

Buprenorphine Misuse, Abuse and Diversion in the RADARS[®] System

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Acknowledgements

Key Informant Signal Detection System

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Drug Diversion Signal Detection System

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Opioid Treatment Program Signal Detection System

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Opioid Dependence (AATOD)

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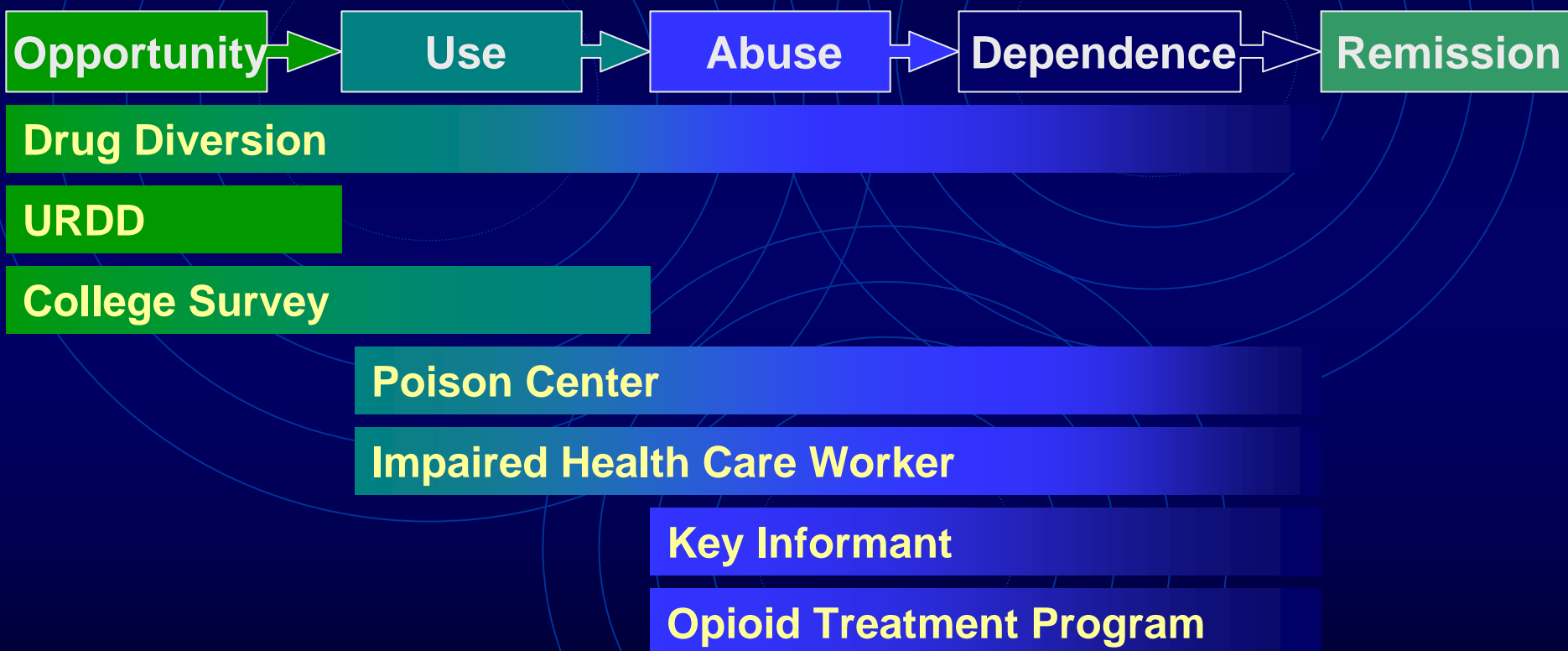
Disclosure of Potential Conflicts of Interest

- The RADARS System
 - Governmental nonprofit operation of the Rocky Mountain Poison and Drug Center, Denver Health and Hospital Authority
 - Provides data to industry and researchers on a subscription basis. RMPDC employees receive their salary for their participation in system operations and research activities.
- Reckitt Benckiser Pharmaceuticals Inc., supported the pediatric analyses through an unrestricted educational grant but did not participate in the study design or analysis.

Outline

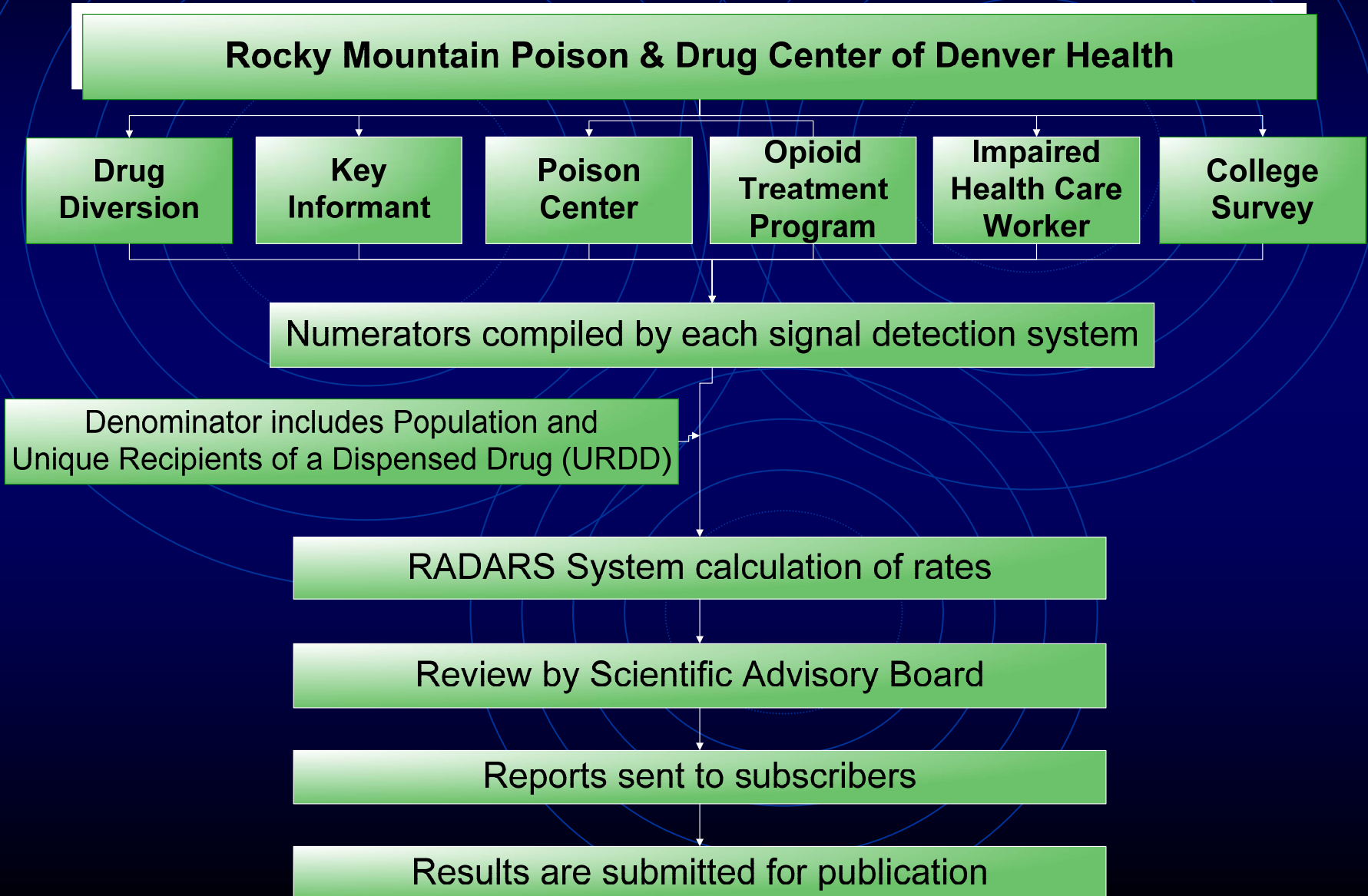
- Overview of the Researched Abuse, Diversion and Addition Related Surveillance (RADARS) System
- Buprenorphine Abuse and Diversion
 - Overview
 - Mortality Data
 - Pediatric Exposures

Drug Dependence Pathway



Modified from Chilcoat HD, Johanson CE. Vulnerability to Cocaine Abuse. Higgins ST, Ed. *Cocaine Abuse: Behavior, Pharmacology, and Clinical Applications*. San Diego, CA: Academic Press; 1998: 313-341. Institute of Medicine – Committee on Opportunities in Drug Abuse Research. *Pathways of Addiction*. Washington, DC: National Academy Press; 1996.

RADARS System Organization



Tale of Two Denominators

- Populations
 - Tried and true
 - Doesn't account for drug availability
- Unique recipients of dispensed drug (URDD)
 - Number of people filling a prescription for specific drug
 - Accounts for availability of drug in community

Scientific Advisory Board

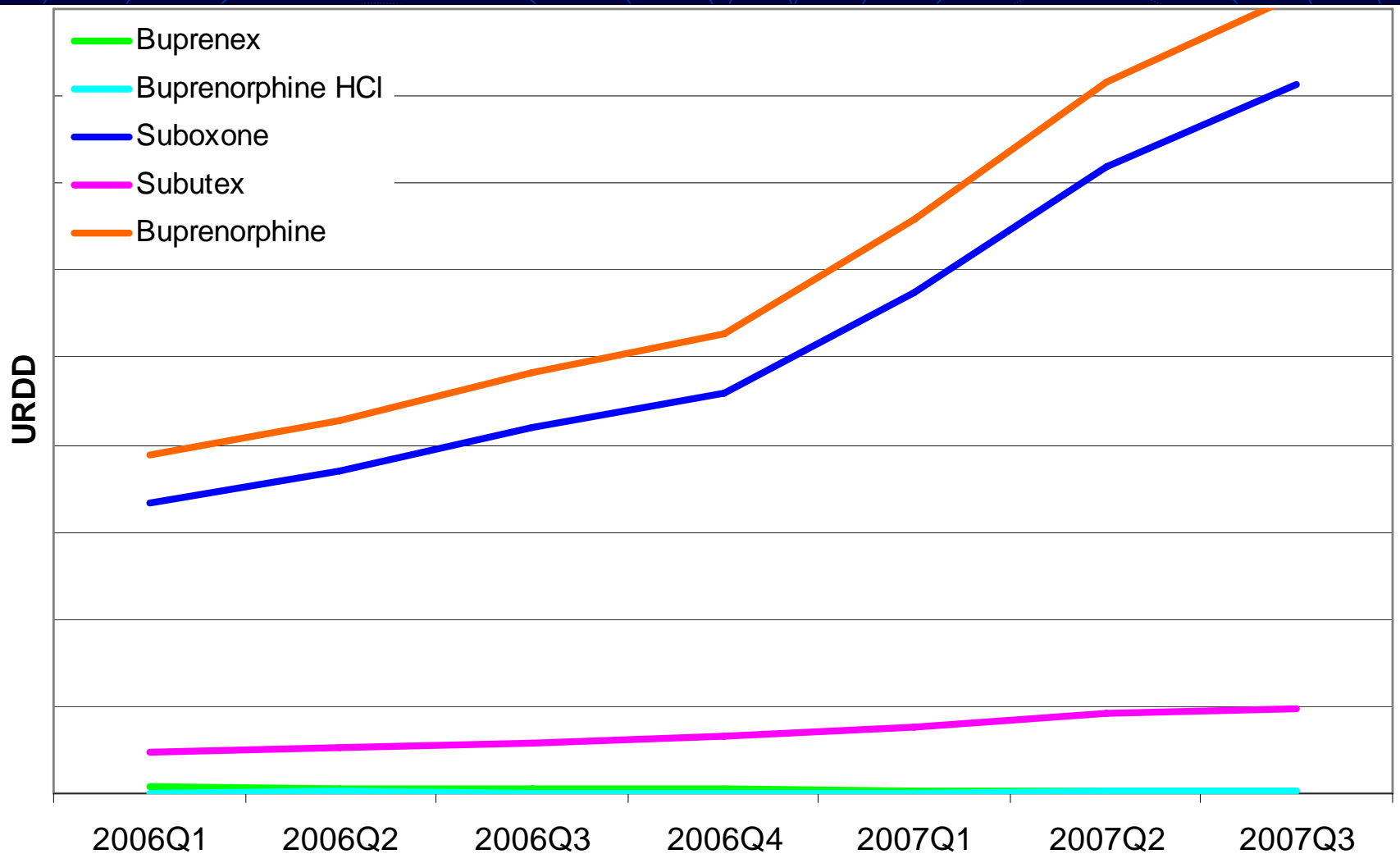
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- George E. Woody, MD, Professor, University of Pennsylvania

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Buprenorphine Abuse and Diversion Overview

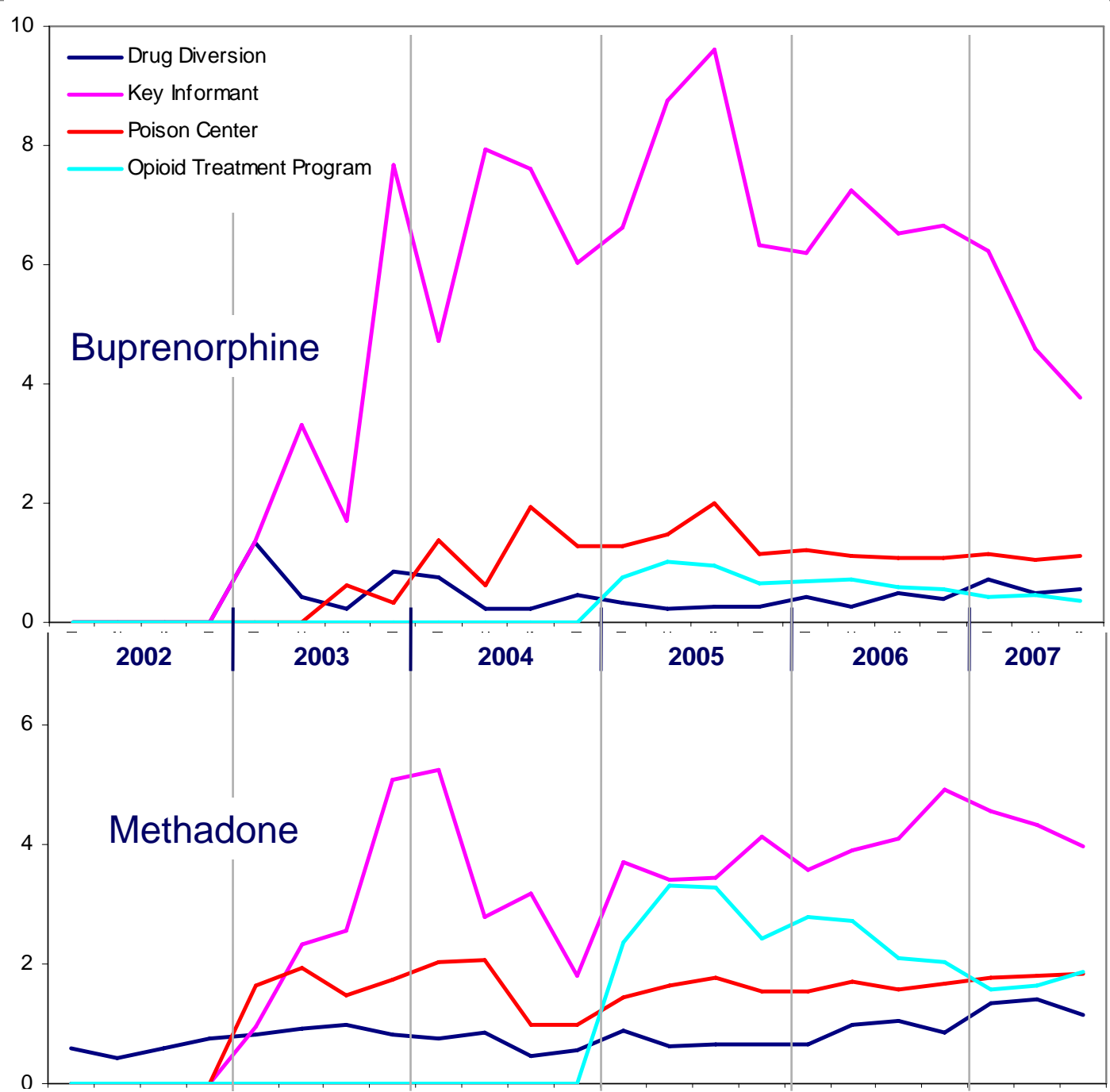
RADARS[®] System

Unique Recipients of Dispensed Drug (URDD)



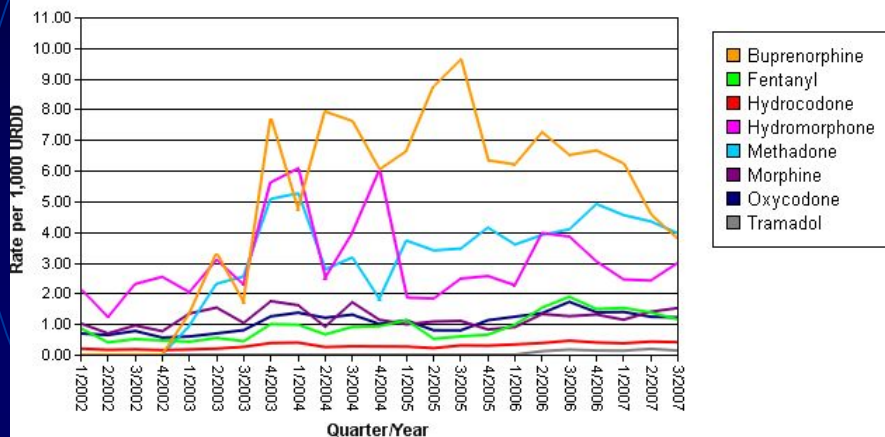
RADARS System

Abuse & Diversion Rates 2002-07

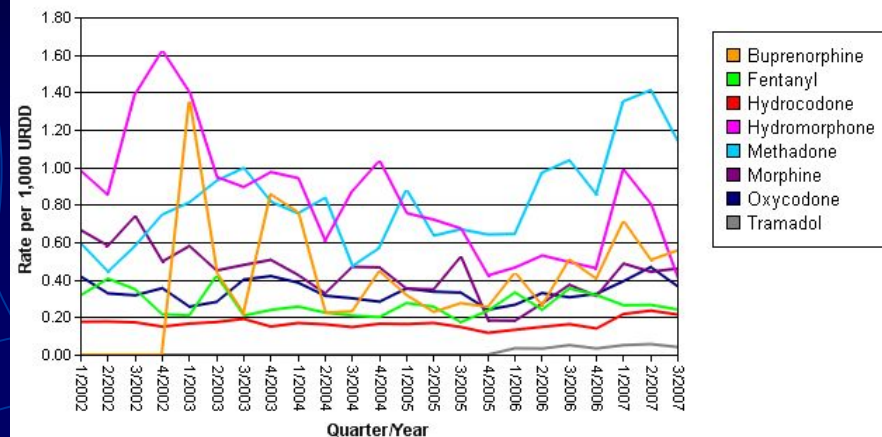


Abuse, Misuse and Diversion Rates per 1,000 URDD

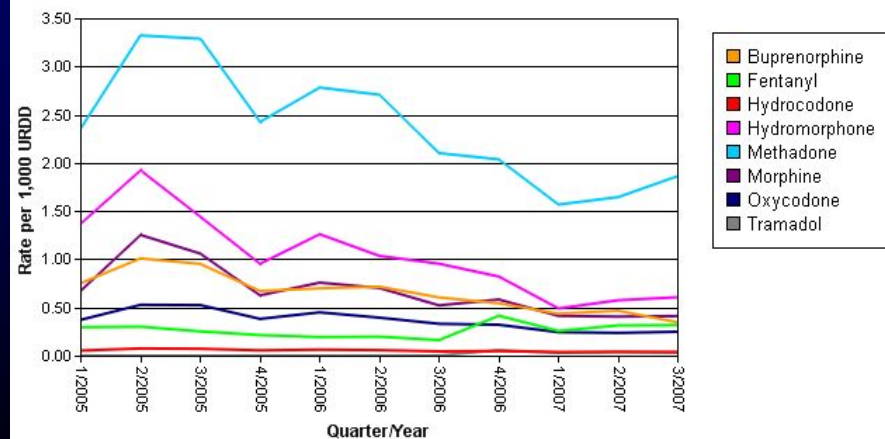
Drug Diversion



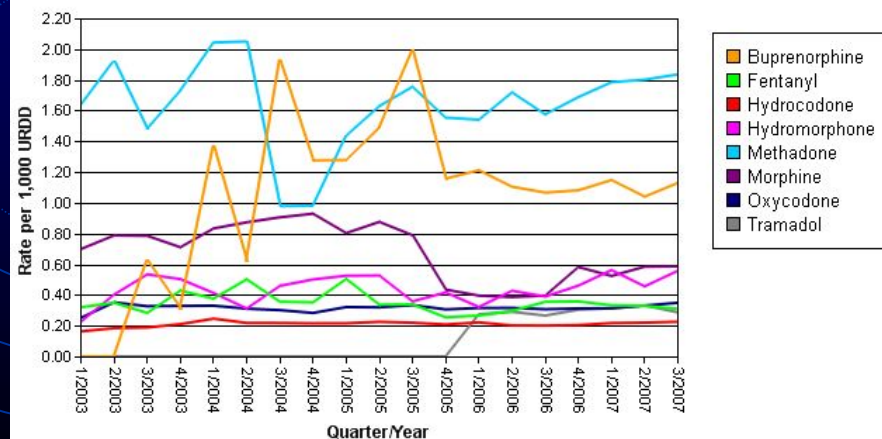
Key Informant



Opioid Treatment Program



Poison Center

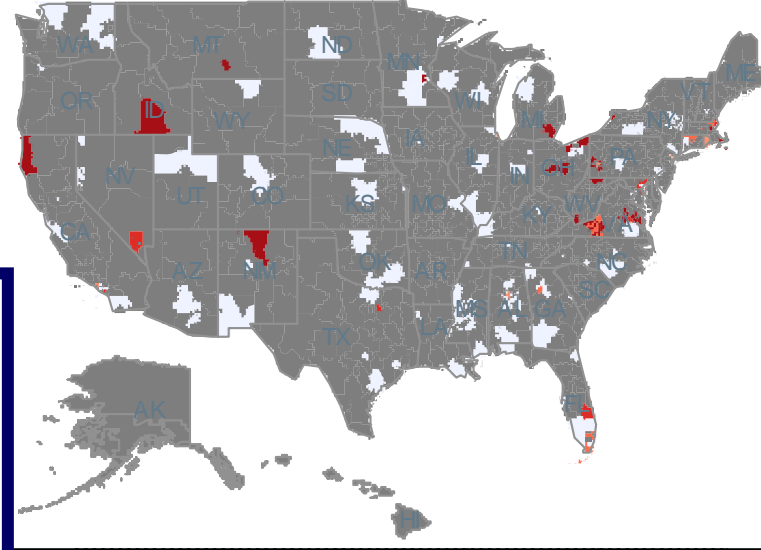
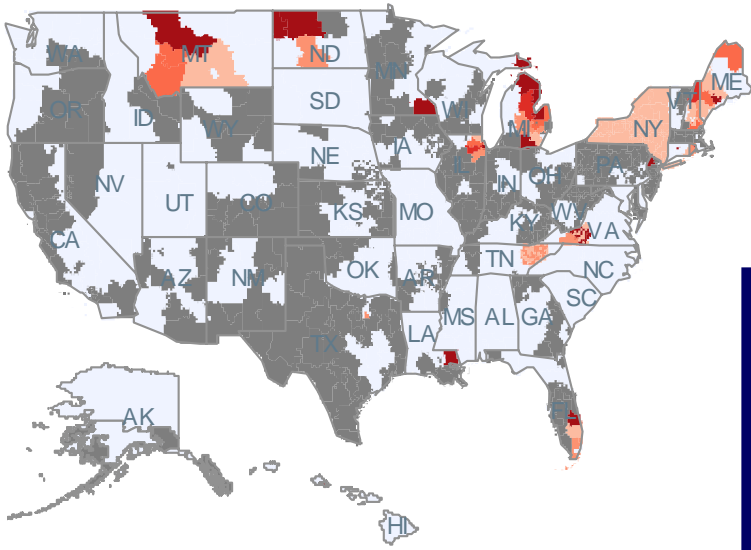


Buprenorphine Rates per 1,000 URDD

3rd Quarter 2007

Drug Diversion

Key Informant

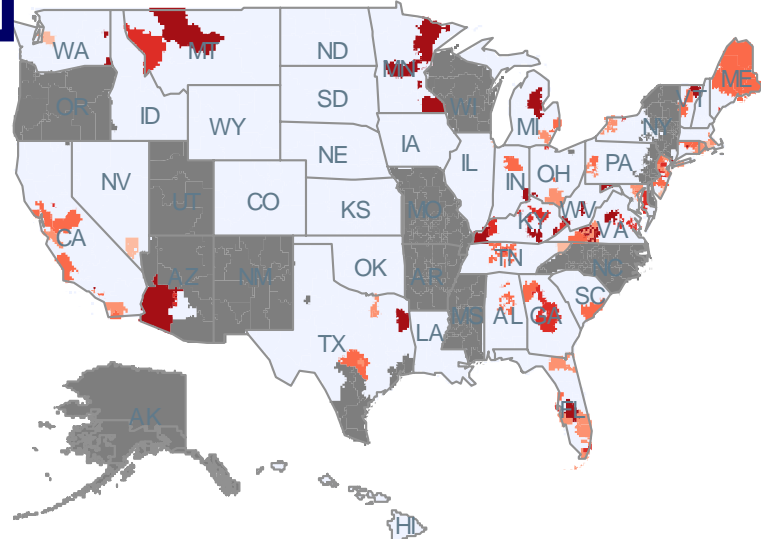
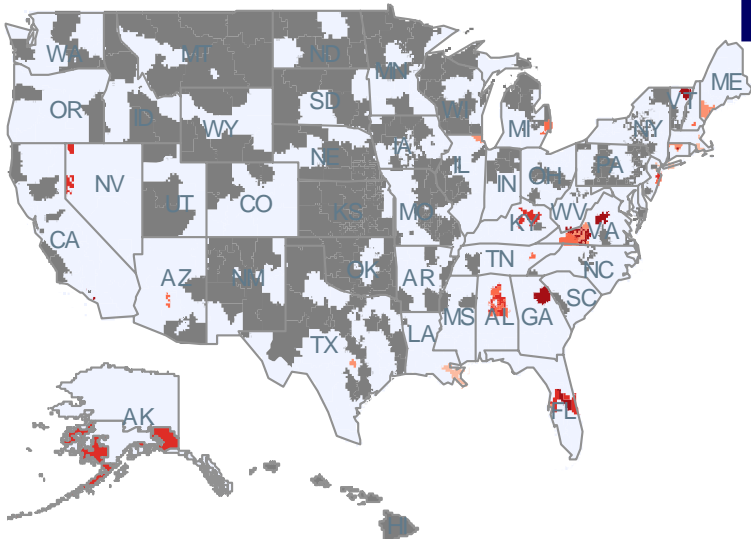


Cases/1,000 URDD

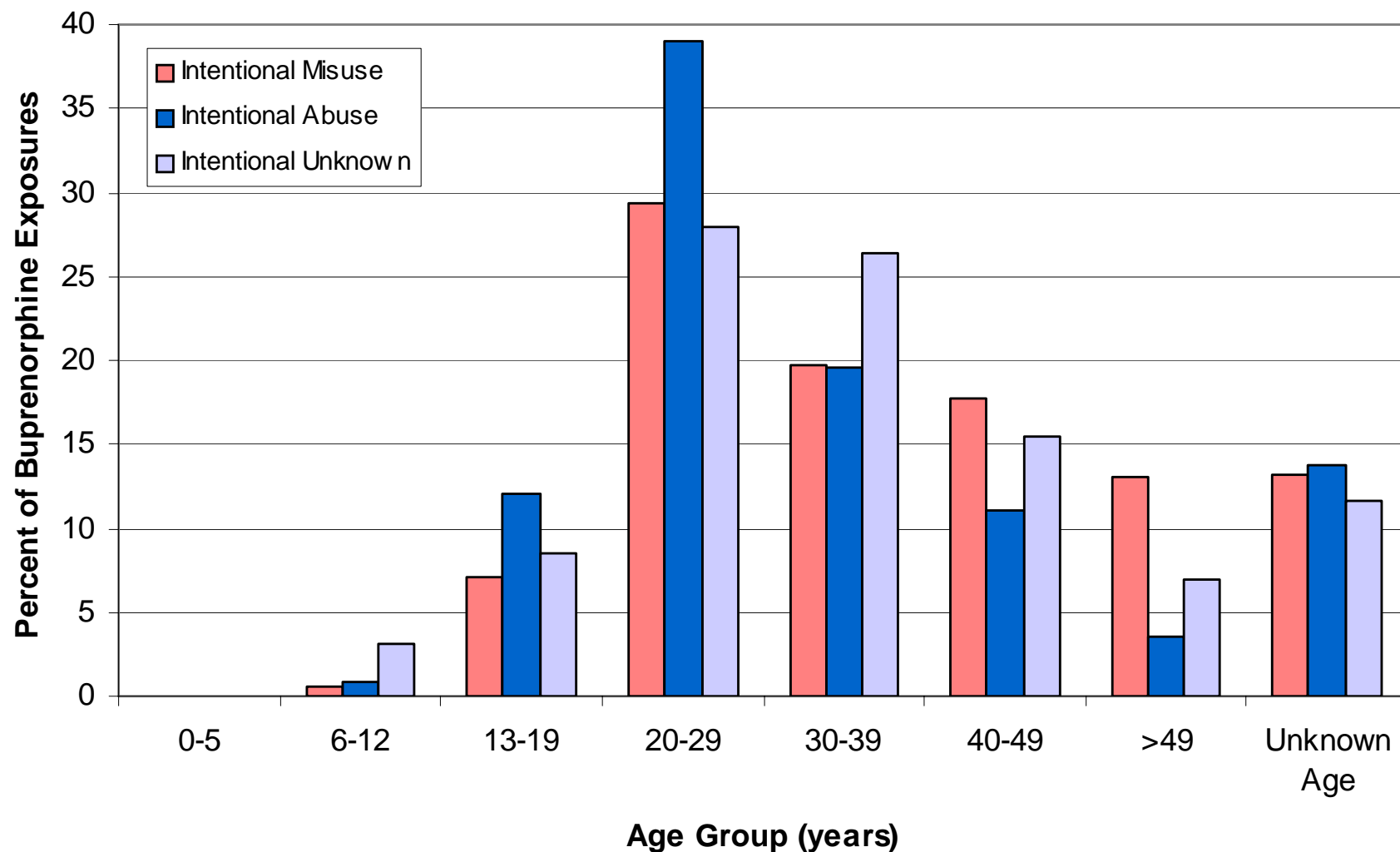
- > 10
- 5.01 - 10
- 2.01 - 5
- 1.01 - 2
- 0.01 - 1
- 0.00
- Noncovered

Opioid Treatment Program

Poison Center



RADARS System Poison Center Buprenorphine Exposures



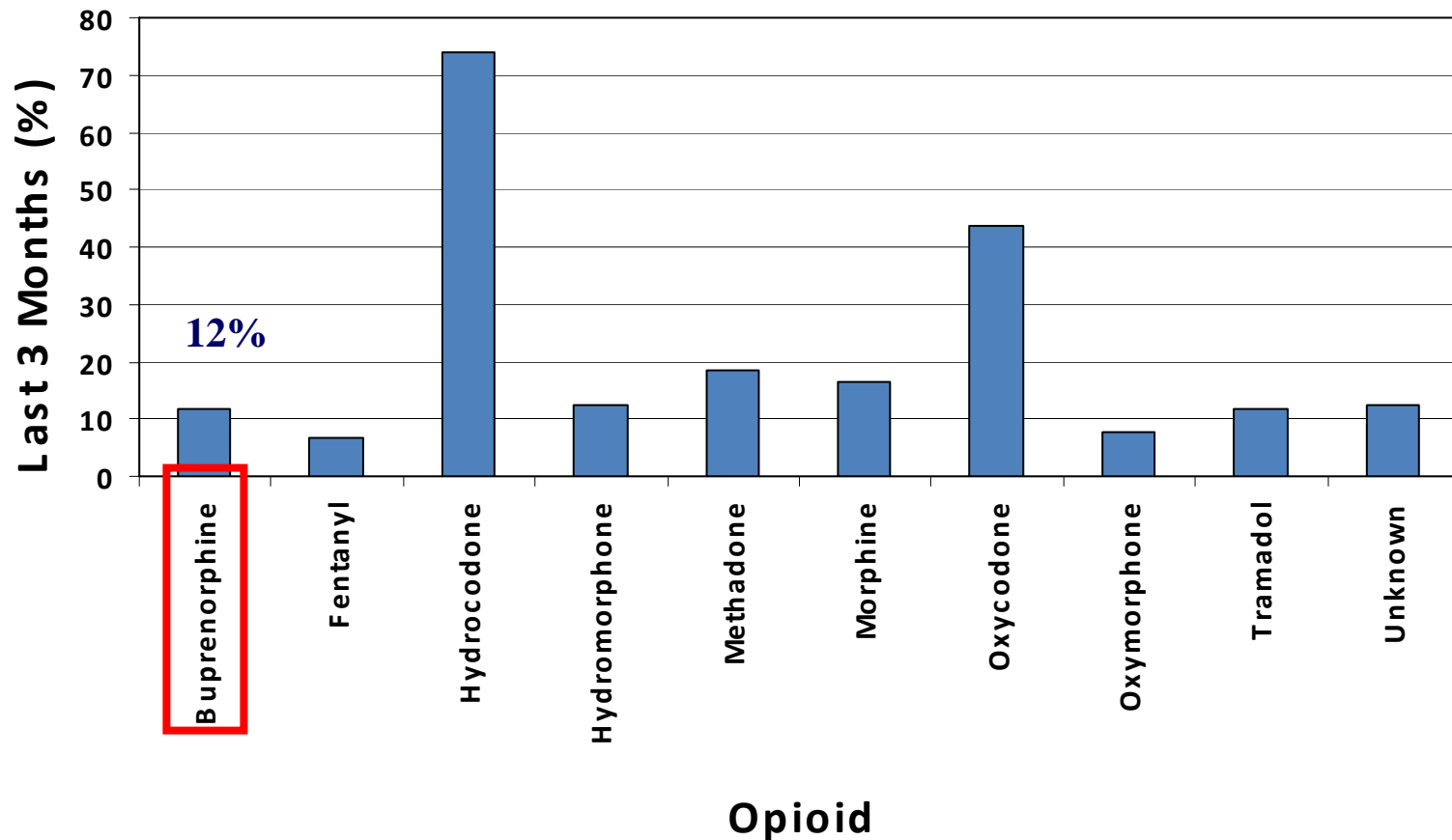
Methadone Programs

Table 1
Opioid abuse among MMTP enrollees, by primary drug of choice

	Prescription opioid (<i>n</i> = 2174) (%)	
	Ever	Past 30 days
Heroin	33	13
Prescription opioids	100	99
Oxycodone, any formulation	89	79
CR-Oxycodone (e.g., OxyContin [®])	89	71
IR-Oxycodone (e.g., Percocet [®])	81	59
Hydrocodone (e.g., Vicodin [®])	88	67
Methadone	58	40
Morphine	59	29
Hydromorphone (e.g., Dilaudid [®])	37	16
Fentanyl	30	9
Buprenorphine	5	1
Ever injected primary drug	33	<i>n/a</i>

RADARS System College Survey

Abuse & Misuse by Self Identified College Students





Poison Center Data

RADARS[®] System

Buprenorphine Methodology

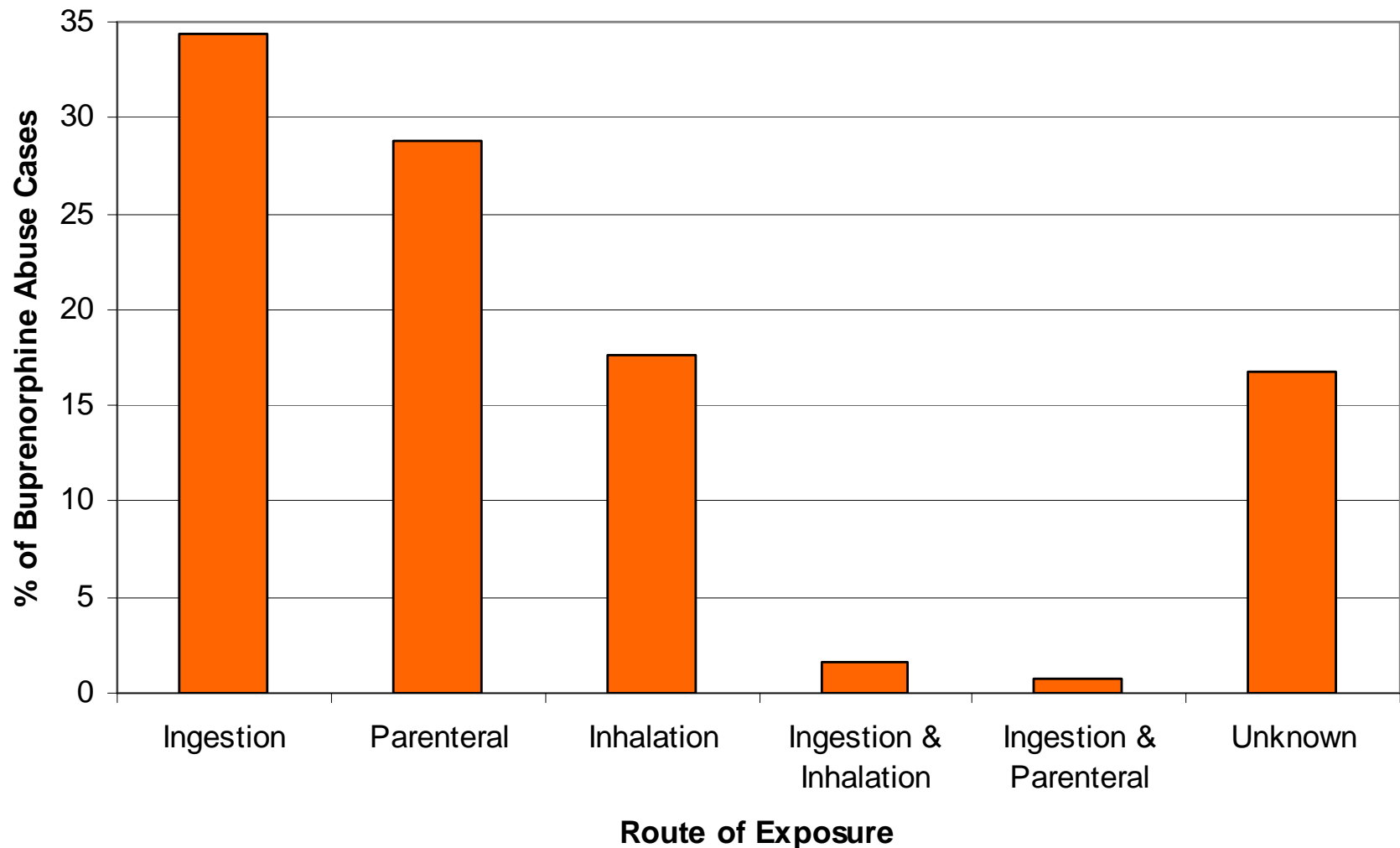
- Data collected from 2003 – 2007Q2
 - 11 of 60 US centers (18%) in 1st quarter 2003
 - 43 of 60 US centers (72%) in 2nd quarter 2007
- All intentional exposure case notes were reviewed for abuse
 - “injected”, “snorted”, “abused”, “to get high”, “recreationally”, and similar terms

RADARS System Poison Centers Buprenorphine Results

- 125 cases were abuse cases as defined in the methodology
- Mean age: 27 years
- 65% male
- 7% described chronic buprenorphine abuse in case notes

RADARS System Poison Centers

Route of Exposure



RADARS System Poison Centers Mortality Data

- Poison center “associated medical outcome”
- 5 deaths associated with buprenorphine intentional exposures
- None causally linked to death
- No pediatric deaths

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Buprenorphine Pediatric Exposures

RADARS[®] System

Rx Opioid Pediatric Exposures

RADARS System Poison Center 2003 - 2006

	<i>Buprenorphine</i> (n=176)	<i>Hydrocodone</i> (n=6,003)	<i>Fentanyl</i> (n=123)	<i>Oxycodone</i> (n=2,036)
Age Mean (SD)	2.1 (0.9)	2.3 (1.2)	2.0 (1.2)	2.1 (1.1)
Male N (%)	99 (56.3) Referent	3,232 (53.9) OR 1.1 (0.81, 1.5)	64 (52.5) OR 1.2 (0.75, 1.89)	1,081 (53.5) OR 1.1 (0.83, 1.54)
Site N (%)				
Own Home	169 (96.0) Referent	5,581 (93.0) OR 1.8 (0.85, 3.91)	111 (90.2) OR 2.6 (1.00, 6.83)	1,821 (89.4) OR 2.8 (1.32, 6.15)
Other Home	3 (1.7)	335 (5.6)	4 (3.3)	155 (7.6)
Route N (%)				
Ingestion	175 (99.4) Referent	5,993 (99.8) OR 0.29 (0.04, 2.30)	77 (62.6) OR 104.5 (14.2, 771)	2,020 (99.1) OR 1.39 (0.18, 10.5)

Rx Opioid Pediatric Exposures

RADARS System Poison Center 2003 - 2006

	<i>Exposure Mentions (URDD Rate)</i>	<i>Mentions Associated with Major Outcome (URDD Rate)</i>	<i>Mentions Associated with Death (URDD Rate)</i>
Buprenorphine	0.5	0.02	0
Fentanyl	0.03	0.0008	0
Hydrocodone	0.06	0.00006	0.00002
Hydromorphone	0.06	0	0
Methadone	0.2	0.006	0.0008
Morphine	0.1	0.001	0
Oxycodone	0.06	0.0003	0.0001

Conclusion

- Buprenorphine use increased dramatically after introduction of new products
- National rates have stabilized or decreased since 2006
- Abuse and diversion is widespread
 - Similar distribution as other prescription opioids
 - Second to methadone – both high risk populations
- Concerns: age of abusers, pediatric exposures
 - Few deaths in adults – none in children

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