RADARS® System
Subutex & Suboxone: How Much is Prescribed vs. Abuse/Diversion Reports

Nabarun Dasgupta, MPH
Researcher, RADARS System
Disclosure of Potential Conflicts of Interest

• The RADARS System is a governmental nonprofit operation of the Rocky Mountain Poison and Drug Center, an agency of Denver Health and Hospital Authority, and provides data to industry and researchers on a subscription basis. RMPDC employees only 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

- RADARS System Overview
- Buprenorphine Abuse and Diversion Overview
- Buprenorphine Abuse Data: Abstracted Poison Center Data
- Buprenorphine Mortality Data
- Buprenorphine Pediatric Exposures
RADARS System Organization

Rocky Mountain Poison & Drug Center of Denver Health

- Drug Diversion
- Key Informant
- Poison Center
- Opioid Treatment Program
- Impaired Health Care Worker
- College Survey

Numerator are compiled by each signal detection system

Denominator includes Population and Unique Recipients of a Dispensed Drug (URDD)

RADARS System calculation of rates

Review by Scientific Advisory Board

Reports sent to subscribers

Data results are submitted for publication
Six Views on Prescription Drug Abuse

Law Enforcement
- Drug Diversion
- Criminal justice perspective

Key Informant
- Dependent/addicted patients
- Health care provider perspective

Poison Center
- Acute incident – calling for care advice
- All ages and geographic regions

Opioid Treatment Program
- Dependent/addicted patients
- Patient perspective

Impaired Health Care Worker
- Subset of all signal detection systems
- Early adopter group?

College Survey
- Experimentation
- Early abuse perspective
Drug Dependence Pathway

Opportunity → Use → Abuse → Dependence → Remission

Drug Diversion
URDD
College Survey

Poison Center
Impaired Health Care Worker
Key Informant
Opioid Treatment Program

Buprenorphine Abuse and Diversion Overview

RADARS® System
RADARS System Signal Detection Studies --- Abuse & Diversion Rates 2002-07

Buprenorphine

Methadone
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

Opioid Treatment Program

Poison Center

Cases/1,000

- > 10
- 5.01 - 10
- 2.01 - 5
- 1.01 - 2
- 0.01 - 1
- 0.00
- Noncovered
Unique Recipients of Dispensed Drug (URDD)
# Buprenorphine Endorsement


<table>
<thead>
<tr>
<th>Table 1</th>
<th>Opioid abuse among MMTP enrollees, by primary drug of choice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescription opioid (n = 2174) (%)</td>
</tr>
<tr>
<td></td>
<td>Ever</td>
</tr>
<tr>
<td>Heroin</td>
<td>33</td>
</tr>
<tr>
<td>Prescription opioids</td>
<td>100</td>
</tr>
<tr>
<td>Oxycodone, any formulation</td>
<td>89</td>
</tr>
<tr>
<td>CR-Oxycodone (e.g., OxyContin®)</td>
<td>89</td>
</tr>
<tr>
<td>IR-Oxycodone (e.g., Percocet®)</td>
<td>81</td>
</tr>
<tr>
<td>Hydrocodone (e.g., Vicodin®)</td>
<td>88</td>
</tr>
<tr>
<td>Methadone</td>
<td>58</td>
</tr>
<tr>
<td>Morphine</td>
<td>59</td>
</tr>
<tr>
<td>Hydromorphone (e.g., Dilaudid®)</td>
<td>37</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>30</td>
</tr>
<tr>
<td>Buprenorphine</td>
<td>5</td>
</tr>
<tr>
<td>Ever injected primary drug</td>
<td>33</td>
</tr>
</tbody>
</table>
RADARS System College Survey
Abuse & Misuse by Self Identified College Students

12%
Buprenorphine Abuse Data: Abstracted Poison Center Data

RADARS® System
Buprenorphine Case Abstraction 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
Buprenorphine Case Abstraction

Results

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

% of Buprenorphine Abuse Cases

Route of Exposure:
- Ingestion
- Parenteral
- Inhalation
- Ingestion & Inhalation
- Ingestion & Parenteral
- Unknown
Buprenorphine
Poison Center
Mortality Data
RADARS® System
Mortality Data Methodology

- Poison center “associated medical outcome”
- Poison center intentional exposures
- Data collected from 2003 – 2007Q3
  - 11 of 60 US centers (18%) in 1st quarter 2003
  - 43 of 60 US centers (72%) in 3rd quarter 2007
- 5 deaths associated with buprenorphine intentional exposures
- Not causally linked to death
Buprenorphine Pediatric Exposures

RADARS® System
## Rx Opioid Pediatric Exposures
### RADARS System Poison Center 2003 - 2006

<table>
<thead>
<tr>
<th></th>
<th>Buprenorphine (n=176)</th>
<th>Hydrocodone (n=6,003)</th>
<th>Fentanyl (n=123)</th>
<th>Oxycodone (n=2,036)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age Mean (SD)</strong></td>
<td>2.1 (0.9)</td>
<td>2.3 (1.2)</td>
<td>2.0 (1.2)</td>
<td>2.1 (1.1)</td>
</tr>
<tr>
<td><strong>Male N (%)</strong></td>
<td>99 (56.3)</td>
<td>3,232 (53.9)</td>
<td>64 (52.5)</td>
<td>1,081 (53.5)</td>
</tr>
<tr>
<td>Referent</td>
<td>1.1 (0.81, 1.5)</td>
<td>OR 1.2 (0.75, 1.89)</td>
<td>OR 1.1 (0.83, 1.54)</td>
<td></td>
</tr>
<tr>
<td><strong>Site N (%)</strong></td>
<td>169 (96.0)</td>
<td>5,581 (93.0)</td>
<td>111 (90.2)</td>
<td>1,821 (89.4)</td>
</tr>
<tr>
<td>Own Home</td>
<td>OR 1.8 (0.85, 3.91)</td>
<td>OR 2.6 (1.00, 6.83)</td>
<td>OR 2.8 (1.32, 6.15)</td>
<td></td>
</tr>
<tr>
<td>Referent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Home</td>
<td>3 (1.7)</td>
<td>335 (5.6)</td>
<td>4 (3.3)</td>
<td>155 (7.6)</td>
</tr>
<tr>
<td><strong>Route N (%)</strong></td>
<td>175 (99.4)</td>
<td>5,993 (99.8)</td>
<td>77 (62.6)</td>
<td>2,020 (99.1)</td>
</tr>
<tr>
<td>Ingestion</td>
<td>OR 0.29 (0.04, 2.30)</td>
<td>OR 104.5 (14.2, 771)</td>
<td>OR 1.39 (0.18, 10.5)</td>
<td></td>
</tr>
</tbody>
</table>
## Rx Opioid Pediatric Exposures
### RADARS System Poison Center 2003 - 2006

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

- Buprenorphine abuse and diversion appears to be localized, but occurs in many parts of the country
- While there was an initial increase in abuse/diversion reports, rates appear to have stabilized or decreased since 2006
- Buprenorphine abuse/diversion follow similar patterns to other opioids
Acknowledgements

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Chunki Fong, *Project Director and Senior Methodologist*, National Development and Research Institutes, Inc. (NDRI)
RADARS System Contact

Elise Bailey, MSPH
RADARS System Manager
Rocky Mountain Poison and Drug Center
(303) 739-1297
Elise.Bailey@rmpdc.org