



# Clinical Risk Factors in ED Patients with Prescription Opioid Overdose

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## Introduction

- The symptoms of the opioid toxidrome include pinpoint pupils, respiratory depression and coma.
- Opioid overdose can be treated with the opioid antagonist naloxone.
- Of the 22,767 deaths relating to pharmaceutical overdose in 2013, 16,235 (71.3%) involved prescription opioids.<sup>1</sup>
- Deaths from prescription opioids exceed deaths from all illicit drugs combined.<sup>2</sup>
- More research is needed to identify characteristics that predict poor outcomes in patients that present with prescription opioid overdose.

## Research Question

- What are risk factors for in-hospital severe respiratory depression (SRD) and mortality in emergency department (ED) patients with prescription opioid overdose?

## Acknowledgements

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## Methods

- Secondary data analysis of data from a prospective cohort of acute drug overdose patients at 2 urban teaching hospitals from 2009-13
- Inclusion criteria: prescription opioid overdose (i.e. not heroin), exclusion criteria: age <18, alternate diagnoses, lacking data
- Data extracted: demographics, initial vital signs, blood gas, ED endotracheal intubation (ETI), naloxone administration, toxicology screen results and in-hospital mortality
- Primary outcome was relative risk for severe respiratory depression (SRD) defined by either (a) naloxone administration or (b) endotracheal intubation, secondary outcome was mortality
- Assuming a 20% prevalence of SRD and predictors, we calculated the need to analyze 300 patients to demonstrate 3-fold risk difference with 80% power and 5% alpha

## Results

- 354 patients screened, 47 were excluded, leaving 307 patients for analysis
- mean age 44.7, 42% females
- 2.0% mortality
- 109 patients met criteria for SRD (90 naloxone alone, 9 ETI alone, 10 both)
- Mean age was higher in the SRD group (51.1 vs. 41.1, p<0.001), gender had no correlation (p=0.95)
- Suicidality was inversely correlated with SRD (OR 0.29, CI 0.17-0.5)
- Risk for SRD was highly dependent on the type of prescription opioid
- In 6 deaths, mortality was associated with tachycardia (p<0.001), hyperlactatemia (p<0.05), and hypotension (p<0.01)

## Limitations

- Naloxone is sometimes given for indications other than respiratory depression. Intubation is sometimes performed for reasons other than respiratory failure. Therefore some cases included in the SRD outcome may not have had severe respiratory depression.
- Some patients with respiratory depression may have been managed with other methods (e.g. noxious stimuli), therefore some cases with SRD could have been missed.

## Conclusions

- In this cohort of patients with prescription opioid overdose, we derived clinical risk factors for SRD (age and specific opioid drugs) as well as mortality (vital sign abnormalities and hyperlactatemia).

## Future Implications

- The results from this cohort suggest that the risk for in-hospital severe respiratory depression was highly dependent on the type of prescription opioid. Further prospective research to corroborate these results in other cohorts is needed.

## Bibliography

1. Centers for Disease Control and Prevention. National Vital Statistics System mortality data. (2015) Available from URL: <http://www.cdc.gov/nchs/deaths.htm>.
2. Centers for Disease Control and Prevention (CDC). Addressing Prescription Drug Abuse in the United States, Current Activities and Future Opportunities. [http://www.cdc.gov/HomeandRecreationalSafety/pdf/HHS\\_Prescription\\_Drug\\_Abuse\\_Report\\_09.2013.pdf](http://www.cdc.gov/HomeandRecreationalSafety/pdf/HHS_Prescription_Drug_Abuse_Report_09.2013.pdf).

Table. Risk of Severe Respiratory Depression\* by Prescription Opioid

Prescription Opioid:	SRD Rate (%)	RR: (descending)	95% CI:	P value:
Fentanyl	5/6 (83.3)	22.5	3.2 - 159	<0.01
Oxymorphone	2/3 (66.7)	18.0	2.2 - 144	<0.01
Tapentadol	2/2 (100)	15.5	3.0 - 79.9	<0.05
Methadone	59/116 (50.9)	13.7	2.0 - 95	<0.01
Hydromorphone	4/9 (44.4)	12.0	1.5 - 94	<0.05
Morphine	5/12 (41.7)	11.3	1.5 - 86	<0.05
Oxycodone	40/124 (32.3)	8.7	1.3 - 60	<0.05
Hydrocodone	9/31 (29.0)	7.8	1.0 - 58	<0.05
Buprenorphine	2/7 (28.6)	7.7	0.8 - 73	0.08
Tramadol	3/12 (25.0)	6.8	0.8 - 58	0.08
Codeine	1/27 (3.7)	1.0 (ref)	-	-

\* Severe Respiratory Depression defined as receiving either naloxone or endotracheal intubation. Abbreviations: Desc = descending order; RR = relative risk; CI = confidence interval; SRD = Severe Respiratory Depression.