



# Assessing National Hospital Care Survey and National Hospital Ambulatory Medical Care Survey Data: A Comparison of Opioid and Respiratory Disease Encounters

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# Topics

- National Health Care Surveys collecting emergency department data.
- Comparing unweighted National Hospital Care Survey results to weighted National Hospital Ambulatory Medical Care Survey estimates.
- National Hospital Care Survey Data Linkage: Opportunities to analyze patient health after the hospital visit.
- The future of National Hospital Care Survey data collection.
- Accessing National Hospital Care Survey and National Hospital Ambulatory Medical Care Survey data.

# National Health Care Surveys collecting emergency department data

# National Health Care Surveys

- A collection of surveys implemented by the National Center for Health Statistics designed to answer key questions of interest to health care policy makers, public health professionals, and researchers.
- These can include the factors that influence the use of health care resources, the quality of health care, including safety, and disparities in health care services provided to population subgroups in the United States.

# Ambulatory and Hospital Care Settings

Physician Offices

Inpatient Hospital Care

Emergency and Outpatient Hospital Departments

Ambulatory Surgery

## Long-term Care Settings

Nursing Homes

Home and Hospice Care Providers

Long-term Providers

Residential Care Facilities

# National Health Care Surveys Emergency Department Data

- National Hospital Care Survey (NHCS)
  - First fielded in 2011
- National Hospital Ambulatory Medical Care Survey (NHAMCS)
  - First fielded in 1992

# National Hospital Care Survey (NHCS)

- Sample:
  - The 2014 NHCS sample consist of 581 non-institutional, non-federal hospitals with six or more staffed inpatient beds. The sampled hospitals represent facilities of a similar size, service type, and/or geographic location and cannot be replaced. The current 2020 sample consists of 608 hospitals.
- Data coverage:
  - All hospitalizations and emergency department (ED) visits for up to a 12-month period.
  - Includes patient personal identifiable information (PII) so patient as well as encounter level counts can be determined.
- Objectives:
  - Provide benchmark data for comparison to national data.
  - Link episodes of care across hospital units as well as link to other data sources such as the National Death Index (NDI) and Center for Medicare & Medicaid Services (CMS) Data.

# National Hospital Ambulatory Medical Care Survey (NHAMCS)

- Sample:
  - Four stage probability sample of geographically defined primary sample units (PSUs), hospitals within PSUs, all EDs/emergency service areas (ESAs) within hospitals, and patient visits within EDs/ESAs.
  - The 2020 sample consists of 401 non-institutional general and short-stay (<30 days) hospitals. Some hospitals are selected with certainty. To be eligible, an ED has to provide unscheduled health care 24 hours a day, seven days a week.
- Data coverage:
  - Approximately 100 ED visits sampled during a four-week reporting period.
- Objective:
  - Provide national estimates of the utilization and provision of ambulatory care services in hospital EDs.



# Data Sources for NHCS and NHAMCS

## NHCS

- Hospitals can provide either UB-04 administrative claims or electronic health records (EHR).
- EHR collection started in 2015.

## NHAMCS

- Data are abstracted directly from hospital medical records by staff from the U.S. Census Bureau.

## UB-04 Administrative Claims for NHCS

- Developed and approved by the National Uniform Billing Committee.
- Accepted electronic standard for hospital billing.
- Mandated by CMS for payment of charges for Medicare and Medicaid beneficiaries.
- Transmitted to CMS and to commercial insurance payers for payment.

# Benefits and Challenges Using UB-04 Data

## Benefits

- Clinical data elements coded to a standard coding system (ICD-10-CM/ICD-10-PCS).
- Primary diagnosis identified.
- Contains PII for linking to outside datasets.
- Care settings and ED admissions are identified.
- ICU information is provided.
- Insurance payer information available.

## Challenges

- Data are for billing not research.
- Limited number of clinical data elements.
- Lab results, medications, and clinical notes are not included.
- “Carryover” diagnosis may be long-standing, not related to the current visit.
- Limited information on race and ethnicity.

# Benefits and Challenges of Abstracting Data for NHAMCS

## Benefits

- Data collected for research.
- Primary diagnosis identified.
- Contains information on race and ethnicity.

## Challenges

- Greater cost than administrative data collection.
- Limited number of data elements.
- Greater burden for hospitals.
- Potential abstraction error.
- Trained coders reviewing the data to provide medical codes.

# NHCS and NHAMCS Data Elements

	NHCS: UB04	NHAMCS: Abstraction
Patient PII	X	
Patient age and sex	X	X
Patient race and ethnicity		X
Encounter dates	X	X
Diagnoses	Up to 25	Up to 5
Procedures	Up to 25	Predetermined categories
Revenue codes	X	
Expected source of payment	X	X
Triage status and wait times		X
Medications		Up to 30 prescribed during the encounter or at discharge

# Summary of NHCS and NHAMCS

	NHCS	NHAMCS
Electronic data collection	X	
On-site or remote medical abstraction		X
Collects 12 months of hospital visits	X	
Collects a sample of hospital visits		X
Collects Inpatient data	X	
Collects ED Data	X	X
Collects Patient PII data	X	

# Comparing unweighted NHCS results to weighted NHAMCS estimates

# Comparing Results from NHAMCS and NHCS

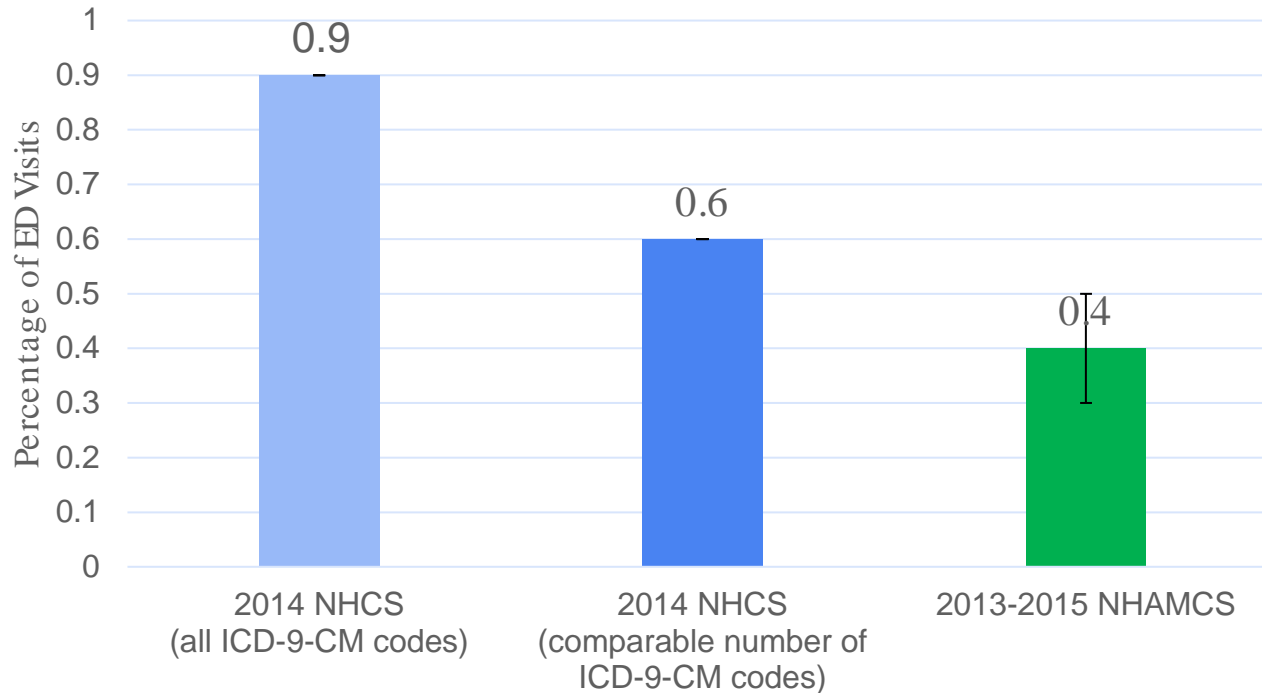
- Compared results for two types of ED visits: opioid-involved and respiratory illness.
  - For opioid-involved, the unweighted 2014 NHCS results were compared to the weighted average number of NHAMCS ED visits between 2013-2015.
  - For respiratory illness, the unweighted 2014 NHCS results were compared to the weighted 2014 NHAMCS ED visits.
- The unweighted NHCS estimates fell in between the weighted NHAMCS confidence intervals suggesting that the NHCS results are similar to the NHAMCS estimates.



# Definitions for Opioid-Involved and Respiratory Illness ED visits

- Opioid-involved ED visits
  - Due to the limit of 5 diagnosis codes captured in NHAMCS, two NHCS results are shown: all available diagnosis codes included and only the first 5 diagnosis codes included.
  - Includes visits with any of the following ICD-9-CM diagnosis or E-codes: 304.00-304.02, 304.70-304.72, 305.50-305.52, 760.72, 965.00, 965.02, 965.09, 970.1, E850.1-E850.2, E935.1-E935.2, or E940.1
- Respiratory illness ED visits
  - Primary diagnosis is one of the following ICD-9-CM codes: 460-466, 470-478, 480-488, or 490-496.

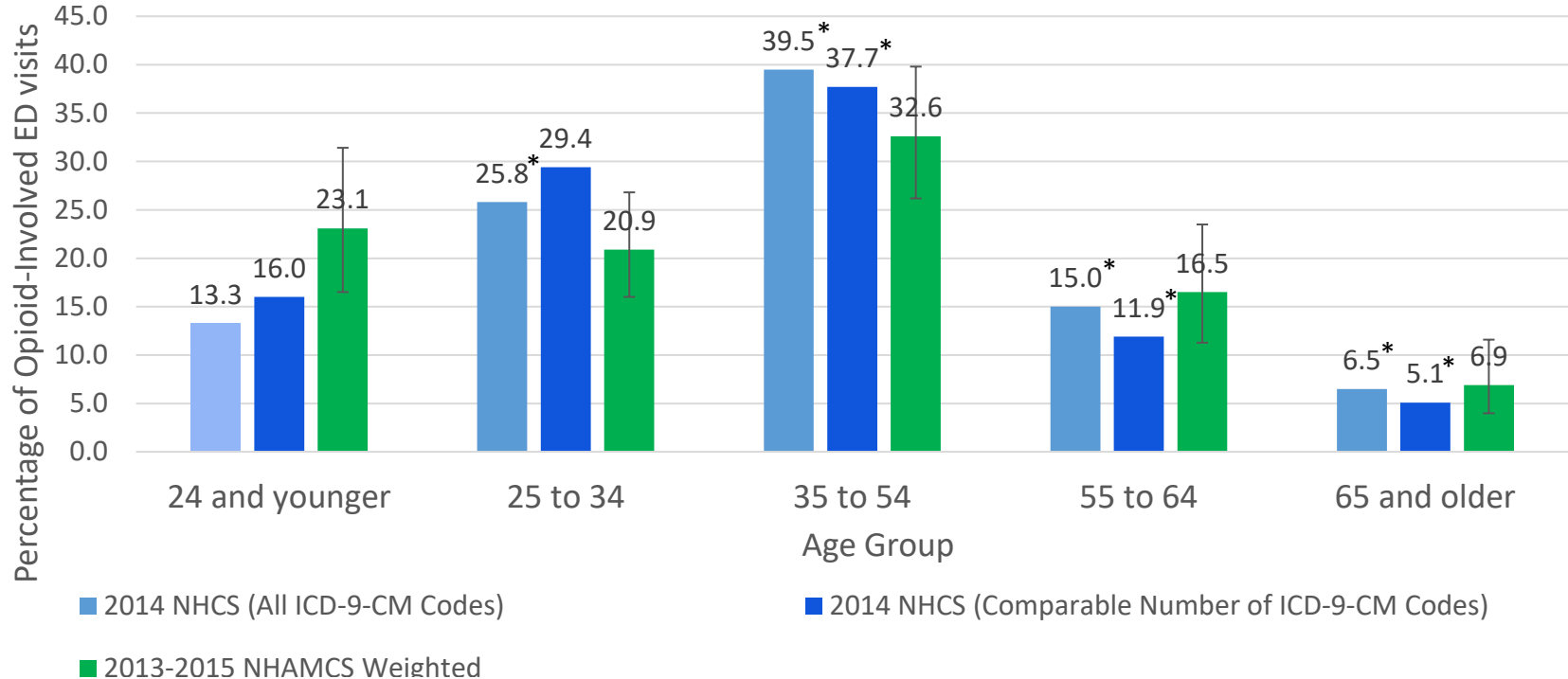
# Percentage of ED visits that were Opioid-Involved in 2014 NHCS and 2013-2015 NHAMCS



NOTE: Error bars indicate 95% confidence interval. NHCS results are not nationally representative.

SOURCES: NCHS, National Hospital Care Survey, 2014 and National Hospital Ambulatory Medical Care Survey, 2013-2015.

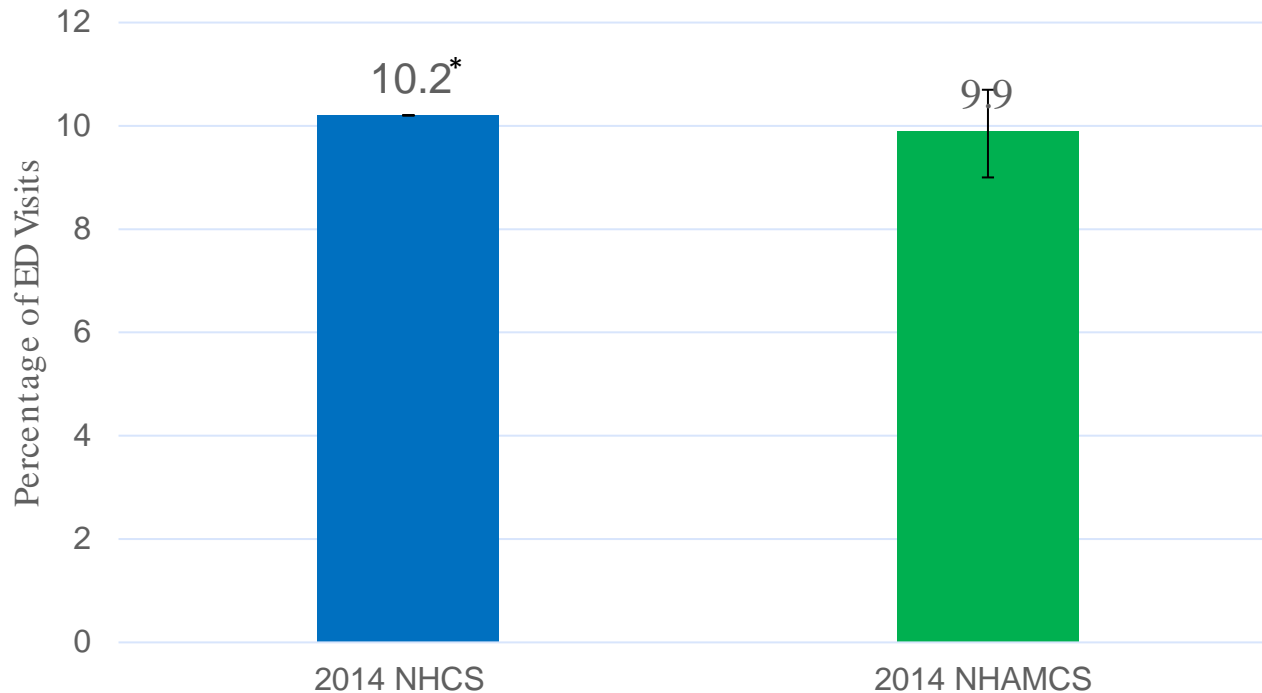
# Age Distribution of Opioid-involved ED visits in 2014 NHCS and 2013-2015 NHAMCS



NOTE: Error bars indicate 95% confidence interval. NHCS results are not nationally representative. NHCS results with a \* indicate the results are within the NHAMCS 95% CI.

SOURCES: NCHS, National Hospital Care Survey, 2014 and National Hospital Ambulatory Medical Care Survey, 2013-2015.

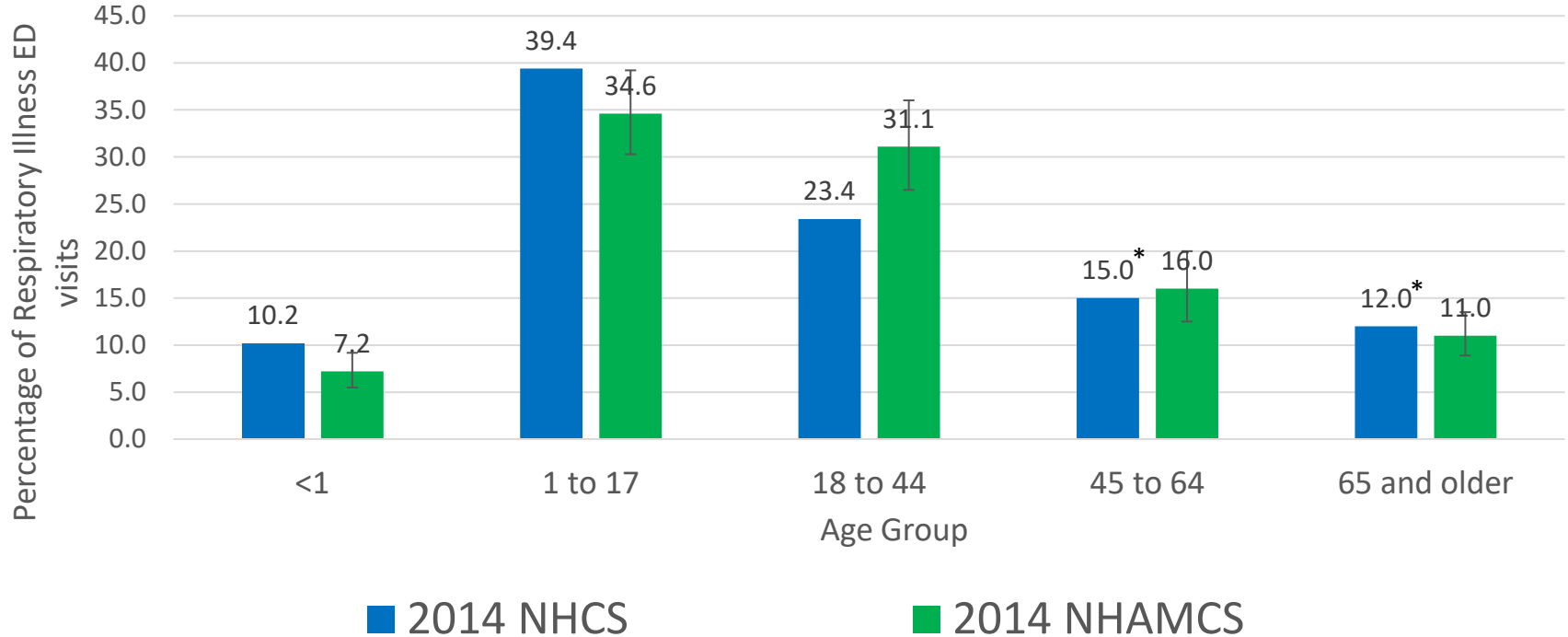
# Percentage of ED visits that were for Respiratory Illness Listed as the Primary Diagnosis in 2014 NHCS and 2014 NHAMCS



NOTE: Error bars indicate 95% confidence interval. NHCS results are not nationally representative. NHCS results with a \* indicate the results are within the NHAMCS 95% CI.

SOURCES: NCHS, National Hospital Care Survey, 2014 and National Hospital Ambulatory Medical Care Survey, 2014.

# Age Distribution of ED Visits for Patients with a Respiratory Illness Listed as the Primary Diagnosis in 2014 NHCS and 2014 NHAMCS



NOTE: Error bars indicate 95% confidence interval. NHCS results are not nationally representative. NHCS results with a \* indicate the results are within the NHAMCS 95% CI.

SOURCES: NCHS, National Hospital Care Survey, 2014 and National Hospital Ambulatory Medical Care Survey, 2014.

# Summary of NHCS and NHAMCS Results Comparison

- Greater percentage of opioid-involved visits identified in NHCS.
- Similar percentages of total ED visits for respiratory illness.
- Difference within age groups:
  - NHAMCS had a larger percentage of opioid-involved ED visits for patients who were 24 years old and younger than NHCS.
  - NHAMCS had a larger percentage of ED visits due to respiratory illness for adult patients between 18 and 44 years old and a smaller percentage of ED visits for children (patients < 18 years old).

# **NHCS Data Linkage: Opportunities to Analyze Patient Health After the Hospital Visit**

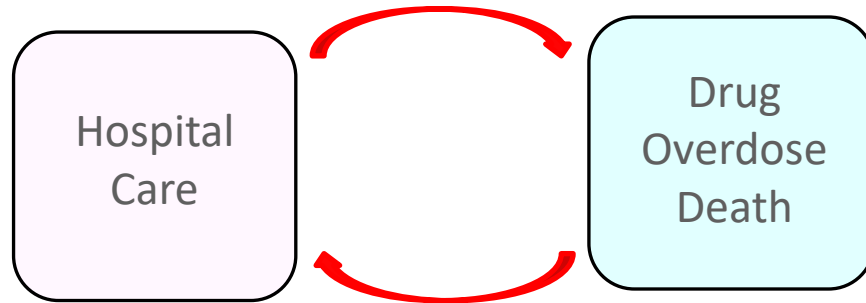
# Data Linkage Opportunities with UB-04 Data

- Patient PII allow data to be linked to external data sources such as the NDI and CMS Master Beneficiary Summary File (MBSF).
- **Linked NDI offers opportunities to study mortality in greater depth:**
  - Study cause of death for deaths occurring during a patient's hospitalization.
  - Calculate 30-, 60-, 90- day post-hospital mortality by principal diagnosis or procedure.
  - Provides a fuller picture of hospital care and the impact on mortality.
- **CMS MBSF offers opportunities to study Medicare beneficiaries in greater depth:**
  - Medicare enrollment and claims/encounters data are available for patient records in the NHCS for which NCHS was able to match with Medicare administrative records.
  - Allows for leveraging information on comorbidities (e.g., CMS' Chronic Conditions Data Warehouse) and Medicare coverage that may be associated with hospital-related service outcomes and health outcomes.



# Types of Health Outcomes Research Possible with Linked Hospital and Death Data

- Look Forward: What happens after hospitalization?



- Look Back: What patterns of service are seen with patients who die from drug overdose?

# Example Research Questions Using Enhanced Data

- What are characteristics of patients who had at least one opioid-involved hospital encounter?
- What are the most frequent types of opioids taken by patients with opioid-involved hospital encounters?
- What are common patterns of hospital use in the months prior to a opioid-involved overdose death?
- How do patients with a history of repeated opioid-involved hospitalizations and/or ED visits who died from an opioid overdose compare to those patients who did not die from an opioid overdose?

# The Future of NHCS Data Collection

# NHCS: Transition to EHR Data

- Less burden on the provider.
- More clinical depth and breadth, without need for medical record abstraction.
  - Unrestricted diagnosis and procedure data
  - Laboratory test results
  - Unrestricted medication data
- Greater volume of data.
  - No need for sampling encounters
  - Can obtain monthly, quarterly or annual data submissions
- Better identification of ED substance-involved visits, with the inclusion of lab and medication data.
- Continued collection of patient PII to enable linkage to other data sources.

# Steps Taken to Move to EHR Data Collection

- Developed Data Standard
  - HL7 CDA Implementation Guide (IG) for the National Health Care Surveys, which provides a standardized format for data submission.
- Survey Incentives
  - Participation fulfills requirements of Medicare and Medicaid EHR Incentive Programs.
  - IG named in 2015 edition of Health IT Certification Criteria.

# Accessing NHCS and NHAMCS Data

# Accessing NHCS in the NCHS Research Data Center

Through the NCHS Research Data Center (RDC), researchers can access:

- Individual years: 2013-2016 NHCS data, 1992-2017 NHAMCS data\*
  
- Linked files (<https://www.cdc.gov/nchs/data-linkage/index.htm>):
  - 2014 NHCS Data Linked to 2014/2015 NDI
  - 2014 NHCS Data Linked to 2014/2015 NDI and the 2014/2015 DIM
  - 2016 NHCS Data Linked to 2016/2017 NDI
  - 2014 NHCS Data Linked to 2014/2015 Master Beneficiary Summary File
  
- For information on preparing an RDC proposal, please visit:  
<https://www.cdc.gov/rdc/index.htm>
  
- For more information on the NHCS data available in the RDC:  
<https://www.cdc.gov/rdc/b1datatype/Dt1224h.htm>  
<https://www.cdc.gov/nchs/data-linkage/nhcs-ndi.htm>
  
- NHAMCS Public Use Files are available”  
[ftp://ftp.cdc.gov/pub/Health\\_Statistics/NCHS/Datasets/NHAMCS](ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Datasets/NHAMCS)

# Thank you!

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