Analysis of Drug Mentions with Involvement for Prescription Stimulants

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Disclosure

The RADARS System is the property of Denver Health and Hospital Authority, a political subdivision of the State of Colorado. The RADARS System is supported by subscriptions from pharmaceutical manufacturers, government and non-government agencies for surveillance, research and reporting services. Subscribers do not participate in data collection or analysis, nor do they have access to the raw data.

Motivating work with opioid mortality was funded by the Opioid Analgesic REMS Program Companies.

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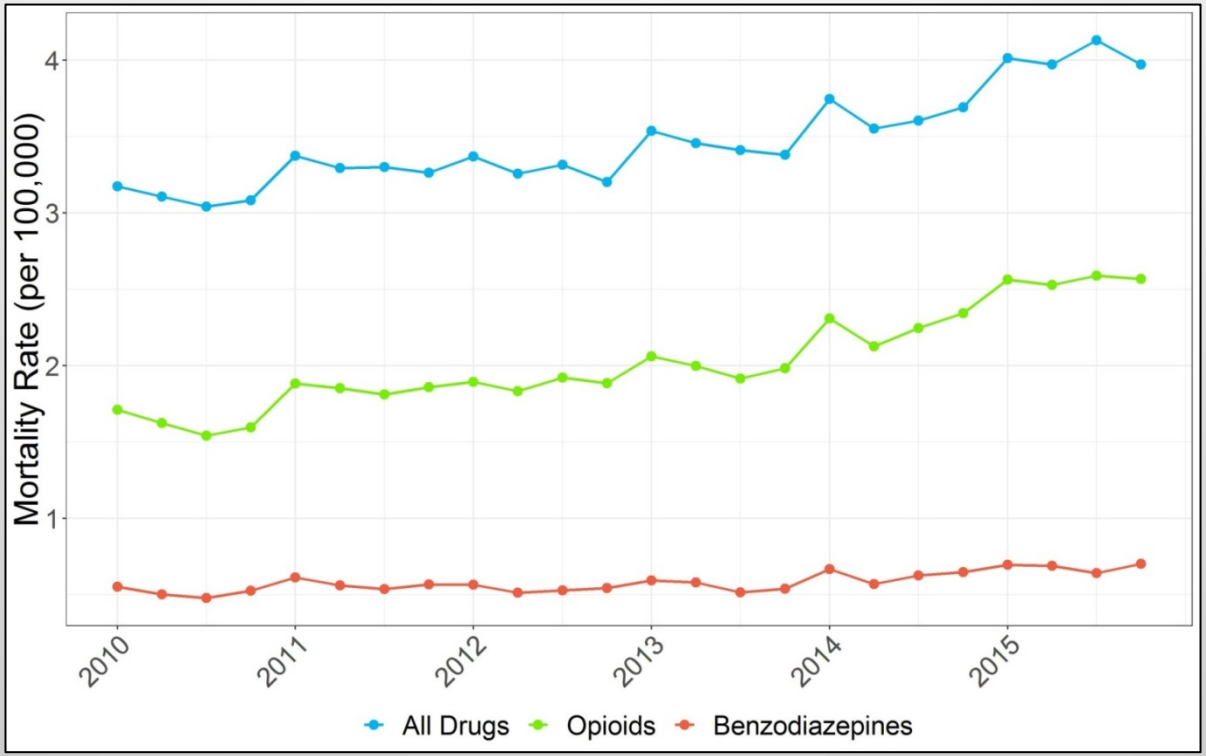
Agenda

- Motivation
- Study Design
- Challenges
- Conclusions

Study Motivation

- Drug overdose deaths are rising



Drugs mentioned with involvement (DMI) database: 2010-2015

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Study Motivation

- Stimulant mortality is comparable to opioid mortality

Stimulant Molecule	Mentions on Death Certificates
Amphetamine	5,518
Pseudoephedrine	425
Methylphenidate	233
Atomoxetine	33
Cocaine	55,147
Methamphetamine	35,709

Opioid Molecule	Mentions on Death Certificates
Oxycodone	40,791
Oxymorphone	6,381
Hydromorphone	4,160
Heroin	63,081
Fentanyl	24,343

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Drugs mentioned with involvement (DMI) database: 2010-2015

Study Design

- Use of CDC Drugs Mentioned with Involvement (DMI) database
  - Adjudicated death certificate data for drug overdoses
  - Includes mentions of drugs found in the cause of death and injury fields on death certificates
- Data from 2010 to 2017 (or earliest available)
- All decedents in the US with drug overdose terms
- Drug Groups:
  - Prescription and illicit stimulants (individually and in aggregate)
  - Opioids for "positive control" (oxymorphone, hydromorphone)
  - NSAIDS for "negative control" (naproxen, ibuprofen)

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Analysis Plan

- Demographic profile: Sex, age, race, ICD-10 underlying COD code
- Crude and age-specific mortality rates (National)
- Age-adjusted Poisson regression
- Count and percentage of observed routes of administration
  - Oral, Injection, Inhalation, Rectal, Topical
- Count and percentage of polysubstance mortality
  - Top 5 substances most frequently mentioned along with stimulants

Results forthcoming

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Challenges - Access

- Submitted proposal on 31 Oct 2018; Approved 28 Jan 2019
- Currently waiting on Rocky Mountain RDC access
  - Use of Census RDC requires additional approval
  - NCHS sites (Maryland, Georgia) don't require additional approval
- Federal government shutdown hindered progress
- State-by-state approach for national data not feasible
  - Multiple data use agreements
  - Contact with Office of Chief Medical Officer (or equivalent) is difficult
  - Substantial operational overhead to manage multiple state sources
  - Divergence in expectation (IRB in some states; 1-page DUA in others)

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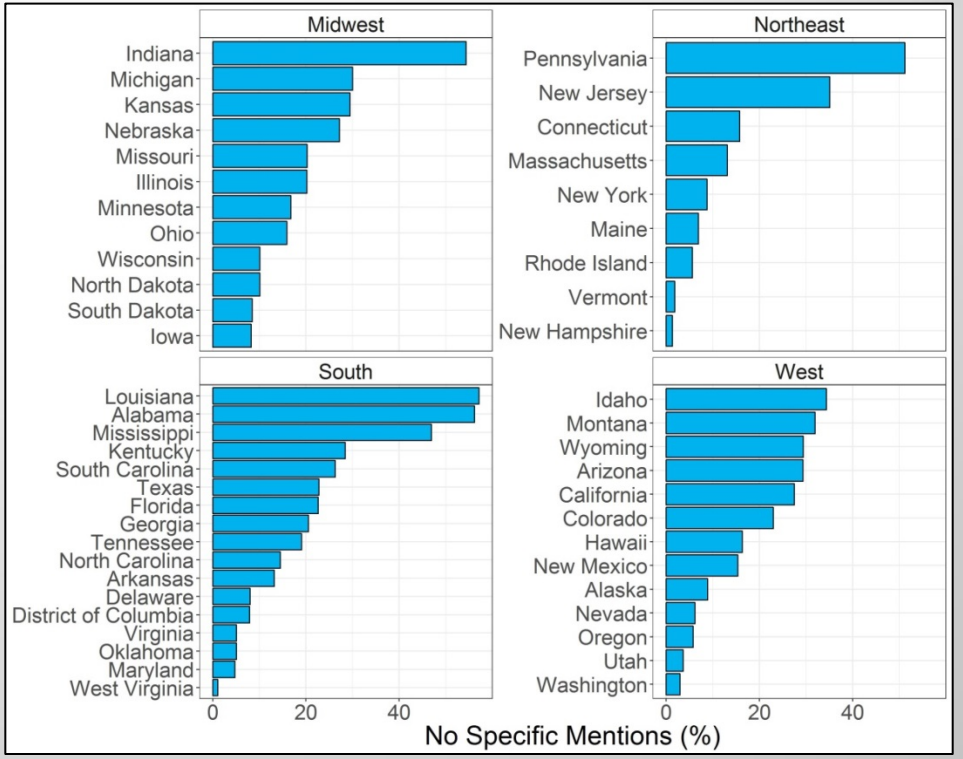
Challenges – Molecule Detection

- Would standard processes reasonably detect prescription stimulants?
  - For example, is methylphenidate low because it's uncommon or because it's not looked for?
- Lack of understanding on likelihood of detection of specific molecules
- Are rare or new molecules missed?
  - For example, poison centers report tianeptine deaths rising[1]



*2010-2015, DMI Database

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Related Activities

- Understanding low volume prescription drug mortality
- State-by-state approach for buprenorphine mortality (5 states)
  - Buprenorphine mortality rising while methadone mortality falling
  - Survey to understand how processes will or will not detect buprenorphine
  - Is differential detection present?
  - Expand to more states?
- Linkage to the National Death Index to quantify mortality risk of patients prescribed opioids

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Conclusions

- Federal database for fatal drug overdose crucial tool in policy making
- Mentions of stimulant mortality comparable to opioid mortality
- Prescription stimulant study ongoing
  - Access to Rocky Mountain RDC expected in 1 month
  - Publication submitted in 3 months
  - Future work: Characterize polysubstance mortality more precisely using death certificate data
- Differential specificity between molecules presents challenges to interpretation

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Reference:

Zahran, TE, J Schier, E Glidden, S Kieszak, R Law, E Bottei, C Aaron, A King, and A Chang. 2018. "Characteristics of tianeptine exposures reported to the national poison data system - United States 2000-2017." *Morbidity and Mortality Weekly Report* no. 67 (30):815-818

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Backup

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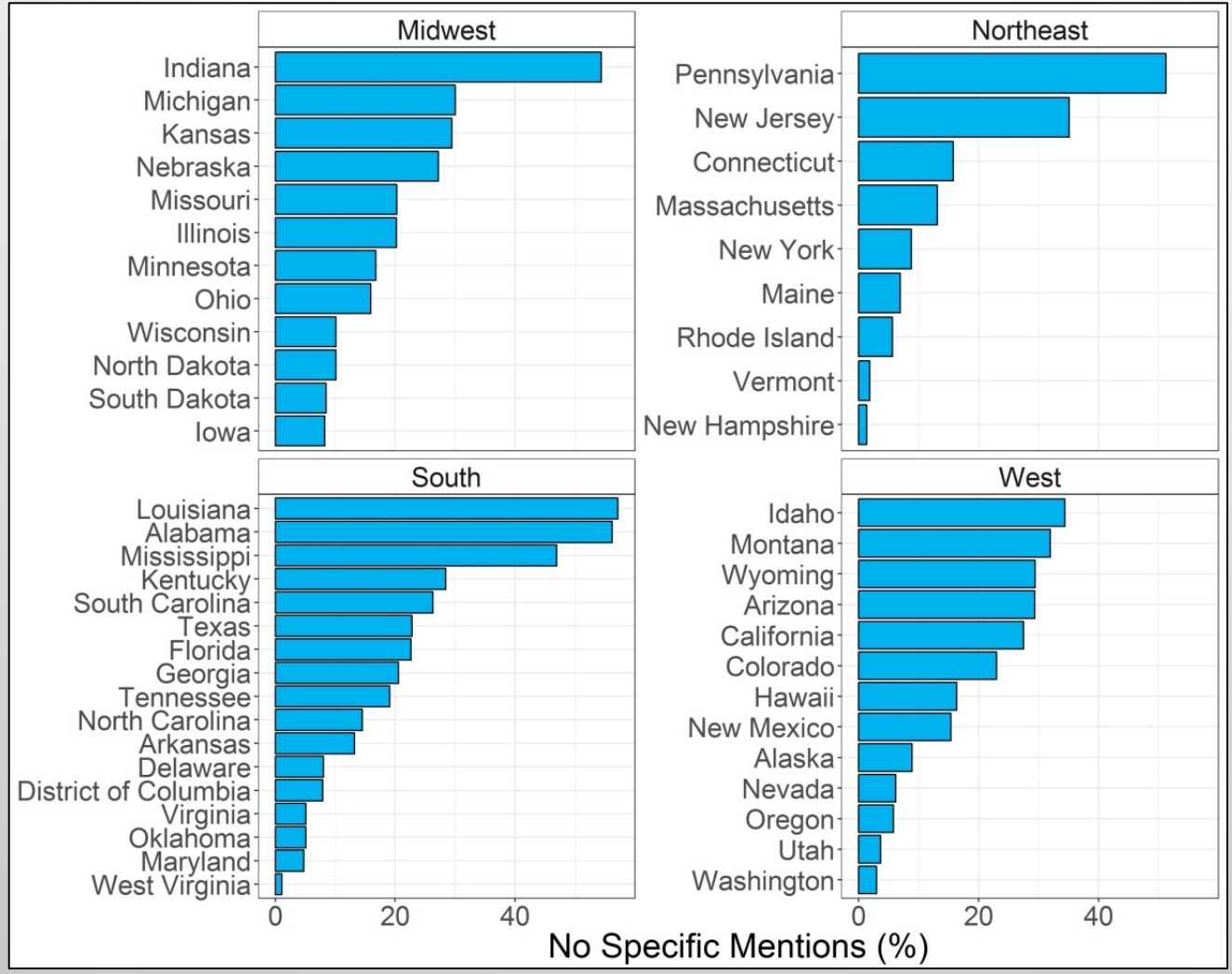

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