



U.S. Department of Health and Human Services



Agency for Healthcare Research and Quality

Advancing Excellence in Health Care • www.ahrq.gov

The Healthcare Cost and Utilization Project (HCUP)

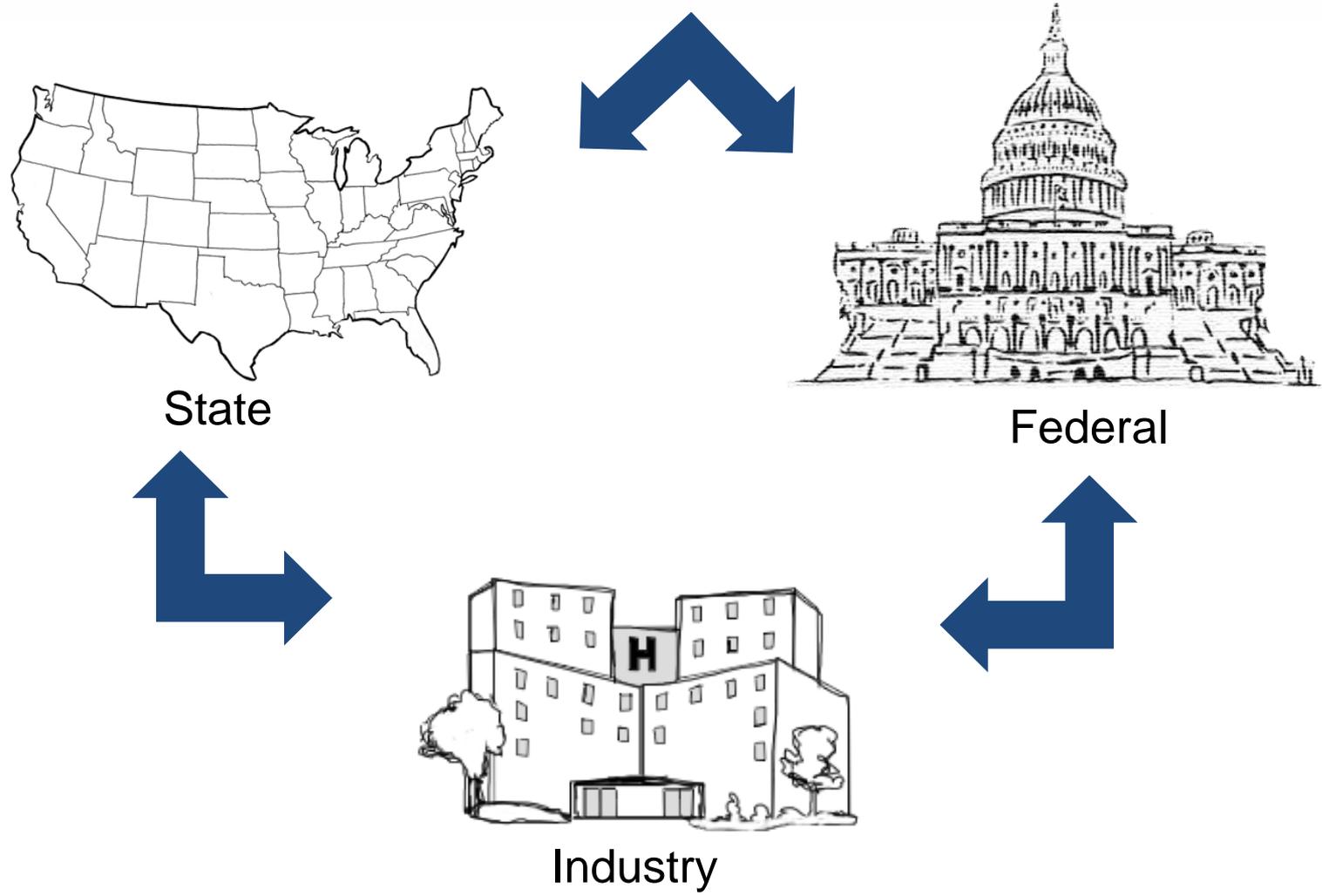
Overview of the HCUP Databases

Agency for Healthcare Research and Quality
Webinar ♦ April 6, 2016

- **Project Overview**
- **HCUP Partners**
- **The Making of HCUP Data**
- **HCUP State Databases**
- **HCUP Nationwide Databases**
- **How to Obtain HCUP Data & Access HCUP Resources**

Costs of care	Septicemia was the most expensive reason for hospitalization in 2013—totaling over \$23 billion in aggregate hospital costs (NIS)
Access to care	Americans in low-income areas visit EDs at rates 90 percent higher compared to those in the highest income areas (NEDS)
Quality of care	Among women who delivered by cesarean section and were covered by Medicaid, 94.6 percent of discharges included a complicating condition (NIS)
Readmissions	In 2013, there were about 500,000 readmissions totaling \$7 billion in aggregate hospital costs for four high-volume conditions—acute myocardial infarction (AMI), congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), and pneumonia.
Patient safety	In 2011, the four most frequent causes of adverse drug events (ADEs) originating in the hospital were steroids, antibiotics, opiates and narcotics, and anticoagulants (SID)
Geographic variation	ED visits were higher in counties with fewer primary care MDs per capita (SEDD)

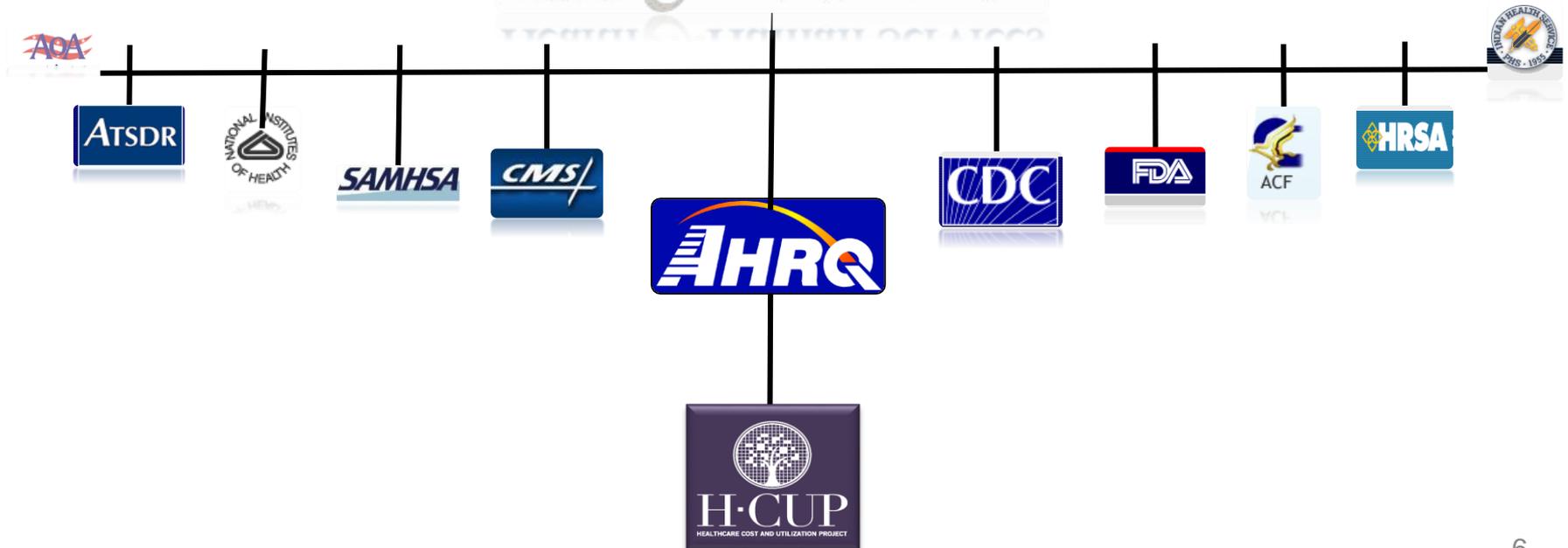
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What is the Agency for Healthcare Research and Quality (AHRQ)?

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

United States Department of
Health & Human Services





Current HCUP Data Partners



Alaska State Hospital and Nursing Home Association

Arizona Department of Health Services

Arkansas Department of Health

California Office of Statewide Health Planning & Development

Colorado Hospital Association

Connecticut Hospital Association

District of Columbia Hospital Association

Florida Agency for Health Care Administration

Georgia Hospital Association

Hawaii Health Information Corporation

Illinois Department of Public Health

Indiana Hospital Association

Iowa Hospital Association



Current HCUP Data Partners



Kansas Hospital Association

Kentucky Cabinet for Health and Family Services

Louisiana Department of Health and Hospitals

Maine Health Data Organization

Maryland Health Services Cost Review Commission

Massachusetts Center for Health Information and Analysis

Michigan Health & Hospital Association

Minnesota Hospital Association

Mississippi Department of Health

Missouri Hospital Industry Data Institute

Montana MHA – An Association of Montana Health Care Providers

Nebraska Hospital Association



Current HCUP Data Partners



- Nevada** Department of Health and Human Services
- New Hampshire** Department of Health & Human Services
- New Jersey** Department of Health
- New Mexico** Department of Health
- New York** State Department of Health
- North Carolina** Department of Health and Human Services
- North Dakota** Minnesota Hospital Association
- Ohio** Hospital Association
- Oklahoma** State Department of Health
- Oregon** Association of Hospitals and Health Systems,
Office of Health Analytics
- Pennsylvania** Health Care Cost Containment Council

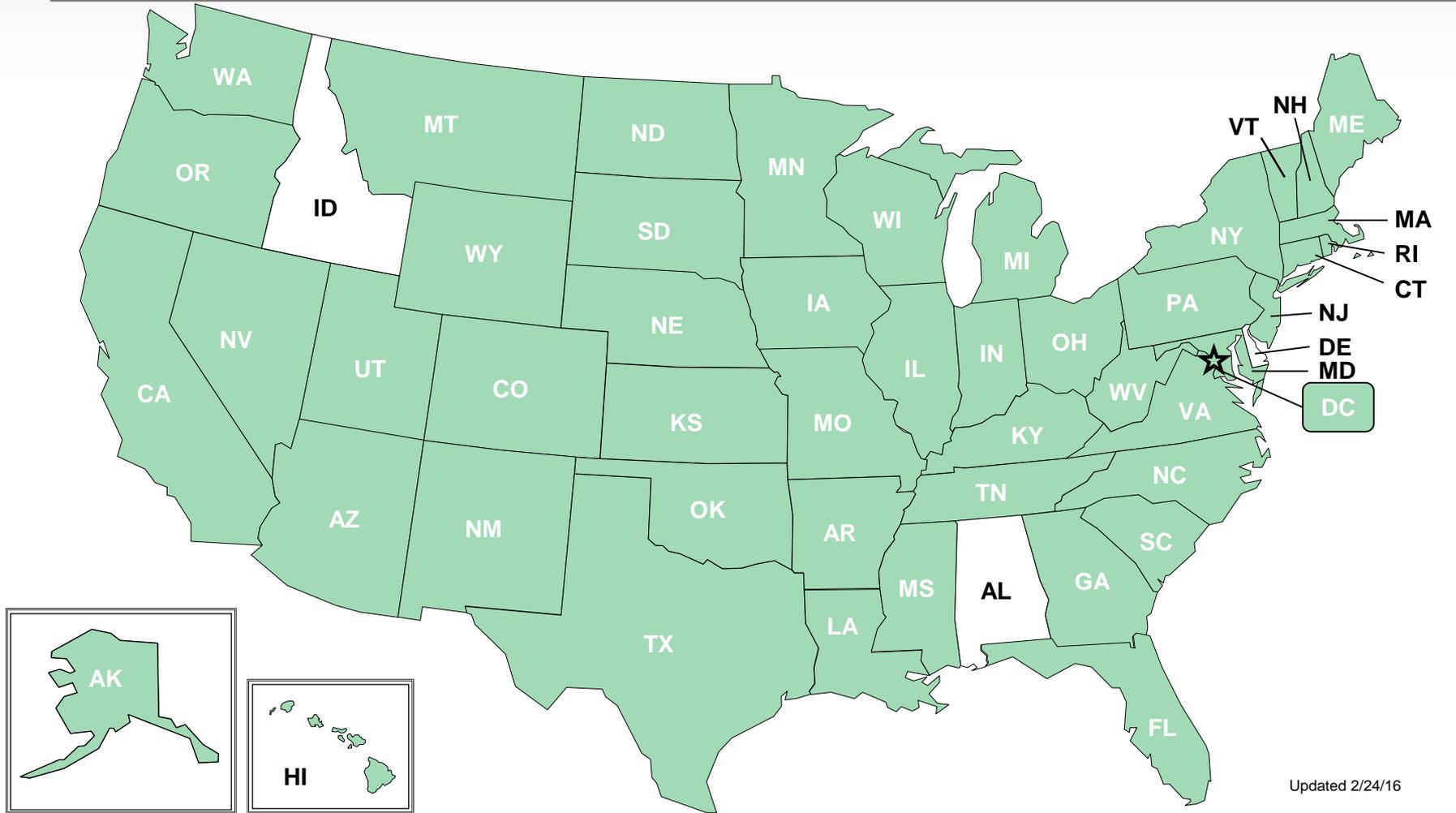


Current HCUP Data Partners

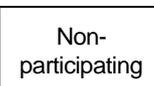


- Rhode Island** Department of Health
- South Carolina** Revenue and Fiscals Affairs Office
- South Dakota** Association of Health Care Organizations
- Tennessee** Hospital Association
- Texas** Department of State Health Services
- Utah** Department of Health
- Vermont** Association of Hospitals and Health Systems
- Virginia** Health Information
- Washington** State Department of Health
- West Virginia** Health Care Authority
- Wisconsin** Department of Health Services
- Wyoming** Hospital Association

HCUP Partners Providing Inpatient Data



Updated 2/24/16

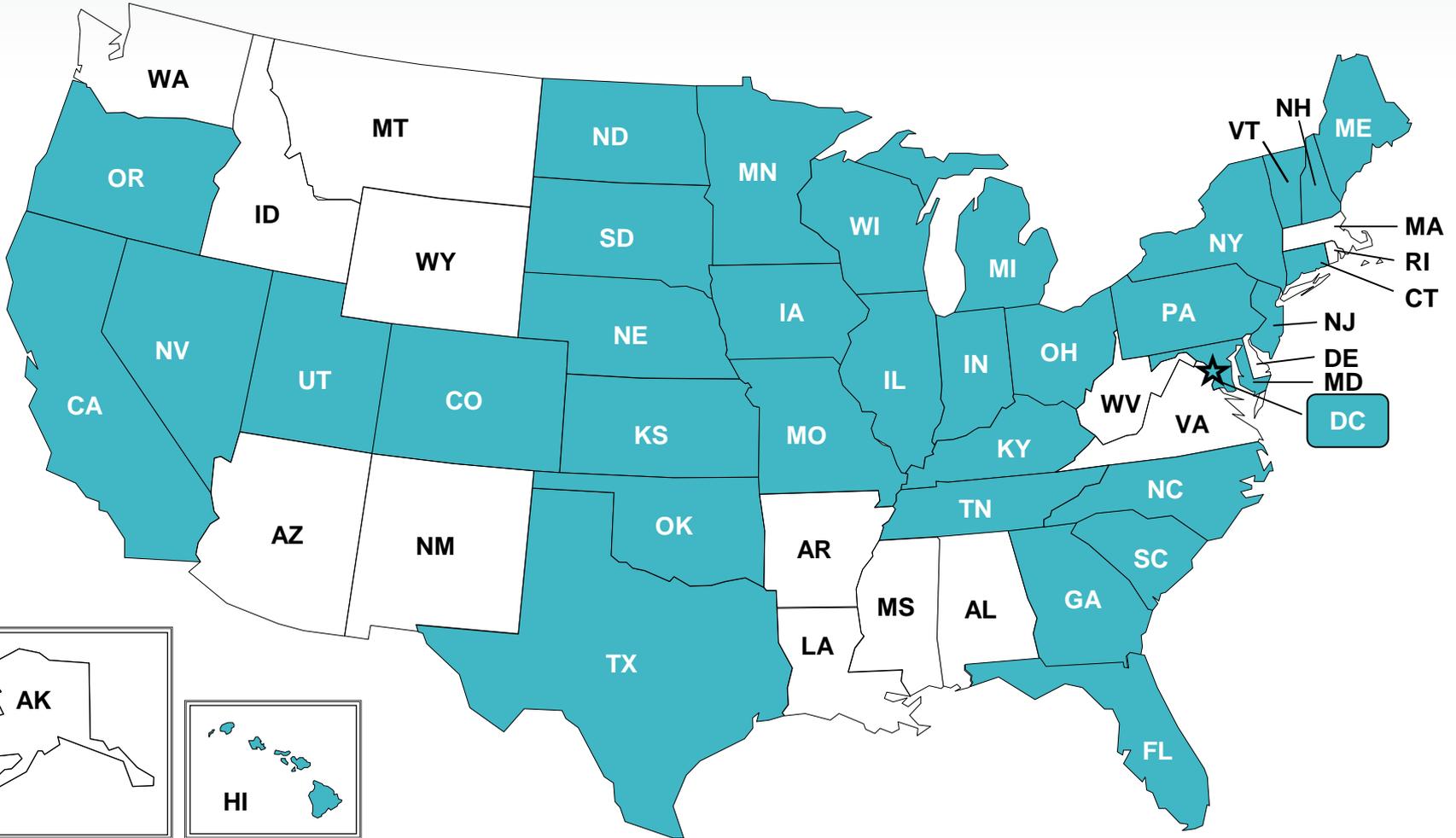
Partners Providing:	Inpatient Data	Non-participating
		



HCUP Partners Providing Ambulatory Surgery & Services Data



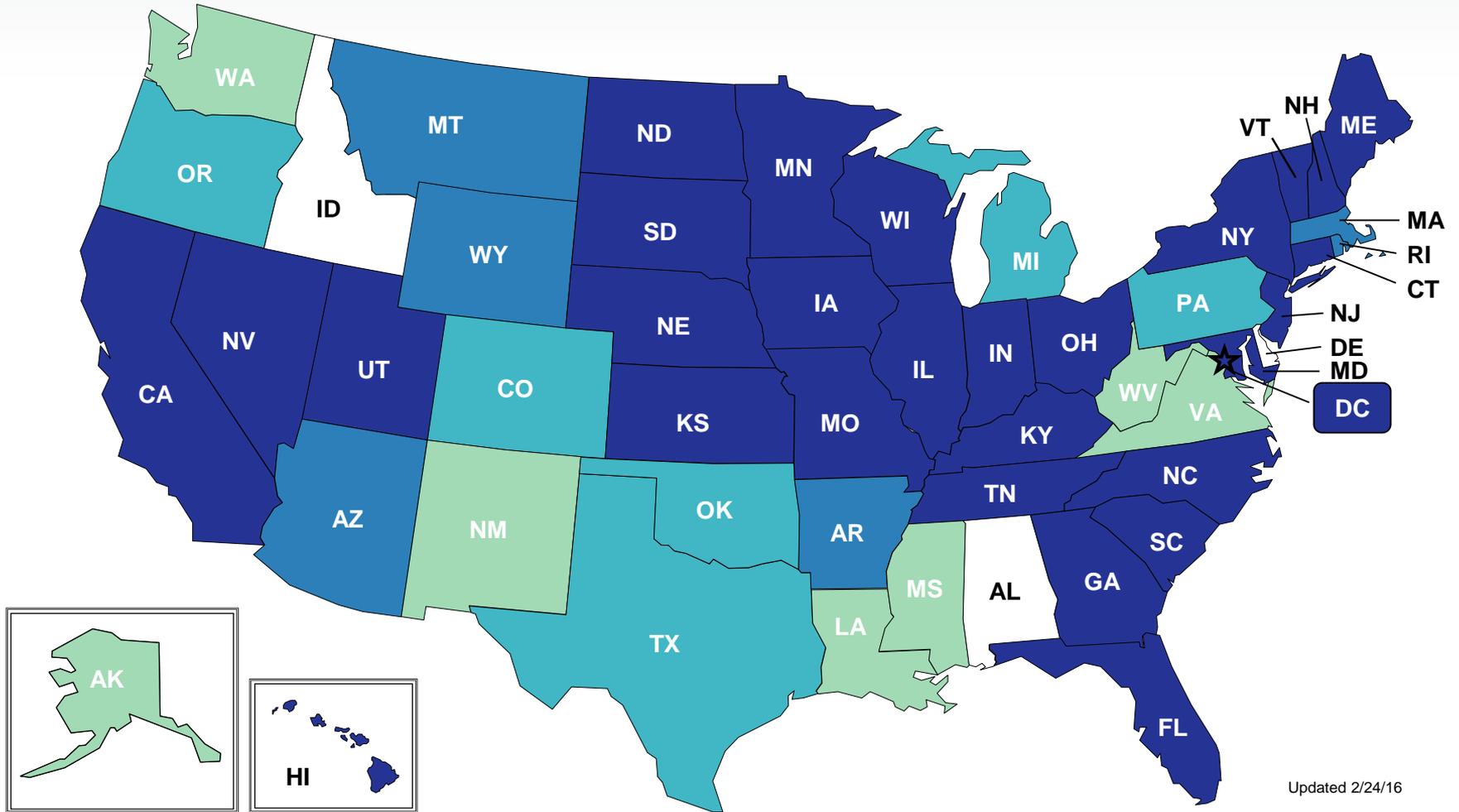
H·CUP
HEALTHCARE COST AND UTILIZATION PROJECT



Updated 2/24/16

Partners Providing:	Ambulatory Surgery & Services Data	Non-participating
----------------------------	------------------------------------	-------------------

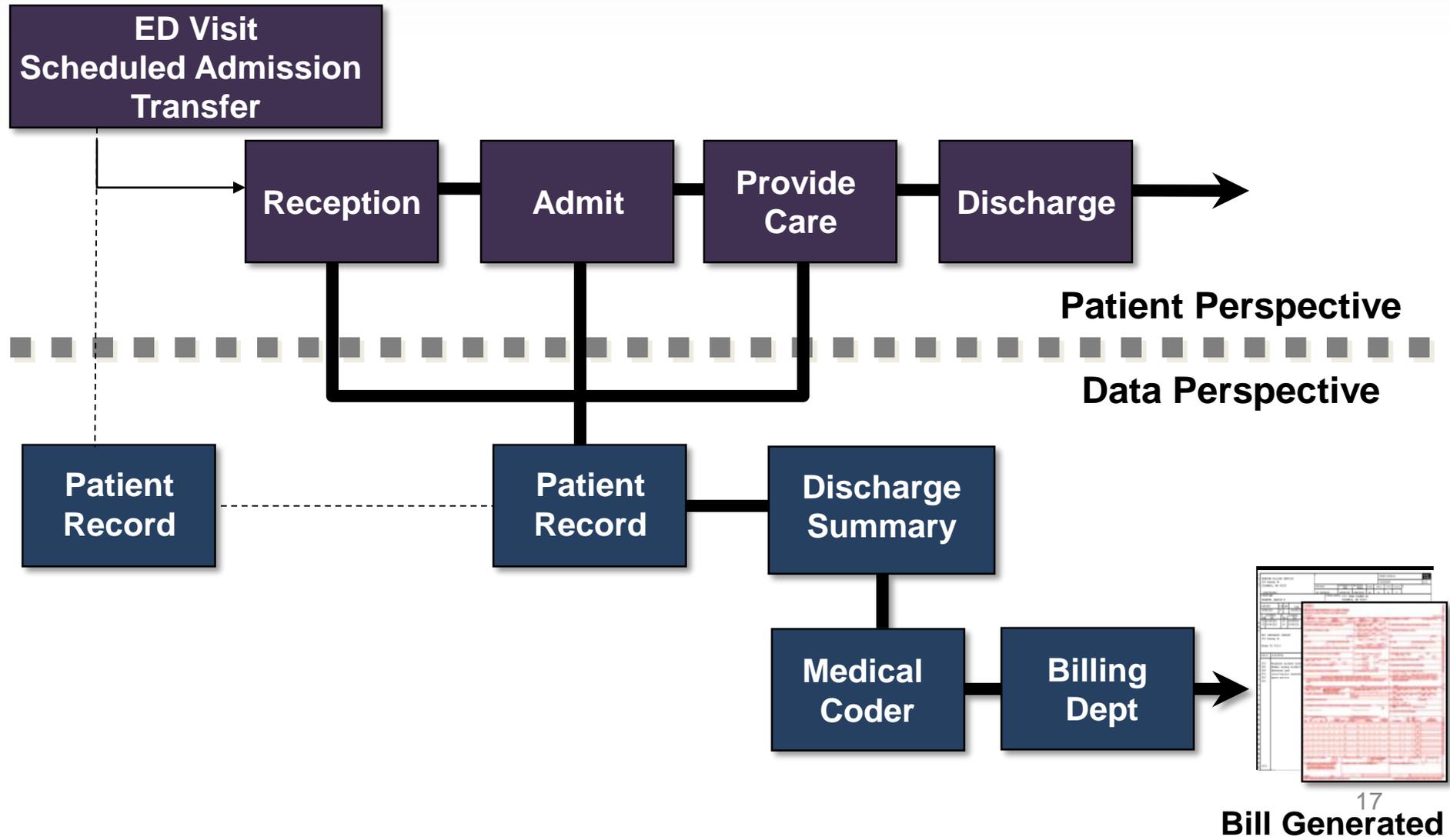
HCUP Participation by Data Type



Updated 2/24/16

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

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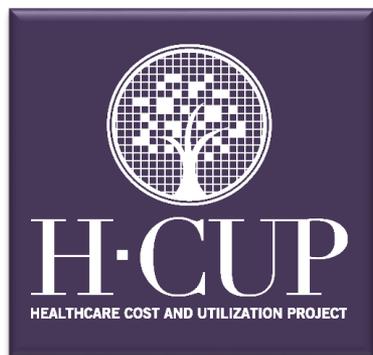
Patient enters hospital



Billing record created



Hospital sends billing data and any additional data elements to data organizations



AHRQ standardizes data to create uniform HCUP databases

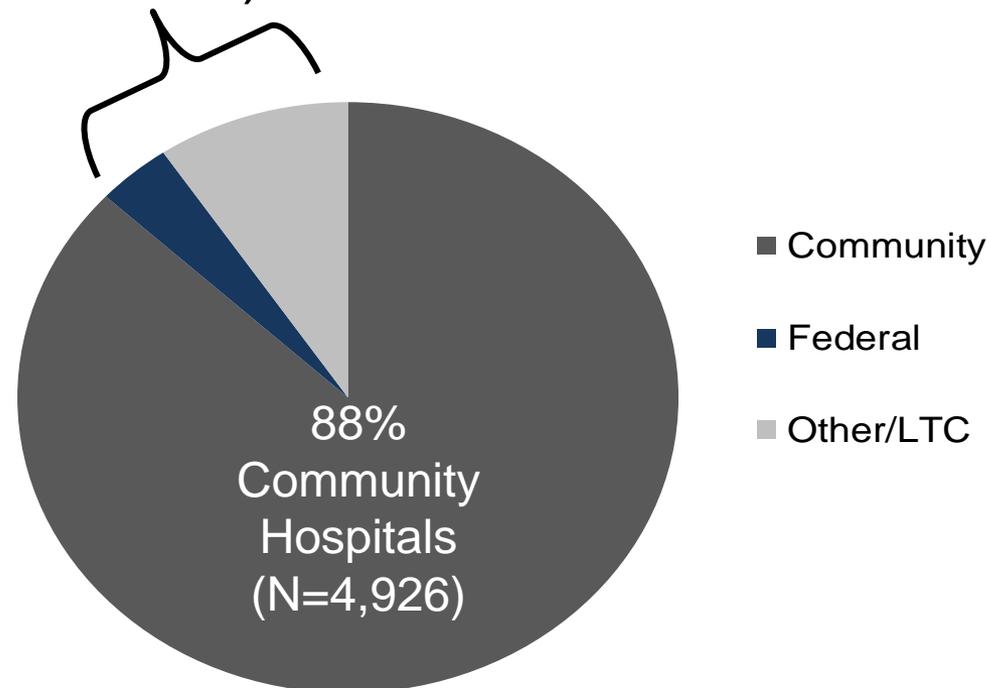
744	98	749	2	79	257	5	290
745	25	614	4	84	541	4	549
746	68	195	1	78	669	3	523
747	43	726	3	46	211	4	970
748	81	533	6	98	83	8	40
749	51	418	4	69	496	1	613
750	16	574	2	77	571	1	905
751	2	326	4	44	638	2	958
752	63	521	4	18	217	8	721
753	38	867	4	44	446	2	71
754	50	418	0	59	216	4	799
755	22	806	3	46	573	2	994
756	94	740	6	55	247	1	218
757	36	852	8	8	289	3	559
758	63	386	1	94	838	5	613
759	17	766	6	92	799	5	612
760	54	735	3	29	556	6	503
761	5	263	4	78	125	8	997
762	48	100	3	94	484	8	206
763	23	916	6	15	556	9	327
764	11	251	4	17	125	6	192
765	30	976	1	9	561	6	39

States store data in varying formats

- State data is mapped to a standardized HCUP format which allows for consistent data elements and values for comparison across States
- Additional data elements are added:
 - ▶ Value-added variables – injury indicators, chronic condition indicators, procedure class
 - ▶ Hospital characteristics – teaching status, ownership/control, bed size
 - ▶ Diagnostic related groups and severity measures –
 - AHRQ’s Clinical Classifications Software (CCS)
 - 3M’s All Patient Refined DRGs (APR-DRGs)
- Quality checks are performed

- 88% of hospitals in the U.S. are community hospitals

12% Non-community hospitals (Federal (DOD/VA/IHS), psychiatric, non-federal long term care, etc.)



What Are Community Hospitals?

American Hospital Association Definition:

Non-Federal, short-term, general, and other specialty hospitals, excluding hospital units of other institutions (e.g., prisons)

Included	Excluded
Multi-specialty general hospitals	Long-term care
OB-GYN	Psychiatric
ENT	Alcoholism/Chemical dependency
Orthopedic	Rehabilitation
Pediatric	DoD / VA / IHS
Public	
Academic medical centers	

What Are Community Hospitals?

- HCUP generally does not receive data from non-community hospitals.
- However, if a patient is treated in a community hospital, their information is included.

Most Frequent Principal Diagnosis	Number of Discharges (thousands)
1. Newborn	3,765
2. Septicemia	1,297
3. Osteoarthritis	1,023
4. Pneumonia	961
5. Congestive Heart Failure	882
6. Mood disorders	836
7. Cardiac dysrhythmias	710

HCUP has Seven Types of Databases

- Three State-Specific Databases



State Inpatient Databases
(SID)



State Ambulatory Surgery & Services Databases
(SASD)



State Emergency Department Databases
(SEDD)

- Four National (Nationwide) Databases



National Inpatient Sample
(NIS)



Nationwide Emergency Department Sample
(NEDS)



Kids' Inpatient Database
(KID)



Nationwide Readmissions Database
(NRD)

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State Inpatient
Databases
(SID)

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

State Ambulatory
Surgery & Services Databases
(SASD)

Ambulatory surgery data (hospital based and some freestanding) and other outpatient services from participating HCUP States

State Emergency Department
Databases
(SEDD)

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

What Data Elements are Included in the HCUP Databases?

Data Elements:

- Patient demographics (age, sex)
- Diagnoses & procedures
- Expected payer
- Length of stay
- Patient disposition
- Admission type
- Point of origin
- Admission month
- Weekend admission



Some Data Elements Vary by State

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





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	Medi-Cal
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



Example: Race Detail Varies by State



RACE_X		RACE (Standardized)	
Value	Description	Value	Description
1	White	1	White
2	Black	2	Black
3	Hispanic	3	Hispanic
4	Hawaiian	4	Asian or Pacific Islander
5	Chinese		
6	Filipino		
7	Japanese		
8	Other Asian		
9	Other Pacific Islander	5	Native American
10	Native American		
11	Mixed or Other	6	Other

Partner State Files vs. HCUP State Files

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

HCUP State Files	Partner State Files
Subset of data elements	All data elements
Value-added data elements	May not have same value-added elements
Uniformly coded across the States	Not uniformly coded across states
Standard data quality checks	Variability in quality checks by state
Lag time	More timely



States Releasing Databases through HCUP Central Distributor



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HEALTHCARE COST AND UTILIZATION PROJECT

- Arizona
- Arkansas
- California
- Colorado
- Florida
- Hawaii
- Iowa
- Kentucky
- Maine
- Maryland
- Massachusetts
- Michigan
- 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**

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National (Nationwide)
Inpatient Sample
(NIS)

Inpatient discharge data for a **sample of discharges from all hospitals** in SID

Kids' Inpatient
Database
(KID)

Pediatric inpatient hospital discharge data from a **sample of pediatric discharges** in SID

Nationwide Emergency
Department Sample
(NEDS)

Emergency department data (treat and release & admitted) from a **sample of hospitals** in SID and SEDD

Nationwide
Readmissions Database
(NRD)

Inpatient discharge data from **all hospitals for SID with verified patient linkage numbers**



NIS is a Stratified Sample of Discharges from the SID



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State Inpatient Databases (SID)

~ 4,380 hospitals
~ 34.3M records

Strata

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

Stratified Sample of Discharges

*State not included in the stratum

Within strata sort by hospital, DRG, and admission month and select 1 in 5 records

National Inpatient Sample (NIS)

N = ~ 4,380 hospitals
~ 7.3M records



KID is a Stratified Sample of Discharges from the SID

State Inpatient Databases (SID)

~ 4,380 hospitals
~ 34.3M records

Strata

- Uncomplicated Births
- Complicated Births
- Pediatric Non-Births

Stratified Sample of Discharges

*State not included in the stratum

• 10% uncomplicated births

• 80% pediatric discharges

Kids' Inpatient Database (KID)

N = ~ 4K hospitals
~ 3M records

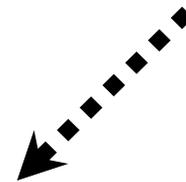
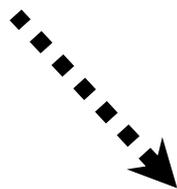




Treat-and-Release ED Visits



Admitted ED Visits



About 84% of ED visits are treat-and-release

About 16% of ED visits result in a hospital stay

NEDS is a Stratified Sample of Hospitals from the SEDD and SID

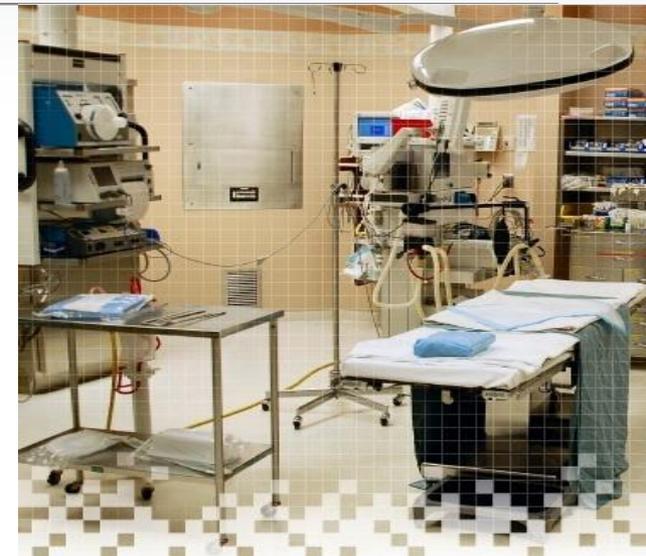
**State
Inpatient
Databases
(SID)**
**State Emergency
Department
Databases
(SEDD)**

Strata

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

Stratified Sample of Hospitals

*State not included in the stratum



Nationwide Emergency Department Sample

(NEDS)

N = ~ 1K hospitals
~ 31M records

State Inpatient Databases (SID)

Hospital and Patient
Exclusions

Strata

- U.S. Region
- Urban/Rural Location
- Teaching Status
- Size
- Ownership/Control
- Patient Characteristics
- Age and sex

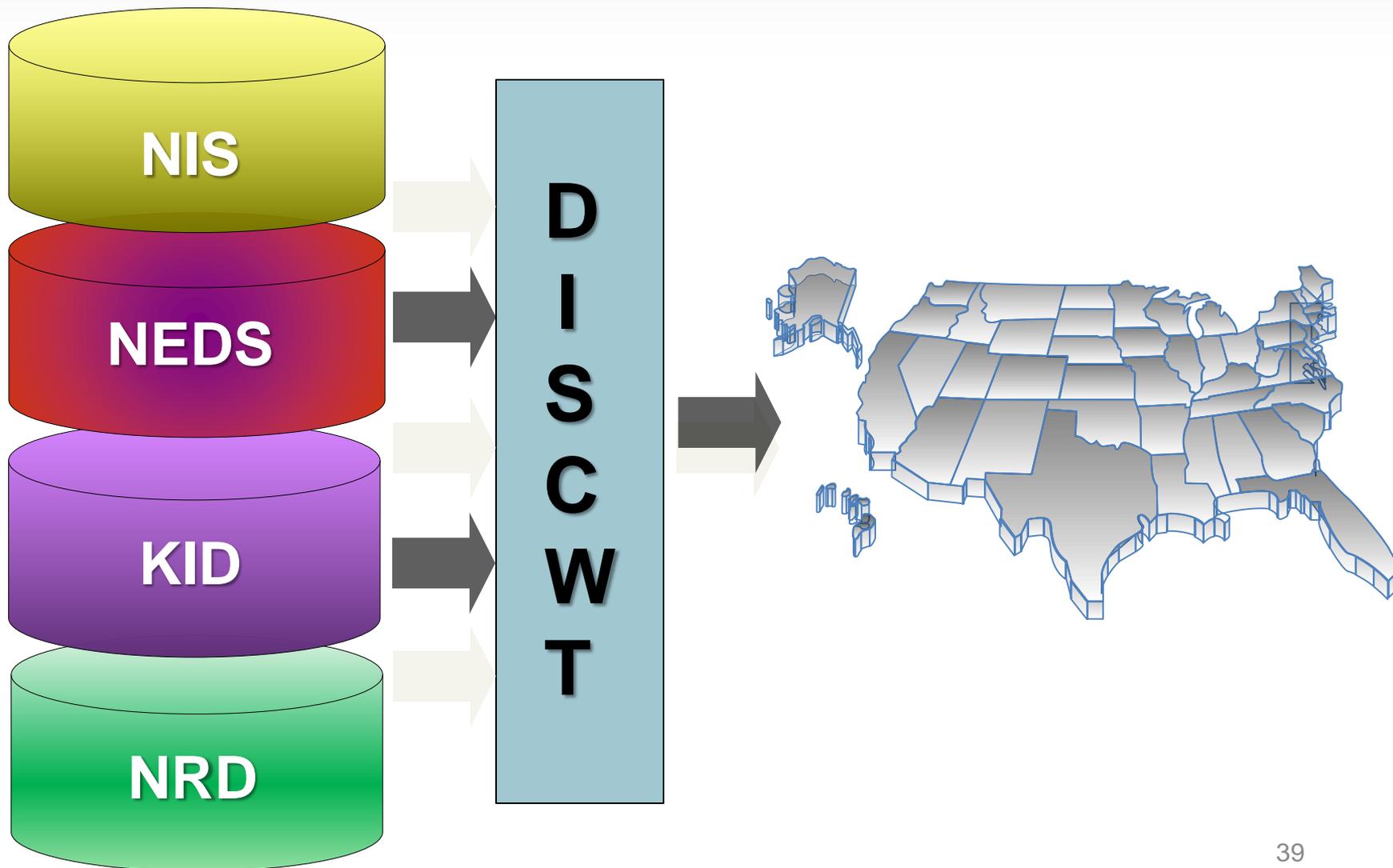
**All Discharges
(after exclusions)**



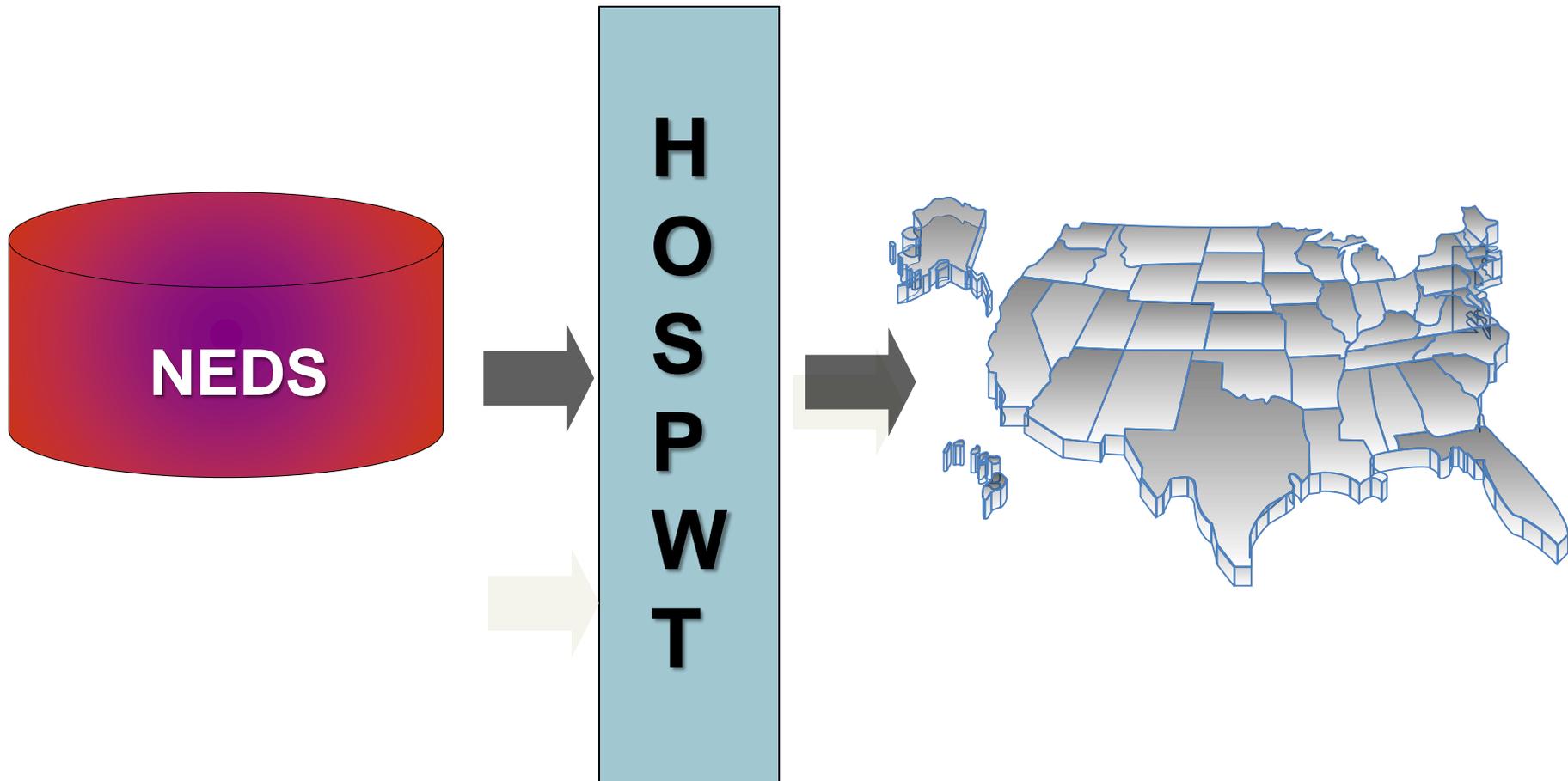
**Nationwide
Readmissions
Database
Sample
(NRD)**

N = ~ 2K hospitals
~ 14M records³⁸

NIS, NEDS, KID, NRD: Must be Weighted to Produce National and Regional Estimates



NEDS: Must be Weighted to Produce National and Regional Estimates



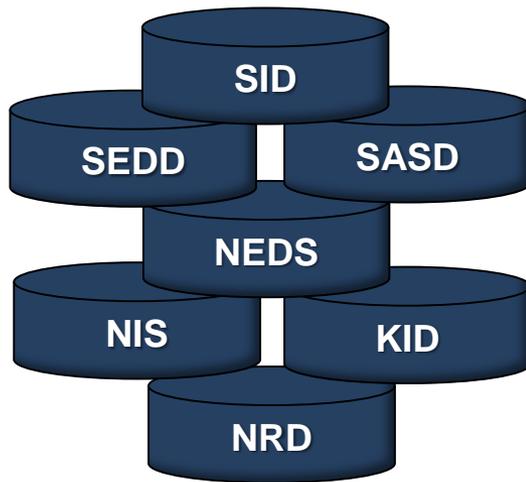
What Types of Care Are and Are Not Captured by HCUP?

Included in HCUP	
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 & Services	State Ambulatory Surgery & Services Databases (SASD)

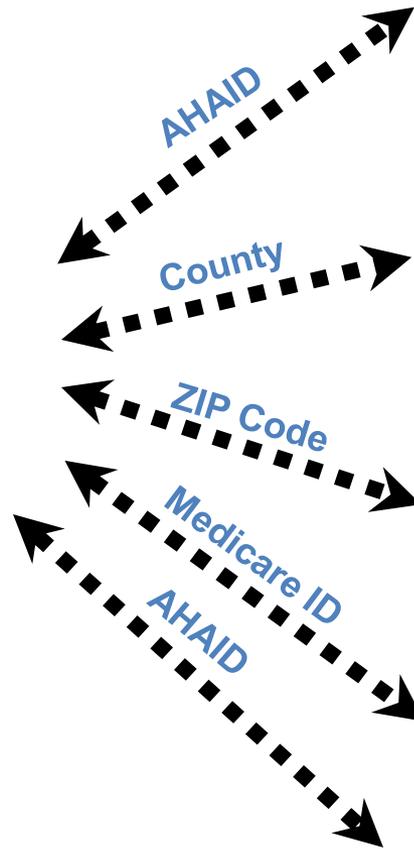
Not Included in HCUP
Physician office visits
Pharmacy
Labs/Radiology



Some Limitations Can be Addressed by Linking to Other Databases



**HCUP
Databases**



American Hospital Association
(AHA) Annual Survey

Health Resources and Services
Administration's (HRSA) Area
Health Resource File (AHRF)

Zip Code Files from Census
or Vendor

Medicare Cost Reports

Trauma Information Exchange
Program (TIEP)



What HCUP Is and What HCUP Is Not?



HCUP is...

Discharge database for health care encounters

All payer, including the uninsured

Hospital, ambulatory surgery, emergency department data

All hospital discharges

Accessible multiple ways: raw data, regular reports, online

HCUP is NOT...

A survey

Specific to a single payer, e.g. Medicare

Office visits, pharmacy, laboratory, radiology

Only a sample

Just another database



Hospital Billing Data Have Benefits and Limitations



Benefits

Large number of visit records

Uniformity of coding

Routine, regular collection

Ease of access

All-payer

Available at local, State, regional and national level

Supplemental files available to facilitate research

Limitations

Differences in coding across hospitals

Limited clinical details

Lack revenue information

May not include all hospitals

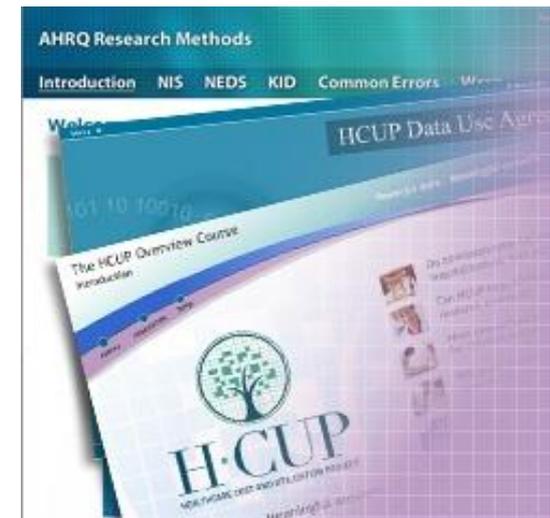
May not show complete experience of care

No data on individuals in the primary care setting

- Seven types of HCUP databases
- Databases are based on administrative hospital data: inpatient, ED, and ambulatory surgery and services
- Available for multiple years
 - ▶ National
 - NIS (1988-2013)
 - NEDS (2006-2013)
 - KID (1997, 2000, 2003, 2006, 2009, 2012)
 - NRD (2013)
 - ▶ State
 - SID (1990-2014)
 - SASD (1997-2014)
 - SEDD (1999-2014)
- Can look at breadth of health care issues
- Can be linked to external files

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- Processed data sent to HCUP Partners
- State databases may become available to public through:
 - ▶ State Data Organization
 - OR*
 - ▶ HCUP Central Distributor



To Purchase HCUP Data Two Methods



Method 1
HCUP Central Distributor
www.hcup-us.ahrq.gov/tech_assist/centdist.jsp

Method 2
HCUP Partner States
www.hcup-us.ahrq.gov/partners.jsp



Purchase Data Online Through the HCUP Central Distributor



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

Step 2: Login or register for an account
http://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

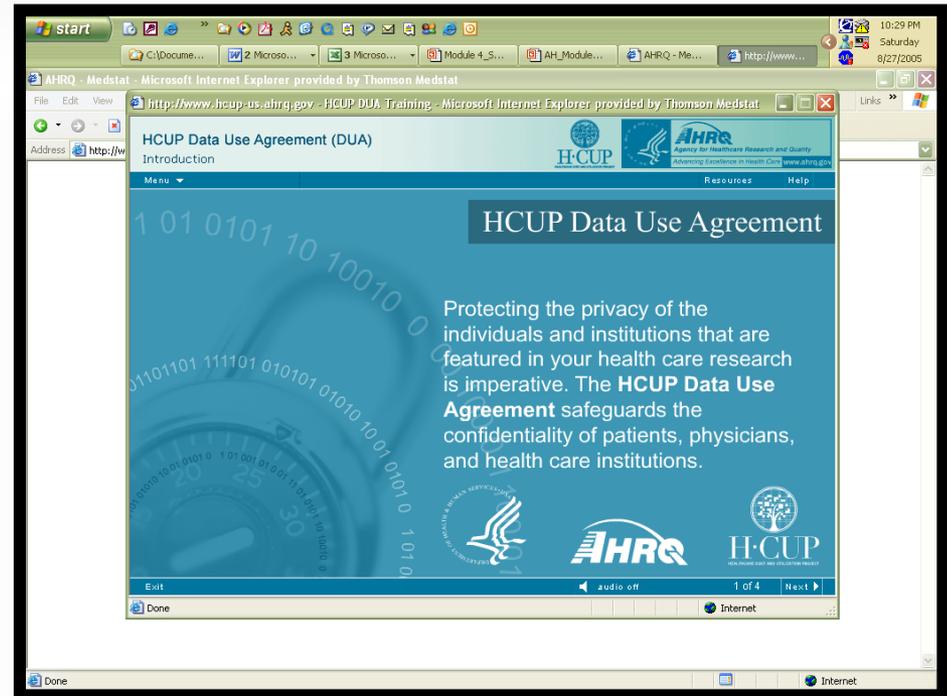
For assistance, contact the HCUP Central Distributor:

- ▶ Phone: 866-556-HCUP (4287) toll free
- ▶ Email: HCUPDistributor@ahrq.gov



NEW!
Download of
Nationwide
Databases

- **Purpose of the Course:**
 - ▶ Emphasize the importance of **data protection**
 - ▶ Reduce the risk of **inadvertent violations**
 - ▶ Describe your **individual responsibility** when using HCUP data



Takes 15 minutes to Complete

http://www.hcup-us.ahrq.gov/DUA/dua_interactive_2014/index.htm

Nationwide Databases (NIS, KID, NEDS, NRD)

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

State Databases (SID, SASD, SEDD)

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

A yellow starburst callout with a black outline, containing text.

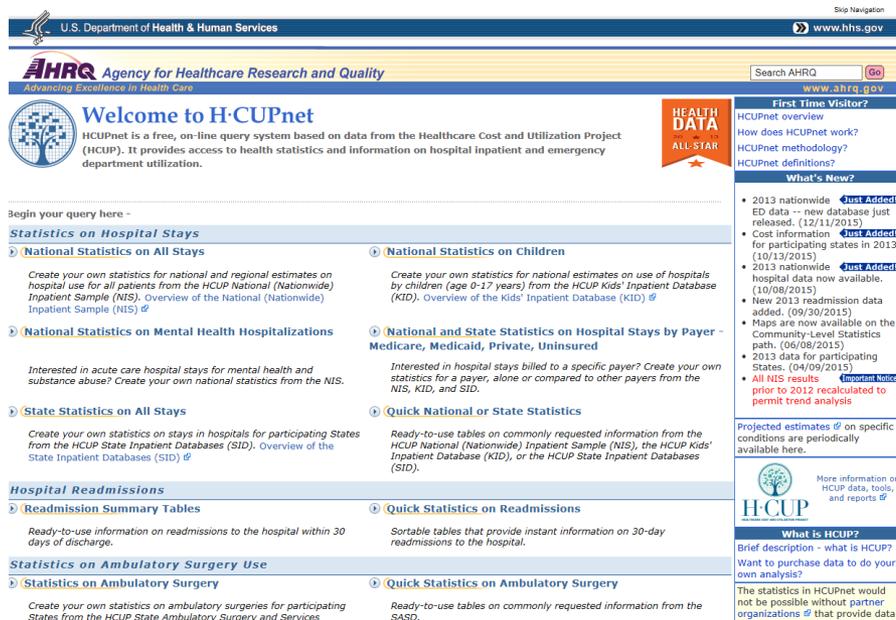
Funds for
State data
sales returned
to State
Partners

Software Package	Load Programs	Format Programs	Example Statistical Coding	HCUP Tools Programs
	X	X	X	X
	X		X	X
	X			X
			X	

MS Excel and Access are NOT GOOD Options!

HCUPnet: Quick, Free Access to HCUP Data

- Free online query system
- Users generate tables of outcomes by diagnoses and procedures
- Data can be cross-classified by patient and hospital characteristics



The screenshot shows the HCUPnet website homepage. At the top, it features the U.S. Department of Health & Human Services logo and the AHRQ logo. The main heading is "Welcome to H-CUPnet". Below this, there is a navigation menu with categories like "National Statistics on All Stays", "National Statistics on Children", "National Statistics on Mental Health Hospitalizations", "State Statistics on All Stays", "Hospital Readmissions", "Quick Statistics on Readmissions", "Statistics on Ambulatory Surgery Use", and "Quick Statistics on Ambulatory Surgery". A "What's New?" section on the right highlights recent updates, such as the release of 2013 nationwide ED data and new 2013 readmission data. The website also includes a search bar and a "First Time Visitor?" section.



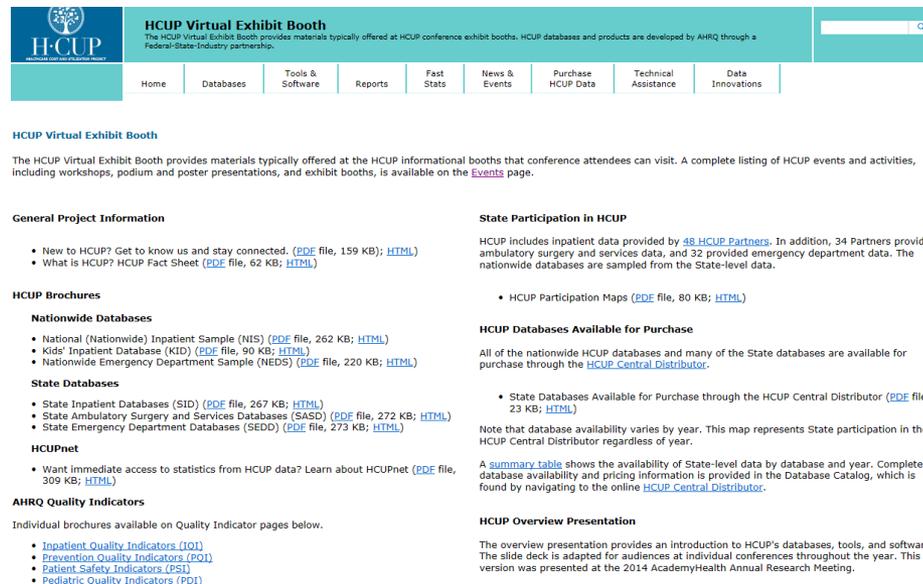
HCUP User Support Web Site



- Find detailed information on HCUP databases, tools, and products
- Access HCUPnet
- Find comprehensive list of HCUP-related publications, database reports, and fact books
- Access technical assistance

<http://www.hcup-us.ahrq.gov>

- 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



The screenshot shows the website for the HCUP Virtual Exhibit Booth. The header includes the H-CUP logo and a navigation menu with links for Home, Databases, Tools & Software, Reports, Fast Stats, News & Events, Purchase HCUP Data, Technical Assistance, and Data Innovations. The main content area is divided into several sections:

- HCUP Virtual Exhibit Booth**: A brief description of the booth and its purpose.
- General Project Information**: Links to "New to HCUP? Get to know us and stay connected." and "What is HCUP? HCUP Fact Sheet".
- HCUP Brochures**: A sub-section for "Nationwide Databases" and "State Databases", each with a list of database names, file formats, and sizes.
- HCUPnet**: A link to learn about HCUPnet.
- AHRQ Quality Indicators**: A list of quality indicators such as Inpatient Quality Indicators (IOI), Prevention Quality Indicators (PQI), Patient Safety Indicators (PSI), and Pediatric Quality Indicators (PDI).
- State Participation in HCUP**: Information about state-level data and participation maps.
- HCUP Databases Available for Purchase**: Details on purchasing databases through the HCUP Central Distributor.
- HCUP Overview Presentation**: Information about an overview presentation of HCUP's databases, tools, and software.

Interactive Online HCUP Tutorials & Training Courses



- HCUP Overview
- Load and Check HCUP Data
- **Nationwide Readmissions Database (NRD)** 
- HCUP Sample Designs
- Produce National HCUP Estimates
- Calculate Standard Errors
- Multi-Year Analysis



The HCUP Overview Course
Overview of HCUP Data

Powerful data. Meaningful answers.

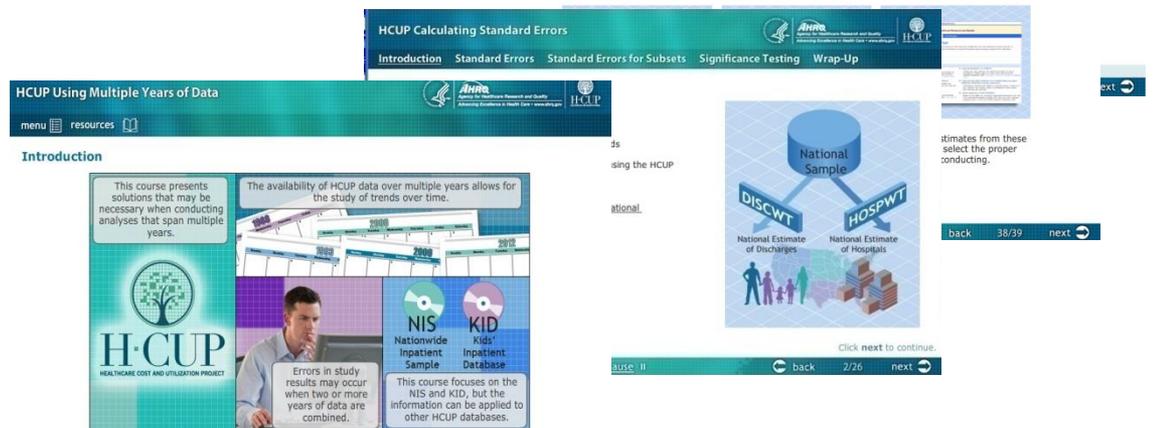
Inpatient
State Inpatient Databases (SID)

HCUP Sample Design: National Databases
Introduction NIS NEDS KID Common Errors Wrap-Up

Load and Check HCUP Data
Introduction Load Check Wrap-Up

HCUP National Estimates
Introduction NIS NEDS KID Wrap-Up

Key Points
Weighting is a key concept when working with the HCUP national databases.
Click each option to learn more.



HCUP Calculating Standard Errors
Introduction Standard Errors Standard Errors for Subsets Significance Testing Wrap-Up

HCUP Using Multiple Years of Data
menu resources

Introduction

This course presents solutions that may be necessary when conducting analyses that span multiple years.

The availability of HCUP data over multiple years allows for the study of trends over time.

NIS
Nationwide Inpatient Sample

KID
Kids' Inpatient Database

Errors in study results may occur when two or more years of data are combined.

This course focuses on the NIS and KID, but the information can be applied to other HCUP databases.

estimates from these select the proper conducting.

back 38/39 next

Click next to continue.
back 2/26 next

National Estimates and Multi-Year Analysis Tutorials have been updated to reflect changes in the 2012 NIS redesign

Active Technical Assistance

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

E-mail: hcup@ahrq.gov





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**Time for Questions
and/or Comments.**

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