

Falling Rates of Prescription Opioid Abuse and Death in the United States: Formulations and Ramifications



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Janetta Iwanicki, MD

Rocky Mountain Poison and Drug Center
Denver Health Medical Center



Disclosures

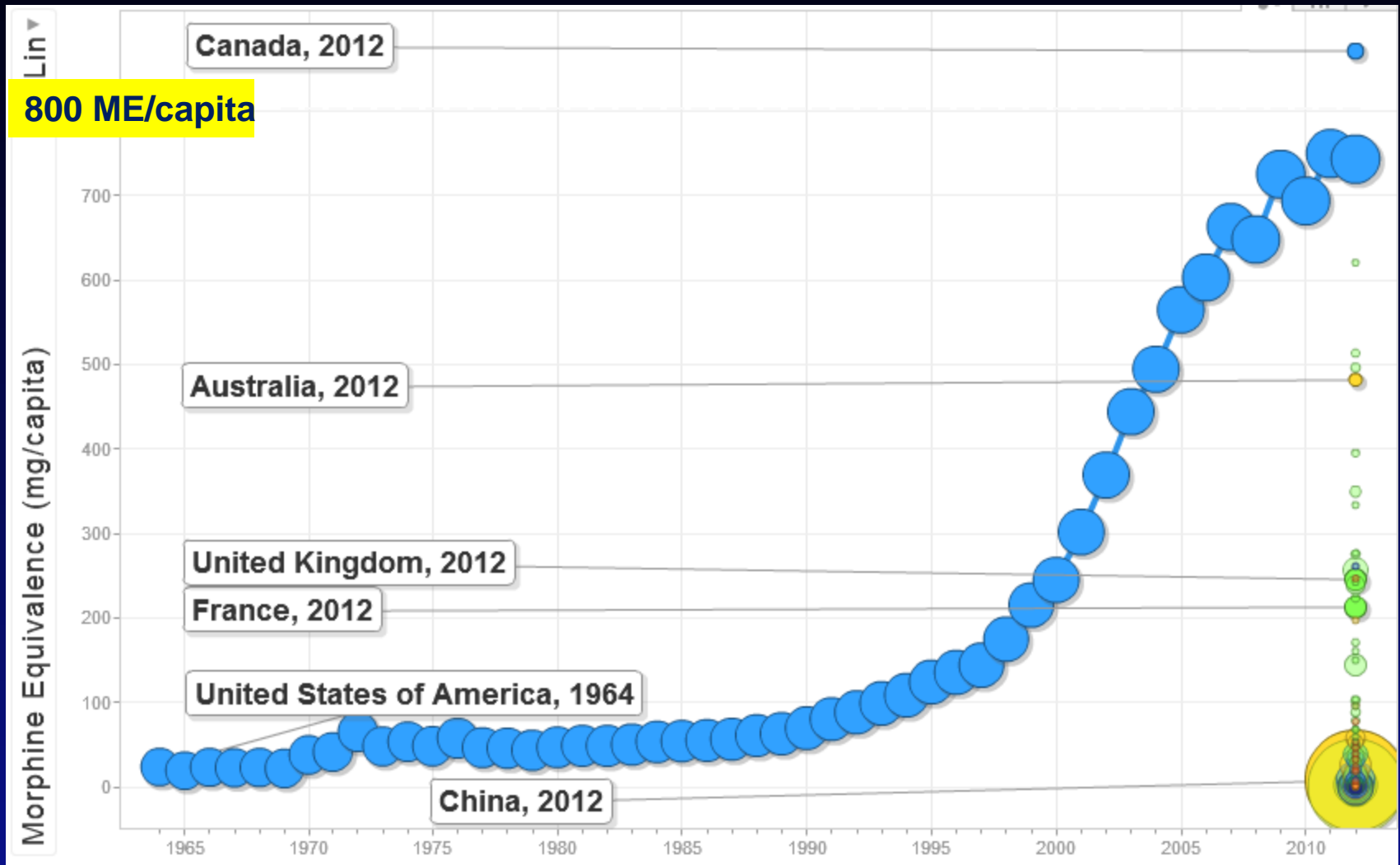
- Most manufacturers of prescription opioids or stimulants subscribe to RADARS System.
- RADARS System is the property of Denver Health and Hospital Authority, a political subdivision of the State of Colorado.
- Subscribers receive information, but do not participate in developing the System, data collection, or analysis of the data. They do not have access to the raw data.
- Employees are prohibited from personal financial relationships with any company.

Outline

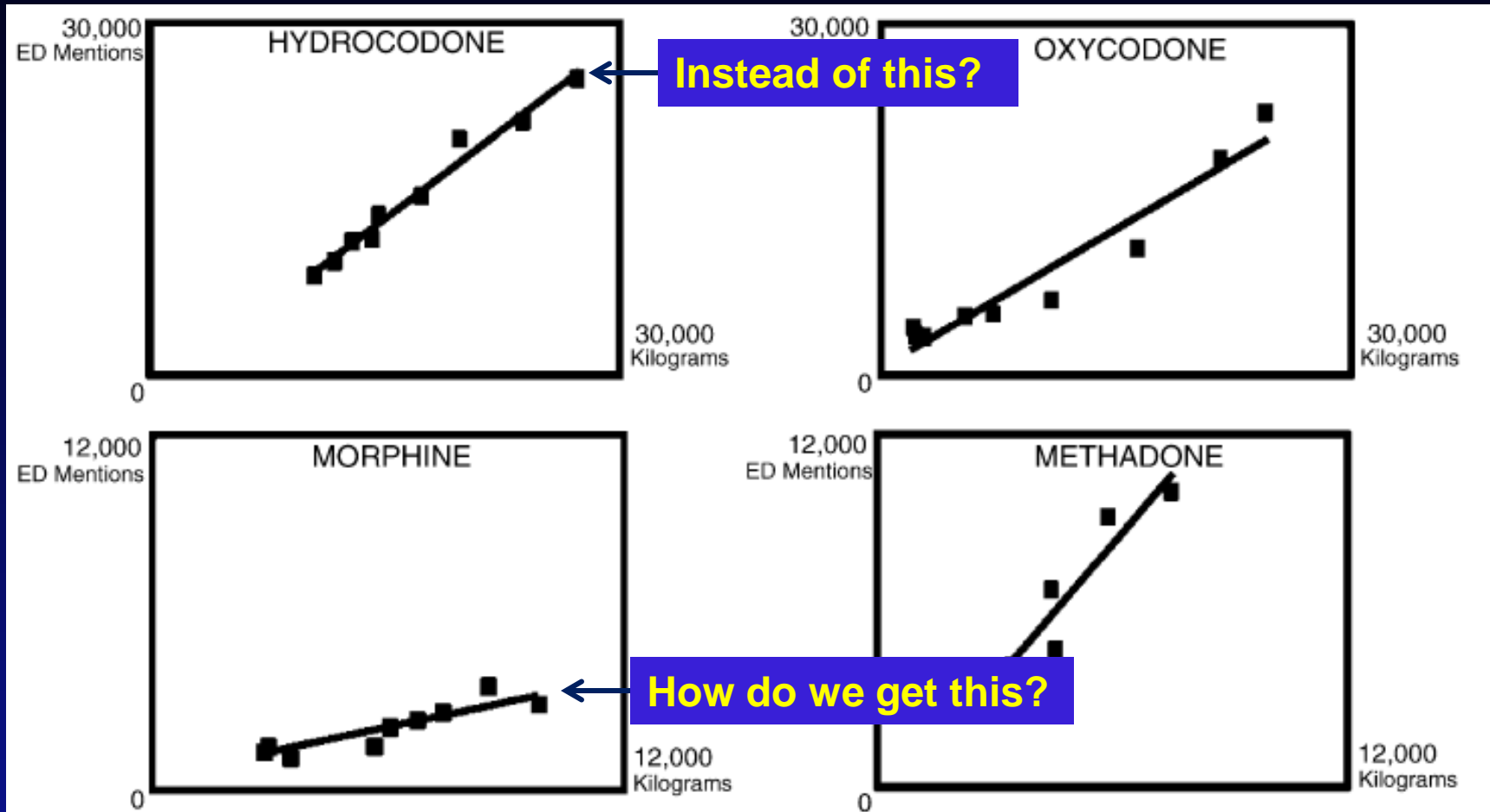
- **Conceptual Framework for Abuse Deterrent Formulations (ADFs)**
- **Effectiveness of ADFs**
- **Unanticipated Consequences?**

The Epidemic

US Consumption of Prescription Opioids, 1964 - 2012



More Drug Production = More Drug Abuse But - the Slope Varies by Drug



How Do Abuse, Addiction and Death Occur?

Progression of Rx Opioid Abuse

Population of People
with Addiction Risk

Exposed to Opioid



Swallow



*Chew



*Crush



*Snort



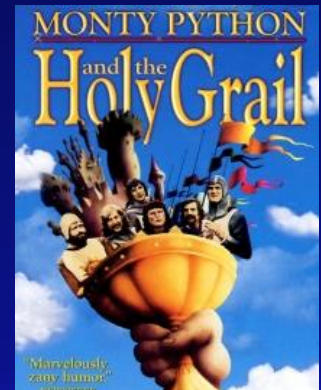
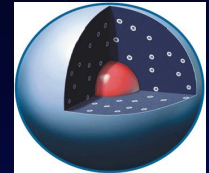
*Inject

Can ADF's Minimize
Progression?

Abuse Deterrent Formulations

Strategies for Abuse Deterrence

- **Physical/Chemical barriers** - physical form of an oral drug is less amenable to abuse.
- **Agonist/Antagonist combinations** - interfere with euphoria
- **Aversion agents** - unpleasant effect if dosage form is manipulated or a higher dosage is used.
- **Delivery System** depot/implants to reduce release (e.g. SR depot SQ injectable formulation).
- **Prodrug** lacks opioid activity until transformed (e.g. GI tract).
- **Combination** – Two or more methods combined
- **Holy Grail** - Overdose only releases therapeutic amount.



Mosaic Surveillance of Prescription Drug Abuse

Acute Health Events

49 Poison centers
491,874 opioid mentions

Drug Transactions

Criminal Justice
260 agency
146,786 opioid mentions

Entering Treatment

Opioid Tx Program
66 programs
183,573 mentions

Entering Treatment

Survey Key Informant Pts - 109 practices, 45 states
64,678 mentions

New Initiates

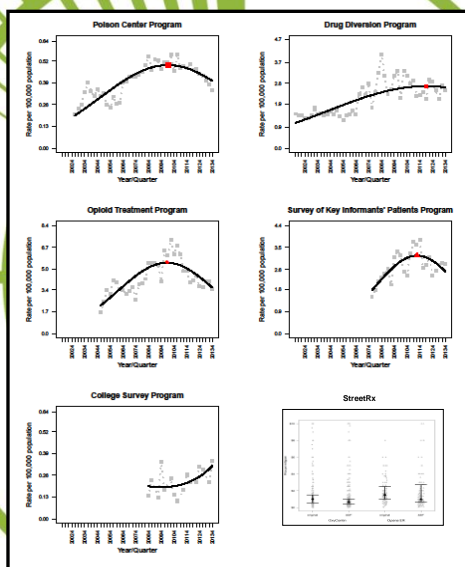
College Survey
2000 students
11,871 mentions

Illicit Market Price

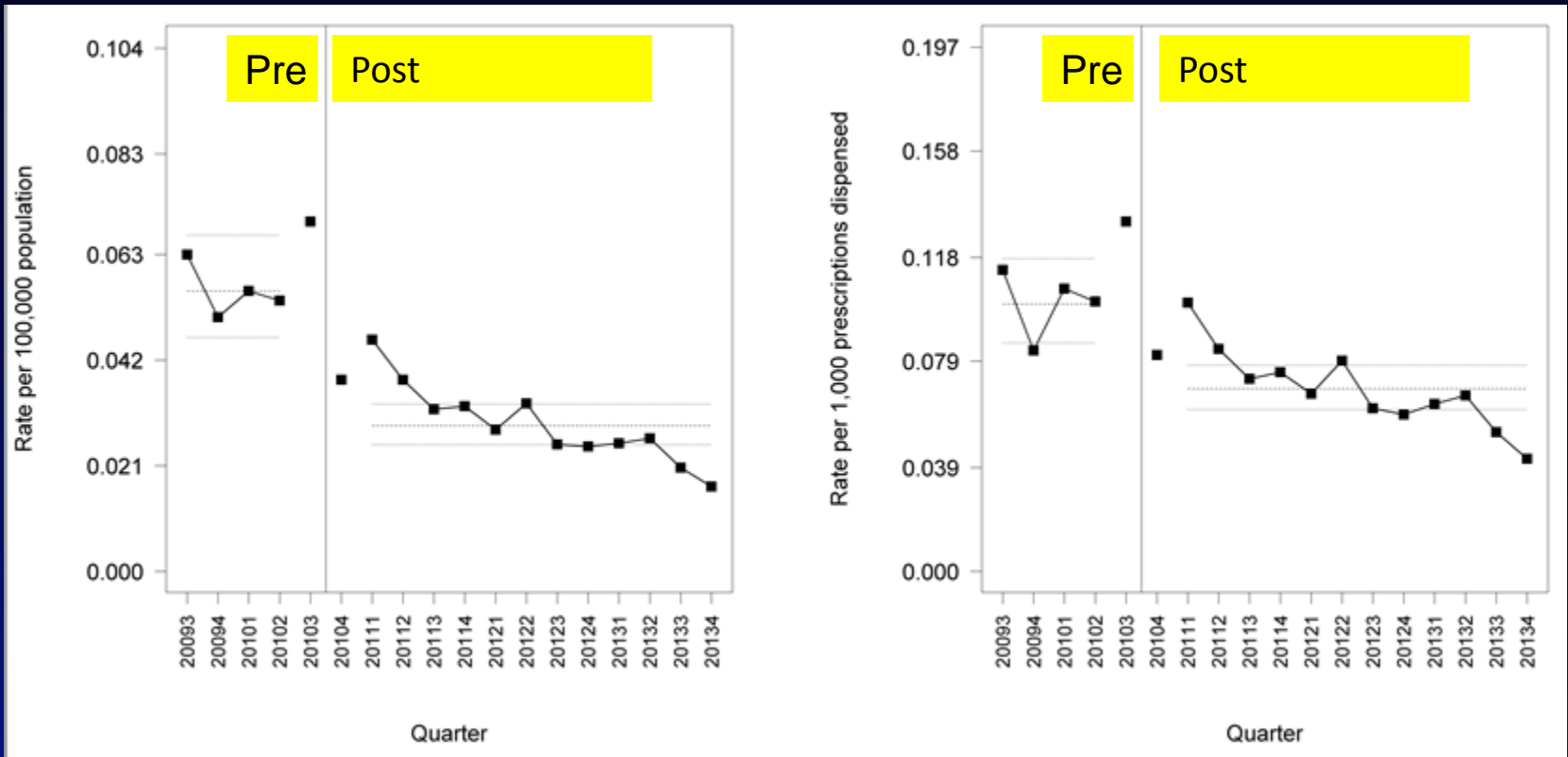
StreetRx.com
Users/Buyers, 50 states
8,441 price entries

Web Monitoring

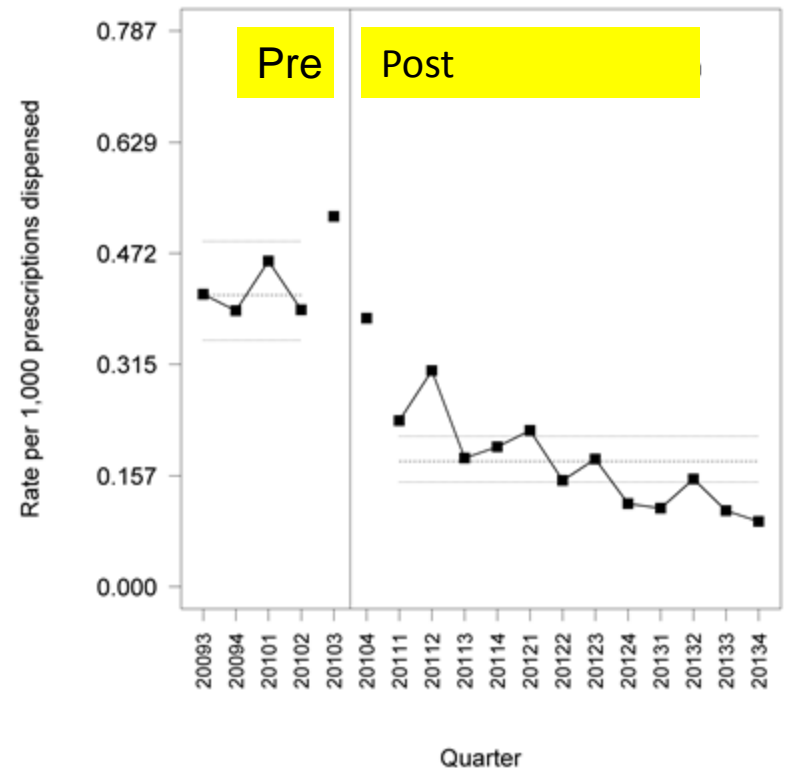
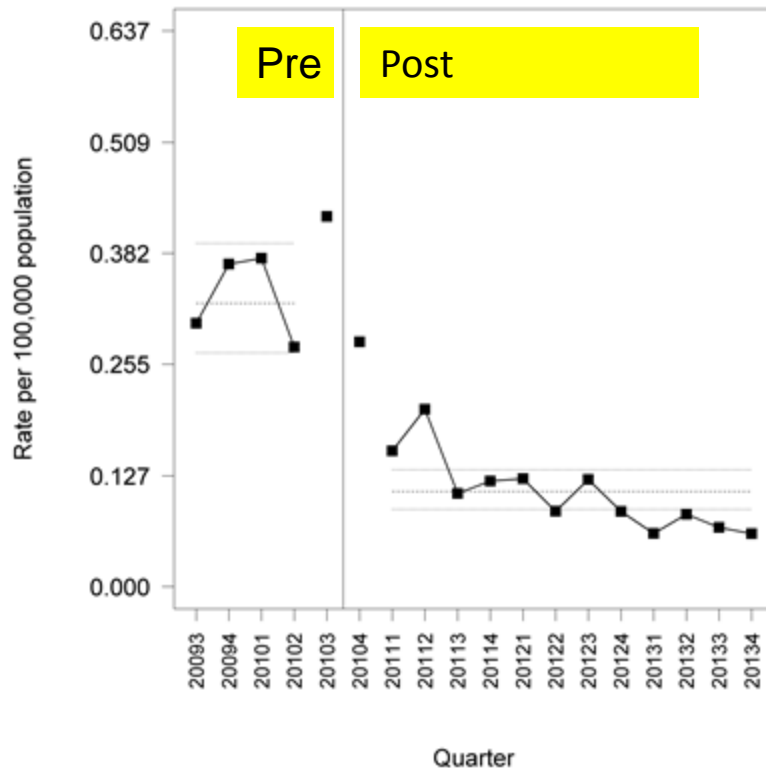
> 150 M sites
> 35,000 posts coded for analysis



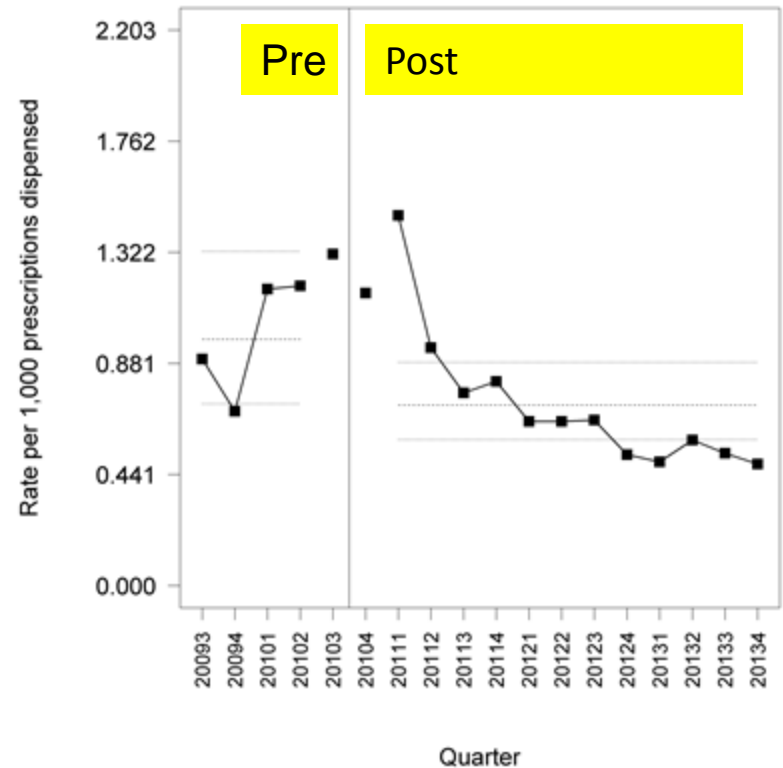
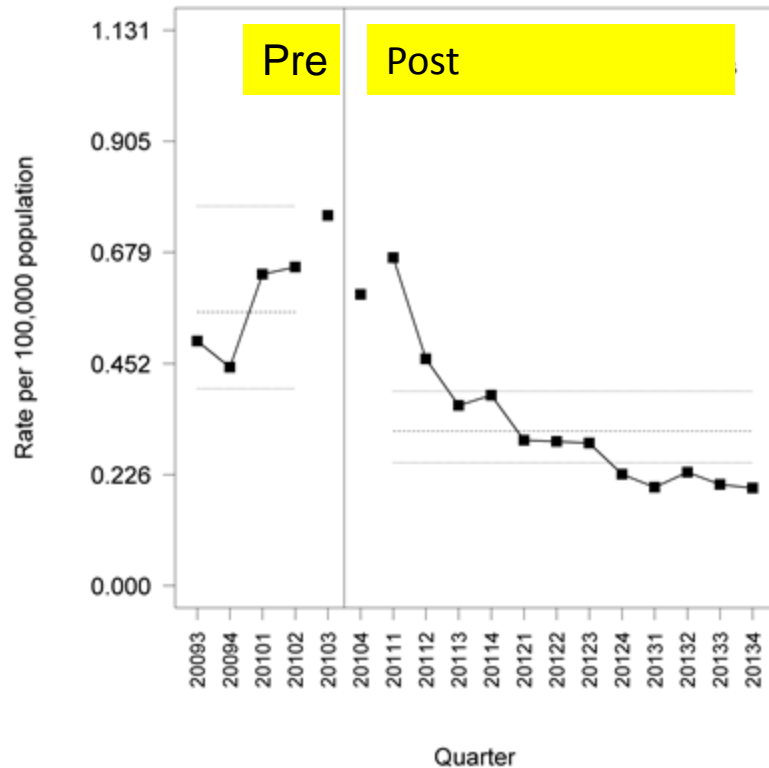
Poison Center Program Oxycodone ER Population and Prescription Rates, 2009-2013



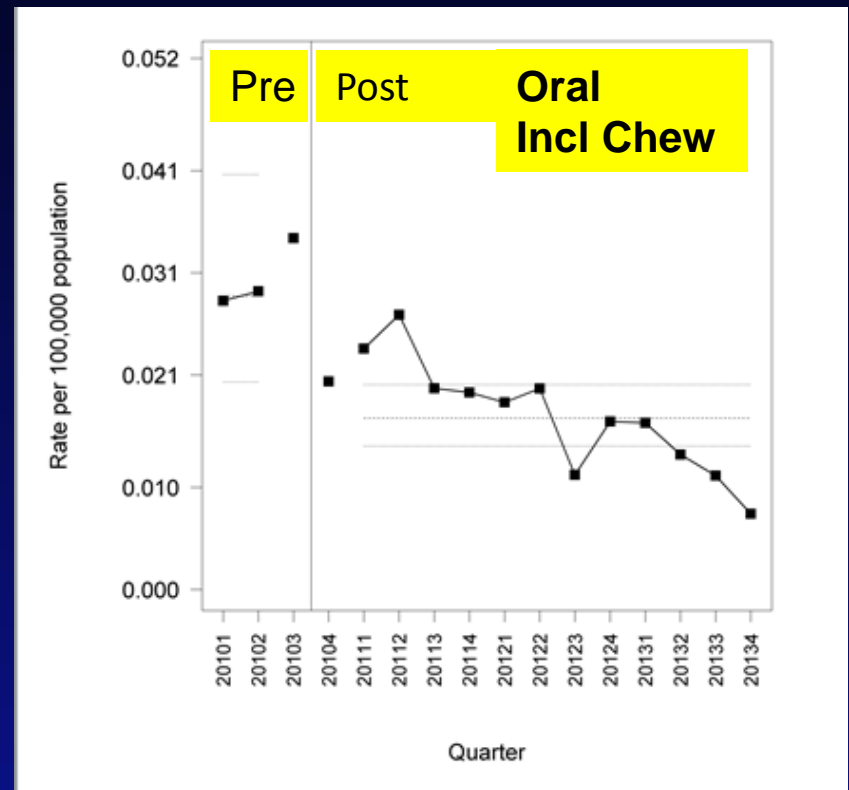
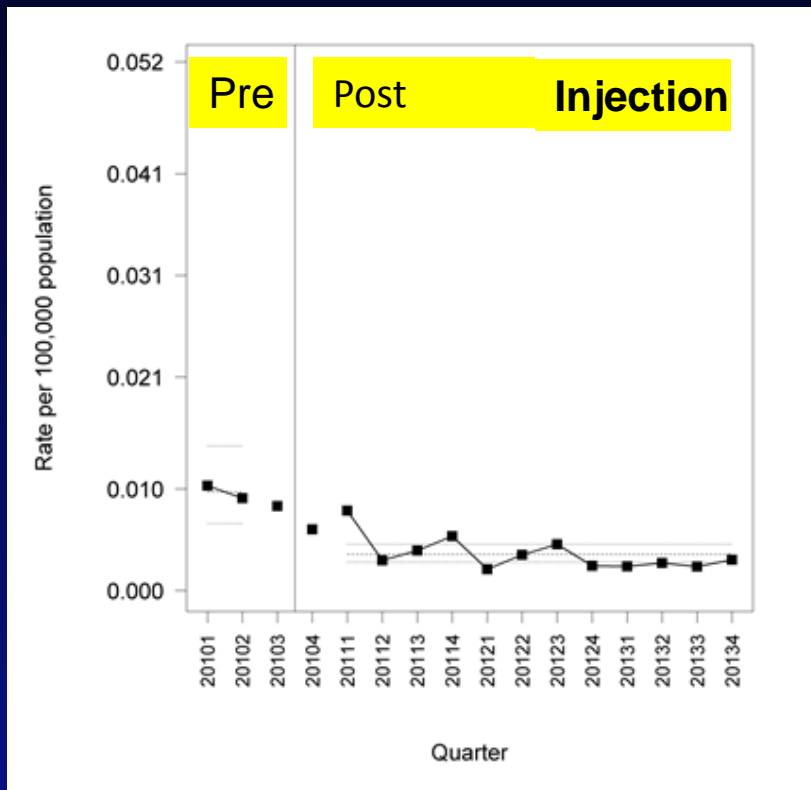
Drug Diversion Program Oxycodone ER Population and Prescription Rates, 2009-2013



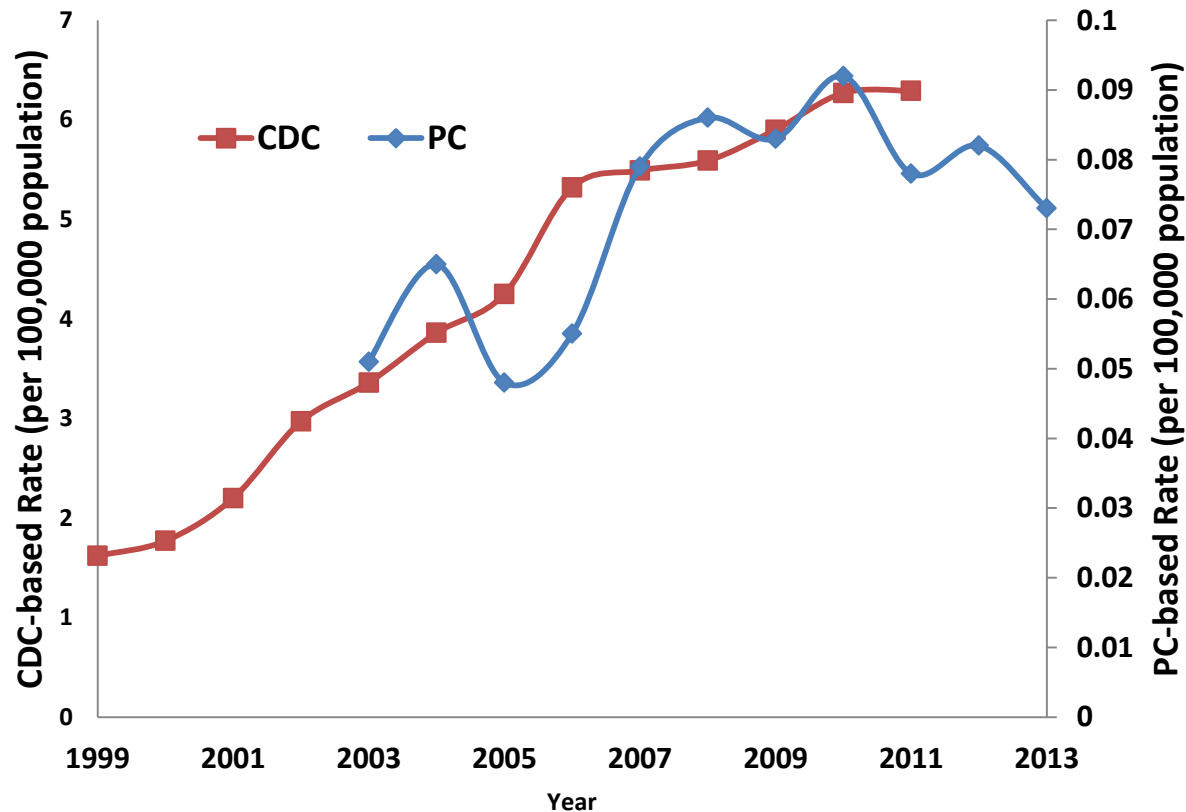
Treatment Centers Combined Oxycodone ER Population and Prescription Rates, 2009-2013



Oral and Non-oral Abuse Decrease after Oxycodone ADF - Poison Center Program



Deaths Associated with Oxycodone ER Decreased Poison Center Program, 2008 - 2013



Refining Our Understanding of Abuse Deterrent Formulations

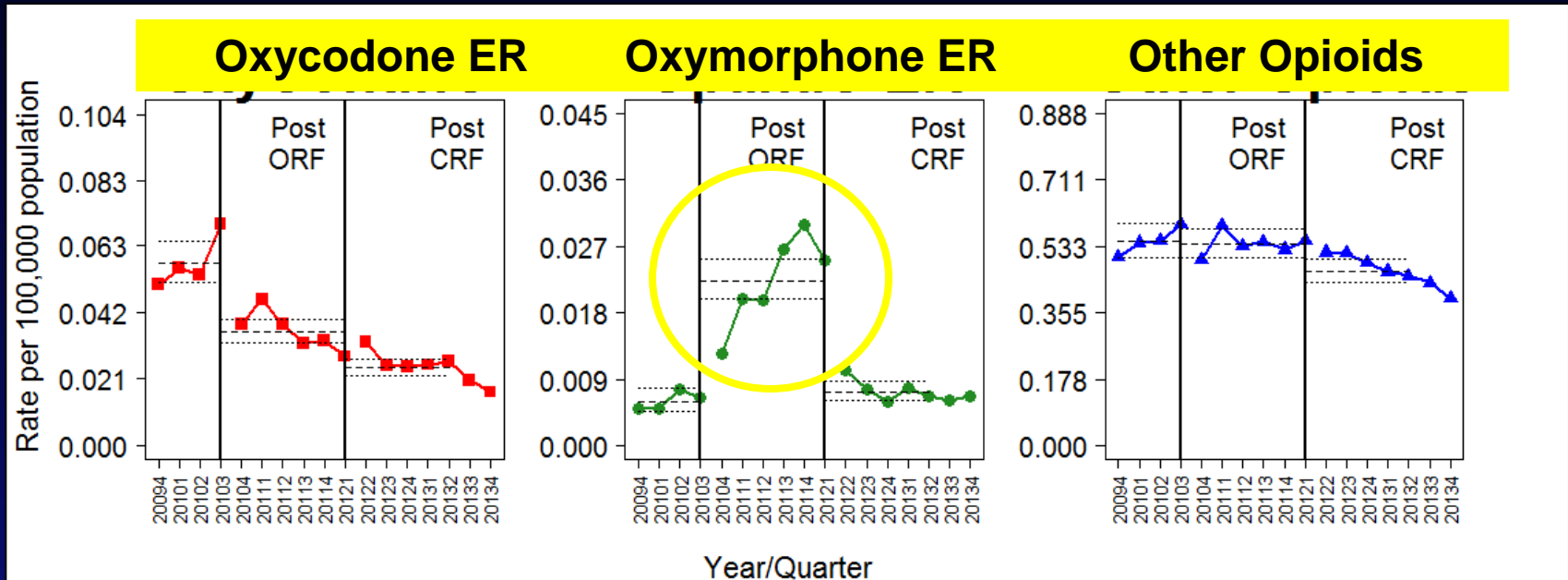
Squeezing the Balloon: ADFs Have Limited Impact Unless All Opioids Included



**Switch opioid
or enter
treatment
program**

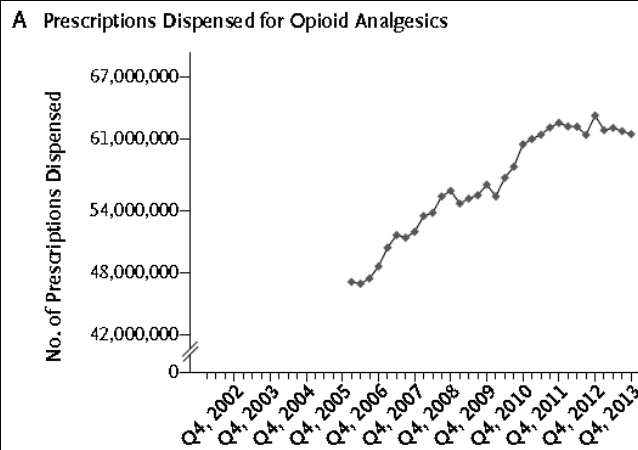
**New opioid-
addicted patients**

Poison Center Program Population Rate, 2009-2013

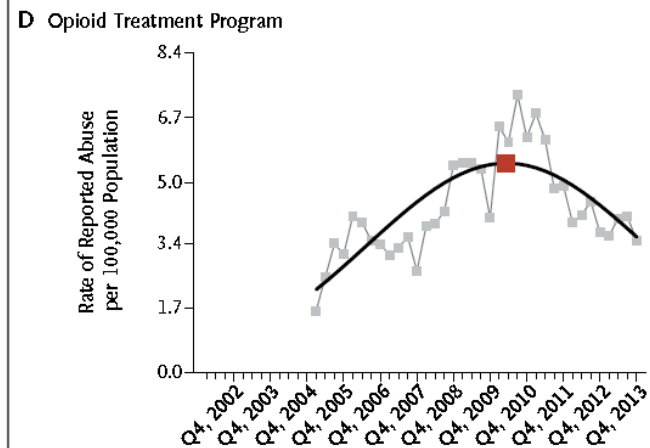
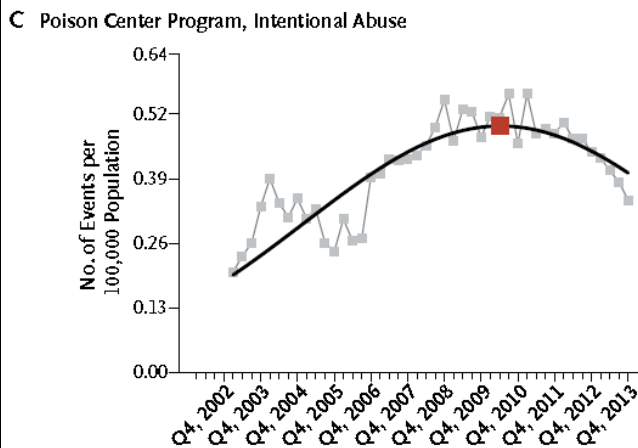
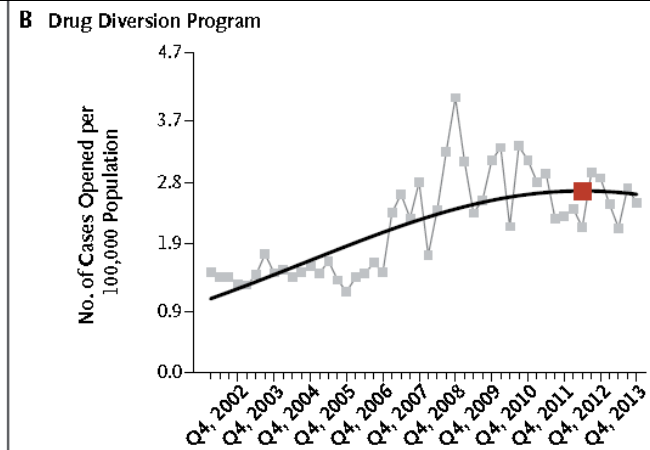


National Trends in Opioid Abuse and Diversion

Prescriptions of Opioid Analgesics



RADARS Drug Diversion Program

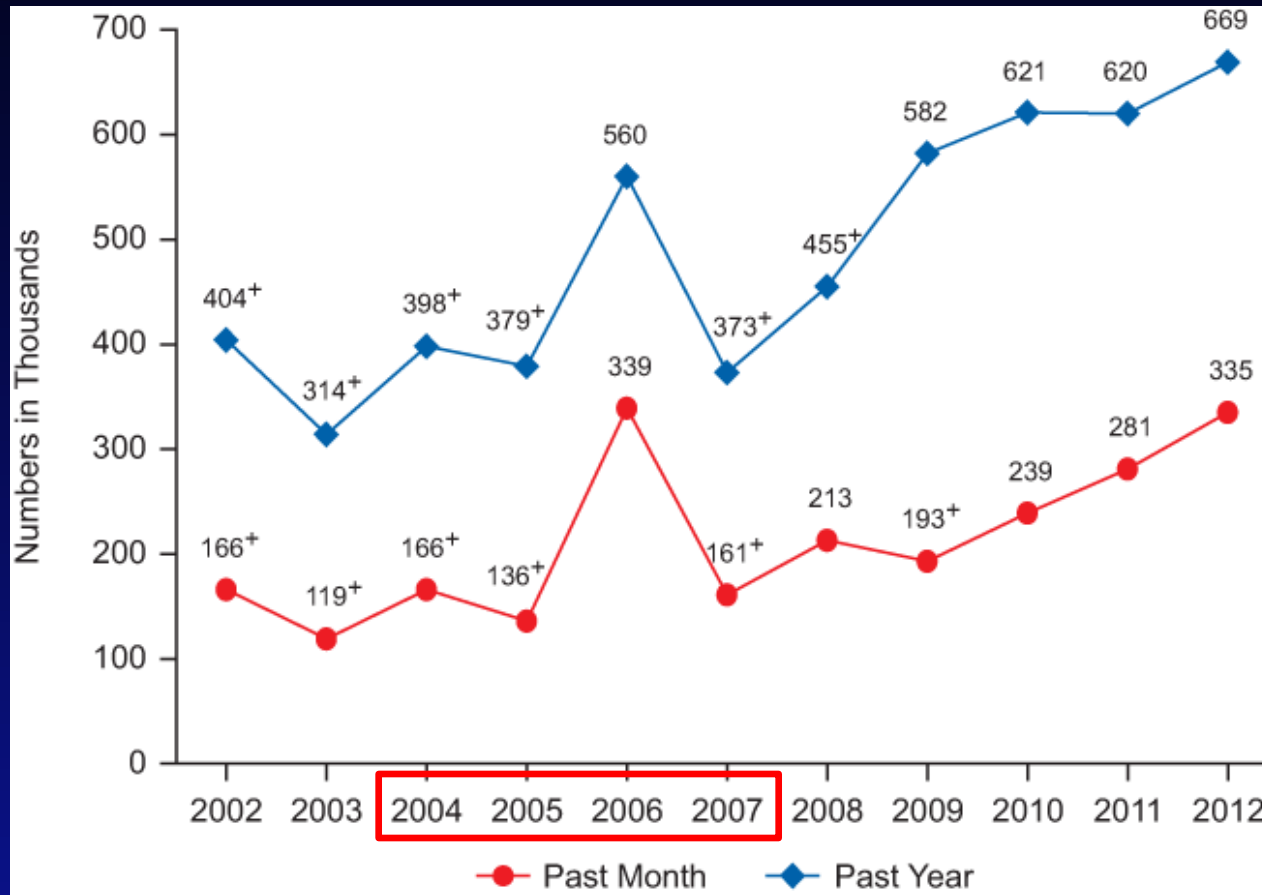


RADARS Poison Center Program

RADARS Opioid Treatment Program

Endorsement of Heroin Use

National Survey of Drug Use and Health



Progression of Rx Opioid Abuse

Population of People
with Addiction Risk

Exposed to Opioid



Swallow



*Chew



*Crush



*Snort



*Inject

- ADFs are not for the addicted
- More drug = more abuse, but formulation can change relation
- Need ADFs for IR as well as ER
- Need greater treatment capacity for opioid addiction

Need to Stop Inflating the Balloon



**Switch opioid
or enter
treatment
program**

**Need
add'l ADFs? Patients**

Questions?

