

# Reduction Over Time in RADARS® System Poison Center Opioid Abuse/Misuse Rates Associated with Prescription Monitoring Programs

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## Introduction

- Prescription Monitoring Programs (PMPs) are statewide databases containing patient-level prescription data on select drugs of abuse.
- PMPs are intended to help clinicians or other officials identify patients or providers engaging in abuse related illegal activities.
- As of September 2009, 36 states have implemented PMPs (Figure 1).
- PMPs' impact on long acting opioid (LAO) abuse/misuse is of special interest, since prescription drug abusers prefer this drug type.
- RADARS® System Poison Center (PC) Program contains data from 44 states from 1<sup>st</sup> quarter 2003 to 3<sup>rd</sup> quarter 2009.
- The purpose of this study was to evaluate the association between PMPs and abuse/misuse trends over time for LAO versus immediate release opioids (IRO).

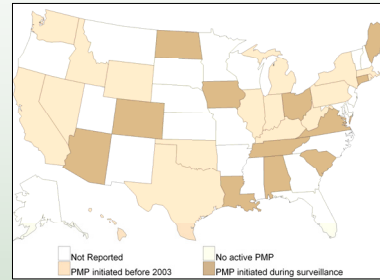
## Methods

- PC human intentional exposure calls were used as a measure of abuse/misuse cases. These include calls of suspected suicide; withdrawal; intentional misuse, abuse, and unknown.
- Cases (2003 through 3<sup>rd</sup> quarter 2009) were selected for analysis if they consumed LAO or IRO products containing oxycodone, fentanyl, hydrocodone, hydromorphone, morphine or methadone.
- 6,826 observations of intentional exposure counts were available for analysis, representing a total of 74,765 intentional exposures.
- Repeated measures, negative binomial regression was used to predict trends over time in intentional exposure cases for the four classifications of opioid type (LAO/IRO) and PMP implementation (active PMP/no PMP).
- The model adjusted for fixed effects of population and unique recipient of dispensed drug (URDD), a measure of drug availability, and random effects of drug and state.
- State PMP status was a time varying covariate, to account for states that implemented a PMP during the study period.

## Results

- Trends over time differ for LAO and IRO formulations (Figure 2).
- Trends over time differ for active PMPs versus no PMP:
  - LAO intentional exposures decrease by 12.0% annually in states with PMPs compared to a 4.5% decrease in states without PMPs (Table 1).
  - IRO intentional exposures decrease by 4.1% annually in states with PMPs compared to a 4.1% increase in states without PMPs.
- PMPs are not associated with differential effect between LAO and IRO time trends.

**Figure 1: State Implementation of PMPs 2003 through 3<sup>rd</sup> Quarter 2009**



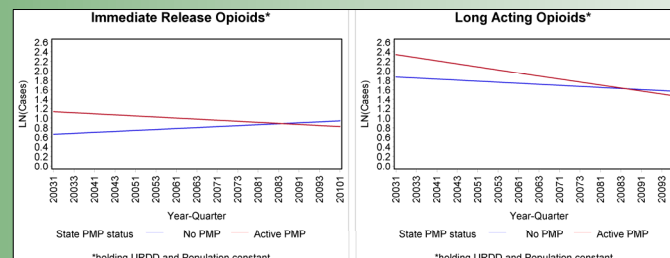
**Figure 2: Final Model**

$$\begin{aligned} \text{Ln(CASES)} = & -8.135 \text{ Intercept} \\ & + 0.846 \text{ Ln(URDD)}^* + 0.087 \text{ Ln(Population)}^* \\ & 0.464 \text{ PMP}^* + 1.208 \text{ LAO}^* \\ & + 0.01 \text{ Quarter}^* + 0.021 \text{ PMP*Quarter}^* - 0.021 \text{ LAO*Quarter}^* \\ & \quad \text{ }^* \text{ Significant at the } p < 0.05 \text{ level} \end{aligned}$$

**Table 1: Adjusted Annual Percent Change in Intentional Exposures**

Opioid Type	Active PMP (% , CI)	No PMP (% , CI)
Long Acting	-12.0 (-15.9, -7.9)	-4.5 (-9.2, 0.6)
Immediate Release	-4.1 (-7.2, -0.8)	4.1 (0.4, 8.0)

**Figure 3: Intentional Exposures Trends over Time**



## Conclusions

- Model results based on PC data offer preliminary support that:
  - PMPs are associated with decreases in intentional exposures over time.
  - LAO and IRO formulations are associated with different intentional exposure trends over time.
- Model results do not support that PMPs differentially influence LAO intentional exposures compared to IRO intentional exposures.
- This observational data provides initial support that PMPs are associated with decreased opioid abuse/misuse.

## RADARS® System Poison Centers

Arizona Poison and Drug Information Center: Boesen K.  
 Banner Good Samaritan Poison and Drug Information Center: Stevens D, Welch S.  
 Blue Ridge Poison Center: Holstege CP, Kilmer H, Dobmeier S.  
 California Poison Control System: Alsup JA.  
 Central Ohio Poison Center: Baker SD.  
 Central Texas Poison Center: Borys D.  
 Children's Hospital of Michigan: Smolinske S.  
 Cincinnati Drug and Poison Information Center: Bond GR, Pierce B.  
 Connecticut Poison Control Center: McKay C, Sangalli B.  
 Florida Poison Information Center – Jacksonville: Schauben JL, Sollee D.  
 Florida Poison Information Center – Miami: Bernstein J, Weisman RS.  
 Florida Poison Information Center – Tampa: Kimball T, Cullen T, Chambers J.  
 Georgia Poison Center: Geller R, Wright N.  
 Hennepin Regional Poison Center: Anderson D, Lintner C.  
 Illinois Poison Center: Wahl M, DesLauries C, Kubic A.  
 Indiana Poison Center: Mowry JB.  
 Iowa Statewide Poison Control Center: Bottei E, Kalin L, Ringling S.  
 Kentucky Regional Poison Center: Spiller HA.  
 Long Island Regional Poison and Drug Information Center: Caraccio T, Jao D.  
 Louisiana Drug & Poison Center: Ryan M.  
 Maryland Poison Center: Doyon S.  
 Massachusetts/Rhode Island Poison Center: Burns Ewald M, Sheroff A.  
 Missouri Regional Poison Center: Weber J, Enders S, Odom C.  
 Nebraska Regional Poison Center: Jacobitz K, Rasmussen M.  
 New Jersey Poison Information and Drug Information Center: Ruck B, Marcus S, Rego R.  
 North Texas Poison Center: Abron D, Cearleys S, Daigle S, Garrison J, Uzoegwu L.  
 Northern New England Poison Center: Simone KE, Bubar J.  
 Oklahoma Poison Control Center: McGoodwin L, Schaeffer S.  
 Oregon Poison Center: Giffin, S, McKeown N.  
 Palmetto Poison Center: Michels J.  
 Pittsburgh Poison Center: Krenzlok E, Kurta D.  
 Regional Poison Control Center of Birmingham, Alabama: Liebelt E, Slattery A.  
 Rocky Mountain Poison & Drug Center: Dart RC, Bailey JE.  
 Tennessee Poison Center: Kumar S.  
 Texas Panhandle Poison Center: Jaramillo J, Rivers R.  
 The Ruth A. Lawrence Poison & Drug Information Center  
 Serving Finger Lakes: Barton N, McFarland S, Rekkerth D.  
 The University of Kansas Hospital Poison Control Center (KS): Lowry J, Oller L.  
 South Texas Poison Center: Fernández MC, Cobb DB, Villarreal CL.  
 Virginia Poison Center: Rose SR, Waring E.  
 Washington Poison Center: Martin T, Chew A, Von Derau K.  
 West Texas Regional Poison Center: Artalejo L, Baeza S.  
 West Virginia Poison Center: Durback-Morris LF, Scharman EJ.  
 Western New York Poison Center: Joshi P.  
 Wisconsin Poison Center: Kostic M.

