The Healthcare Cost and Utilization Project (HCUP)

Overview of HCUP Products and Tools

Agency for Healthcare Research and Quality
Webinar ♦ September 17, 2019
Webinar Overview

• Introduction to HCUP
• Readily Available HCUP Information
  ► HCUPnet Overview
  ► HCUP Fast Stats
• Add Value to Your Databases with HCUP Tools & Software
• Publications and Publication Search
• How to Access HCUP Resources
Healthcare Cost and Utilization Project (HCUP)

THE LARGEST COLLECTION OF MULTI-YEAR, ALL-PAYER, ENCOUNTER-LEVEL:

INPATIENT
EMERGENCY DEPARTMENT
AMBULATORY SURGERY
HOSPITAL-BASED ADMINISTRATIVE DATA
What is HCUP?

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

Federal-State-Private Partnership

HCUP Databases

Online Tools

Analytics

User Support

SID

SEDD

SASD

NEDS

NIS

KID

NRD
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 (HHS).
# HCUP Answers Questions

Uniquely addresses variation in acute care

| Use of inpatient, emergency department (ED), and ambulatory surgery and other outpatient services | Expected payer of services (Medicare, Medicaid, private insurance, self-pay, or those billed as ‘no charge’)
<table>
<thead>
<tr>
<th></th>
<th></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, State, national)</td>
<td>Access, quality, patient safety</td>
</tr>
</tbody>
</table>

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

*Availability varies by State
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 Nationwide Databases
  - National Inpatient Sample (NIS)
  - Nationwide Emergency Department Sample (NEDS)
  - Kids’ Inpatient Database (KID)
  - Nationwide Readmissions Database (NRD)
## HCUP State Databases

<table>
<thead>
<tr>
<th>State Inpatient Databases (SID)</th>
<th>Inpatient discharge data (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>Ambulatory surgery data (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>Emergency department data (treat-and-release) from participating HCUP States</td>
</tr>
<tr>
<td>Database Name</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<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 Emergency Department Sample (NEDS)</td>
<td>Generate national and regional estimates of emergency department 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>
</tbody>
</table>
AHRQ plans to release the Nationwide Ambulatory Surgery Sample or NASS soon

- Nationally representative database of major ambulatory surgery encounters
- Sampled from the SASD
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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>
<tbody>
<tr>
<td><strong>Hospital inpatient setting</strong> (SID, NIS, KID, NRD)</td>
<td>• Overall inpatient stays</td>
<td>• Trends in inpatient stays</td>
</tr>
<tr>
<td></td>
<td>• Select conditions or procedures</td>
<td>• Related conditions and procedures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Readmissions (NRD)</td>
</tr>
<tr>
<td><strong>Emergency department (ED) setting</strong> (SID, SEDD, NEDS)</td>
<td>• Overall ED visits</td>
<td>• Trends in ED visits</td>
</tr>
<tr>
<td></td>
<td>• Select conditions or procedures</td>
<td>• Percent of patients admitted versus discharged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>from the ED (i.e., treat-and-release)</td>
</tr>
<tr>
<td><strong>Ambulatory surgery (AS) setting</strong> (SASD)</td>
<td>• Overall AS encounters</td>
<td>• Percent of cases treated in the inpatient versus AS</td>
</tr>
<tr>
<td></td>
<td>• Select conditions or procedures</td>
<td>settings</td>
</tr>
<tr>
<td><strong>Community-level statistics</strong></td>
<td>• County-level, regional, or U.S.-Mexico border State statistics</td>
<td>• Inpatient stays for alcohol and other drugs</td>
</tr>
</tbody>
</table>
How Does HCUPnet Work?

• **Step 1:** What kind of statistics are you looking for?
• **Step 2:** Do you want information on a specific diagnosis or procedure?
• **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: Step 1

Analysis Setup

Choose a setting of care.

- **Inpatient**
  - Statistics on stays in hospitals.
  - Statistics are from the HCUP National (Nationwide) Inpatient Sample (NIS), Kids' Inpatient Database (KID), and State Inpatient Databases (SID).
  - Statistics on readmissions are from the Nationwide Readmissions Database (NRD).

- **Emergency Department**
  - Statistics on emergency department visits.
  - Statistics are from the HCUP Nationwide Emergency Department Sample (NEDS), State Emergency Department Databases (SEDD), and State Inpatient Databases (SID).

- **Ambulatory Surgery**
  - Statistics on ambulatory surgeries.
  - Statistics are from the HCUP State Ambulatory Surgery and Services Databases (SASD), with comparisons with statistics from the HCUP State Inpatient Databases (SID).

- **Community**
  - Statistics on hospital stays for counties or regions.
  - Data are from the HCUP State Inpatient Databases (SID) for participating States.
How Does HCUPnet Work?

• Step 1: What kind of statistics are you looking for?
• **Step 2:** Do you want information on a specific diagnosis or procedure?
• Step 3: Create your analysis
• Step 4: View and update your results in real time
• Step 5: View your results in detailed graphs
• Step 6: Export your results for future use
How Does HCUPnet Work: Step 2

1. Inpatient
2. Choose how you would like to analyze data.
   - Descriptive Statistics
   - Trends
   - Rank Order
3. Choose a year.
   - 2016
4. Choose how you want to classify diagnoses or procedures.
   - Please Note: ICD-10 Procedure Codes, Medicare-Severity Diagnosis Related Groups (MS-DRG) and Diagnosis Related Groups (DRG) for Trends Will Be Added Soon
5. Diagnoses—ICD-10-CM Codes (ICD10)

Create Analysis
How Does HCUPnet Work?

• Step 1: What kind of statistics are you looking for?
• Step 2: Do you want information on a specific diagnosis or procedure?
• **Step 3: Create your analysis**
• Step 4: View and update your results in real time
• Step 5: View your results in detailed graphs
• Step 6: Export your results for future use
How Does HCUPnet Work: Step 3

Analysis Setup

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.

Please Note: ICD-10 Procedure Codes, Medicare-Severity Diagnosis Related Groups (MS-DRG) and Diagnosis Related Groups (DRG) for Trends Will Be Added Soon

Diagnoses--ICD-10-CM Codes (ICD10)

Create Analysis
How Does HCUPnet Work?

- **Step 1**: What kind of statistics are you looking for?
- **Step 2**: Do you want information on a specific diagnosis or procedure?
- **Step 3**: Create your analysis
- **Step 4**: View and update your results in real time
- **Step 5**: View your results in detailed graphs
- **Step 6**: Export your results for future use
## How Does HCUPnet Work: Step 4

### Manage Analysis
- **Analysis Type**: Rank
- **Setting of Care**: Hospital Inpatient
- **Geographic Settings**: National
- **Years**: 2016
- **Categorization Type**: Diagnoses—ICD-10-CM Codes (ICD10)
- **Principal or All-Listed**: Principal
- **Outcome and Measures**: Number | Rate

### HCUPnet - Hospital Inpatient National Statistics

#### Results Per Table: 10

<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>Z86.00 Single liveborn infant, 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>Z86.01 Single liveborn infant, delivered by cesarean</td>
<td>1,153,164</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>5,688</td>
</tr>
<tr>
<td>6</td>
<td>N17.9 Acute kidney failure, unspecified</td>
<td>478,175</td>
<td>3,319</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>O68.0 Post-term pregnancy</td>
<td>348,165</td>
<td>8,171</td>
</tr>
<tr>
<td>10</td>
<td>N39.0 Urinary tract infection, site not specified</td>
<td>355,594</td>
<td>3,777</td>
</tr>
</tbody>
</table>

- Weighted national estimates from HCUP National (Nationwide) Inpatient Sample (NIS), 2016, Agency for Healthcare Research and Quality (AHRQ), based on data collected by individual States and provided to AHRQ by the States. Total number of weighted discharges in the U.S. based on HCUP NIS = JULY 31 2016. Statistics based on estimates with a relative standard error (standard error / weighted estimate) greater than 30% or with standard error > 1/10 in the nationwide statistics (NS, NSU, and NSL) are not reliable. These statistics are suppressed and are designated with an asterisk (*).
- Beginning with the 2012 data, the National Inpatient Sample (NIS) was redesigned to optimize national estimates. The nationwide statistics in HCUPnet for years prior to 2012 were represented using new trend weights in order to permit longitudinal analysis. The representative data were posted to HCUPnet on 7/2/2014. The statistics for years prior to 2012 currently on HCUPnet will differ slightly from statistics obtained prior to 7/2/2014. For more information about the NIS redesign and trend weights, please view the Overview of the NIS.
How Does HCUPnet Work?

• Step 1: What kind of statistics are you looking for?
• Step 2: Do you want information on a specific diagnosis or procedure?
• Step 3: Create your analysis
• Step 4: View and update your results in real time
• **Step 5: View your results in detailed graphs**
• Step 6: Export your results for future use
How Does HCUPnet Work: Step 5

HCUPnet - Hospital Inpatient National Statistics

Results Per Table: 10

Column: Total number of discharges N  
Row: Rank

2016 National Diagnoses—ICD-10-CM Codes (ICD10), Principal—Rank order of ICD-10-CM Codes (ICD10) Diagnoses by Number—with Standard Errors
How Does HCUPnet Work?

- Step 1: What kind of statistics are you looking for?
- Step 2: Do you want information on a specific diagnosis or procedure?
- Step 3: Create your analysis
- Step 4: View and update your results in real time
- Step 5: View your results in detailed graphs
- **Step 6: Export your results for future use**
How Does HCUPnet Work: Step 6

HCUPnet - Hospital Inpatient National Statistics

- Analysis Type: Rank
- Setting of Care: Hospital Inpatient
- Geographic Settings: National
- Years: 2016
- Categorization Type: Diagnoses--ICD-10
- Diagnoses--ICD-10: Codes (ICD10), Principal
- Rank order of ICD-10-CM Codes (ICD10) Diagnoses by Number

- Weighted national estimates from HCUP National (Nationwide) Inpatient Sample (NIS), 2016, Agency for Healthcare Research and Quality (AHRQ). Beginning with the 2012 data, the National Inpatient Sample (NIS) was redesigned to optimize national estimates. The nationwide statistics is Citation: HCUPnet, Healthcare Cost and Utilization Project. Agency for Healthcare Research and Quality, Rockville, MD. https://hcupnet.ahrq.gov
### Statistics for community hospital stays 2016 California, by county or county equivalent

#### 2016 California

**Stays Related to Mental and/or Substance Use Disorders**

<table>
<thead>
<tr>
<th>County</th>
<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>00</td>
<td>9,955,578</td>
<td>3,087.7</td>
<td>3,087.7</td>
</tr>
<tr>
<td>State Total</td>
<td>06</td>
<td>899,356</td>
<td>2,295.6</td>
<td>2,285.8</td>
</tr>
<tr>
<td>Alameda, California</td>
<td>06001</td>
<td>32,529</td>
<td>1,973.6</td>
<td>1,925.7</td>
</tr>
<tr>
<td>Alpine, California</td>
<td>06003</td>
<td>18</td>
<td>1,800.0</td>
<td>1,817.3</td>
</tr>
<tr>
<td>Amador, California</td>
<td>06005</td>
<td>1,202</td>
<td>3,264.4</td>
<td>2,789.7</td>
</tr>
<tr>
<td>Butte, California</td>
<td>06007</td>
<td>11,834</td>
<td>5,213.6</td>
<td>5,043.5</td>
</tr>
<tr>
<td>Calaveras, California</td>
<td>06009</td>
<td>1,290</td>
<td>2,880.0</td>
<td>2,462.5</td>
</tr>
<tr>
<td>Colusa, California</td>
<td>06011</td>
<td>404</td>
<td>1,875.0</td>
<td>1,935.3</td>
</tr>
<tr>
<td>Contra Costa, California</td>
<td>06013</td>
<td>25,341</td>
<td>2,252.2</td>
<td>2,340.2</td>
</tr>
</tbody>
</table>

#### Total number of discharges

- 18 – 846
- 881 – 2,730
- 2,893 – 7,233
- 7,440 – 15,291
- 23,780 – 257,174
## HCUPnet Versus Full HCUP Databases

<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>
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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.

www.hcup-us.ahrq.gov/faststats/landing.jsp
State Trends in Inpatient Stays by Payer

Click map to select one of the identified States, or select from list and click Select: Alaska* Select Medicaid expansion State

Information is available for labeled States. A Tutorial for State Trends in Inpatient Stays by Payer is available.
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.
• **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.
HCUP Fast Stats – Interactive Opioid Maps

Opioid-Related Hospital Use
Use the interactive map and legend below to examine overall opioid-related inpatient and emergency department (ED) rates by State. To explore the data in more detail (by age, sex, and other characteristics), click on the State, or select from the list and click Select.

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

Emergency department visits exclude those for patients admitted to the hospital.
States are classified into five categories which were defined based on an equal grouping of States in 2015.
Data Notes & Methods and Data Export options are available within the data exploration tool.

Rate of Opioid-Related Inpatient stays per 100,000 Population
2016 National rate: 295.9

Inpatient stays include those admitted through the emergency department.
States are classified into five categories which were defined based on an equal grouping of States in 2015.
Data Notes & Methods and Data Export options are available within the data exploration tool.
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Multiple Coding Systems

Consider which coding system is appropriate for your analysis

<table>
<thead>
<tr>
<th>Individual Codes</th>
<th>Groupers</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICD-9-CM</td>
<td>DRGs</td>
</tr>
<tr>
<td>ICD-10-CM/PCS</td>
<td>MDCs</td>
</tr>
<tr>
<td>CPT</td>
<td></td>
</tr>
<tr>
<td>HCPCS</td>
<td></td>
</tr>
</tbody>
</table>
ICD-9-CM Procedure and Diagnosis Codes are included in both inpatient and outpatient databases through Q3 of the 2015 data year.

- ICD-9-CM Procedure Codes
- ICD-9-CM Diagnosis Codes
ICD-10-CM/PCS

- ICD-10-CM/PCS Diagnosis and Procedure Codes were introduced starting in Q4 of the 2015 data year.
  - ICD-10-CM – diagnosis classification system
    - Diagnosis coding under this system uses 3–7 alpha and numeric digits and full code titles
  - ICD-10-PCS – inpatient procedure classification system
    - Procedure coding system uses 7 alpha or numeric digits
Common Procedural Coding System – CPT & HCPCS

Level 1: CPT
Level 2: HCPCS
Level 3: Local Codes

Levels 1 & 2:

• Included mostly in outpatient databases (SEDD and SASD)
• Also in select inpatient databases (SID)
Diagnosis-Related Groups (DRGs)

Group ICD-9-CM or ICD-10-CM/PCS Codes into Clinical/Resource Categories

Input Variables

- ICD-9-CM Diagnoses and Procedures
- ICD-10-CM Diagnoses
- ICD-10-PCS Procedures
- Age
- Sex
- Discharge Status

DRG Grouper Software

Output

DRG Code
Major Diagnostic Category (MDC)

Approximately 15,000 ICD-9-CM and 71,900 ICD-10-CM Diagnosis Codes

Approximately 500 DRGs

25 MDCs
HCUP Software Tools
## 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>X*</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Procedure Classes</td>
<td>X*</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic Condition Indicator</td>
<td>X*</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elixhauser Comorbidity Software</td>
<td>X*</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilization Flags</td>
<td>X*</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery Flags</td>
<td>X*</td>
<td></td>
<td></td>
<td>X*</td>
</tr>
<tr>
<td><strong>AHRQ Quality Indicators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prevention Quality Indicators</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inpatient Quality Indicators</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Safety Indicators</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pediatric Quality Indicators</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Included on the HCUP databases*
Clinical Classifications Software (CCS) Versions

- **CCSR for ICD-10-CM Diagnoses** NEW
  - Replaces the beta version of the CCS for ICD-10-CM diagnoses
  - Applies to all ICD-10-CM diagnosis codes through fiscal year (FY) 2019

- **CCS for ICD-10-PCS Procedures (beta version)**
  - Available through FY 2019

- **CCS for ICD-9-CM**
  - Valid through FY 2015

- **CCS for Services and Procedures**
  - Classifies CPT/HCPCS codes
  - Updated to include codes released through January 2019
Now Available:  
CCSR for ICD-10-CM

• The new CCSR replaces the beta version of the CCS for ICD-10-CM diagnoses and applies to all ICD-10-CM diagnosis codes through FY 2019.

• 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.
Clinical Classification Software Refined (CCSR) for ICD-10-CM Diagnoses Development

- Clinically meaningful categories
- Maintain clinical intent of most important categories in previous version
- Every code assigned to at least one category, but can be assigned to multiple categories
- Capitalize on the specificity of the ICD-10-CM coding scheme (e.g., maintain information on episodes of care)
- Follow groupings already available from other Federal agencies (e.g., injury coding matrix from CDC, cancer categories from NCI, DSM-5)
- Minimize the number of ‘Other’ (catch all) categories
- Make the software flexible for users’ differing needs

www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp
CCSR for ICD-10-CM Categories

• CCSR Categories are not mutually exclusive and can be used in conjunction with each other (e.g., intent of INJ category can be crossed with a nature of INJ category)

• Each of the 72,436 ICD-10-CM codes is assigned at least one CCSR category
  ▶ 64,791 codes (89.4%) are assigned to 1 CCSR category
  ▶ 5,728 codes (7.9%) are assigned to 2 CCSR categories
  ▶ 1,535 codes (2.1%) are assigned to 3 CCSR categories
  ▶ 361 codes (0.5%) are assigned to 4 CCSR categories
  ▶ 21 codes (0.03%) are assigned to 5 CCSR categories
Clinical Classifications Software (CCS) for ICD-10-PCS (Beta Version)

- 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
Clinical Classifications Software (CCS) for ICD-9-CM

- Clusters diagnosis and procedure codes into clinically meaningful categories
  - > 14,000 diagnoses codes → 285 categories
  - > 3,900 procedure codes → 231 categories

- Useful for presenting descriptive statistics and understanding patterns

### ICD-9-CM Codes

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<th>Codes</th>
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<td>0031 0202 0223 0362</td>
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### CCS Categories

- CCS 2: Septicemia
- CCS 6: Hepatitis
Procedure Classes

• Groups procedure codes into one of four categories
  ► Procedure Classes for ICD-9-CM
    — Updated for codes valid through September 30, 2015
    — Approximately 3,900 procedure codes
  ► Procedure Classes for ICD-10-PCS (beta version)
    — Versions available by FY for years 2016-2019
    — More than 71,900 procedure codes!

Procedure Categories

1. Minor Diagnostic, e.g., Electrocardiogram
2. Minor Therapeutic, e.g., Pacemaker
3. Major Diagnostic, e.g., Pericardial Biopsy
4. Major Therapeutic, e.g., CABG
Chronic Condition Indicator (CCI)

- Group diagnosis codes into Chronic or Non-Chronic Categories
  - CCI for ICD-9-CM diagnoses codes valid through FY 2015
  - CCI for ICD-10-CM diagnoses codes (beta version)
    - by FY for years 2016-2019

Condition Categories
1. Chronic, e.g., Diabetes
2. Non-Chronic, e.g., Food Poisoning
Elixhauser Comorbidity Software

• Creates indicator flags for 29 major comorbidities
  ► Elixhauser Comorbidity Software for ICD-9-CM diagnoses codes valid through FY 2015
  ► Elixhauser Comorbidity Software for ICD-10-CM (beta version) available by FY for years 2016-2019

ICD-9-CM or ICD-10-CM codes
DRGs on Administrative Data

Comorbidity Variables
- Obesity
- Congestive heart failure
- Hypertension
- Paralysis
- Diabetes
- Liver disease…
Utilization Flags

- Reveals additional information about the use of healthcare services
- Primarily uses UB-04 revenue codes, augmented with ICD-9-CM and ICD-10-PCS procedure codes
- Three versions available for ICD-10-PCS:
  - **Version 2017.1**: Utilization Flags for ICD-10-PCS valid through FY 2017
  - **Version 2018.1**: Utilization Flags for ICD-10-PCS valid through FY 2018
  - **Version 2019.1**: Utilization Flags for ICD-10-PCS valid through FY 2019

UB-04 codes + ICD-9-CM & ICD-10-PCS procedure codes

Utilization software

30 Utilization Flags

- Emergency Room Observation Services
- Intensive Care Unit
- Renal Dialysis
- CT Scan…
Surgery Flags

• Provides a method for identifying surgical procedures and encounters using ICD-9-CM or CPT-based data

• Surgery Flags for ICD-9-CM
  ► Valid for ICD-9-CM codes through FY2015

• Surgery Flags for Service 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
2016-2018 State and 2016 Nationwide Databases: Revised Structure

• The 2016 and 2017 State and 2016 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 (e.g., Clinical Classifications Software (CCS) and the Elixhauser Comorbidity Software) are not provided in these HCUP databases because the ICD-10-CM/PCS versions are still under development.

• For users interested in applying the HCUP software tools to the ICD-10-CM/PCS data in the 2016-2017 State and 2016 Nationwide databases:
  ► Beta versions of the HCUP software tools are available for download on the HCUP Tools & Software section of the HCUP-US Website.
  ► 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.
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)
Prevention Quality Indicators (PQIs)

• Identify hospital admissions that are potentially preventable through high-quality outpatient care.

Examples of PQI Measures:

► PQI 01 - Diabetes, short-term complications admission rate
► PQI 03 - Diabetes, long-term complications admission rate
► PQI 07 - Hypertension admission rate
► PQI 10 - Dehydration admission rate
► PQI 15 - Asthma in younger adults admission rate
Inpatient Quality Indicators (IQI)

- Reflect quality of care inside hospitals:
  - Inpatient mortality for medical conditions and surgical procedures
  - Utilization of procedures
  - Volume of procedures

- Examples of IQI Measures:
  - IQI 01 - Esophageal resection volume
  - IQI 12 - Coronary artery bypass graft (CABG) mortality rate
  - IQI 20 - Pneumonia mortality rate
  - IQI 21 - Cesarean delivery rate, uncomplicated
Patient Safety Indicators (PSI)

- Identify potentially avoidable complications and iatrogenic events.
- Examples of PSI Measures:
  - PSI 03 - Pressure ulcer rate
  - PSI 06 – Iatrogenic pneumothorax rate
  - PSI 09 – Perioperative hemorrhage or hematoma rate
  - PSI 11 - Postoperative respiratory failure rate
  - PSI 13 - Postoperative sepsis rate
  - PSI 16 - Transfusion reaction count
Pediatric Quality Indicators (PDI)

- Identify potentially avoidable hospitalizations among children.

Examples of PDI Measures:
- PDI 01 - Accidental puncture or laceration
- PDI 05 - Iatrogenic Pneumothorax Rate
- PDI 08 - Postoperative hemorrhage or hematoma
- PDI 09 - Postoperative Respiratory Failure Rate
Quality Improvement and monitoring at your fingertips.

Get to know the AHRQ Quality Indicators

PQI  Prevention Quality Indicators
IQI  Inpatient Quality Indicators
PSI  Patient Safety Indicators
PDI  Pediatric Quality Indicators

www.qualityindicators.ahrq.gov

Bringing excellence to healthcare decision making, quality improvement, and research
HCUP Supplemental Files
HCUP Supplemental Files Can Only be Applied to HCUP Databases

- Cost-to-Charge Ratio (CCR) Files
- Hospital Market Structure (HMS) Files
- Supplemental Variables for Revisit Analyses
- Trend Weights Files (NIS & KID)
- American Hospital Association (AHA) Linkage Files
- 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

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Hospital-Level Data ➔ Apply Ratios ➔ Convert Total Charges to Costs
HCUP Supplemental Variables for Revisit Analyses

• Allow linkage across settings and time
  ► Hospital readmissions
  ► ED visits following hospital discharge
  ► Inpatient hospitalizations following ambulatory surgery visits
• Adheres to strict privacy guidelines
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 (NIS, KID, NEISS, and NHDS) and the State Databases (SID, SASD, and SEDD) 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 health care 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.

HCUP Tools & Software

Tools for ICD-9-CM

NOTE: The U.S. transitioned to the ICD-10-CM/PCS coding scheme on October 1, 2015. The HCUP Tools for ICD-9-CM should only be used with data for discharges before 10/1/15.

Clinical Classifications Software (CCS) for ICD-9-CM

Clinical Classifications Software (CCS) 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

The Chronic Condition Indicator (CCI) provides users 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 18 body system categories. (Codes valid through FY 2015.)

Elxhauser Comorbidity Software

Elxhauser Comorbidity Software assigns variables that identify coexisting conditions on hospital discharge records. (Codes valid through FY 2015.) The software computes an index for in-hospital mortality and an index for readmissions.

Procedure Classes

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

Utilization Flows


Tools for ICD-10-CM/PCS

Note: The HCUP tools were translated to ICD-10-CM/PCS prior to the availability of ICD-10-CM/PCS-coded data. AHRQ is conducting analyses of the validity of these tools for use with ICD-10-CM/PCS coded data; preliminary findings suggest some unexpected discontinuities between the tools based on ICD-9-CM and those based on ICD-10-CM/PCS. See this page www.hcup-us.ahrq.gov/datainnovations/icd10_resources.jsp 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. We welcome comments. If you have questions or suggestions for changes, please contact hcup@ahrq.gov.

Beta Clinical Classifications Software (CCS) for ICD-10-CM/PCS

Clinical Classifications Software (CCS) for ICD-10-CM/PCS provides a method for classifying ICD-10-CM diagnoses or ICD-10-PCS procedures into clinically meaningful categories, which can be used for aggregate statistical reporting of a variety of types. (Updated for codes valid through FY 2019.) A fully refined version of the CCS for ICD-10-CM/PCS is expected to be released in 2019.

Beta Chronic Condition Indicator for ICD-10-CM

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Webinar Overview

• Introduction to HCUP
• Readily Available HCUP Information
  ► 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
Statistical Brief Topics

STATISTICAL BRIEF #251

September 2019

Characteristics of Inpatient Hospital Stays Involving Sickle Cell Disease, 2000–2016

Kathryn R. Foger, Ph.D., M.P.H., Pamela L. Owens, Ph.D., Ph.D., Laureneta V. Nath, Ph.D., M.P.H., Kamar Di Matteo, Ph.D., M.P.H., and Margarita L. Barrett, M.D.

Introduction
Approximately 100,000 Americans have sickle cell disease (SCD), a genetic disorder of blood disorders that most frequently affects individuals with ancestry from Africa, central African American countries, Sout Arabia, India, and Spanish-speaking regions of South America, Central America, and the Caribbean (areas of the world where malaria is or was more common). SCD alters the body’s red blood cells, causing some to have a disc or sickle shape and to become hard and sticky.

When sick red blood cells travel through small blood vessels, they can block blood flow that carries oxygen to vital organs. As a result, people with SCD experience “pain episodes” or “pain crises” that start suddenly, vary in severity, and can last any length of time. Pain is the leading reason people with SCD go to the hospital or the emergency department. Additional complications of SCD include repeated infections, painful swelling in hands and feet, acute chest syndrome, and stroke, to name a few.

Advancements in the treatment of SCD complications among children have reduced mortality rates so that nearly 65 percent of individuals born with SCD in the United States reach 18 years of age.

In 2016, there were 134,000 sickle cell disease (SCD)-related inpatient hospital stays. Over three-fourths of these stays involved a pain crisis.

Half of all SCD-related stays were for patients 16–34 years old, and nearly 50 percent were for black patients. From 2000 to 2014, the number of SCD-related stays increased most for adults older than 64 years.

Stays for patients with SCD who were more likely to be in the emergency department than were stays for patients without SCD (79 vs. 57 percent). SCD-related stays resulted in discharge against medical advice at a rate 4 times greater than non-SCD-related stays in 2016 (4.1 vs. 1.2 percent).

In 2016, aggregate costs for inpatient stays for SCD stayed $371.4 million with an average length of stay of 9.6 days.

One-third of stays for SCD had a 30-day readmission compared with 12.9 percent of non-SCD-related stays.

SCD-related stays were concentrated in a subset of 55 hospitals in 2016. Only 19 hospitals (3.7 percent of all hospitals) had more than 30 SCD-related stays in 2016.

Most SCD-related stays were for patients from metro areas and occurred at hospitals in metro areas. Half of SCD-related stays for patients from rural areas occurred at hospitals in metro areas.

September 2019

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HCUP Methods Reports

Methodological information on the HCUP databases and software tools
Reports

HCUP Statistical Briefs
Statistical Briefs are simple, descriptive reports on a variety of specific health-care related issues. A full list is available by topic and chronological order. The most recent briefs are:
- Characteristics of 30-Day All-Cause Hospital Readmissions, 2010-2016
- Inpatient Stays Involving Mental and Substance Use Disorders, 2016

ICD-10-CM/PCS Resources
These resources summarize key issues anticipated by researchers when analyzing health services outcomes using HCUP databases that include International Classification of Diseases, Tenth Revision, Clinical Modification/Procedure Coding System (ICD-10-CM/PCS) coding:
- General Information about ICD-10
- HCUP Databases and ICD-10 Related Data Elements
- Doing Analysis with ICD-10 Data

HCUP Infographics
Infographics provide a visual representation of Statistical Brief data. A full list is available. The most recent infographic is:
- Complications During Labor and Delivery (PDF file, 492 KB)

HCUP Methods Series
Methods Series reports, organized by topic and chronological order, feature a broad array of methodological information on the HCUP databases and software tools. The most recent reports are:
- User Guide: An Examination of Expected Payer Coding in HCUP Databases (Updated for 2016 HCUP Data) (PDF file, 559 KB)
- Supplements 1-3 (PDF file, 950 KB)
- Population Denominator Data Sources and Data for Use with HCUP Databases (Updated with 2017 Population Data) (PDF file, 359 KB)
- Appendix A: Population Data Tables (in ZIP format)

HCUP Nationalwide Database Reports
These reports are specific to the design and content of the HCUP nationwide databases.
- National (nationwide) Inpatient Sample (NIS)
- Kids' Inpatient Database (KID)
- Nationwide Emergency Department Sample (NEDS)
- Nationwide Readmissions Database (NRD)

HCUP State Database Reports
These reports are specific to the design and content of the HCUP state databases.
- State Inpatient Databases (SID)
- State Ambulatory Surgery and Services Databases (SASD)
- State Emergency Department Databases (SEDD)

Information About Using HCUP Data

Publications and Additional Topics

Topical Reports
Topical reports provide information about various priority populations.
- Trends in the Number of Neonatal Abstinence Syndrome Births in the U.S.
  - 2008-2016 (PDF file, 186 KB)
- Inpatient Stays Involving Malnutrition
  - 2016 (PDF file, 628 KB)
- Clostridium Difficile Hospitalizations
  - 2011-2015 (PDF file, 716 KB)
  - 2010-2014 (PDF file, 364 KB)
- Approaches to using race-ethnicity data for reducing

HCUP Publications
These links provide access to lists of publications, resources, and descriptions of research activities that are based on HCUP data, software products, and tools.
- Search for HCUP publications
- Research Spotlights on recent peer-reviewed journal articles
- Review comprehensive list of AHRQ publications

HCUP Archive
This archive features a broad array of information based on HCUP databases and other related reports.
- HCUP Projections (2012-2016)
- The Value of Hospital Discharge Data (PDF file, 664 KB) (Posted May 2005)
Publications Search Page on HCUP-US Website

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

Approximately 7,300 peer-reviewed publications using HCUP data, products, or tools
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  ► HCUP Fast Stats
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- Find comprehensive list of HCUP-related publications, database reports, and fact books
- Access technical assistance

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- Collects user feedback and suggestions for improvement

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Healthcare Cost and Utilization Project (HCUP)
Questions/Comments?

Time for Questions and/or Comments.

E-mail: hcup@ahrq.gov