

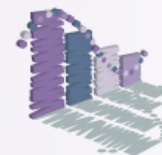
Using the National Hospital Care Survey (NHCS) to Identify Opioid-Related Hospital Visits

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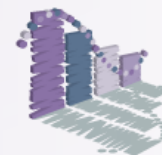
Overview of Presentation

1. Goals and objectives of the NHCS
2. NHCS methodology and data collection
3. Uniqueness of the NHCS
4. Identifying substance-involved emergency department (ED) visits using the NHCS
5. Preliminary findings
6. Improving the identification of substance-involved ED visits in the NHCS using electronic health record (EHR) data
7. Moving forward

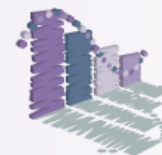


Goal and Objectives of the NHCS

- Goal:
 - Provide reliable and timely healthcare utilization data for hospital-based settings.
- Objectives:
 - Move toward electronic data collection.
 - Continue to make available health statistics previously provided.
 - Link episodes of care across hospital units as well as link to other data sources such as the National Death Index (NDI) and Medicare data.

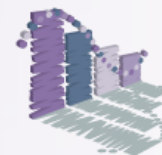


NHCS Methodology and Data Collection



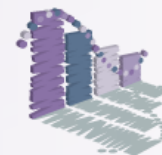
Sample Design

- 2018 Updated Sample:
 - Consists of 598 non-institutional, non-federal hospitals with six or more staffed inpatient beds.



Hospital Recruitment Challenges

- Participation is voluntary.
- Protecting the identity of sampled hospitals complicates recruitment efforts.
- Hospitals have competing demands.
- Hospitals lack the resources to devote to our request.
- Making the business case for participation is an ongoing challenge.



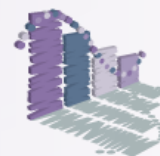
Data Coverage and Sources

Data coverage:

- All inpatient discharges, ED and outpatient department visits for a 12 month period

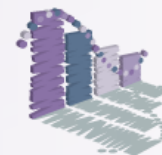
Data sources:

- UB-04 administrative claims
- Claims plus some meds and labs from Vizient-member hospitals (As of 2015)
- Electronic health records (EHR) data (as of 2015)



Transition to EHR Data

- Less burden on the provider.
- More clinical depth and breadth without need for medical record abstraction.
- Greater volume of data.
- Better identification of ED substance-involved visits through lab and medication data.



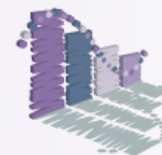
Data Elements by Source

UB-04:

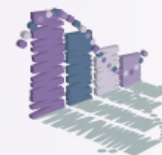
- Personally identifiable information (PII)
- Demographic information
- Encounter dates
- Diagnoses and procedures
- Revenue codes

EHR:

- Personally identifiable information (PII)
- Demographic information
- Encounter dates
- Diagnoses and procedures
- Procedure outcomes
- Lab tests and results
- Medications
- Vital signs
- Clinical notes (for ED visits only)



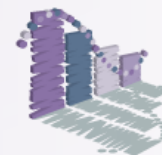
Uniqueness of the NHCS



2013-2016 NHCS Visit Volume

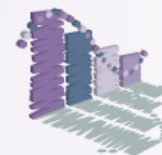
Setting	2013	2014	2015	2016*
Inpatient	1,474,000 (97 hospitals)	1,654,000 (94 hospitals)	2,204,000 (115 hospitals)	2,538,000 (140 hospital)
Emergency Department	3,784,000 (88 hospitals)	4,530,000 (83 hospitals)	5,901,000 (103 hospitals)	6,985,000 (122 hospitals)
Outpatient Department	15,144,000 (88 hospitals)	19,005,000 (83 hospitals)	26,455,000 (103 hospitals)	35,691,000 (126 hospitals)

* 2016 visit volume is preliminary.



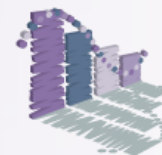
Data Linkage

- The records are at the encounter-level and contain PII.
- The inclusion of PII allows users to:
 - Follow episodes of care across hospital settings;
 - Measure repeat visits; and
 - Link to external data sources such as the NDI and Medicare data

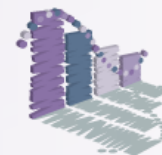


Potential Data Uses

- NHCS allows for the study of hospitalizations due to:
 - common medical issues like asthma, pneumonia, and strokes;
 - injuries, both intentional and accidental;
 - rare medical conditions such as traumatic brain injury;
 - rare treatments, medications, and procedures; and;
 - opioid-involved visits, which comprise about 1% of all ED visits.

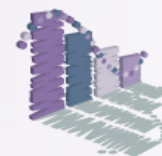


Identifying Substance-Involved ED Visits



Initial Methods

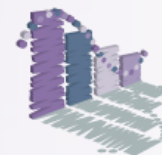
- After DAWN was discontinued in 2011, SAMHSA partnered with NCHS to begin a new data collection on substance-involved ED visits.
- Initial plan was to collect claims data, draw a sample of substance-involved ED visits, and abstract clinical information.
- Challenges of this plan included:
 - **Carryover diagnoses:** Flagged cases were occasionally false positives (ex. Previous overdoses unrelated to the visit were frequently carried over on the claim);
 - **Abstractors:** Definition of a substance-involved case can be subjective.



Move to Development of Algorithms

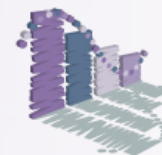
Current set of algorithms search standard medical code systems for 10 priority substance categories:

1. Alcohol (under age 21)
2. Antidepressants
3. Antipsychotics
4. Benzodiazepines/Sedatives
5. Cannabinoids
6. Cocaine
7. Hallucinogens
8. Heroin
9. Other Opiates/Opioids
10. Pharmaceutical central nervous system (CNS) stimulants



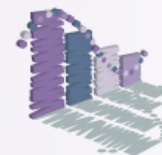
Current Algorithms

- Algorithms applied to claims data.
- General algorithms search broadly for ICD diagnosis codes and external cause of injury codes (E-code).
- Enhanced algorithms adopted a more restrictive criteria to approximate DAWN case definition: recent substance use related to patient's reason for visit.
 - Utilizes greater variety of medical codes, including symptoms and procedures commonly associated with substance use (coded in ICD, CPT, & HCPCS)



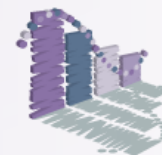
Limitations of Algorithms

- Some diagnosis/E-codes only specify drug categories (e.g., opioid), rather than specific drug names (e.g., fentanyl)
- Algorithms have not yet been validated to enumerate false positives and false negatives, but this is forthcoming
- Algorithms only used on claims data to date, which is designed for billing purposes, not research
 - Claims data excludes charity care and self-pay visits
 - Sometimes hard to distinguish past and present substance use
 - Cannot always distinguish care delivered in ED vs. inpatient



Preliminary Findings

Unweighted data; not nationally representative



Percentage and Number of Opioid-Involved ED Visits, NHCS 2014

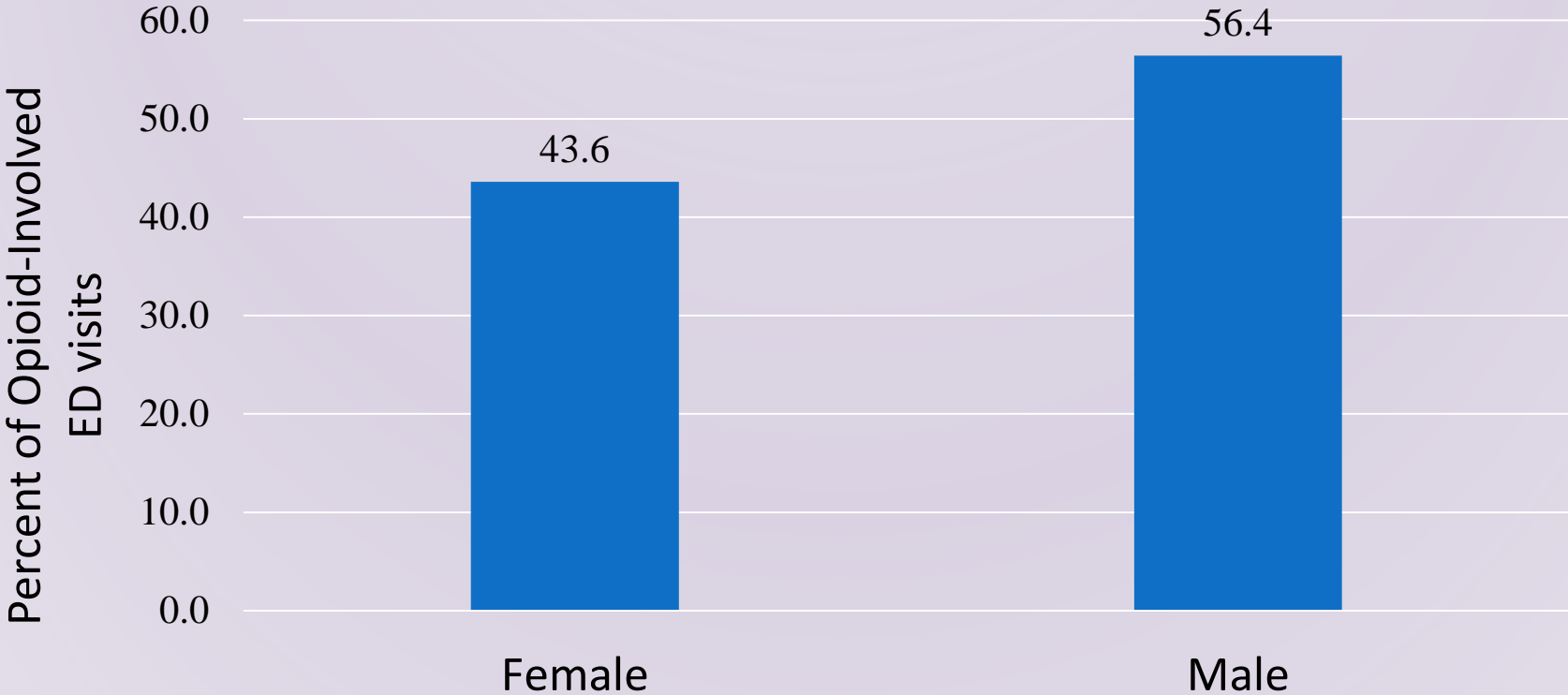
Percentage of ED Visits that are Opioid-Involved	0.90%
Number of Opioid-Involved ED Visits	39,094
Total ED Visits	4,530,360

Note: Data are not nationally representative.

SOURCE: National Center for Health Statistics, National Hospital Care Survey, 2014.



Percentage of Opioid-Involved ED Visits by Sex, NHCS 2014

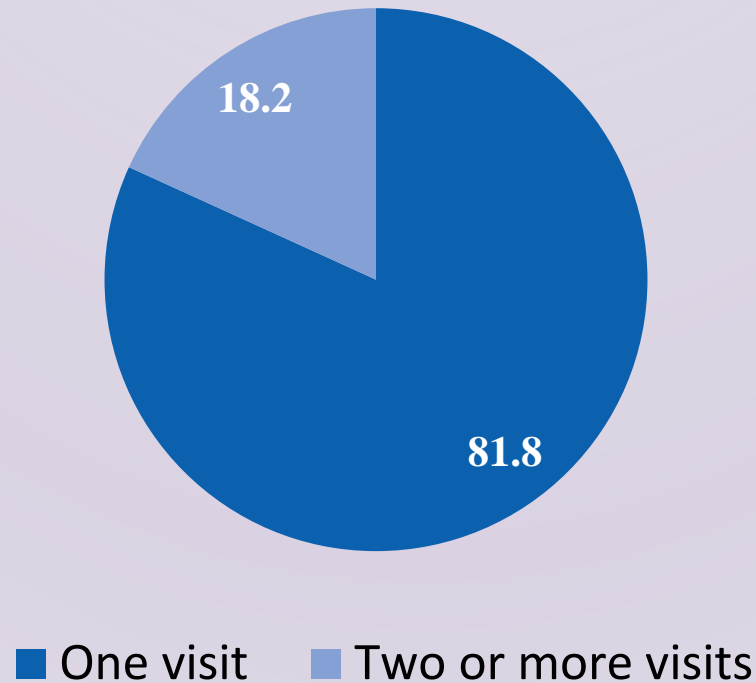


Note: Data are not nationally representative.

SOURCE: National Center for Health Statistics, National Hospital Care Survey, 2014.

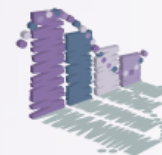


Percentage of Patients with Two or More Opioid-Involved ED Visits, NHCS 2014

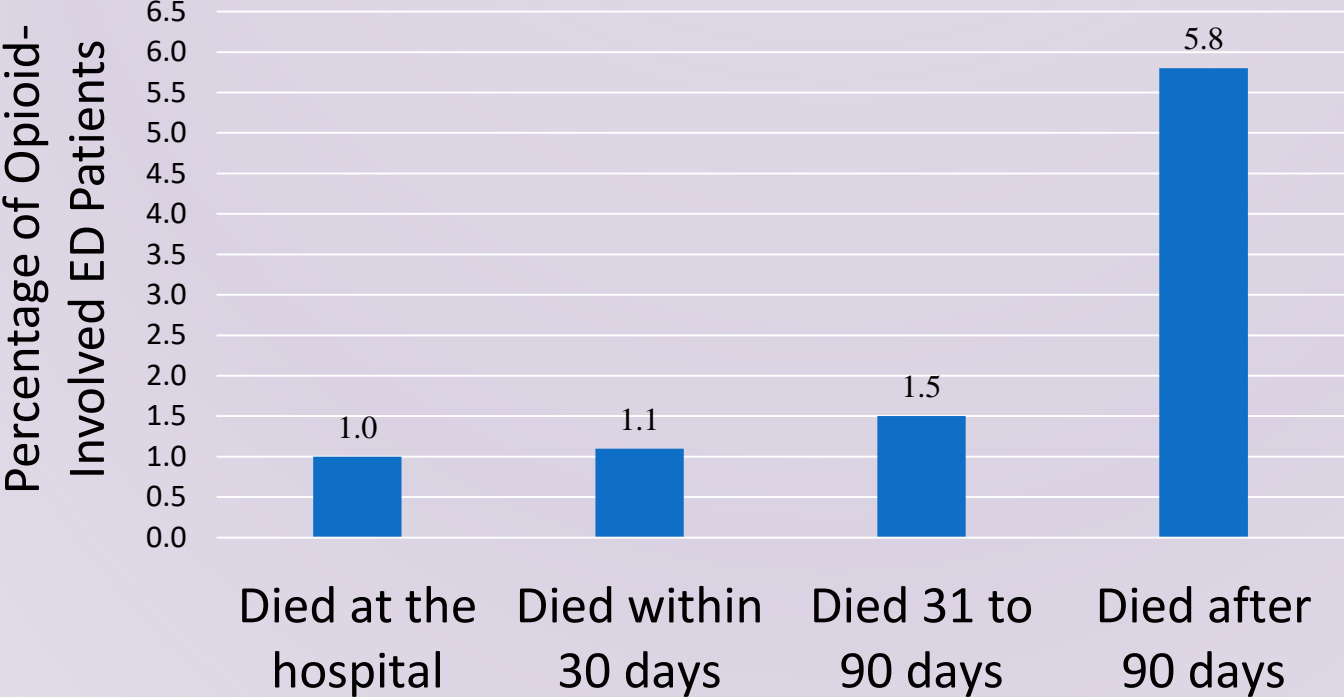


Note: Data are not nationally representative.

SOURCE: National Center for Health Statistics, National Hospital Care Survey, 2014.



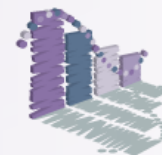
Percentage of Opioid-Involved ED Patients Who Died at the Hospital or Post Discharge, NHCS 2014



Note: Data are not nationally representative.

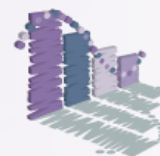
SOURCES: National Center for Health Statistics (NCHS), National Hospital Care Survey, 2014. NCHS, National Death Index, 2014-2015.

Improved Identification of Substance-Involved ED Visits with EHR Data



EHR Data Enhances Algorithms

- Starting in 2015, the NHCS started collecting EHR data from hospitals.
- EHR data contains additional data elements: clinical notes, labs and medications that can help improve the identification of substance-involved ED visits.
- Additional fields may identify substances related to the ED visit that were not captured in diagnosis or procedure codes.
- Clinical notes may provide the context that is not available in medical codes.

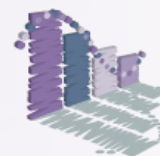


Patient-Centered Outcomes Research Trust Fund (PCORTF) Opioid Project

- NCHS was recently awarded monies from the Patient Centered Outcome Research Trust Fund (PCORTF) to improve the NHCS' ability to identify substance-involved ED visits by utilizing the EHR clinical notes.
- **Goals of Project**
 - Develop and apply text mining strategies, such as natural language processing, to written and coded data to identify the specific opioids involved in hospital encounters and drug overdose deaths.
 - Merge several data sources – the NHCS, the NDI, and the National Vital Statistics restricted-use mortality file, which includes information on the specific drugs involved in a death to create an enhanced, more comprehensive data file on care and outcomes.



- **Final products**
 - A Web-based portal to report clinical information back to responding hospitals; and
 - Dissemination of new data files, methods, findings and other output from this project to the overall research community.

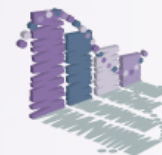


Restricted Use Data Sets

Restricted use data sets available in the NCHS RDC:

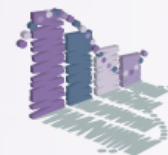
<https://www.cdc.gov/rdc/index.htm>

- 2013 and 2014 NHCS data
- 2014 linked NHCS and NDI data
 - For more information:
https://www.cdc.gov/nchs/data-linkage/nhcs_linkage.htm
- 2015 data available in June 2018



Moving Forward...

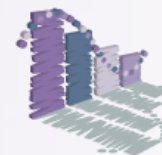
- Continue to recruit hospitals.
- Collect claims and EHR data for 2018 data collection.
- Continue to enhance algorithms.
- Plan algorithm validation study.



Questions?

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THANK YOU!

