

## Increased Risk of Overdose Death Given Substance Use ED History, New Mexico, 2016–2022

In 2021, New Mexico (NM) ranked 6th in the United States for drug overdose deaths, with a rate of 51.6 deaths per 100,000 population.<sup>1</sup> Between 2016 and 2020 in NM, the rate of opioid-related ED visits was 70.9 per 100,000 persons.<sup>2</sup>

Other retrospective cohort studies have found an increased risk of death among individuals who present to the emergency department (ED) with an opioid overdose. Weiner et al. (2020) found that 5.5% of their study cohort died one year after their first opioid overdose ED visit, even after excluding patients who had had an overdose within the six months prior to the index visit.<sup>3</sup> A study in Maryland found that ED patients with a prior non-fatal overdose had a case fatality rate of 69.2 per 100,000 patients, which is six times higher than patients who were in the ED for anything else.<sup>4</sup> Similarly, Moe et al. (2021) found that all-cause mortality was higher among those who had an overdose-related ED visit as compared to those who visited the ED for something else.<sup>5</sup> Previous studies have also found that contact with healthcare after an overdose event can increase the chance of survival. For example, Leece (2020) found that contact with a physician in the seven days after the index overdose was associated with a lower risk of opioid or all-cause mortality.<sup>6</sup>

This study emerged out of a desire to examine the emergency department (ED) history of individuals who died from a drug overdose in the hopes of identifying intervention for overdose prevention efforts.

### Methods

A retrospective cohort was created by linking NM's Violent Death Reporting System (VDRS) data to ED visits from NM's syndromic surveillance database. VDRS is a database of violent deaths, including those due to homicide, suicide,

**Nora Holzinger, MA, MPH**

*Epidemiology and Response Division  
New Mexico Department of Health*

those in which an individual was killed by law enforcement, deaths of undetermined intent, and unintentional firearm deaths. Overdoses are typically included in the “undetermined intent” category. Syndromic surveillance is a passive surveillance system of emergency department (ED) visits in the state of NM, to which 87% of non-federal hospitals submit data. Deaths were limited to those individuals who died from an intentional, unintentional drug overdose, or suicide by overdose, and decedents must have been NM residents.

Records with insufficient identifying data (such as name, date of birth, or social security number), were removed from the dataset, as were outpatient visits and visits from urgent care centers. These data were subset again to include only those who had at least one ED visit for substance use, abuse, or dependence.

Opioid poisoning ED visits were determined using ICD-10-CM codes listed in the ED discharge diagnosis field. A subject was included in the study from the first ED visit for mental health or substance use between 2016 and 2022, and they were “followed” until either a fatal overdose or the end of the study period occurred.

Data processing and Cox proportional hazards regressions were performed using SAS 9.4, and Link King software was used to link death records to ED visits.

### Results

There were more than 12 million ED visits reported to the NM syndromic surveillance database between 2016 and 2022 (see Figure). After applying the inclusion criteria, this was whittled down to

699,180 visits. The data were then aggregated to the person level (one observation per person), and matched to 3,858 decedents, leaving 274,190 individuals that were not matched to a death record. This put the cohort total at 116,674 individuals. From this cohort, there were 1,068 fatal overdoses, and 115,606 individuals who did not die from an overdose. There were 7,322 people with at least one opioid overdose ED visit and 563 people who died of an overdose attributed to opioids.

Hazard functions were run on the cohort, where overdose death was the event, and the length of follow up was the span of time in days between the first ED visit in the study period and either overdose death or the end of the study period. Among those who went to the ED for substance use between 2016 and 2022, those with at least one ED visit for opioid poisoning had a 186% increased risk of death from drug overdose (HR= 2.86 (95% CI [2.44-3.36])) during the study period. Within one year of their ED visit, those with at least one opioid poisoning were at a 193% increased risk of overdose death (HR = 2.93 (95% CI [2.07-4.15])).

Within three years, that same group was at a 172% increased risk of overdose death (HR = 2.72 (95% CI [2.18-3.92])), and within five years, a 182% increased risk (HR = 2.82 (95% CI [2.44-3.36])). Age was not a statistically significant covariate for any of these calculations. For individuals with two or more opioid poisonings between the initial ED visit and the fatal overdose, they were at a 214% increased risk of death that increased 0.8% with each increasing year of age (HR=3.14 (95% CI [2.28-4.33])). In total there were 1,127 individuals who had more than two opioid overdoses (of those who had an opioid overdose, 15.3% had two or more during the study period).

### Limitations

There are several important limitations to this study. Due to the nature of the data, semi-arbitrary limits had to be set in order to define the cohort. Therefore, there is no reliable way to ensure that an individual's first substance use-related ED visit in the study period was their first-ever visit. Some people may have had visits that happened before the study period that were not included in the co-

hort. Those who did not die of overdose during the study period could have died from other causes, or even from substance-use related causes. However, those deaths were not within the scope of this project.

The data sources used in this study also present some limitations as well. Syndromic surveillance data are from non-federal hospitals only (Veteran's Administration and Indian Health Services data are not included), amounting to about 87% percent of EDs in NM. These considerations may mean that some of the deceased individuals may have had an ED history, but those visits did not get reported to NMDOH.

Additionally, due to how the cohort was constructed, the index visit could have been for mental health as long as that individual had at least one visit for substance use later in the study period. However, there is little overlap between those who had ED visits for substance use and those who had visits for mental health. Only 21% of the cohort had at least one ED visit for mental health during the study period, and less than 1% of the individuals with at least one mental health ED visit died from an overdose during the study period.

### Discussion

According to these results, among those with a history of substance use, those with an opioid overdose ED history are at an increased risk of fatal overdose, even if that overdose involves substances other than opioids. However, opioids do account for about half of the fatal overdoses in this cohort. Among those who had more than one opioid overdose, their risk of fatal overdose was significantly higher, and those individuals warrant increased attention in prevention efforts.

The hazard ratios show that opioid overdose patients are at significant risk of overdose death for multiple years after the event, and EDs in particular can be excellent points of intervention for this population.

Though the study period spans the COVID-19 pandemic, it is difficult to ascertain what effects the pandemic may have had on the overdose rate in NM. The pandemic co-occurred with the ap-

pearance and increased prevalence of fentanyl in the local drug supply, muddling NMDOH's ability to tease out pandemic effects. Questions regarding the impact of fentanyl on overdose mortality warrant further exploration in this cohort.

This study, if conducted again with slightly different inclusion and exclusion criteria, could provide a better understanding of whether these findings apply to the general population (individuals who went to the ED for conditions other than substance use or mental health). This type of process would also be suited to routine surveillance for things like overdose or strategies to quantify the number of unhoused individuals in a locality, with analysis conducted every year after the mortality data have been finalized. For example, during the creation of the dataset, it was found that a large number of unhoused people were visiting the ED for mental health or substance use visits. Using the syndromic surveillance data with identifiers allowed the team to determine which patients were unhoused, based on their patient address fields. With some refinement, the data linkage methodology used in this study could be used as another way to estimate the number of unhoused people in a locality.

### Recommendations

Given that opioid overdoses present with a recognizable etiology (as compared to other substances like stimulants), and as these findings demonstrate, an increased risk of later overdose death, then intervening in the ED among individuals suffering from a nonfatal opioid overdose may provide an opportunity for overdose prevention efforts. In NM, the scaling-up of existing ED-based overdose prevention efforts would be a great way to combat the crisis highlighted in this study. Currently, only about a third of NM hospitals are using peer-support workers/navigators, providing naloxone prior to discharge from the ED, or initiating medication-assisted opioid use disorder treatment to those who were hospitalized with an opioid overdose.

### REFERENCES

1. Centers for Disease Control and Prevention. Drug overdose mortality by State. Centers for Disease Control and Prevention. 2022. [https://www.cdc.gov/nchs/pressroom/sosmap/drug\\_poisoning\\_mortality/drug\\_poisoning.html](https://www.cdc.gov/nchs/pressroom/sosmap/drug_poisoning_mortality/drug_poisoning.html).
2. Epidemiology and Response Division, *New Mexico Substance Use Epidemiology Profile*. 2021.
3. Weiner, SG, Baker O, Bernson D, Schuur J. One Year Mortality of Patients after Emergency Department Treatment for Nonfatal Opioid Overdose. *Annals of Emergency Medicine*. 2020 Jan; 75(1): 13-17.
4. Krawczyk N., Eisenberg M., Schneider KE., Richards TM., Lyons BC., Jackson K., Ferris L., Weiner P., Saloner B. Predictors of overdose death among high-risk emergency department patients with substance-related encounters: A data linkage cohort study. 2020. *Annals of Emergency Medicine*, 75(1):1–12.
5. Moe J, Chong M, Zhao B., Scheuermeyer FX, Purssell R., Slaunwhite A. Death after emergency department visits for opioid overdose in British Columbia: A retrospective cohort analysis. 2021. *CMAJ Open* 9(1).
6. Leece P, Chen C, Manson H, Orkin AM, Schwartz B, Juurlink DN, Gomes T. One-year mortality after emergency department visit for nonfatal opioid poisoning: A population-based analysis. 2020. *Annals of Emergency Medicine*. 75(1), 20–28

The New Mexico Epidemiology Report

Heidi Krapfl, MS

Deputy Division Director of Programs,

Deputy State Epidemiologist & Editor

The New Mexico Epidemiology Report

by the

Epidemiology and Response Division

New Mexico Department of Health

1190 St. Francis Dr.

P.O. Box 26110, Santa Fe, NM 87502

24-Hour Emergency Number:  
1-833-796-8773

<https://nmhealth.org>

**Figure.**

