RADARS® System Technical Report # 2012Q4-2

A comparison of three measures of prescription opioid availability

Key points

- The abuse of prescription drugs is related to availability.
- 3 measures of drug availability are highly correlated: # pills dispensed, # prescriptions filled, # individuals filling at least 1 prescription per quarter.
- Rates routinely provided by the RADARS® System provide valid nationwide estimates of abuse adjusted for drug availability.

Background

Surveillance of drug abuse trends can inform public health officials on the extent of the prescription drug abuse crisis and guide dissemination of funds for intervention, awareness and prevention campaigns. Abuse is most commonly analyzed as the rate of cases per population. However, this has led to an interesting dichotomy. The most abused drug by population using RADARS System Poison Center data is hydrocodone (Figure 1) while, hydrocodone is seldom the drug of choice among those entering drug abuse treatment programs [1]. This suggests that other factors are important when looking at prescription drug abuse. One such factor is drug availability. In a previous RADARS System Quarterly Technical Report we demonstrated the importance of examining a measure of drug availability in assessing the abuse potential of prescription drug products [2]. In this report; three different measures of drug availability are correlated.

Several alternatives for estimating drug availability have been proposed, ranging from number of pills distributed, to number of prescriptions filled, to number of unique individuals filling one or more prescriptions, all in a particular time interval. This report compares these three measures of drug availability: using data from the state of Ohio for the fourth quarter of 2010.

Methods

Ohio PMP

The Ohio Automated Rx Reporting System has collected data on the distribution of prescription solid oral opioids and fentanyl patches since the fourth quarter of 2008. Data were collected by drug class: buprenorphine, fentanyl patch, hydrocodone, methadone, oxycodone and tramadol. Data on total doses dispensed by year-quarter and three digit zip codes were provided from fourth quarter 2008 until fourth quarter 2010. For illustrative purposes only data from the fourth quarter of 2010 are presented but results were similar across all year quarters.

SDI

SDI healthcare collects data on prescription drug distribution at approximately half the retail pharmacies in the US. Projections are then made at the 3 digit zip code level to the rest of the US. Two measures of drug availability are available from SDI, the number of individuals filling one or more prescriptions in a given time frame for a given drug and the number of claims (or prescriptions) filled.

Statistics

Pearson correlation coefficients were utilized to quantify the strength of the linear relationship between the pairs of drug availability measures for the fourth quarter of 2010 at the three digit zip code level in Ohio for each drug class. Scatter plots were used to assess validity of the linear relationship between pairs of variables and the appropriateness of the normality assumption for Pearson correlation coefficients.

Statistical Analysis

Mentions of prescription opioid drug classes by intentional abuse cases from the 1st quarter of 2010 through the 2nd quarter of 2012 were summed by age between the ages of 11 years and 69 years. The analyses were conducted in two steps. The first step of the analysis used a linear regression model and tested the association between the age with the greatest number of mentions (peak age) for each drug and the log of number of individuals filling a prescription for that drug between 1st quarter of 2010 and 2nd quarter of 2012. The second stage of the analysis utilized a negative binomial regression to fit a growth curve to each prescription opioid class to examine differences in age trends by drug class. This model was used to determine whether different drug classes had different trajectories over the lifespan. Analyses were conducted with the REG and GLIMMIX procedure in SAS v9.3.
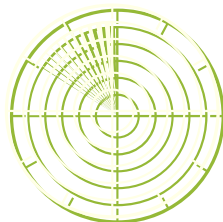
Results

Table 1 lists the Pearson correlation coefficients between all pairs of variables by drug class. High correlations are seen with all three pairs of variables. Correlations between number of claims and number of unique recipients were very strong. Figure 2 shows these relationships for oxycodone for each of the three measures of drug availability introduced in this study. All other drugs had similar plots to oxycodone.

Discussion

Since the three alternative measures of drug availability are highly correlated, the choice of the measure of drug availability for analysis purposes becomes less critical. Similar conclusions will result from the analysis of drug abuse rate trends using any of the measures. The rates routinely provided by the RADARS System deliver valid nationwide estimates of abuse adjusted for drug availability.
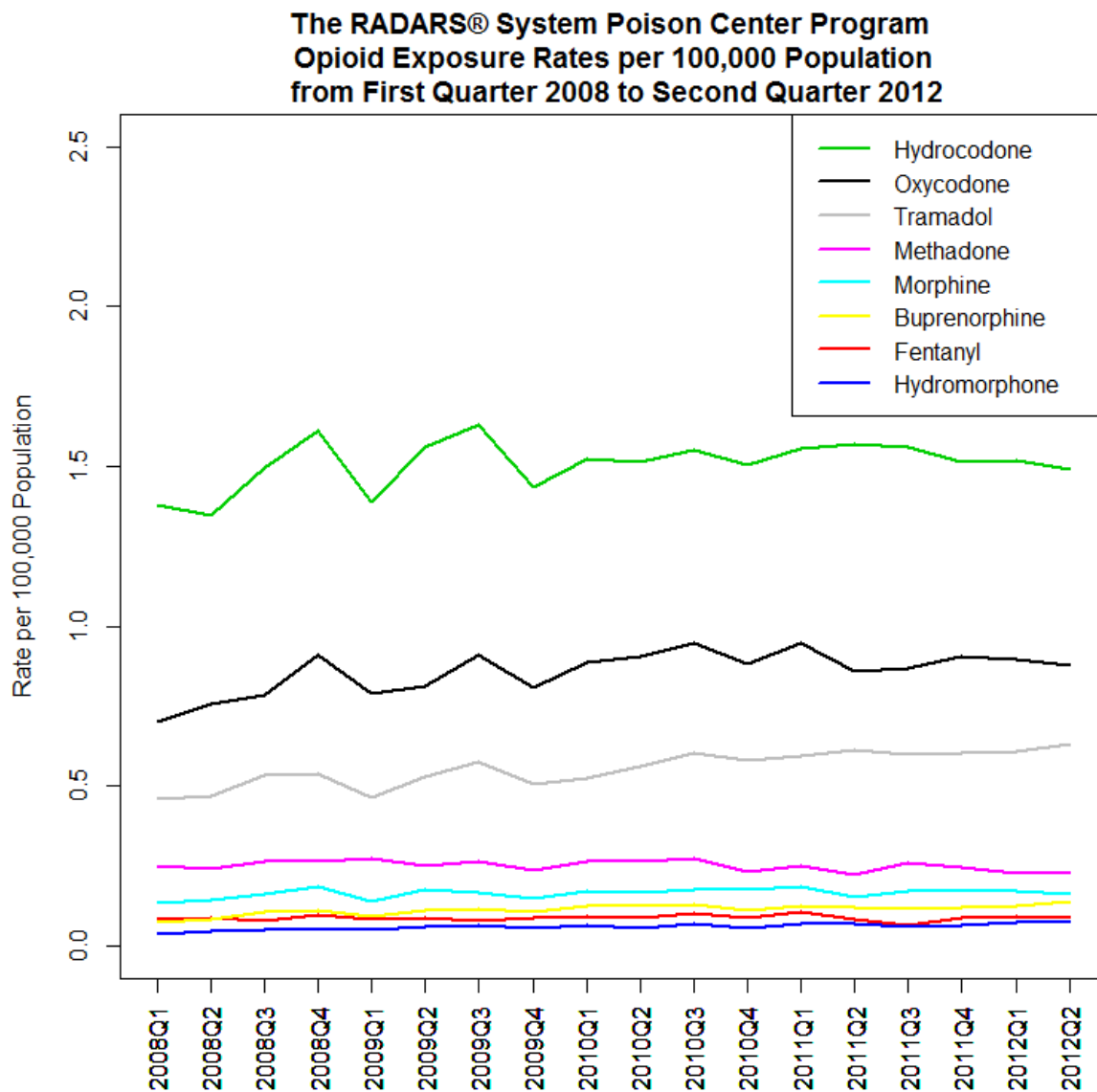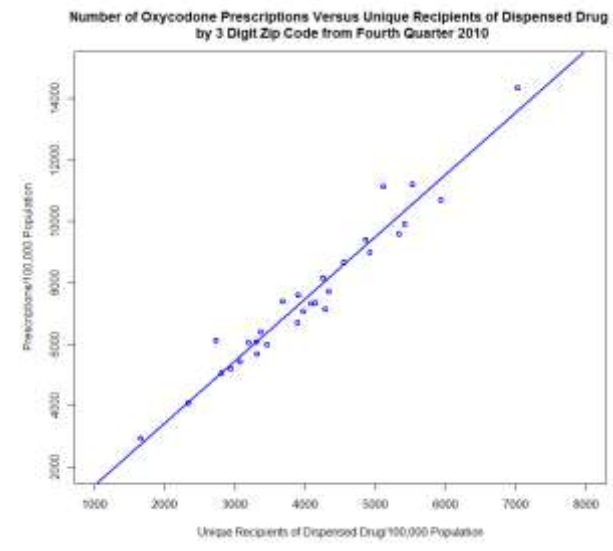
Figure 1

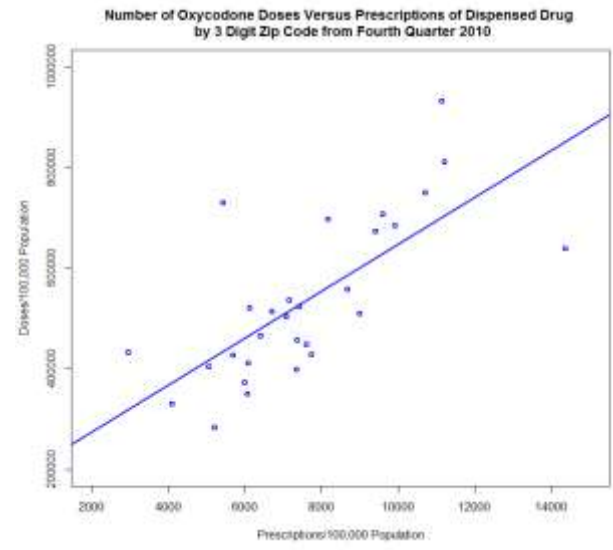The RADARS® System Poison Center Program
Opioid Exposure Rates per 100,000 Population
from First Quarter 2008 to Second Quarter 2012

Figure 2

Number of Oxycodone Doses Versus Unique Recipients of Dispensed Drug
by 3 Digit Zip Code from Fourth Quarter 2010

Number of Oxycodone Doses Versus Prescriptions of Dispensed Drug
by 3 Digit Zip Code from Fourth Quarter 2010

Number of Oxycodone Prescriptions Versus Unique Recipients of Dispensed Drug
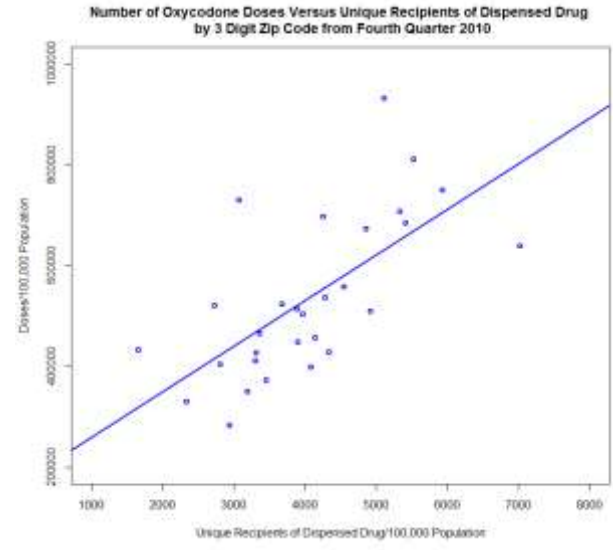by 3 Digit Zip Code from Fourth Quarter 2010

Table 1 Pearson correlations coefficients between three measures of drug availability

Drug Class	Doses versus Individuals	Doses versus Prescriptions	Prescriptions versus Individuals
Buprenorphine	0.81	0.79	0.97
Fentanyl Patches	0.89	0.88	0.99
Hydrocodone	0.96	0.97	0.99
Methadone	0.91	0.88	0.99
Oxycodone	0.96	0.97	0.99
Tramadol	0.92	0.92	0.99

Suggested citation: Bucher Bartelson B, Droz D, Severtson G, Le Lait C, Dart R (2012). A comparison of three measures of prescription opioid availability. RADARS System Technical Report, 2012Q4-2.

References

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2. Severtson, SG; Davis, J; Bartelson, B.B. & Dart, R. (2012). Use of unique recipients of dispensed drug (URDD) in assessing the burden of abuse, misuse, and diversion of prescription opioid products. RADARS System Technical Report, 2012Q2-1.