

Prescription Drug Monitoring Programs: Evaluation of Effectiveness

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Disclosures

- Rocky Mountain Poison and Drug Center
 - Division of Denver Health and Hospital Authority, a Colorado governmental entity
 - No bonus or incentive compensation
 - Operates the RADARS[®] System
 - Collects data about prescription drug diversion, abuse, and misuse for research and pharmacovigilance
 - Funded by subscription fees
- No personal or family conflicts

Outline

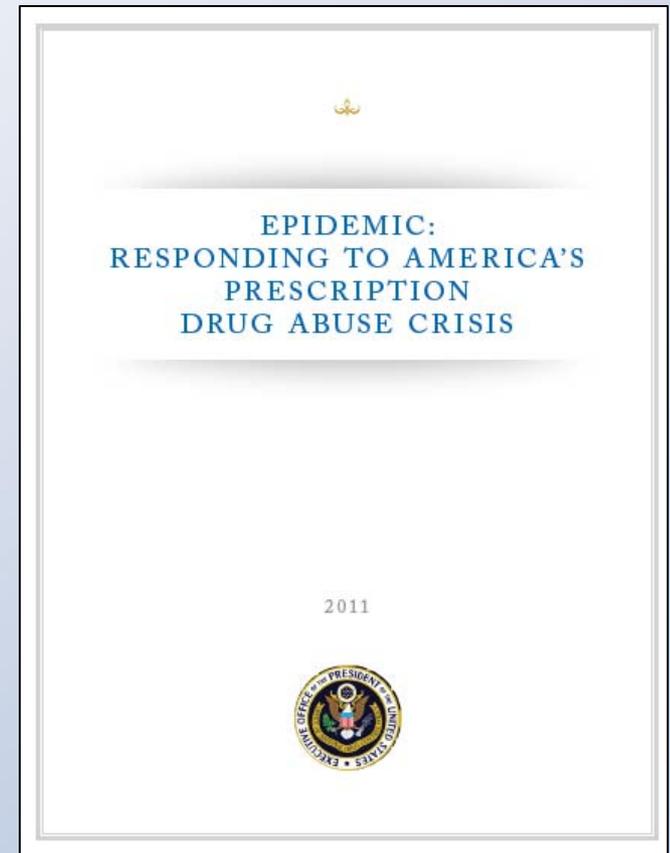
- Discuss structure and operational characteristics of PDMPs
- Review key literature about PDMP effectiveness
- Present new data
 - Hydrocodone
 - Schedule II opioids
- Knowledge gaps

Prescription Drug Monitoring Programs

- White House designated priority strategy

Prescription Drug Abuse Plan Goals:

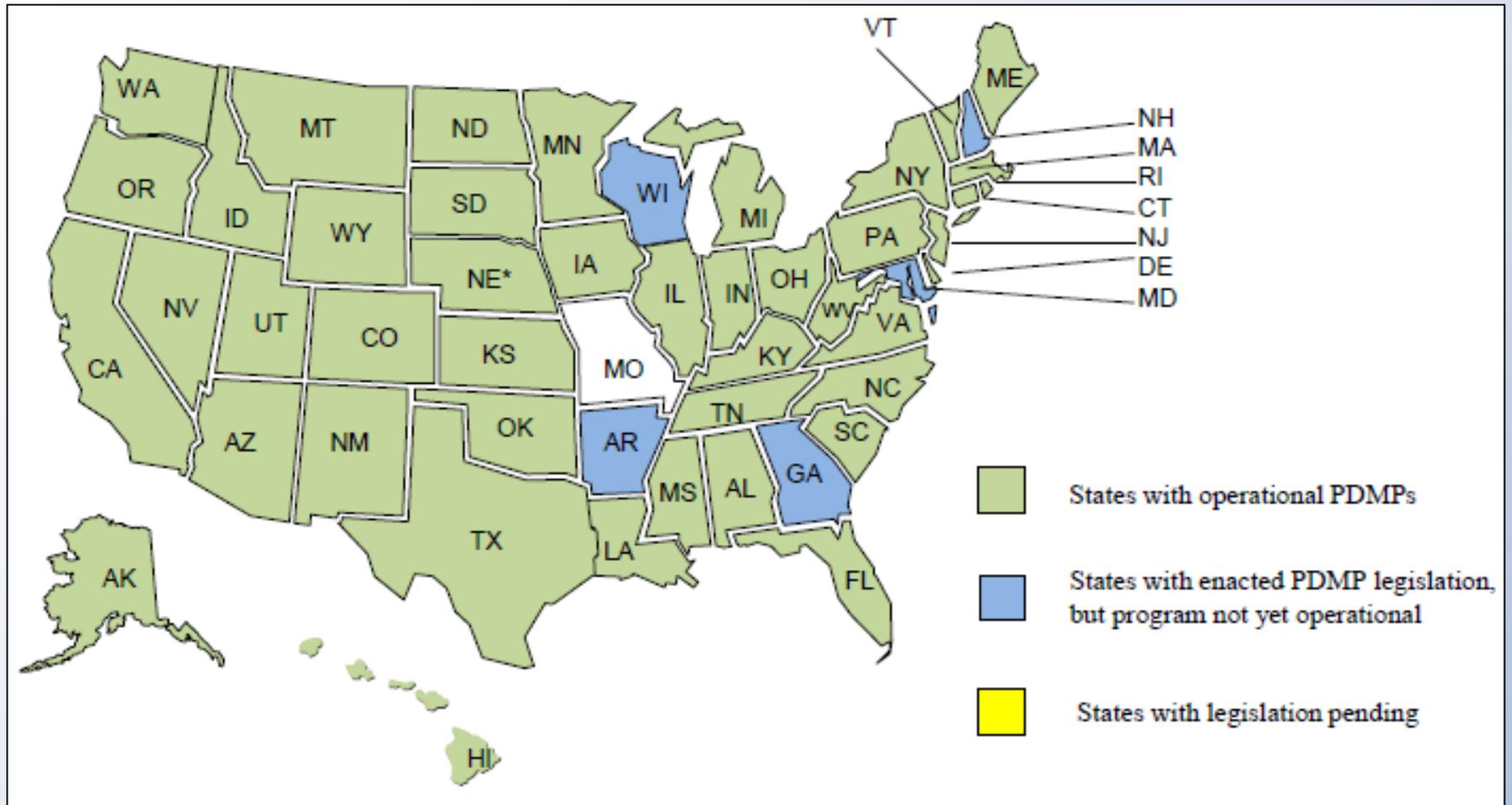
- Have legislation in all 50 states establishing Prescription Drug Monitoring Programs within 36 months



Prescription Drug Monitoring Programs

- State-based with federal funding
- Monitor patient and provider behavior
- Wide variety in
 - Governance & intent
 - Ease of use
- Integration between states in early implementation

PDMPs Operational in 44 States



Simeon 2006

- Ecological study, 1999 – 2005
- Categorized PDMPs as extensive, active, or not active by year
- Outcomes studied: Drug supply (ARCOS) and treatment admissions (TEDS)
- Main results – PDMP states had:
 - Less increase in schedule II opioid supply
 - Least increase in extensive PDMP states
 - Similar rise in treatment admission rates for Rx opioids

Reisman 2009

- Ecological study, 1997 – 2003
- 14 states with PDMP programs through the entire study period
- Outcomes studied: Drug supply (ARCOS) and treatment admissions (TEDS)
- Main results – PDMP states had:
 - Significant reduction in the rise of oxycodone shipments
 - Less increase in Rx opioid treatment admissions

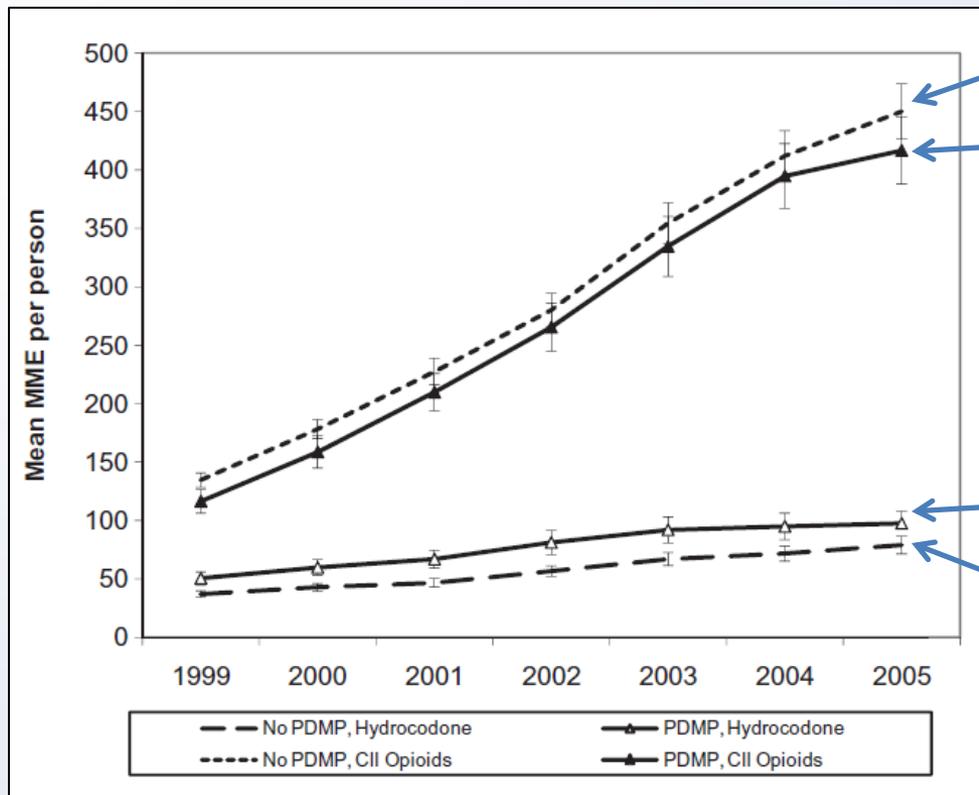
Paulozzi 2011

- Ecological study, 1999 – 2005
- Each state / year categorized by having a PDMP reporting to anyone at any time during the year
 - Proactive if program sent unsolicited reports
- Outcomes studied: Drug supply (ARCOS) and unintentional overdose deaths (WONDER)
- Main analysis: Average rates for state / years with PDMPs and without PDMPs

Paulozzi 2011: Overall Changes 1999 – 2005

- Deaths
 - Overall overdose mortality doubled
 - Opioid analgesic overdose mortality tripled
- Opioids dispensed tripled
 - 175 → 525 mg morphine equivalent per person per year

Paulozzi, 2011: No Apparent Relationship Between PDMPs and Opioid Sales



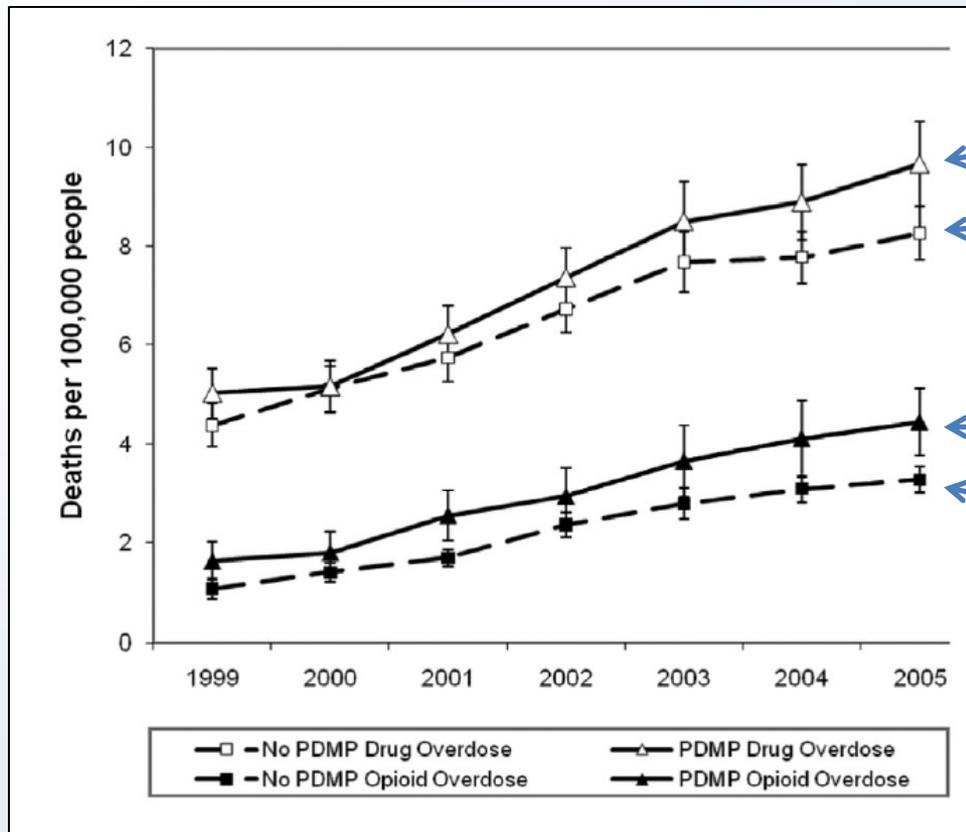
No PDMP, Schedule II Opioids

PDMP, Schedule II Opioids

PDMP, Hydrocodone

No PDMP, Hydrocodone

Paulozzi, 2011: No Apparent Relationship Between PDMPs and Overdose Mortality



PDMP, All Drug Overdoses

No PDMP, All Drug Overdoses

PDMP, Rx Opioid Overdoses

No PDMP, Rx Opioid Overdoses

Paulozzi, 2011: Why No Observed Effect?

- Study methods
 - Adverse selection
 - States with high rates tended to start PDMPs
 - Main calculations based on average rates
 - Methods used to classify PDMP status of states
 - No lag time for uptake of PDMP effect
- PDMP issues
 - Low utilization by prescribers
 - Some states not allowing prescribers to access data
 - Death rates affected by drugs obtained in adjacent states

Paulozzi 2011: Low PDMP Utilization by Opioid Prescribers

Table 1 PDMP characteristics, health care professional PDMP utilization, and overdose mortality in the states included in Paulozzi et al.'s article

| State | Health care professional access to PDMP? | Approx. no. inquiries/month | % of inquiries by prescribers/pharmacists | 1995–2005 rate of inquiries attributable to health professionals/100,000 population, ages 17–70 | Quartile of 1999–2005 drug overdose death rate (4th = highest) | 1999–2005 overdose death rate | 1999–2005 fatal and nonfatal overdose rate | RR of health professional inquiries to overdose death rate | RR of health professional inquiries to fatal and nonfatal overdose rate |
|----------------|--|-----------------------------|---|---|--|-------------------------------|--|--|---|
| California | Yes, on request | 5,000 | 80 | 29.31 | 2nd | 9.36 | 224.64 | 3.13 | 0.13 |
| Hawaii | Yes, on request | 270 | 30 | 16.52 | 3rd | 9.72 | 233.28 | 1.70 | 0.07 |
| Idaho* | Yes, on request | 1,100 | 95 | <u>201.63</u> | 2nd | <u>8.25</u> | <u>198.00</u> | <u>24.44</u> | <u>1.02</u> |
| Illinois* | No | 2 | 0 | 0.00 | 3rd | 9.84 | 236.16 | 0.00 | 0.00 |
| Indiana* | No | 80 | 0 | 0.00 | 1st | 7.59 | 182.16 | 0.00 | 0.00 |
| Kentucky | Yes, on request | 5,500 | 95 | <u>317.66</u> | 4th | <u>13.57</u> | <u>325.68</u> | <u>23.41</u> | <u>0.98</u> |
| Maine | Yes, on request and unsolicited | 1,100 | 100 | <u>212.30</u> | 3rd | <u>10.07</u> | <u>241.68</u> | <u>21.08</u> | <u>0.88</u> |
| Massachusetts | No | 10 | 0 | 0.00 | 4th | 13.43 | 322.32 | 0.00 | 0.00 |
| Michigan | Yes, on request | 5,000 | 95 | <u>120.48</u> | 2nd | <u>8.88</u> | <u>213.12</u> | <u>13.57</u> | <u>0.57</u> |
| Nevada† | Yes, on request | 1,100 | 90 | <u>113.98</u> | 4th | <u>17.16</u> | <u>411.84</u> | <u>6.64</u> | <u>0.28</u> |
| New Mexico | Yes, on request | NA | NA | 0.00 | 4th | 21.19 | 508.56 | 0.00 | 0.00 |
| New York | No | NA | 0 | 0.00 | 1st | 6.39 | 153.36 | 0.00 | 0.00 |
| Oklahoma* | Yes, on request | 200 | 0 | 0.00 | 3rd | 11.71 | 281.04 | 0.00 | 0.00 |
| Pennsylvania | No | 80 | 0 | 0.00 | 4th | 13.29 | 318.96 | 0.00 | 0.00 |
| Texas | Yes, on request | 100 | 40 | 0.47 | 2nd | 8.61 | 206.64 | 0.05 | 0.00 |
| Utah | Yes, on request and unsolicited | 4,200 | unknown | unknown | 4th | 16.66 | 399.84 | — | — |
| Virginia | Yes, on request | 600 | 78 | 15.83 | 2nd | 7.92 | 190.08 | 2.00 | 0.08 |
| West Virginia* | Yes, on request | 1,000 | 90 | <u>123.71</u> | 4th | <u>14.24</u> | <u>341.76</u> | <u>8.69</u> | <u>0.36</u> |
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Paulozzi, 2011: Many Providers Could Not Access PDMP

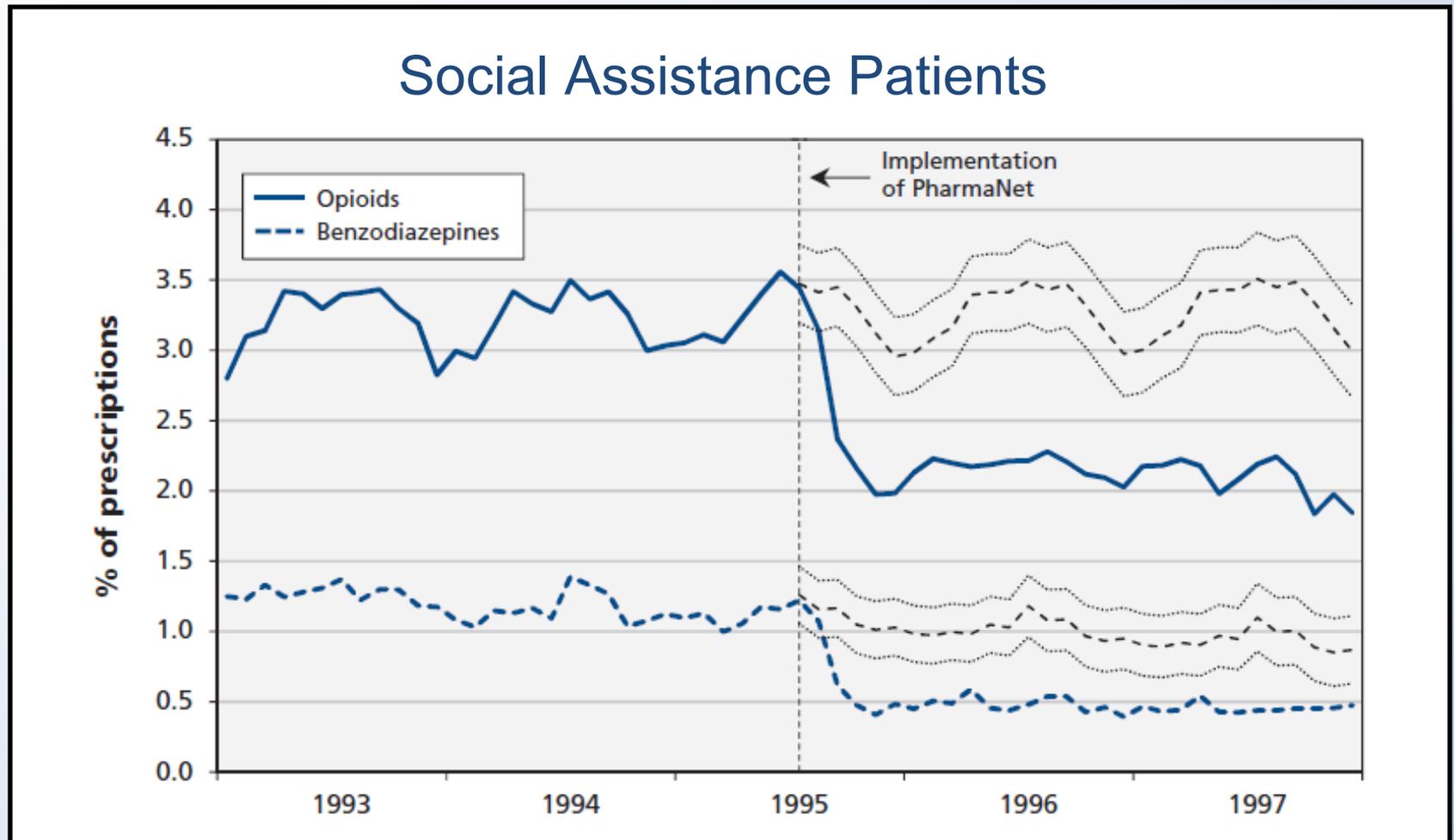
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Dormuth, 2012

- Natural experiment: British Columbia
 - PharmaNet: Pharmacist filling a prescription sees all prescriptions a patient has filled
 - New system introduced July 1995
 - Data 1993 - 1997
- Outcome: Percent of prescriptions that were “inappropriate”
 - Claims data

Dormuth, 2012: Fewer Inappropriate Prescriptions after PharmaNet



PDMP Effectiveness Analysis

- Ecological study, using quarterly data from the RADARS System
- Main comparisons:
 - States with and without an operational PDMP in a given year-quarter
 - Proportional change in rates calculated for each consecutive year-quarter, then averaged for comparison

RADARS System

Poison Center Program

- Case-level data collected from 50 participating US poison centers
- Drug, reason, and outcome data with rigorous quality control
- One case = One person exposed to a prescription opioid
- Intentional abuse cases
 - Standard definition: “Attempting to gain a high, euphoric effect, or some other psychotropic effect”
- Jan 2003 – September 2012

RADARS System

Treatment Center Programs

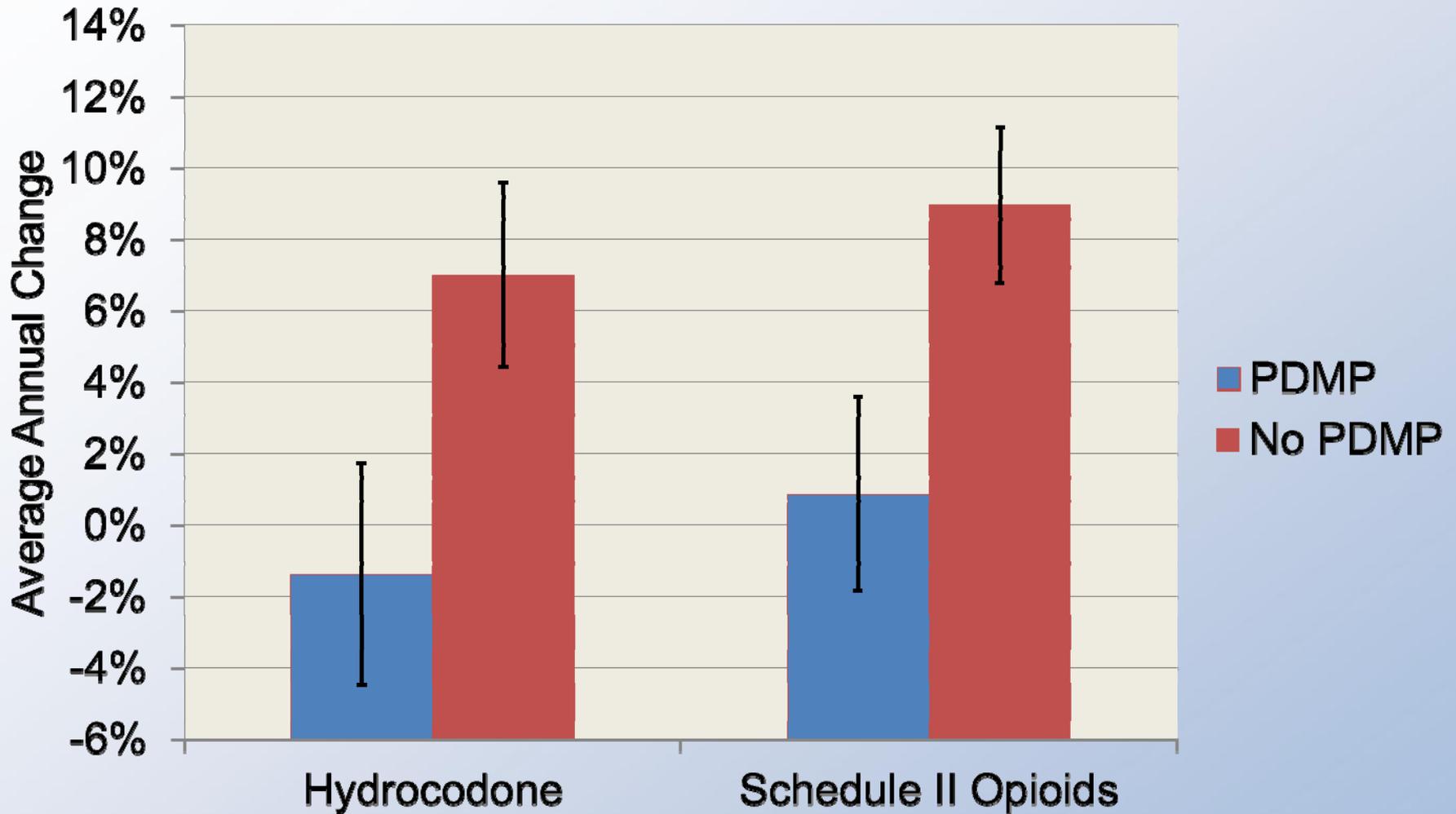
- Patients entering treatment volunteer to complete a drug use study instrument
 - List specific drugs they “used to get high” in the previous 30 days
- Data derived from two research networks using identical study instruments
 - Opioid Treatment Program
 - Survey of Key Informants’ Patients Program
- Jan 2005 – September 2012

Analysis

- Hydrocodone
- Schedule II opioid analgesics
 - Combined: Fentanyl, hydromorphone, methadone, morphine, oxycodone, oxymorphone, tapentadol
- Population rates
 - With and without adjustment for drug supply
 - Unique Recipients of a Dispensed Dose (URDD)
- Exponential increases

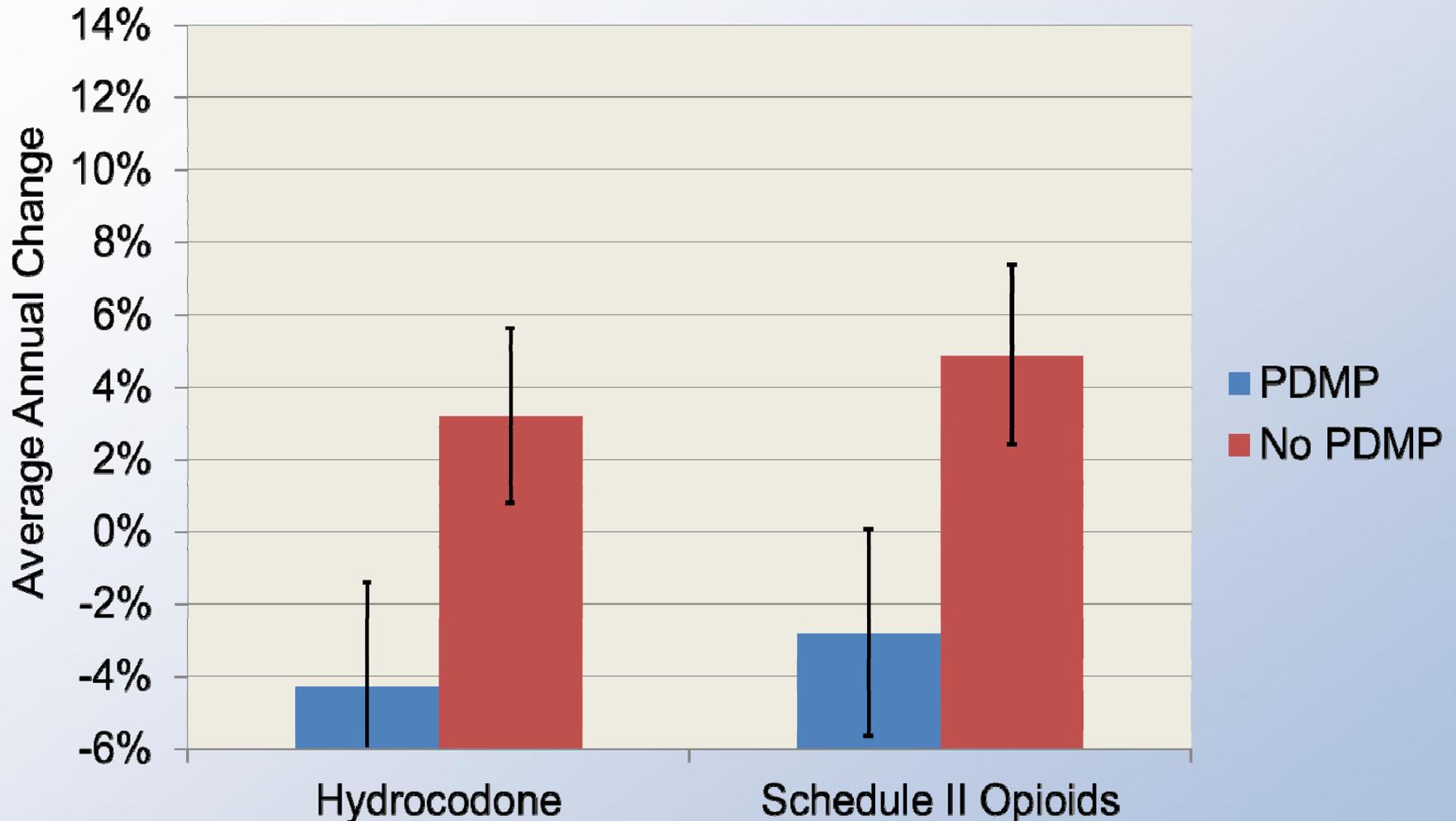
Poison Center Program

Intentional Abuse Exposures



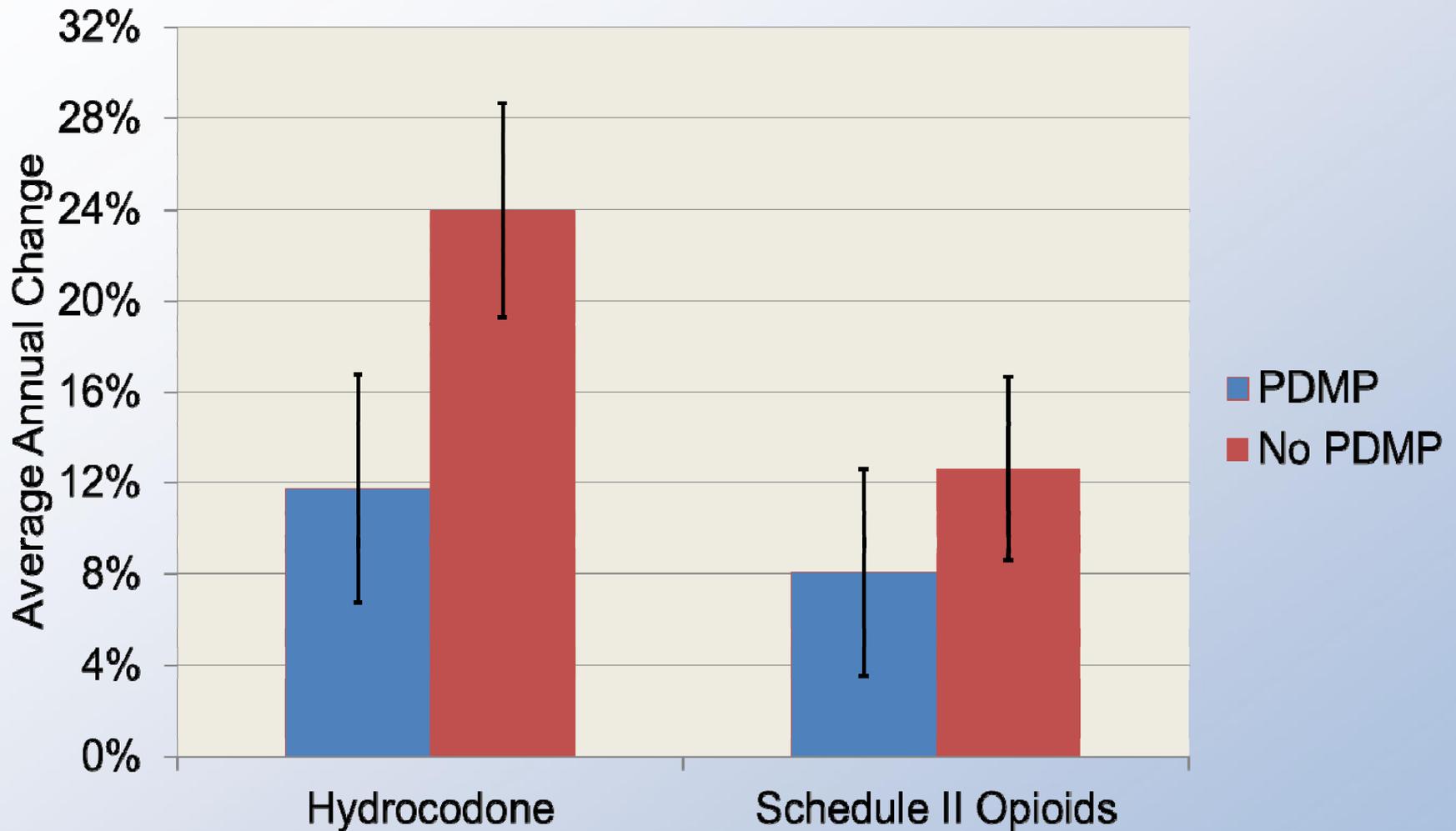
Poison Center Program

Intentional Abuse Exposures, Adjusted for Drug Supply



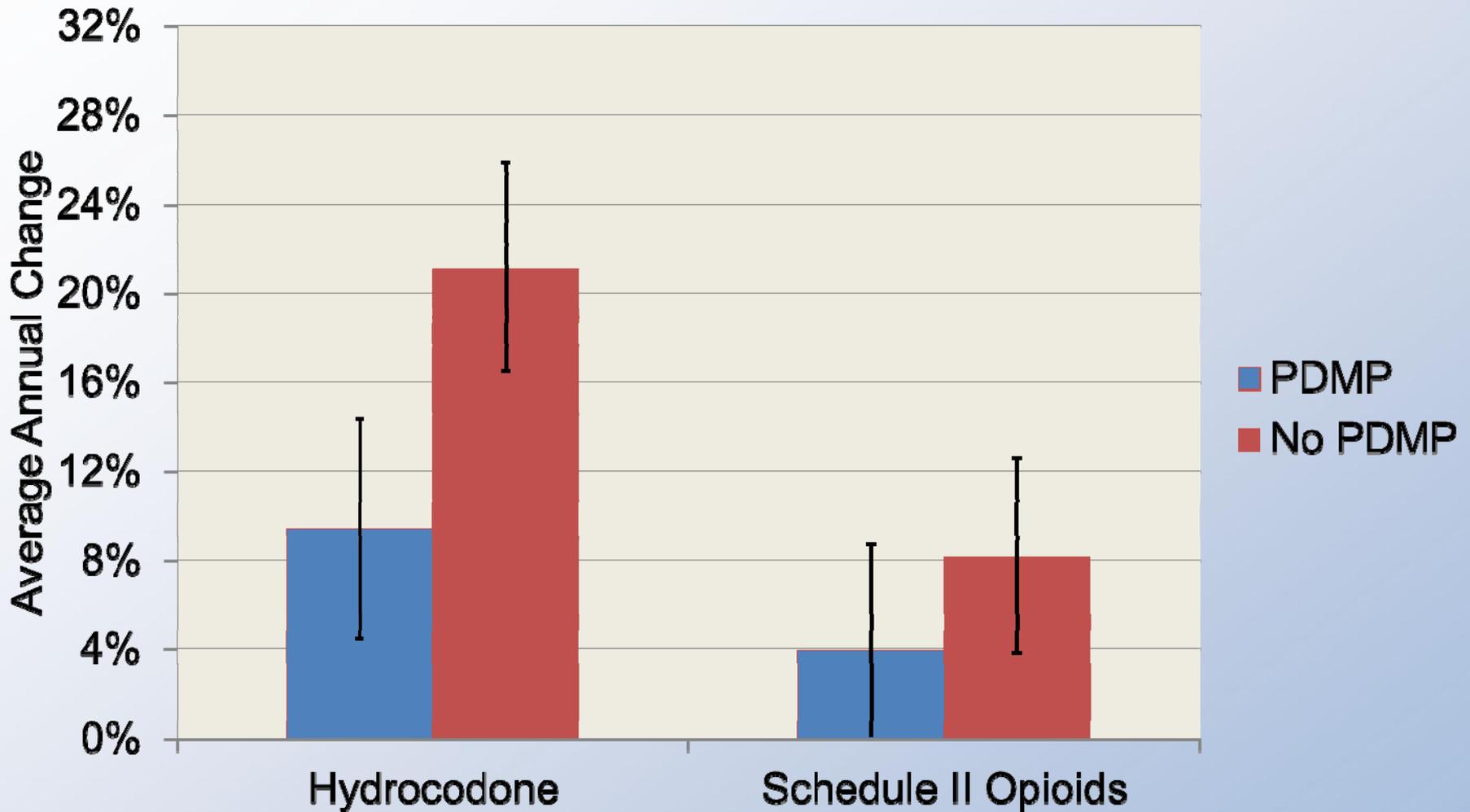
Treatment Programs

Opioid Abuse Mentions



Treatment Programs

Opioid Abuse Mentions, Adjusted for Drug Supply



Limitations

- Association \neq causation
- Not all PDMPs cover hydrocodone
- No run-in period
- Cannot account for all sources of supply
 - Other states
 - Dispensing sites other than commercial pharmacies

Conclusions

- In states with PDMPs, opioid abuse rates rise less quickly than in states with no PDMP
 - Similar effects seen for hydrocodone and schedule II opioids
 - At least some of this effect is in addition to any effect on overall drug supply

Knowledge Gaps

- Are the associations causal?
- What are the features of an effective PDMP?
- How much are PDMP's utilized?
- Are we assessing the right harms?
 - Is there a shift to other opioids?

What Might Make PDMPs More Effective?

- Inclusion of all prescription opioid sources
- Increased utilization by providers
 - Reduced logistical barriers to access
 - Summary scores
 - Electronic medical record integration

Thanks To...

- RMPDC biostatistics team
 - Becki Bucher-Bartelson, PhD
 - Claire Le Lait, MS
- RADARS System program principal investigators
 - Poison Center: Richard Dart, MD, PhD
 - OTP: Andrew Rosenblum, PhD and Mark Parrino, MPA
 - SKIP: Ted Cicero, PhD
- National Association for Model State Drug Laws
 - Heather Gray, JD
 - Sherry Green, JD

In Summary

- The preponderance of evidence support a clinically meaningful impact for PDMPs
 - PDMPs mitigate the increase in prescription opioid abuse
 - Only part of this is due to reduction in overall supply
- Limited data suggest that PDMPs affect hydrocodone and schedule II opioids similarly
- PDMPs alone are not sufficient to solve the problem of prescription opioid diversion and abuse

