup differences, e.g., sex, race, expected payer
- Geographic variation
- Medical treatment variations
- Hospital characteristics

- Cost and burden of illness
- Quality of care
- Patient safety
- Access to care
- Special populations and minorities
- Care of pediatric patients
- Epidemiology of diseases and treatments
- Injury surveillance
Between 2006 and 2012, the rate of neonatal hospital stays related to substance use increased by 71%, from 5.1 to 8.7 per 1,000 neonatal stays.

Aggregate hospital costs for these neonatal stays increased by 135%, from $253 million to $595 million.
Mastectomies between 2005 and 2013:
- Unilateral inpatient ↓ 36%
- Unilateral ambulatory ↑ 71%
- Bilateral inpatient ↑ 143%
- Bilateral ambulatory ↑ 431%
Use of ED services

2.8 million ED visits and 105,000 inpatient stays for sports injury
- Bicycling #1 for ED
- Walking/hiking #1 for inpatient

Table 1. Top 10 specific sports activities associated with emergency department visits (discharged) and hospital inpatient stays, 2013

<table>
<thead>
<tr>
<th>Specific sports activity</th>
<th>ED visits (discharged)</th>
<th>Inpatient stays</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rank</td>
<td>n</td>
</tr>
<tr>
<td>All sports activities</td>
<td></td>
<td>2,807,880</td>
</tr>
<tr>
<td>Bicycle riding</td>
<td>1</td>
<td>383,790</td>
</tr>
<tr>
<td>Walking, marching, and hiking</td>
<td>2</td>
<td>340,290</td>
</tr>
<tr>
<td>Other unspecified sports activity&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3</td>
<td>288,380</td>
</tr>
<tr>
<td>Basketball</td>
<td>4</td>
<td>268,580</td>
</tr>
<tr>
<td>American tackle football</td>
<td>5</td>
<td>211,220</td>
</tr>
<tr>
<td>School recess and summer camp&lt;sup&gt;b&lt;/sup&gt;</td>
<td>6</td>
<td>150,150</td>
</tr>
<tr>
<td>Running</td>
<td>7</td>
<td>148,650</td>
</tr>
<tr>
<td>Roller skating and skateboarding</td>
<td>8</td>
<td>143,780</td>
</tr>
<tr>
<td>Soccer</td>
<td>9</td>
<td>128,950</td>
</tr>
<tr>
<td>Baseball</td>
<td>10</td>
<td>113,420</td>
</tr>
<tr>
<td>Downhill skiing and snowboarding&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3</td>
<td>5,320</td>
</tr>
<tr>
<td>Horseback riding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The HCUP Data Process— from Patient to Research

Patient enters hospital

Billing record created

Hospital sends data to State data organizations

States store data in varying formats

HCUP sends uniform data back to State data organizations

AHRQ standardizes data to create uniform HCUP databases

Data made available for research
HCUP has Seven Types of Databases

- **Three State-Specific Databases**
  - State Inpatient Databases (SID)
  - State Ambulatory Surgery & Services Databases (SASD)
  - State Emergency Department Databases (SEDD)

- **Four National (Nationwide) Databases**
  - National Inpatient Sample (NIS)
  - Nationwide Emergency Department Sample (NEDS)
  - Kids’ Inpatient Database (KID)
  - Nationwide Readmissions Database (NRD)

*The first HCUP database*
What Data Elements are Included in the HCUP Databases?

Data Elements:

• Patient demographics (age, sex)
• Diagnoses & procedures
• Expected payer
• Length of stay
• Patient disposition
• Admission type
• Point of origin
• Admission month
• Weekend admission
Some Data Elements Vary by State

- Race/Ethnicity
- Patient county
- Patient ZIP Code
- Severity of illness
- Birthweight
- Procedure date (days from admission)
- Health plan details
- Additional expected payers
- Detailed charges
- Patient identifiers encrypted
- Physician identifiers encrypted
- Physician specialty
- Hospital identifier unencrypted
Value Added Data Elements

• Clinical tools based on ICD
  ► Comorbidities
  ► Clinical Classification Software (CCS)
  ► Standard DRG grouping across all data
  ► Severity adjustment software

• Supplemental data elements and files

• Linkages

More on these later under “Tools”
HCUP Supplemental Files

- Supplemental Variables for Readmission Analyses
- AHA Linkage Files
- Cost-to-Charge Ratio Files
- Hospital Market Structure Files
- Trend Weights Files (NIS & KID)
- NIS Hospital Ownership File
Linkages with Other Data

HCUP State Databases

- American Hospital Association (AHA) Annual Survey
- Health Resources and Services Administration’s (HRSA) Area Health Resource File (AHRF)
- Zip Code Files from Census or Vendor
- Medicare Cost Reports
- Trauma Information Exchange Program (TIEP)
HCUP Files vs. Partner Files

- HCUP Files vs. Data Files received directly from the Partners

<table>
<thead>
<tr>
<th>HCUP Files</th>
<th>Partner Files</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subset of data elements</td>
<td>All data elements</td>
</tr>
<tr>
<td>Uniformly coded across the States</td>
<td>Not uniformly coded across states</td>
</tr>
<tr>
<td>Lag time</td>
<td>More timely</td>
</tr>
<tr>
<td>Standard data quality checks</td>
<td>Variability in quality checks by state</td>
</tr>
<tr>
<td>Value-added data elements</td>
<td>May not have same value-added elements</td>
</tr>
<tr>
<td>Arizona</td>
<td>Massachusetts</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Arkansas</td>
<td>Michigan</td>
</tr>
<tr>
<td>California</td>
<td>Mississippi</td>
</tr>
<tr>
<td>Colorado</td>
<td>Nebraska</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>Nevada</td>
</tr>
<tr>
<td>Florida</td>
<td>New Jersey</td>
</tr>
<tr>
<td>Georgia</td>
<td>New Mexico</td>
</tr>
<tr>
<td>Hawaii</td>
<td>New York</td>
</tr>
<tr>
<td>Iowa</td>
<td>North Carolina</td>
</tr>
<tr>
<td>Kentucky</td>
<td>Oregon</td>
</tr>
<tr>
<td>Maine</td>
<td>Rhode Island</td>
</tr>
<tr>
<td>Maryland</td>
<td>South Carolina</td>
</tr>
<tr>
<td></td>
<td>South Dakota</td>
</tr>
</tbody>
</table>

Not all States participate in all years and for all databases.
<table>
<thead>
<tr>
<th>Database Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>National (Nationwide) Inpatient Sample (NIS)</td>
<td>Inpatient discharge data for a sample of discharges from all hospitals in SID</td>
</tr>
<tr>
<td>Kids’ Inpatient Database (KID)</td>
<td>Pediatric inpatient hospital discharge data from a sample of pediatric discharges in SID</td>
</tr>
<tr>
<td>Nationwide Emergency Department Sample (NEDS)</td>
<td>Emergency department data (treat and release &amp; admitted) from a sample of hospitals in SID and SEDD</td>
</tr>
<tr>
<td>Nationwide Readmissions Database (NRD)</td>
<td>Inpatient discharge data from all hospitals for SID with verified patient linkage numbers</td>
</tr>
</tbody>
</table>
Within strata sort by hospital, DRG, and admission month and select 1 in 5 records

State Inpatient Databases (SID)

- ~ 4,400 hospitals
- ~ 33 M records

Strata
- U.S. Division
- Urban/Rural Location
- Teaching Status
- Ownership/Control
- Bed Size

Stratified Sample of Discharges
*State not included in the stratum

National Inpatient Sample (NIS)

N = ~ 4,400 hospitals
~ 7 M records
KID is a Stratified Sample of Discharges from the SID

State Inpatient Databases (SID)

~ 4,380 hospitals
~ 34.3M records

Strata
- Uncomplicated Births
- Complicated Births
- Pediatric Non-Births

Stratified Sample of Discharges
*State not included in the stratum

- 10% uncomplicated births
- 80% pediatric discharges

Kids' Inpatient Database (KID)

N = ~ 4K hospitals
~ 3M records
NEDS is a Stratified Sample of Hospitals from the SEDD and SID

Strata
- U.S. Region
- Urban/Rural Location
- Teaching Status
- Ownership/Control
- Trauma center

Stratified Sample of Hospitals
*State not included in the stratum

Nationwide Emergency Department Sample (NEDS)
N = ~ 1K hospitals
~ 31M records
NRD is Constructed from SID with Verified Patient Linkage Numbers

State Inpatient Databases (SID)

Hospital and Patient Exclusions

Strata
- U.S. Region
- Urban/Rural Location
- Teaching Status
- Size
- Ownership/Control
- Patient Characteristics (age and sex)

All Discharges (after exclusions)

Nationwide Readmissions Database Sample (NRD)
N = ~ 2K hospitals
~ 14M records
Data Use Agreement (DUA) Training Course

Purpose of the Course:

► Emphasize the importance of data protection

► Reduce the risk of inadvertent violations

► Describe your individual responsibility when using HCUP data

Takes 15 minutes to Complete

http://www.hcup-us.ahrq.gov/DUA/dua/index.htm
Pricing Information
Per Data Year

Nationwide Databases (NIS, KID, NEDS, NRD)

► **NIS**: $350 (2007-2013; 2013 student price $100)
  $160-200 (earlier years; student price $20-$50)
► **KID**: $350 (2009 and 2012; 2013 student price $50)
  $200 (earlier years; student price $20)
► **NEDS**: $500 (2013 student price $75)
  (earlier years; student price $75)
► **NRD**: $500 (student price $150)

State Databases (SID, SASD, SEDD)

► Varies by state, database, year, and type of applicant
► $35 - $3,185

Funds for State data sales returned to State Partners