Touchpoints Prior to Opioid Overdose Death

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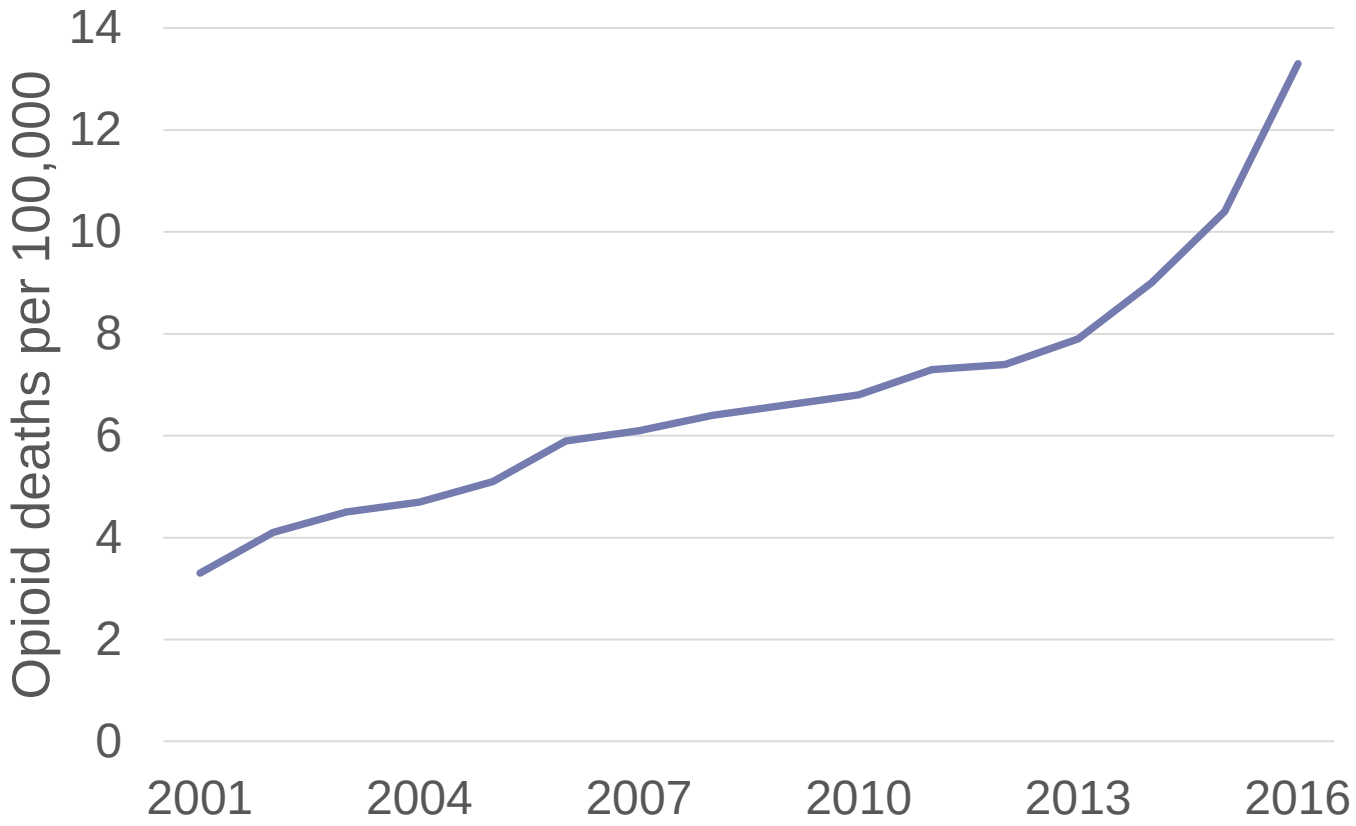
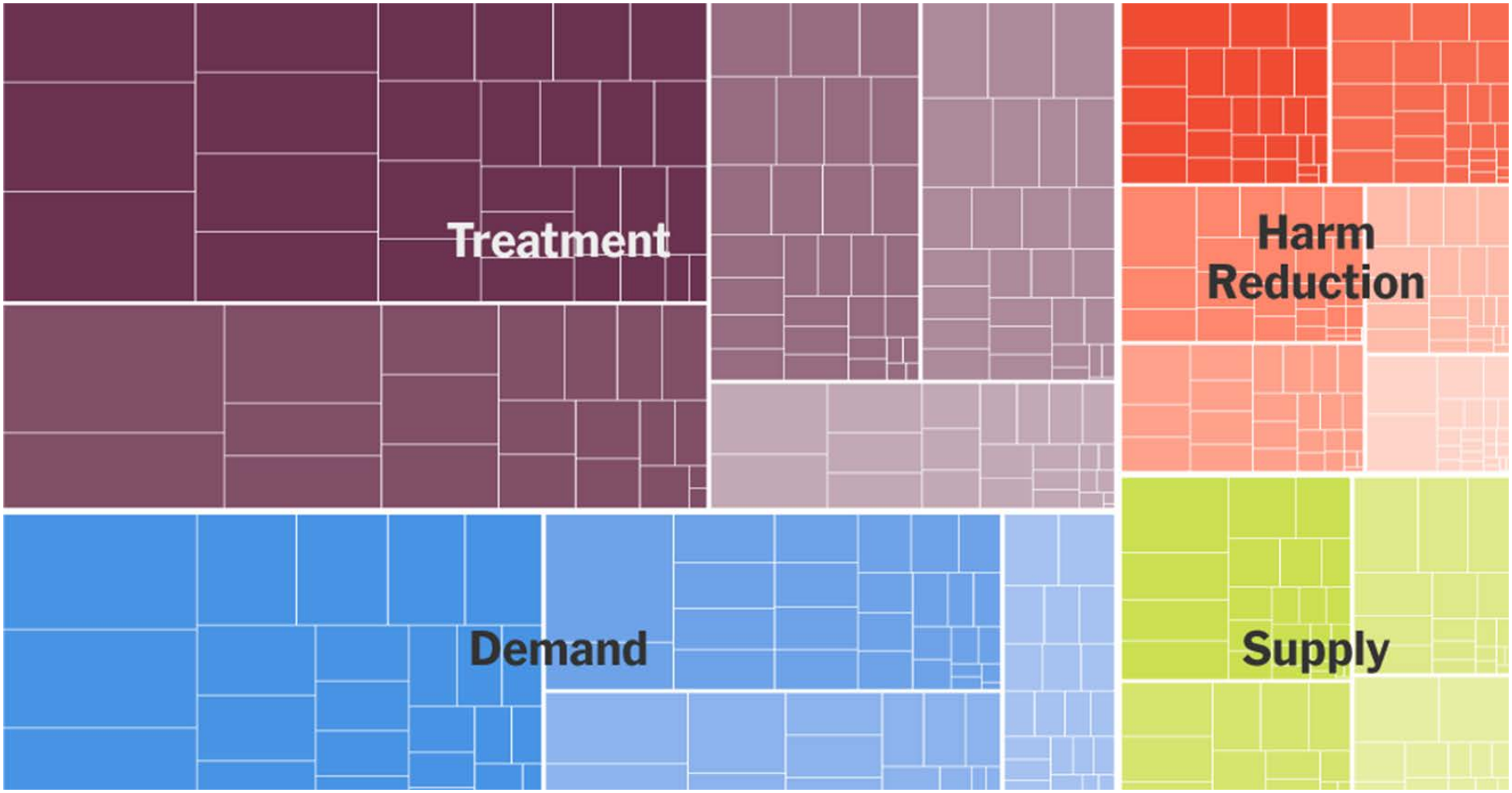
US Opioid Overdose Death Rates 2001-2016



Source: CDC WONDER

How a Police Chief, a Governor and a Sociologist Would Spend $100 Billion to Solve the Opioid Crisis

***New York Times* February 14, 2018**



touch·point – /ˈtəCHˌpoint/ – *noun*

***OUR DEFINITION*:**

A health care, public health, or criminal justice system encounter to:

- identify individuals at high-risk for opioid overdose death
- deliver harm-reduction services, and/or
- engage in treatment.

Ideal Touchpoint Characteristics

1. Readily identifiable

2. High-risk of subsequent opioid-related death

3. Identify substantial proportion of individuals prior to opioid-related death

4. Effective interventions exist to reduce mortality

Objectives

Use Massachusetts public health data to:

1. Examine eight candidate touchpoints to identify:
    a. Subsequent rate of opioid-related mortality
    b. Occurrence prior to opioid-related deaths

2. Following nonfatal opioid overdose:
    a. Describe use of medications for opioid use disorder (MOUD)
    b. Identify association between MOUD and mortality

Massachusetts Chapter 55 of the Acts of 2015

Directed Department of Public Health to use available data to improve understanding of and response to opioid crisis.

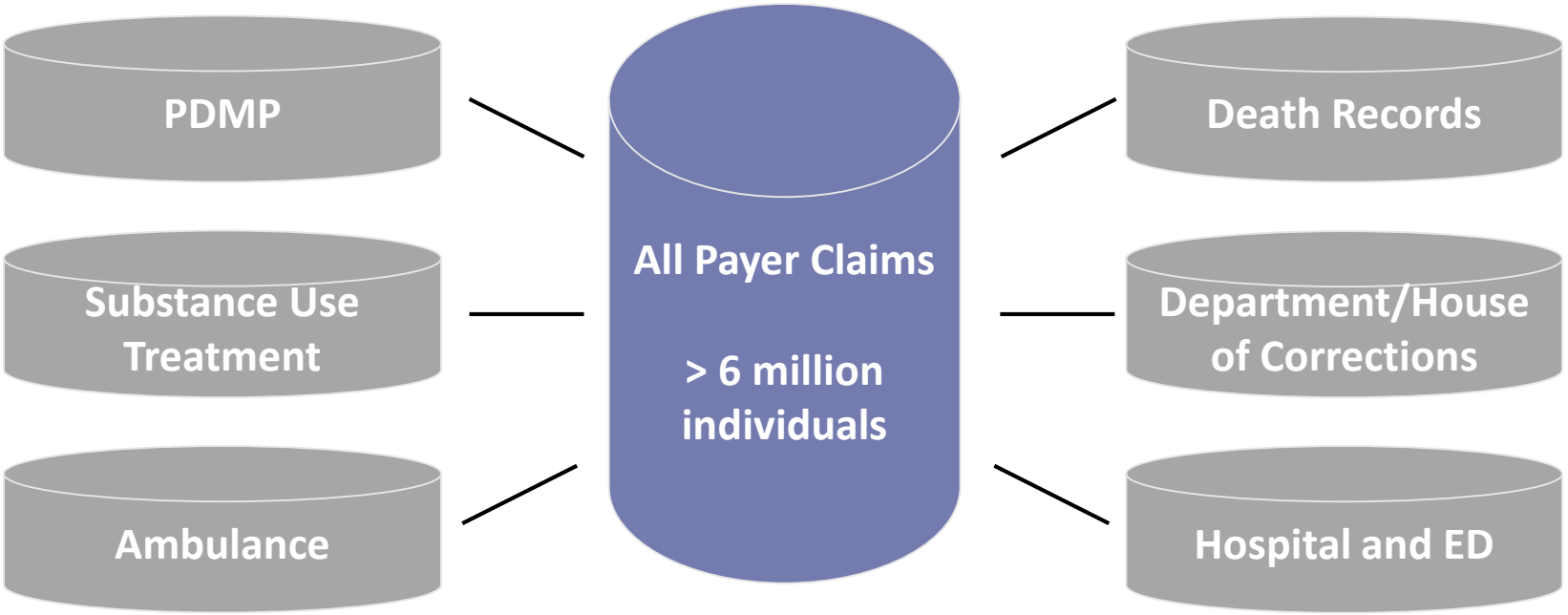
center
for health
information
and analysis

Public Health Dataset – System Attributes

Multilayered approach to protect privacy:

- Encrypted data
- Limited data sets
- All analysis onsite at DPH
- No viewing of individual records
- Automatic cell suppression

Public Health Dataset



Candidate Touchpoints – Prescribing

High-risk opioid prescribing using Prescription Monitoring Program data:

- ≥3 months with ≥ 100 mg morphine-equivalent daily dosage
- ≥3 months with overlapping opioid and benzodiazepine prescription
- ≥3 opioid prescribers in a quarter
- ≥3 opioid pharmacies in a quarter

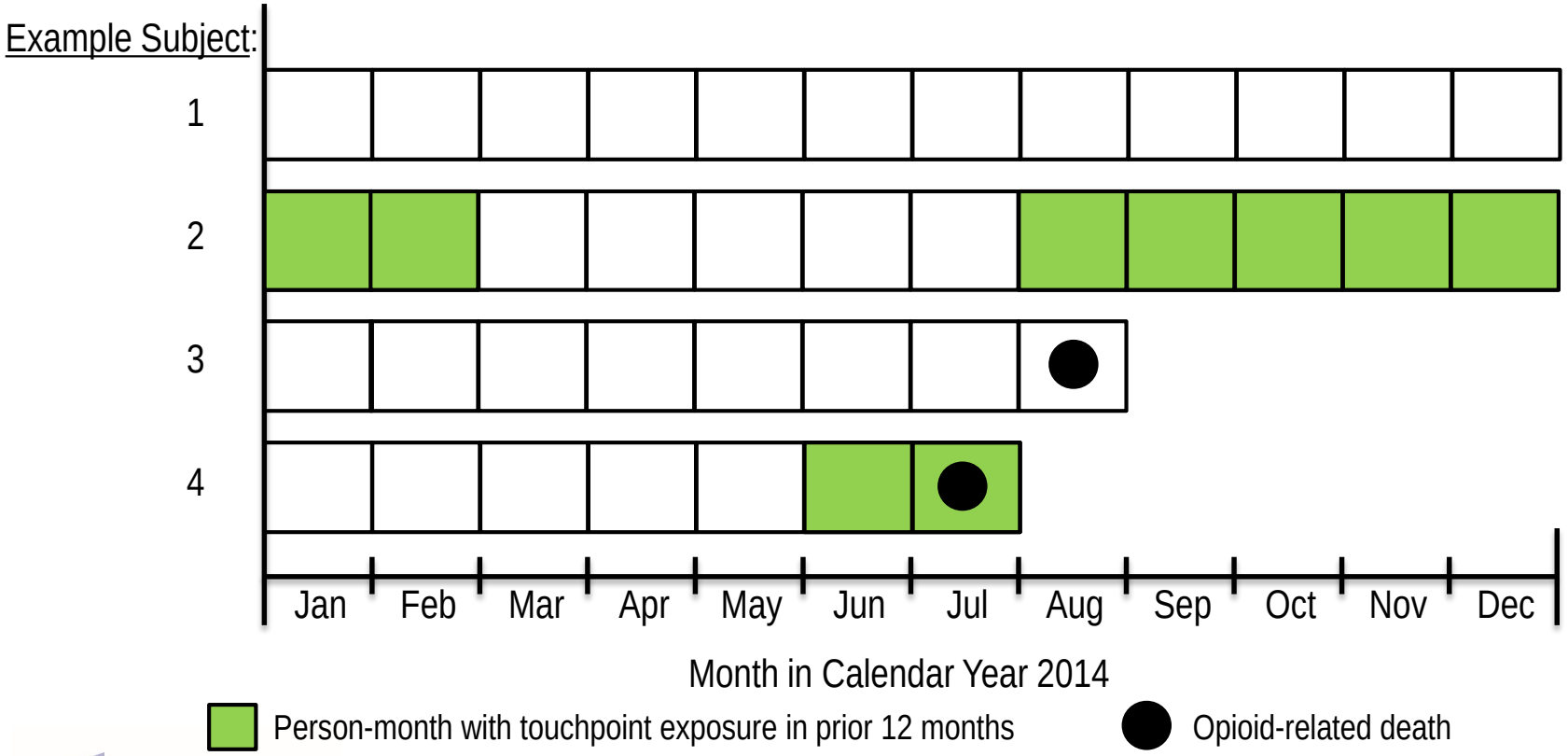
Candidate Touchpoints – Non-Prescribing

Non-prescribing touchpoints:

- opioid detoxification treatment
- nonfatal opioid overdose identified by ambulance or hospital encounter
- hospital encounter for potentially IVDU-related infection
- release from incarceration

Study Design – Retrospective Cohort

- Included Massachusetts residents ≥ 11 years or older
- Unit of analysis – person month (total of 6,717,387 person years)



Analyses

Standardized Mortality Ratio (SMR)*

$$SMR = \frac{\text{Observed Deaths after Touchpoint}}{\text{Expected Deaths}}$$

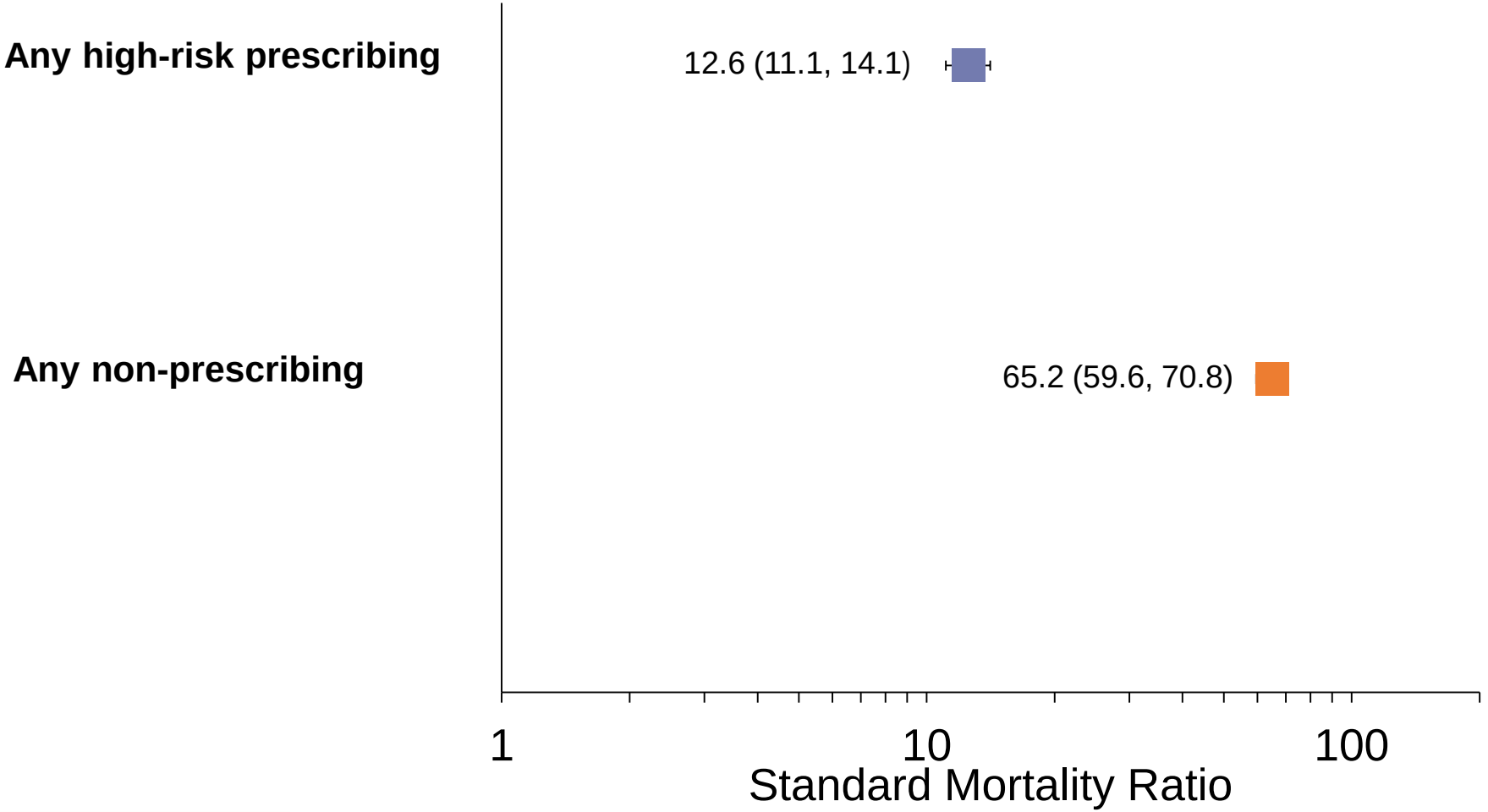
Population Attributable Fraction (PAF)*

$$PAF = \frac{\text{Incidence Rate}_{overall} - \text{Incidence Rate}_{unexposed}}{\text{Incidence Rate}_{overall}}$$

* Standardized by age group and sex

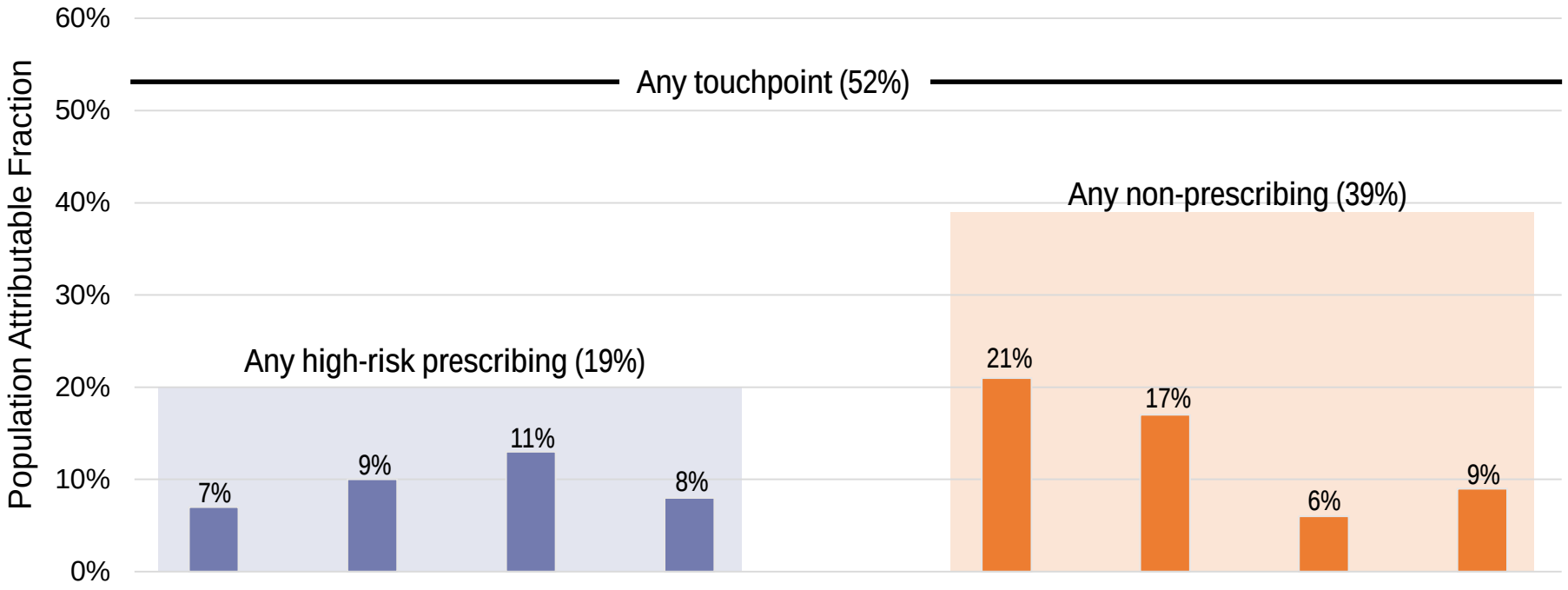
Opioid Overdose Standardized Mortality Ratios following high-risk touchpoint

(Massachusetts, 2014, n=1,315 opioid-related deaths)



Population attributable fraction (PAF) for touchpoints prior to opioid overdose death

(Massachusetts, 2014, n=1,315 opioid-related deaths)



Conclusions and Implications

- More than half of opioid overdose decedents experienced a high-risk touchpoint identifiable in public health data in year prior to death

- These touchpoints may present an opportunity to develop and deliver interventions to reduce opioid-related mortality

Objectives

Use Massachusetts public health data to:

1. Examine eight candidate touchpoints to identify:
    a. Subsequent rate of opioid-related mortality
    b. Occurrence prior to opioid-related deaths

2. **Describe use of medications for opioid use disorder and association with mortality after nonfatal overdose.**

Medications for opioid use disorder (OUD)

Three FDA approved medications for OUD:

- methadone
- buprenorphine +/- naloxone
- naltrexone

RCTs have consistently demonstrated benefit:

- cravings
- treatment retention
- illicit opioid use

Observational evidence for mortality benefit for methadone and buprenorphine.*

*Sordo et al. BMJ 2017

Exposure: Medication for opioid use disorder

Naltrexone:

- Pharmacy claim from all payer claims database

Buprenorphine +/- naloxone:

- Prescription drug monitoring program

Methadone

- Claim for methadone administration from all payer claims database
- Bureau of Substance Addiction Services treatment data

Outcome & Analysis

Time to opioid-related mortality

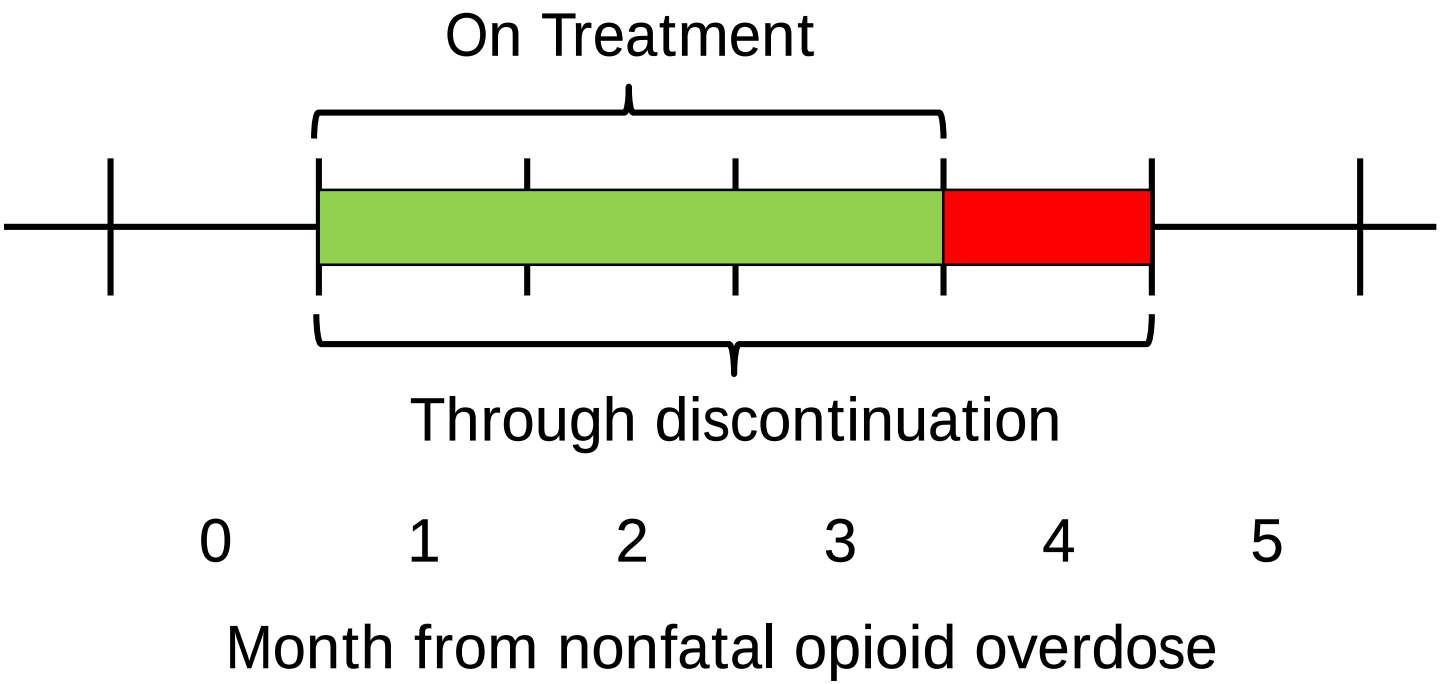
- Censored at 12 months

Analysis

- Cox regression, adjusting for:
  - age, sex
  - mental health diagnoses
  - baseline history of incarceration or detoxification
  - opioid and benzodiazepine prescriptions
  - detoxification, short- and long-term residential treatment

Exposure Classification

Medications for OUD as monthly time varying covariates.



Baseline cohort characteristics

Sample size, n	17,568
Male	62%
Age, in years	
18-29	35%
30-44	34%
≥ 45	31%
Anxiety*	17%
Depression*	21%
Detoxification treatment*	22%

* In 12 months prior to index overdose

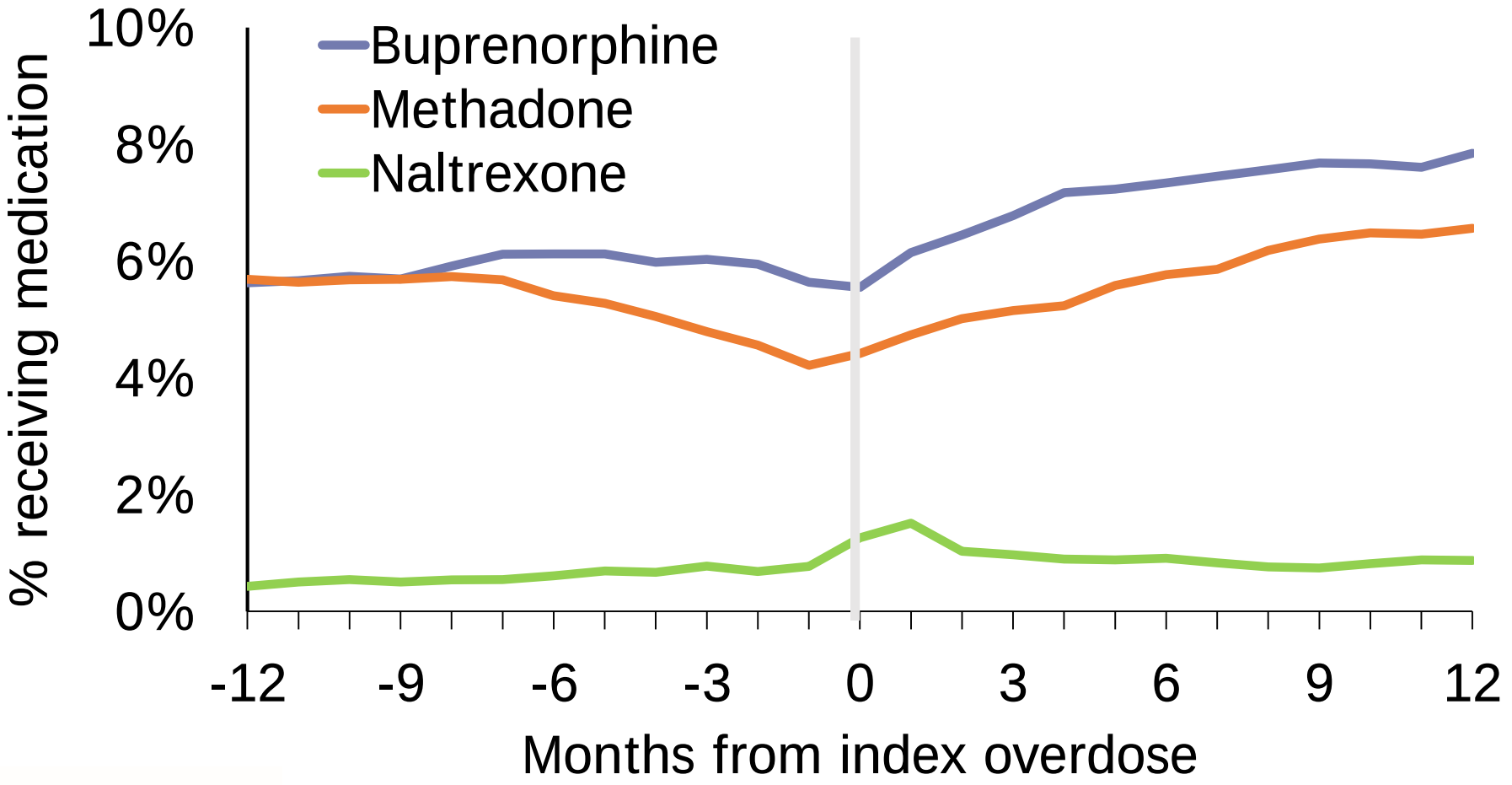
Grayken Center for Addiction
Boston Medical Center

Medications for OUD after overdose

	% (n)	Months Received (median [IQR])
Any MOUD	30% (5,273)	
Buprenorphine	17% (3,022)	4 [2,8]
Methadone	11% (2,040)	5 [2,9]
Naltrexone	6% (1,099)	1 [1,2]

Sample n = 17,568

Medications for OUD before and after overdose

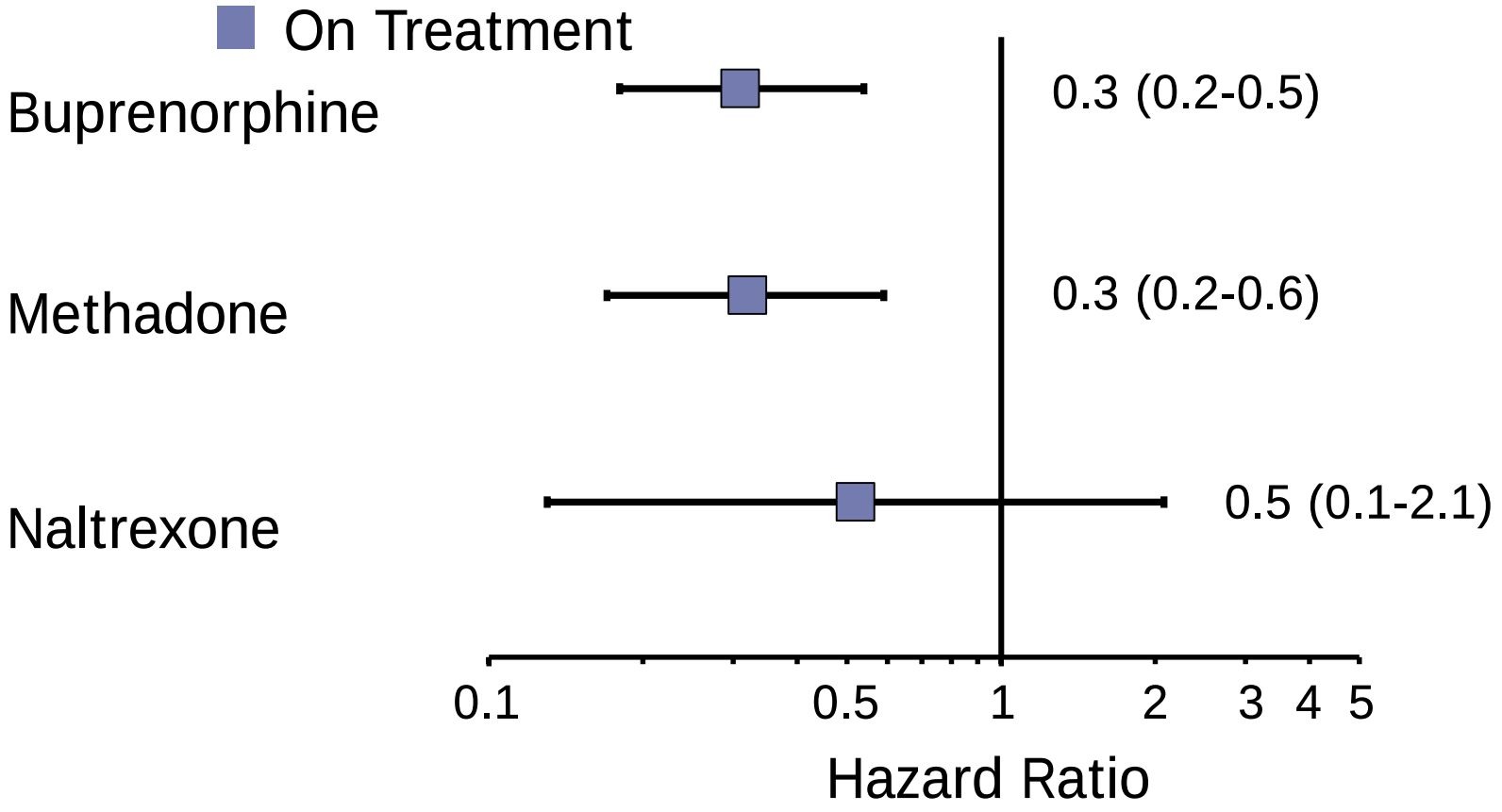


All-cause and opioid-related mortality

	# of deaths	Incidence Rate* (95% CI)
All-cause	807	4.7 (4.4-5.0)
Opioid-related	368	2.1 (1.9-2.4)

* per 100 person-years of follow-up
Sample n = 17,568

Adjusted* hazard for opioid-related mortality
By monthly receipt of treatment in post-overdose period



* Adjusted for: age, sex, depression dx, anxiety dx, incarceration, detoxification, baseline opioid and benzodiazepine rx, and monthly post-overdose receipt of benzodiazepines, opioids, detoxification and short- and long-term residential treatment

Adjusted* hazard for opioid-related mortality
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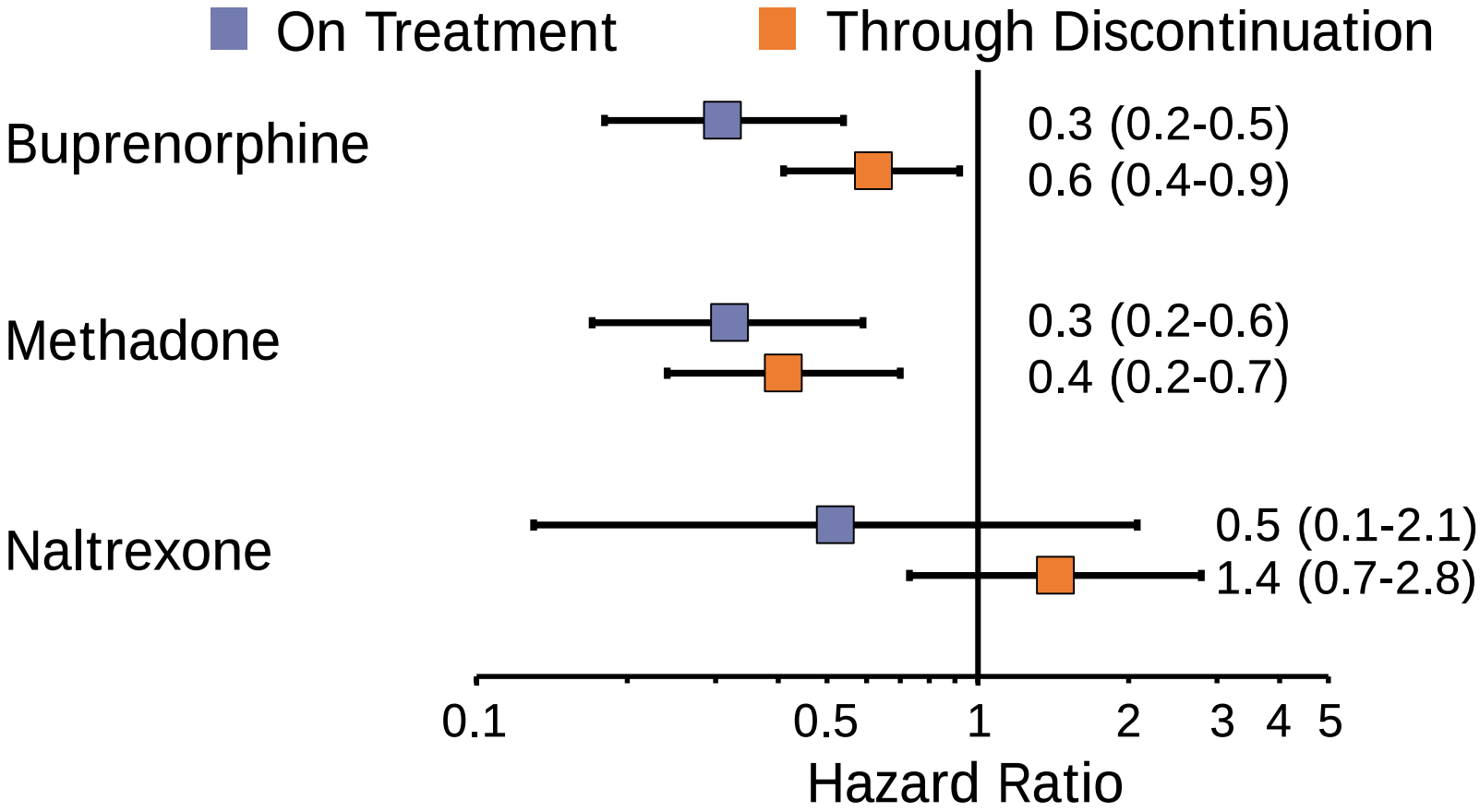

* Adjusted for: age, sex, depression dx, anxiety dx, incarceration, detoxification, baseline opioid and benzodiazepine rx, and monthly post-overdose receipt of benzodiazepines, opioids, detoxification and short- and long-term residential treatment

Conclusions: Missed opportunity?

- Very high one-year mortality following nonfatal opioid overdose
- Buprenorphine and methadone associated with reduced risk of opioid-related mortality
- Minority receive medications for OUD following nonfatal opioid overdose
  - Duration of treatment low, particularly for naltrexone

Are these candidate touchpoints ideal?

1. Readily identifiable

2. High-risk of subsequent opioid-related death

3. Identify substantial proportion of individuals prior to opioid-related death

TBD

4. Effective interventions exist to reduce mortality