



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)

Where we came from

Where we are

Where we're going

What we've learned

Kevin Heslin, Ph.D.

Anne Elixhauser, Ph.D.

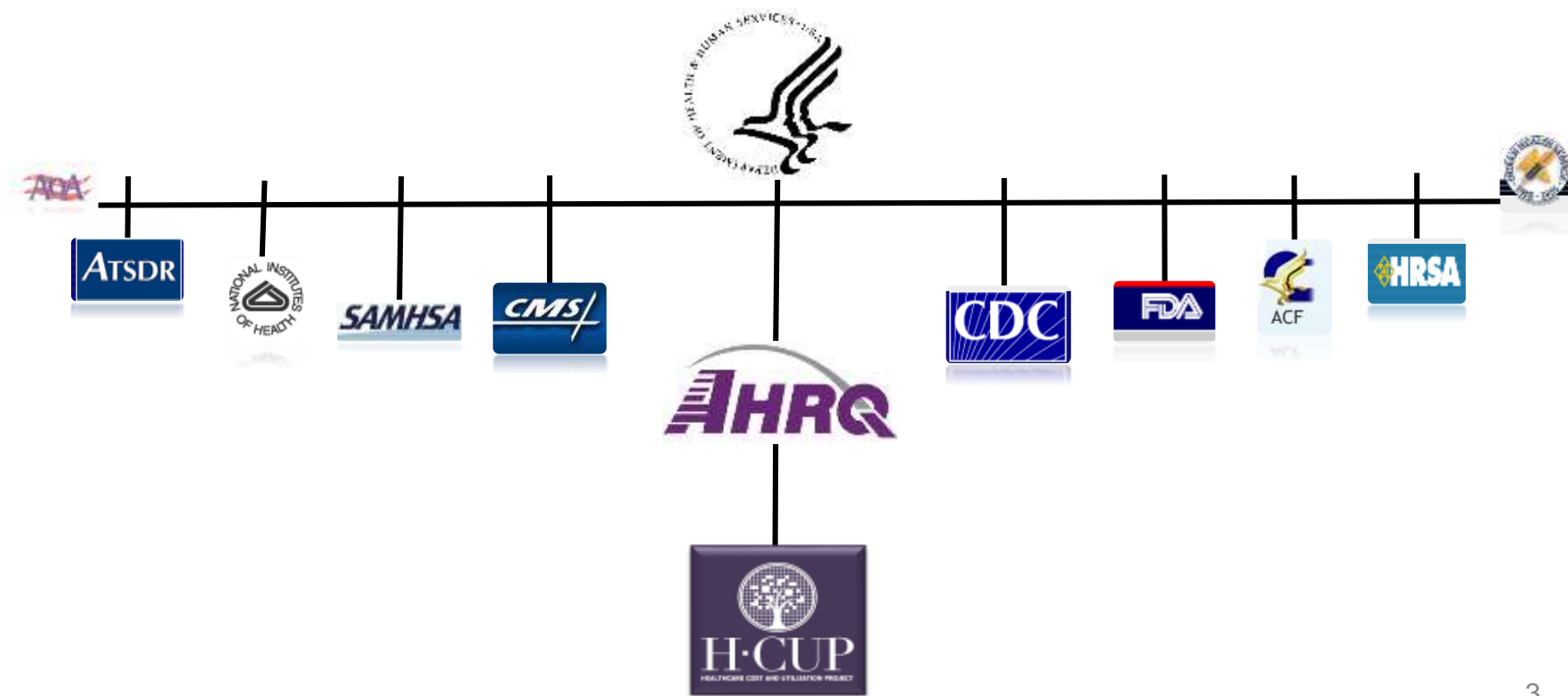
NAHDO Annual Conference

October 27, 2016

- A little history: National hospital data sources weren't widely available in the US.
 - ▶ How did HCUP happen?
- The Data and the Tools
 - ▶ The state of HCUP in 2016
- HCUP challenges along the way
- What can the APCD community learn from HCUP?

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

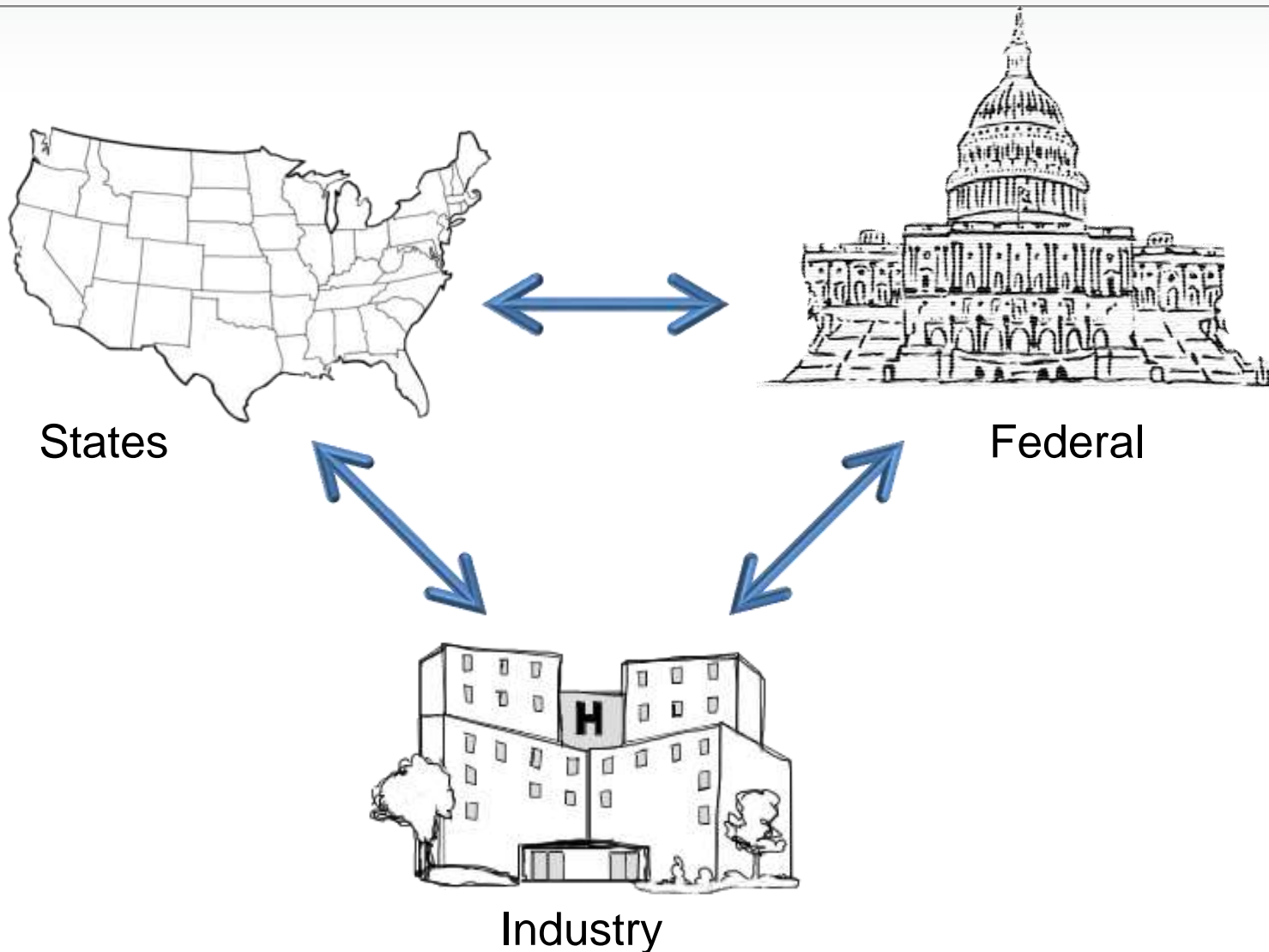
The Agency for Healthcare Research and Quality (AHRQ) is a federal agency under the Department of Health and Human Services.



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

Work with HHS and other partners to make sure
that the evidence is understood and used

The HCUP Partnership: Voluntary and Cooperative



HCUP is a comprehensive set of publicly available **all-payer healthcare databases**

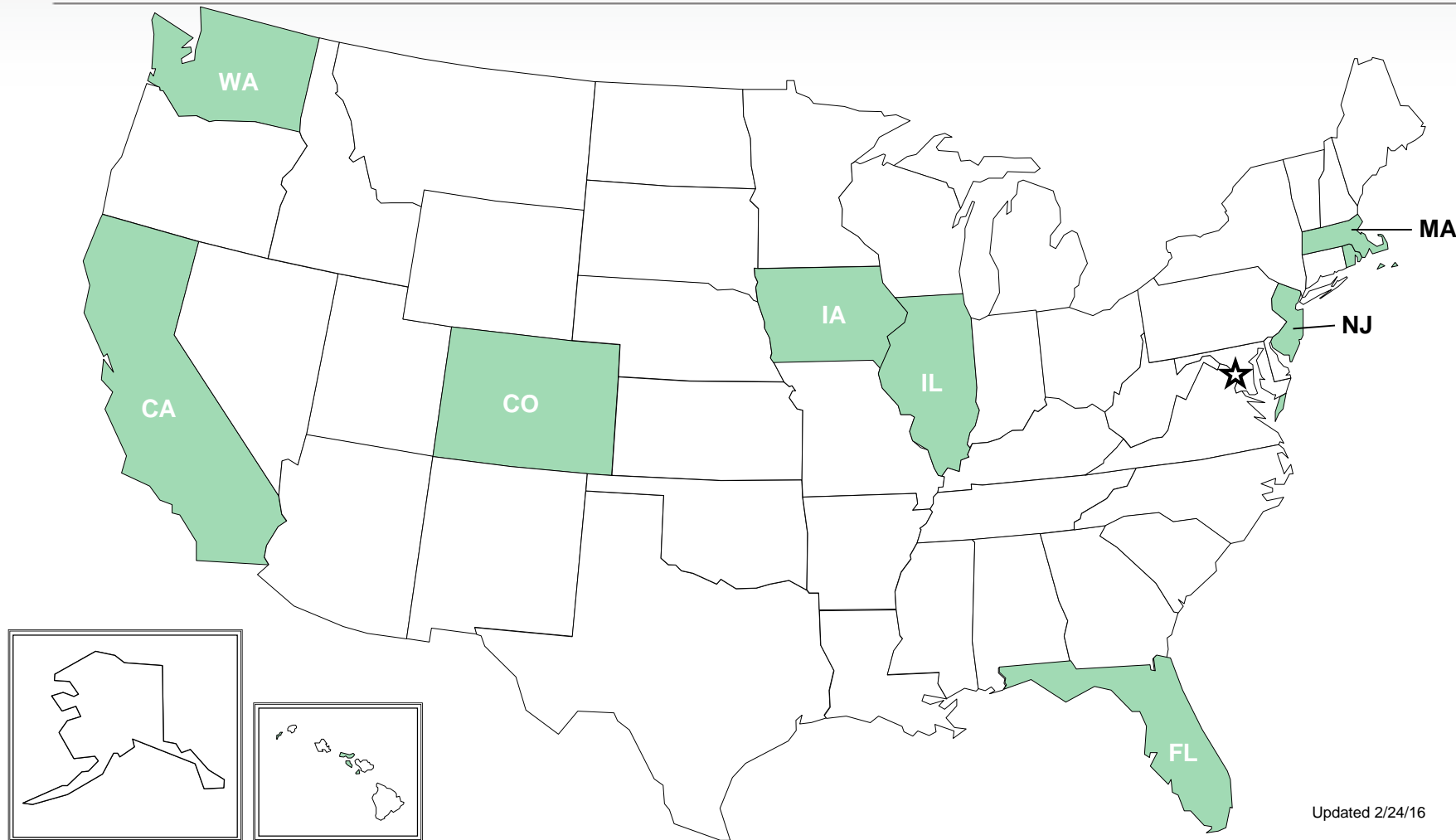


Includes multiyear **inpatient** and **outpatient** data based on **hospital billing** records





HCUP Partners: Inpatient Data for the 1988 Data Year



Updated 2/24/16

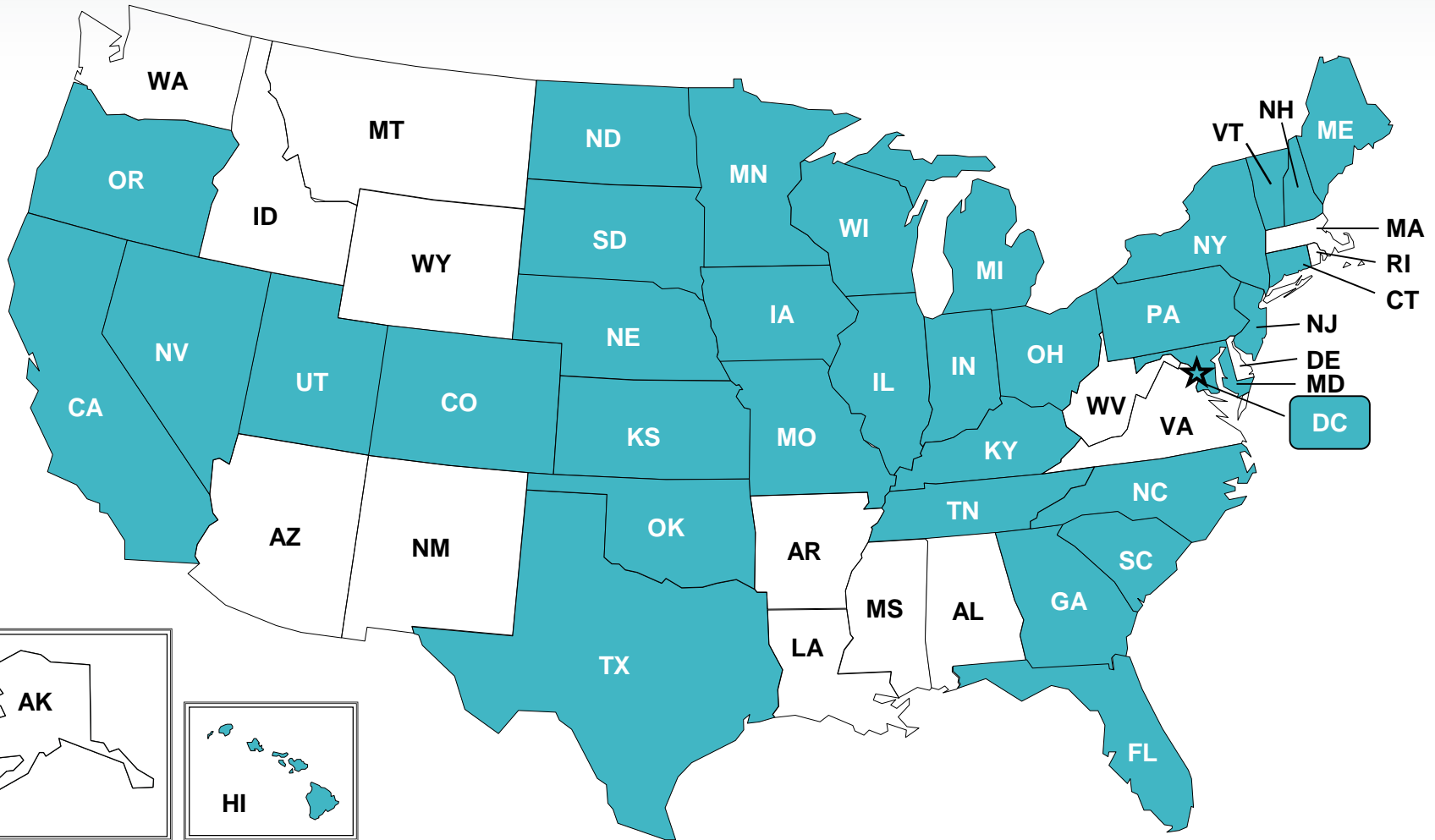
**Partners
Providing:**

Inpatient
Data

Non-
participating



HCUP Partners Providing Ambulatory Surgery & Services Data

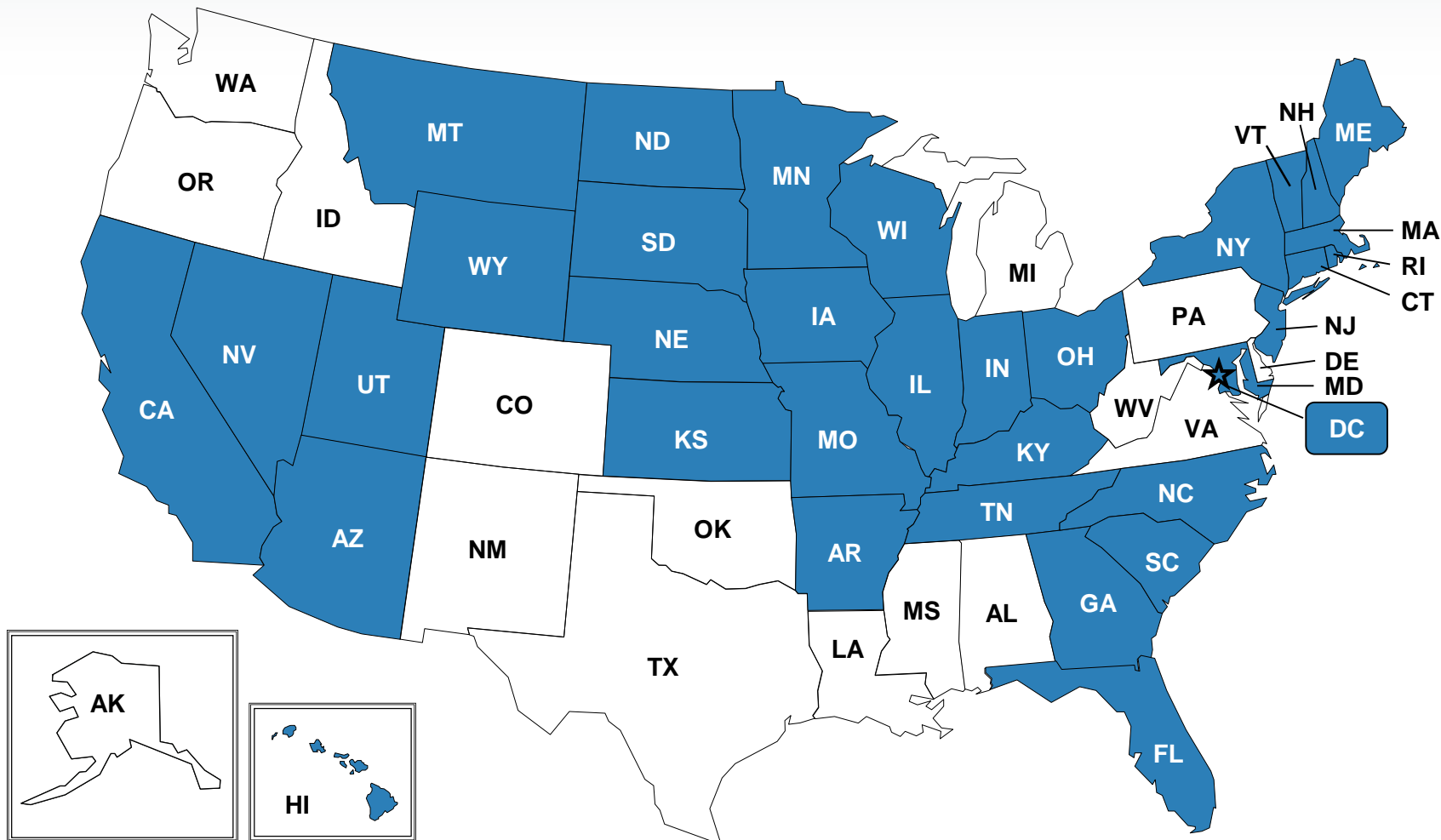


Updated 2/24/16

Updated 2/24/16		
Partners Providing:	Ambulatory Surgery & Services Data	Non-participating



HCUP Partners Providing Emergency Department Data



Updated 2/24/16

**Partners
Providing:**

Emergency
Department Data

Non-
participating



Current HCUP Data Partners



Alaska State Hospital and Nursing Home Association
Arizona Department of Health Services
Arkansas Department of Health
California Office of Statewide Health Planning & Development
Colorado Hospital Association
Connecticut Hospital Association
District of Columbia Hospital Association
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Health Information Corporation
Illinois Department of Public Health
Indiana Hospital Association
Iowa Hospital Association



Current HCUP Data Partners



Kansas Hospital Association

Kentucky Cabinet for Health and Family Services

Louisiana Department of Health and Hospitals

Maine Health Data Organization

Maryland Health Services Cost Review Commission

Massachusetts Center for Health Information and Analysis

Michigan Health & Hospital Association

Minnesota Hospital Association

Mississippi Department of Health

Missouri Hospital Industry Data Institute

Montana MHA – An Association of Montana Health Care Providers

Nebraska Hospital Association



Current HCUP Data Partners



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



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

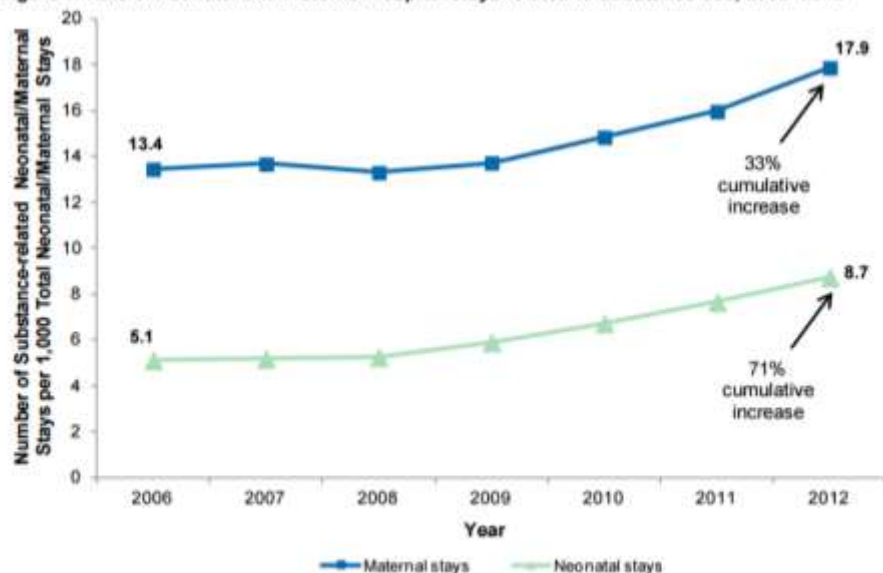
- Originally one database released through HCUP
 - ▶ Added more databases over time: national, state, inpatient, ED, ambulatory surgery
 - ▶ Since 1999: 45,000 HCUP databases distributed
 - ▶ 6,900 databases sold in 2015 alone
- 2,200,000 web visits last year to HCUP-US—online documentation system
- Over 4,500 peer reviewed papers published using HCUP

Types of Topics HCUP Can Address

- Use and cost of care
- Uncommon conditions
- Trends
- Readmissions and revisits
- Subgroup differences, e.g., sex, race, expected payer
- Geographic variation
- Medical treatment variations
- Hospital characteristics
- Cost and burden of illness
- Quality of care
- Patient safety
- Access to care
- Special populations and minorities
- Care of pediatric patients
- Epidemiology of diseases and treatments
- Injury surveillance

Use and Costs of Hospital Care

Figure 1. Rate of neonatal and maternal hospital stays related to substance use, 2006–2012



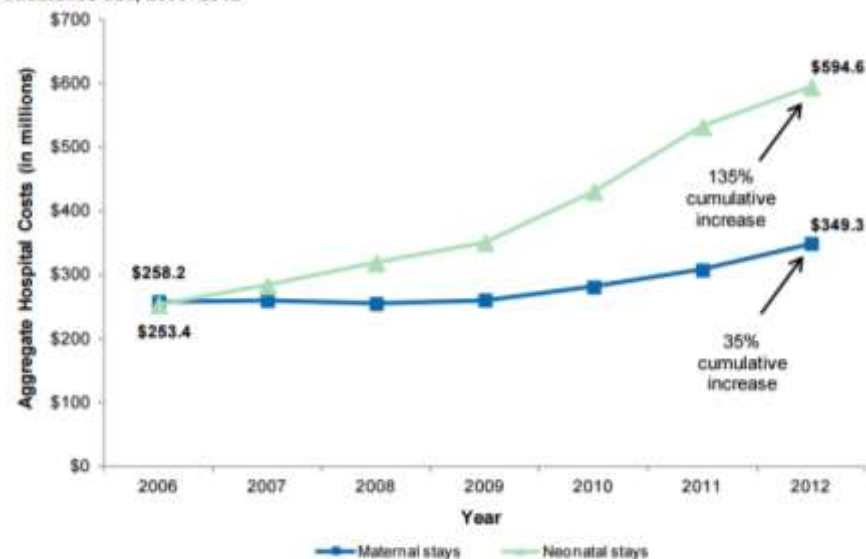
Note: Neonatal and maternal stays related to substance use were identified using all-listed conditions. Neonatal and maternal rates were calculated separately based on total neonatal or total maternal stays.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID) from 38 States, 2006–2012

Aggregate hospital costs for these neonatal stays increased by 135%, from \$253 million to \$595 million.

Between 2006 and 2012, the rate of **neonatal hospital stays** related to substance use increased by 71%, from 5.1 to 8.7 per 1,000 neonatal stays.

Figure 2. Inflation-adjusted aggregate hospital costs for neonatal and maternal stays related to substance use, 2006–2012

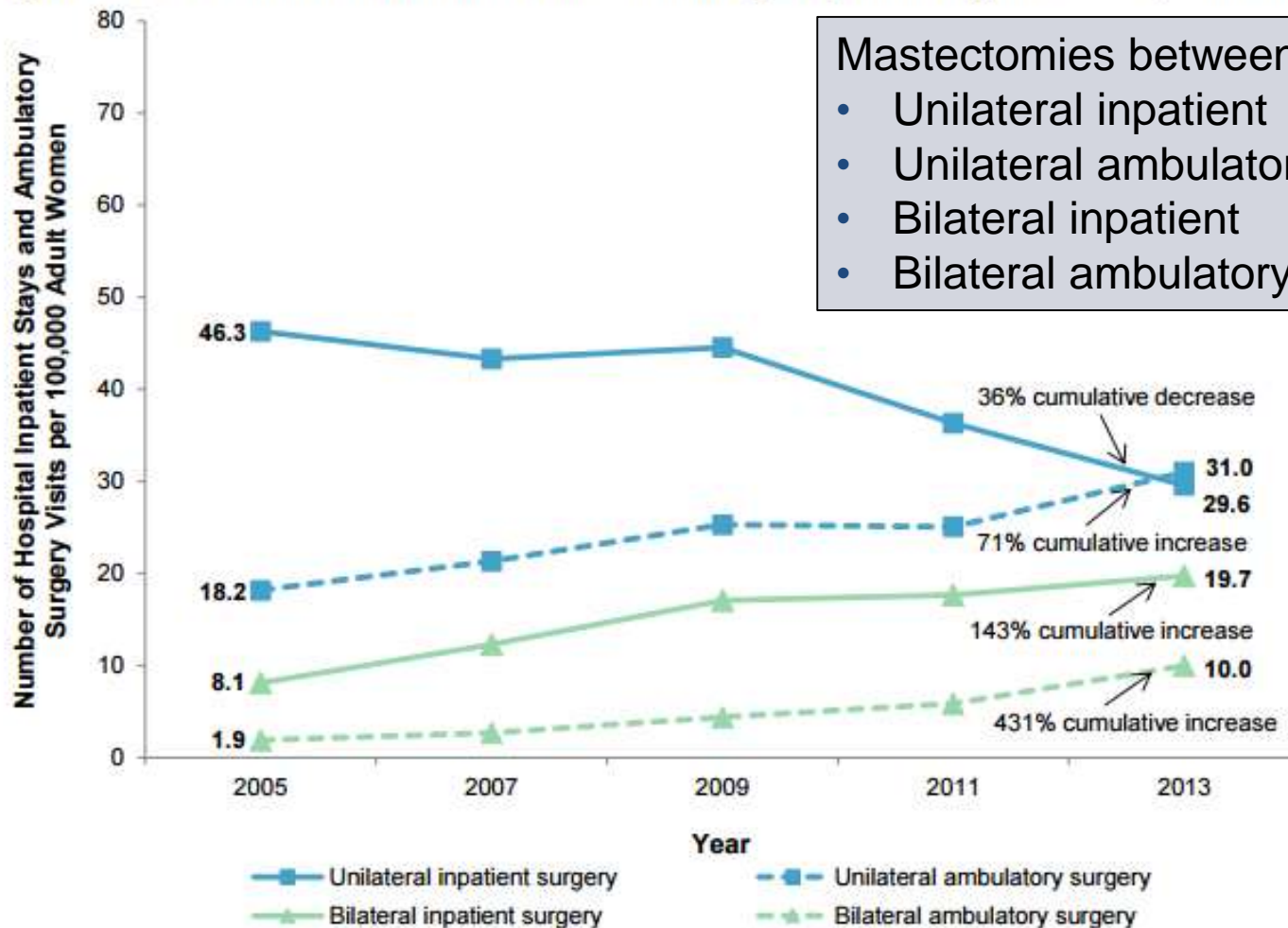


Notes: Neonatal and maternal stays related to substance use were identified using all-listed conditions. Inflation-adjusted costs are presented in 2012 dollars.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID) from 38 States, 2006–2012

Trends in Procedure Use

Figure 2. Rate of bilateral and unilateral mastectomies by hospital setting, in 13 States, 2005–2013





Use of ED services

2.8 million ED visits and 105,000 inpatient stays for sports injury

- Bicycling #1 for ED
- Walking/hiking #1 for inpatient

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

Specific sports activity	ED visits (discharged)			Inpatient stays		
	Rank	n	% of all sports-related visits	Rank	n	% of all sports-related stays
All sports activities		2,807,880	100.0		105,490	100.0
Bicycle riding	1	383,790	13.7	2	26,530	25.1
Walking, marching, and hiking	2	340,290	12.1	1	30,650	29.1
Other unspecified sports activity ^a	3	288,380	10.3	5	4,970	4.7
Basketball	4	268,580	9.6	10	2,020	1.9
American tackle football	5	211,220	7.5	7	2,830	2.7
School recess and summer camp ^b	6	150,150	5.3	4	5,140	4.9
Running	7	148,650	5.3	8	2,240	2.1
Roller skating and skateboarding	8	143,780	5.1	6	4,600	4.4
Soccer	9	128,950	4.6			
Baseball	10	113,420	4.0			
Downhill skiing and snowboarding ^c				3	5,320	5.0
Horseback riding				9	2,220	2.1

HCUP has Seven Types of Databases

- Three State-Specific Databases



State
Inpatient
Databases
(SID)



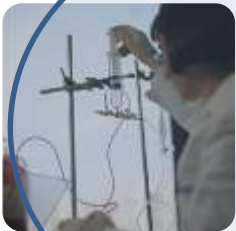
State
Ambulatory
Surgery &
Services
Databases
(SASD)



State
Emergency
Department
Databases
(SEDD)

The first HCUP database

- Four National (Nationwide) Databases



National
Inpatient
Sample
(NIS)



Nationwide
Emergency
Department
Sample
(NEDS)



Kids'
Inpatient
Database
(KID)



Nationwide
Readmissions
Database
(NRD)

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

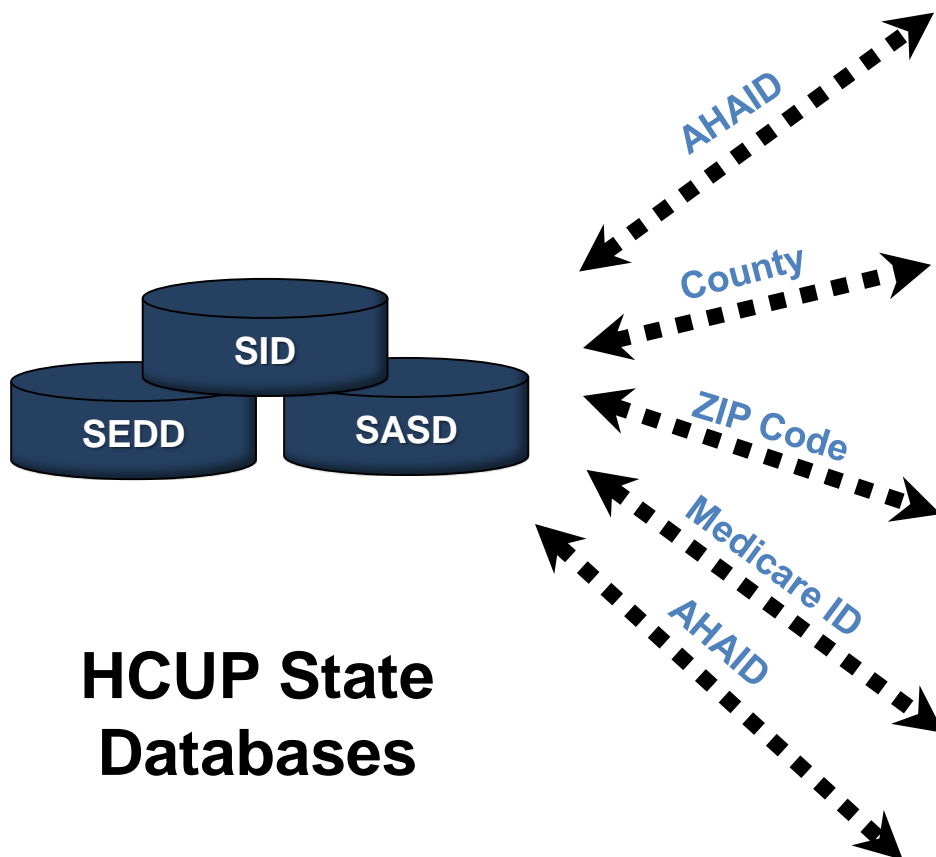


- Clinical tools based on ICD
 - ▶ Comorbidities
 - ▶ Clinical Classification Software (CCS)
 - ▶ Standard DRG grouping across all data
 - ▶ Severity adjustment software
- Supplemental data elements and files
- Linkages

More on
these later
under
“Tools”

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





American Hospital Association
(AHA) Annual Survey

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

Zip Code Files from Census
or Vendor

Medicare Cost Reports

Trauma Information Exchange
Program (TIEP)

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

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



States Releasing Databases through HCUP Central Distributor



- Arizona
- Arkansas
- California
- Colorado
- District of Columbia
- Florida
- Georgia
- 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

**Not all States
participate in all
years and for all
databases**

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



State Inpatient Databases (SID)

~ 4,400 hospitals
~ 33 M records

Strata

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

Stratified Sample of Discharges

*State not included in the stratum

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

National Inpatient Sample (NIS)

N = ~ 4,400 hospitals
~ 7 M records



KID is a Stratified Sample of Discharges from the SID

State Inpatient Databases (SID)

~ 4,380 hospitals
~ 34.3M records

Strata

- Uncomplicated Births
- Complicated Births
- Pediatric Non-Births

Stratified Sample of Discharges

*State not included in the stratum

- 10% uncomplicated births

- 80% pediatric discharges

Kids' Inpatient Database (KID)

N = ~ 4K hospitals
~ 3M records



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

**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

NRD is Constructed from SID with Verified Patient Linkage Numbers

State Inpatient Databases (SID)

Hospital and Patient
Exclusions

Strata

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

**All Discharges
(after exclusions)**

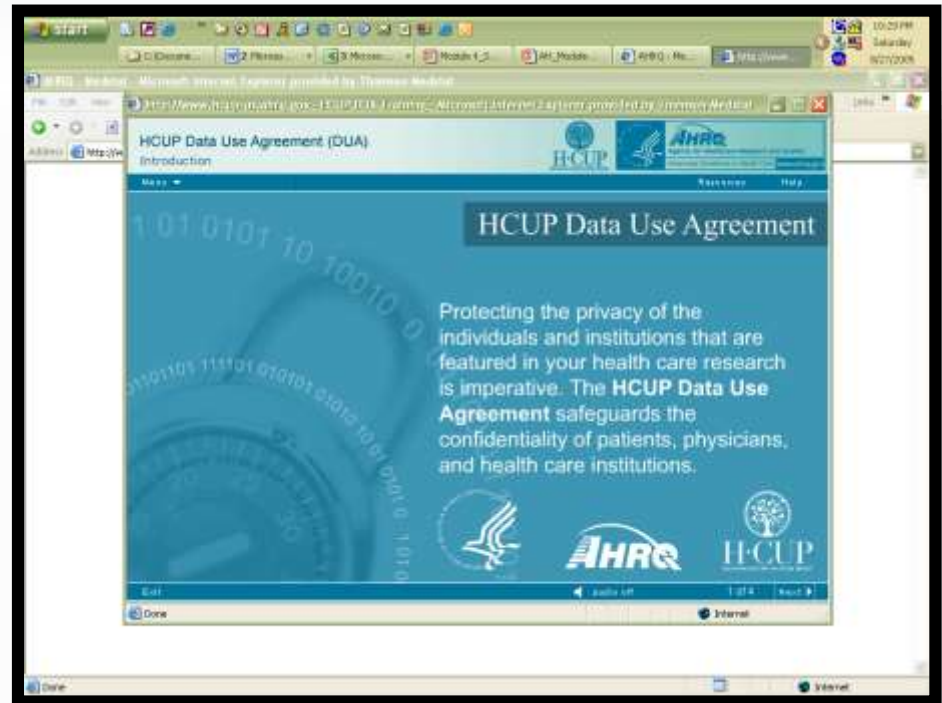


Nationwide Readmissions Database Sample (NRD)

N = ~ 2K hospitals
~ 14M records

Data Use Agreement (DUA) Training Course

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



Takes 15 minutes to Complete

<http://www.hcup-us.ahrq.gov/DUA/dua/index.htm>

Pricing Information Per Data Year

Nationwide Databases (NIS, KID, NEDS, NRD)

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

Funds for State
data sales
returned to State
Partners

State Databases (SID, SASD, SEDD)

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