



Researched Abuse, Diversion and Addiction-Related Surveillance System

QUARTERLY Technical REPORT

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Matching Poison Center Deaths with Death Certificate Data

Key Findings

- Of six deaths reported to the Colorado poison center from 2015-2016, only two were definitively matched with death certificate data.
- Barriers to definitive matching include incomplete demographics reported to poison centers, and death certificates with limited data regarding substances involved in the reported death.
- Poison center records included more extensive detail of the substances involved and circumstances surrounding the death, but report only a small fraction of all deaths. Death certificate data include all deaths in a given geographic region but provide limited information regarding the context surrounding the given death.

Introduction

Opioid-associated deaths in the United States continue to rise, despite multiple interventions from both federal and state agencies. Prescription opioid prescribing has declined in the setting of these interventions, however data from the Centers for Disease Control and Prevention National Vital Statistics System show that deaths associated with natural and semisynthetic opioids (the category which includes the most common prescription opioids) continue to rise. Recent analyses reveal many of these deaths likely involve both prescription and illicit opioids, and deaths from prescription opioids alone remain flat. However, a major limitation of CDC NVSS data is categorization of deaths only by ICD-10 code. Because of this limitation, deaths are only identified by the category of drug involved (eg. natural and semisynthetic opioid) rather than by the specific drug or active pharmaceutical ingredient (eg. oxycodone). Data from state medical examiners and coroners offices reported on death certificates may contain more granularity, as the literal cause of death fields may contain additional information on specific substances involved. However, these data are without additional context and may still be insufficient to fully understand the circumstances of the death. When determining what additional public health interventions are needed to decrease prescription opioid deaths, more detailed information is crucial to ensure interventions are appropriately targeted.

The RADARS System Poison Center Program collects data on acute health events resulting from potentially toxic exposures reported by the general population, caregivers, and health care providers. Data on exposures are collected from 50 regional poison centers across the country, and include demographics, specific products and active pharmaceutical ingredients involved in the exposure, narrative case notes about the clinical course, and the outcome of the patient's care such as death. While only 1% of prescription opioid-associated deaths are reported by poison centers, the detailed cases provide much greater amounts of information and context surrounding the deaths than what is typically seen on death certificates.

While both death certificate and poison center death data have significant limitations, one potential solution is to link cases together. If successful, this would allow more detailed information from poison center cases to inform larger statewide and national mortality datasets. This analysis sought to match poison center direct deaths with death certificate data in Colorado from 2015 to 2016, and to determine the feasibility of this method to determine whether poison center deaths are representative of all coroner and medical examiner deaths.

Methods

Programs

The RADARS System Poison Center Program gathers data on acute health events reported by the general population, caregivers, and health care providers regarding potentially toxic exposures. Data are collected from 50 regional US poison centers in 48 states, providing coverage for more than 93% of the US population. Trained specialists at each center collect data using a nationally standardized electronic health record (the National Poison Data System). A direct death case is defined as a case where the patient died as a direct result of the exposure to a substance or complications of the exposure. Fatality verifications are performed according to the National Poison Data System guidelines. Direct deaths reported from 2015 to 2016 associated with a Colorado zip code were included in this analysis.

Data Matching Process

Deaths identified via the Poison Center Program were matched with Colorado medical examiner and coroner deaths by age, sex, and year-quarter of death. Death certificate data were extracted including age, sex, year-quarter of death, 3-digit zip code, associated ICD-10 codes, and cause of death literal text. Between one and five potential matches were identified for each Poison Center Program death.

Expert Review Process

Expert review of each Poison Center Program direct death case and potential death certificate matches was conducted by two board-certified medical toxicologists. Each case and potential match pairing was reviewed independently by each physician. Matches were judged as “definite”, “possible”, or “unlikely”, and any disagreements were adjudicated by discussion between the reviewers.

Results

From 2015 to 2016, there were 6 direct deaths with a Colorado zip code reported to the RADARS System Poison Center Program (Table 1). After matching for age, sex, and year-quarter of death, there were between 1 and 5 matches identified among death certificates for each of the poison center deaths. In 2 of the poison center deaths a definite match was identified from the death certificates. In the other 4 deaths, a possible match was identified from the death certificates, however there was insufficient data to confirm the matches. Of these cases, 3 had 1 possible match, and 1 had 2 possible matches. In all cases where a definite match was not made, details such as the year-quarter of death, age and sex of the patient were matched. However, the death certificate documented literal causes of death included imprecise responses such as “multiple drug intoxication” and “cardiopulmonary arrest” and it was impossible to definitively determine if the case was the same as a poison center case with more specific drugs identified.



Table 1. Number of death certificate potential matches, adjudicated possible and definite matches for each Poison Center Program direct death case, Colorado 2015-2016.

<u>Poison Center Direct Death Case Identifier</u>	<u>Number of Death Certificate Potential Matches</u>	<u>Number of Adjudicated Possible Matches</u>	<u>Number of Adjudicated Definite Matches</u>
2015A	1	0	1
2015B	5	2	0
2015C	1	1	0
2015D	2	0	1
2015E	3	1	0
2015F	2	1	0

Conclusions

Successfully matching poison center deaths with medical examiner and coroner death certificate data is challenging. Barriers to matching included death certificates with limited data regarding substances involved in the death. Poison center records included much greater detail of the substances involved and circumstances surrounding the death but report only a small fraction of all deaths, while death certificate data include all deaths in a given geographic region but provide limited information of the context surrounding that death.

Suggested Citation

Iwanicki JL, Buchanan J, Black JC, Dart RC (2018). Matching Poison Center Deaths with Death Certificate Data. RADARS® System Technical Report, 2018-Q4.

References

- ¹Iwanicki JL, Severtson SG, Margolin Z, Dasgupta N, Green JL, Dart RC. (2018). Consistency between opioid-related mortality trends derived from poison center and National Vital Statistics System, United States, 2006-2016. *Am J Public Health*. 108. 1639-1645. doi:10.2105/AJPH.2018.304728
- ²Warner M, Paulozzi LJ, Nolte KB, Davis GG, Nelson LS. (2013). State variation in certifying manner of death and drugs involved in drug-intoxication deaths. *Acad Forensic Pathol*. 3. 231-237.