When Prescribers Use PDMP Data

Opioid Prescribing Before and After PDMP Registration

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Disclosure Statement

Christi Hildebran, LMSW, CADC III, and Sara Hallvik, MPH,

have disclosed no relevant, real or apparent personal or professional financial relationships with proprietary entities that produce health care goods and services.
Learning Objectives

1. Explain the benefits when prescribers use PDMP data.
2. Outline evidence-based practices that increase prescriber utilization of PDMPs.
3. Compare opioid prescribing patterns before and after provider registration with the Oregon PDMP.
National Institutes of Health Funded Study

“Use of Prescription Monitoring Programs to Improve Patient Care and Outcomes”

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Background

• PDMPs increasingly used for public health: reduce drug abuse, improve patient safety

• Many clinicians who prescribe controlled drugs do not use PDMPs

• Little is known about the impact of PDMP use on prescribing practices and patient outcomes
Oregon PDMP History

• Oregon PDMP became operational in September 2011.

• Oregon PDMP is paid for by an annual fee of $25 that is included in board licensee fees of prescribers and pharmacists.

• NIH grant to study Oregon’s PDMP awarded in February 2012.
Oregon PDMP Profile

• Optional registration and use
• User must pull query information from website (no push notifications or unsolicited reports)
• Providers’ experience of using PDMP is mixed
  – time constraints in accessing the system
  – cannot delegate access
  – system difficult to access and navigate
  – frequent password changes
  – provides objective evidence of patient’s prescription history
PDMP Registration by Type

Cumulative system accounts by quarter and discipline

Number of System Accounts

MD / DO
RPh
NP / PA
DDS/DMD
Delegates

Q4 2011
Q1 2012
Q2 2012
Q3 2012
Q4 2012
Q1 2013
Q2 2013
Q3 2013
Q4 2013
Q1 2014
Q2 2014
Q3 2014
Q4 2014
Q1 2015
Q2 2015
Q3 2015
Q4 2015
State Policy Changes During Study Time Period

• Beginning in 2012, there were new financial arrangements (CCOs), guidelines and authorizations required by Medicaid.
• Regional Pain Collaborative developed across the state.
• Delegated access in effect as of January 2014.
• System interface upgraded in 2014.
Study Aims

Understand the prescribing differences between registered prescribers and non-registered prescribers and how their patient outcomes differ. Does use of the PDMP improve patient outcomes?

Hypothesis

Providers who register for PDMP will reduce prescribing and prescribe more safely after registering to use.
Definitions

- **Registered User**: Prescriber who registers to use the PDMP.
- **Non-Registered User**: Prescriber who does not register to use the PDMP.
- **Query**: Prescriber (or delegate) runs a query in the PDMP to see a patient’s prescriptions.
- **Death***: Identified in vital records (death certificates) with underlying cause AND contributing cause ICD-10 codes indicating poisoning by opioids, regardless of intent.
- **Overdose hospitalization***: Identified in hospital discharge registry data with
  - Poisoning ICD-9 code, OR
  - Adverse effect of opioid ICD-9 code on the same day as a diagnosis or intent code (e-code) suggestive of overdose.

*Including heroin
Methods

• Improved patient linkage within PDMP

• Created clean PDMP dataset, Oct ‘11–Oct ‘14
  – Removed invalid prescriptions and prescriptions from non-Oregon prescribers
  – Augmented classification of drugs; strength and conversion factor information to calculate MME

• Linked PDMP with statewide hospital discharge registry and vital records
Methods

• Defined a set of measures to describe provider prescribing practices

• Calculated measures in the 12 months before and 12 months after date of registration, among providers who registered to use the PDMP between October 2012 and September 2013

• Used propensity score methods to match each registered provider (n=1,131) with a non-registered provider of similar “pre” prescribing profile (n=1,131)
Provider cohorts (registrants and non-registrants) were very well matched

<table>
<thead>
<tr>
<th>Prescribing variable used for matching</th>
<th>Mean difference*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients with an opioid prescription</td>
<td>.030</td>
</tr>
<tr>
<td>Average pills per opioid prescription</td>
<td>.050</td>
</tr>
<tr>
<td>Average dose (MME) per prescription</td>
<td>.028</td>
</tr>
<tr>
<td>Average dose (MME) per patient</td>
<td>.027</td>
</tr>
<tr>
<td>Percent of patients with high dose (MME)</td>
<td>.016</td>
</tr>
<tr>
<td>Number of benzodiazepine prescriptions</td>
<td>.043</td>
</tr>
</tbody>
</table>

*Mean difference is the standardized distance between the “pre” value of each pair. Values <0.1 indicate negligible differences.
Methods

Then we examined:

1. statewide trends in prescribing over time
2. pre-post change in prescribing between matched registered and non-registered provider cohorts
3. pre-post change in prescribing considering the number of queries made in PDMP system
Number of opioid units (pills) dispensed per 100 population

- Volume of opioids in the state decreased over time

Graph showing number of opioid units dispensed per 100 population from Q4 2011 to Q3 2014, with numbers ranging from 1690 to 1498.
Number of patients with a quarterized MME greater than or equal to 100MME per 100 population

Chronic high dose of opioids decreased over time
Inappropriate prescribing decreased over time

*same medication within 7 days from a different prescriber
Number of methadone Rx per 100 population

- Volume of methadone decreased over time

- ➢ Volume of methadone decreased over time
Statewide opioid-related overdose deaths and hospitalizations per 1,000 population

- Overdose hospitalizations and deaths remained steady over time
Time Trend Results

• General downward trend in per capita prescribing
• Stagnant per capita death and hospitalization overdose rates

Hypothesis

• Providers who register for PDMP will reduce prescribing and prescribe more safely after registering.
### Pre–Post Change in Prescribing Patterns

<table>
<thead>
<tr>
<th>Prescribing pattern</th>
<th>Registered</th>
<th>Non-registered</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of opioid prescriptions</strong></td>
<td>91.5</td>
<td>-8.6</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Number of patients with an opioid prescription</strong></td>
<td>33.2</td>
<td>-2.1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Dose (MME) per patient</strong></td>
<td>2.14</td>
<td>-1.71</td>
<td>.0023</td>
</tr>
<tr>
<td><strong>Pills per opioid prescription</strong></td>
<td>4.6</td>
<td>-2.6</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Number of methadone prescriptions</strong></td>
<td>4.1</td>
<td>-0.2</td>
<td>.0006</td>
</tr>
<tr>
<td><strong>Number of benzodiazepine prescriptions</strong></td>
<td>24.4</td>
<td>-4.1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Percent of opioid prescriptions with a sedative-hypnotic or carisoprodol prescription within 30 days</strong></td>
<td>.018</td>
<td>.005</td>
<td>.0005</td>
</tr>
<tr>
<td><strong>Number of inappropriate prescriptions</strong></td>
<td>.054</td>
<td>-.005</td>
<td>.0355</td>
</tr>
</tbody>
</table>

- Registered providers increased prescribing after registration
- Non-registered provider pairs decreased prescribing in the same time period
Pre-Post Change in Prescribing Patterns Among Registered Prescribers, According to Query Frequency

<table>
<thead>
<tr>
<th>Prescribing pattern</th>
<th>Top quartile of PDMP users</th>
<th>Bottom quartile of PDMP users</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>282</td>
<td>342</td>
<td></td>
</tr>
<tr>
<td>Change</td>
<td>Change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of opioid prescriptions</td>
<td>144.92</td>
<td>-6.34</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Number of patients with an opioid prescription</td>
<td>61.01</td>
<td>-1.11</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Dose (MME) per patient</td>
<td>3.71</td>
<td>-2.29</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Pills per opioid prescription</td>
<td>11.50</td>
<td>-1.86</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Number of methadone prescriptions</td>
<td>7.95</td>
<td>-1.13</td>
<td>.0054</td>
</tr>
<tr>
<td>Number of benzodiazepine prescriptions</td>
<td>32.47</td>
<td>4.72</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Percent of opioid prescriptions with a sedative-hypnotic or carisoprodol prescription within 30 days</td>
<td>.036</td>
<td>.005</td>
<td>.0003</td>
</tr>
<tr>
<td>Number of inappropriate prescriptions</td>
<td>.106</td>
<td>-.003</td>
<td>.0099</td>
</tr>
</tbody>
</table>

- Prescribers who use the PDMP the most increased prescribing after registering
- Prescribers who registered but never use the PDMP decreased prescribing after registering
## Patient Overdose Outcomes, According to Registration Status of Prescribers

<table>
<thead>
<tr>
<th>Patients whose providers were ALL REGISTERED</th>
<th>Patients with AT LEAST ONE REGISTERED provider and AT LEAST ONE NON-REGISTERED provider</th>
<th>Patients with NO REGISTERED providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Total in the PDMP</td>
<td>540,889</td>
<td>663,059</td>
</tr>
<tr>
<td>Overdose death</td>
<td>150 (0.03%)</td>
<td>335 (0.05%)</td>
</tr>
<tr>
<td>Overdose hospitalization</td>
<td>1,045 (0.19%)</td>
<td>5,173 (0.78%)</td>
</tr>
</tbody>
</table>

| All overdose events                       | 1,195 (0.22%)                                                                          | 5,508 (0.83%)                      | 589 (0.11%)                         |
| No overdose events                        | 539,694 (99.78%)                                                                       | 657,551 (99.17%)                   | 516,543 (99.89%)                    |

**p-val**

- <.0001
Conclusions

• Following implementation of Oregon’s PDMP, there was a statewide decline in:
  – per capita number of inappropriate prescriptions
  – MME dispensed
  – number of pills dispensed

• Despite the changes, the number of opioid-related deaths and overdose hospitalizations remained stable.
Conclusions

• Contrary to our hypotheses, prescribers who registered for the PDMP did NOT appear to decrease prescribing. In fact, they prescribed more.

• This trend was most apparent among registrants who made greatest use of the PDMP.
Conclusions

• Among prescribers who did NOT register for the PDMP, there were **decreases** in prescribing.

• Non-registered prescribers, who outnumbered registered prescribers roughly 10:1, may have accounted for the statewide trends.
Conclusions

• Number of patients and number of prescriptions increased among registered prescribers, and decreased among non-registered prescribers.
• Possible migration of patients from non-registered to registered prescribers who were most likely to use the PDMP, and perhaps most liberal in prescribing.
• Migration might account for some increases in prescribing among registered prescribers.
Conclusions

• Overall statewide decline in opioid prescribing may have resulted from a “surveillance effect,” in which prescribers perceived that their prescribing patterns were being scrutinized.

• Other factors in the environment were likely important, such as greater reporting of opioid prescribing and related mortality in the media and professional publications, new clinical guidelines, new reimbursement restrictions from Medicaid.
Study Limitations

• Generalizable to states similar to Oregon: states without mandatory registration or PDMP use, nor proactive alerts.
• Selection bias: providers who register for and use PDMP may have different treatment goals / patient panels.
• Difficult to parse out influence of PDMP from current environmental factors in prescribing.
Next Steps for PDMP Administrators and Health Plans

• Refinements in the program and supplementary policies may be necessary to improve the PDMP’s impact.
• Refinements might include the use of proactive alerts, mandatory registration, mandatory querying for new opioid prescriptions, and better training of clinicians in use of this relatively new innovation.
• Supplementary policies might include preauthorization for high-dose prescriptions or initial prescriptions for long-acting opioids, and “pill mill” laws.

*Many of these have been implemented in other states.
Next Steps for PDMP Research

• Determine what factors influence the increase in prescribing, especially risky prescribing, among those who use the PDMP.
• Understand how refinements to Oregon’s PDMP (e.g., mandatory use, proactive alerts) might affect prescribing patterns and ultimately patient care and outcomes.
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For more information, please visit http://www.acumentra.org/PDMP/