

# Clinical Characteristics of Opioid Overdose Cases Identified in a Large Commercially Insured Population

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## INTRODUCTION

- There is increasing interest in opioid overdose, with recent studies describing an increased risk of overdose at higher opioid doses.<sup>1-4</sup>
- However, there remain a number of unanswered questions related to study design issues, potential confounding (particularly confounding by abuse and by indication), and the relative contribution of other risk factors such as sedative hypnotic use.
- We have replicated this research in a large administrative claims database (MarketScan), identifying cases of opioid overdose using ICD-9-CM codes 965.00 (poisoning by opium [alkaloids], unspecified), 965.02 (poisoning by methadone), 965.09 (poisoning by other opiates and related narcotics).
  - Based on the review of several hundred medical record charts of those diagnosed with opioid overdose or poisoning, a study conducted at Kaiser Permanente (Northwest and Northern California regions) showed that these particular ICD-9 codes are both sensitive and have a high predictive value (PPLP data on file).
- While our MarketScan analyses demonstrate several strengths, including a large sample size that comprises a large number of cases (n=3,224), information on the severity of the overdose events is limited.

## OBJECTIVE

- To better understand the potential severity of the overdose events by exploring the clinical characteristics of overdose cases including:
  - Treatment setting
  - Primary diagnoses
  - Concomitant diagnoses, such as other poisoning diagnoses or psychiatric diagnoses

## METHODS

- Study Design:** retrospective cohort study
- Dataset:** MarketScan Commercial 1Q2008-1Q2012
- Population:**
  - patients 18-64 years of age with a new opioid\* prescription
  - 6 months of insurance enrollment preceding the index Rx
  - \*all opioids excluding powder formulations of all opioids; opium; and antitussive formulations of codeine, hydrocodone, dihydrocodeine
- Observation time ended at first occurrence of:**
  - Opioid overdose
    - ICD9CM Codes 965.00 (unspecified), 965.02 (methadone), 965.09 (other opiates/related narcotics)
  - Insurance enrollment discontinuation
  - End of available data (March 2012)
- Overdose case characteristics were described including the treatment setting in which cases were identified:
  - Hospitalization
  - Inpatient or outpatient emergency room [hereafter referred to as ER cases]
  - Neither hospitalization nor ER [hereafter referred to as other cases]
- The principal reason for the medical visit was summarized by the primary diagnosis for hospitalized cases or the primary or first diagnosis for ER and other cases (Table 1).
  - Note: ER and other cases could have more than one primary/first diagnosis, though few did (<7%). Therefore, patients can be in more than one category.
  - Cases were then further categorized within categories to explore the principal diagnoses with greater granularity.
- The proportion of cases with concomitant psychiatric or poisoning diagnoses (primary or secondary) were also explored (see Table 2).

**Table 1. Diagnostic Codes Used to Identify Primary/First Diagnoses for Overdose Cases**

Condition	ICD-9-CM Codes
Opioid overdose/poisoning	965.00, 965.02, 965.09
Other poisonings by drugs, medicinals, and biological substances (excl. opioid overdose/poisoning 965.00, 965.02, 965.09)	960-979
Toxic effects of substances chiefly non-medicinal	980-989
Psychiatric disorders	290-319, V62.84

## METHODS (CONT.)

**Table 2. Diagnostic Codes Used to Identify Concomitant Psychiatric or Poisoning Diagnoses**

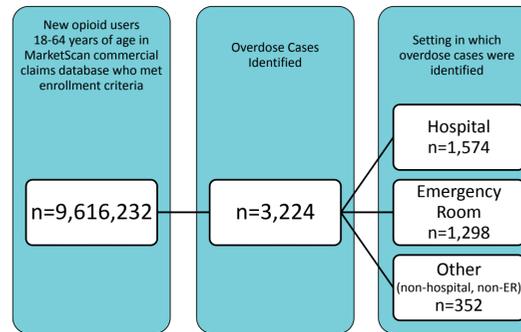
Condition	ICD-9-CM Codes
1 Psychiatric disorders	290-319, V62.84
2 Sedative/hypnotic poisoning	967, E852, E950.2, E980.2
3 Sedative/hypnotic/tranquilizer (SHT) poisoning	#2 plus 969.1-969.5, E853, E950.3, E980.3
4 Psychotropic/other similar drug poisoning (including SHT) (excl. opioid/overdose poisoning 965.00, 965.02, 965.09)	#3 plus all 965-970, E850-E855, E950.0-E950.5, E980.0-E980.5
5 Any poisoning	#4 plus 960-964, 971-979, E856-E858, E860-E869, E980-E982
6 Suicide/self-inflicted poisoning by drugs/other substances	E950
7 Any suicide/self-inflicted poisoning or injury	#6 plus E951-E959
8 Accidental poisoning by analgesics/antipyretics/antirheumatics	E850

*Note: concomitant diagnoses include both primary/first and secondary diagnoses. E codes are included for concomitant conditions only and not for identification of primary diagnoses.*

## RESULTS

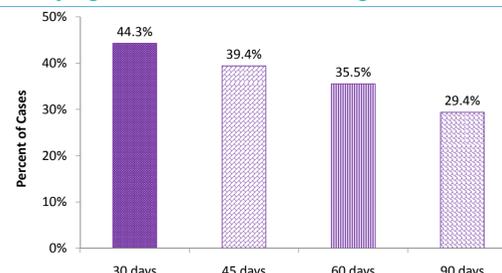
In the 9.6 million individuals dispensed a new opioid in the MarketScan Commercial database during the study period, 3,224 cases of overdose were identified (0.02 cases/100 person-years). Almost 90% of cases were identified in a hospital (n=1,574, 48.8%) or emergency room (n=1,298, 40.3%) setting (Figure 1).

**Figure 1. Treatment Setting of Overdose Cases**



Despite the identification of overdose cases based on opioid poisoning diagnostic codes, almost half (44%) of the overdose cases had no opioid prescriptions in the 30 days preceding the event (Figure 2).

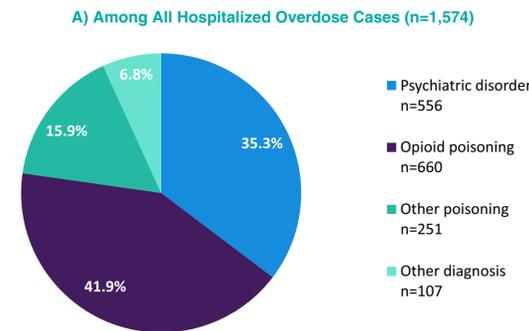
**Figure 2. Proportion of Cases with no Prescribed Opioids in Varying Time Windows Preceding the Overdose**



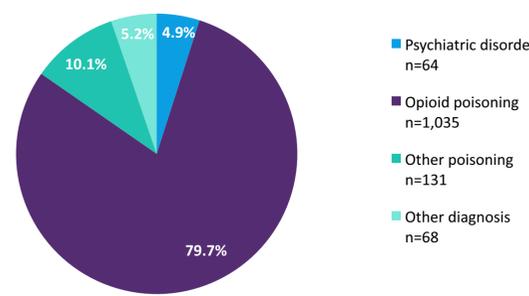
## RESULTS (CONT.)

The most common primary diagnoses were opioid poisonings, other poisonings, and psychiatric disorders, particularly for hospitalized and ER cases, where these 3 categories accounted for over 90% of the primary diagnoses (Figure 3A, 3B, 3C).

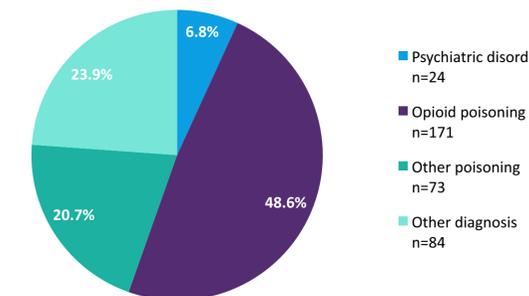
**Figure 3. Primary diagnoses**



**B) Among ER Overdose Cases (n=1,298)**



**C) Among Other Overdose Cases (n=352)**



Note: ER and other cases could have more than one primary/first diagnosis

Within psychiatric and poisoning diagnoses, the most common were mood disorders and poisoning by analgesics, antipyretics, antirheumatics\*, respectively (Table 3).  
\*It is important to note that poisoning by analgesic, antipyretics, antirheumatics includes the opioid poisoning codes used to identify the cases.

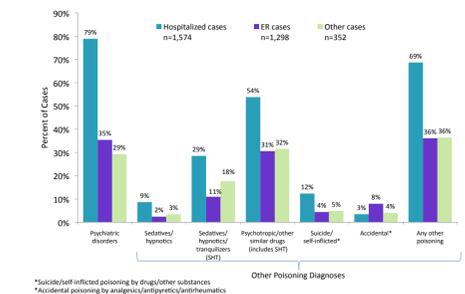
**Table 3. Specific Psychiatric and Poisoning Diagnoses in Commercial Cases by Treatment Setting: Primary/First Diagnoses Only (n=3,224)**

Psychiatric disorders (ICD-9-CM codes)	Hospitalized n=556	ER n=64	Other n=24
Mood disorders - depressive, bipolar, suicidal ideation (296.311, V62.84)	81.5%	51.6%	70.8%
Adjustment reaction (600)	5.9%	7.8%	0.0%
Drug and alcohol disorder (291.292, 300-305)	8.5%	29.7%	12.5%
Anxiety, dissociative, and somatoform disorder (300)	2.0%	7.8%	8.3%
Any other psychiatric disorder	2.2%	3.1%	8.3%
Poisonings (ICD-9-CM codes)	Hospitalized n=911	ER n=1,167	Other n=244
Opioid poisoning (965.00, 965.02, 965.09)	72.4%	88.7%	70.1%
Analgesics, antipyretics, antirheumatics (960-979, 980-989)	7.2%	2.9%	3.7%
Psychotropic agents - benzodiazepine based tranquilizers (969.4)	8.2%	4.2%	15.6%
Other psychotropic agents (969, excl. 969.4)	3.8%	0.9%	1.6%
Sedatives and hypnotics (967)	2.6%	0.9%	2.9%
Drugs affecting CNS (964, 970)	1.8%	1.2%	2.0%
Alcohol (980)	0.9%	0.3%	2.0%
Any other poisoning (including toxic effects)	3.0%	0.9%	2.0%

\*Although these represent percent of diagnoses, few cases had >1 primary/first diagnosis

In addition to the overdose poisoning codes used to identify the cases, the cases commonly had co-occurring diagnostic codes for other poisonings, including poisoning by sedatives/hypnotics/tranquilizers (SHT) and psychotropic/other similar drugs (Figure 4).

**Table 4. Concomitant Psychiatric and Other Poisoning/Related Diagnostic Codes among the 3,224 Overdose Cases (includes secondary diagnosis codes)**



## CONCLUSIONS

- Administrative claims databases are a rich resource of medical/prescription data, and the clinical characteristics of the cases provide further insight into the case severity.
- Overall, most cases were identified through a hospitalization claim or treatment in an ER setting (89.1%) and almost half had no recent prescriptions for opioids.
- Overdose cases appeared to be complex – co-occurring sedative/hypnotic/tranquilizer poisoning and psychotropic/other similar drug poisoning was common, as were psychiatric disorder comorbidities.
- Clear risk factors for overdose appear to be identifiable including use of psychiatric drugs, and mood or other psychiatric disorders.
- Multifactorial risk profiles are needed to guide clinicians to help decrease the risk of opioid overdoses.

## Conflict of Interest

Research funded by Purdue Pharma L.P.