PDMPs at Work: Fentanyl Overdose Deaths and the "Holy Trinity"

Lawrence Scholl, PhD, MPH, Epidemic Intelligence Service Officer, Division of Unintentional Injury Prevention, Centers for Disease Control and Prevention

Chris Delcher, PhD, Assistant Professor, University of Florida

Tina Farales, Department of Justice Administrator, Prescription Drug Monitoring Program, California Department of Justice

Moderator: **Julie Miller,** Editor in Chief, *Behavioral Healthcare Executive* and *Addiction Professional*

Disclosures

- Chris Delcher, PhD; Tina Farales; Lawrence Scholl, PhD, MPH; and Julie Miller have disclosed no relevant, real, or apparent personal or professional financial relationships with proprietary entities that produce healthcare goods and services.

Disclosures

- All planners/managers hereby state that they or their spouse/life partner do not have any financial relationships or relationships to products or devices with any commercial interest related to the content of this activity of any amount during the past 12 months.
- The following planners/managers have the following to disclose:
  - Kelly J. Clark, MD, MBA, FASAM, DFAPA – Consulting fees: Braeburn, Indivior
  - John J. Dreyzehner, MD, MPH, FACOEM – Salary: Amerigroup Healthcare Insurance (spouse)

Learning Objectives

- Describe prescribing indicators that can be used to gauge risk of poor outcome, and the epidemiology of these Rx risk factors among heroin and fentanyl decedents in Ohio.
- Identify patients at risk for Rx opioid addiction while under medical supervision, prior to potential transition to heroin use and potential overdose.
- Distinguish the characteristics of prescribers, patients and pharmacies associated with holy trinity prescribing behaviors.
- Specify measures and methods that can be used with PDMP data to identify the high-risk groups associated with holy trinity prescribing.

Opioid Prescribing Histories of Unintentional Fentanyl- and Heroin-Related Overdose Decedents, Ohio 2014

Lawrence Scholl, PhD, MPH
Centers for Disease Control and Prevention
National Center for Injury Prevention and Control
Division of Unintentional Injury Prevention

CDC/NCIPC

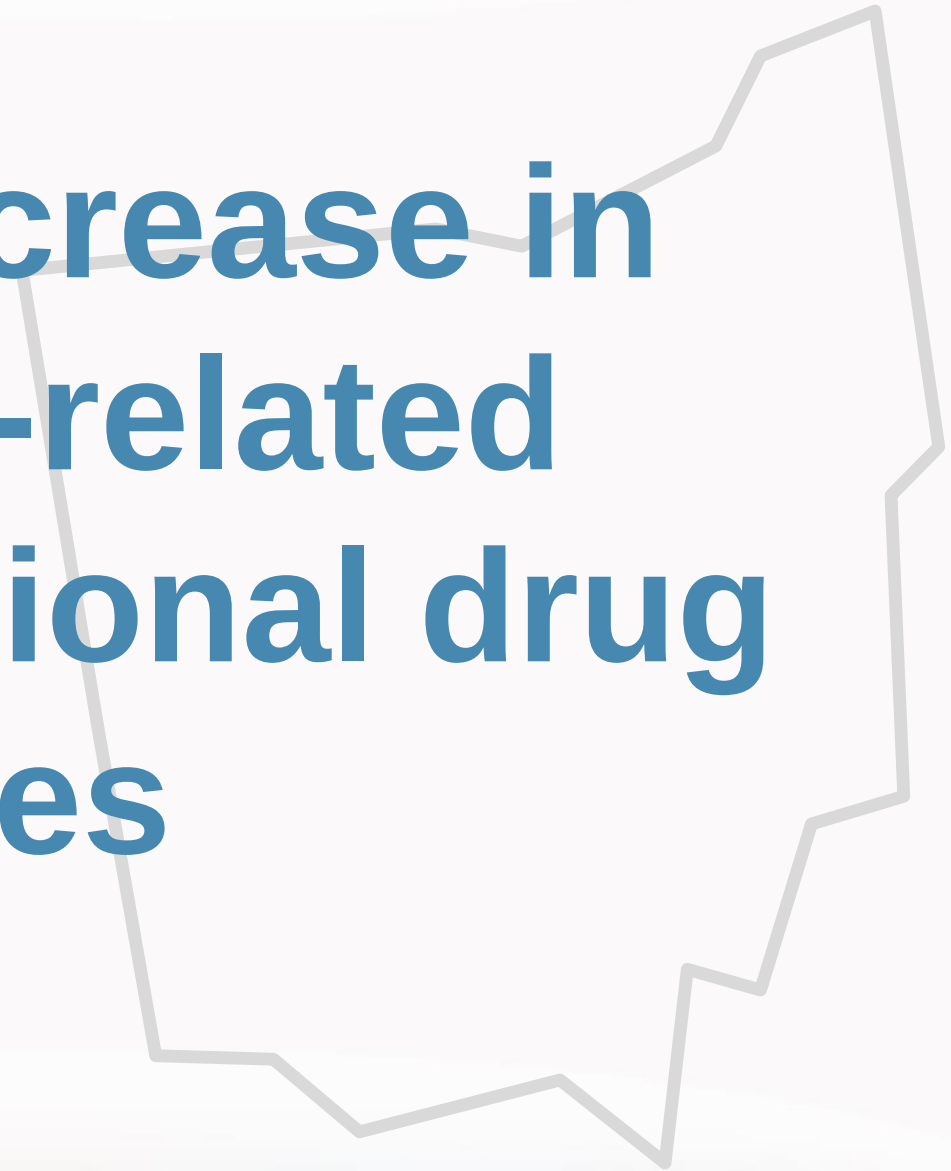
Erica Spies, PhD, MS
Alexis Peterson, PhD
Amanda Garcia-Williams, PhD, MPH
John Halpin, MD, MPH
Matt Gladden, PhD
Jon Zibbell, PhD

Ohio Department of Health

Jolene Defiore-Hyrmer, MPH
Mary DiOrio, MD, MPH

The findings and conclusions in this presentation are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

500% increase in fentanyl-related unintentional drug overdoses



In September 2015

Ohio issued a Fentanyl Health Alert

State Health Alerts > Ohio State Health Alerts

Health Alert From the Ohio Department of Health

September 24, 2015

Comment Print

Summary

Preliminary Ohio Department of Health data show that there were 502 fentanyl-related drug overdose deaths in Ohio in 2014, and at least 98 fentanyl-related deaths in 2015. By comparison, just 84 drug overdose deaths involved fentanyl in 2013.According to the federal Substance Abuse and Mental Health Services Administration (SAMHSA), the effects of overdose occur quickly, and critical minutes may be lost in the emergency room because fentanyl is not detected in routine toxicology screenings.

Background

Fentanyl, a schedule II synthetic painkiller that is 30 to 50 times more potent than heroin, is often mixed with heroin to produce a stronger high, according to the Centers for Disease Control and Prevention. Fentanyl-laced heroin has been blamed for dozens of deaths across the United States this year, including 58 confirmed deaths in Detroit and 39 deaths in Baltimore. This year, fentanyl-related overdoses have also been reported in Virginia, Vermont, and Wisconsin.

The Ohio deaths involved 76 men and 22 women, ranging in age from 18 to 62. Eighteen deaths occurred in Butler County, 13 deaths in Franklin County, 11 deaths in Hamilton County, and 11 deaths in Summit County. There were 2 deaths in Brown County, 8 deaths in Clark County, 3 deaths each in Clermont and Cuyahoga County, 2 deaths in Lawrence County, 6 deaths in Lorain County, 4 deaths in Montgomery County, 3 deaths in Stark County, 2 deaths in Trumbull County and 4 deaths in Warren County. Adams, Gallia, Lake, Lucas, Mahoning, Perry, Portage and Tuscarawas Counties all had 1 death each. The deaths occurred among Ohio residents.

These data are preliminary and may not include the most recent overdose deaths.

Recommendations

CDC in Ohio to study fentanyl, heroin overdoses

By Beairshelle Edmé
Published: October 26, 2015, 10:37 am | Updated: August 30, 2016, 10:17 am

SCENE & HEARD

Friday, October 23, 2015

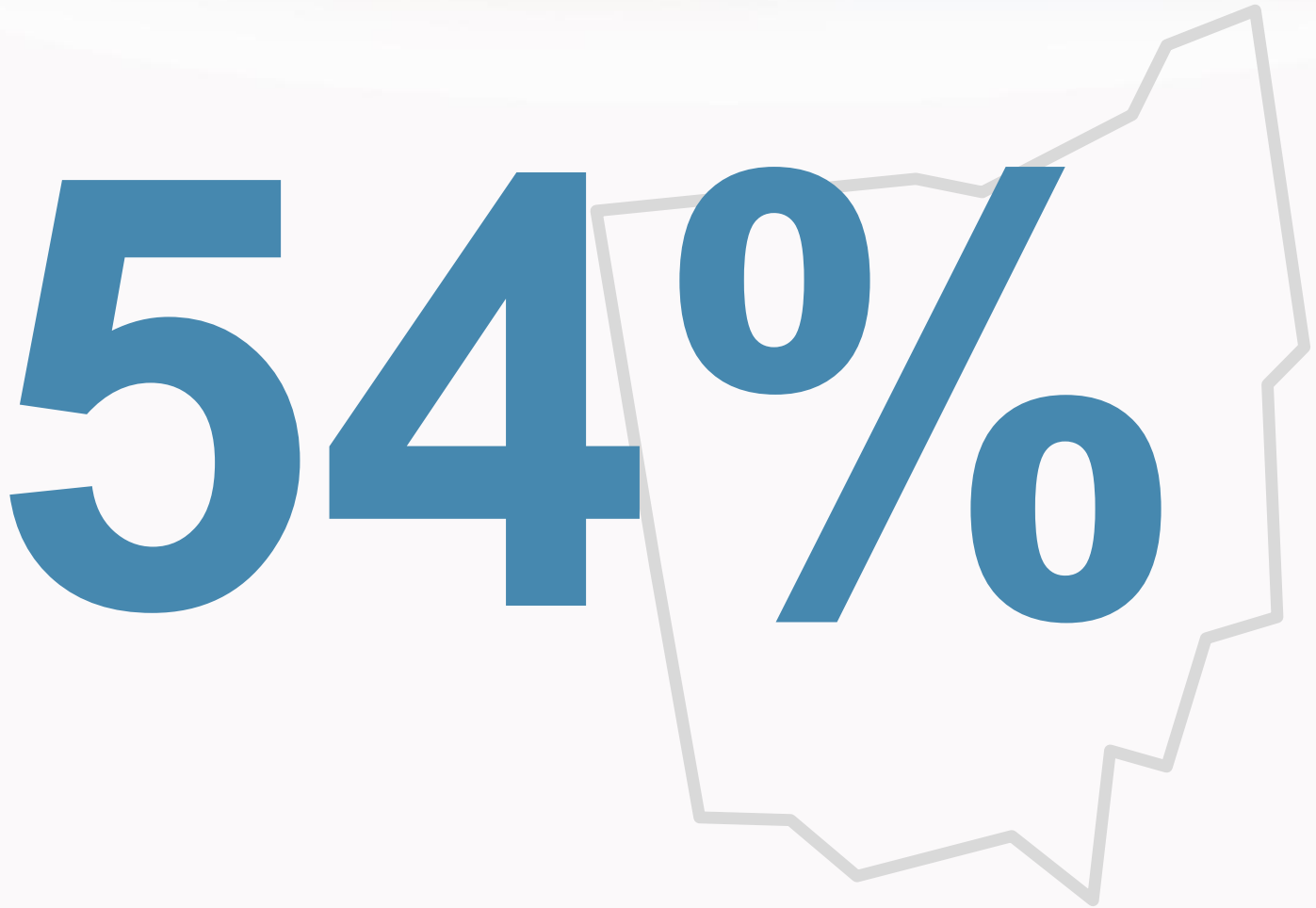
CDC Team to Visit Ohio to Study Fentanyl-Related Deaths

Posted By Vince Grzegorek Email Us! on Fri, Oct 23, 2015 at 12:52 pm

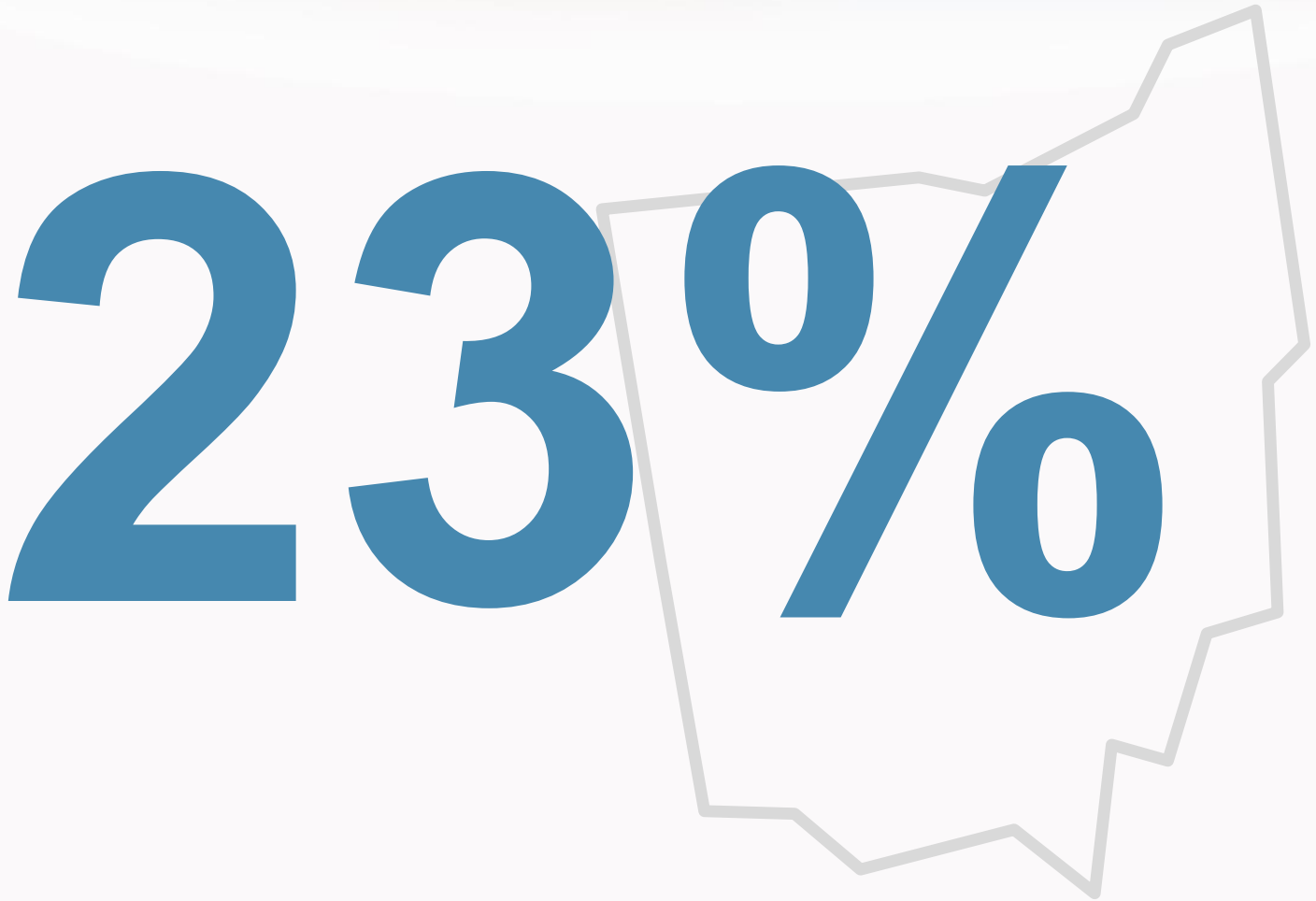
The opiate hellstorm that's rained down on Ohio has only gotten worse, not better, in recent years. Overdose deaths continue to spike, morbid records continue to be set, and new wrinkles and complexities are constantly being added to an already complex mix. Which is why a six-person CDC team will arrive in Ohio Monday and spend up to several weeks studying what's become the latest in a batch of bad drug news.

Wikipedia

CDC to help Ohio deal with deadly twist to heroin epidemic



≥1 prescription in six months preceding death



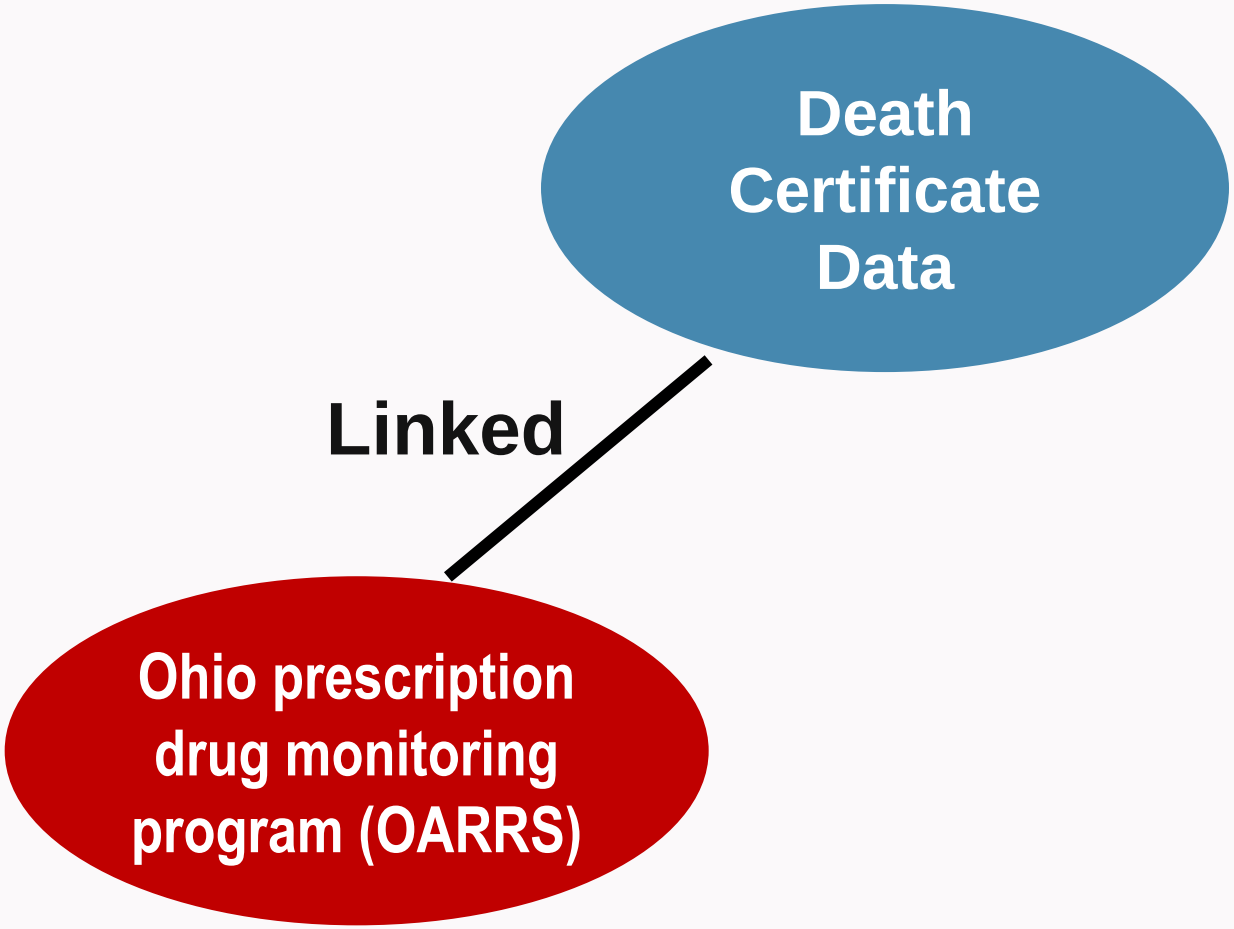
≥1 opioid prescription in the month preceding death

New Analyses Built on CDC Epi-Aid

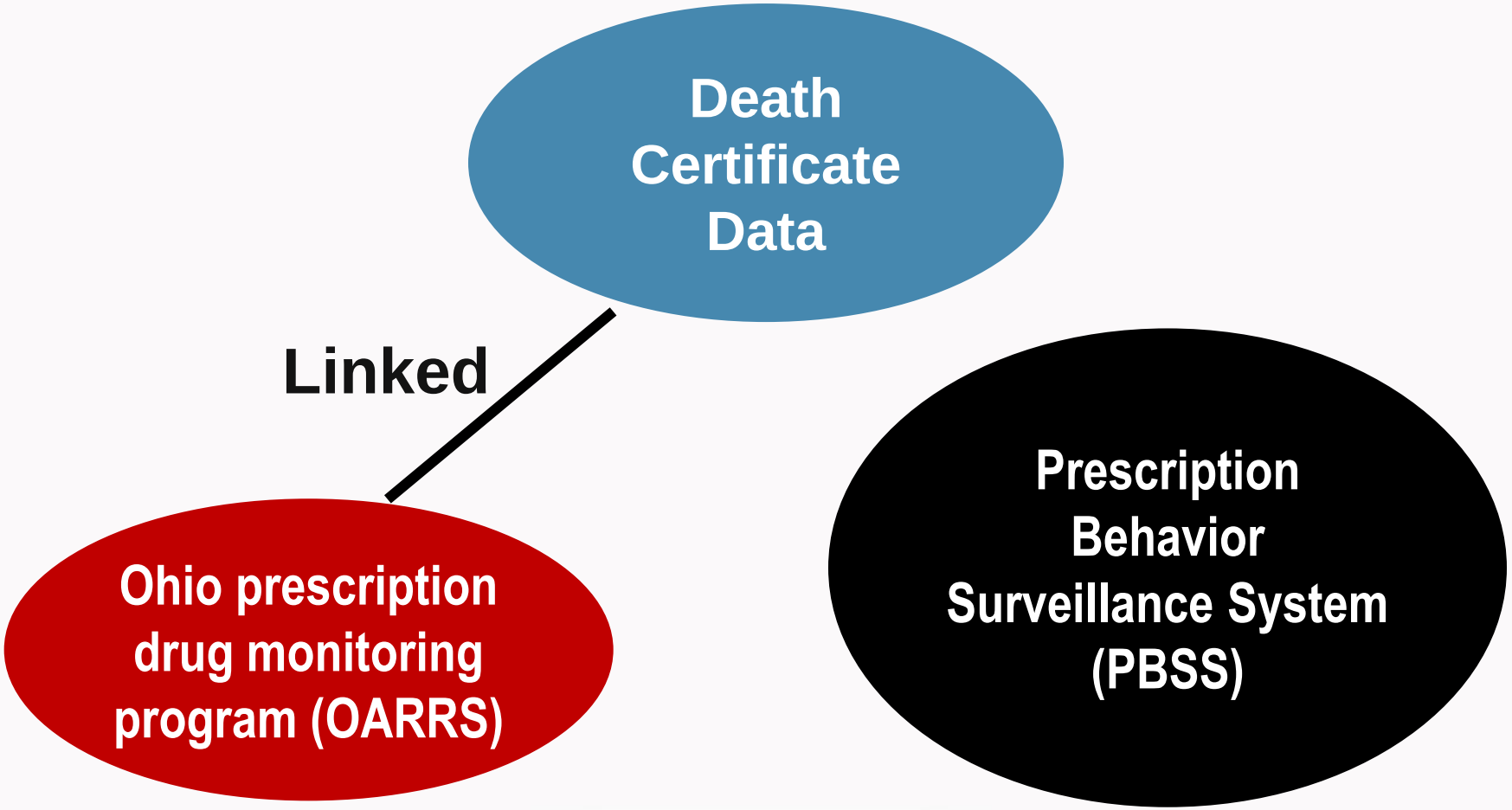
- High risk prescribing patterns
- Opportunities for early intervention
- Overdose deaths during 2014
- Deaths linked to PDMP data

3 de-identified data sources from Ohio

Ohio 2014 Overdoses Linked to PDMP



Ohio 2014 Overdoses Linked to PDMP



836 Fentanyl- & Heroin-Related Deaths

836 Fentanyl- & Heroin-Related Overdose Deaths

- **Ohio 2014 Unintentional Drug Overdoses Linked to PDMP**
- **At least 1 Rx in PDMP within 6 months before death**
- **Rx Opioids also Possibly Related to Overdose**

836 Fentanyl- & Heroin-Related Deaths

836
Fentanyl- & Heroin-Related Overdose Deaths

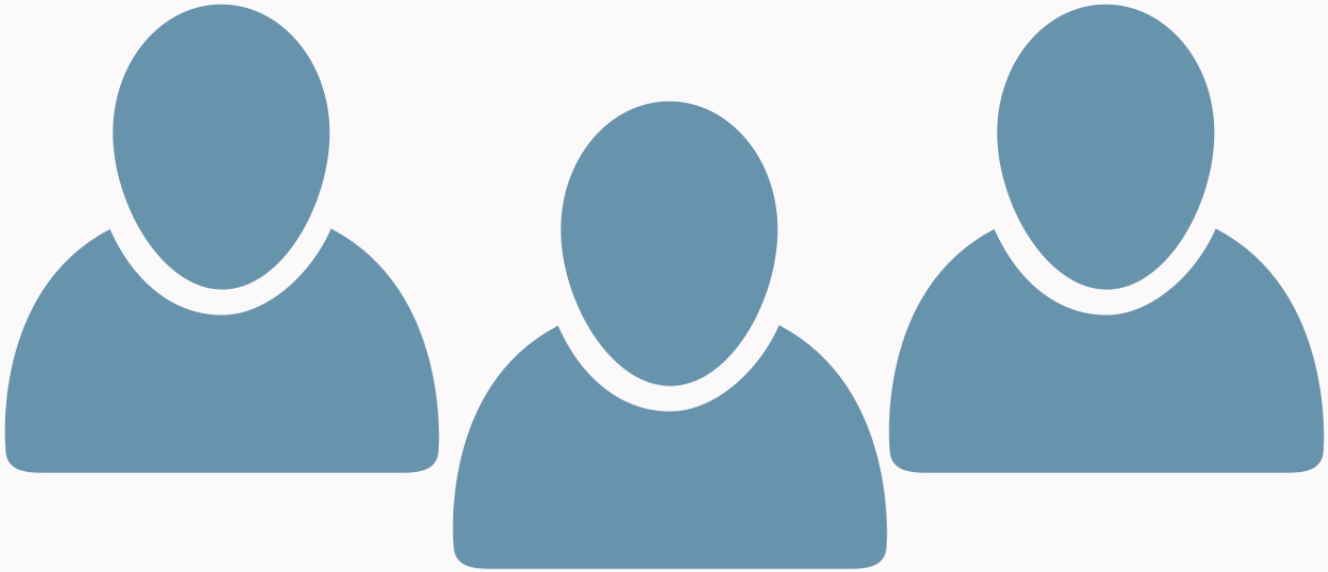
18%
with Benzodiazepines

Ohio 2014 Unintentional Drug Overdoses Linked to PDMP

At least 1 Rx in PDMP within 6 months before death

Rx Opioids also Possibly Related to Overdose

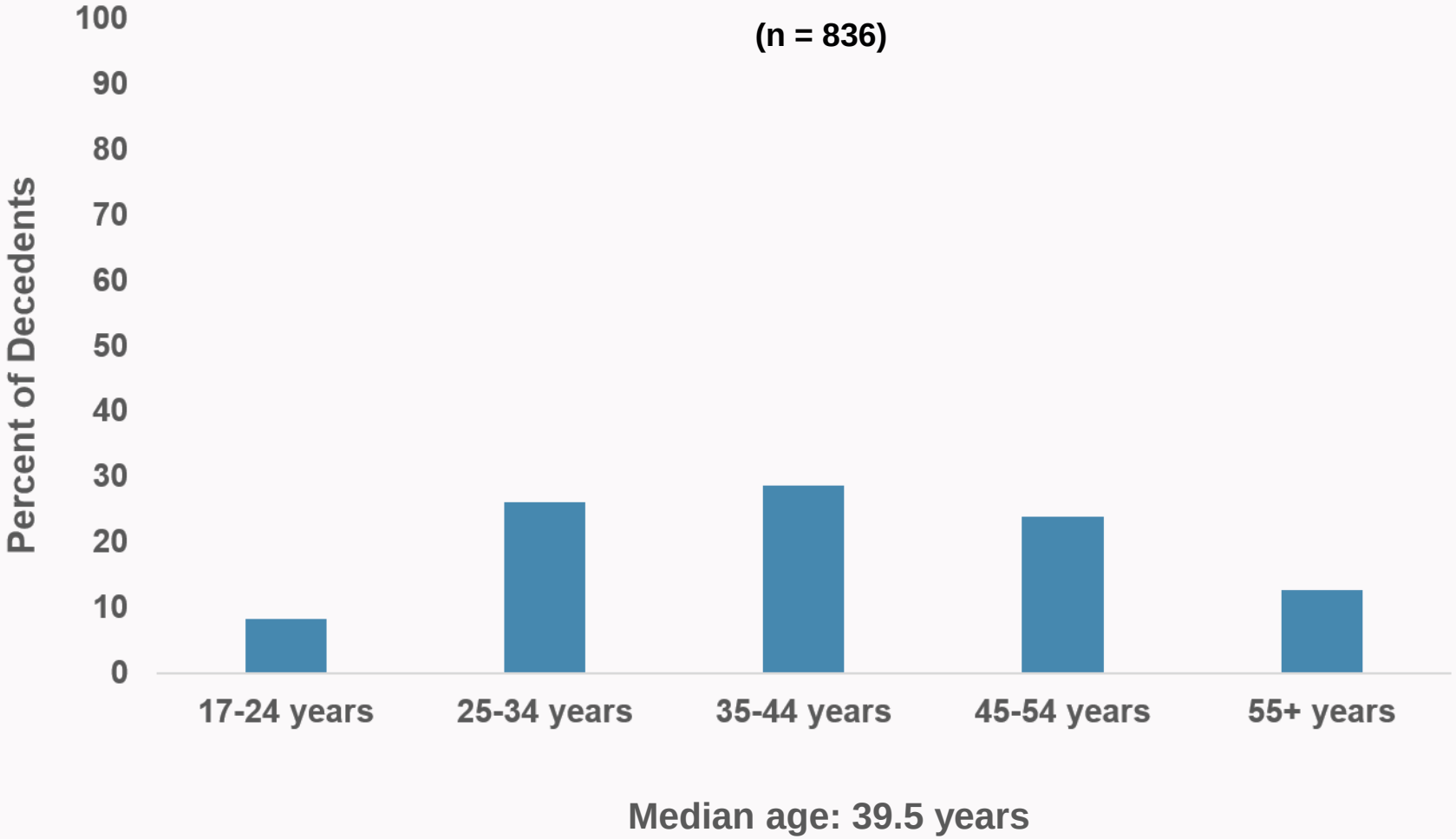
Who were the 836 people who died from Fentanyl- and Heroin-related Overdoses?



Fentanyl- & Heroin-related Deaths

Age of Decedents

(n = 836)



Median age: 39.5 years

Fentanyl- & Heroin-related Deaths

Marital Status

(n = 836)

47%
Single

30%
Divorced

18%
Married

Place of Death

(n = 836)

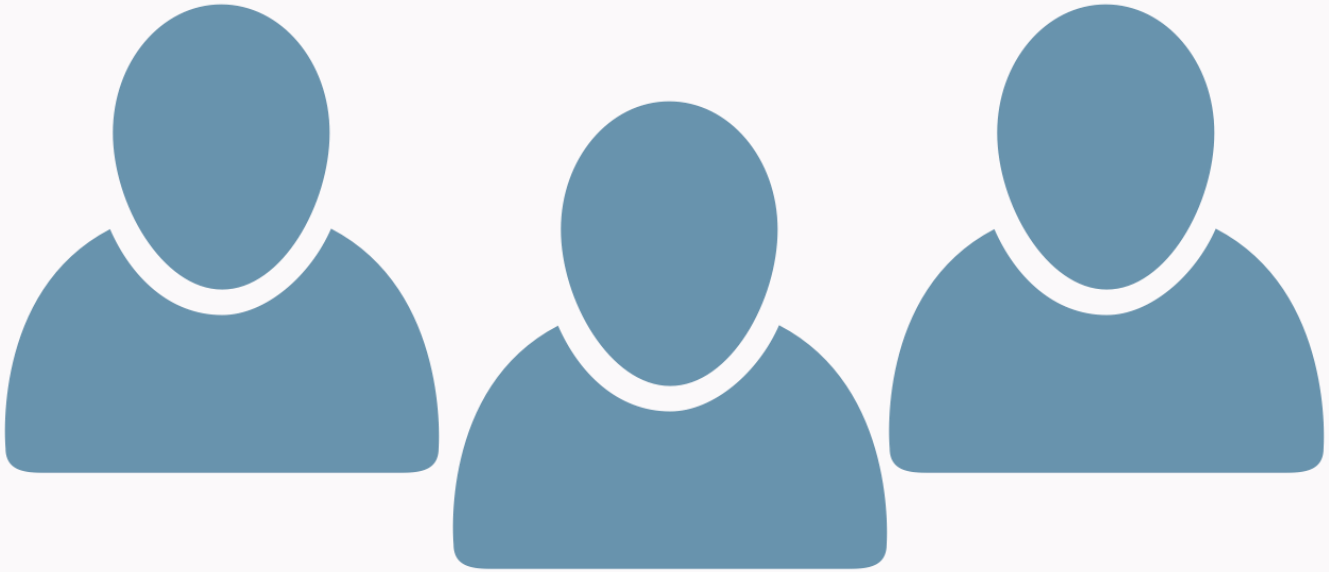
51%
At Home

16%
ER, outpatient

8%
Hospital, inpatient

Prescription Histories during 6 Months before Overdose:

836 Fentanyl- and Heroin-involved Deaths



Fentanyl- & Heroin-related Deaths

Controlled Substance Prescriptions:

During 6 Months before Overdose

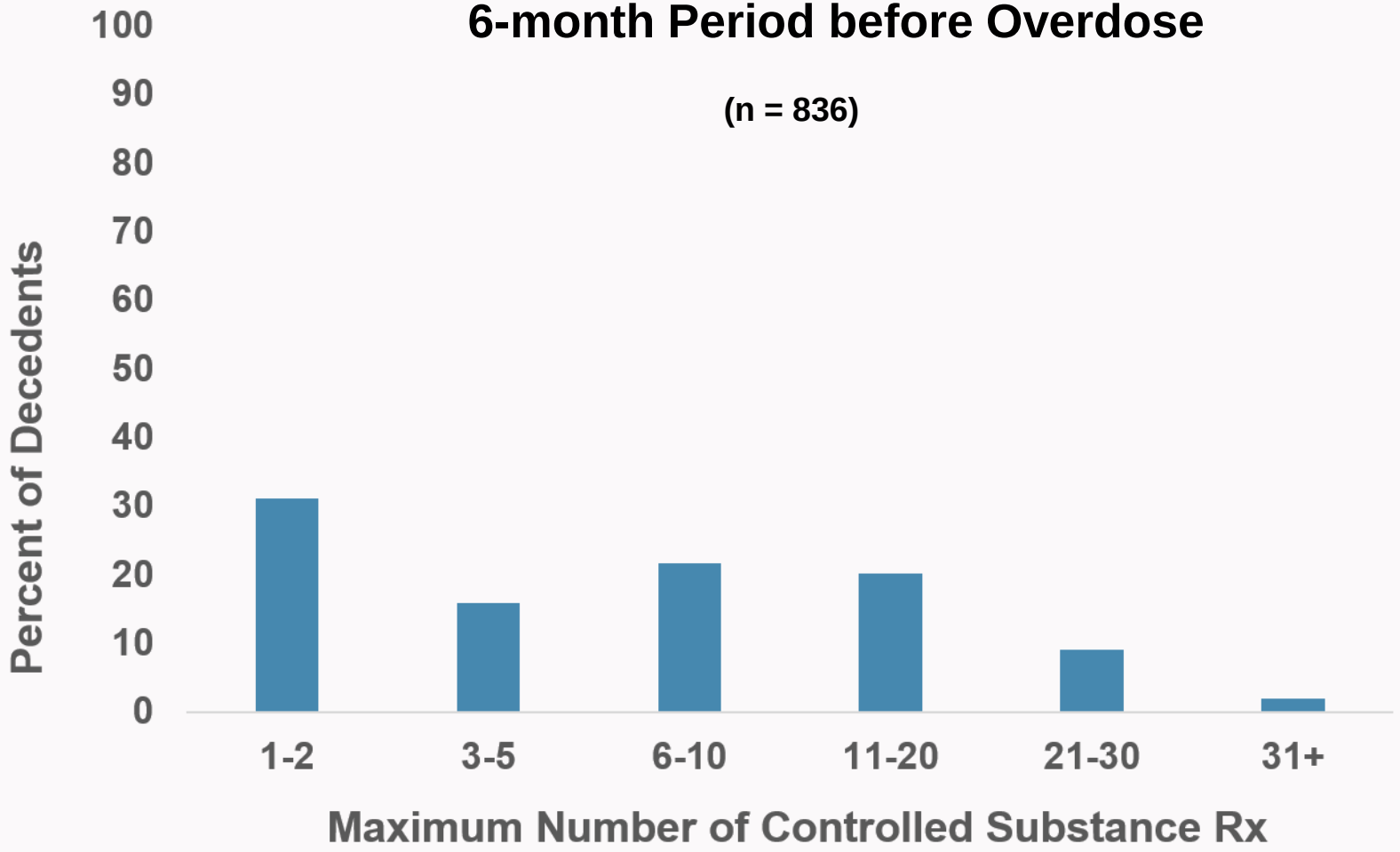
7,168 total Rx

8.6 Rx per person

Maximum # of Controlled Substance Rx Filled:

6-month Period before Overdose

(n = 836)



Fentanyl- &
Heroin-related
Deaths

Opioid Prescriptions:

During 6 Months before Overdose

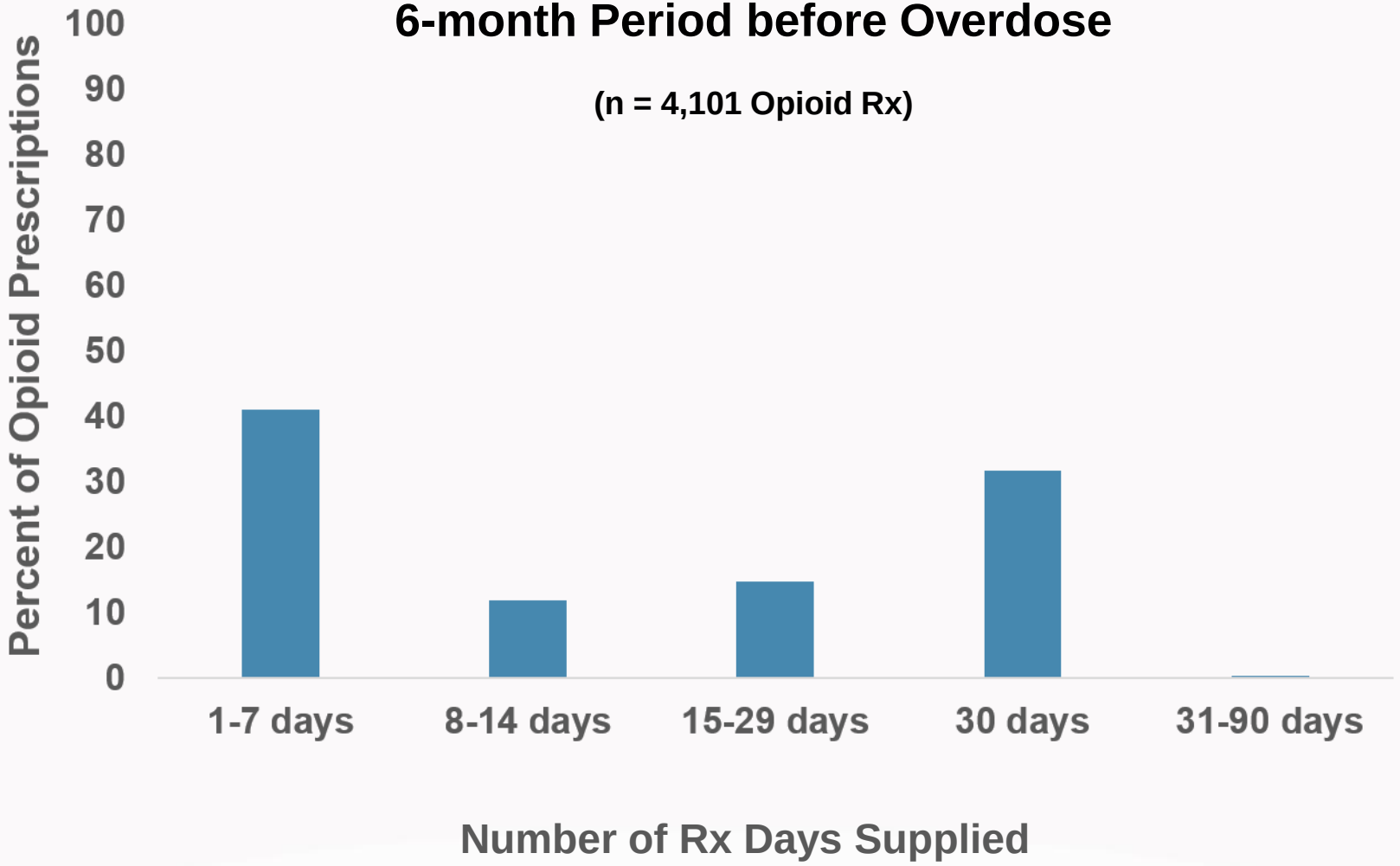
4,101 Opioid Rx

57% of Rx filled

Opioids Rx Days Supplied:

6-month Period before Overdose

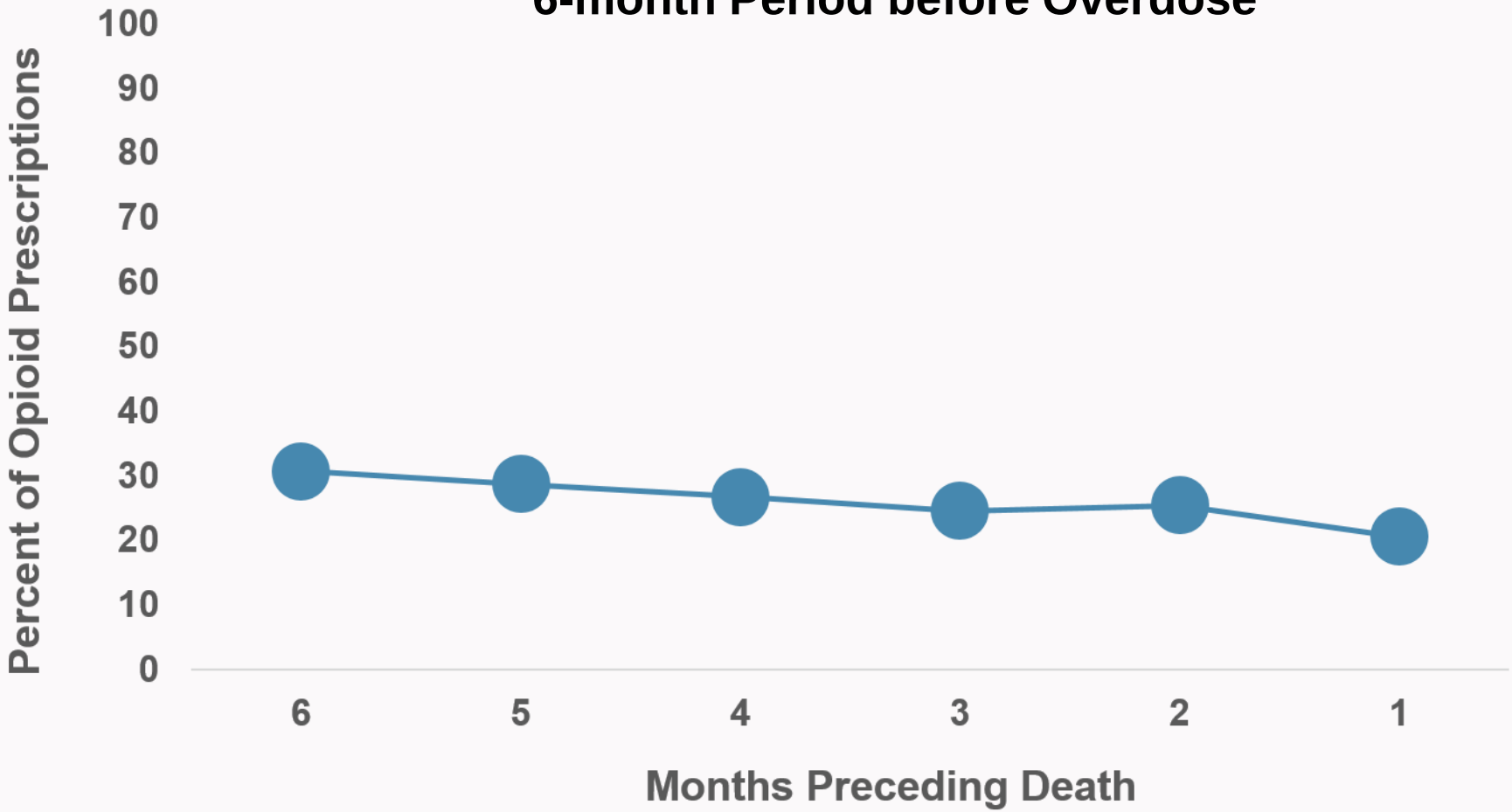
(n = 4,101 Opioid Rx)



Fentanyl- & Heroin-related Deaths

% Long-acting / Extended Release Opioid Rx:

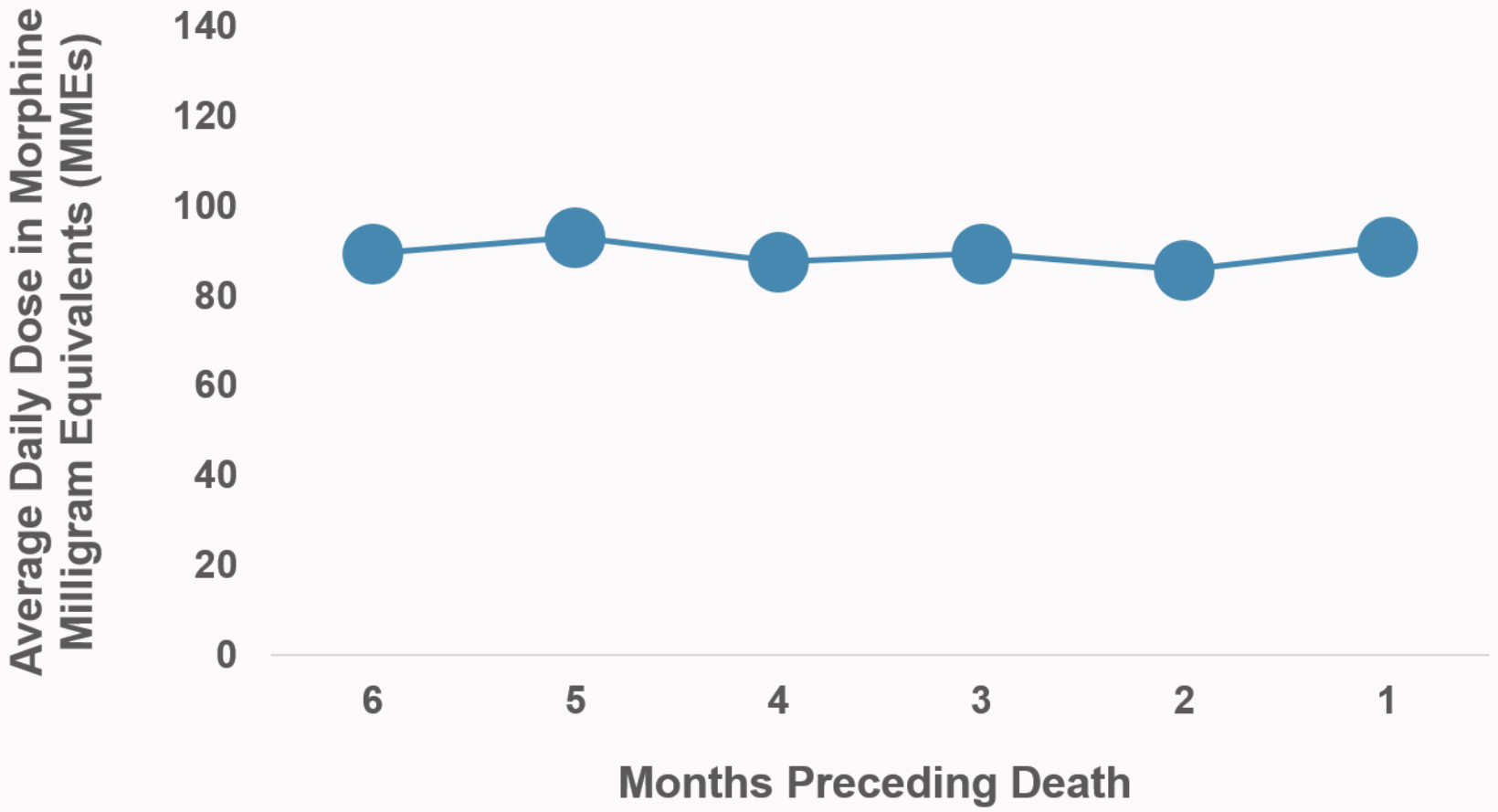
6-month Period before Overdose



Fentanyl- & Heroin-related Deaths

Opioids Rx Average Daily Dose:

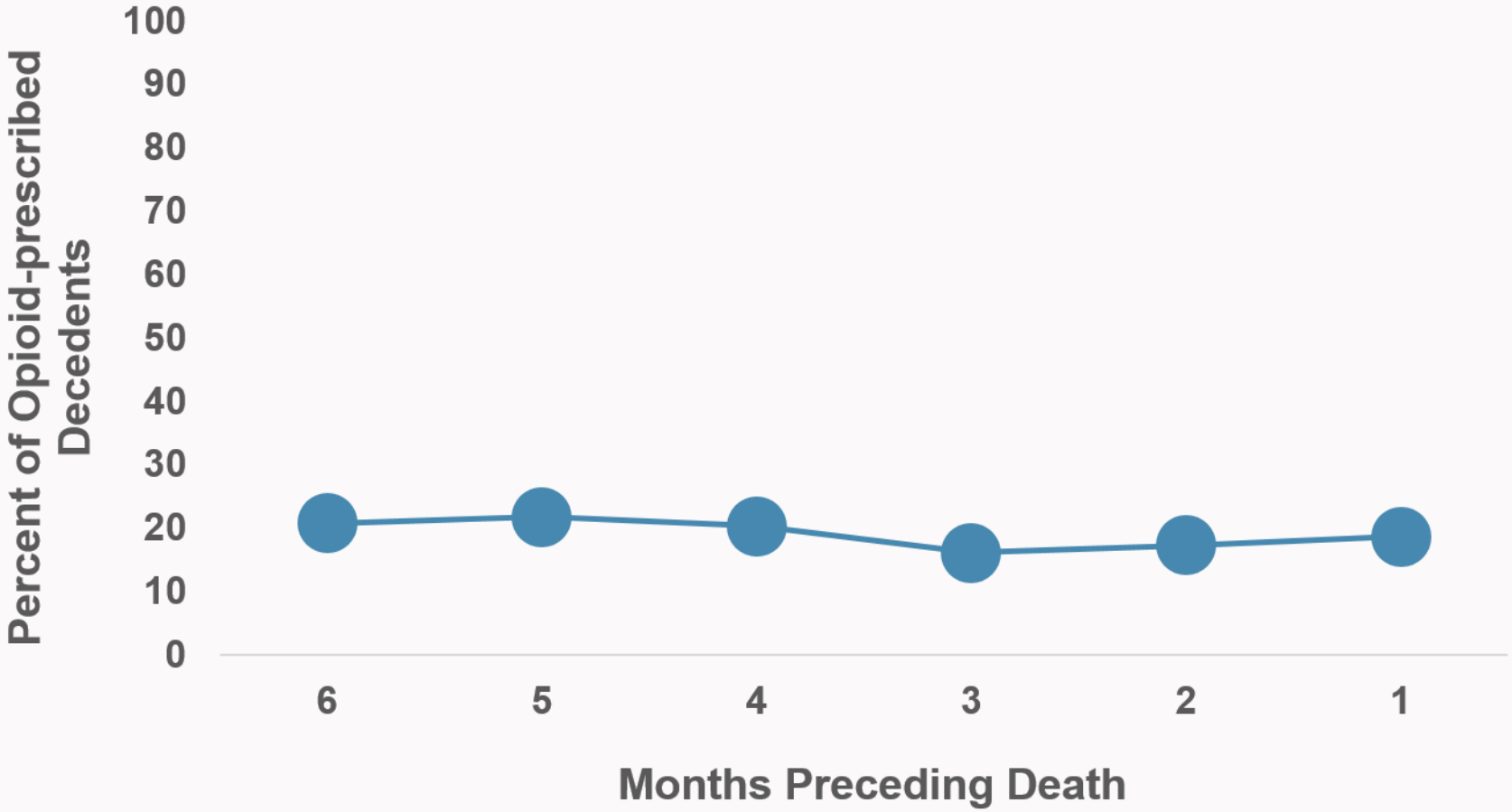
6-month Period before Overdose



Fentanyl- & Heroin-related Deaths

Percent with Average Daily Doses > 90 MMEs:

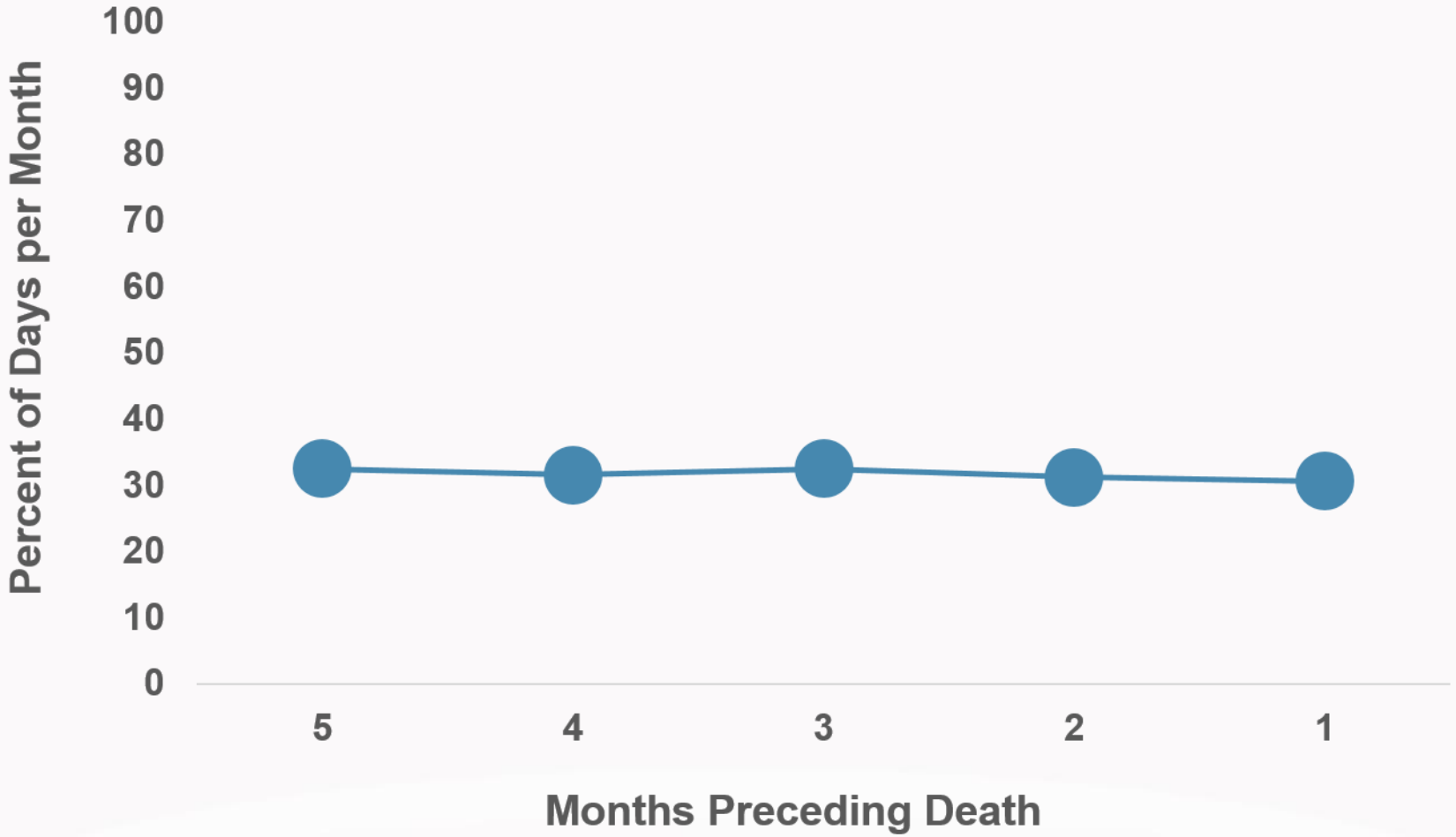
6-month Period before Overdose



Fentanyl- & Heroin-related Deaths

% Days with Opioid-Benzodiazepine Overlapping Rx:

5-month Period before Overdose



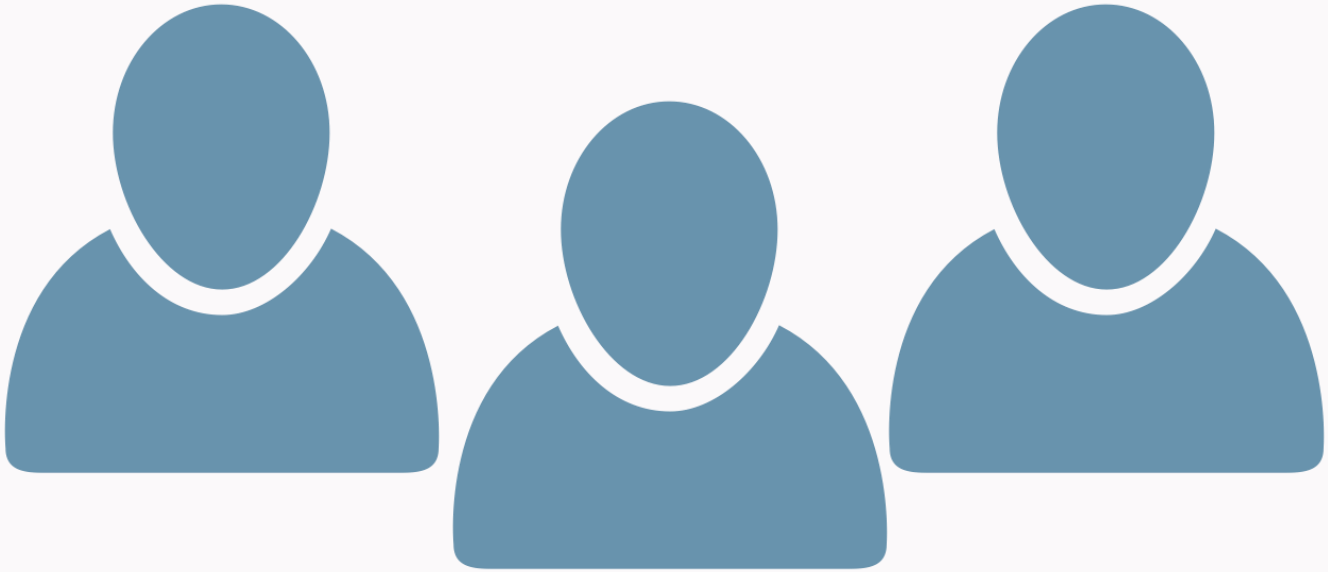
Multiple Providers during 6 Months before Overdose

(n = 827)

Multiple Providers	
Prescribers (5+)	14%
Pharmacies (5+)	7%
5+ Prescribers & 5+ Pharmacies	4%

Percentages based on those with at least 1 DEA schedule II-IV Rx in OARRS during 6 months preceding death: 827 Fentanyl- and Heroin-related deaths.

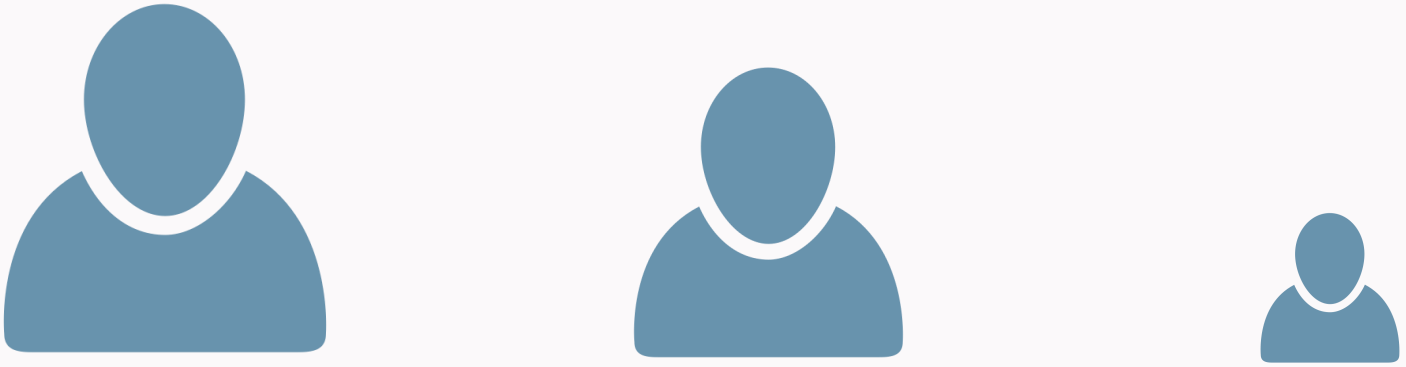
During 30 Days before Overdose



Fentanyl- &
Heroin-related
Deaths

% with Opioid & Benzodiazepine Rx:
30-day Period before Overdose

(n = 836)



42%
Opioids

35%
Benzos

18%
Both Opioids & Benzos *

**** Opioids and Benzodiazepines prescribed during the same time period—last 30 days prior to death—but not necessarily overlapping prescriptions during this time period.***

Fentanyl- &
Heroin-related
Deaths

% Decedents with Rx for Specific Opioids:
30-day Period before Overdose

(n = 836)

17%
Oxycodone SA

17%
Hydrocodone

9%
Tramadol

4%
Fentanyl

Fentanyl- &
Heroin-related
Deaths

Benzodiazepine Rx:
30-day Period before Overdose

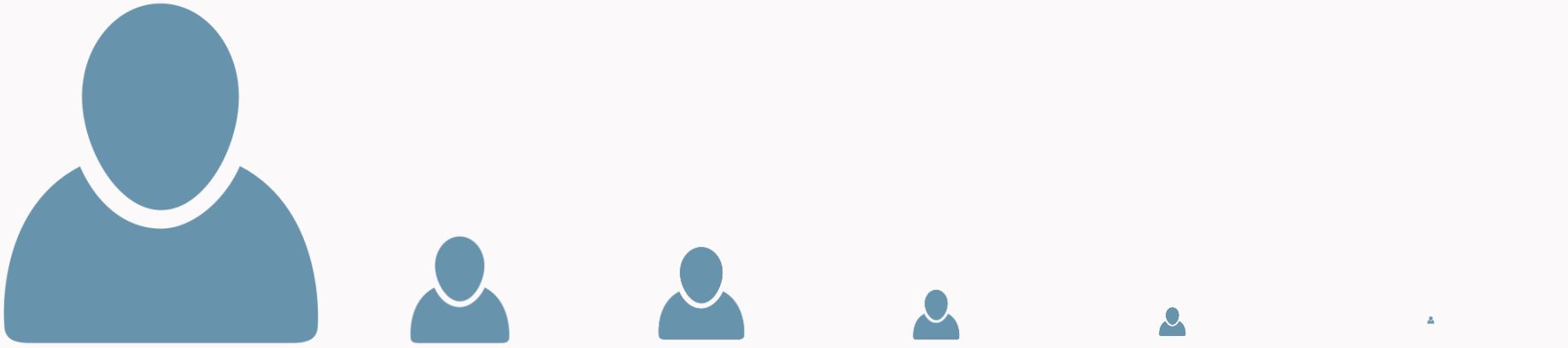
57%

of 147 decedents with benzodiazepines contributing to death

Fentanyl- & Heroin-related Deaths

Specialties of Opioid Prescribers:
30-day Period before Overdose

(n = 355)



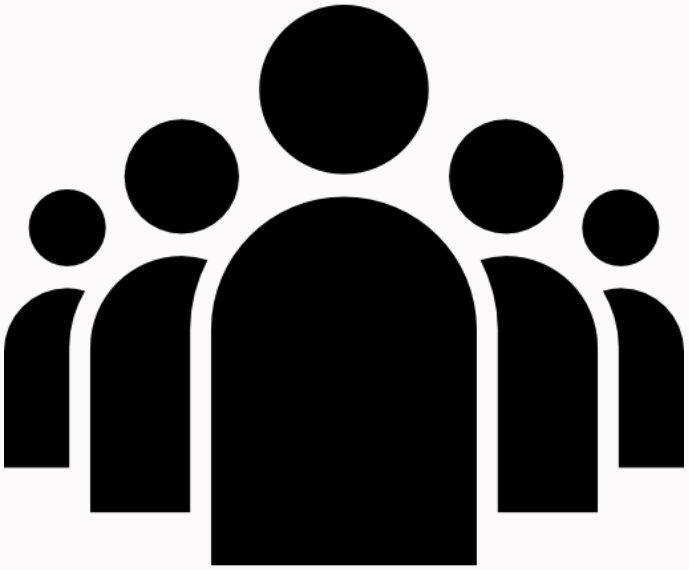
48%	15%	13%	7%	4%	<1%
Primary Care	ER	Psychiatry	Dentist	Surgery	Orthopedic

**** Percentages calculated using 355 fentanyl and heroin decedents with opioid prescriptions filled during 30 days before overdose.***

Recap of Selected Findings

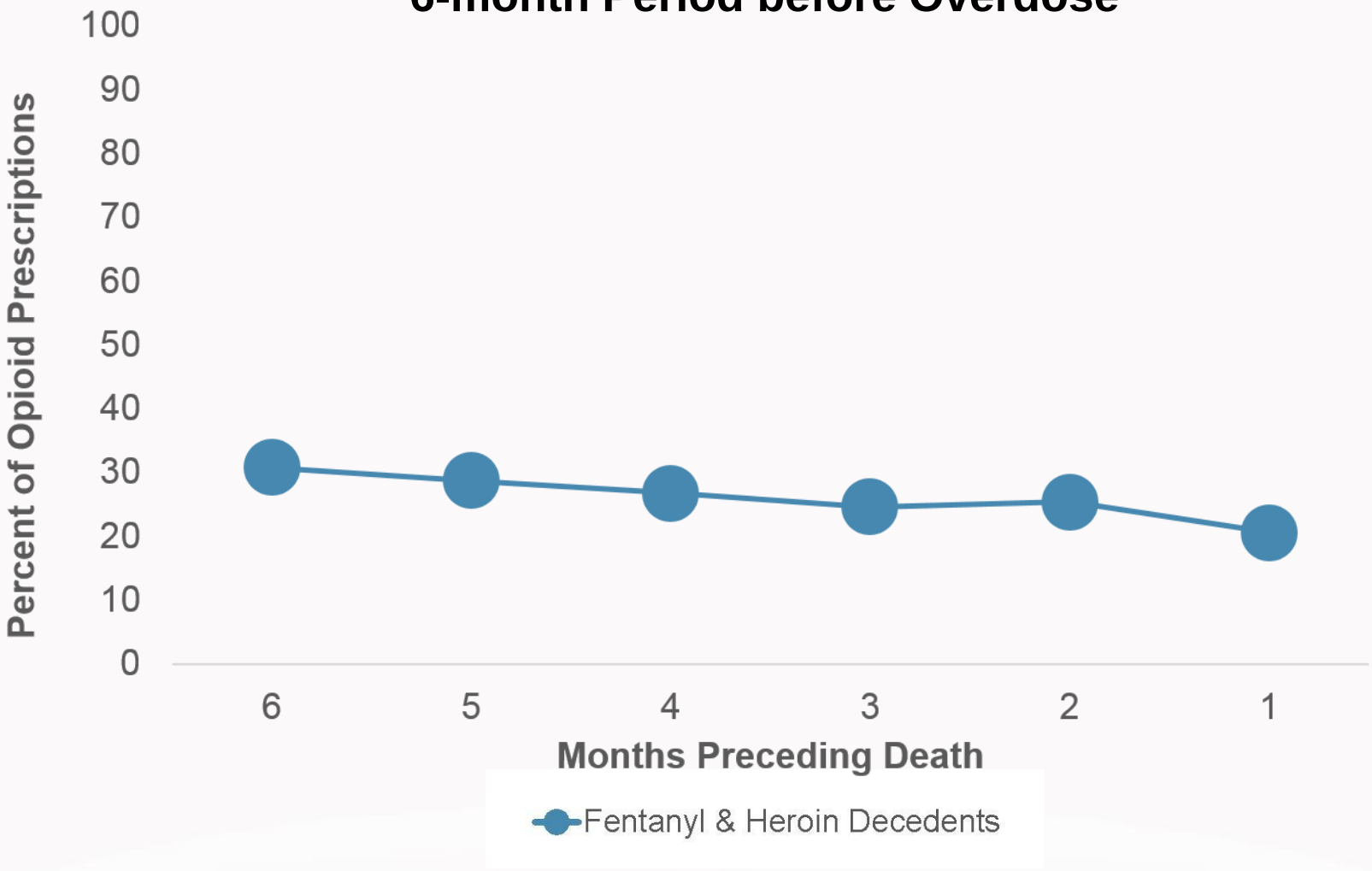
- Most decedents with multiple Rx during 6 months
  - ~1/3 of all Opioid Rx for 30-day supply
  - >20% of monthly opioid Rx were long-acting
- Monthly average daily dosage of opioids ~ 90 MMEs
- > 30% Opioid Rx days per month overlapped with Benzo Rx
- Rx was substantial during 30 days prior to overdose
  - 42% decedents with Opioid Rx
    - 48% with Opioid Rx prescribed by Primary Care

Comparison to Ohio Overall



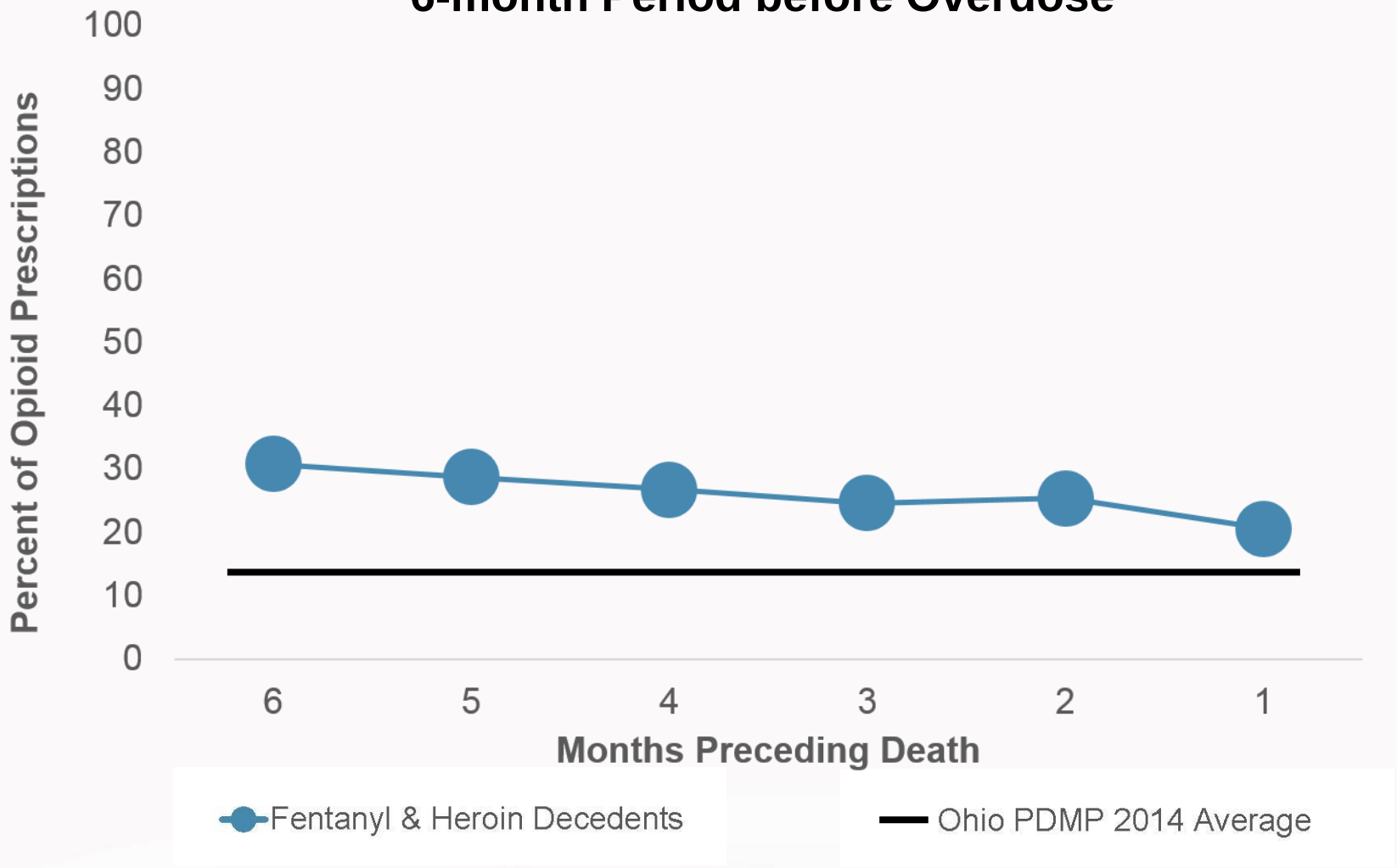
% Long-acting / Extended Release Opioid Rx:

6-month Period before Overdose



% Long-acting / Extended Release Opioid Rx:

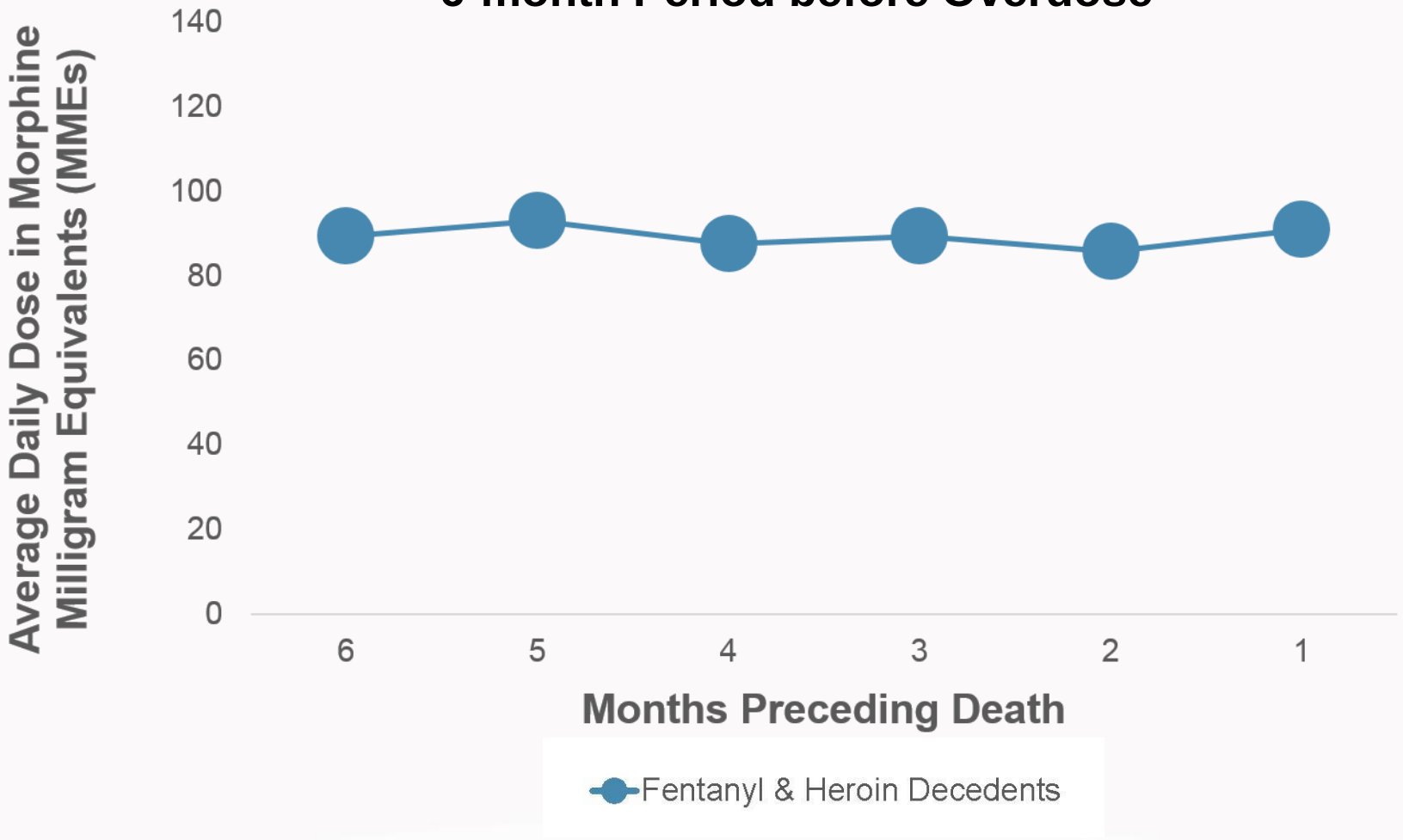
6-month Period before Overdose



Fentanyl- & Heroin-related Deaths

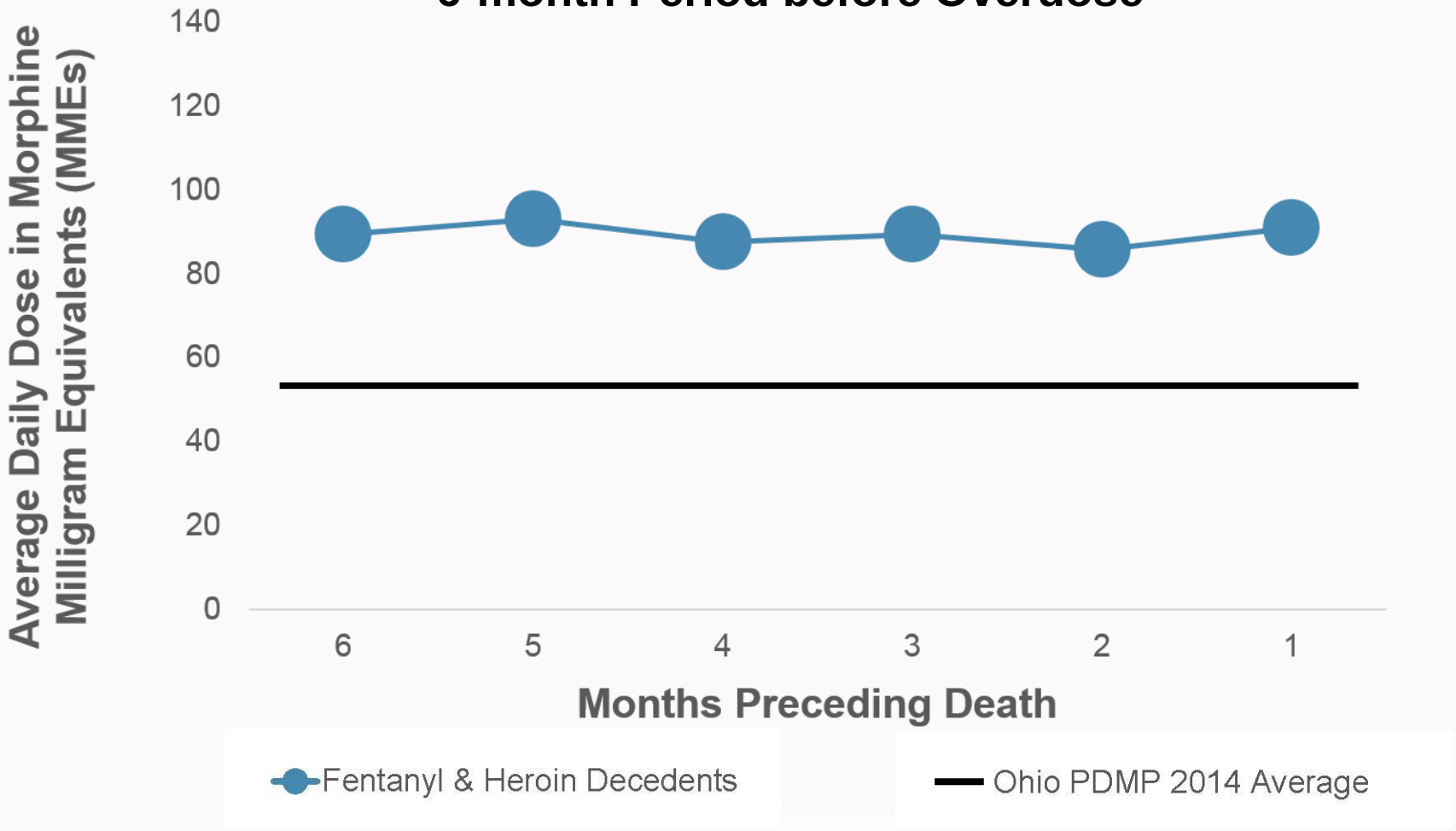
Opioids Rx Average Daily Dose:

6-month Period before Overdose



Opioids Rx Average Daily Dose:

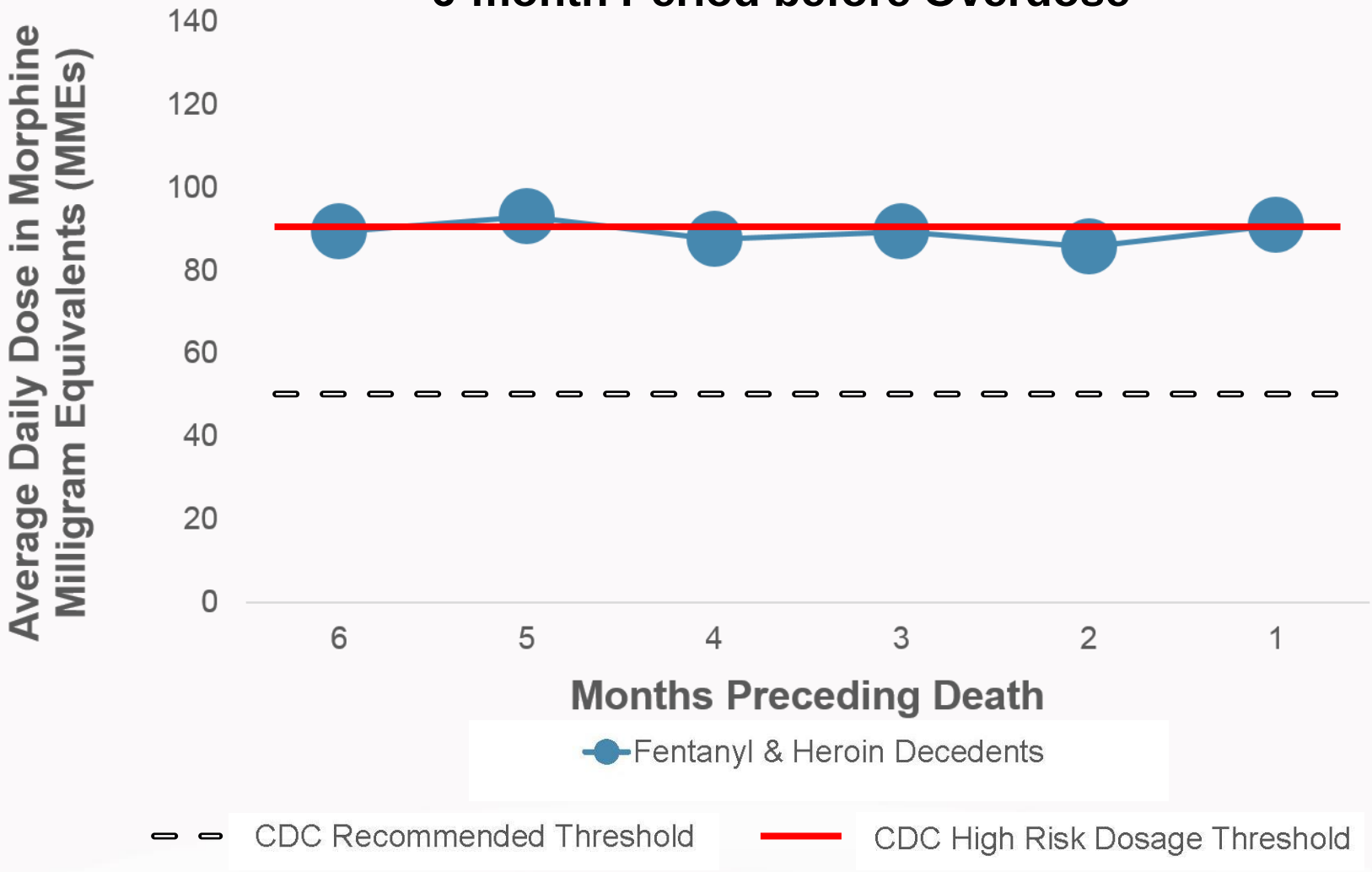
6-month Period before Overdose



Fentanyl- & Heroin-related Deaths

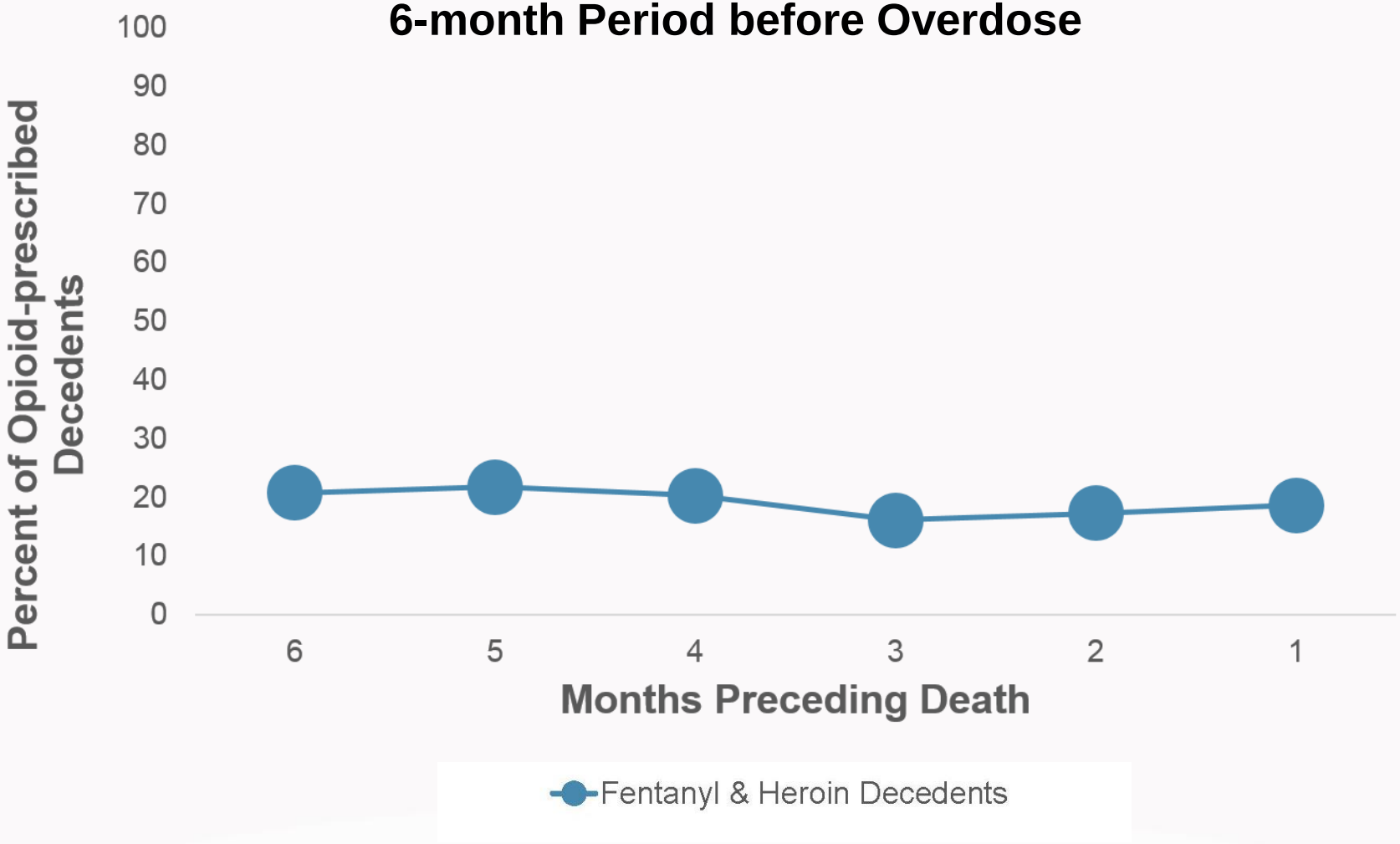
Opioids Rx Average Daily Dose:

6-month Period before Overdose



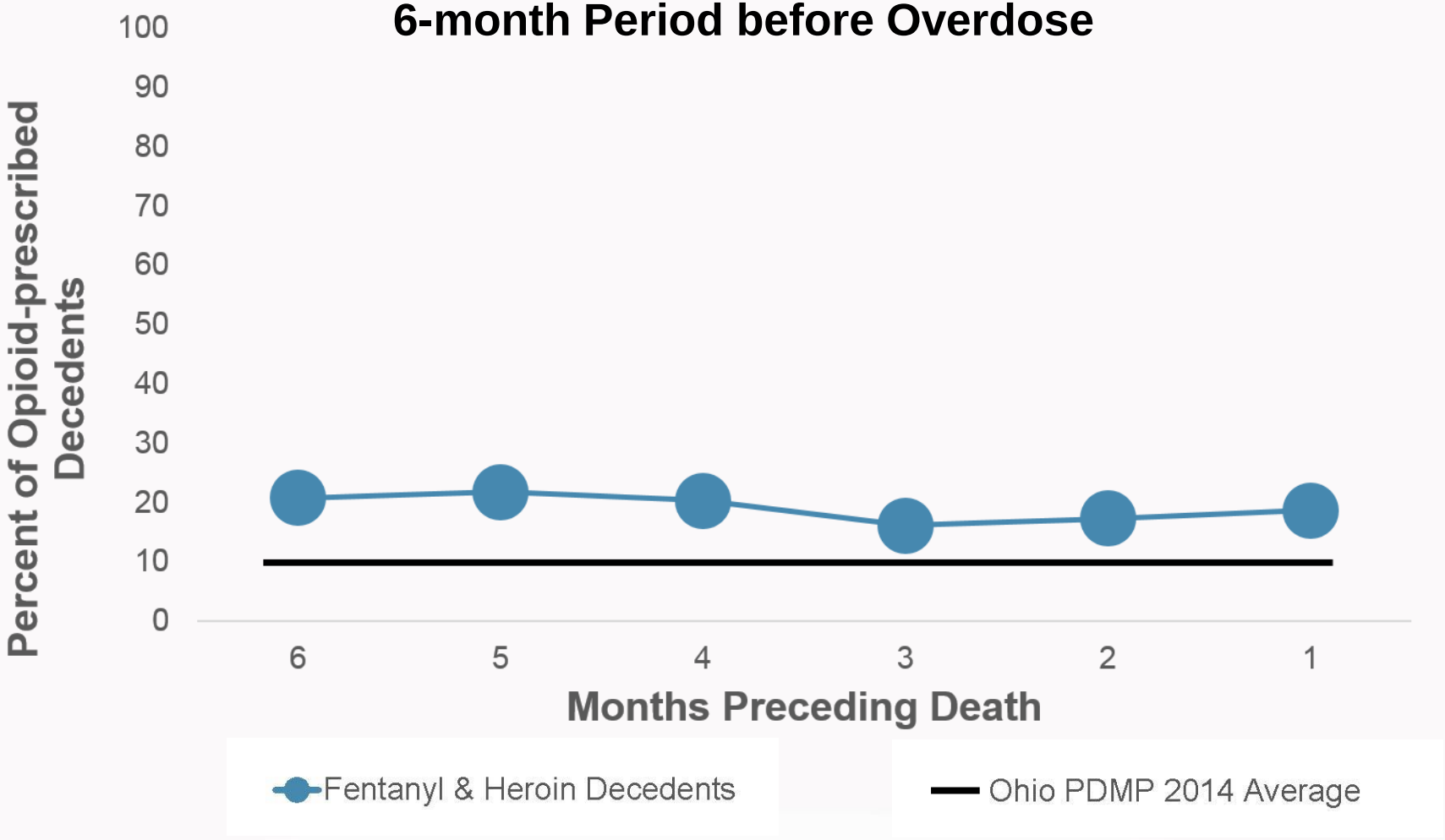
Percent with Average Daily Doses > 90 MMEs:

6-month Period before Overdose



Percent with Average Daily Doses > 90 MMEs:

6-month Period before Overdose

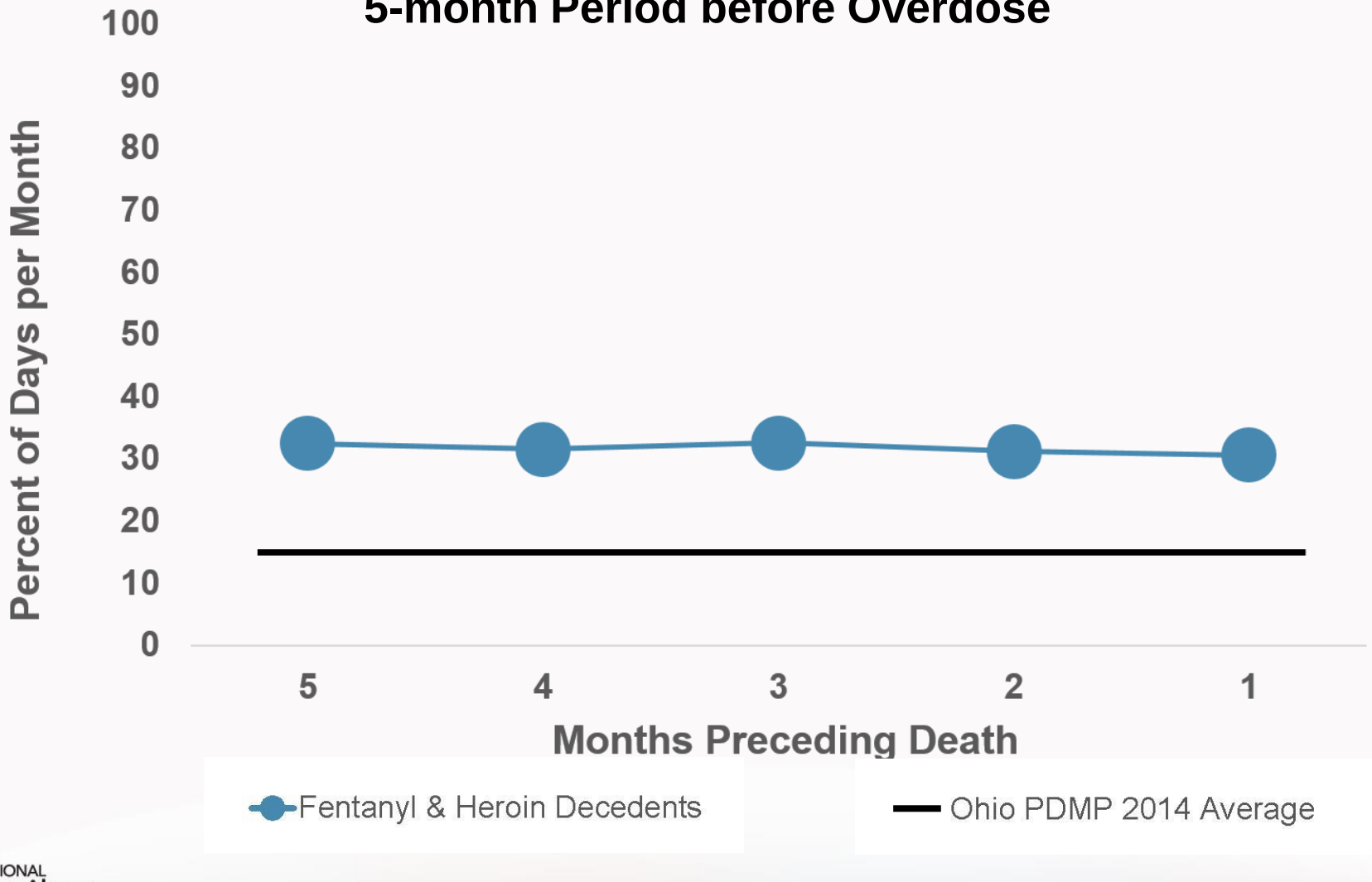


% Days with Opioid-Benzodiazepine Overlapping Rx:

5-month Period before Overdose

% Days with Opioid-Benzodiazepine Overlapping Rx:

5-month Period before Overdose



Multiple Providers during 6 Months before Overdose

	Fentanyl- & Heroin-related Decedents
Prescribers (5+)	14%
Pharmacies (5+)	7%
5+ Prescribers & 5+ Pharmacies	4%

Percentages based on decedents with at least 1 DEA schedule II-IV Rx in OARRS during 6 months preceding death: 827 Fentanyl- and Heroin-related deaths.

Fentanyl- & Heroin-related Deaths

Multiple Providers during 6 Months before Overdose

Ohio PDMP

	Fentanyl- & Heroin-related Decedents	Ohio PDMP July-Dec 2014
Prescribers (5+)	14%	2%
Pharmacies (5+)	7%	1%
5+ Prescribers & 5+ Pharmacies	4%	<1%

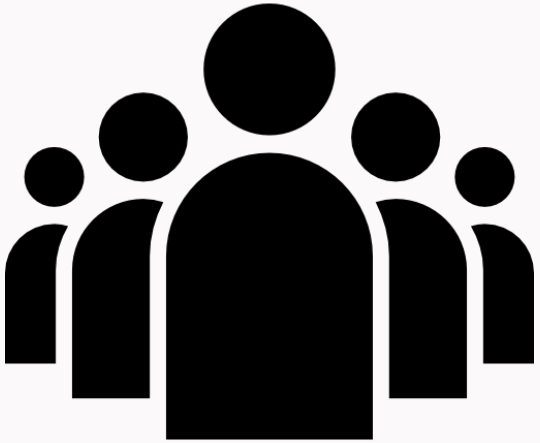
Percentages based on decedents with at least 1 DEA schedule II-IV Rx in OARRS during 6 months preceding death: 827 Fentanyl- and Heroin-related deaths.

Percentages for Ohio prescription recipients based on those with at least 1 DEA schedule II-IV Rx during the last 6 months of 2014: 2,632,737 individuals.

% with Opioid Rx:
30-day Period before Overdose

42%

Fentanyl & Heroin Decedents



55%

Ohio PDMP

Ohio PDMP data for the month in 2014 with the highest number of overall prescriptions and highest number of unique patients receiving prescriptions.

% with Benzodiazepine Rx:
30-day Period before Overdose

35%

Fentanyl & Heroin Decedents

28%

Ohio PDMP

Ohio PDMP data for the month in 2014 with the highest number of overall prescriptions and highest number of unique patients receiving prescriptions.

% with Opioid & Benzodiazepine Rx*:
30-day Period before Overdose

18%

Fentanyl & Heroin Decedents

10%

Ohio PDMP

**** Opioids and Benzodiazepines prescribed during the same 30-day time period, but not necessarily overlapping prescriptions during this time period.***

Ohio PDMP data for the month in 2014 with the highest number of overall prescriptions and highest number of unique patients receiving prescriptions.

Summary of Key Points

Fentanyl- & Heroin-related Deaths

- High degree of prescribing to decedents
  - not Fentanyl
- Distinctions compared to Ohio overall
  - Prescribing patterns
  - Indications of misuse
- Dosages prescribed higher than recommended
- Dominant role of primary care in opioid prescribing

Lessons Learned

Fentanyl- & Heroin-related Deaths

- Opportunities to intervene
- Greater adherence to prescribing guidelines
- Important role of PDMPs

Limitations

Fentanyl- & Heroin-related Deaths

- Restriction to 6 months of prescribing
- Analysis solely for 2014 overdose decedents
- No analysis of indications for opioid prescribing
- No analysis of illicit drug use

Ongoing Efforts

Fentanyl- & Heroin-related Deaths

- Additional investigation into prescribing patterns
- Provider education on prescribing best practices
- Ongoing effort to improve utility and use of PDMPs

Acknowledgements

Centers for Disease Control and Prevention (CDC)

Grant Baldwin, PhD, MPH

Tamara Haegerich, PhD

Rita Noonan, PhD

Rose Rudd, MSPH

Puja Seth, PhD

Organizations Supporting the CDC Epi-Aid Investigation

Ohio Department of Health

Ohio Department of Mental Health and Addiction Services

Ohio Association of County Behavioral Health Authorities

Ohio Department of Public Safety

Ohio Attorney General's Office

Ohio Coroners Association

Ohio State Medical Association

Ohio Board of Pharmacy

Medical Board of Ohio

Ohio Board of Nursing

Ohio Department of Aging

Cuyahoga County/ Cleveland

Hamilton County/ Cincinnati

Montgomery County/ Dayton

Scioto County/Portsmouth

US Department of Justice

Drug Enforcement Administration

PDMPs at work: Fentanyl overdose deaths and the “Holy Trinity”

Chris Delcher, PhD
Department of Health Outcomes and Policy
University of Florida

Tina Farales
Department of Justice Administrator
Prescription Drug Monitoring Program
California Department of Justice

Overview

- Using prescription drug monitoring program (PDMP) data from Florida and California
  - "Holy Trinity" analysis (FL)
  - A view of fatal overdoses involving "Holy Trinity"
  - Prescription Behavioral Surveillance System
    - Fentanyl and carisoprodol prescribing (FL, CA)
    - High-risk prescribing of opioid-benzodiazepine combinations (8 states)
- Future directions
- Acknowledgements

“Holy Trinity” prescribing Florida, 2013-2015

What is the "Holy Trinity"[1]?

- Combination of an opioid, benzodiazepine, and carisoprodol (Soma®): "O/B/C"
- Carisoprodol – Scheduled C-IV on Jan. 11, 2012
- May enhance the euphoria, but increases central nervous system depression (e.g., drowsiness, respiratory depression, psychomotor impairment)
- Some law enforcement officers consider O/B/C *prima facie* evidence of illegitimate prescribing
- Some states (e.g. AZ, KY) monitor O/B/C prescribing with PDMPs
- Distinct characteristics associated with O/B/C compared to O/B-only prescribing?

Methods

- O/B/C Rx's, FL residents only, 2013-2015, inclusive
- Inclusion criteria
  - Must have:
    - ≥ 1 episode with ≥ 7-day overlapping "window" of any Rx opioid and benzodiazepine
  - Then groups are defined as:
    - O/B/C carisoprodol Rx in the window
    - O/B only no carisoprodol at all (yet high-risk)
- Examined individual, episode, prescriber, and clinical characteristics using FL PDMP data (CA planned)

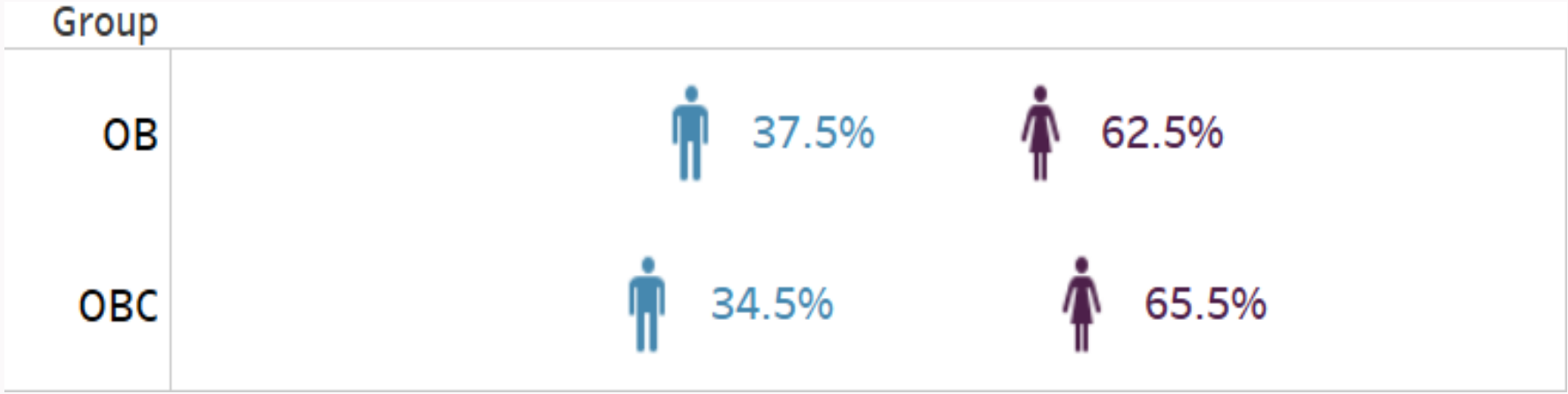
Person- and episode-level counts

Measure	O/B/C	O/B-only
Individual-prescriber-pharmacy*		
Individuals with Rx	65,325	1,049,897
Prescribers	19,643	69,884
Prescribers - opioids	13,677	56,333
Prescribers - benzodiazepines	13,994	54,067
Prescribers - carisoprodol	12,082	N/A
Pharmacies	4,916	5,800
Episodes		
Rx episodes	1,613,429	11,287,381
Rx episodes with O/B-only from same prescriber	982,564 (61%)	6,355,367 (56%)
Rx episodes with O/B/C same prescriber	916,272 (57%)	N/A

***Distinct counts**

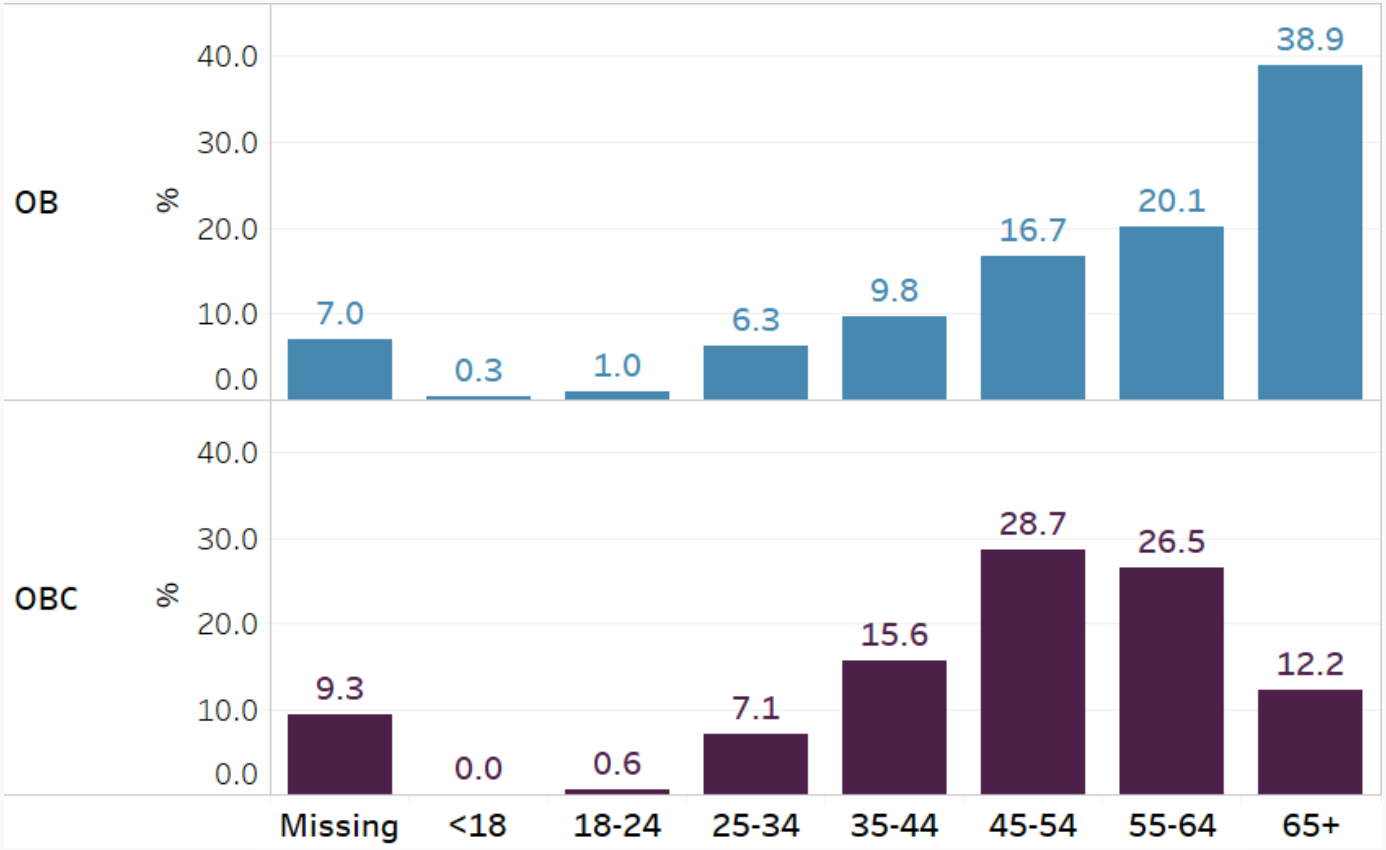
Sex

Women disproportionately represented in O/B and O/B/C groups



Age groups

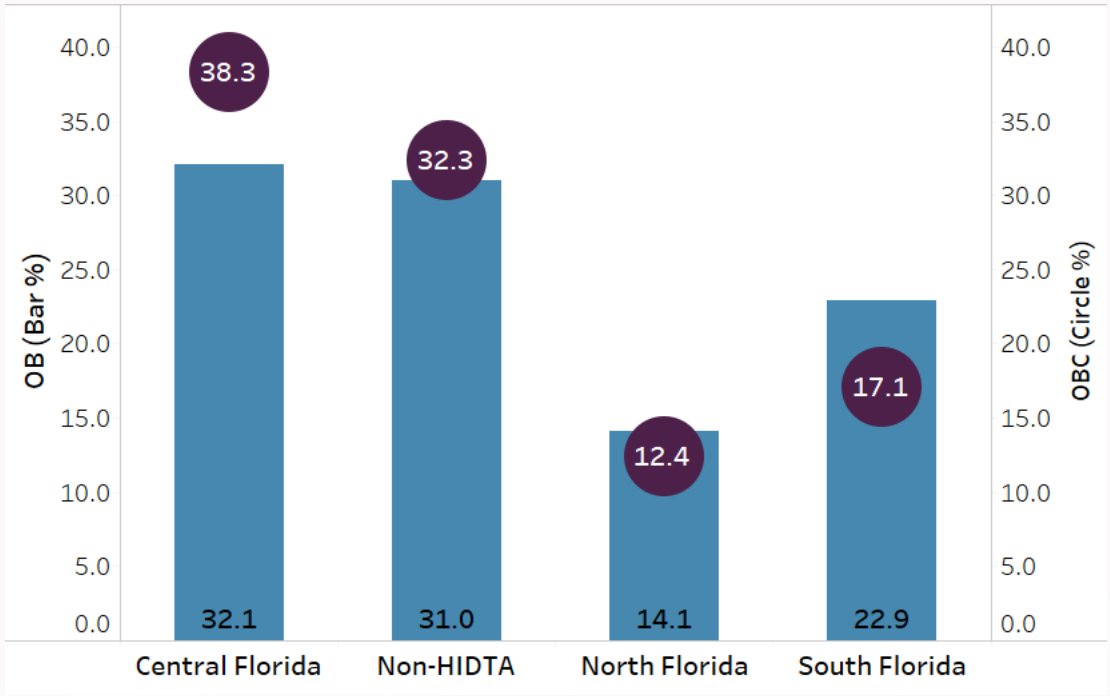
Younger ages disproportionately represented in O/B/C

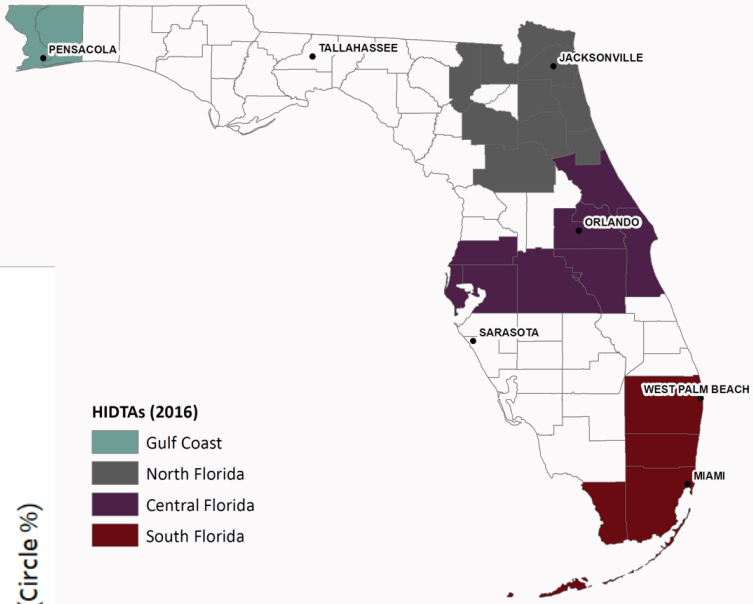


***Reporting for age under 16 is not required in Florida**

High Intensity Drug Trafficking Areas (HIDTA)

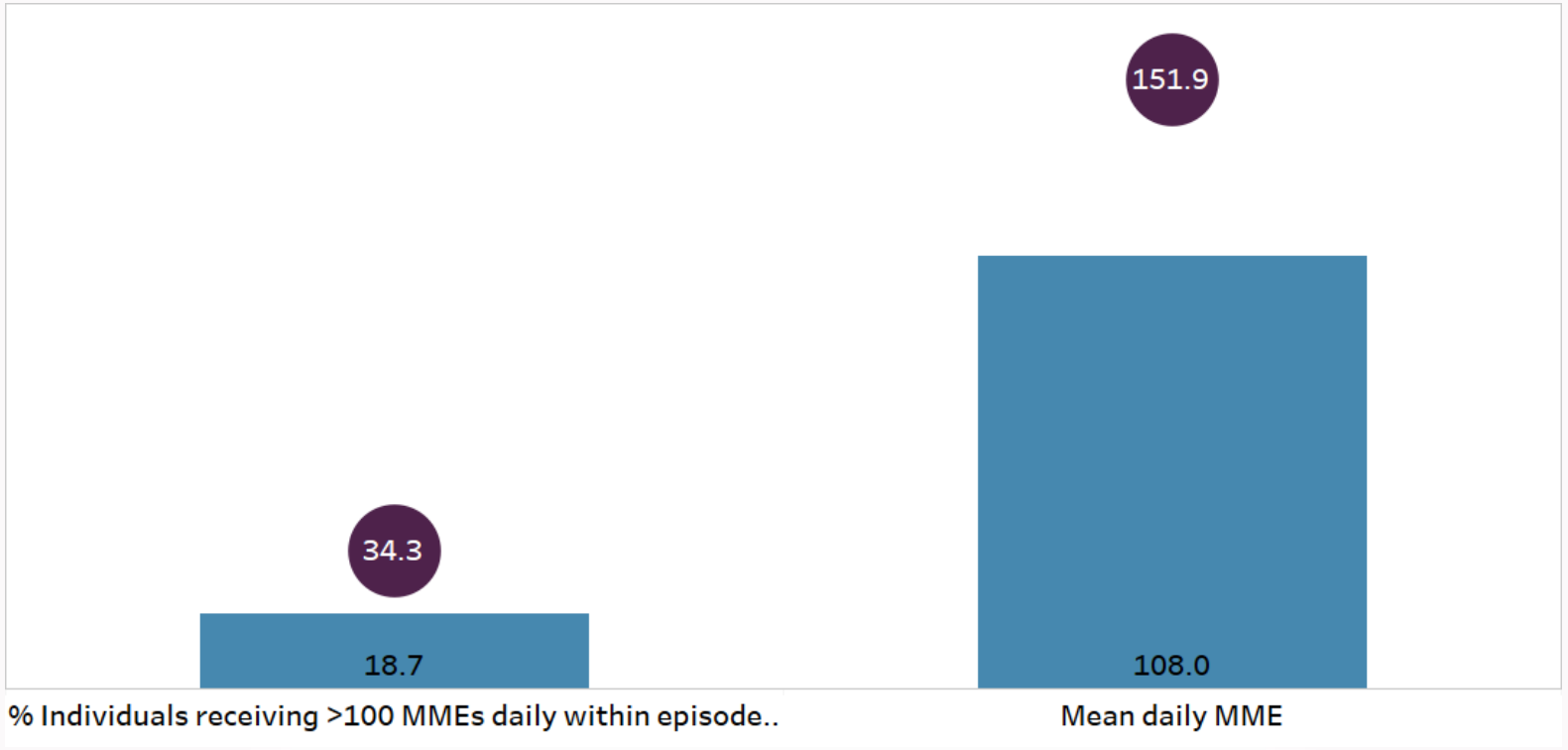
O/B/C residents concentrated in Central FL HIDTA





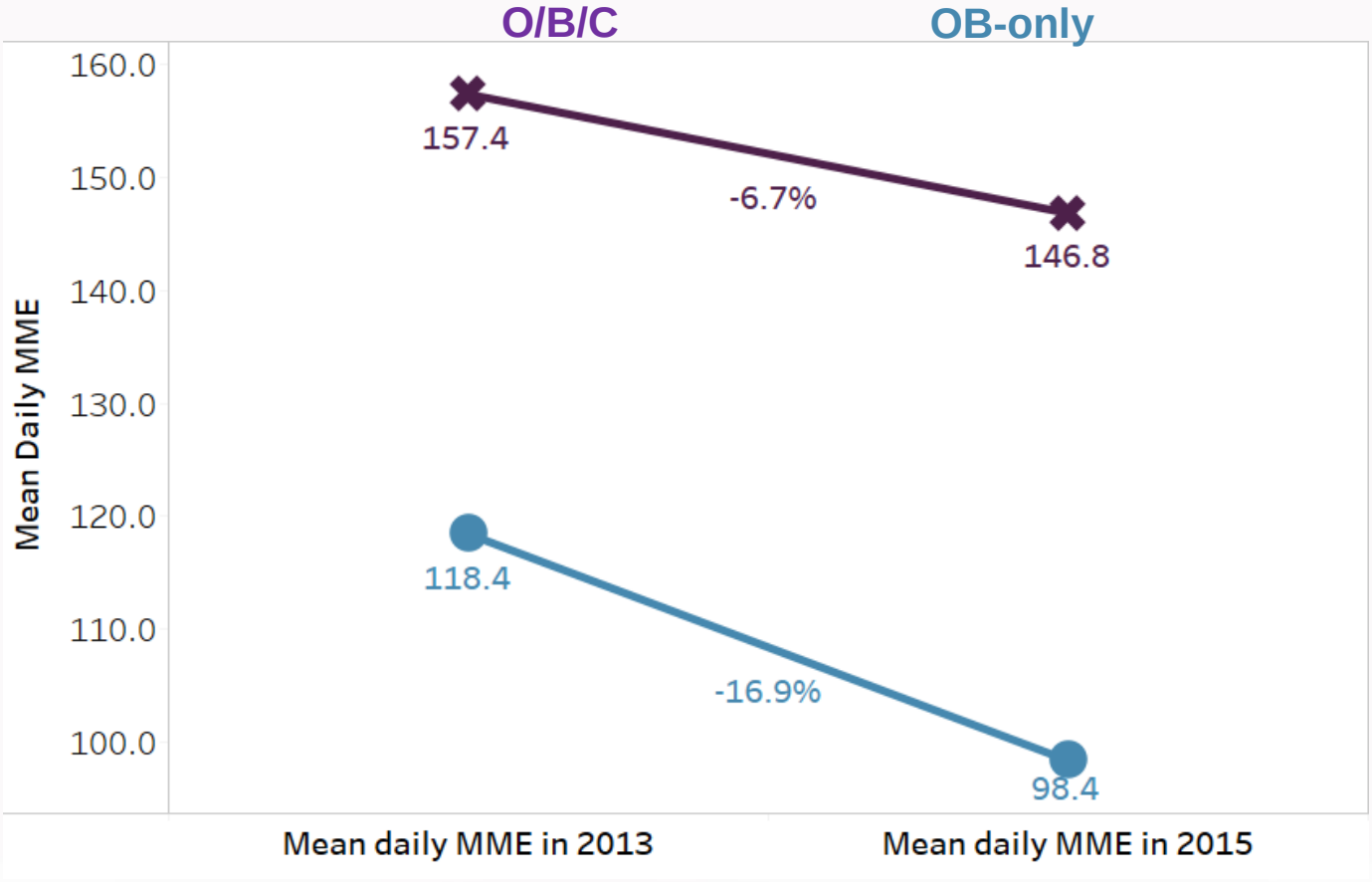
Morphine milligram equivalent (MME)

- Prevalence of high-risk MMEs ~2x higher for O/B/C (●)
- Mean daily MME of O/B/C much higher than CDC Rx guideline



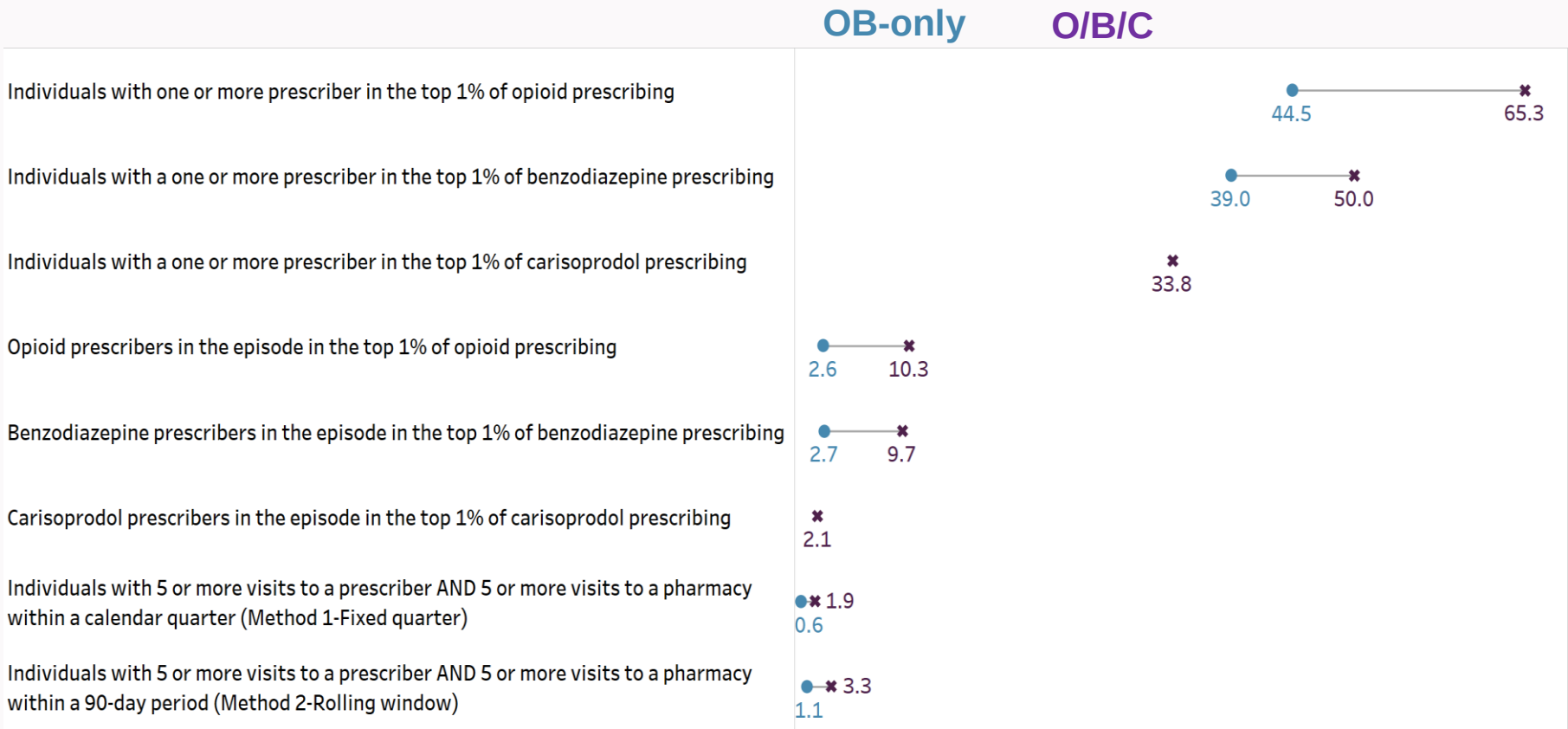
Morphine milligram equivalent (MME)

MMEs decreased for O/B and O/B/C; Exposure maintained longer for O/B/C



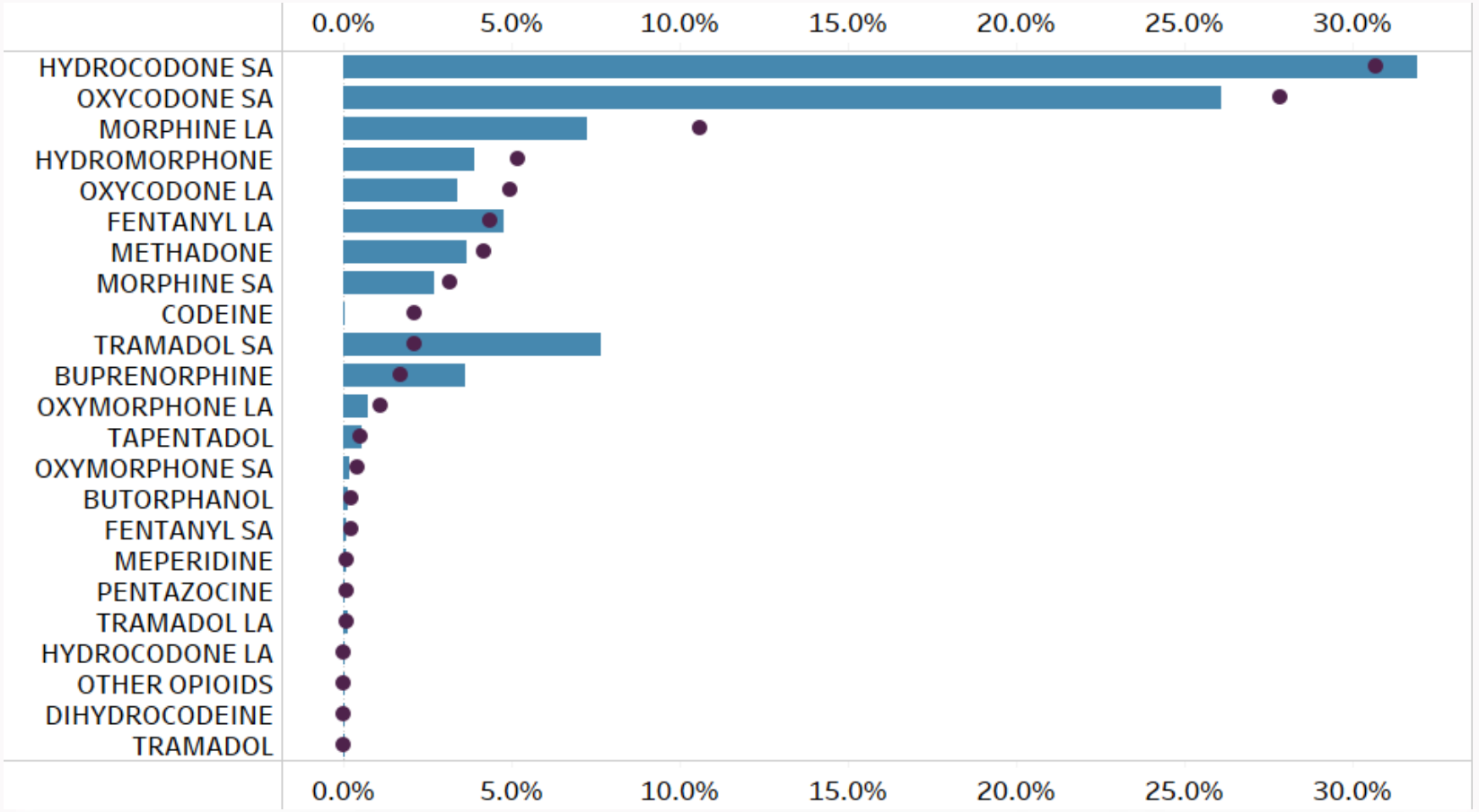
Prescribing behaviors

- O/B/C associated with more top 1% prescribers
- ~10% O/B prescribers involved in O/B/C episodes in top 1% of prescribers
- 1.9-3.3% O/B/C individuals would classify as *potential* "doctor shoppers" (DS)



Opioids involved in prescribing episodes

- Oxycodone, morphine, codeine more frequent in O/B/C episodes
- Tramadol, buprenorphine more frequent in O/B-only episodes

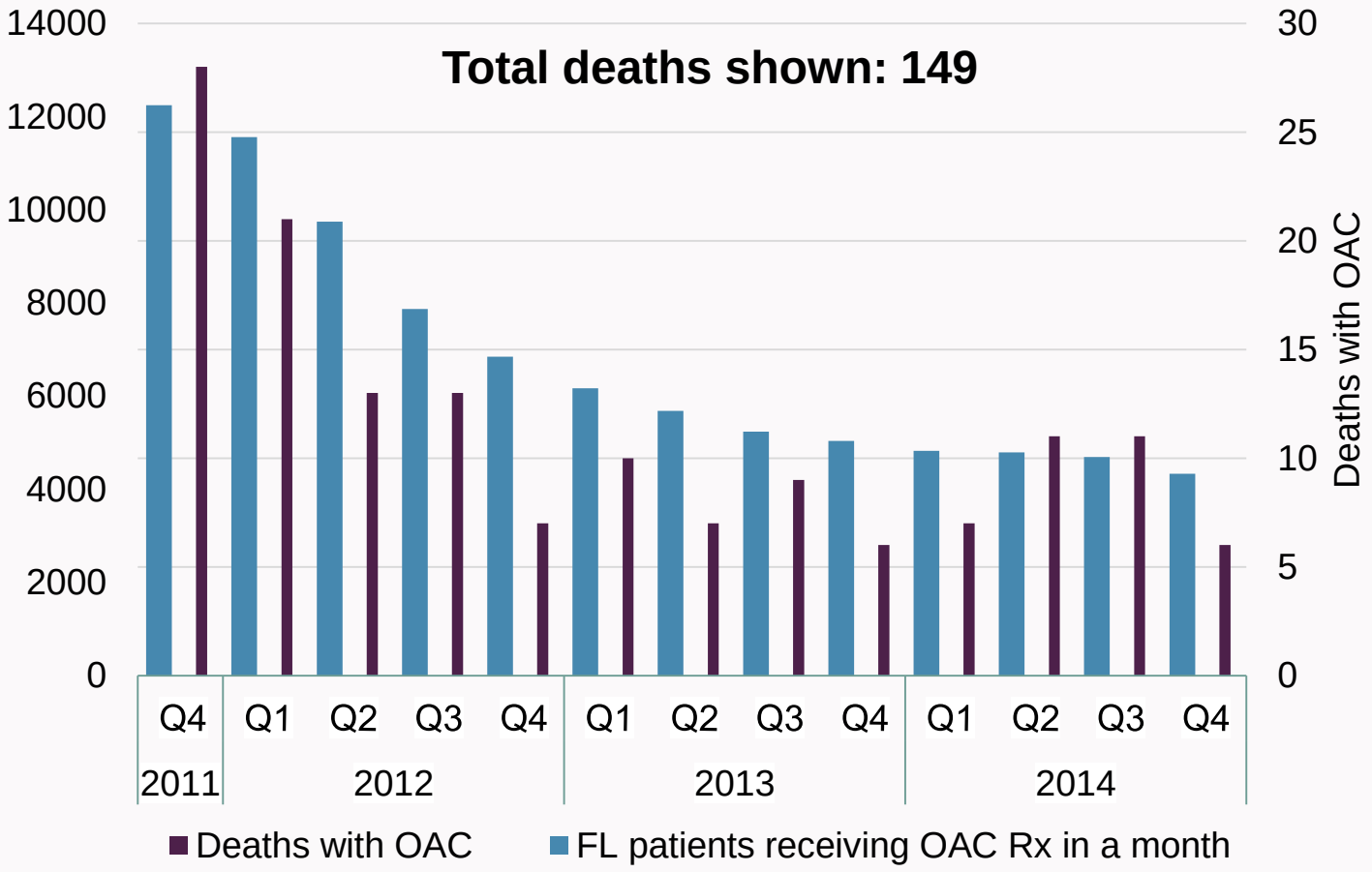


Conclusions

- Large no. of individuals receiving O/B/C Rx in FL
- Higher degree of opioid-benzo Rxs written from same prescriber for O/B/C
- O/B/C and O/B-only groups differ in multiple ways (even though both are high-risk prescribing)
  - O/B/C assoc. w/ higher no. of top 1% prescribers
  - Women, younger age, geography, MMEs (higher exposure for O/B/C w/ slower decline), DS rates, and opioid types

O/B/C Fatal Overdoses in Florida, 2011-2014

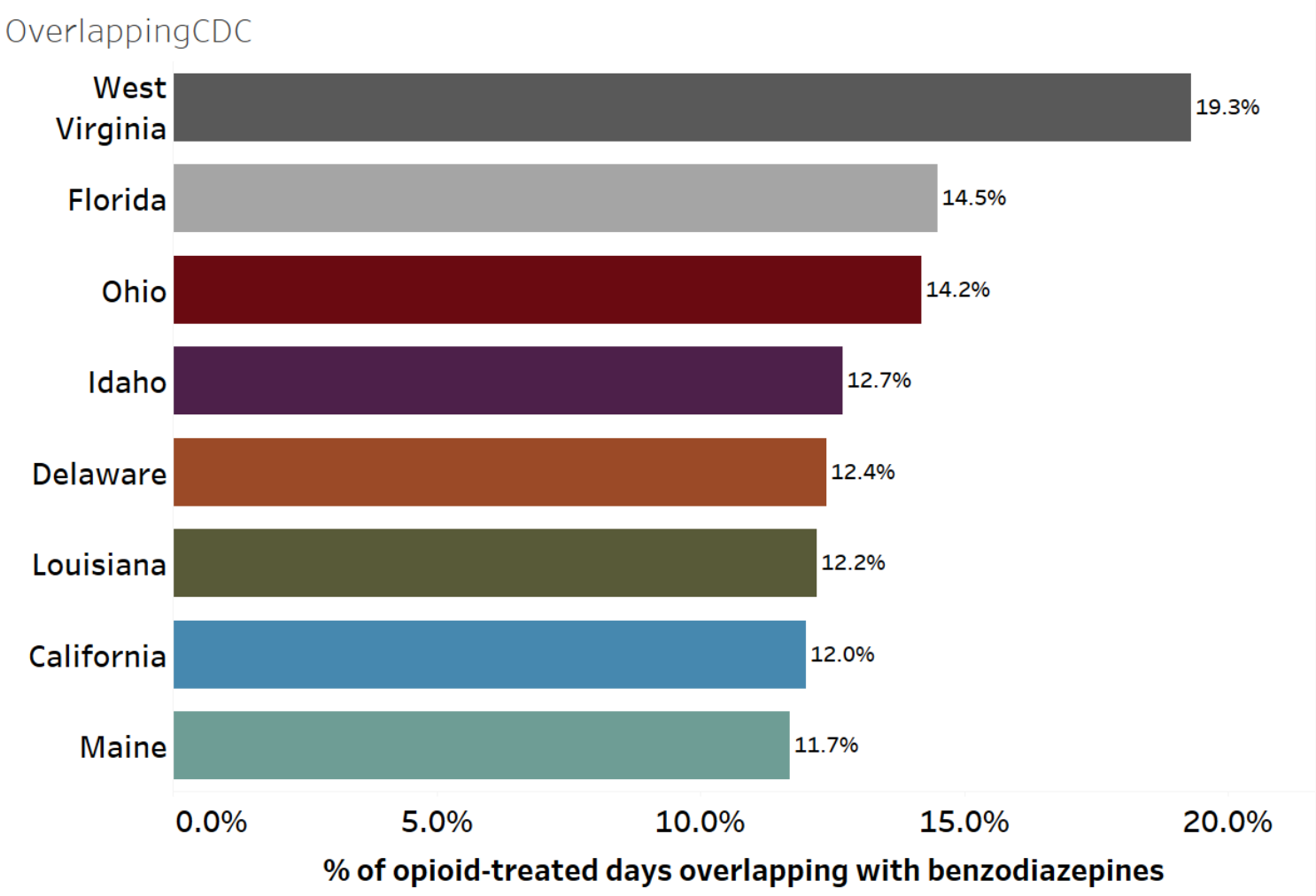
O/A/C* fatal overdoses/prescribing



***O=oxycodone, A=alprazolam, C=carisoprodol/meprobomate. PDMP started in October 2011**
Source: Florida Medical Examiners Commission

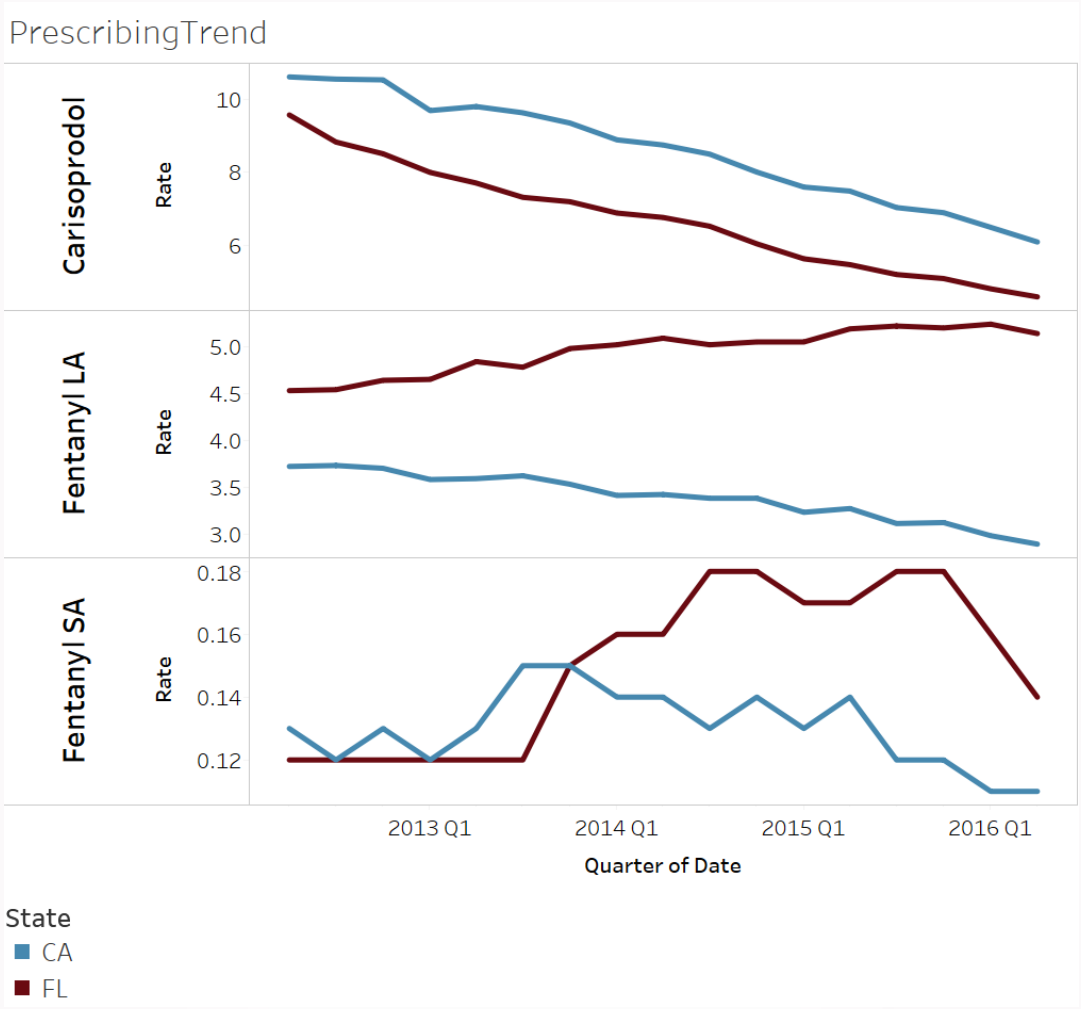
Prescription Behavior Surveillance System (PBSS) data

Overlapping O/B by state



Source: Paulozzi LJ, Strickler GK, Kreiner PW, Koris CM. Controlled Substance Prescribing Patterns — Prescription Behavior Surveillance System, Eight States, 2013. *MMWR Surveillance Summaries*. 2015

Prescribing rates (FL, CA)



Source: Prescription Behavior Surveillance System (PBSS) state summary files.
Note differences in y-axis scales

Future directions

- Examine additional measures using methods from:
  - Geographic Information Systems
    - e.g. O/B/C zip code clustering
  - Social Network Analysis
    - e.g. shared prescribing networks
- “Holy Trinity” analysis using CA PDMP data
- Did CDC Opioid Prescribing Guidelines reduce O/B/C?

Thank you!

BJA
Bureau of Justice Assistance
U.S. Department of Justice

Florida HEALTH

E-FORCSE®
Electronic-Florida Online Reporting of Controlled Substances Evaluation

CURES 2.0

PDMP TTAC
Prescription Drug Monitoring Program Training and Technical Assistance Center

Brandeis University The Heller School
FOR SOCIAL POLICY AND MANAGEMENT

FLORIDA DEPARTMENT OF LAW ENFORCEMENT
FDLE

NATIONAL Rx Drug Abuse & Heroin SUMMIT

THANK YOU

#RxSummit

www.NationalRxDrugAbuseSummit.org