



Optimizing the Use of Pre-Hospital Emergency Medical Data to Identify Opioid Overdoses

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Introduction

Opioid overdose is the leading cause of accidental death in the US. To respond to this public health crisis, public health and safety agencies are attempting to optimize their use of data sets that can identify opioid overdoses cases early in the continuum of emergency medical care. In this study, we are developing and validating a novel approach to identifying opioid overdose cases using a set of indicators in pre-hospital data, including electronic patient care record (ePCR) and dispatch data.

Methods

We queried all medical emergency calls in calendar year (CY) 2016 for a single EMS agency, using three triggers in the FirstWatch® system:

- (1)definitive overdoses (naloxone administered and patients showed improvement on respiratory rate (RR), level of consciousness (LOC), or pupil responsiveness);
- (2)naloxone administered, excluding calls identified in trigger 1,
- (3)narrative keyword matches to any of 127 opioid and drug-related keywords, excluding calls identified in triggers 1 and 2.

We then conducted a detailed review of the ePCR to determine whether calls identified by the triggers were:

- (1)confirmed cases (any clear positive response to naloxone administration) or
- (2)probable cases (information in the review indicates that it is an opioid overdose, but a clear confirmation with administration of and/or positive response to naloxone was not made).

Results

Figure 1. Preliminary results for Trigger 1: Naloxone administered + improvement on RR, LOC, or pupil responsiveness

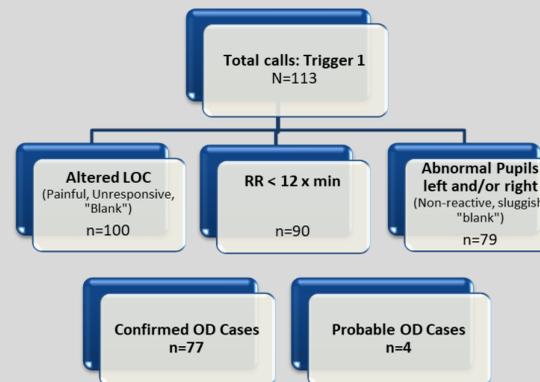


Figure 2. Preliminary results for Trigger 2: Naloxone administered, excluding calls from Trigger 1

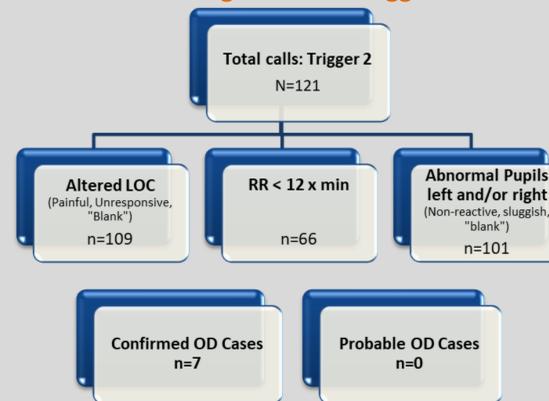
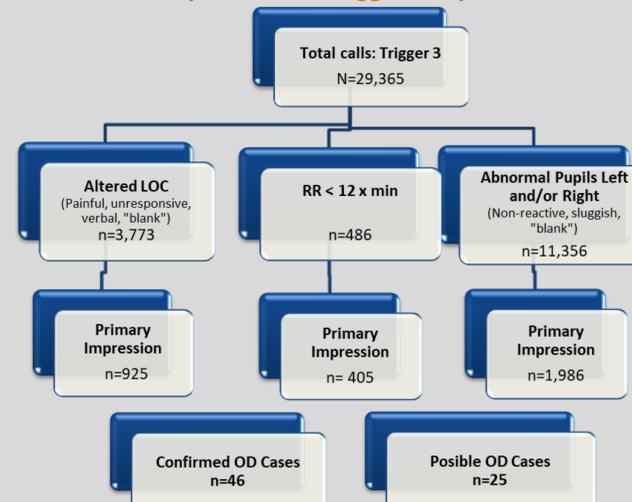


Figure 3. Preliminary results for Trigger 3: Opioid-related keywords



Methods, Continued

The physician screening process involved reviewing the record for documentation of:

1. Opioids or drug paraphernalia on scene
2. Witness description of overdose
3. Patient history of drug use
4. Administration of naloxone with improvement of LOC and/or RR
5. Improvement in LOC and/or RR with stimulation or ventilation (rescue breathing or oxygen)
6. Signs of asphyxia
7. Other clinical signs that rule out the possibility of an OD by opioids (other agents, signs of stroke, coronary, high/low blood sugar, high/low blood pressure, trauma, convulsions)

Triggers 1 (n=113) and 2 (n=121): All calls were reviewed.

Trigger 3 (n=29,365): A 2-stage process was used to review calls. First, calls with any data on LOC, RR, and pupils were reviewed based on 19 primary impressions likely to indicate opioid overdose. Second, narrative was reviewed for calls with a matching primary impression using the criteria above.

Conclusions

Preliminary analysis found that querying pre-hospital emergency medical data on naloxone administration in the presence of clinical features resulted in the highest proportion of identified cases (72%). Querying on naloxone administration in the absence of clinical features and querying on solely opioid-related keywords resulted in low proportions of identified cases (6% and 0.2%, respectively). Although Trigger 1 identified the greatest proportion of overdose-related calls, Triggers 2 & 3 identified a set of cases that basic clinical features of overdose and standard treatment protocols alone failed to identify. Next steps: finalize case identification, develop and test an algorithm using indicators from the dispatch data, and conduct sensitivity and specificity testing to determine whether dispatch data indicators can identify opioid overdose cases.