

Prescription Opioid Analgesic Dependence and Addiction: Experience in the United States

October 10, 2013

Richard C. Dart, MD, PhD
Director, Rocky Mountain Poison and Drug Center
Professor, University of Colorado

Prescription Opioid Misuse & Diversion

- Outline of Presentation
 - Brief Epidemiology
 - Brief RADARS® System Methodology
 - Trends with abuse deterrent formulations & market changes

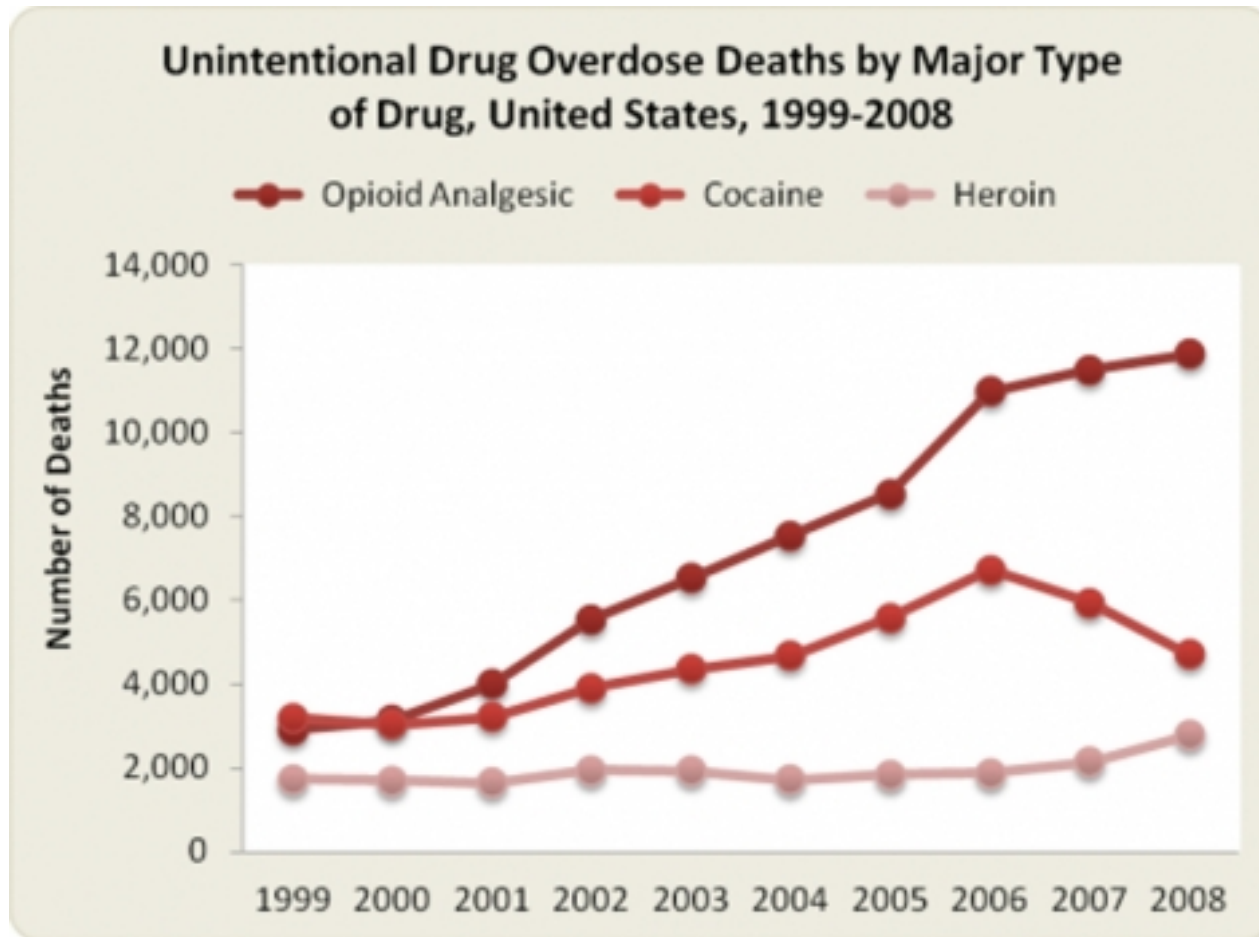
Drug-Related Fatalities Top Deaths From Motor Vehicle Accidents

By [Join Together Staff](#) | September 19, 2011 | [2 Comments](#) | Filed in [Drugs & Prescription Drugs](#)

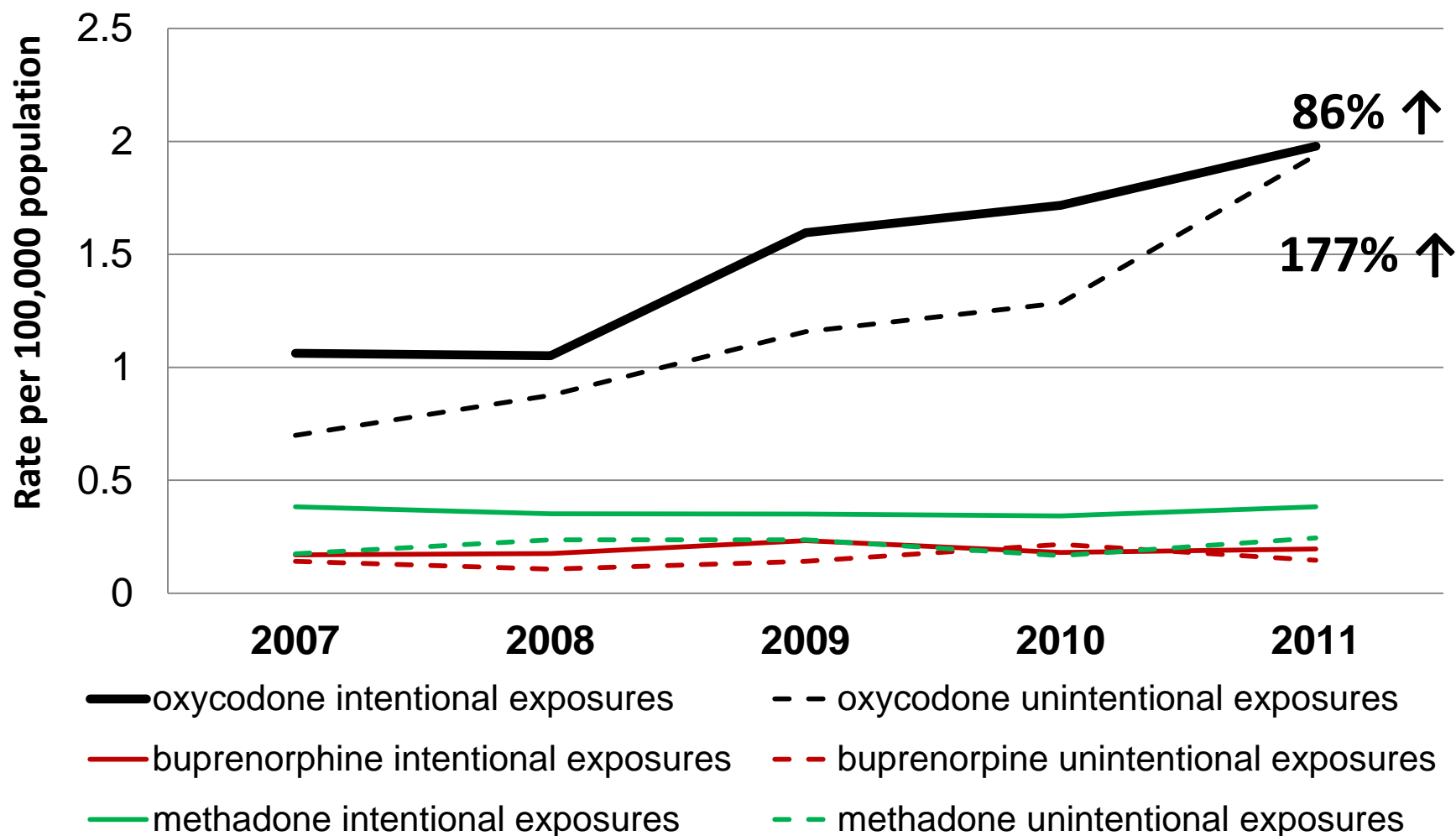


Prescription Drug Abuse in the United States

Prescription Drug Associated Deaths



Australia - Intentional and Unintentional Exposure Rates By Opioid and Year



Acknowledgement: Naren Gunja and Jared Brown (NSW Poisons Information Centre, Sydney)

M



ting

S

RADARS System Mosaic

Acute Events

53 Poison
Centers
46 States

**Drug
Transactions**

Criminal Justice
280 investigator
50 states

**Entering
Treatment**

OTP
73 programs
33 states

**Entering
Treatment**

SKIP
125 practices
50 states

**New
Initiates**

College Survey
2000 students
50 States

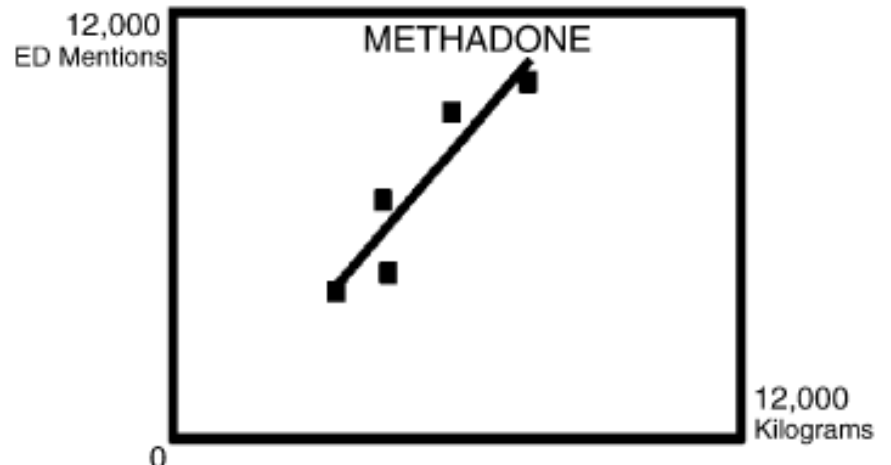
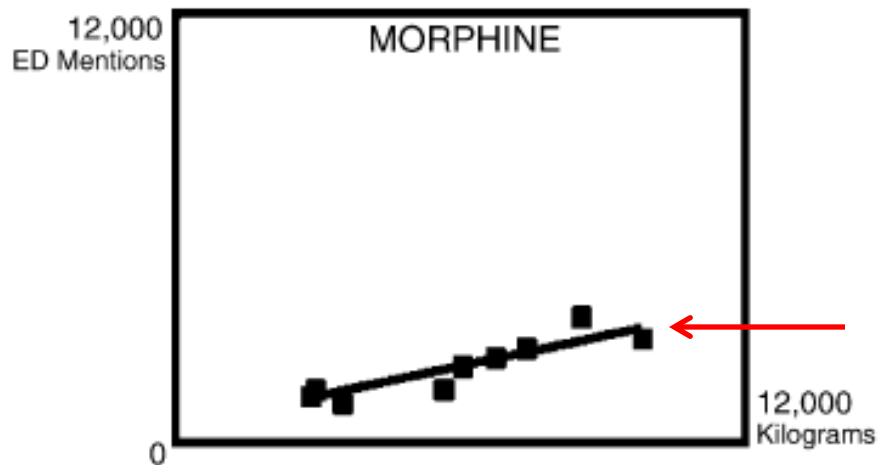
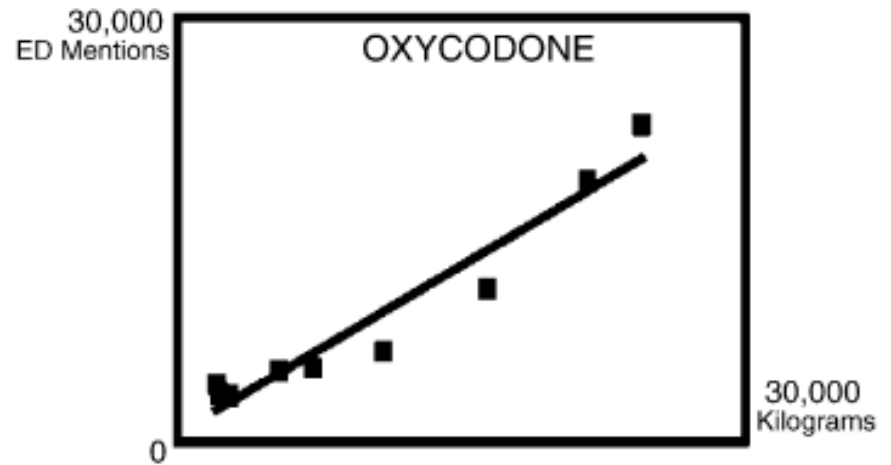
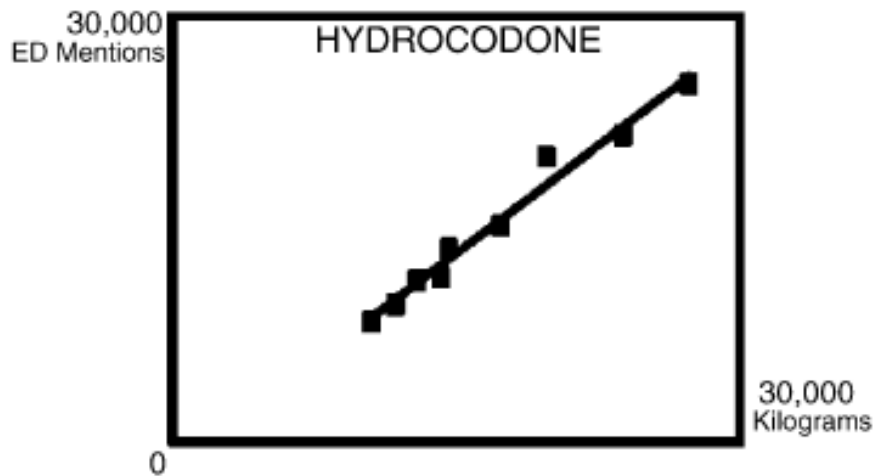
**Illicit Market
Price**

StreetRx.com
Users/Buyers
50 states



**WHICH OPIOIDS ARE ABUSED AND
DIVERTED?**

More Drug Production = More Drug Abuse



What Drugs Are Most Abused?

2011 v. 2012 Population Rate (Ranked Highest-Lowest)

Poison Center		Opioid Treatment		Drug Diversion	
2011	2012	2011	2012	2011	2012
Hydrocodone	Hydrocodone	Oxycodone	Oxycodone	Oxycodone	Oxycodone
Oxycodone	Oxycodone	Hydrocodone	Hydrocodone	Hydrocodone	Hydrocodone
Tramadol	Tramadol	Methadone	Methadone	Morphine	Morphine
Methadone	Methadone	Morphine	Morphine	Buprenorphine	Hydromorphone
Morphine	Morphine	Hydromorphone	Hydromorphone	Methadone	Buprenorphine
Buprenorphine	Buprenorphine	Buprenorphine	Buprenorphine	Hydromorphone	Methadone
Fentanyl	Fentanyl	Fentanyl	Oxymorphone	Tramadol	Tramadol
Hydromorphone	Hydromorphone	Oxymorphone	Fentanyl	Fentanyl	Oxymorphone
Oxymorphone	Oxymorphone	Tramadol	Tramadol	Oxymorphone	Fentanyl

What Drugs Are Most Desired?

2011 v. 2012 URDD Rate (Ranked Highest-Lowest)

Poison Center		Opioid Treatment		Drug Diversion	
2011	2012	2011	2012	2011	2012
Methadone	Methadone	Methadone	Oxymorphone	Methadone	Oxymorphone
Buprenorphine	Oxymorphone	Hydromorphone	Methadone	Hydromorphone	Hydromorphone
Morphine	Buprenorphine	Morphine	Hydromorphone	Buprenorphine	Methadone
Hydromorphone	Hydromorphone	Buprenorphine	Buprenorphine	Morphine	Buprenorphine
Fentanyl	Morphine	Fentanyl	Morphine	Oxycodone	Morphine
Tramadol	Fentanyl	Oxycodone	Fentanyl	Fentanyl	Oxycodone
Oxycodone	Tramadol	Oxymorphone	Oxycodone	Oxymorphone	Fentanyl
Oxymorphone	Oxycodone	Hydrocodone	Hydrocodone	Hydrocodone	Hydrocodone
Hydrocodone	Hydrocodone	Tramadol	Tramadol	Tramadol	Tramadol

StreetRx

www.streetrx.com

- **Population**
 - Any person in US, UK or Canada with access to the internet
- **Definition/Type of Cases**
 - Utilize crowdsourcing methodology to calculate average price of specific prescription drug in particular location
 - Validated by DD

Submissions are anonymous

DID YOU GET a good deal?

Name of drug*

City State*

\$ Price*

Show me:

-
-
-

Latest prices

Drug	Location	Price	Date	Rating
Vicodin, 7.5/325mg pill	Salem, Oregon	\$10	Oct 6	Rate: \$ \$ \$ \$ \$
Heroin (black tar), balloon	Florida	\$100	Oct 6	Rate: \$ \$ \$ \$ \$
Bubbles,	Beverly hills, Florida	\$5	Oct 6	Rate: \$ \$ \$ \$ \$
Percocet, 7.5/325mg pill	Washington	\$4	Oct 6	Rate: \$ \$ \$ \$ \$

See what **OTHERS** paid

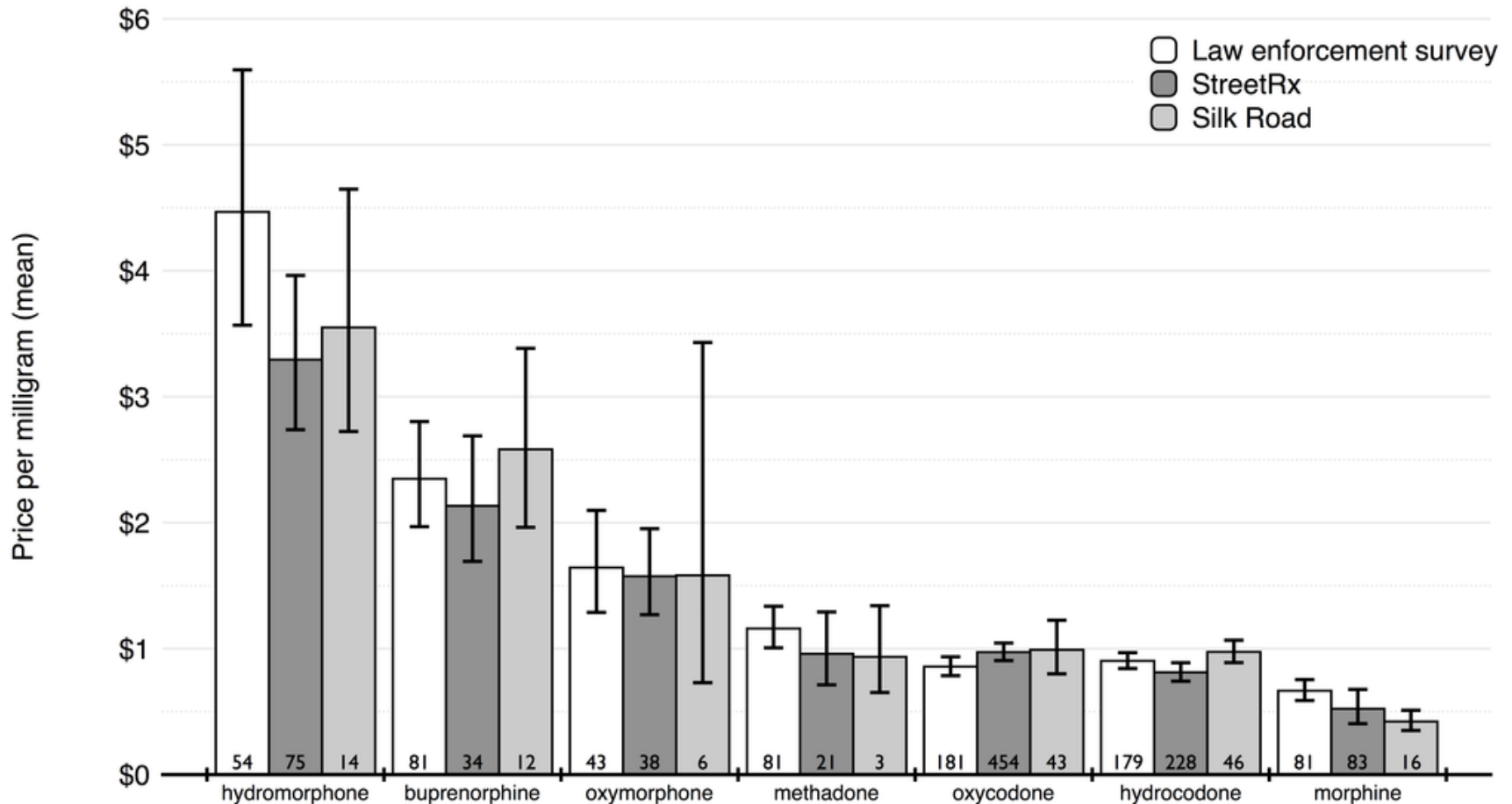
e.g. dilaudid california

Map Satellite

United States

Example of Validation

Comparison of StreetRx, RADARS System Drug Diversion and Silk Road



Street Price of Drugs

Product	Median (IQR)	p Value
Opana [®] ER (new, hard to crush)	\$1.00 (\$0.40,\$1.00)	
Opana [®] ER (old, crushable)	\$1.38 (\$1.00,\$2.67)	0.0580
OxyContin [®] (new OP, hard to crush)	\$0.63 (\$0.50,\$1.00)	
OxyContin [®] (old OC, crushable)	\$1.00 (\$0.63,\$1.25)	0.0003

Underground Website Lets You Buy Any Drug Imaginable



Los Angeles Times

BUSINESS

LOCAL U.S. WORLD BUSINESS SPORTS ENTERTAINMENT HEALTH STYLE TR

MONEY & CO. TECHNOLOGY HIGHWAY 1 COMPANY TOWN PERSONAL FINANCE J

TRENDING NOW ▲ GOVERNMENT SHUTDOWN | CAPITOL SHOOTING | ROBERT RIZZO | DODGERS-B

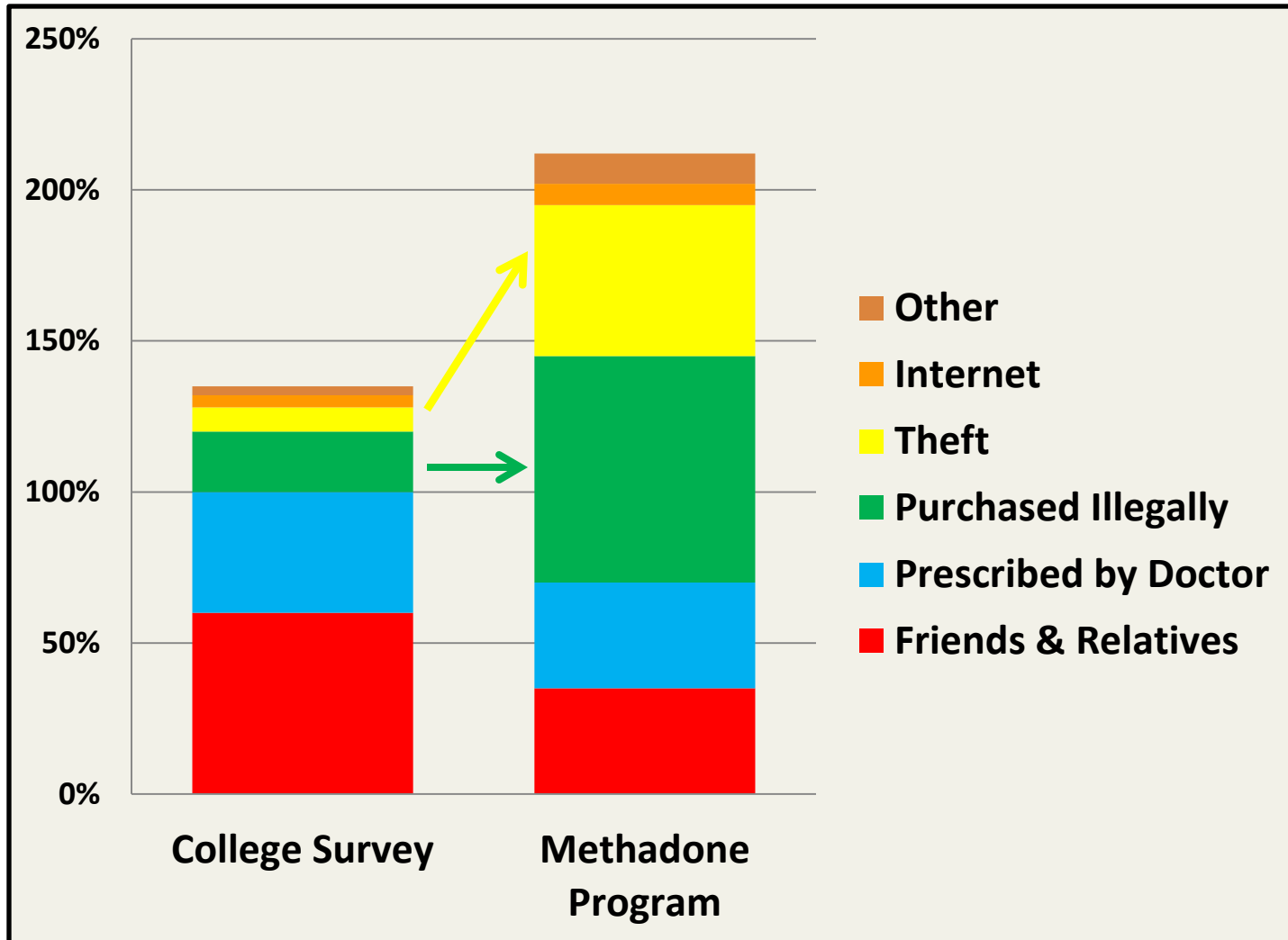
End of Silk Road for drug users as FBI shuts down illicit website

Prosecutors arrest the alleged founder of Silk Road, an illicit online marketplace where users paid in Bitcoin virtual money.

**WHERE DO ABUSERS GET THEIR
DRUGS?**

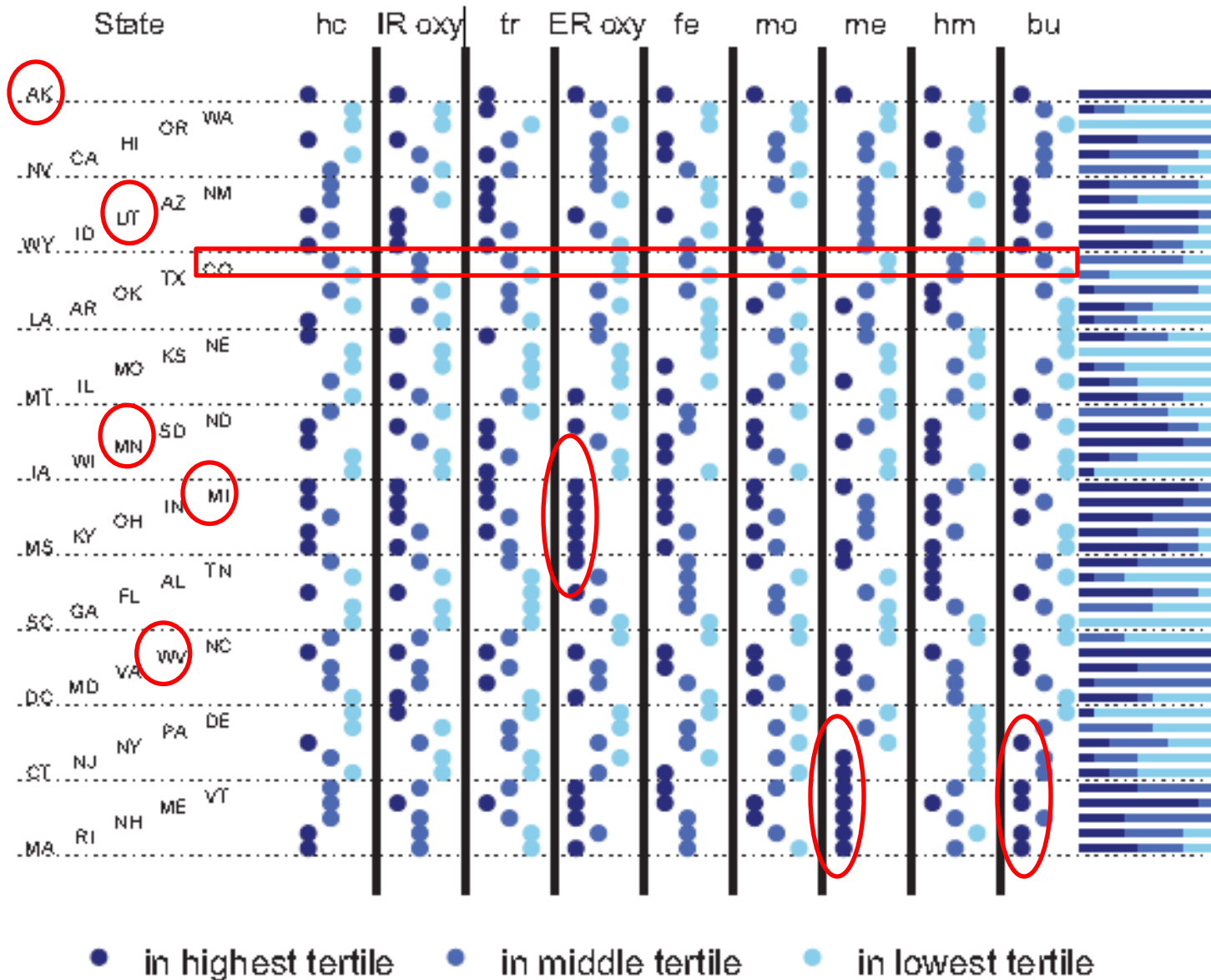
RADARS[®] System

Source of Abused Opioid, 2008



**WHERE DO DIVERSION AND ABUSE
OCCUR IN THE UNITED STATES?**

Rx Abuse Occurs in Every 3 Digit Zip Code

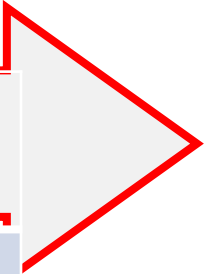


**WHICH ROUTES ARE USED TO
ABUSE PRESCRIPTION OPIOIDS?**

Intravenous Abuse is More Prevalent in Experienced Users

RADARS System through March 2011

Source	College Survey (%)	OTP / SKIP (%)
Oral or chew	98	
Inhale or snort	31	
IV	7	58



Route of Abuse

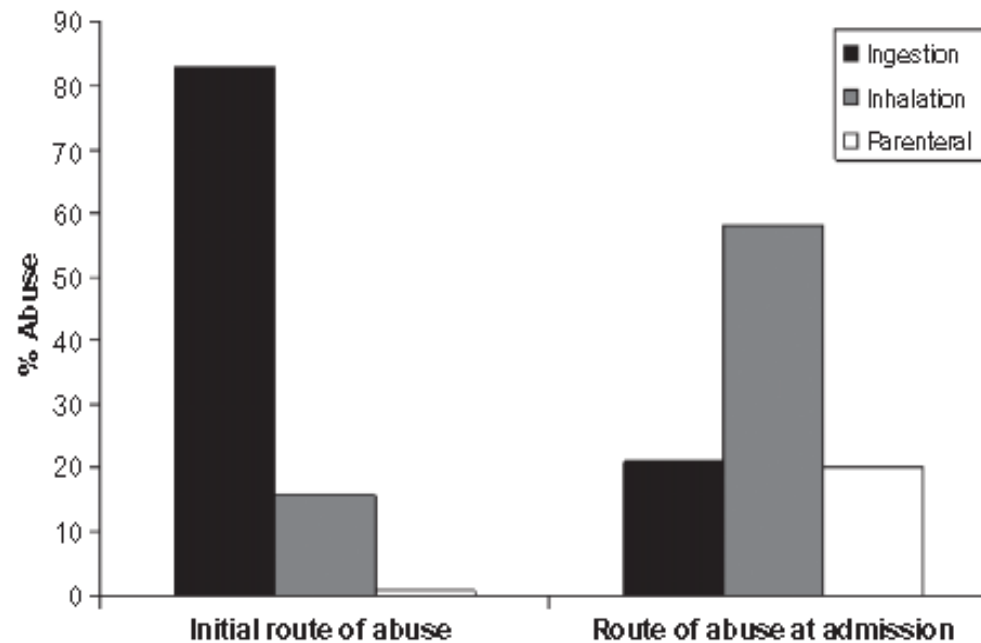


FIGURE 3. Initial route of abuse versus route of abuse at admission in a substance abuse treatment center.

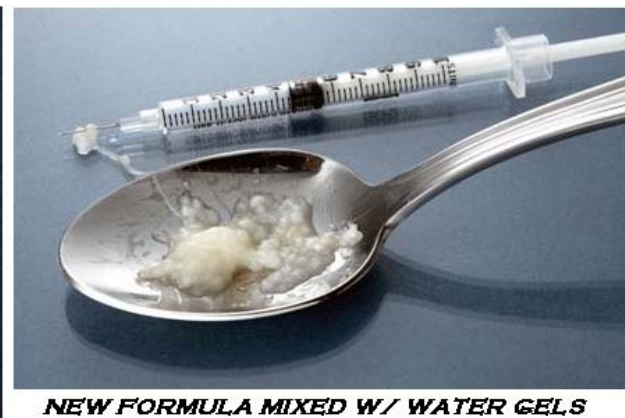
Source: Data from Hays et al. (21).

Katz, et al. Am J Drug Alcohol Abuse 2011

Can We Formulate a Solution to Rx Drug Abuse?

The Abuse Deterrent Formulations

OxyContin, Opana ER, Exalgo, Nucynta ER

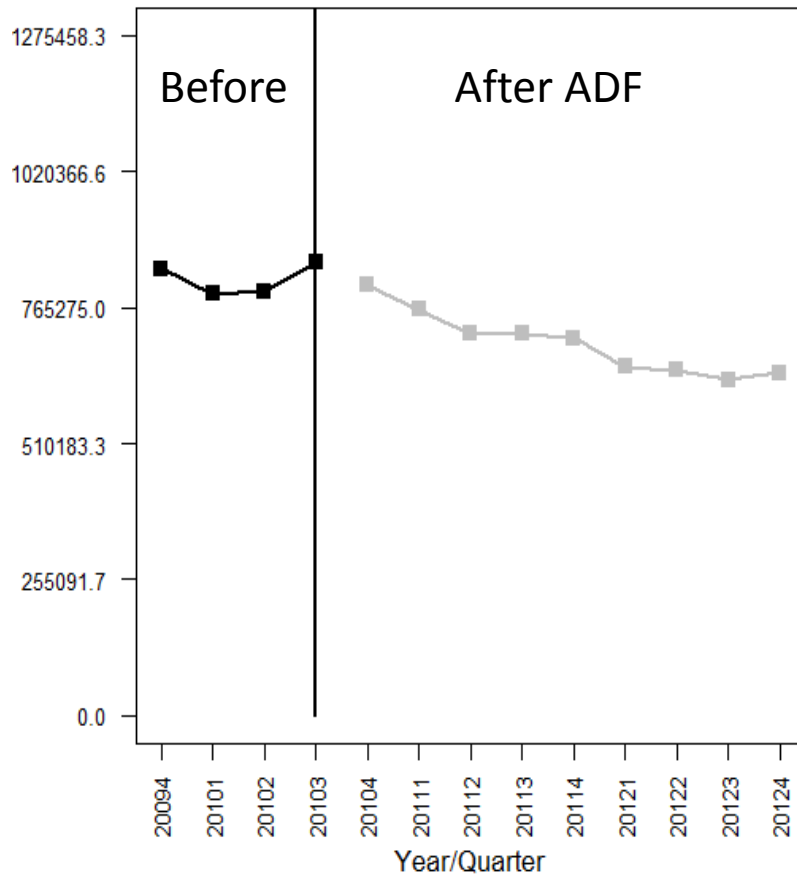


Tamper Resistant Strategies

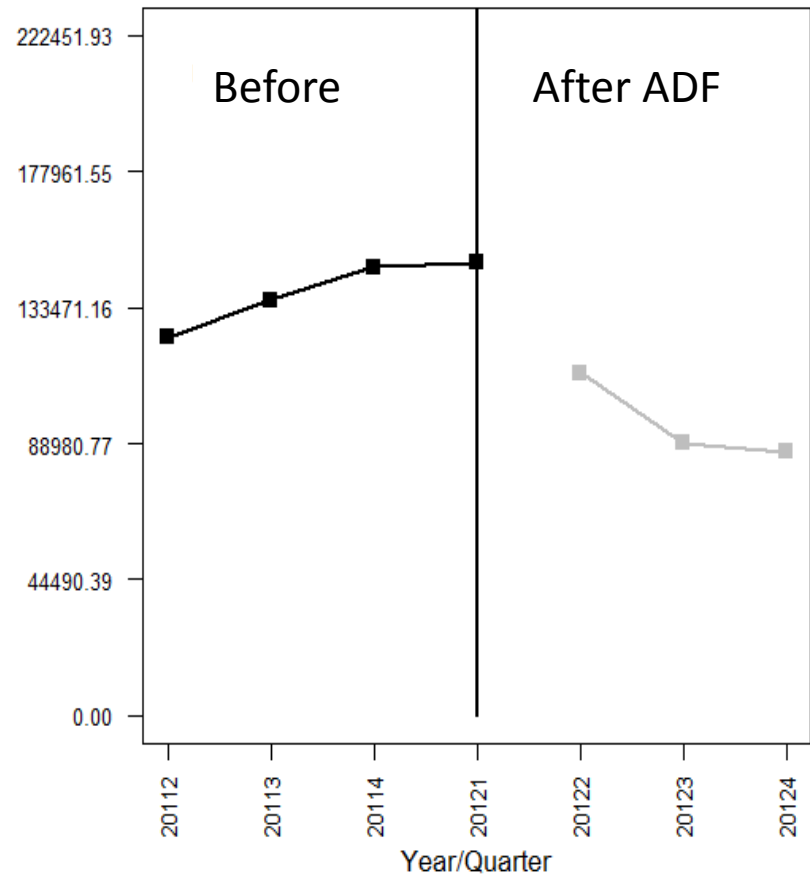
- Hard coatings which resist crushing
- Polymers which turn to viscous gel when heated
- Polymers which resist dissolving in water and alcohol
- Nasal tissue irritants
- Novel delivery systems (patches, implants, etc.)

Number of People Filling a Prescription for OxyContin® or Opana® ER

OxyContin®



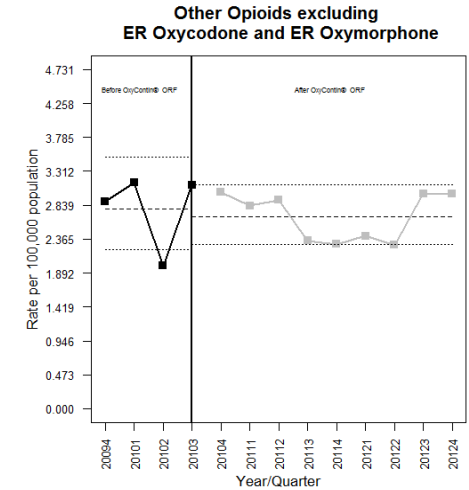
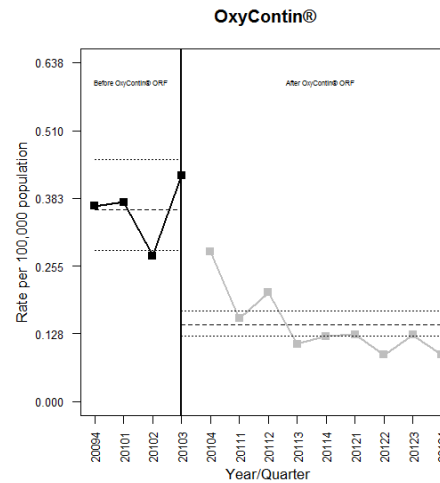
Opana® ER



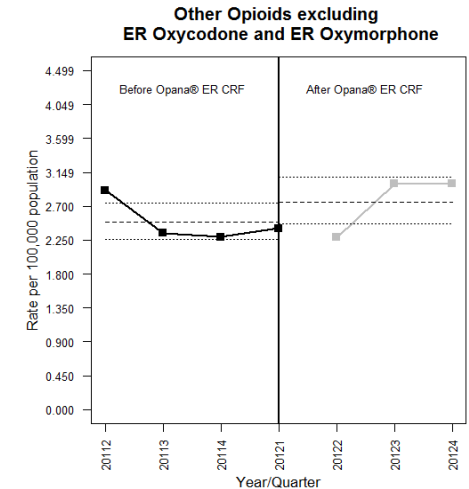
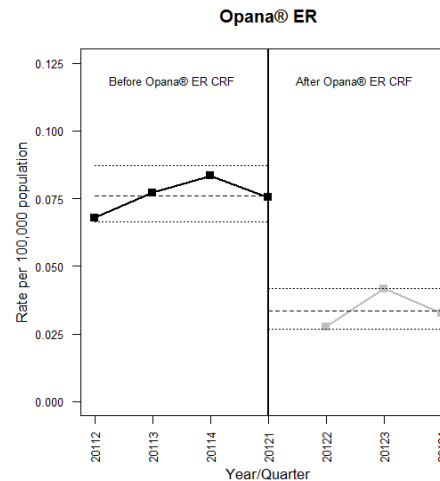
Drug Diversion Program

Abuse Deterrent Formulations

OxyContin

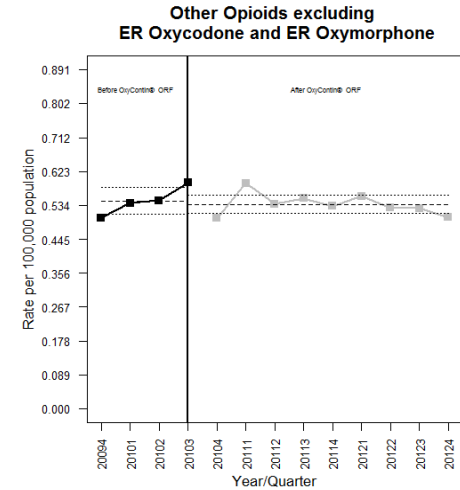
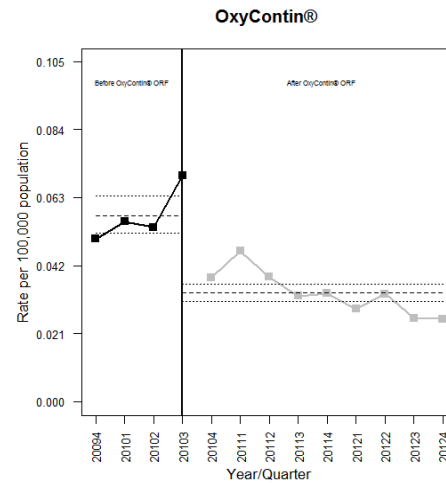


Opana ER

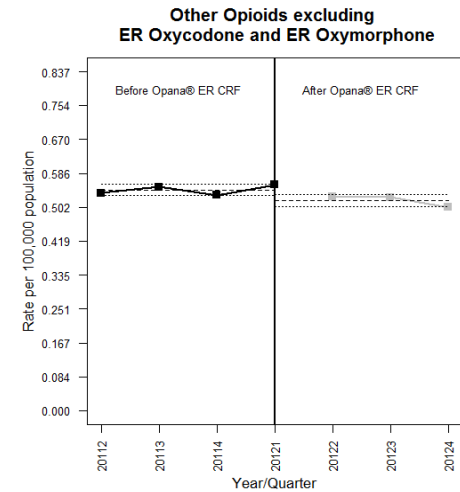
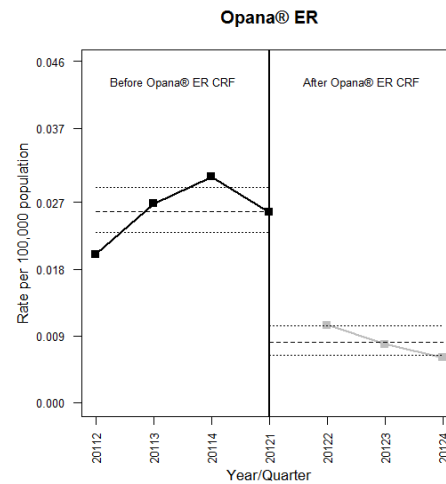


Poison Center Program Abuse Deterrent Formulations

OxyContin

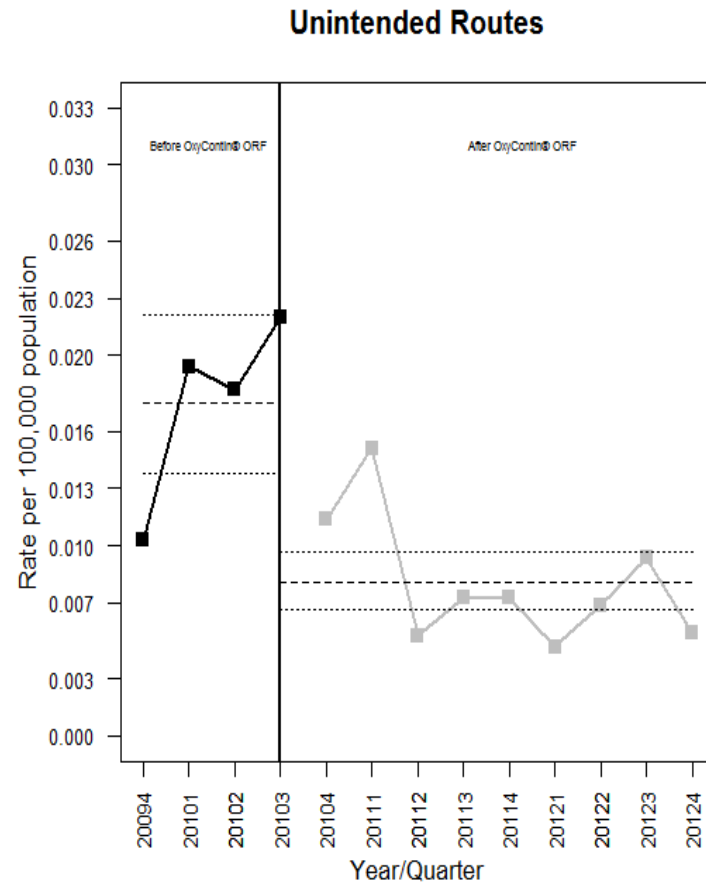
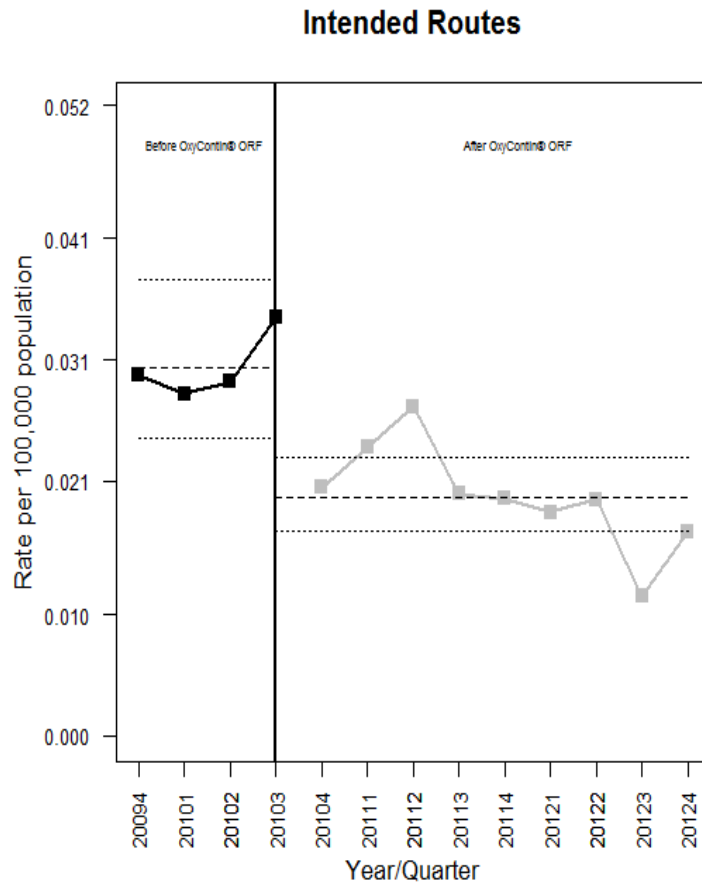


Opana ER



Poison Center Program

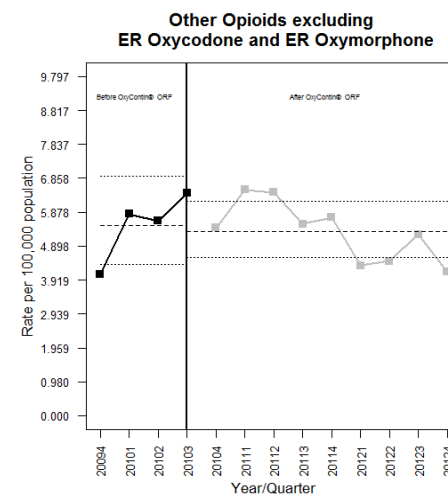
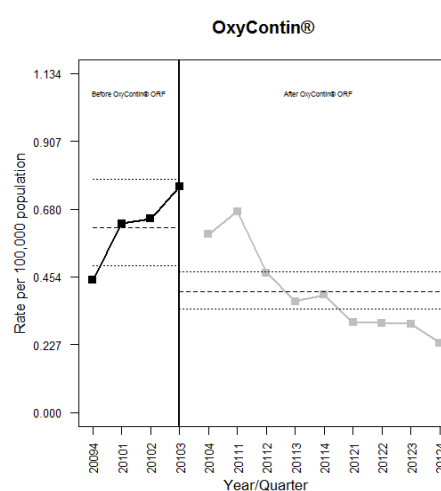
Route of Abuse



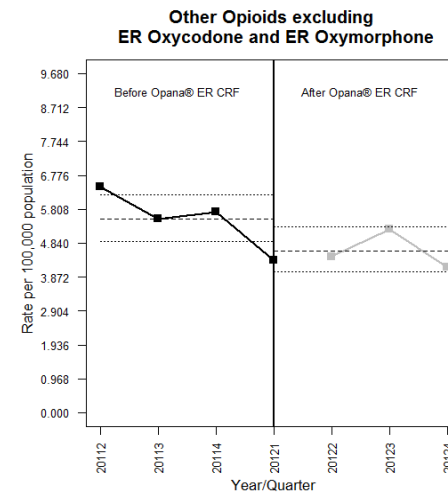
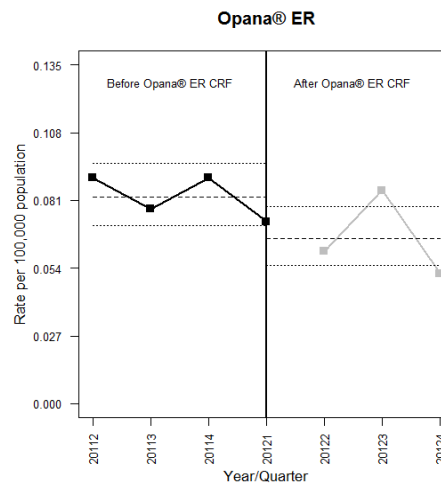
Treatment Programs

Abuse Deterrent Formulations

OxyContin



Opana ER



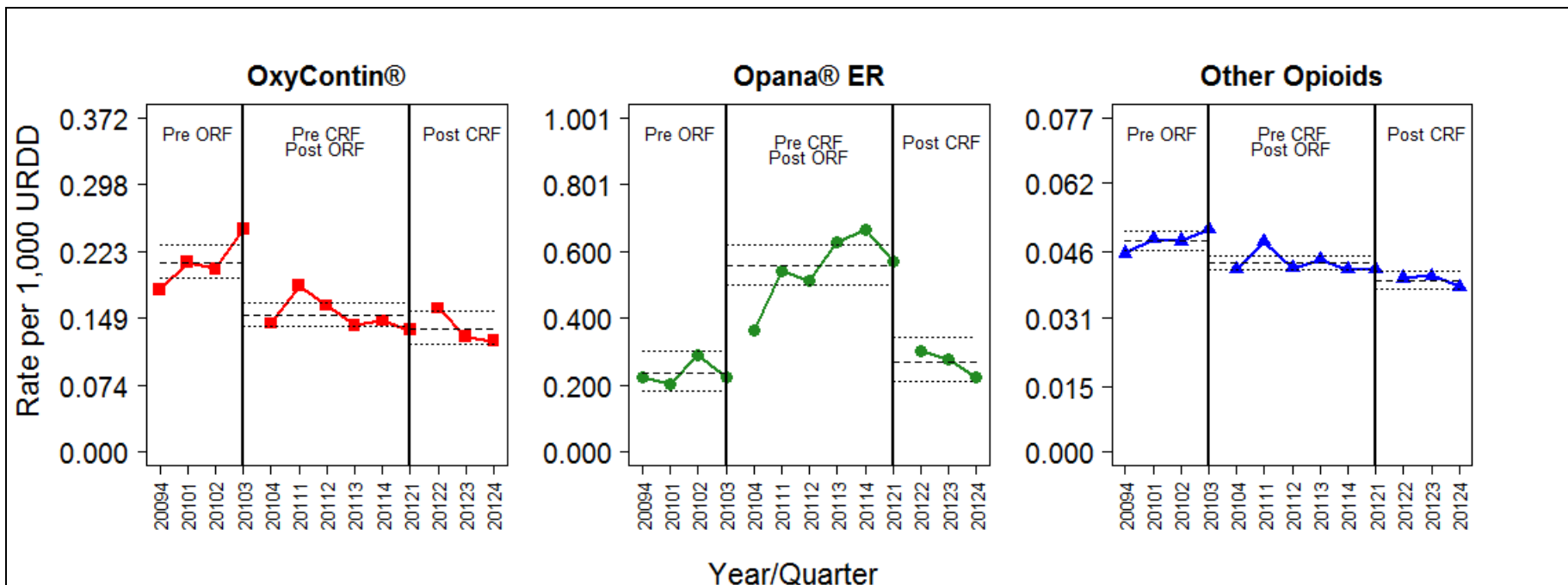
Oxymorphone: Squeezing the Balloon?



Poison Center Program

Contacts Involving Intentional Abuse

OxyContin®, Opana® ER, Other Opioids



ORF = OxyContin ADF, CRF = Opana ER ADF

Intentional Abuse: An exposure resulting from intentional improper or incorrect use of a substance where the victim was likely attempting to gain a high, euphoric effect or some other psychotropic effect.

Conclusions

- Prescription drug abuse affects all countries
- Hydrocodone and oxycodone are the most prevalent drugs abuse
- Oxymorphone and methadone are most abused when drug supply is considered
- Abuse deterrent formulations appear to be effective
 - State Attorneys General
 - FDA