

# Medical Outcomes Associated with Unintended Routes of Prescription Opioid Abuse

B Bucher Bartelson<sup>1</sup>, MC Le Lait<sup>1</sup>, RC Dart<sup>1</sup>, CL Roland<sup>2</sup>, ET Masters<sup>3</sup>, J Mardekian<sup>3</sup>, and JL Green<sup>1</sup>

<sup>1</sup>Rocky Mountain Poison & Drug Center - Denver Health, CO <sup>2</sup>Pfizer Inc, Durham, NC <sup>3</sup>Pfizer Inc, New York, NY

## Introduction

- The severity of the immediate clinical outcomes associated with prescription opioid abuse via unintended routes (e.g. inhalation and injection) has not been well studied.
- Poison centers receive large numbers of calls addressing the acute health effects of prescription opioids and often collect data on route of administration.
- We hypothesized that death and major medical outcomes occur more frequently among prescription opioid abuse exposures reported to poison centers via unintended routes compared to ingestion.

## Methods

- Data from the Researched Abuse, Diversion, and Addiction-Related Surveillance (RADARS<sup>®</sup>) System Poison Center Program from 2006 through 2014 were used.
- Inclusion criteria:
  - Adult (>12 years)
  - Reason for exposure was Intentional abuse
  - Involved at least one oral tablet prescription opioid product containing hydrocodone, hydromorphone, morphine, oxycodone, oxymorphone, or tapentadol
  - Case was followed to a known medical outcome
    - Medical outcomes were assessed using standard definitions of death (direct and indirect combined), major effect, moderate effect, minor effect, or no effect
- Definitions:
  - Intentional abuse*: "an exposure resulting from the intentional, improper, or incorrect use of a substance where the patient was likely attempting to gain a high, euphoric effect or some other psychotropic effect, including recreational use of a substance for any effect" (National Poison Data System Manual, v3.1, 2014)
  - Ingestion*: includes swallowing intact and crushed or chewed then swallowed
  - Unintended routes*: inhalation (includes snorting and smoking), injection, and other/multiple
- Relative risks were calculated for death or major medical outcomes given that the exposure involved an unintended route relative to ingestion.

Table 1. Medical Outcome by Route

Medical Outcome	Route			Total
	Ingestion	Unintended	Unknown	
Death	40 (0.4%)	6 (0.3%)	87 (2.0%)	133
Major	756 (6.8%)	266 (11.5%)	471 (10.6%)	1,493
Moderate	3,607 (32.5%)	927 (39.9%)	1,709 (38.6%)	6,243
Minor	4,379 (39.5%)	780 (33.6%)	1,456 (32.9%)	6,615
No Effect	2,311 (20.8%)	342 (14.7%)	700 (15.8%)	3,353
TOTAL	11,093 (62.2% of Total)	2,321 (13.0% of Total)	4,423 (24.8% of Total)	17,837 (100% of Total)
RR of Death OR Major (95% CI)	REF	1.63 (1.43,1.86)	NA*	

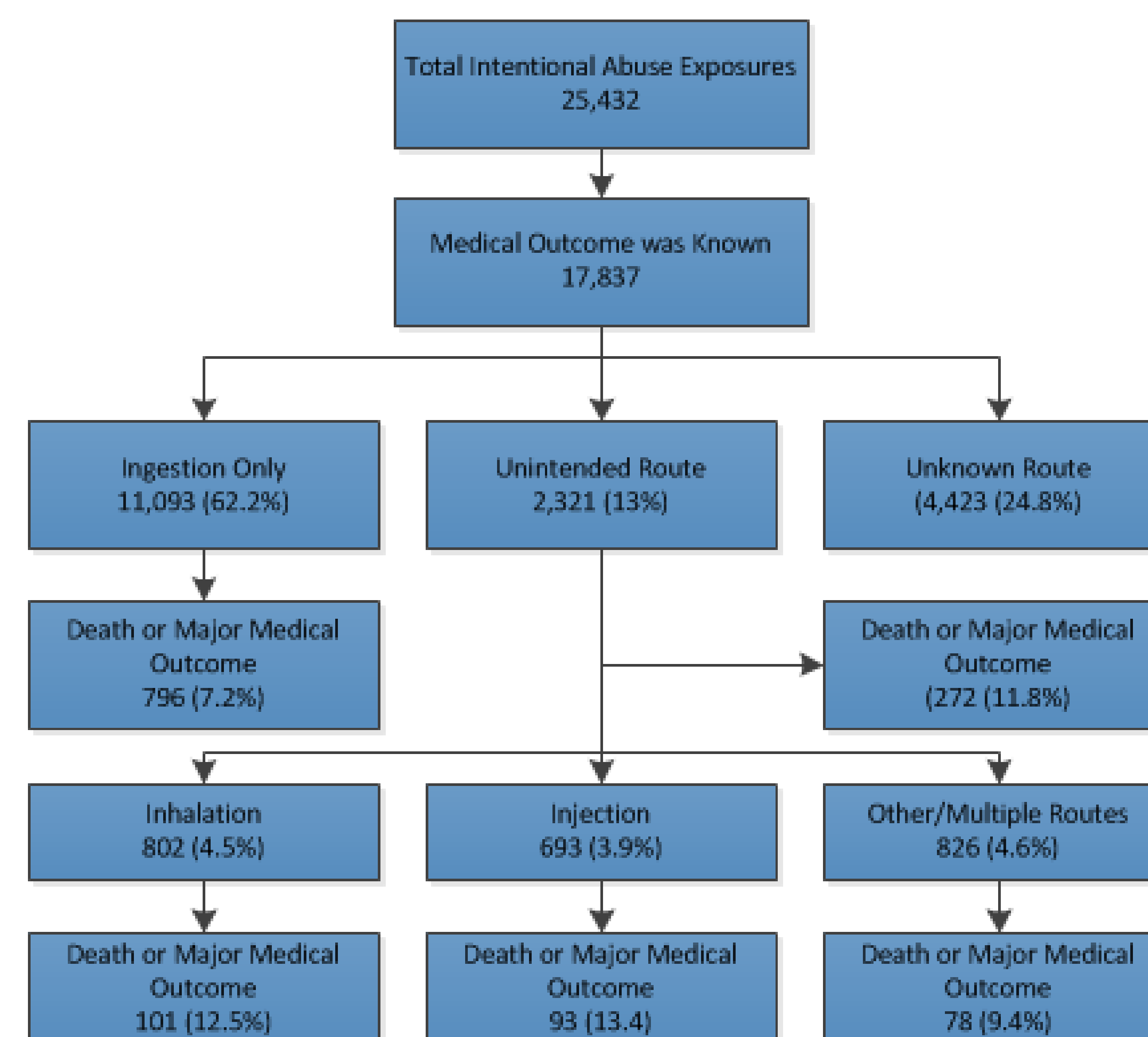
\*Relative risks were not calculated for unknown routes.

Table 2. Medical Outcome by Detailed Route

Medical Outcome	Detailed Route					Total
	Ingestion	Inhalation	Injection	Other or Multiple	Unknown	
Death	40 (0.4%)	2 (0.2%)	3 (0.4%)	1 (0.1%)	87 (2.0%)	133
Major	756 (6.8%)	99 (12.3%)	90 (13.0%)	77 (9.3%)	471 (10.6%)	1,493
Moderate	3,607 (32.5%)	303 (37.8%)	305 (44.0%)	319 (38.6%)	1,709 (38.6%)	6,243
Minor	4,379 (39.5%)	258 (32.2%)	204 (29.4%)	318 (38.5%)	1,456 (32.9%)	6,615
No Effect	2,311 (20.8%)	140 (17.5%)	91 (13.1%)	111 (13.4%)	700 (15.8%)	3,353
TOTAL	11,093 (62.2% of Total)	802 (4.5% of Total)	693 (3.9% of Total)	826 (4.6% of Total)	4,423 (24.8% of Total)	17,837 (100% of Total)
RR of Death OR Major (95% CI)	REF	1.76 (1.45,2.13)	1.87 (1.53,2.29)	1.32 (1.05,1.64)	NA*	

\*Relative risks were not calculated for unknown routes.

## Results



- Exposures involving an unintended route were 63% more likely to be associated with death or major medical outcomes (Table 1).
- Exposures involving inhalation, injection, and other/multiple routes were more likely associated with death or major medical outcomes than ingestion exposures (Table 2).

## Conclusions

- Based upon RADARS Poison Center data, unintended routes are associated with more severe medical outcomes than abuse via ingestion.
- The proportion of cases resulting in death or major medical outcomes was highest for injection followed by inhalation, other/multiple routes, and ingestion.
- These data suggest acute safety risks associated with unintended routes of prescription opioid abuse, in addition to the known long-term public health concerns.

## Limitations

- Poison Center data are self-reported and may reflect a bias towards more severe medical outcomes.
- Poison Center data may underestimate the number of drug exposures in the population.



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