The Healthcare Cost and Utilization Project (HCUP)

Overview of the HCUP Databases and Resources

Agency for Healthcare Research and Quality
Updated April 2020
Presentation Objectives Part I

- Project Overview
- AHRQ and HCUP Partners
- The Making of HCUP Data
- HCUP State Databases
- HCUP Nationwide Databases
- How to Obtain HCUP Data & Access HCUP Resources
HCUP is a comprehensive set of publicly available all-payer healthcare data (including self-pay and those billed as ‘no charge’).

Includes multi-year inpatient and outpatient data based on hospital billing records.

HCUP Databases
- SID
- SEDD
- SASD
- NEDS
- NIS
- KID
- NRD
- NASS

Online Tools

Analytics

User Support
# HCUP Answers Questions

**Uniquely addresses variation in acute care**

<table>
<thead>
<tr>
<th>Use of inpatient, emergency department (ED), and ambulatory surgery and other outpatient services</th>
<th>Expected payer of services (Medicare, Medicaid, private insurance, self-pay, or those billed as ‘no charge’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical detail</td>
<td>Cost of care</td>
</tr>
<tr>
<td>Age, race and area of residence of patients</td>
<td>Care for a patient across time* (revisits/readmissions)</td>
</tr>
<tr>
<td>Geographical estimates (county, region, State, national)</td>
<td>Access, quality, patient safety</td>
</tr>
</tbody>
</table>

↑ ↑ ↑ **Trends over time in all of the above** ↑ ↑ ↑

*Availability varies by State*
<table>
<thead>
<tr>
<th>Costs of care</th>
<th>In 2016, there were 35.7 million hospital stays in the United States, with a rate of 104.2 stays per 1,000 population. The cost of these stays totaled over $417 billion with a mean cost per stay of $11,700. (2016 NIS, Stat Brief #246)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to care</td>
<td>Rates of influenza-related stays and ED visits were highest for patients from low-income areas. This disparity was greatest for young children: for children aged 0–4 years, the rate of influenza-related ED visits in 2015–2016 was 220 percent higher in the lowest than in the highest income areas. (2006-2016 NIS &amp; NEDS, Stat Brief #253)</td>
</tr>
<tr>
<td>Quality of care</td>
<td>From 2010 to 2014, the rate of stays involving an adverse drug event (ADE) increased the most for ADEs caused by smooth muscle and respiratory drugs (up 24 percent) and decreased the most for ADEs caused by cardiovascular drugs (down 18 percent). (2010 and 2014 SID, Stat Brief #234)</td>
</tr>
<tr>
<td>Readmissions</td>
<td>In 2016, the highest readmission rates were among Medicare patients aged 21–64 years and nonmaternal Medicaid patients aged 45-64 years (21.2 and 20.4 per 100 index admissions, respectively). (2010-2016 NRD, Stat Brief #248)</td>
</tr>
</tbody>
</table>
### Patient safety

Hospital improvements in patient safety and adverse events were noted from 2011 to 2014 in 34 States—there was a decrease in the percentage of hospitals classified as worse than average (from 9.5 to 6.7 percent) and an increase in the percentage of hospitals classified as better than average (from 3.4 to 5.5 percent). (2011 & 2014 SID, Stat Brief #237)

### Geographic variation

From 2013-2015, alcohol-related stays in Rhode Island and Massachusetts (80 and 71 percent of counties in the top quintile) cost an average of $98 and $95 per resident annually, respectively. (2013-2015 SID, Stat Brief #245)

### Trends in practice

In 2016, Medicare was the primary expected payer for the vast majority of cardiac pacemaker or cardioverter/defibrillator procedures (75.1 percent); lens and cataract procedures (68.5 percent); and vascular stents and OR procedures, other than head or neck (67.2 percent). (2016 NASS, Stat Brief #252)

### Opioid-related stays

In 2016, most opioid-related stays among women aged 15–44 years involved abuse/dependence (86 percent). Nearly half of opioid stays among women aged 65 years and older were due to adverse events. (2016 NIS, Stat Brief #247)
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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

• To produce evidence to make healthcare
  ► Safer
  ► Higher quality
  ► More accessible
  ► Equitable
  ► Affordable

• To work with HHS and other partners to make sure that the evidence is understood and used
The HCUP Partnership
HCUP Data Partners

Alaska Department of Health and Social Services
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
Delaware Health Statistics Center & Office of Vital Statistics
District of Columbia Hospital Association
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Laulima Data Alliance
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
Maine Health Data Organization
Maryland Health Services Cost Review Commission
Massachusetts Center for Health Information and Analysis
Michigan Health & Hospital Association
Minnesota Hospital Association (provides data for Minnesota and North Dakota)
Mississippi State Department of Health
Missouri Hospital Industry Data Institute
Montana Hospital Association
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
North Dakota (data provided by the Minnesota Hospital Association)
Ohio Hospital Association
Oklahoma State Department of Health
Oregon Healthy Authority
Oregon Association of Hospitals and Health Systems
Pennsylvania Health Care Cost Containment Council
Rhode Island Department of Health
South Carolina Revenue and Fiscal Affairs Office
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
HCUP Partners Providing Inpatient Data

Updated 01/16/20

Partners Providing:

- Inpatient Data
- Non-participating
HCUP Partners Providing Emergency Department Data

Updated 01/16/20
HCUP Participation by Data Type

**Partners Providing:**
- Inpatient Data
- Inpatient and Ambulatory Surgery & Services Data
- Inpatient and Emergency Department Data
- Inpatient, Ambulatory Surgery & Services, and Emergency Department Data
- Non-participating

**Updated 01/16/20**
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The Foundation of HCUP Data is Hospital Billing Data

Demographic Data

Diagnoses

Procedures

Charges

UB-04
CMS 1500
From Patient Hospital Visit to Administrative Record

ED Visit
Scheduled Admission
Transfer

Reception

Admit

Provide Care

Discharge

Patient Perspective

Data Perspective

Patient Record

Patient Record

Discharge Summary

Medical Coder

Billing Dept

Bill Generated
The Making of HCUP Data

Patient enters hospital

Billing record created

States store data in varying formats

AHRQ standardizes data to create uniform HCUP databases

Hospital sends billing data and any additional data elements to data organizations
The HCUP Data Process

- State data are mapped to a standardized HCUP format which allows for consistent data elements and values for comparison across States

- Additional data elements are available:
  - Value-added variables (supplemental variables for revisit analyses, injury indicators, indicators for observation and ED services)
  - Hospital characteristics (teaching status, ownership/control, bed size)
  - Diagnostic related groups and severity measures
    - 3M’s All Patient Refined DRGs (APR-DRGs)

- Quality checks are performed
85 percent of hospitals in the U.S. are Community Hospitals
15 percent Noncommunity Hospitals (Federal (DoD/VA/IHS), Nonfederal Psychiatric, Nonfederal Long-term Care, etc.)

Source: American Hospital Association (AHA) Annual Survey (FY 2018)
www.aha.org/statistics/fast-facts-us-hospitals
### American Hospital Association Definition:
Nonfederal, short-term general, and other special hospitals, excluding hospitals not accessible by the general public (e.g., prison hospitals or college infirmaries)

<table>
<thead>
<tr>
<th>Included</th>
<th>Excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-specialty general hospitals</td>
<td>Long-term care</td>
</tr>
<tr>
<td>OB-GYN</td>
<td>Psychiatric</td>
</tr>
<tr>
<td>ENT</td>
<td>Alcoholism/Chemical dependency</td>
</tr>
<tr>
<td>Orthopedic</td>
<td>Long term care Rehabilitation</td>
</tr>
<tr>
<td>Pediatric</td>
<td>DoD / VA / IHS</td>
</tr>
<tr>
<td>Public</td>
<td>College infirmaries</td>
</tr>
<tr>
<td>Academic medical centers</td>
<td></td>
</tr>
</tbody>
</table>
What Are Community Hospitals?

- HCUP generally does not receive data from non-community hospitals, such as Psychiatric facilities.
- However, if a patient is treated for a mental health condition in a community hospital, their information is included.

<table>
<thead>
<tr>
<th>Mental, Behavioral and Neurodevelopmental Disorders, Top 5 Principal Diagnoses</th>
<th>Total Number of Discharges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Depressive disorders</td>
<td>536,580</td>
</tr>
<tr>
<td>2. Schizophrenia spectrum and other psychotic disorders</td>
<td>398,840</td>
</tr>
<tr>
<td>3. Alcohol-related disorders</td>
<td>308,030</td>
</tr>
<tr>
<td>4. Bipolar and related disorders</td>
<td>271,610</td>
</tr>
<tr>
<td>5. Suicidal ideation/attempt/intentional self-harm</td>
<td>125,135</td>
</tr>
</tbody>
</table>

Source: Weighted national estimates from the 2017 National Inpatient Sample (NIS), Clinical Classifications Software Refined (CCSR) default for principal diagnosis assignment
HCUP State-Specific Databases

Inpatient State-Specific Databases

State Inpatient Databases (SID)

Outpatient State-Specific Databases

State Ambulatory Surgery & Services Databases (SASD)

State Emergency Department Databases (SEDD)
HCUP Nationwide Databases

Inpatient Nationwide Databases

National Inpatient Sample (NIS)

Kids’ Inpatient Database (KID)

Nationwide Readmissions Database (NRD)

Outpatient Nationwide Databases

Nationwide Emergency Department Sample (NEDS)

Nationwide Ambulatory Surgery Sample (NASS)

New!
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### HCUP State Databases

<table>
<thead>
<tr>
<th>State Inpatient Databases (SID)</th>
<th><strong>Inpatient discharge data</strong> (including those admissions that started in the ED) from participating HCUP States</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Ambulatory Surgery &amp; Services Databases (SASD)</td>
<td><strong>Ambulatory surgery data</strong> (hospital-owned and some nonhospital-owned facilities) and other outpatient services from participating HCUP States</td>
</tr>
<tr>
<td>State Emergency Department Databases (SEDD)</td>
<td><strong>Emergency department data</strong> (treat-and-release) from participating HCUP States</td>
</tr>
</tbody>
</table>
What Data Elements Are Included in the HCUP Databases?

Data Elements:

• Patient demographics (e.g., age, sex, and, for some States, race)
• Diagnoses & procedures
• Expected payment source (including self-pay and those billed as ‘no charge’)
• Length of stay
• Admission and discharge status
• Point of origin
• Total charges
• Value-added variables (e.g., supplemental variables for revisit analyses)
Some Data Elements Vary by State

- Race/Ethnicity
- Patient county
- Patient ZIP Code
- Severity of illness
- Birthweight
- Procedure date (days from admission to procedure)
- Health plan details
- Additional and/or more detailed expected payer information
- Detailed charges
- Patient identifiers (encrypted); supplemental variables for revisit analyses

- Physician identifiers (encrypted)
- Physician specialty
- Hospital identifier (unencrypted)
# Example:
## Payer Detail Varies by State

<table>
<thead>
<tr>
<th>PAY1_X</th>
<th>Description</th>
<th>PAY1 (Standardized)</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>010</td>
<td>Medicare</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>011</td>
<td>Medicare (HMO)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>012</td>
<td>Medicare (Managed care - Other)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>013</td>
<td>Medicare (fee for service)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>020</td>
<td>Medi-Cal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>021</td>
<td>Medi-Cal (HMO)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>022</td>
<td>Medi-Cal (Managed care - Other)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>023</td>
<td>Medi-Cal (fee for service)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>030</td>
<td>Private Coverage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>031</td>
<td>Private Coverage (HMO)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>032</td>
<td>Private Coverage (Managed care - Other)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>033</td>
<td>Private Coverage (fee for service)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08n, where n=0-3</td>
<td>Self-pay</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Example: Payer Detail Varies by State
## Example:
### Race Detail Varies by State

<table>
<thead>
<tr>
<th>RACE_X</th>
<th>Description</th>
<th>RACE (Standardized)</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>White</td>
<td></td>
<td>1</td>
<td>White</td>
</tr>
<tr>
<td>2</td>
<td>Black</td>
<td></td>
<td>2</td>
<td>Black</td>
</tr>
<tr>
<td>3</td>
<td>Hispanic</td>
<td></td>
<td>3</td>
<td>Hispanic</td>
</tr>
<tr>
<td>4</td>
<td>Hawaiian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Chinese</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Filipino</td>
<td></td>
<td>4</td>
<td>Asian or Pacific Islander</td>
</tr>
<tr>
<td>7</td>
<td>Japanese</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Other Asian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Other Pacific Islander</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Native American</td>
<td></td>
<td>5</td>
<td>Native American</td>
</tr>
<tr>
<td>11</td>
<td>Mixed or Other</td>
<td></td>
<td>6</td>
<td>Other</td>
</tr>
</tbody>
</table>
### Partner-Provided Files vs. HCUP Files

<table>
<thead>
<tr>
<th>Partner-Provided Files</th>
<th>HCUP Files</th>
</tr>
</thead>
<tbody>
<tr>
<td>All data elements</td>
<td>Subset of data elements</td>
</tr>
<tr>
<td>May not have same value-added elements available</td>
<td>Value-added data elements available</td>
</tr>
<tr>
<td>Not uniformly coded across States</td>
<td>Uniformly coded across the States</td>
</tr>
<tr>
<td>Variability in quality checks by State</td>
<td>Standard data quality checks</td>
</tr>
<tr>
<td>More timely</td>
<td>Lag time</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Database Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Inpatient Sample (NIS)</td>
<td>Generate national and regional estimates of inpatient utilization, access, quality, patient safety, etc.</td>
</tr>
<tr>
<td>Kids’ Inpatient Database (KID)</td>
<td>Generate national and regional estimates of pediatric inpatient utilization, access, quality, etc.</td>
</tr>
<tr>
<td>Nationwide Readmissions Database (NRD)</td>
<td>Generate national estimates of all-cause and condition-specific readmissions.</td>
</tr>
<tr>
<td>Nationwide Emergency Department Sample (NEDS)</td>
<td>Generate national and regional estimates of emergency department utilization, access, quality, etc.</td>
</tr>
<tr>
<td>Nationwide Ambulatory Surgery Sample (NASS)</td>
<td>Generate national and regional estimates of major ambulatory surgery encounters in hospital-owned facilities.</td>
</tr>
</tbody>
</table>
All Nationwide Databases Are Derived from HCUP State Databases

- **NIS**: Sample inpatient discharges of all ages from all SID and community hospitals*
- **KID**: Sample inpatient discharges aged <= 20 years old from all SID and community hospitals*
- **NRD**: All inpatient discharges for all ages and community hospitals* from SID with verified patient linkage numbers, with some exclusions
- **NEDS**: Sample of hospital-owned EDs* from all SEDD and includes all ED admissions from the SID for the sampled EDs
- **NASS**: All major ambulatory surgery encounters for all ages and hospital-owned facilities* from the SASD, with some exclusions

*NIS, NRD, and NASS exclude community hospitals that are rehabilitation or long-term, acute-care facilities; KID and NEDS exclude community hospitals that are rehabilitation facilities.
NIS is a Stratified Sample of Discharges from the SID

State Inpatient Databases (SID)

- ~ 4,600 hospitals
- ~ 35 M records

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

Stratified Sample of Discharges
- *State not included in the stratum
- Within strata sort by hospital, DRG, and admission month and select 1 in 5 records

National Inpatient Sample (NIS)

- ~ 4,600 hospitals
- ~ 7 M records

Statistics listed from 2017 data year
KID is a Stratified Sample of Discharges from the SID

<table>
<thead>
<tr>
<th>State Inpatient Databases (SID)</th>
</tr>
</thead>
<tbody>
<tr>
<td>~ 4,600 hospitals</td>
</tr>
<tr>
<td>~ 35 M records</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strata</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncomplicated Births</td>
</tr>
<tr>
<td>Complicated Births</td>
</tr>
<tr>
<td>Pediatric Non-Births</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stratified Sample of Discharges</th>
</tr>
</thead>
<tbody>
<tr>
<td>*State not included in the stratum</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Kids' Inpatient Database (KID)</th>
</tr>
</thead>
<tbody>
<tr>
<td>~ 4,200 hospitals</td>
</tr>
<tr>
<td>~ 3M records</td>
</tr>
</tbody>
</table>

- 10% uncomplicated births
- 80% pediatric discharges

Statistics listed from 2016 data year
NEDS is a Stratified Sample of Hospitals from the SEDD and SID

State Inpatient Databases (SID)
State Emergency Department Databases (SEDD)

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

Stratified Sample of Hospitals
*State not included in the stratum

Nationalwide Emergency Department Sample (NEDS)
~ 980 EDs
~ 34M ED visits

Statistics listed from 2017 data year
~ 87% of ED visits are treat-and-release

~ 13% of ED visits result in a hospital stay

Statistics listed from 2017 data year
Additional Variables Are Included in the NEDS

These additional variables are relevant for research on emergency department utilization:

Examples include:

- Type of ED event: treated and released, admitted to the same hospital, transferred, died
- Disposition of patient from ED
- Died during the visit: in the ED, in the hospital, or did not die
- Diagnosis reported on record indicates self harm
- Trauma center level I, II, or III
- HCUP ED hospital identifier
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 (NRD)**

~ 2K hospitals
~ 18M records

Statistics listed from 2017 data year
<table>
<thead>
<tr>
<th>Discharge-level exclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharges from patients with an age of 0</td>
</tr>
<tr>
<td>Discharges with missing or unverified patient linkage numbers</td>
</tr>
<tr>
<td>Questionable patient linkage numbers: same patient linkage number on 20 or more discharges</td>
</tr>
<tr>
<td>Questionable patient linkage numbers: patient is hospitalized after discharged dead</td>
</tr>
<tr>
<td>Questionable patient linkage numbers: overlapping stays</td>
</tr>
<tr>
<td>Discharges from hospitals with more than 50 percent of their total discharges excluded for any of the above causes</td>
</tr>
</tbody>
</table>
NASS is Constructed from Major Ambulatory Surgery Encounters in the SASD

State Ambulatory Surgery and Services Databases (SASD)

- U.S. Region
- Bed Size
- Urban/Rural Location and Teaching Status
- Ownership/Control

All Major AS Encounters from Hospital-Owned Facilities*
(after exclusions)
*State not included in the stratum

Nationwide Ambulatory Surgery Sample (NASS)

~ 7.5 M ambulatory surgery encounters
~ 2,700 hospital-owned facilities

Statistics listed from 2017 data year
NASS Exclusions/Limitations

Facility-level exclusions

- Hospitals with gross irregularities in quarterly reporting volume
- Hospitals that do not submit data in all 4 quarters
- Hospitals with an unusually low volume of encounters involving an in-scope major ambulatory surgery

Encounter-level limitations

Limited to encounters involving at least one in-scope major ambulatory surgery.

Major ambulatory surgeries: selected invasive, therapeutic surgical CPT-coded procedures that typically require the use of an operating room and regional anesthesia, general anesthesia, or sedation.

In-scope surgeries include CCS for Services and Procedures categories with (1) relatively high major ambulatory surgery volume, (2) a substantial share of major ambulatory surgeries performed in hospital-owned facilities, and (3) evidence of reliable reporting from SASD hospitals.
NIS, NRD, KID, NEDS, & NASS: Must be Weighted to Produce National and Regional Discharge Estimates

* The NRD is not designed to support regional analyses.
NEDS: Must be Weighted to Produce National and Regional Hospital Estimates

NEDS → HOSPWT → Map of the United States
## Comparison of the HCUP Inpatient Databases

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>States</td>
<td>48 States + DC</td>
<td>47 States + D.C.</td>
<td>46 States + DC</td>
<td>28 States</td>
</tr>
<tr>
<td>Hospitals</td>
<td>4,584</td>
<td>4,584</td>
<td>4,200</td>
<td>2,454</td>
</tr>
<tr>
<td>Inpatient Discharges</td>
<td>35 million</td>
<td>7 million</td>
<td>3 million</td>
<td>18 million</td>
</tr>
<tr>
<td>Derived From</td>
<td>--</td>
<td>SID</td>
<td>SID</td>
<td>SID</td>
</tr>
<tr>
<td>Uses</td>
<td>Examine <strong>State and local market area</strong> statistics on healthcare utilization, access, quality, patient safety, etc. Readmission analyses possible in some States.</td>
<td>Generate <strong>national and regional</strong> estimates of healthcare utilization, access, quality, patient safety, etc.</td>
<td>Generate <strong>national and regional pediatric</strong> estimates of healthcare statistics.</td>
<td>Generate <strong>national estimates</strong> of all-cause and condition-specific readmissions.</td>
</tr>
</tbody>
</table>
## Comparison of the HCUP Outpatient Databases

<table>
<thead>
<tr>
<th></th>
<th>Emergency Department Data</th>
<th>Ambulatory Surgery and Services Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>States</strong></td>
<td>40 States + DC</td>
<td>36 States + DC</td>
</tr>
<tr>
<td><strong>Hospitals</strong></td>
<td>3,896</td>
<td>984</td>
</tr>
<tr>
<td><strong>Outpatient Records</strong></td>
<td>99 million ED visits</td>
<td>34 million ED visits</td>
</tr>
<tr>
<td><strong>Derived From</strong></td>
<td>–</td>
<td>SID &amp; SEDD</td>
</tr>
<tr>
<td><strong>Uses</strong></td>
<td>Examine ED visits at hospital-affiliated EDs that do not result in an admission for a given State.</td>
<td>Generate national and regional estimates for hospital-owned ED visits.</td>
</tr>
</tbody>
</table>
What Types of Care Are and Are Not Captured by HCUP?

### Included in HCUP

<table>
<thead>
<tr>
<th>Inpatient Care</th>
<th>State Inpatient Databases (SID)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>National (Nationwide) Inpatient Sample (NIS)</td>
</tr>
<tr>
<td></td>
<td>Kids’ Inpatient Database (KID)</td>
</tr>
<tr>
<td></td>
<td>Nationwide Readmissions Database (NRD)</td>
</tr>
<tr>
<td>Emergency Department</td>
<td>State Emergency Department Databases (SEDD)</td>
</tr>
<tr>
<td></td>
<td>Nationwide Emergency Department Sample (NEDS)</td>
</tr>
<tr>
<td>Ambulatory Surgery &amp; Services</td>
<td>State Ambulatory Surgery &amp; Services Databases (SASD)</td>
</tr>
<tr>
<td></td>
<td>Nationwide Ambulatory Surgery Sample (NASS)</td>
</tr>
<tr>
<td>Other Non-Emergent Outpatient Services</td>
<td>State Ambulatory Surgery &amp; Services Databases (SASD)</td>
</tr>
</tbody>
</table>

### Not Included in HCUP

- Physician office visits
- Pharmacy
- Labs/Radiology
# Benefits and Limitations of HCUP Databases

## Benefits

<table>
<thead>
<tr>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large number of records</td>
</tr>
<tr>
<td>Uniformity in coding</td>
</tr>
<tr>
<td>Regular, routine collection</td>
</tr>
<tr>
<td>Ease of access</td>
</tr>
<tr>
<td>All payers, including self-pay, or those billed as ‘no charge’</td>
</tr>
<tr>
<td>Available at local, State, regional, and national level</td>
</tr>
<tr>
<td>Supplemental variables available to facilitate research</td>
</tr>
</tbody>
</table>

## Limitations

<table>
<thead>
<tr>
<th>Limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited clinical details</td>
</tr>
<tr>
<td>Lack reimbursed claims information</td>
</tr>
<tr>
<td>Does not include all hospital types (e.g., VA and DoD)</td>
</tr>
<tr>
<td>Does not show complete episode of care</td>
</tr>
<tr>
<td>State databases lack hospital characteristic information</td>
</tr>
<tr>
<td>Cannot link nationwide databases to external sources</td>
</tr>
<tr>
<td>Differences in coding across hospitals</td>
</tr>
</tbody>
</table>
Some Limitations of HCUP State Databases Can be Addressed by Linking to Other Databases

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)
Summary

• Eight types of HCUP databases
• Databases are based on administrative hospital data: inpatient, emergency department, and ambulatory surgery and services
• Available for multiple years
  ► Nationwide
    - NRD (2010-2017)
    - NASS (2016-2017)
  ► State
    - SID (1990-2017)
    - SEDD (1999-2017)
• Can look at breadth of healthcare issues

Find out more on HCUP-US!
www.hcup-us.ahrq.gov/
• Project Overview
• AHRQ and HCUP Partners
• The Making of HCUP Data
• HCUP State Databases
• HCUP Nationwide Databases
• How to Obtain HCUP Data & Access HCUP Resources
The HCUP Database Process

• Processed data sent to HCUP Partners

• State Databases become available to the public through the HCUP Central Distributor

• Nationwide Databases become available for download through the HCUP Central Distributor
How to Purchase HCUP Data

► Visit the HCUP Central Distributor website.
► The Central Distributor provides one stop shopping for purchasing many of the State Databases, as well as the Nationwide Databases.
► Not all data elements are available from every Partner Organization, and not all Partner Organizations make their data available through the Central Distributor.
► Some Partner Organizations may place additional restrictions on the sale of their data.

HCUP Central Distributor website
www.hcup-us.ahrq.gov/tech_assist/centdist.jsp
Step 1: Take Data Use Agreement (DUA) online training: www.hcup-us.ahrq.gov/tech_assist/dua.jsp

Step 2: Login or register for an account: www.hcup-us.ahrq.gov/tech_assist/centdist.jsp

Step 3: Create your profile under “My Account”

Step 4: Submit online order and complete further instructions listed on the “Thank You” page

Step 5: Download Nationwide Databases online or receive delivery of State Databases through the mail

For assistance, contact the HCUP Central Distributor:

- Phone: 866-556-HCUP (4287) toll free
- Email: HCUPDistributor@ahrq.gov
Additional Requirement: 
Electronic Data Use Agreement (DUA) 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

www.hcup-us.ahrq.gov/tech_assist/dua.jsp
Pricing Information Per Data Year

Nationwide Databases (NIS, KID, NRD, NEDS, NASS)

- **NIS**: $750 beginning 2017, student price $150
- **KID**: $500 beginning 2016, student price $100
- **NRD**: $1,000 beginning 2015, student price $200
- **NEDS**: $1,000 beginning 2016, student price $200
- **NASS**: $1,000 beginning 2016, student price $200

State Databases (SID, SASD, SEDD)

- Varies by state, database, year, and type of applicant
- $50 - $3,200

Funds for State data sales returned to HCUP Partners
Partners Releasing Databases through HCUP Central Distributor

- Alaska
- Arizona
- Arkansas
- California
- Colorado
- Delaware
- District of Columbia
- Florida
- Georgia
- Hawaii
- Iowa
- Kansas
- Kentucky
- Maine
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- Nebraska
- Nevada
- New Jersey
- New Mexico
- New York
- North Carolina
- Oregon
- Rhode Island
- South Carolina
- South Dakota
- Utah
- Vermont
- Washington
- West Virginia
- Wisconsin

Remember:
Not all States participate in all years and for all databases
# Software Requirements for Working with the Full HCUP Files

<table>
<thead>
<tr>
<th>Software Package</th>
<th>Load Programs</th>
<th>Format Programs</th>
<th>Example Statistical Coding</th>
<th>HCUP Tools Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAS</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>STATA</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SPSS</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SUDAAN 9</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

MS Excel and Access are NOT GOOD Options!
HCUP User Support Website

- Find detailed information on HCUP databases, tools, and products
- Access HCUPnet, HCUP Fast Stats, the Central Distributor, Online Tutorials, and more
- Find comprehensive list of HCUP-related publications and database reports
- Access technical assistance

Visit us at www.hcup-us.ahrq.gov
Presentation Objectives Part II

• HCUPnet Overview
• HCUP Fast Stats
• Add Value to Your Databases with HCUP Tools & Software
• Publications and Publication Search
• How to Access HCUP Resources
HCUPnet: Quick, Free Access to HCUP Statistics

- Free online query system
- Users generate tables and figures of outcomes by diagnoses and procedures
- Statistics can be cross-classified by patient and hospital characteristics
- Can produce county-level statistical maps

www.hcupnet.ahrq.gov/
HCUPnet Can Answer a Variety of Questions

- What percentage of hospitalizations for children report Medicaid as expected payer, by State?
- What are the most expensive conditions treated in U.S. hospitals?
- What is the trend in hospitalizations for depression?
- Will there be a sufficient number of cases to do my analysis?
- How do my estimates and calculations compare with HCUPnet (validation)?
### Examples of What HCUPnet Provides …

<table>
<thead>
<tr>
<th>Step-by-step queries from:</th>
<th>Specialized queries by:</th>
<th>Ready-to-use statistics on:</th>
</tr>
</thead>
</table>
| **Hospital inpatient setting** (SID, NIS, KID, NRD) | • Overall inpatient stays  
• Select conditions or procedures | • Trends in inpatient stays  
• Related conditions and procedures  
• Readmissions (NRD) |
| **Emergency department (ED) setting** (SID, SEDD, NEDS) | • Overall ED visits  
• Select conditions or procedures | • Trends in ED visits  
• Percent of patients admitted versus discharged from the ED (i.e., treat-and-release) |
| **Ambulatory surgery (AS) setting** (SASD) | • Overall AS encounters  
• Select conditions or procedures | • Percent of cases treated in the inpatient versus AS settings |
| **Community-level statistics** | • County-level, regional, or U.S.-Mexico border State statistics | • Inpatient stays for alcohol and other drugs |
How Does HCUPnet Work?

• Step 1: What kind of statistics are you looking for?
• Step 2: Choose how you would like to analyze the data
• Step 3: Create your analysis
• Step 4: View and update your results in real time
• Step 5: View your results in detailed graphs and maps
• Step 6: Export your results for future use
How Does HCUPnet Work?
Analysis Setup (Steps 1 and 2)

Choose how you would like to analyze data.
- Descriptive Statistics
- Trends
- Rank Order

Choose a year:
- 2016

Choose how you want to classify diagnoses or procedures.
- Diagnoses—ICD-10-CM Codes (ICD10)

Create Analysis
### How Does HCUPnet Work?

**Modifying Results**

The screenshot displays a section of the HCUPnet website, focusing on the analysis of hospital inpatient national statistics. The analysis is for 2016, with the categorization type being diagnoses using ICD-10-CM codes (ICD10). The table shows the top 10 principal diagnoses by number, with associated codes and descriptions.

<table>
<thead>
<tr>
<th>Rank</th>
<th>ICD-10-CM Principal diagnosis code</th>
<th>Total number of discharges: N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Z38.00</td>
<td>Single liveborn infant, delivered vaginally</td>
</tr>
<tr>
<td>2</td>
<td>A41.9</td>
<td>Sepsis, unspecified organism</td>
</tr>
<tr>
<td>3</td>
<td>Z38.01</td>
<td>Single liveborn infant, delivered by cesarean</td>
</tr>
<tr>
<td>4</td>
<td>J18.9</td>
<td>Pneumonia, unspecified organism</td>
</tr>
<tr>
<td>5</td>
<td>J44.1</td>
<td>Chronic obstructive pulmonary disease with (acute) exacerbation</td>
</tr>
<tr>
<td>6</td>
<td>N17.9</td>
<td>Acute kidney failure, unspecified</td>
</tr>
<tr>
<td>7</td>
<td>I21.4</td>
<td>Non-ST elevation (NSTEMI) myocardial infarction</td>
</tr>
<tr>
<td>8</td>
<td>O34.21</td>
<td>Maternal care for scar from previous cesarean delivery</td>
</tr>
<tr>
<td>9</td>
<td>O48.0</td>
<td>Post-term pregnancy</td>
</tr>
</tbody>
</table>
### How Does HCUPnet Work?

#### Options for Result Output

<table>
<thead>
<tr>
<th>Analysis Type</th>
<th>Setting of Care</th>
<th>Geographic Settings</th>
<th>Years</th>
<th>Categorization Type</th>
<th>Principal or All-Listed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rank</td>
<td>Hospital Inpatient</td>
<td>National</td>
<td>2016</td>
<td>Diagnoses--ICD-10-CM Codes (ICD10)</td>
<td>Principal</td>
</tr>
<tr>
<td>Outcome and Measures</td>
<td>Number</td>
<td>Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

##### Hide Standard Errors

- Excel
- CSV

---

**HCUPnet - Hospital Inpatient National Statistics**

**Results Per Table:**

2016 National Diagnoses--ICD-10-CM Codes (ICD10), Principal

**Rank order of ICD-10-CM Codes (ICD10) Diagnoses by Number**

<table>
<thead>
<tr>
<th>Rank</th>
<th>ICD-10-CM Principal diagnosis code</th>
<th>Total number of discharges: N</th>
<th>Total number of discharges: SE(N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Z38.00 Single liveborn, delivered vaginally</td>
<td>2,497,092</td>
<td>43,361</td>
</tr>
<tr>
<td>2</td>
<td>A41.9 Sepsis, unspecified organism</td>
<td>1,446,559</td>
<td>18,010</td>
</tr>
<tr>
<td>3</td>
<td>Z38.01 Single liveborn infant, delivered by cesarean</td>
<td>1,153,764</td>
<td>21,486</td>
</tr>
<tr>
<td>4</td>
<td>J18.9 Pneumonia, unspecified organism</td>
<td>603,379</td>
<td>5,871</td>
</tr>
<tr>
<td>5</td>
<td>J44.1 Chronic obstructive pulmonary disease with (acute) exacerbation</td>
<td>501,849</td>
<td>5,868</td>
</tr>
<tr>
<td>6</td>
<td>N17.9 Acute kidney failure, unspecified</td>
<td>478,175</td>
<td>5,319</td>
</tr>
<tr>
<td>7</td>
<td>I21.4 Non-ST elevation (NSTEMI) myocardial infarction</td>
<td>470,935</td>
<td>7,131</td>
</tr>
<tr>
<td>8</td>
<td>O34.21 Maternal care for scar from previous cesarean delivery</td>
<td>366,610</td>
<td>6,904</td>
</tr>
<tr>
<td>9</td>
<td>O48.0 Post-term pregnancy</td>
<td>348,165</td>
<td>8,171</td>
</tr>
</tbody>
</table>

---

Click to Graph Table
Additional Examples of Output from HCUPnet

Statistics for community hospital stays 2016 California, by county or county equivalent

Stays Related to Mental and/or Substance Use Disorders

<table>
<thead>
<tr>
<th>FIPS state county code</th>
<th>Total number of discharges</th>
<th>Rate of discharges per 100,000 population</th>
<th>Age/sex adjusted rate of discharges per 100,000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Total</td>
<td>9,055,578</td>
<td>3,687.7</td>
<td>3,047.7</td>
</tr>
<tr>
<td>State Total</td>
<td>899,536</td>
<td>2,285.6</td>
<td>2,285.8</td>
</tr>
<tr>
<td>Alameda, California</td>
<td>32,529</td>
<td>1,973.6</td>
<td>1,929.7</td>
</tr>
<tr>
<td>Alpine, California</td>
<td>13</td>
<td>1,800.0</td>
<td>1,817.3</td>
</tr>
<tr>
<td>Amador, California</td>
<td>1,202</td>
<td>3,284.4</td>
<td>2,789.7</td>
</tr>
<tr>
<td>Butte, California</td>
<td>11,834</td>
<td>5,213.6</td>
<td>5,043.5</td>
</tr>
<tr>
<td>Calaveras, California</td>
<td>1,290</td>
<td>2,888.6</td>
<td>2,402.5</td>
</tr>
<tr>
<td>Colusa, California</td>
<td>404</td>
<td>1,875.6</td>
<td>1,933.3</td>
</tr>
<tr>
<td>Contra Costa, California</td>
<td>25,341</td>
<td>2,252.2</td>
<td>2,149.2</td>
</tr>
</tbody>
</table>

Total number of discharges:

- 18 - 846
- 881 - 2,780
- 2,803 - 7,333
- 7,440 - 19,291
- 23,780 - 237,174
<table>
<thead>
<tr>
<th>Capability</th>
<th>HCUPnet Can Produce...</th>
<th>HCUP Databases Can Produce...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple statistics</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>More complicated queries</td>
<td>X</td>
<td>✓</td>
</tr>
<tr>
<td>Sample size calculations</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Trends analyses</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Multivariate analyses</td>
<td>X</td>
<td>✓</td>
</tr>
<tr>
<td>Rank order of diagnoses and procedures</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Z-test calculator for significance testing</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Validation of results obtained from the HCUP databases</td>
<td>✓</td>
<td>X</td>
</tr>
</tbody>
</table>
Presentation Objectives Part II

• HCUPnet Overview
• **HCUP Fast Stats**
• **Add Value to Your Databases with HCUP Tools & Software**
• Publications and Publication Search
• How to Access HCUP Resources
HCUP Fast Stats provides easy access to the latest HCUP-based statistics for healthcare information topics. HCUP Fast Stats uses visual statistical displays in stand-alone graphs, trend figures, or simple tables to convey complex information at a glance. Fast Stats will be updated regularly (quarterly or annually, as newer data become available) for timely, topic-specific national and State-level statistics.

- State Trends in Hospital Use by Payer
  - Inpatient Stay Trends by Payer (Updated Dec. 2019)
  - Emergency Department Visit Trends by Payer (Updated Dec. 2019)

- Opioids & Neonatal Abstinence Syndrome
  - Opioid-Related Hospital Use, National and State (Updated Apr. 2019)
  - Neonatal Abstinence Syndrome (NAS), National and State (NEW Sep. 2019)

- National Hospital Utilization and Costs
  - Trends in Inpatient Stays (Updated Mar. 2019; through 2016 data)
  - Most Common Diagnoses for Inpatient Stays (Updated Nov. 2017; through 2015 data)
  - Most Common Operations During Inpatient Stays (Updated Nov. 2017; through 2015 data)

- Other Topics
  - Hurricane Impact on Hospital Use (NEW Dec. 2019)

- HCUP Fast Stats provides easy access to the latest HCUP-based statistics for healthcare information topics.
- Uses visual statistical displays in stand-alone graphs, trend figures, or simple tables to convey complex information at a glance.
- Information will be updated regularly (quarterly or annually, as newer data become available).

www.hcup-us.ahrq.gov/faststats/landing.jsp
HCUP Fast Stats – National Hospital Utilization and Costs

• Includes information on trends in inpatient stays, the most common diagnoses for inpatient stays, and the most common operations during inpatient stays.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National (Nationwide) Inpatient Sample (NIS) 2007-2016 (all available data as of 02/06/2019).
HCUP Fast Stats –
Opioid-Related Hospital Use

• Provides information on opioid-related inpatient stays and ED visits overall and by age group, sex, community-level income, patient location, and expected payer. Trends are presented graphically as population-based rates for the U.S. and by State.

Source: Agency for Healthcare Research and Quality (AHRQ). Healthcare Cost and Utilization Project (HCUP), National (Nationwide) Inpatient Sample (NIS), 2009-2016 (all available data as of 03/22/2019). Inpatient stays include those admitted through the emergency department.
HCUP Fast Stats – Neonatal Abstinence Syndrome Among Newborn Hospitalizations

- Provides trends in neonatal abstinence syndrome-related newborn hospitalizations overall and by sex, expected payer, community-level income, and patient location. Trends are presented graphically as rates per 1,000 newborn hospitalizations, median costs, and median length of stay for the U.S. and by State.
HCUP Fast Stats – Interactive Maps

Rate of Opioid-Related Inpatient Stays per 100,000 Population
2016 National rate: 296.9

Rate of Opioid-Related ED Visits per 100,000 Population
2016 National rate: 243.5

Rate of NAS per 1,000 Newborn Hospitalizations
2016 National rate: 7.0
HCUP Fast Stats – Hurricane Impact on Hospital Use

- Presents change in population-based inpatient and emergency department utilization rates pre- versus post-hurricane for 11 U.S. hurricanes between 2005-2017. Hospital utilization statistics are provided for all conditions and for injuries only, and for select age groups, based on county proximity to the hurricane.
Presentation Objectives Part II

- HCUPnet Overview
- HCUP Fast Stats
- Add Value to Your Databases with HCUP Tools & Software
- Publications and Publication Search
- How to Access HCUP Resources
What are HCUP Software Tools?

• Can be applied to HCUP databases, to systematically create new data elements from existing data, thereby enhancing a researcher's ability to conduct analyses

• While designed to be used with HCUP databases, the analytic tools may be applied to other administrative databases
Multiple Coding Systems

Consider which coding system is appropriate for your analysis

<table>
<thead>
<tr>
<th>Diagnosis-Related</th>
<th>Procedure-Related</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICD-10-CM</td>
<td>ICD-10-PCS</td>
</tr>
<tr>
<td>DRGs*</td>
<td>CPT</td>
</tr>
<tr>
<td>MDCs*</td>
<td>HCPCS</td>
</tr>
<tr>
<td>ICD-9-CM</td>
<td>ICD-9-CM</td>
</tr>
</tbody>
</table>

*Grouped conditions/procedures on inpatient stays
ICD-10-CM Diagnosis-Related HCUP Software Tools
The CCSR replaces the beta version of the CCS for ICD-10-CM diagnoses and applies to all ICD-10-CM diagnosis codes through fiscal year (FY) 2020.

Aggregates over 70,000 ICD-10-CM diagnosis codes into a manageable number of clinically meaningful categories.

Categories are organized across 21 body systems, which generally follow the structure of the ICD-10-CM diagnosis chapters.
<table>
<thead>
<tr>
<th>Difference</th>
<th>CCSR for ICD-10-CM Diagnoses</th>
<th>CCS for ICD-10-CM (Beta Version)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of categories</td>
<td>Over 530 categories</td>
<td>283 categories</td>
</tr>
<tr>
<td>Mutually exclusive category assignment</td>
<td>Some codes cross-classified to more than one CCSR diagnosis category</td>
<td>Each diagnosis code maps to one and only one CCS category</td>
</tr>
<tr>
<td>Category naming convention</td>
<td>Categories start with three-character body system abbreviation followed by three digits</td>
<td>Categories are numeric</td>
</tr>
<tr>
<td>Multi-level system</td>
<td>No multi-system developed</td>
<td>Multi-level system with additional diagnostic information up to two levels</td>
</tr>
<tr>
<td>Output from SAS software</td>
<td>Flexibility to choose between file output versions</td>
<td>Array of CCS data elements with the CCS category as the value</td>
</tr>
</tbody>
</table>
Example: CCSR Category Naming Convention and Assignment

**Diagnosis Code I13.0**
Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease

**CCSR CIR008**
Hypertension with complications and secondary hypertension

**CCSR CIR019**
Heart failure

**CCSR GEN003**
Chronic kidney disease
CCSR for ICD-10-CM Diagnoses
Default Categorization Scheme

• Added to v2020.2, released in February 2020
• Purpose of default CCSR categorization:
  ► Allow users to rank hospital encounters into mutually exclusive groups
    - Principal (or first-listed) diagnosis code is assigned to a single default CCSR category
    - Each hospital encounter can be counted just once
• The default categorizations are based on a specific set of 12 guidelines
CCSR for ICD-10-CM Diagnoses

Resources

- User Guide for ICD-10-CM Diagnoses (PDF)
  - Detailed description of the guidelines used to assign CCSR categories and default for principal diagnosis
  - How-to guide for using the SAS program and CSV mapping file with your administrative data

- Diagnosis CCSR reference file (Excel)
  - Searchable list of CCSR categories
  - Searchable list of ICD-10-CM codes, CCSR assignment, and default CCSR for the principal diagnosis

- Comparison of the CCSR with the beta version of the CCS for ICD-10-CM Diagnoses (both PDF and Excel)

- Log of changes across versions (Excel)

www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp
Chronic Condition Indicator (CCI) for ICD-10-CM (Beta Version)

• Currently a beta version; a fully refined version of the CCI for ICD-10-CM is expected to be released in late 2020

• Group diagnosis codes into Chronic or Non-Chronic Categories
  ► CCI for ICD-10-CM diagnoses codes (beta version)
  ► by FY for years 2016-2020

Condition Categories
1. Chronic, e.g., Diabetes
2. Non-Chronic, e.g., Food Poisoning
Elixhauser Comorbidity Software for ICD-10-CM (Beta Version)

• Currently a beta version; a fully refined version of the Elixhauser Comorbidity for ICD-10-CM is expected to be released in late 2020

• Creates indicator flags for 29 major comorbidities
  ▶ Elixhauser Comorbidity Software for ICD-10-CM (beta version) available by FY for years 2016-2020

ICD-10-CM codes
DRGs on Administrative Data

Comorbidity Variables
- Obesity
- Congestive heart failure
- Hypertension
- Paralysis
- Diabetes
- Liver disease…
ICD-10-PCS Procedure-Related HCUP Software Tools
Clinical Classifications Software (CCS) for ICD-10-PCS (Beta Version)

- Currently a beta version; a fully refined version of the CCS for ICD-10-PCS is expected to be released in late 2020
- Clusters procedure codes into clinically meaningful categories
  - >77,000 ICD-10-PCS procedure codes → 231 categories
- Useful for presenting descriptive statistics and understanding patterns
- The CCS can be used to identify populations for procedure-specific studies
- It can be a useful way to categorize procedures when exploring data and can serve as a tool for reporting statistical information on hospitalizations
Procedure Classes for ICD-10-PCS (Beta Version)

- Currently a beta version; a fully refined version of the Procedure Classes for ICD-10-PCS is expected to be released in late 2020
- Groups procedure codes into one of four categories
  - Versions available by FY for years 2016-2020

<table>
<thead>
<tr>
<th>Procedure Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Minor Diagnostic, e.g., Electrocardiogram</td>
</tr>
<tr>
<td>2. Minor Therapeutic, e.g., Pacemaker</td>
</tr>
<tr>
<td>3. Major Diagnostic, e.g., Pericardial Biopsy</td>
</tr>
<tr>
<td>4. Major Therapeutic, e.g., CABG</td>
</tr>
</tbody>
</table>
Utilization Flags for ICD-10-PCS (Beta Version)

• Currently a beta version; a fully refined version of the Utilization Flags is expected to be released in 2021
• Reveals additional information about the use of healthcare services
• Primarily uses UB-04 revenue codes, augmented with ICD-10-PCS procedure codes
  ▶ Versions available by FY for years 2017-2020
2016-2018 State and 2016-2017 Nationwide Databases: Revised Structure

- 2016-2018 State and 2016-2017 Nationwide databases include full calendar years of data with diagnosis and procedure codes reported using the ICD-10-CM/PCS coding system.
- Data elements derived from HCUP software tools are not provided in these HCUP databases.
- For users interested in applying the HCUP software tools to the ICD-10-CM/PCS data in the 2016-2018 State and 2016-2017 Nationwide databases:
  - CCSR for ICD-10-CM diagnoses is available for download from the HCUP Tools & Software section of the HCUP-US Website.
  - Beta versions of other HCUP software tools are also available for download.
  - The HCUP Tools Loading tutorial is available to assist users interested in applying the HCUP software tools to the data at www.hcup-us.ahrq.gov.tech_assist/tutorials.jsp.
CPT/HCPCS Procedure-Related HCUP Software Tools
Clinical Classifications Software (CCS) for Services and Procedures

• Clusters HCPCS Level I (or CPT procedure codes) and HCPCS Level II codes into clinically meaningful procedure categories

• Procedure categories are identical to the CCS beta version for ICD-10-PCS and CCS for ICD-9-CM, with the addition of specific categories unique to professional service codes in CPT/HCPCS

• Users must agree to a license to use the CCS-Services and Procedures before accessing the software

• Updated to include procedure codes effective January 2019
Surgery Flags for Services and Procedures

• Provides a method for identifying surgical procedures and encounters using CPT-based data

• Surgery Flags for Services and Procedures
  ▶ Updated to include CPT codes released through January 2019

1. **Narrow**
   • Invasive therapeutic surgical procedure
   • Typically requires use of an operating room
   • Requires regional/general anesthesia, or sedation to control pain

2. **Broad**
   • Includes all narrowly defined surgical procedures as well as a broader group of diagnostic and less invasive therapeutic surgeries

3. **Neither Broad nor Narrow**
   • Ex: Use of endoscopies for diagnostic purposes only and for which nothing was removed
ICD-9-CM Related HCUP Software Tools
HCUP Software Tools for ICD-9-CM

- Clinical Classifications Software (CCS) for ICD-9-CM Diagnosis and Procedures
- Chronic Condition Indicator for ICD-9-CM
- Elixhauser Comorbidity Software for ICD-9-CM
- Procedure Classes for ICD-9-CM
- Utilization Flags for ICD-9-CM
- Surgery Flags for ICD-9-CM

https://www.hcup-us.ahrq.gov/tools_software.jsp
AHRQ Quality Indicators
AHRQ Quality Indicators

• Create measures of healthcare quality using inpatient administrative data

• Four Quality Indicator modules:
  1. Prevention Quality Indicators (PQIs)
  2. Inpatient Quality Indicators (IQIs)
  3. Patient Safety Indicators (PSIs)
  4. Pediatric Indicators (PDIs)
# AHRQ Value-Added Clinical and Quality Measurement Tools

<table>
<thead>
<tr>
<th>HCUP Software Tool</th>
<th>ICD-9-CM</th>
<th>ICD-10-CM/PCS (Beta)</th>
<th>ICD-10-CM Diagnoses</th>
<th>CPT® Procedure Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Classifications Software (CCS)</td>
<td>X*</td>
<td>X</td>
<td></td>
<td>X*</td>
</tr>
<tr>
<td>Clinical Classifications Software Refined (CCSR) for ICD-10-CM diagnoses <strong>NEW</strong></td>
<td></td>
<td></td>
<td>X (ICD-10-CM only)</td>
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<tr>
<td>Procedure Classes</td>
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<td>Utilization Flags</td>
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<td>Surgery Flags</td>
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**AHRQ Quality Indicators**

<table>
<thead>
<tr>
<th>AHRQ Quality Indicators</th>
<th>ICD-9-CM</th>
<th>ICD-10-CM/PCS (Beta)</th>
<th>ICD-10-CM Diagnoses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention Quality Indicators</td>
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<tr>
<td>Inpatient Quality Indicators</td>
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<tr>
<td>Patient Safety Indicators</td>
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<td></td>
</tr>
<tr>
<td>Pediatric Quality Indicators</td>
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</tr>
</tbody>
</table>

*Included on the HCUP databases*
HCUP Supplemental Files
HCUP Supplemental Files Can Only be Applied to HCUP Databases

- Cost-to-Charge Ratio (CCR) Files
- Hospital Market Structure (HMS) Files
- Trend Weights Files (NIS & KID)
- NIS Hospital Ownership File
Cost-to-Charge Ratio (CCR) Files

- Enable conversion of charge data to cost data on the SID, NIS, KID, and NRD

Hospital-Level Data → Apply Ratios → Convert Total Charges to Costs

<table>
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<th>C</th>
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<tbody>
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<td>7</td>
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</tbody>
</table>
Hospital Market Structure (HMS) Files

- Contain various measures of hospital market competition
- Allow users to broadly characterize the intensity of competition that hospitals face
  - Using various definitions of market area
Additional HCUP Supplemental Files

- Trend Weights Files (NIS & KID)
  - Provide trend weights and data elements that are consistently defined across data years to address the NIS sample redesign in 2012 and the KID sample redesign in 2000

- AHA Linkage Files
  - Enable researchers to link hospital identifiers in some State databases to the AHA Annual Survey Databases

www.hcup-us.ahrq.gov/tools_software.jsp
www.hcup-us.ahrq.gov/tools_software.jsp

HCUPnet
HCUPnet is an online query system for identifying, tracking, analyzing, and comparing statistics on inpatient and outpatient care. HCUPnet provides statistics from the HCUP Nationwide Databases (NID, KID, NEDS, and NRD) and the State Databases (SID, SASS, and SEED) for those States that have agreed to participate.

HCUP Fast Stats
HCUP Fast Stats provides easy online access to the latest HCUP-based statistics for select State and national healthcare information topics. HCUP Fast Stats uses interactive, side-by-side comparisons of visual statistical displays, trend figures, or simple tables to convey complex information at a glance.

AHRQ Quality Indicators (QIs)
AHRQ Quality Indicators (QIs) are standardized, evidence-based measures of healthcare quality that can be used with readily available hospital inpatient administrative data to measure and track clinical performance and outcomes.

MONAHQ
MONAHQ is a software product that enables organizations—such as state and local data organizations, hospital systems, and health plans—to input either publicly available or their own data and quality metrics for hospitals, nursing homes, and physicians, and then generate a data-driven website that can be used by consumers or healthcare professionals to compare care providers.

Note: Effective September 27, 2017, technical support and software updates are no longer available for the MONAHQ tool. Existing software and supporting materials will remain available on the MONAHQ website, as well as the open source project.

HCUP Tools & Software
The HCUP Tools and Software can be applied to HCUP databases, to systematically create new data elements from existing data, thereby enhancing a researcher’s ability to conduct analyses. While designed to be used with HCUP databases, the analytic tools may be applied to other administrative databases. We welcome comments. If you have questions or suggestions for changes, please contact hcup@ahrq.gov.

The U.S. transitioned to the International Classification of Diseases, 10th Revision, Clinical Modification/Procedure Coding System (ICD-10-CM/PCS) coding scheme on October 1, 2015. The HCUP tools for International Classification of Diseases, 9th revision, Clinical Modification (ICD-9-CM) should only be used with data for discharges before 10/1/15.

The HCUP tools were translated to ICD-10-CM/PCS prior to the availability of ICD-10-CM/PCS-coded data. The translated tools are considered in beta version until a refined version of the tool can be developed. Preliminary findings suggest some unexpected discontinuities between the tools based on ICD-9-CM and the beta version of tools based on ICD-10-CM/PCS. See the ICD-10-CM/PCS Resources page for details. The tools will continue to undergo refinements over the next several years. You are advised to visit this page regularly to download and apply the most recent version of the HCUP tools for your data throughout your research process.

Tools for ICD-10-CM/PCS

NEW! Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses
Clinical Classifications Software Refined (CCSR) for ICD-10-CM diagnoses aggregates over 72,000 ICD-10-CM diagnosis codes into a manageable number of clinically meaningful categories organized across 21 body systems, which generally follow the structure of the ICD-10-CM diagnosis chapters. The CCSR reduces the beta version of the CCSR for ICD-10-CM diagnoses. It provides a means by which to identify specific clinical conditions using ICD-10-CM diagnosis codes. The CCSR capitalizes on the specificity built into ICD-10-CM coding by creating new clinical categories that did not exist in previous versions of the CCSR and allows ICD-10-CM codes to be classified in more than one category. The CCSR is intended to be used analytically to examine patterns of healthcare in terms of cost, utilization, and outcomes; rank utilization by diagnosis; and risk adjust by clinical condition. (Codes valid through FY 2020.)

Beta Versions of HCUP Tools for ICD-10-CM/PCS

Clinical Classifications Software (CCS) for ICD-10-CM/PCS (beta version)
Clinical Classifications Software (CCS) for ICD-10-CM/PCS (beta version) provides a method for classifying ICD-10-CM procedures into clinically meaningful categories, which can be used for aggregate statistical reporting of a variety of types. (Updated for codes valid through FY 2015.)

Chronic Condition Indicator for ICD-10-CM (beta version)
Chronic Condition Indicator for ICD-10-CM (beta version) provides a method for categorizing ICD-10-CM diagnosis codes into one of two categories: chronic or not chronic. The tool can also assign ICD-10-CM diagnosis codes into 1 of 18 body system categories. (Codes valid for FY 2015.) A fully refined version of the Chronic Condition Indicator for ICD-10-CM is expected to be released in 2019.

Elbhauser Comorbidity Software for ICD-10-CM (beta version)
Elbhauser Comorbidity Software for ICD-10-CM assigns variables that identify coexisting conditions on hospital discharge records. (Codes valid through FY 2013.) The software computes an index for in-hospital mortality and an index for readmissions.

Tools for ICD-9-CM

Clinical Classifications Software (CCS) for ICD-9-CM
Clinical Classifications Software (CCS) for ICD-9-CM provides a method for classifying ICD-9-CM diagnoses or procedures into clinically meaningful categories, which can be used for aggregate statistical reporting of a variety of types. (Updated for codes valid through FY 2015.)

Chronic Condition Indicator for ICD-9-CM
Chronic Condition Indicator for ICD-9-CM provides an easy way to categorize ICD-9-CM diagnosis codes into one of two categories: chronic or not chronic. The tool can also assign ICD-9-CM diagnosis codes into 1 of 18 body system categories. (Codes valid through FY 2015.)

Elbhauser Comorbidity Software for ICD-9-CM
Elbhauser Comorbidity Software for ICD-9-CM assigns variables that identify coexisting conditions on hospital discharge records. (Codes valid through FY 2013.) The software computes an index for in-hospital mortality and an index for readmissions.

Procedure Classes for ICD-9-CM
Procedure Classes for ICD-9-CM identifies whether a procedure is (a) diagnostic or therapeutic, and (b) major or minor in terms of invasiveness and/or resource use. (Updated for codes valid through FY 2015.)

Utilization Flags for ICD-9-CM
Utilization Flags for ICD-9-CM combines information from UB-04 revenue codes and ICD-9-CM procedure codes to create flags, or indicators, of utilization. Use of procedures and services such as ICU, CCU, NICU, and specific diagnostic tests and therapies can be assessed with these Utilization Flags. (Updated for codes valid through FY 2015.)

Surgery Flags for ICD-9-CM
Surgery Flags for ICD-9-CM provides a method for identifying surgical procedures and encounters using ICD-9-CM procedure codes. (Codes valid through FY 2015.)
Presentation Objectives Part II

- HCUPnet Overview
- HCUP Fast Stats
- Add Value to Your Databases with HCUP Tools & Software
- Publications and Publication Search
- How to Access HCUP Resources
HCUP Publications

- Statistical Briefs
- Methods Series Reports
Methodological information on the HCUP databases and software tools
HCUP Findings-At-A-Glance

- Provide focused look at different topics across a broad range of health policy issues relate to hospital use and costs
- Examples of current report topics:
  - Wildfires in California: Emergency Department Visits, 2018
  - Suicidal Ideation, Suicide Attempt, or Self-Inflicted Harm: Pediatric Emergency Department Visits, 2010-2014 and 2016
www.hcup-us.ahrq.gov/reports.jsp
Publications Search Page on HCUP-US Website

- Simple or advanced search options:
  - Data Year
  - Database, Tool, & Product
  - Author
  - Title
  - State

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HCUP Supports High Impact Health Services, Policy, & Clinical Research
Presentation Objectives Part II

• HCUPnet Overview
• HCUP Fast Stats
• Add Value to Your Databases with HCUP Tools & Software
• Publications and Publication Search
• How to Access HCUP Resources
HCUP User Support Website

- Find detailed information on HCUP databases, tools, and products
- Access HCUPnet, HCUP Fast Stats, the Central Distributor, Online Tutorials, and more
- Find comprehensive list of HCUP-related publications, database reports, and fact books
- Access technical assistance

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Technical Assistance Team
• Responds to inquiries about HCUP data, products, and tools
• Collects user feedback and suggestions for improvement

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