

Poison Center Exposure Calls Predict Mortality due to Prescription Opioid Poisoning

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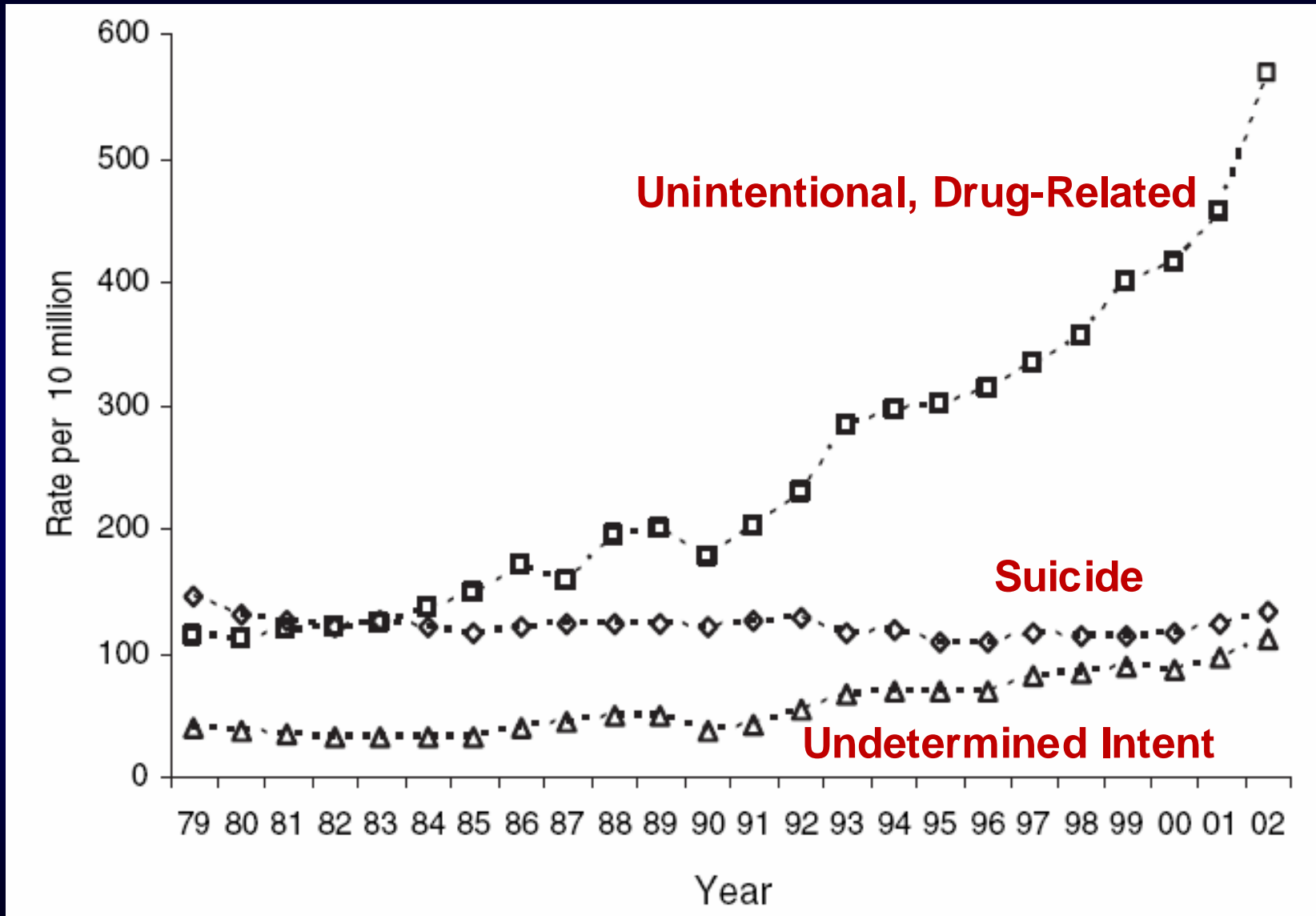
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Increasing Poisoning Mortality (USA)



Source: Paulozzi L, et al. *Pharmacoepidemiol Drug Saf.* 2006 Sep;15(9):618-27.

Unintentional Overdoses

drug user surveys

Life Threatening Overdoses

EMS

Medical Attention

hospital data

Iatrogenic

FDA
AERS

Fatal Overdoses

Overdoses on
Death Certificates

poison center calls

vital statistics

*Intentional
Overdoses*

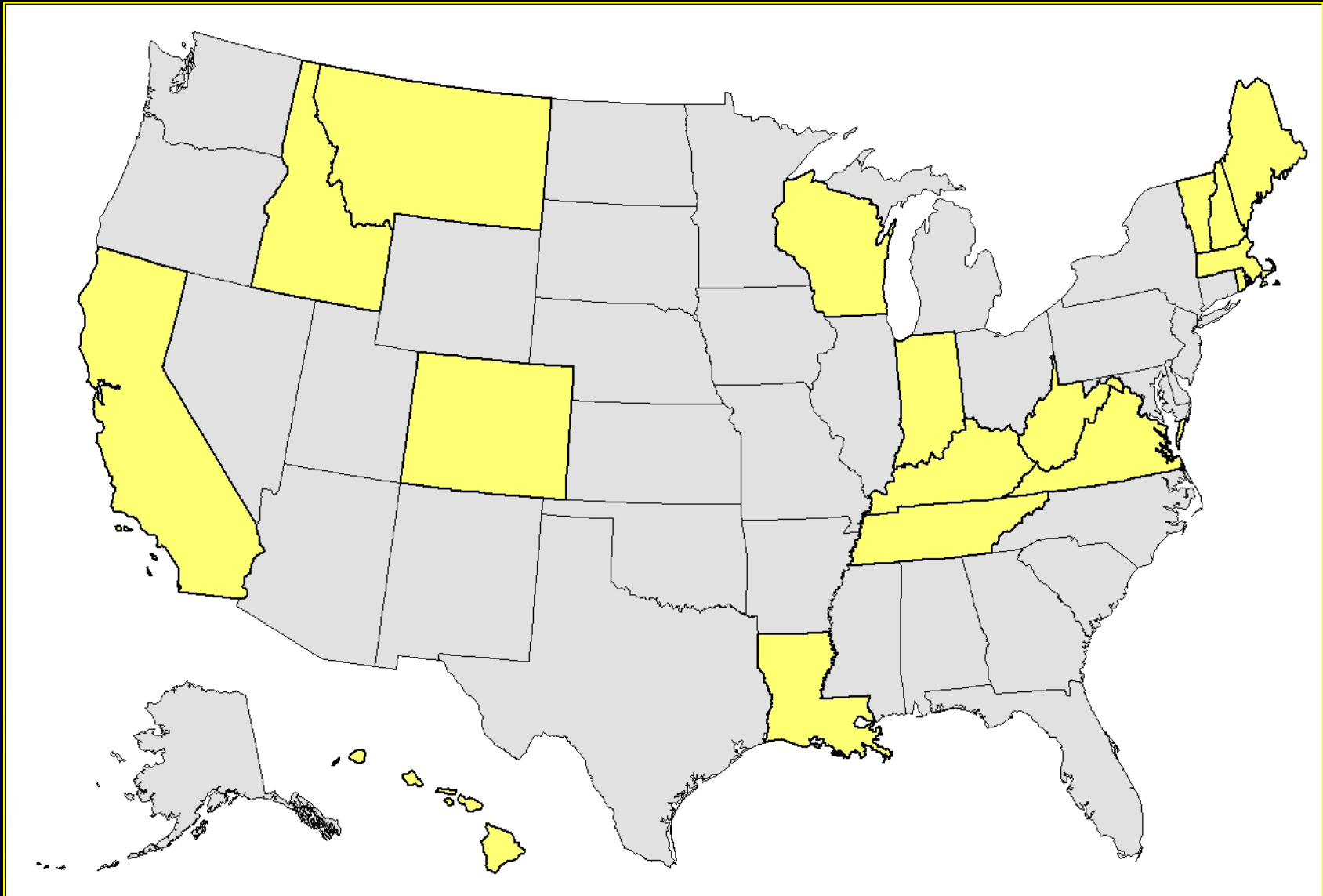
Surveillance System	Pros	Cons
Drug User Surveys	High risk population	Retrospective self-report, survivors only
Drug Adverse Events (FDA)	Rx opioids	Terminally ill patients, spontaneous reports
Hospital Inpatients (AHRQ)	Non-fatal, financial cost	Clinical complications, and...
Emergency Departments (NEISS, DAWN, etc.)	Fatal & non-fatal	<ul style="list-style-type: none"> • Insurance/cost • Fear of criminal prosecution
Emergency Medical Services	First line of care	<ul style="list-style-type: none"> • Reporting delay and...
Poison Centers	Rapid reporting, geographically specific	<ul style="list-style-type: none"> • Help-seeking behavior • Access/utilization
Vital Statistics	All deaths, lab toxicology	Reporting delay, misclassification

Research Questions

- What are the differences between poison center calls and decedents for methadone poisoning?
- Can poison center data be used to “predict” poisoning mortality due to methadone?

Year 2003 17 States	Source	Population	Coding	Definition
Death Certificates	National Center for Health Statistics (CDC)	All decedents (n=693)	ICD-10	<ul style="list-style-type: none"> • Unintentional poisoning • Intentional poisoning • Undetermined intent • Injury code for methadone
Poison Center Calls	RADARS [®] System	Human exposure calls (n=391)	AAPCC	<ul style="list-style-type: none"> • Abuse • Intentional misuse • Intentional unknown • Withdrawal • Suicide <p>“intentional exposure calls”</p>
Methadone Recipients	Commercial vendors (Verispan & IMS)	Pain patients filling Rx [and others] (n=214,149)		<ul style="list-style-type: none"> • Unique recipients of pharmacy dispensed methadone • Used for rate calculations

17 States Included in Analysis (IN YELLOW)



Includes 30.8% of the United States population.

Analysis

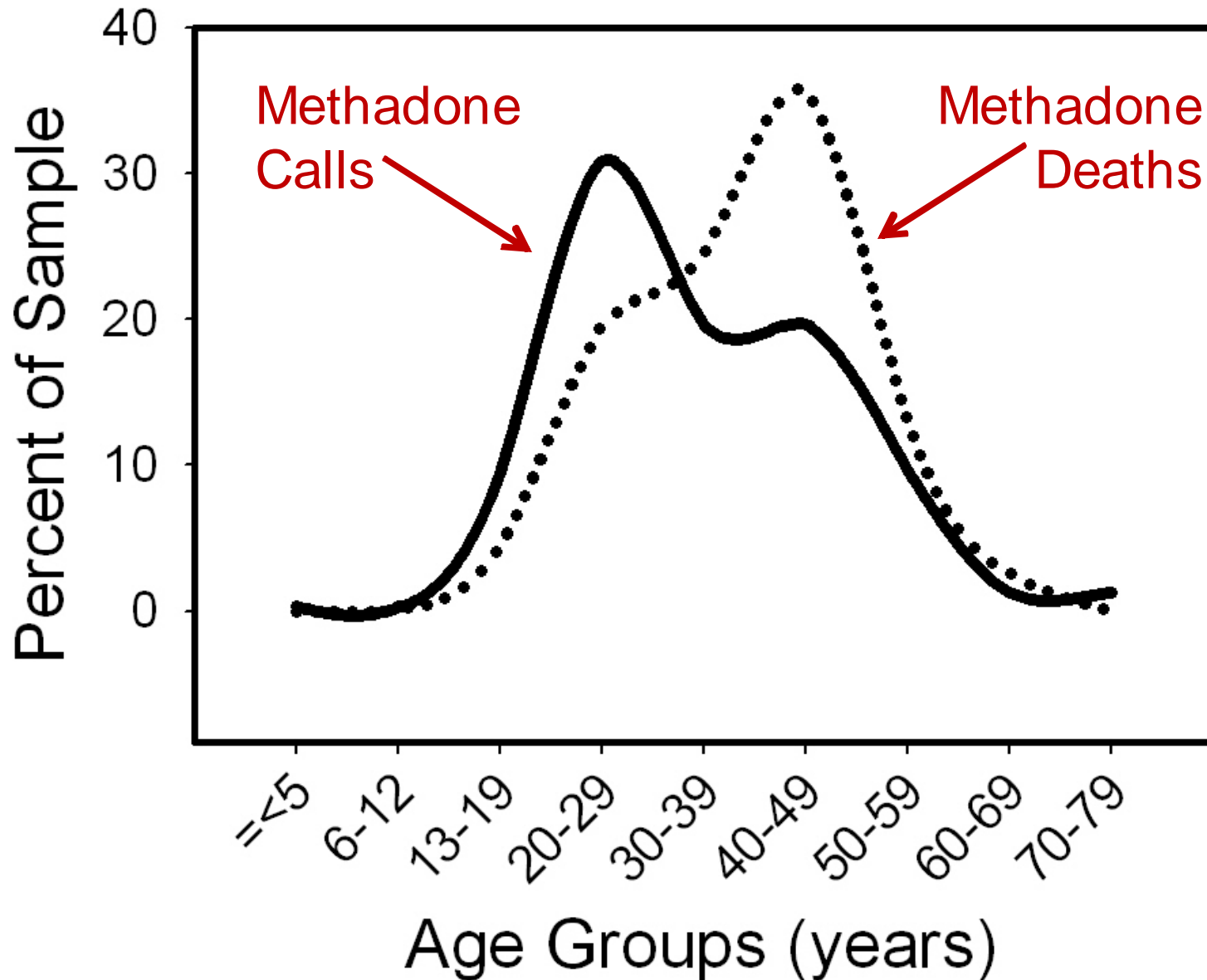
- Calendar year 2003, by quarter
- Descriptive statistics
- Regression models
 - p-scale Poisson regression
 - Generalized estimating equations
 - Adjusted for poison center penetrance
- Sensitivity analysis
 - Underreporting of methadone deaths

Question 1

What are the differences between poison center calls and decedents (methadone, 2003)?

- Age
- Sex
- Place of Injury
- Disposition

Methadone Calls and Deaths - 2003



Sex and Place of Injury

	Methadone Calls	Methadone Deaths	χ^2
Female	40.4%	35.0%	p<0.05
Place of Injury			p<0.05
Residence	85.4%	59.9%	
Workplace	0.5%	4.0%	
School,			
healthcare facility, or other public area	3.6%	0.4%	
Other/Unspecified	10.5%	35.5%	
Missing	0	0.1%	

Disposition

	Methadone Calls	Methadone Deaths
Deaths	2.1%	100%
Medical attention required	35.9%	
No effect or self- resolving	28.8%	
Not followed up/other	32.4%	?

Results

- What are the differences between poison center calls and decedents?

Poison center calls were more likely to be: younger, female, at home, and less likely to require medical attention.

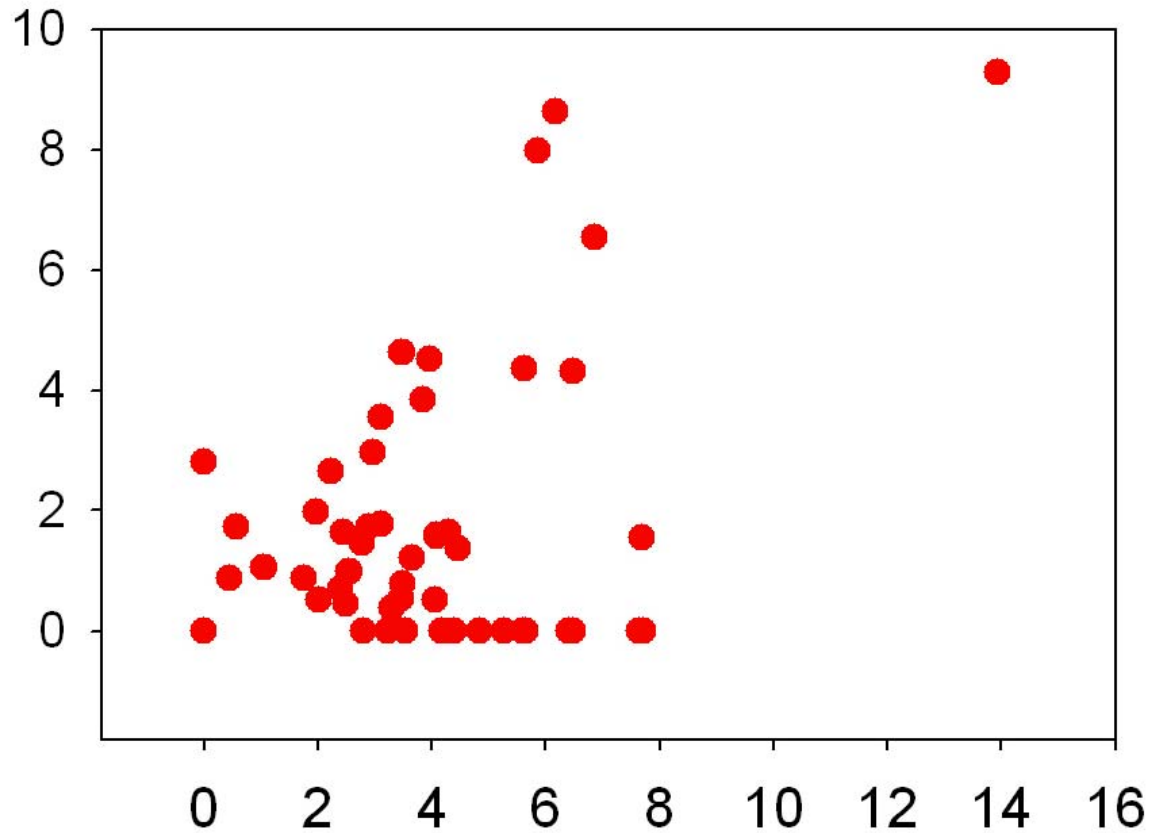
Question 2

Can poison center data be used to “predict” poisoning mortality due to methadone?

- Pearson’s correlation
- Regression models
- Sensitivity analysis

Raw Data Scatterplot

Poison Center Intentional Exposure Calls
Rate per 1000 Filling Prescriptions



Methadone Poisoning Deaths

Rates per 1,000 Filling Methadone Prescriptions

Regression Model

13.4 percent increase (95% CI: 9.2, 17.9)

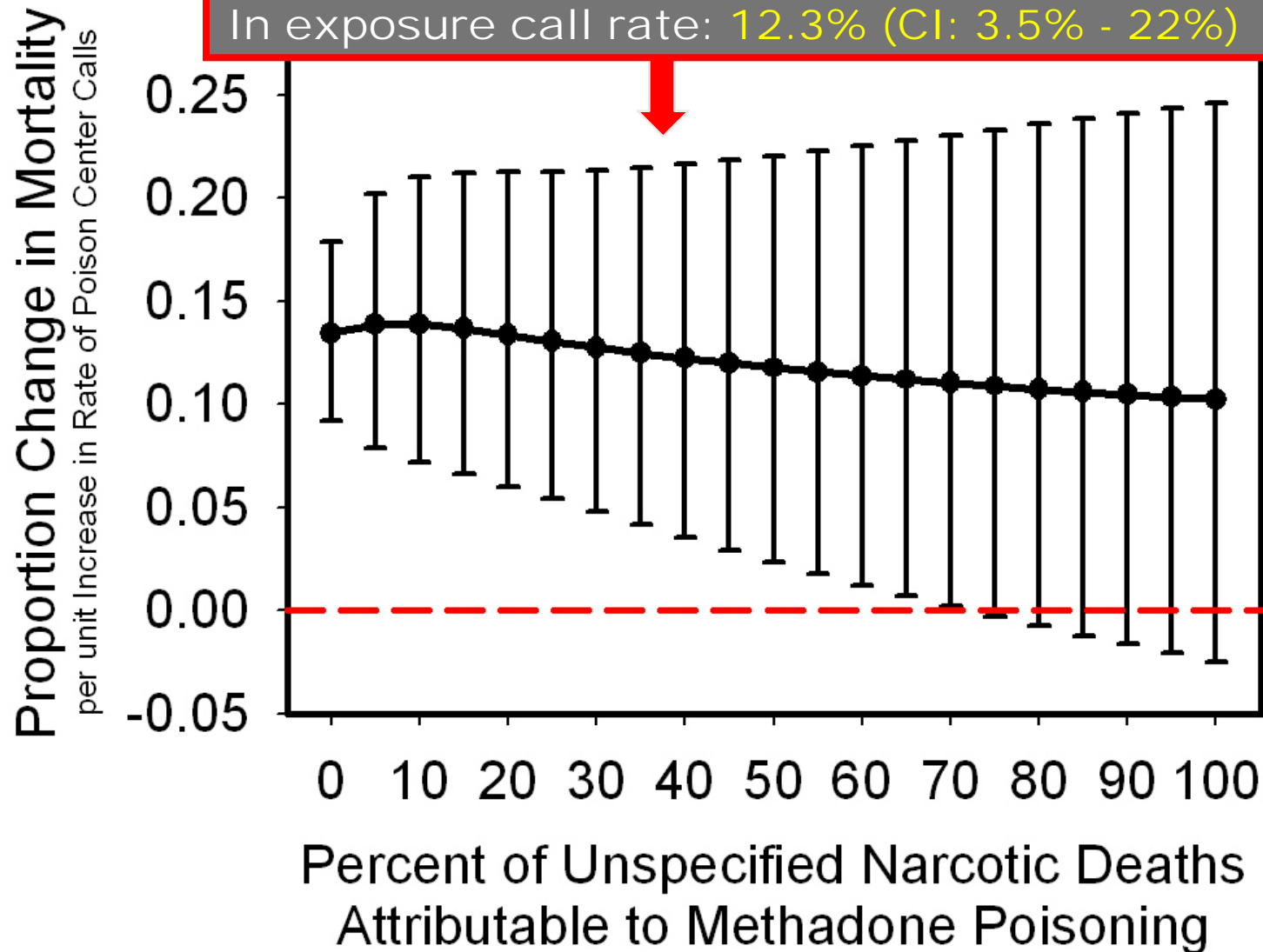
in mortality with each unit increase in the rate of poison center exposure calls (per 1,000 methadone recipients), adjusting for penetrance and clustering by poison center, among poison centers receiving at least one call for methadone.

Sensitivity

Missing at Random Assumption

(38% of unclassified opioid deaths attributable to methadone)

Percent Increase in Deaths per unit increase
In exposure call rate: **12.3%** (CI: 3.5% - 22%)



Results

- Can poison center data be used to “predict” poisoning mortality due to methadone?

Yes. There was a 13% increase in deaths per one unit increase in poison center call rate.

Findings were robust to concerns about underreporting of methadone poisoning deaths.

Limitations - 1

- Ecological study
 - Nature of surveillance systems
- RADARS System[®] poison centers only
 - Selection bias for high abuse areas
 - Covered 30.8% of US population in 2003
- Stronger association for poison centers receiving calls for methadone
 - Zero-inflated models
- Using non-fatal exposures to predict deaths
 - Sentinel population?

Limitations - 2

- Included accidental poisonings and suicide
 - Separate analyses did not substantially change findings
 - Increased precision by including both
- Rate denominator did not include methadone maintenance patients
 - Most deaths resulting from pain medications
 - Relative rates would not change
- Limitations of death certificate data
 - Sensitivity analysis showed robustness for underreporting of methadone deaths

Summary of Findings

- Poison center calls were more likely to be: younger, female, at home, and less likely to require medical attention.
- Poison center data can be used to predict poisoning mortality due to methadone.
- There was a 13% increase in deaths per one unit increase in poison center exposure call rate.

Conclusions and Considerations

- Poison center data has utility in surveillance
- Are poison center callers a sentinel population?
- What is the function of availability/opportunity?
- Further characterization of different surveillance systems is needed
- Better data on “overdose”/poisonings

Questions?

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