AGENCY FOR HEALTHCARE RESEARCH AND QUALITY

The Healthcare Cost and Utilization Project (HCUP)

HCUP Database Overview

Agency for Healthcare Research and Quality (AHRQ)

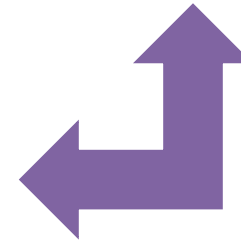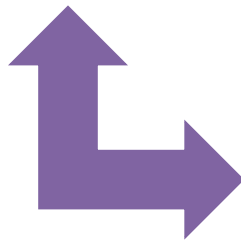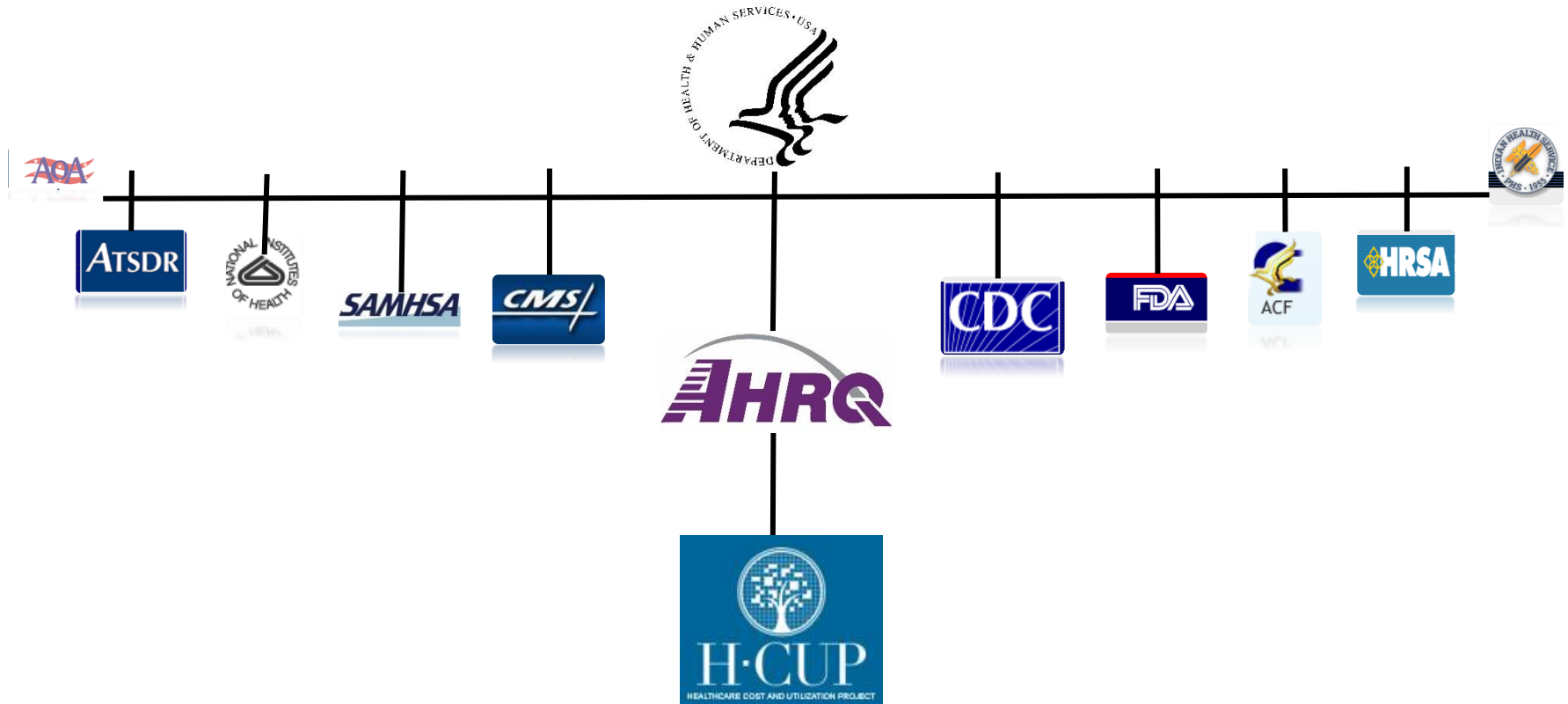# What Is HCUP?

The HCUP Partnership

State

Federal

Industry

Sponsored by the Agency for Healthcare Research and Quality

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

Available HCUP Resources

Federal-State-Private Partnership

HCUP is a comprehensive set of **publicly available all-payer** healthcare data (including self-pay and those billed as "no charge")
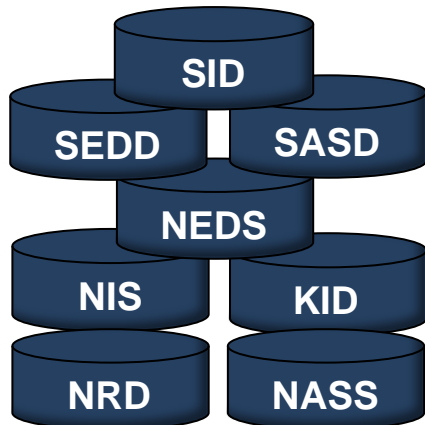

Includes **multiyear** inpatient and outpatient data based on **hospital billing** records

HCUP Databases	Online Tools	Analytics	User Support

Research Using HCUP Data

Costs of care	In 2018, there were 27,833,500 nonmaternal, nonneonatal hospital stays in the United States. The 20 most frequent principal diagnoses accounted for 47.6 percent of these stays (13,236,300 stays) and 46.7 percent of aggregate costs for these stays ($188.3 billion). *2017 NIS, Stat Brief #277*
Readmissions	In 2018, initial admissions for septicemia accounted for the largest number of readmissions overall (8.3 percent) and by expected payer. *2018 NRD, Stat Brief #278*
Geographic variation	During the 2016–2017 & 2017–2018 flu seasons, States with the highest rates of influenza-like illness-related ED visits (3,843-5,820 per 100,000 population) were concentrated in the Midwest and in the South, whereas the lowest rates (1,933-2,458 per 100,000 population) were generally in northern States. *2016-2018 SID and SEDD, Stat Brief #269*
Trends over time	In every year from 2008 to 2017, the rate of ED visits related to suicidal ideation or suicide attempt was highest among older adolescents, young adults, and those aged 25–44 years and lowest among children aged 5–9 years and older adults. *2008, 2010, 2012, 2014, 2016, 2017 NEDS, Stat Brief #263*
COVID-19-related analyses	Non-Hispanic Black, Hispanic, and other non-Hispanic patients combined accounted for a larger share of COVID-19-related hospitalizations in April, May, June, and July 2020 than non-Hispanic White patients (55.0–58.2 vs. 38.8–42.4 percent, respectively). *2019 SID and 2020 quarterly data from selected States, Stat Brief #276*

Research Using HCUP Data, Cont'd.

|	
Natural disasters	According to an analysis of seven U.S. hurricanes, the rate of injury-related ED visits resulting in hospital admission increased the most during the week of the hurricane for people of all ages living in the direct path: 22.6 percent increase for children aged 0–17 years, 13.2 percent increase for adults aged 18–64 years, and 53.2 percent increase for adults aged 65 years and older. *2005–2016 SID and SEDD from selected States, Stat Brief #267*
Access to care	In 2018, nearly one-third of stays (8.2 million hospitalizations) involving type 1 diabetes (32.0 percent) or type 2 diabetes (32.9 percent) were among individuals from the lowest income communities (quartile 1), compared with 28.0 percent of stays without a diabetes diagnosis. Conversely, 20.2 percent of stays for patients without diabetes were among individuals from the highest income communities (quartile 4), compared with 16.0 and 15.8 percent of stays involving type 1 or type 2 diabetes, respectively. *2018 NIS, Stat Brief #279*
Quality of care	In 2017, 3.5 million potentially preventable adult inpatient stays accounted for $33.7 billion in aggregate hospital costs. These stays represented 12.9 percent of all nonobstetric stays and 8.9 percent of costs for all nonobstetric stays. *2017 SID, Stat Brief #259*
Opioid-related analyses	Among all inpatient stays involving an opioid diagnosis, the percentage with a concurrent stimulant diagnosis was 13.7 percent in 2012 (91,000 of 663,500) and 20.5 percent in 2018 (192,800 of 941,700). The percentage of all stimulant-related stays with a concurrent opioid diagnosis was 21.9 percent in 2012 (91,000 of 415,100) and 24.5 percent in 2018 (192,800 of 788,200). *2012-2014 and 2016-2018 SID and NIS, Stat Brief #271*

HCUP Data Partners

Alaska Department of Health

Alaska Hospital and Healthcare Association

Arizona Department of Health Services

Arkansas Department of Health

California Department of Health Care Access and Information (HCAI)

Colorado Hospital Association

Connecticut Hospital Association

Delaware Division of Public Health

District of Columbia Hospital Association

Florida Agency for Health Care Administration

Georgia Hospital Association

Hawaii Laulima Data Alliance

Hawaii University of Hawai'i at Hilo

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 Department of Health and Human Resources

Wisconsin Department of Health Services
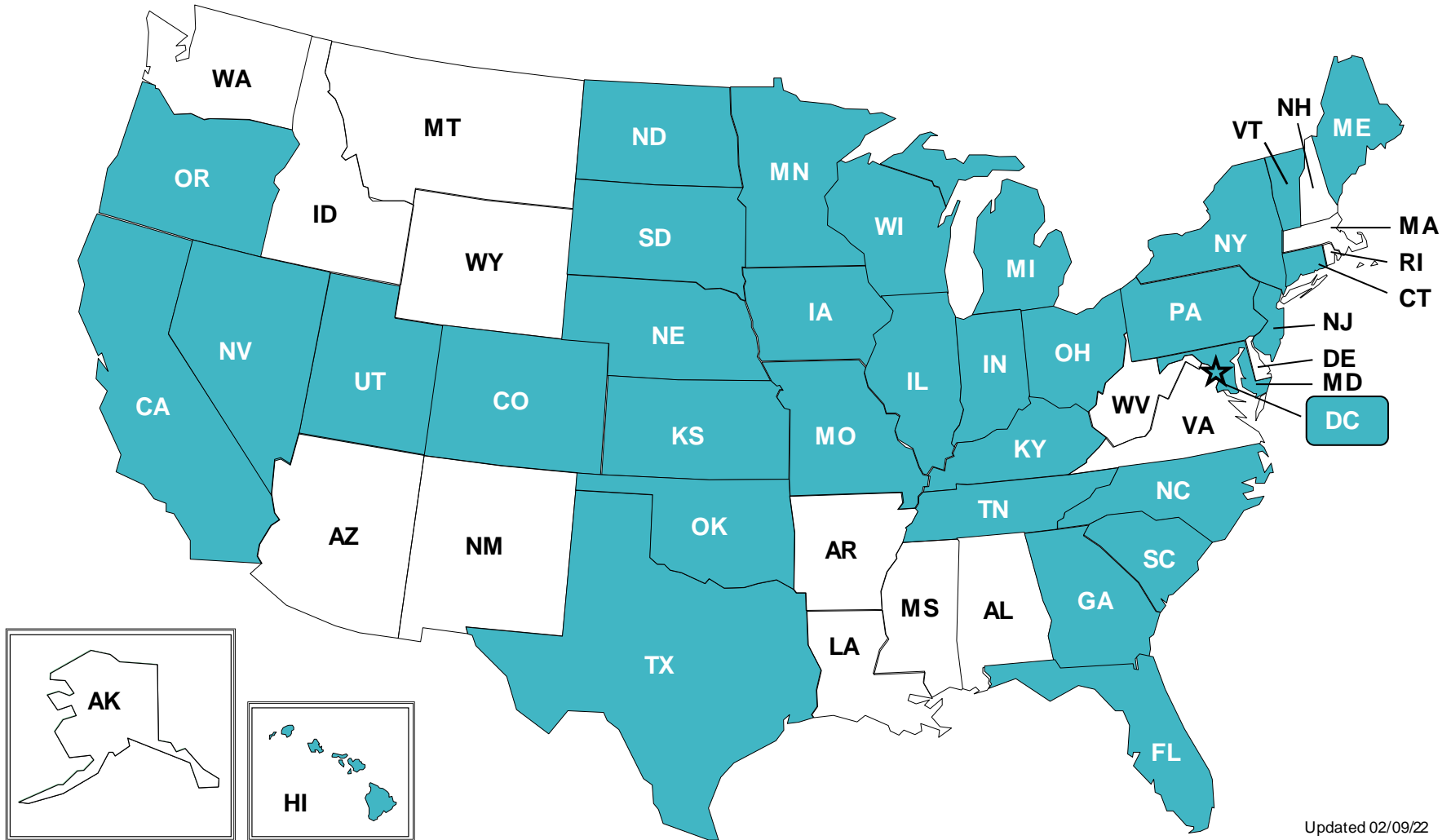
Wyoming Hospital Association

HCUP Partners Providing Inpatient Data
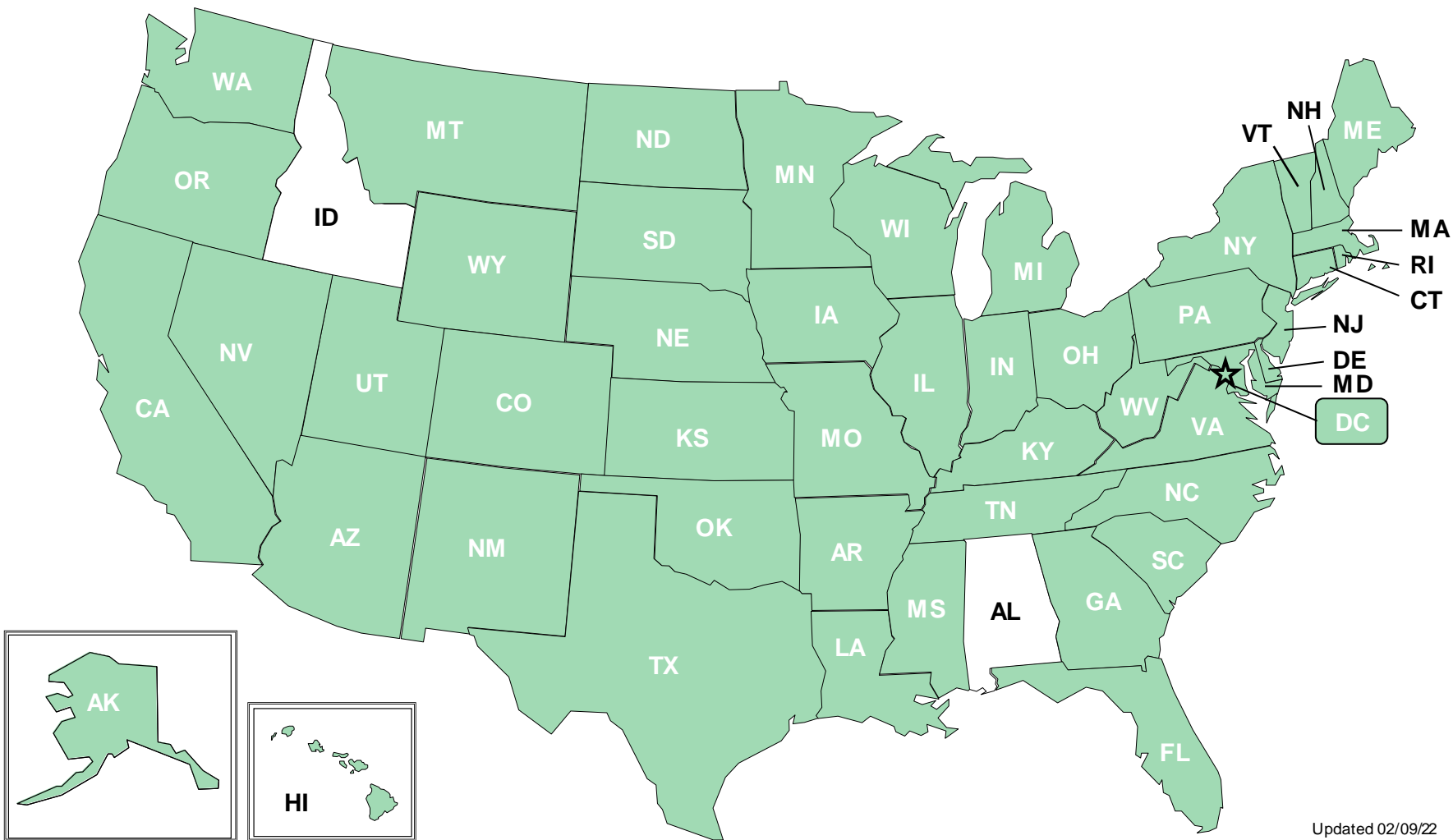
Updated 02/09/22

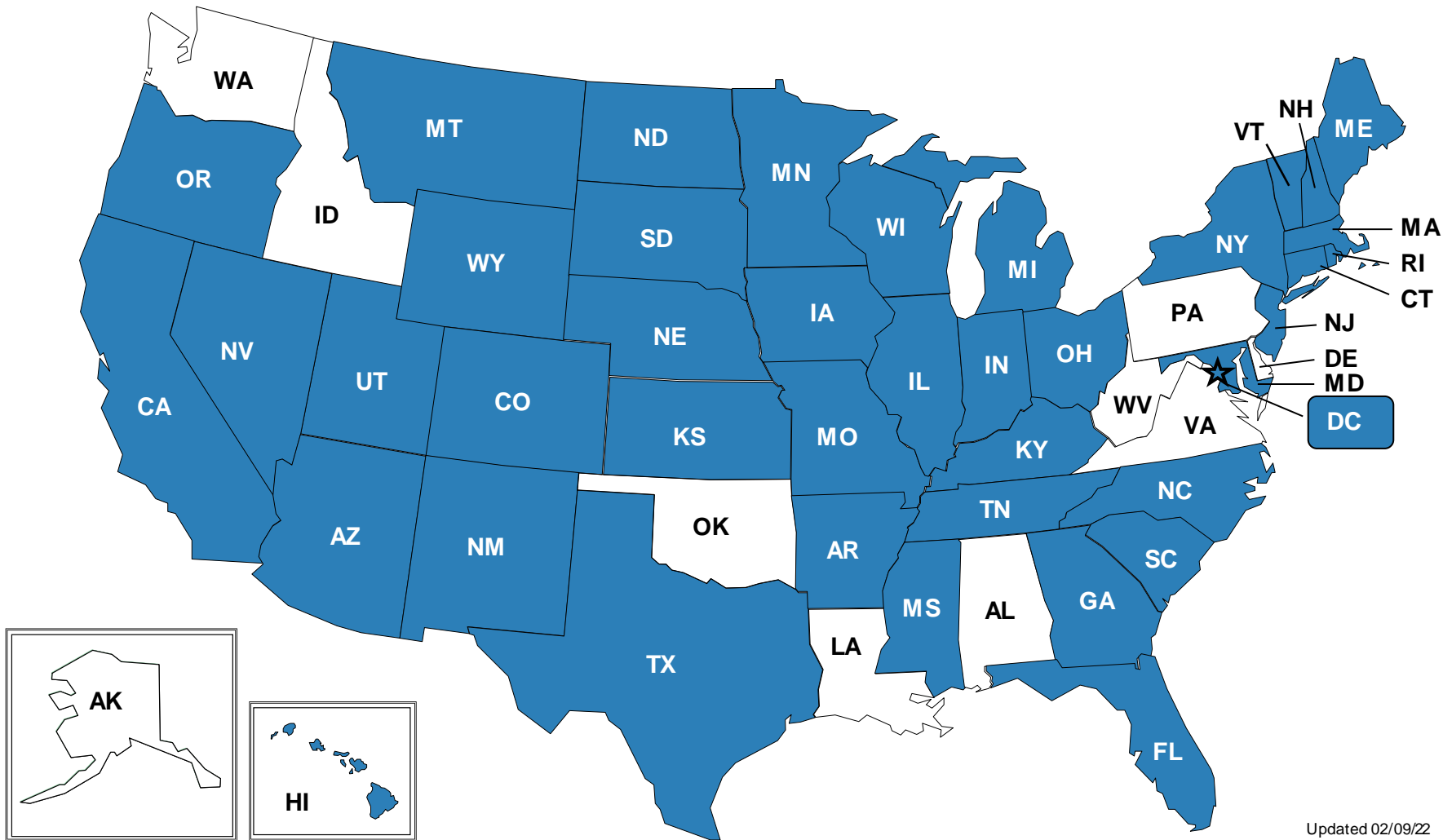| Partners Providing:	Inpatient Data	Non-participating

HCUP Partners Providing Ambulatory Surgery and Services Data

Updated 02/09/22

| Partners Providing: | Ambulatory Surgery and Services Data | Non-participating |

HCUP Partners Providing Emergency Department Data

Updated 02/09/22

Partners Providing:	Emergency Department Data	Non-participating

HCUP Participation by Data Type

Updated 02/09/22
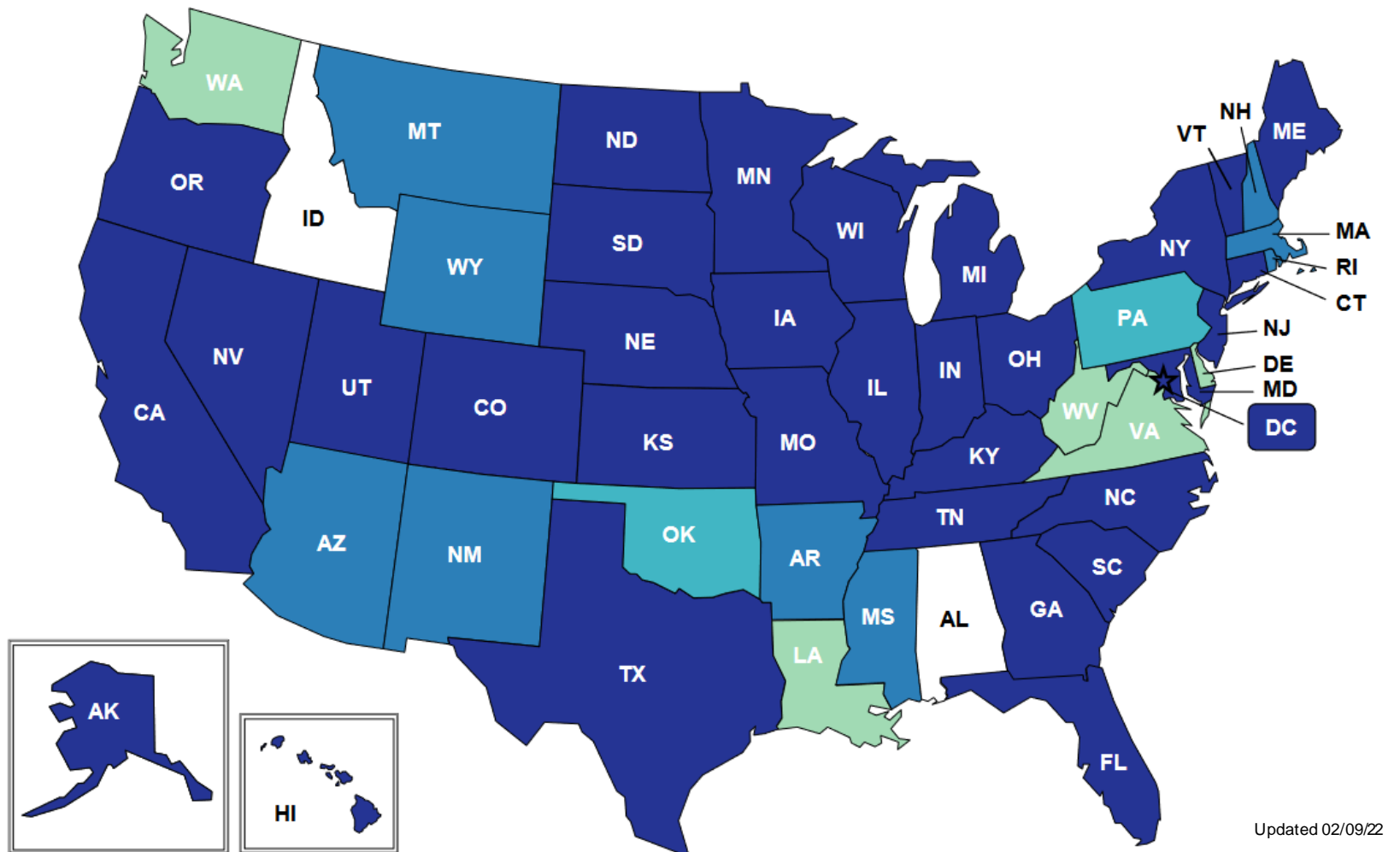
| Partners Providing: | Inpatient Data | Inpatient and Ambulatory Surgery & Services Data | Inpatient and Emergency Department Data | Inpatient, Ambulatory Surgery & Services, and Emergency Department Data | Non-participating |

What Is the Foundation of HCUP Data?

The Foundation of HCUP Data Is Hospital Billing Data

UB-04
CMS 1500

Demographic Data

Diagnoses Procedures Charges

From Patient Hospital Visit to Administrative Record

Patient Perspective

Data Perspective

- ED Visit
- Scheduled Admission
- Transfer

- Reception
- Admit
- Provide Care
- Discharge

- Patient Record
- Patient Record
- Discharge Summary
- Medical Coder
- Billing Dept.

Bill Generated
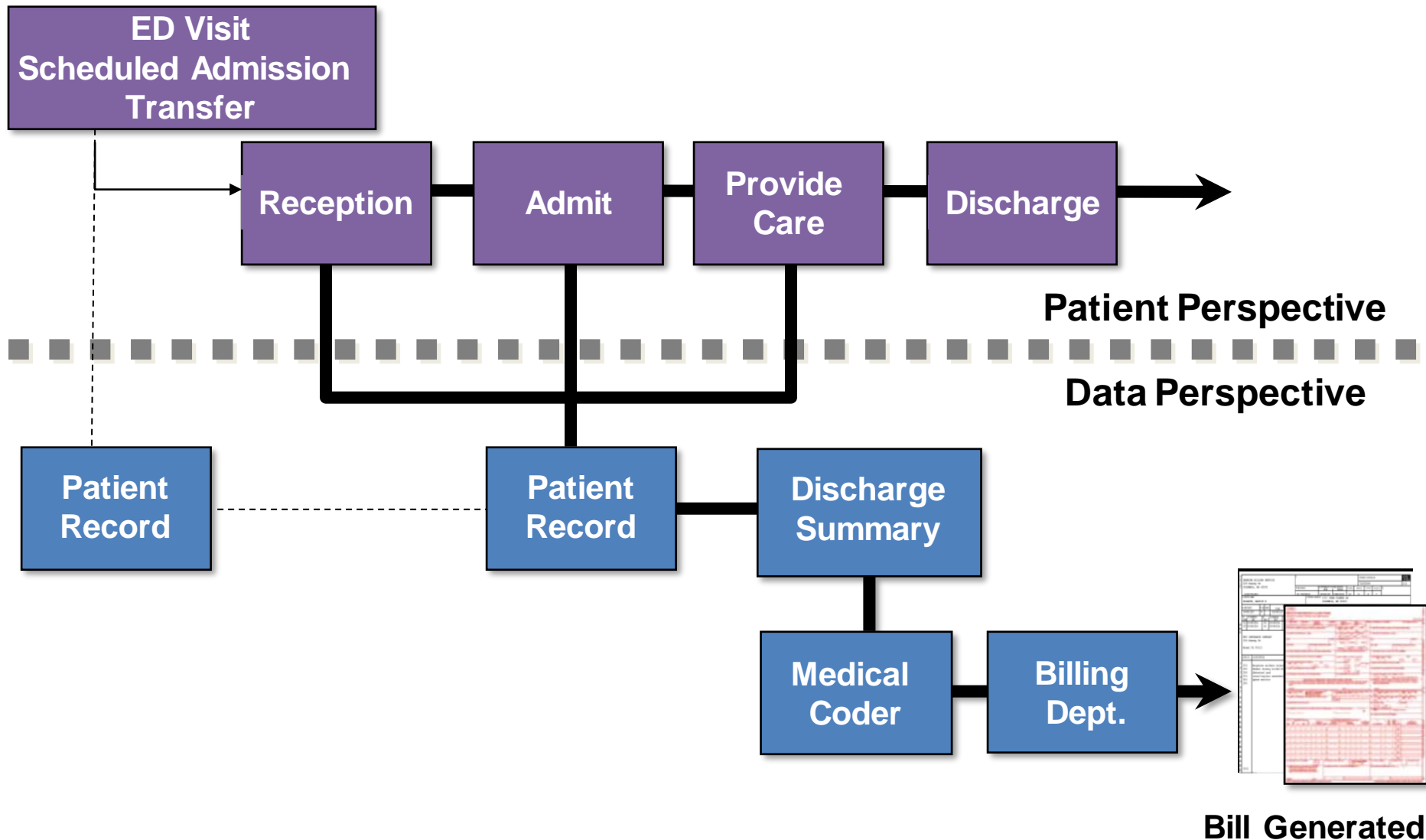
The Making of HCUP Data

Patient enters hospital

Billing record created

States store data in varying formats

Hospital sends billing data and any additional data elements to data organizations
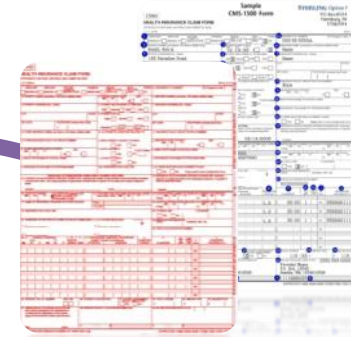
AHRQ standardizes data to create uniform HCUP databases

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
- Quality checks are performed
- 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)
  - ► Diagnosis-related groups and severity measures
    - − 3M™ All Patient Refined Diagnosis Related Groups (APR-DRGs)

What Types of Hospitals Are Included in the HCUP Databases?

HCUP Data Come Mostly From Community Hospitals

American Hospital Association Definition:
Non-Federal, short-term general, and other special hospitals, excluding hospitals not accessible by the general public (e.g., prison hospitals or college infirmaries)

Included*	Excluded
Multispecialty general hospitals	Non-Federal long-term care hospitals
OB-GYN	Psychiatric
Ear, nose, and throat	Alcoholism/chemical dependency
Orthopedic	Long-term care rehabilitation
Pediatric	Department of Defense/Department of Veterans Affairs/Indian Health Service
Public	College infirmaries
Academic medical centers	Prison hospitals

*Sometimes this also includes short-term rehabilitation and long-term acute care hospitals. Availability varies across HCUP States.

Hospitals in the United States

- 84 percent of U.S. hospitals are community hospitals
- 15 percent are noncommunity hospitals (Federal [DoD/VA/IHS], non-Federal psychiatric, non-Federal LTC, etc.)

Legend:
- Number of U.S. Community Hospitals
- Number of Federal Government Hospitals
- Number of Non-Federal Psychiatric Hospitals
- Other Hospitals LTC

Pie chart values: 84%, 3%, 10%, 2%
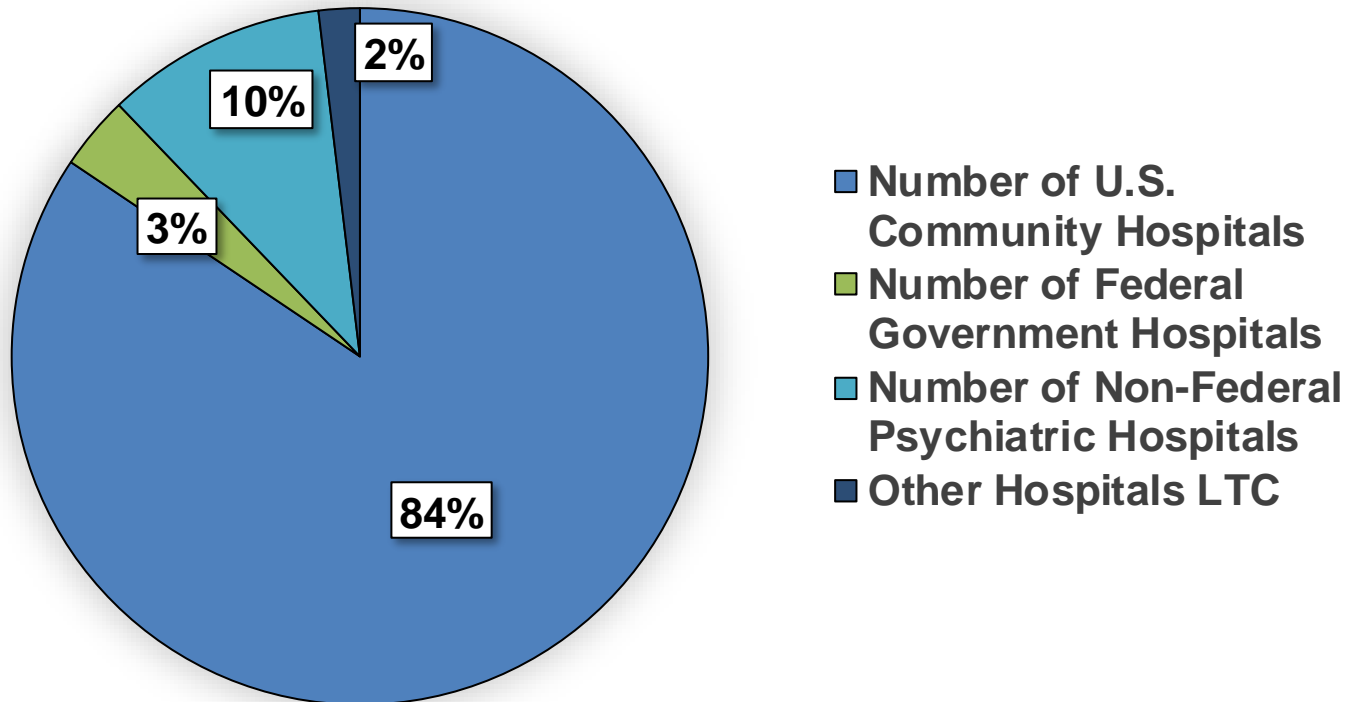
Community Hospitals
Provide a Range of Services

- HCUP generally does not receive data from noncommunity hospitals, such as psychiatric facilities
- However, if patients are treated for a mental health condition in a community hospital, their information is included

Mental, Behavioral, and Neurodevelopmental Disorders, Top Five Principal Diagnoses	Total Number of Discharges
1. Depressive disorders	509,655
2. Schizophrenia spectrum and other psychotic disorders	391,150
3. Alcohol-related disorders	334,410
4. Bipolar and related disorders	257,130
5. Suicidal ideation/attempt/intentional self-harm	115,230

Source: Weighted national estimates from the 2019 National Inpatient Sample (NIS), Clinical Classifications Software Refined (CCSR) default for principal diagnosis assignment, v2021.2.

What Types of HCUP Databases Are Available?

HCUP Includes Inpatient and Outpatient Databases

- Different hospital settings
  - ► Inpatient databases
    - − Discharge abstracts for patients admitted for an inpatient stay
  - ► Outpatient databases
    - − Ambulatory surgery encounters
    - − ED visits for which patients are treated and released from the ED
- Varying geographic levels
  - ► State
  - ► Nationwide
- HCUP databases do not include physician office visits, pharmacy, and laboratory/radiology information

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

HCUP State Databases

State Inpatient Databases (SID)

Inpatient discharge data (including those admissions that started in the ED) from participating HCUP States

State Ambulatory Surgery and Services Databases (SASD)

Ambulatory surgery data (hospital-owned and some nonhospital-owned facilities) and other outpatient services from participating HCUP States
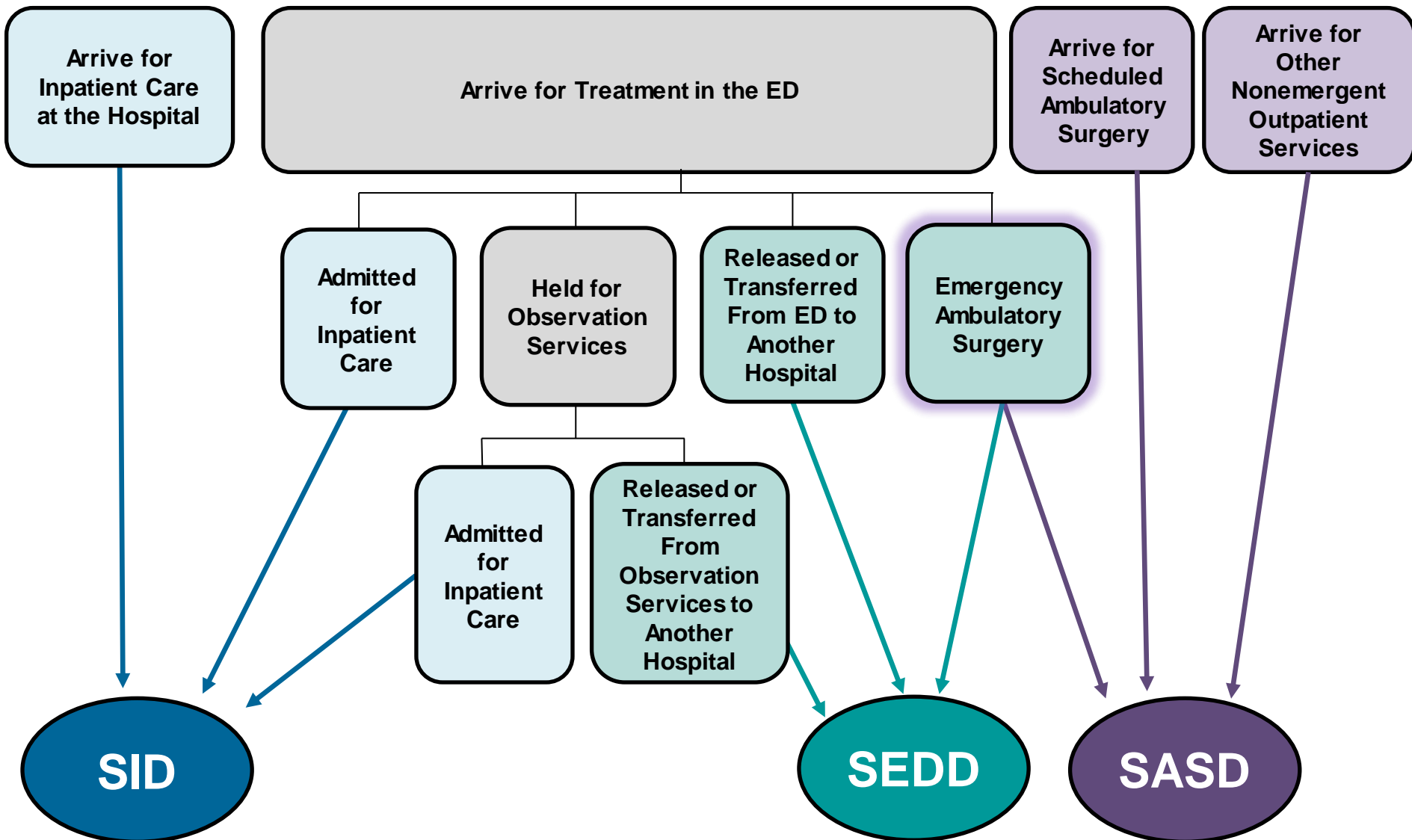
State Emergency Department Databases (SEDD)

Emergency department data (treat and release) from participating HCUP States

There Are Different Pathways of Care Reflected in HCUP State Databases

HCUP Nationwide Databases

Database		Description
National Inpatient Sample (NIS)		Generate national and regional estimates of **inpatient** utilization, access, quality, patient safety, etc.
Kids' Inpatient Database (KID)		Generate national and regional estimates of **pediatric inpatient** utilization, access, quality, etc.
Nationwide Ambulatory Surgery Sample (NASS)		Generate national and regional estimates of **major ambulatory surgery encounters** in hospital-owned facilities
Nationwide Emergency Department Sample (NEDS)		Generate national and regional estimates of **emergency department** utilization, access, quality, etc.
Nationwide Readmissions Database (NRD)		Generate national estimates of all-cause and condition-specific **readmissions**

All Nationwide Databases Are Derived From HCUP State Databases

State Inpatient Databases (SID)

NIS: Sample inpatient discharges of all ages from all SID and community hospitals*

KID: Sample inpatient discharges aged ≤20 years 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

State Emergency Department Databases (SEDD)

NEDS: Sample of hospital-owned EDs* from all SEDD and includes all ED admissions from the SID for the sampled EDs

State Ambulatory Surgery and Services Databases (SASD)

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 Sample Design

Starting HCUP Database

State Inpatient Databases

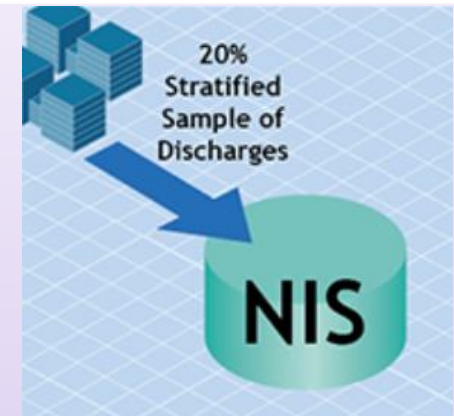The NIS is drawn from the SID, covering more than 97 percent of the U.S. population.

Sampling Strata

- Ownership/control
- Bed size
- Teaching status
- Urban/rural location
- U.S. census division

*State **not** included

Sample Design

20% Stratified Sample of Discharges

NIS

The NIS approximates a 20 percent **stratified sample of discharges** from all hospitals in the SID.
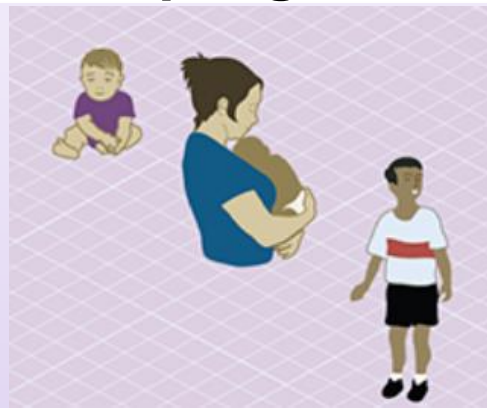
KID Sample Design

Starting HCUP Database

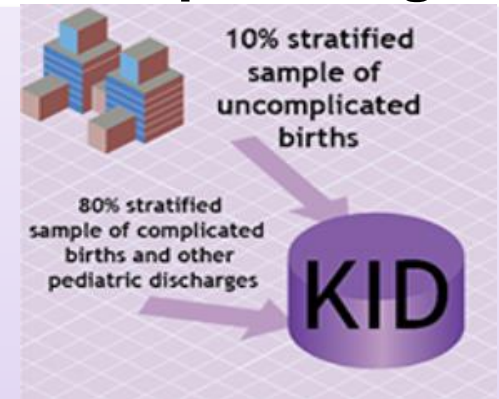The KID is drawn from **pediatric discharges** in the SID.

Sampling Strata

- Uncomplicated births
- Complicated births
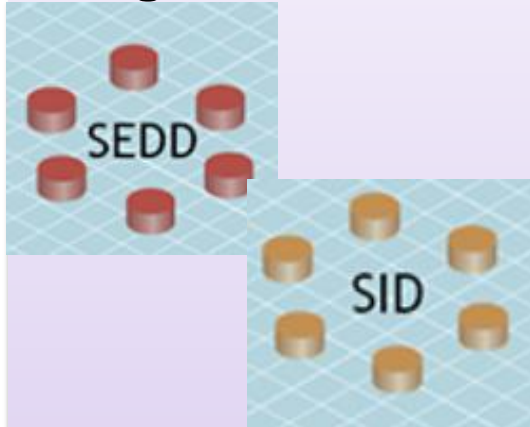- Pediatric nonbirths

*State **not** included

Sample Design

The KID is a systematic random sample design, 10 percent **uncomplicated births** and 80 percent **complicated births and other pediatric discharges**.

NEDS Sample Design

Starting HCUP Database

The NEDS is drawn from **SEDD** (ED treat-and-release visits) and **SID** (ED visits resulting in a hospital stay).
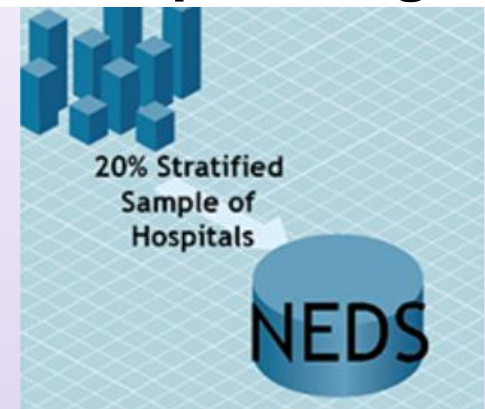
Sampling Strata

- U.S. region
- Urban/rural location
- Teaching status
- Ownership/control
- Trauma center

*State **not** included

Sample Design

20% Stratified Sample of Hospitals

The NEDS is a 20 percent **stratified sample of hospital-owned EDs** from the SID and SEDD. Roughly 85 percent of ED visits are treat and release, and 15 percent result in a hospital stay.

NRD Sample Design

Starting HCUP Database

The NRD is drawn from SID that have **verified patient linkage numbers**.

Sampling Strata

- U.S. region
- Urban/rural location
- Teaching status
- Size
- Ownership/control
- Patient age and sex

*State **not** included

Sample Design

The NRD is a **100 percent sample of discharges from the SID**, after certain discharge and hospital exclusions.

NASS Sample Design

Starting HCUP Database

The NASS is drawn from SASD encounters with **selected major ambulatory surgeries**.
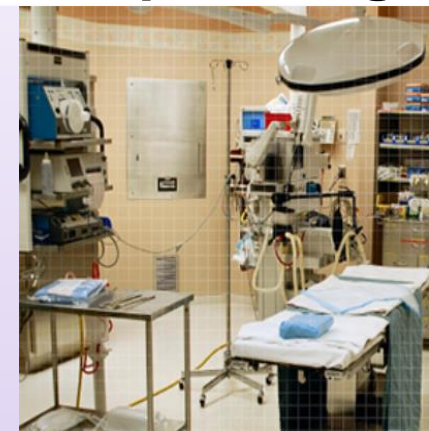
Sampling Strata

- U.S. region
- Bed size
- Urban/rural location
- Teaching status
- Ownership/control

*State **not** included

Sample Design

The NASS is a 100 percent sample of **major ambulatory surgery encounters** from hospital-owned facilities in the SASD, after certain exclusions.

Weighting the HCUP Nationwide Databases to Produce National Estimates

The NIS, KID, NASS, NEDS, and NRD* must be weighted to produce national and regional **discharge/encounter estimates.**

The NEDS must be weighted to produce national and regional **hospital estimates.**
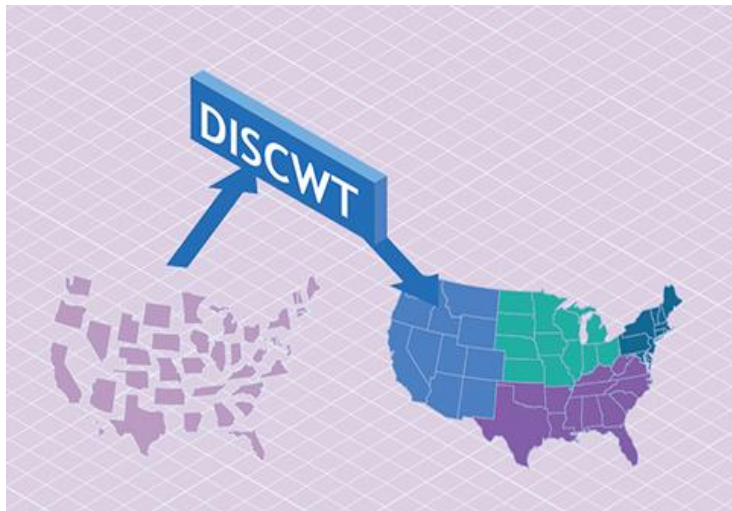
* The NRD is not designed to support regional analyses.

Comparison of the HCUP Inpatient Databases

	HCUP Inpatient Databases			
HCUP database	SID (2019)	NIS (2019)	KID (2019)	NRD (2019)
States	48 States + DC	48 States + DC	48 States + DC	30 States
Hospitals	4,470	4,568	3,998	2,507
Inpatient discharges	34 million	7 million	3 million	18 million
Derived from	--	SID	SID	SID
Uses	Examine State and local market-area statistics on healthcare utilization, access, quality, patient safety, etc. Readmission analyses possible in some States.	Generate national and regional estimates of healthcare utilization, access, quality, patient safety, etc.	Generate national and regional pediatric estimates of healthcare statistics.	Generate national estimates of all-cause and condition-specific readmissions.

Comparison of the HCUP Outpatient Databases

	Emergency Department Data		Ambulatory Surgery and Services Data	
HCUP database	SEDD (2019)	NEDS (2019)	SASD (2019)	NASS (2019)
States	40 States + DC	40 States + DC	34 States + DC	34 States + DC
Hospitals	3,590	989	3,447	2,958
Outpatient records	103 million ED visits	33 million ED visits	19 million ambulatory surgeries	12 million major ambulatory surgeries
Derived from	–	SID and SEDD	–	SASD
Uses	Examine ED visits at hospital-affiliated EDs that do not result in an admission for a given State.	Generate national and regional estimates for hospital-owned ED visits.	Study encounter-level data for ambulatory surgeries and other outpatient services from hospital-owned facilities.	Generate national and regional estimates of major ambulatory surgery encounters performed in hospital-owned facilities.

What Types of Care Are and Are Not Captured by HCUP?

Type of Care Captured	Which HCUP Database(s)
Inpatient care	State Inpatient Databases (SID) National (Nationwide) Inpatient Sample (NIS) Kids' Inpatient Database (KID) Nationwide Readmissions Database (NRD)
Emergency department	State Emergency Department Databases (SEDD) Nationwide Emergency Department Sample (NEDS)
Ambulatory surgery and services	State Ambulatory Surgery and Services Databases (SASD) Nationwide Ambulatory Surgery Sample (NASS)
Other nonemergent outpatient services	State Ambulatory Surgery and Services Databases (SASD)

Type of Care Not Captured
Physician office visits
Pharmacy
Labs/radiology

Benefits and Limitations of HCUP Databases

Benefits	Limitations
Large number of records	Lack reimbursed claims information
Uniformity in coding	Limited clinical detail
Regular, routine collection	Do not include all hospital types (e.g., VA and DoD)
Ease of access	Do not show complete episode of care
All payers, including self-pay, or those billed as "no charge"	State databases lack hospital characteristic information
Available at local, State, regional, and national level	Cannot link nationwide databases to external sources
Supplemental variables available to facilitate research	Differences in coding across hospitals

Abbreviations: DoD, Department of Defense; VA, Department of Veterans Affairs.

What Data Elements Are Available in the HCUP Databases?

Data Elements Common to the HCUP Databases

- Patient demographics
  - ▶ Age, sex, urban/rural location
- Clinical information
  - ▶ Diagnoses and procedures
- Discharge information
  - ▶ Expected payment source, discharge status
- Resources
  - ▶ Length of stay, total charges
- Hospital characteristics
  - ▶ Only on HCUP Nationwide databases

Some Data Elements Vary by State

- Race/ethnicity
- Patient county
- Patient ZIP Code
- Birthweight
- Revenue center codes and units
- Additional and/or more detailed expected payer information
- Detailed charges

- Synthetic patient linkage numbers
- Synthetic physician identifiers
- Physician specialty
- Hospital identifier (unencrypted)

Example:
Payer Detail Varies by State

PAY1_X		PAY1 (Standardized)	
Value	**Description**	**Value**	**Description**
010	Medicare	1	Medicare
011	Medicare (HMO)		
012	Medicare (Managed care - Other)		
013	Medicare (fee for service)		
020	Medi-Cal	2	Medicaid
021	Medi-Cal (HMO)		
022	Medi-Cal (Managed care - Other)		
023	Medi-Cal (fee for service)		
030	Private Coverage	3	Private insurance
031	Private Coverage (HMO)		
032	Private Coverage (Managed care - Other)		
033	Private Coverage (fee for service)		
08n, where n=0-3	Self-pay	4	Self-pay
--		5	No charge

Interested in
Purchasing an
HCUP Database?

HCUP Databases Available Through HCUP Central Distributor

HCUP Central Distributor website:

www.hcup-us.ahrq.gov/tech_assist/centdist.jsp

▶ The HCUP Central Distributor provides one-stop shopping for purchasing State and nationwide databases

▶ Cost and availability of databases vary across years

▶ Some Partner organizations may place additional restrictions on the sale of their State data

Steps to Purchase HCUP Databases Online

Step 1: Take the Data Use Agreement (DUA) online training: www.hcup-us.ahrq.gov/tech_assist/dua.jsp

Step 2: Log in 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: 866-290-HCUP (4287) (toll free)

► Email: hcup@ahrq.gov

Additional Requirement: Electronic 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
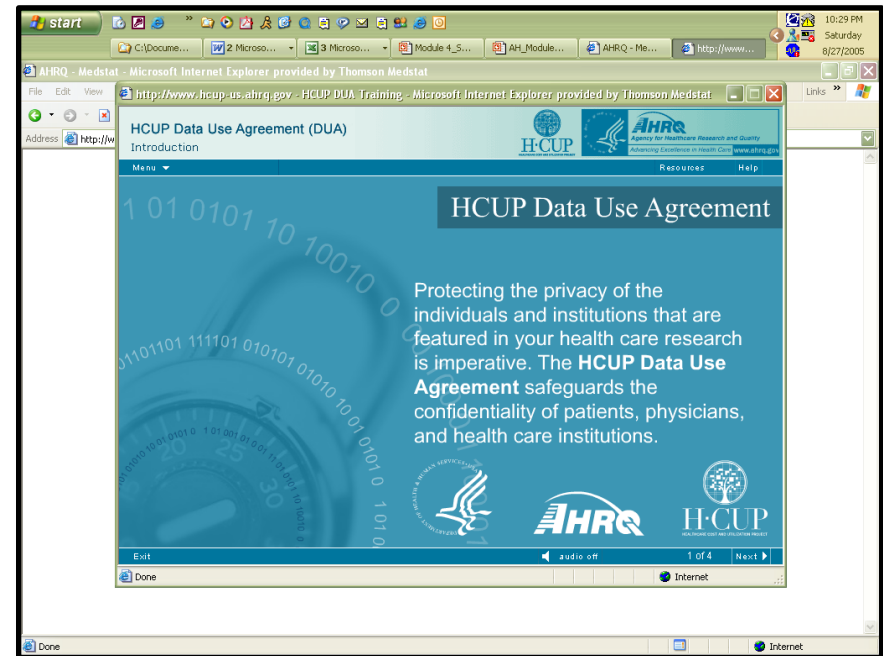
Takes 15 minutes to complete

www.hcup-us.ahrq.gov/tech_assist/dua.jsp

Pricing Information Per Data Year

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

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

Software Package	Load Programs	Format Programs	Example Statistical Coding	HCUP Tools Programs
SAS	X	X	X	X
STATA	X		X	X
SPSS	X			X
SUDAAN			X	
R			X	

MS Excel and Access are NOT GOOD options!

What Types of Online Resources Does HCUP Have Available?

Types of HCUP Resources

- Analytic reports
  - ► Descriptive brief reports on select topics
  - ► Methodological reports to facilitate use of the HCUP databases
- Search option for publications based on HCUP databases
- Precalculated statistics
  - ► Online query tool HCUPnet
  - ► Topic-specific tables and figures
  - ► Database-specific information
- Data visualizations
  - ► Interactive visual displays of select HCUP data

What Types of Analytic Reports Does HCUP Offer?

Statistical Briefs Are Descriptive Reports on Specific Healthcare Topics

www.hcup-us.ahrq.gov/reports/statbriefs/statbriefs.jsp

Findings-At-A-Glance Are Focused Reports on Select Topics

Table 1. Number of Adult, Nonmaternal Inpatient Stays with Any Diagnosis of *Clostridioides difficile*, 2011-2016 and 2019

Year	Rate of Any Diagnosis of *C. Diff* per 1,000 Adult, Nonmaternal discharges	95% confidence interval
2011	13.0	(12.7, 13.3)
2012	13.6	(13.3, 13.9)
2013	13.8	(13.6, 14.1)
2014	14.0	
2015 Q1-Q3	14.2	
2016	13.6	
2019	10.2	

Note: Additional analyses of national estimates overall (not
for *C. diff* declined each year.

Source: Agency for Healthcare Research and Quality (AHRQ
Inpatient Databases (SID) nationally weighted analysis file,
Q1–2015 Q3 and ICD-10-CM Diagnoses from 2016 and 2019

Figure 2b: Percent of Adult, Nonmaternal Inpatient Stays with a Diagnosis of Septic Shock, By Expected Primary Payer and Discharge Quarter, 2012-2018
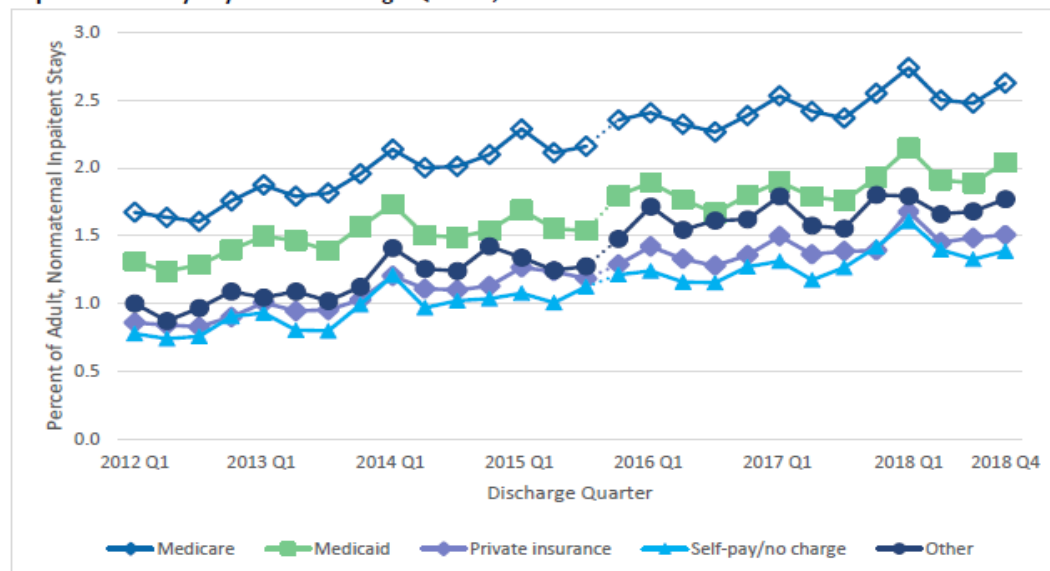
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), ICD-9-CM Diagnoses from 2012 Q1-2015 Q3 and ICD-10-CM Diagnoses from 2015 Q4-2018 Q4

www.hcup-us.ahrq.gov/reports/ataglance/findingsataglance.jsp

Methods Series Reports Provide Technical Guidance on Using HCUP Data

HCUP Methods Series
Calculating National Inpatient Sample (NIS) Variances for Data Years 2012 and Later

Report # 2015-09

HCUP Methods Series
Methodological Issues when Studying Readmissions and Revisits using Hospital Administrative Data

Report # 2011-01

Population Denominator Data Sources and Data for Use with HCUP Databases (Updated with 2019 Population Data)

Report #2020-02

Conducting County-Level Analyses With HCUP Data: Approaches and Methodological Considerations.

Report #2019-04

www.hcup-us.ahrq.gov/reports/methods/methods.jsp

What Is the HCUP Publications Search?

Search for Publications Using HCUP Databases

Approximately 11,080 peer-reviewed publications using HCUP data, products, or tools

An official website of the Department of Health & Human Services

AHRQ — Agency for Healthcare Research and Quality

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HEALTHCARE COST & UTILIZATION PROJECT
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| DATABASE INFORMATION | RESEARCH TOOLS | REQUEST DATA | REPORTS & PUBLICATIONS | DATA VISUALIZATIONS | DATA QUERY TOOLS |

PUBLICATIONS SEARCH

HCUP Publications Search

There are two options available to search for articles based on HCUP data or products.

Simple Search: Use the simple search feature available on this page. Select the publication category that you would like to search: Peer-Reviewed Journ... government publications. Enter the keyword(s) you would like to search in the text field. Select the search button. The simple search will search for the ...

Advanced Search: Use the Advanced Search feature to perform a more refined search. Access the Advanced Search feature by selecting one of the links ... including author, title, periodical, publication, abstract, state, HCUP data year, HCUP database, and HCUP tools and products.

To obtain a list of all articles based on HCUP data or products, select "All Publications" for the publication category and enter a single asterisk (*) as the ...

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Search [Peer Reviewed Journals ▾]   For [Enter keyword(s)...]   [Search]

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Periodical	[ ]	(Exa
Publication Year	[ ]	(Exa
Abstract	[ ]	(Exa
State	[All States ▾]	
HCUP Data Year	[All Data Years ▾]	
HCUP Database	[All Databases ▾]	

HCUP Tools and Products (Choose one or multiple tools and products)

AHA Linkage Files
Chronic Condition Indicator (CCI)
Clinical Classifications Software (CCS) or Clinical Classifications Software Refined (CCSR)
Cost-to-Charge Ratio Files (CCR)
Elixhauser Comorbidity Software

[Search]

www.hcup-us.ahrq.gov/reports/pubsearch/pubsearch.jsp

What Precalculated Statistics Are Available?

HCUPnet Provides Quick, Free Access to HCUP Statistics

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

https://datatools.ahrq.gov/hcupnet

HCUPnet Can Answer a Variety of Questions

- What percentage of hospitalizations are billed to Medicaid as the expected primary payer?

- What are the most expensive conditions treated in U.S. hospitals?

- What is the trend in the number of hospitalizations related to depression?

- How do my estimates using an HCUP database compare with HCUPnet (validation)?

- Downloadable tables containing State-specific monthly trends in hospital utilization provided overall as well as by three key reporting categories:
  - ► Inpatient stays by select priority conditions
  - ► Inpatient encounter type (including normal newborns, deliveries, and nonelective and elective inpatient stays)
  - ► Inpatient service line (including maternal and neonatal conditions, mental health and substance use disorders, injuries, surgeries, other medical conditions)

www.hcup-us.ahrq.gov/reports/trendtables/summarytrendtables.jsp

HCUP Fast Stats

- Uses visual displays to compare national or State statistics on a range of healthcare topics
  - ▶ Neonatal Abstinence Syndrome
  - ▶ Opioid-Related Hospital Use
  - ▶ Hurricane Impact on Hospital Use
  - ▶ National Trends for Utilization Statistics and Costs
  - ▶ State Trends by Payer

www.hcup-us.ahrq.gov/faststats/landing.jsp
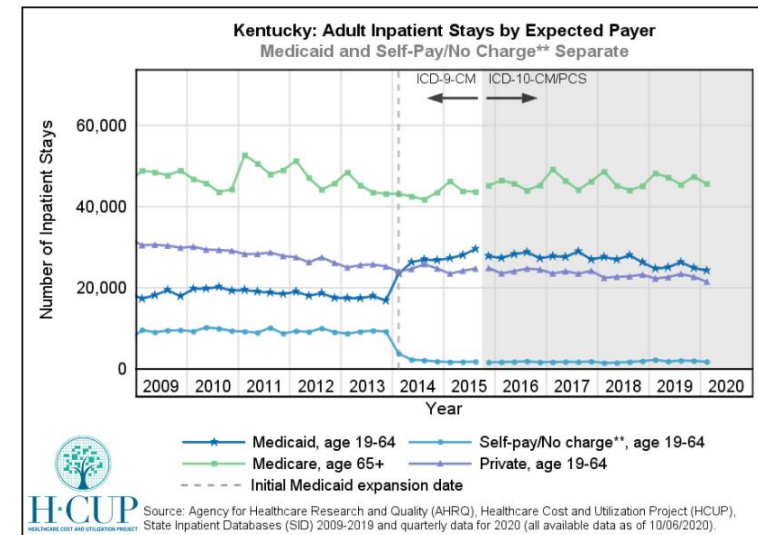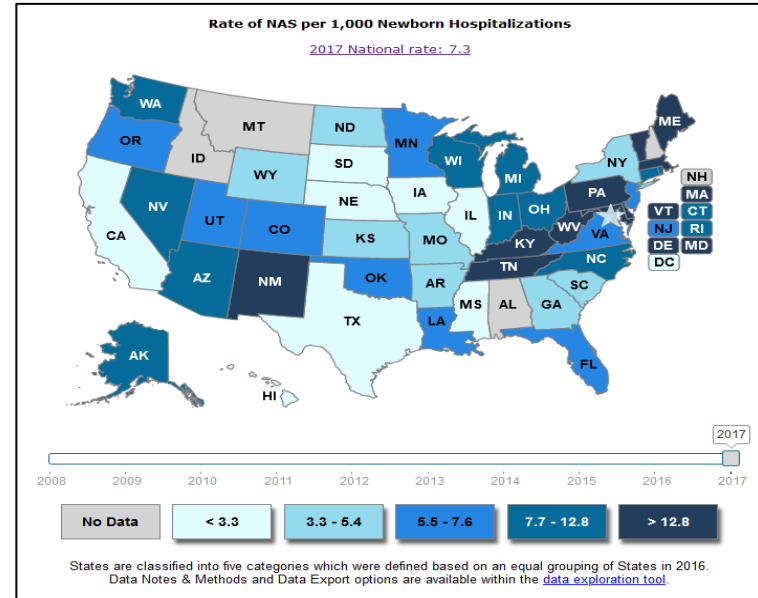
HCUP Summary Statistics

- Available for all HCUP databases by year
- Provide descriptive statistics for most data elements
- Use before purchase of HCUP database
  - ► Allow users to preview the type of information available in the respective HCUP database
- Use after purchase of HCUP database
  - ► Allow users to validate results
- Found under database-specific documentation pages of HCUP-US website

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

Diagnosis and Procedure Frequency Tables

- Frequencies of International Classification of Diseases, Tenth Revision, Clinical Modification/Procedure Coding System (ICD-10-CM/PCS) codes (individually and grouped by clinical category)
- Available for the HCUP nationwide databases (NIS, KID, NASS, NEDS, NRD)
  - ► Under **"Data Elements"** section of the respective Database Documentation pages

Data Elements

- NIS Description of Data Elements
  - ○ Prior Years
- NIS Summary Statistics
- Frequencies by Diagnosis and Procedure Codes, NIS 2016-2018 (Excel file, 9.8 MB)
- Prior to Data Year 2012
  - ○ Availability of AHA Hospital Identifiers
  - ○ Why the NIS should not be used to make State-level estimates

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

HCUP's Precalculated Statistics Meeting Varying Analytic Needs

Consideration	Analytic Need	HCUP Resource(s)
Type of information	Diagnosis- or procedure-specific information	HCUPnet HCUP Fast Stats HCUP Summary Trend Tables HCUP Diagnosis and Procedure Frequency Tables
	Other healthcare topics (e.g., hurricane-related ED visits)	HCUP Fast Stats
	Database-specific information	HCUP Summary Statistics
Display	Graphics (e.g., charts, maps)	HCUPnet HCUP Fast Stats
	Downloadable tables	HCUPnet HCUP Fast Stats HCUP Summary Trend Tables HCUP Diagnosis and Procedure Frequency Tables
Quality control	Validate analytic output based on HCUP database(s)	HCUPnet HCUP Summary Statistics HCUP Diagnosis and Procedure Frequency Tables
Flexibility	Predetermined stratifiers (e.g., patient characteristics)	HCUPnet HCUP Fast Stats HCUP Summary Trend Tables
	Multiple query options	HCUPnet HCUP Fast Stats

HCUP Data Visualizations

What HCUP Data Visualizations Are Available?

HCUP Visualization of Inpatient Trends in COVID-19 and Other Conditions

New!

Interactive visual display of State-specific monthly trends in inpatient stays related to COVID-19 and other conditions
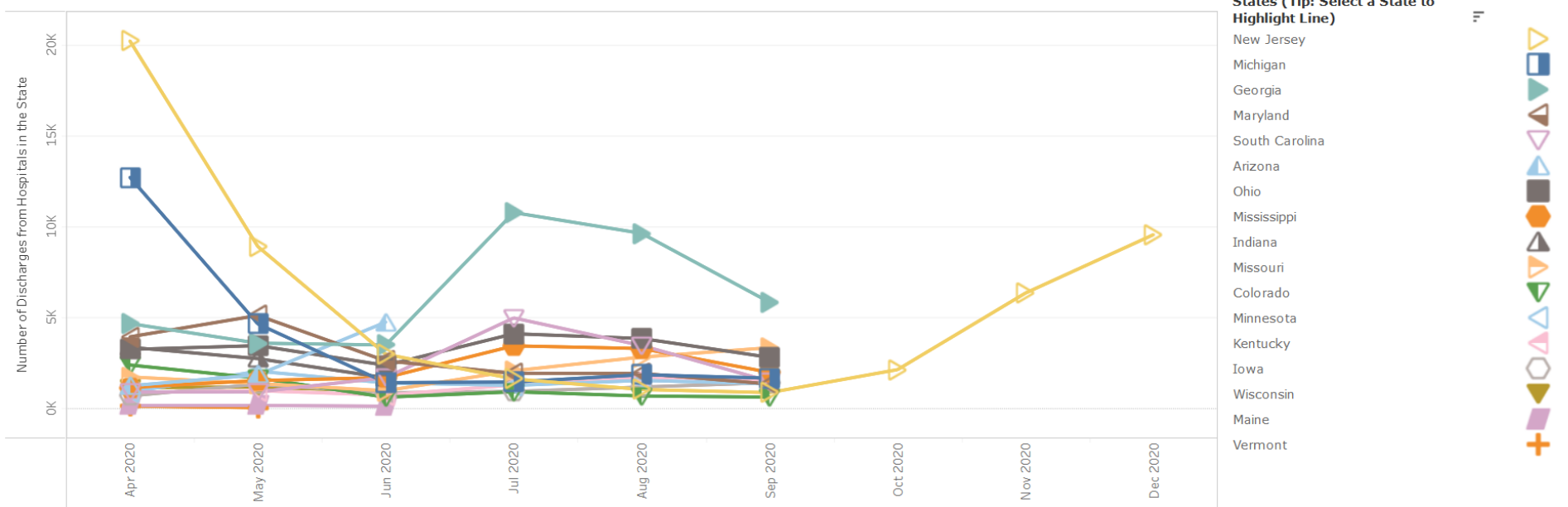
www.hcup-us.ahrq.gov/datavisualizations/covid-19-inpatient-trends.jsp

What Are the HCUP Software Tools?

HCUP Software Tools Augment HCUP and Other Administrative Databases

- Create new data elements from existing data, thereby enhancing a researcher's ability to conduct analyses
- May be applied to HCUP and other administrative databases

```
┌─────────────┐      ┌──────────────────┐      ┌─────────────────┐
│    HCUP     │      │      HCUP        │      │    New Data     │
│  Software   │  →   │   and Other      │  →   │  Elements for   │
│    Tools    │      │ Administrative   │      │    Research     │
│             │      │   Databases      │      │                 │
└─────────────┘      └──────────────────┘      └─────────────────┘
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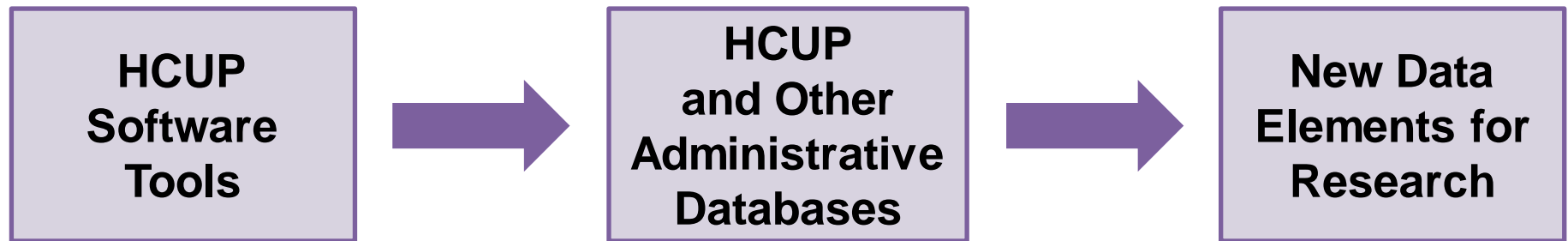
www.hcup-us.ahrq.gov/tools_software.jsp

HCUP Software Tools Available for Different Coding Systems

- Coding systems based on setting of care (e.g., inpatient and outpatient)
- Apply to either diagnosis codes or procedure codes
- Consider which coding system is appropriate for your analysis to identify the right HCUP software tool to use

Diagnosis-Related	Procedure-Related
ICD-10-CM ICD-9-CM	ICD-10-PCS HCPCS Level I (CPTs) HCPCS Level II ICD-9-CM

Types of Diagnosis Codes Included in HCUP Databases

Diagnosis Coding Systems

- **ICD-10-CM** (International Classification of Diseases, Tenth Revision, Clinical Modification)
    - Implemented in the United States starting on October 1, 2015
    - Included on inpatient and outpatient data

- **ICD-9-CM** (International Classification of Diseases, Ninth Revision, Clinical Modification)
    - Used in the United States prior to October 1, 2015
    - Included on inpatient and outpatient data

ICD-10-CM Diagnosis-Related HCUP Software Tools

Need to identify clinical categories that encompass similar codes?	Want to identify comorbidities?	Need to identify diagnoses indicating chronic conditions?
↓	↓	↓
Clinical Classifications Software Refined (CCSR) for ICD-10-CM diagnoses	**Elixhauser Comorbidity Software Refined for ICD-10-CM**	**Chronic Condition Indicator (CCI) for ICD-10-CM [beta version]**

These tools apply to both inpatient and outpatient data

CCSR for ICD-10-CM Diagnoses Identifies Broad Clinical Categories

- The CCSR for ICD-10 CM groups diagnoses into clinically meaningful categories that:
  - ► Capitalize on the specificity of the ICD-10-CM coding scheme
  - ► Retain the clinical concepts from the Clinical Classifications Software (CCS) for ICD-9-CM, when possible
- Includes ICD-10-CM diagnosis codes valid as of October 2015 through current fiscal year

ICD-10-CM Codes

I2101 I2102 I2109 I2111
I2119 I2121 I2129 I213 I214
I219 I21A1 I21A9 I220 I221
I222 I228 I229

CCSR Categories

CIR009: Acute myocardial infarction

K251 K253 K255 K257 K259
K261 K263 K265 K267 K269
K271 K273 K275 K277 K279
K281 K283 K285 K287 K289

DIG005: Gastroduodenal ulcer

Key Characteristics of the CCSR for ICD-10-CM

Characteristic	Description
Number of categories	More than 530 CCSR categories
Category naming convention	Categories start with three-character body system abbreviation followed by three digits. Examples: • CIR007 Essential hypertension • NEO023 Bone cancer
Category assignment is not mutually exclusive	Some codes cross-classified to more than one CCSR category
Output from SAS software	Flexibility to choose between file output versions

Default CCSR for ICD-10-CM Categorization Scheme Available

Do you need a default CCSR category for a specific analytic purpose, such as ranking principal diagnoses in inpatient data?

CCSR for ICD-10-CM default categorization scheme

Default CCSR categories are mutually exclusive, and they are based on hierarchical guidelines that relied on clinical coding rules, clinical input on the etiology/pathology of diseases, coding input, and standards from other Federal agencies

Elixhauser Comorbidity Software Refined for ICD-10-CM Identifies Pre-existing Conditions

- Allows researchers to control for comorbidities that are not directly related to the reason for the inpatient stay or outpatient encounter because they can affect:
  - ► Resource allocation (e.g., length of stay or total hospital charges)
  - ► Outcomes used to assess the quality of care (e.g., in-hospital mortality)
- Includes ICD-10-CM diagnosis codes valid as of October 2015 through current fiscal year

Key Characteristics of the Elixhauser Comorbidity Software Refined for ICD-10-CM

Characteristic	Description
Number of comorbidities	38 comorbidity measures
Indicators that the diagnosis was present on admission	Required to assign 18 of the 38 comorbidity measures to identify pre-existing conditions, as opposed to medical conditions that arise during the hospital stay
Comorbidity assignment is not mutually exclusive	Some codes cross-classified to more than one comorbidity measure
Clinically similar comorbidity measures	Some comorbidity measures clinically similar but differentiated by severity Examples: • Diabetes, uncomplicated • Diabetes, complicated

CCI for ICD-10-CM (Beta Version) Readily Identifies Chronic Conditions

Classifies diagnoses into one of four types of conditions:

Type of Diagnosis	Examples
Chronic	Malignant cancer, diabetes, obesity
Acute	Pregnancy, initial encounter of injury
Both chronic and acute	Persistent asthma with (acute) exacerbation, sickle-cell disease with acute chest syndrome
Not applicable	External cause of morbidity codes, injury sequela codes

Includes ICD-10-CM diagnosis codes valid as of October 2015 through the current fiscal year

Similar HCUP Software Tools for ICD-9-CM Diagnoses

- ICD-9 CM Diagnosis-related tools
  - ► Clinical Classifications Software (CCS) for ICD-9-CM diagnoses
  - ► Chronic Condition Indicator (CCI) for ICD-9-CM
  - ► Elixhauser Comorbidity Software for ICD-9-CM
- ICD-9-CM diagnosis-related tools are similar in concept but differ in methodology
  - ► Should not be used to trend between ICD-9-CM and ICD-10-CM

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

Types of Procedure Codes Included in HCUP Databases

Procedure Coding Systems

- **ICD-10-PCS** (International Classification of Diseases, Tenth Revision, Procedure Coding System)
  - Implemented in the United States starting on October 1, 2015
  - Reported only on inpatient data

- **ICD-9-CM**
  - Used in the United States prior to October 1, 2015
  - Reported on inpatient data and sometimes on outpatient data

- **HCPCS** (Healthcare Common Procedure Coding System)
  - **Level I CPT** (Current Procedural Terminology)
  - **HCPCS Level II**
  - Available in all data years
  - Applicable to outpatient procedures and physician services

ICD-10-PCS Procedure-Related HCUP Software Tools

Need to identify inpatient procedure categories that encompass similar codes?	Want to identify therapeutic/ diagnostic operating room procedures?	Need to identify services based on procedure and/or revenue center codes?
↓	↓	↓
Clinical Classifications Software Refined (CCSR) for ICD-10-PCS Procedures	**Procedure Classes Refined for ICD-10-PCS**	**Utilization Flags for Revenue Center Codes and ICD-10-PCS [beta version]**

These tools apply to <u>only inpatient data</u>

CCSR for ICD-10-PCS Procedures Identifies Broad Procedure Categories

- The CCSR for ICD-10-PCS groups procedure codes into clinically meaningful categories that:
  - ► Capitalize on the taxonomy and specificity of the ICD-10-PCS coding scheme
  - ► Retain the surgical concepts from the CCS for ICD-9-CM, when possible
- Includes ICD-10-PCS procedure codes valid as of October 2015 through current fiscal year

ICD-10-PCS Codes	CCSR Categories
10D00Z0 10D00Z1 10D00Z2	PGN003: Cesarean section
009U30Z 009U3ZX 009U3ZZ 00JU3ZZ	CNS002: Lumbar puncture

Key Characteristics of the CCSR for ICD-10-PCS

Characteristic	Description
Number of categories	More than 320 CCSR categories
Category naming convention	Categories start with three-character body system abbreviation followed by three digits. Examples: • CAR003 Coronary artery bypass grafts (CABG) • NCM001 Planar nuclear medicine imaging
Category assignment is mutually exclusive	Codes classified to one and only one CCSR category
Output from SAS software	Flexibility to choose between file output versions

Procedure Classes Refined for ICD-10-PCS Identifies OR Procedures

- Procedure Classes Refined for ICD-10-PCS facilitates health services research by allowing the researcher to readily determine:
  - ► Whether a procedure is expected to be performed in an operating room (OR)
  - ► Whether a procedure is diagnostic or therapeutic
- Includes ICD-10-PCS procedure codes valid as of October 2015 through current fiscal year

Four Procedure Class Categories

The Procedure Classes Refined for ICD-10-PCS assigns all codes to one of four categories:

Category	Description	Example
Minor Diagnostic	Non-OR procedures that are diagnostic	B244ZZZ, Ultrasonography of Right Heart
Minor Therapeutic	Non-OR procedures that are therapeutic	02HQ33Z, Insertion of Infusion Device into Right Pulmonary Artery, Percutaneous Approach
Major Diagnostic	Procedures that are considered OR procedures that are performed for diagnostic reasons	02BV0ZX, Excision of Superior Vena Cava, Open Approach, Diagnostic
Major Therapeutic	Procedures that are considered OR procedures that are performed for therapeutic reasons	0210093, Bypass Coronary Artery, One Site from Coronary Artery with Autologous Venous Tissue, Open Approach

Utilization Flags for Revenue Center Codes and ICD-10-PCS (Beta Version)

- 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 fiscal year for 2017–2020
  - ► Currently a beta version

UB-04 Revenue Codes and ICD-10-PCS Procedure Codes

⬇

Utilization Flags Software for ICD-10-PCS (beta version)

⬇

Utilization Flags (30)

Examples:

- Emergency room
- Observation services
- Renal dialysis
- Intensive care unit

Similar HCUP Software Tools for ICD-9-CM Procedures

- ICD-9-CM procedure-related tools:
  - ► Clinical Classifications Software (CCS) for ICD-9-CM procedures
  - ► Procedure Classes for ICD-9-CM
  - ► Utilization Flags for Revenue Center Codes and ICD-9-CM
  - ► Surgery Flags for ICD-9-CM
    - – No version available for ICD-10-PCS
- ICD-9-CM procedure-related tools are similar in concept but differ in methodology
  - ► Should not be used to trend between ICD-9-CM and ICD-10-PCS

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

CPT and HCPCS Level II Procedure-Related HCUP Software Tools

Need to identify procedure categories that encompass similar CPT and HCPCS Level II codes?	Want to identify CPT procedures by use of OR and degree of invasiveness?
↓	↓
Clinical Classifications Software (CCS) for Services and Procedures	**Surgery Flags Software for Services and Procedures**

These tools apply to <u>only outpatient data</u> and require users to agree to the license for use of CPT

CCS-Services and Procedures Groups HCPCS Codes Into Procedure Categories

- Categories align with the CCS for ICD-9-CM procedures

  ► Added categories unique to the professional services and supplies identified by CPT and Level II HCPCS codes

  ► Example: CCS 245 Telehealth for remote monitoring, telephone calls, online communication, etc.

CPT or HCPCS Level II Codes → CCS-Services and Procedures Categories

60210 60212 60220 60225
60240 60252 60254 60260
60270 60271 → CCS 10: Thyroidectomy, partial or complete

0308T 65920 66820 66825
66830 66840 66850 66852
66920 66930 66940 66982 → CCS 15: Lens and cataract procedures

CCS-Services and Procedures has not been modified to align with the CCSR for ICD-10-PCS

Surgery Flags Software for Services and Procedures Identifies Surgical Procedures

Subset of CPT codes are classified as one of three categories:

Category	Description	Examples
Narrow	A narrowly defined surgery that is usually a major therapeutic procedure	Arthroplasty, organ transplant
Broad	A more broadly defined surgery that includes major diagnostic and invasive minor therapeutic procedures	Biopsy of tissue (not within internal organ), episiotomy
Neither	Neither a narrowly nor broadly defined surgery	Injections, lithotripsy

Summary of HCUP Software Tool Availability

HCUP Software Tool Purpose	ICD-10-CM/PCS	ICD-9-CM	CPT/HCPCS Level II Codes
Groups diagnoses into categories	CCSR for ICD-10-CM	CCS for ICD-9-CM	
Identifies comorbidities	Elixhauser Comorbidity Software Refined for ICD-10-CM	Elixhauser Comorbidity Software for ICD-9-CM	
Identifies chronic conditions	CCI for ICD-10-CM [beta version]	CCI for ICD-9-CM	
Groups procedures into categories	CCSR for ICD-10-PCS	CCS for ICD-9-CM	CCS-Services and Procedures
Identifies operating room procedures	Procedure Classes Refined for ICD-10-PCS	Procedure Classes for ICD-9-CM	
Identifies specific services	Utilization Flags for Revenue Center Codes and ICD-10-PCS [beta version]	Utilization Flags for Revenue Center Codes and ICD-9-CM	
Identifies procedures by use of operating room and invasiveness		Surgery Flags for ICD-9-CM	Surgery Flags Software for Services and Procedures

HCUP Software Tool Versioning

- Tools are updated annually to reflect the most recent coding updates
  - ► CPT/HCPCS Level II codes are updated on a calendar year basis (effective on January 1)
  - ► ICD-10-CM and ICD-10-PCS codes are updated on a fiscal year basis (effective October 1)
- Tools use specific file naming conventions to indicate applicable version of the underlying codes (vyyyy.r):
  - ► Where *yyyy* represents either fiscal year for ICD-10-CM/PCS or calendar year for CPT/HCPCS and *r* represents the release number within year
    - − For example, the first release of the CCSR for ICD-10-CM diagnoses that includes codes valid through fiscal year 2021 is v2021.1

Availability of HCUP Software Tools on HCUP Databases

- ICD-10-CM/PCS refined tools are being added to the HCUP databases
  - ► 2018 HCUP nationwide databases include the CCSR for ICD-10-CM diagnoses
  - ► 2019 HCUP nationwide databases and 2020 HCUP State databases will include:
    - – Elixhauser Comorbidity Software Refined for ICD-10-CM
    - – CCSR for ICD-10-PCS procedures
    - – Procedure Classes Refined for ICD-10-PCS

How Can You Use the HCUP Supplemental Files?

HCUP Supplemental Files Augment Applicable HCUP Databases

- Provide access to additional data elements or analytically useful information

- Either they are available for download from the HCUP-US website or they may be ordered when purchasing the applicable HCUP database

Designed to be <u>used only with the HCUP databases</u>

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

Available HCUP Supplemental Files

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

www.hcup-us.ahrq.gov/tools_software.jsp
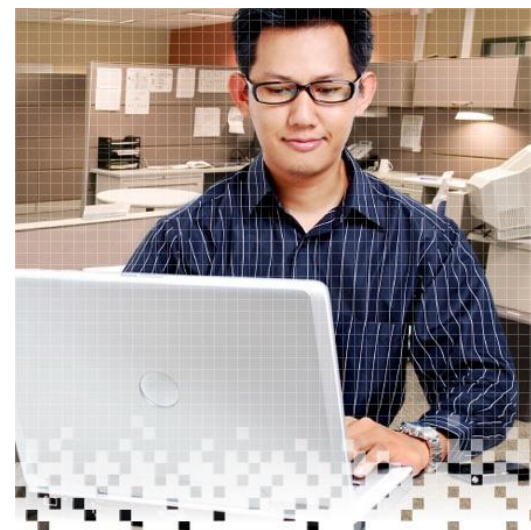
HCUP Cost-to-Charge Ratio (CCR) Files Convert Total Charges to Costs

Available for HCUP inpatient databases (NIS, KID, NRD, and SID) beginning 2001 and one HCUP ED database (SEDD) beginning 2017

APICC
GAIPCC
CCSR_NIS
CCSR_NRD
APECC
GAEPCC

Hospital-Level Data

Apply Ratios

Convert Total Charges to Costs

www.hcup-us.ahrq.gov/db/ccr/costtocharge.jsp

AHA Linkage Files Provide Linkage For HCUP Hospital Identifiers

- Linkage between hospital identifiers on the HCUP State Databases to those on the AHA Annual Survey Databases

- Files are unique by State and year and are available for a subset of HCUP Partners that release AHA identifiers

| **HCUP State Databases** | → | **AHA Linkage File** | → | **AHA Annual Survey*** |

*Must be purchased separately from the AHA

www.hcup-us.ahrq.gov/db/state/ahalinkage/aha_linkage.jsp

HCUP Supplemental Variables for Revisit Analyses

- Availability varies by State, specifically those that provide synthetic patient identifiers to HCUP

- Allow linkage across settings and time (e.g., hospital readmissions, ED visits following hospital discharge)

- Adhere to strict privacy guidelines

- Storage of variables varies by data year
  - ► For 2003–2008, released as stand-alone files
  - ► Starting 2009, included on the Core File of the SID, SASD, or SEDD

www.hcup-us.ahrq.gov/toolssoftware/revisit/revisit.jsp

NIS and KID Trend Weights Files Adjust Discharge Weights for Longitudinal Analyses

- Adjust discharge weights to account for sample redesign of the NIS (2012) and KID (2000) when trending across these years

- Files are needed for longitudinal analyses that span these redesign time periods

www.hcup-us.ahrq.gov/db/nation/nis/trendwghts.jsp

www.hcup-us.ahrq.gov/db/nation/kid/kidtrends.jsp

HCUP Hospital Market Structure Files Contain Measures of Hospital Competition

- Estimate the intensity of competition that hospitals may face under various definitions of market area, including:
  - ► Markets defined by geopolitical boundaries
  - ► Fixed radius defined by 15 miles
  - ► Variable radius that varies to capture majority of hospital discharges
  - ► Patient flow
- Available for the NIS, KID, and SID for data years 1997, 2000, 2003, 2006, and 2009

www.hcup-us.ahrq.gov/toolssoftware/hms/hms.jsp

HCUP NIS Ownership Files Facilitate Analyses by Ownership Categories

- Provide uncollapsed ownership categories (government, non-Federal, private, nonprofit, and private, investor-owned) to facilitate longitudinal analyses
- Available for 1998–2007 for the NIS because these data years include a version of hospital ownership that provides collapsed values for some strata

www.hcup-us.ahrq.gov/db/nation/nis/nisownership.jsp

Resources for the HCUP Supplemental Files

- Additional information about the HCUP supplemental files available on the Tools and Software page:

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

- All supplemental files available for free

- The supplemental files differ on method of download

    ► Some available for download directly from HCUP-US website

    ► Others available through the HCUP Central Distributor:

    www.hcup-us.ahrq.gov/tech_assist/centdist.jsp

What Should You Do If You Have Questions About HCUP?

HCUP User Support Website

- Find detailed information on HCUP databases, tools, and products

- Access HCUPnet, HCUP Fast Stats, HCUP Summary Trend Tables, Data Visualizations, 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

Technical Assistance Team

- Responds to inquiries about HCUP data, products, and tools

- Collects user feedback and suggestions for improvement

Email: hcup@ahrq.gov
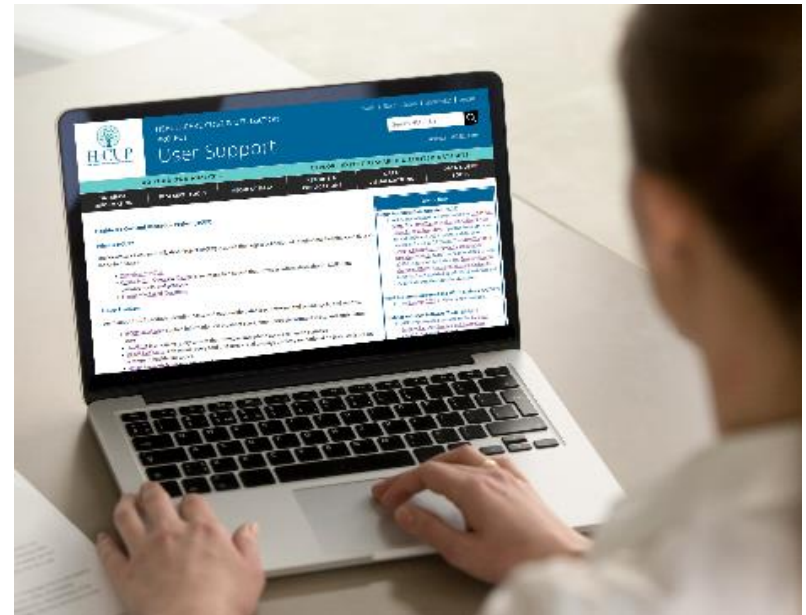
Interactive Online HCUP Tutorials and Training Courses

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- Producing National HCUP Estimates
- Load and Check HCUP Data
- Calculating Standard Errors
- HCUP Sample Design
- Multi-Year Analysis
- Nationwide Readmissions Database (NRD)
- HCUP Software Tools **(NEW)**

Visit HCUP's Virtual Exhibit Booth

- The HCUP Virtual Exhibit Booth provides materials typically offered at the HCUP conference exhibit booths
- Includes brochures, participation maps, an overview presentation of HCUP, and additional information that provides general project information

www.hcup-us.ahrq.gov/news/exhibit_booth.jsp

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