



An Analysis of West Virginia SUDORS Data

Years 2019 to 2022

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The following report contains analyses of drug overdose fatalities that occurred in West Virginia for the years 2019 to 2022, as compiled in the State Unintentional Drug Overdose Reporting System (SUDORS).

Key Findings

- A total of 851 drug overdose deaths were reported in SUDORS in 2019, 1,308 in 2020, 1,458 in 2021, and 1,359 in 2022.
- Overdose deaths among males outnumber females by a ratio of more than 2 : 1.
- Approximately 80% of the decedents were unmarried, a much larger proportion than is unmarried in the general population.
- Naloxone was administered to less than 20% of decedents in 2019, but this treatment was increased to more than 30% of decedents in the following years, suggesting greater availability of naloxone in the field. Naloxone was mostly administered by Emergency Medical Services (EMS) or unknown administrators.
- The percentage of decedents who had survived a prior overdose was around 20% for these years, suggesting an opportunity for intervention exists for some individuals who survived an overdose.
- The percentage of decedents who did not receive emergency department (ED) care during the fatal event increased slightly from 70.8% in 2019 to 74.0% in 2022.
- Opiate and amphetamine were the top two substance classes listed as a factor in the cause of death for these years. Other common substances included cocaine, marijuana, benzodiazepines, antidepressants, and alcohol. Multiple substances were listed as a cause of death for many decedents.

West Virginia SUDORS

West Virginia SUDORS data consist of de-identified accidental and undetermined manner drug overdose deaths confirmed by the West Virginia Office of the Chief Medical Examiner (OCME), updated and distributed semi-annually by the Centers for Disease Control and Prevention (CDC). Drug overdose deaths where the manner of death is suicide or homicide are not included in SUDORS. For nearly all decedents, core demographic variables are available, including age, sex, race, marital status, education level, and state of residence. Additional variables are available for some or most decedents, drawn from death scene

investigations including bystander reports, autopsy, toxicology reports, and prescription history. Cause of death codes (ICD-10) and cause of death statements are derived from the WV Health Statistics Center's (HSC) Vital Statistics System (VSS).

SUDORS does not include West Virginia resident deaths that occur outside the state. For this reason, population rates should not be calculated from SUDORS data and comparisons of overdose death counts derived from HSC data, such as those in the West Virginia Office of Drug Control Policy (ODCP) public dashboard are subject to these important limitations. Additionally, SUDORS data includes unconfirmed, suspected overdose deaths that are pending cause/manner of death and toxicology results as reported by the OCME and therefore have not been confirmed as drug overdose deaths by the HSC. Therefore, SUDORS results are not comparable to HSC death statistics available on their website and the historical and provisional fatality statistics on the ODCP dashboard.

Demographic Characteristics of Overdose Decedents

From 2019 to 2022, SUDORS drug overdose deaths increased from more than 800 to around 1,400 (Table 1). West Virginia residents constituted more than 93% of overdose deaths registered in WV SUDORS for the aforementioned period, and males outnumbered females by more than 2 : 1.

For 2019 to 2022, the mean ages of all decedents increased from 42.3 to 44.0 years old, and the median ages of all decedents increased from 41 to 43 years old.

The dominant ages of decedents were between 35 and 44 years, and nearly three quarters of decedents were 25-54 years old during these years.

Nearly 90% of decedents were White, non-Hispanic, while Black, non-Hispanic comprised about 6% of decedents.

The percentage of decedents who were married, in a civil union, or in a domestic partnership was nearly 19% in 2019 but continued to drop to about 14% in 2022. For comparison, around 50% of the adult population in West Virginia is married.

More than half of the decedents were high school graduates with no college. Many decedents (around 20%) did not complete high school, while more than 10% of them had some college or an associate degree. The percentage of decedents with a bachelor's or higher degree was about 6% in 2019 and continued to drop to about 3% in 2022.

Table 1. Demographic characteristics of overdose decedents, 2019-2022.

	2019		2020		2021		2022	
	n	(%)	n	(%)	n	(%)	n	(%)
Total Decedents	851		1,308		1,458		1,359	
State of Residence								
West Virginia	809	(95.1)	1,229	(94.0)	1,362	(93.4)	1,284	(94.5)
Other States or Unknown	42	(4.9)	79	(6.0)	96	(6.6)	75	(5.5)
Sex								
Male	575	(67.6)	936	(71.6)	1,035	(71.0)	990	(72.9)
Female	276	(32.4)	372	(28.4)	423	(29.0)	369	(27.1)
Age Category								
Under 15	1	(0.1)	3	(0.2)	2	(0.1)		
15-24	51	(6.0)	46	(3.5)	72	(4.9)	47	(3.5)
25-34	199	(23.4)	323	(24.7)	311	(21.3)	261	(19.2)
35-44	244	(28.7)	396	(30.3)	472	(32.4)	435	(32.0)
45-54	199	(23.4)	310	(23.7)	326	(22.4)	320	(23.5)
55-64	124	(14.6)	191	(14.6)	224	(15.4)	241	(17.7)
65+	33	(3.9)	39	(3.0)	50	(3.4)	55	(4.1)
Unknown					1	(0.1)		
Race / Ethnicity								
White, non-Hispanic	771	(90.6)	1,196	(91.4)	1,323	(90.7)	1,222	(89.9)
Black, non-Hispanic	50	(5.9)	77	(5.9)	96	(6.6)	85	(6.2)
Other race/ethnicity	11	(1.3)	21	(1.6)	16	(1.1)	5	(0.4)
Unknown	19	(2.2)	14	(1.1)	23	(1.6)	47	(3.5)

	2019		2020		2021		2022	
	n	(%)	n	(%)	n	(%)	n	(%)
Marital Status								
Never Married	354	(41.6)	560	(42.8)	601	(41.2)	587	(43.2)
Divorced, widowed, married but separated	320	(37.6)	498	(38.1)	589	(40.4)	514	(37.8)
Married / civil union / domestic partnership	161	(18.9)	231	(17.7)	228	(15.6)	192	(14.1)
Unknown	16	(1.9)	19	(1.4)	40	(2.7)	66	(4.9)
Education								
Did not complete high school	168	(19.7)	278	(21.3)	338	(23.2)	302	(22.2)
High school graduate or GED	484	(56.9)	750	(57.3)	848	(58.2)	763	(56.1)
Some college or associate's	128	(15.0)	194	(14.8)	173	(11.9)	185	(13.6)
Bachelor's or higher	52	(6.1)	62	(4.7)	60	(4.1)	40	(2.9)
Unknown	19	(2.2)	24	(1.8)	39	(2.7)	69	(5.1)

Source: SUDORS

Naloxone Administration

In 2019, 168 individuals received one or more doses of Naloxone during the fatal overdose incident, and the number increased to 509 in 2022 (Table 2). Naloxone was mostly administered by EMS personnel or unknown administrators.

Table 2. Administration of Naloxone during fatal overdose episode, 2019-2022.

	2019		2020		2021		2022	
	n	(%)	n	(%)	n	(%)	n	(%)
Total Decedents	851		1,308		1,458		1,359	
Decedents not administered naloxone	682	(80.1)	832	(63.6)	965	(66.2)	850	(62.6)
One Administrator								
Bystander	27	(3.2)	53	(4.05)	62	(4.3)	74	(5.5)
EMS	64	(7.5)	224	(17.1)	185	(12.7)	163	(12.0)
Hospital	3	(0.4)	9	(0.7)	7	(0.5)	9	(0.7)
Law	6	(0.7)	8	(0.6)	6	(0.4)	4	(0.3)
Other	2	(0.2)	2	(0.2)	1	(0.1)	1	(0.1)
Unknown	47	(5.5)	143	(10.9)	200	(13.7)	230	(16.9)
Two Administrators								
Bystander & EMS	5	(0.6)	17	(1.3)	16	(1.1)	11	(0.8)
Bystander & Hospital	2	(0.2)	1	(0.1)				
Bystander & Law	2	(0.2)	2	(0.2)	1	(0.1)	1	(0.1)
Bystander & Other	1	(0.1)	2	(0.2)				
Bystander & Unknown							1	(0.1)
EMS & Hospital	6	(0.7)	13	(1.0)	14	(1.0)	11	(0.8)
EMS & Law	2	(0.2)					2	(0.2)
EMS & Other			1	(0.1)				
EMS & Unknown							1	(0.1)

	2019		2020		2021		2022	
	n	(%)	n	(%)	n	(%)	n	(%)
Three Administrators								
Bystander & EMS & Law	1	(0.1)			1	(0.1)		
Bystander & EMS & Other	1	(0.1)	1	(0.1)				
EMS & Hospital & Unknown							1	(0.1)

Source: SUDORS

Previous Overdose

Many decedents (around 20%) had a nonfatal overdose prior to the fatal incident in these years (Table 3), suggesting an opportunity for intervention in fatal overdose deaths. The window for intervention following a nonfatal overdose is wide, however, ranging from 1 month to more than 1 year.

Table 3. Timing of previous overdose, 2019-2022.

	2019		2020		2021		2022	
	n	(%)	n	(%)	n	(%)	n	(%)
Total decedents	851		1,308		1,458		1,359	
Unknown					4	(0.3)	1	(0.1)
No previous overdose reported	708	(83.2)	977	(74.7)	1,149	(78.8)	1,050	(77.3)
Previous OD:								
Previous OD within the last month	37	(4.4)	48	(3.7)	37	(2.5)	45	(3.3)
Previous OD occurred between a month and a year ago	56	(6.6)	129	(9.9)	98	(6.7)	84	(6.2)
Previous OD occurred more than a year ago	22	(2.6)	121	(9.3)	159	(10.9)	173	(12.7)
Previous OD, timing unknown	28	(3.3)	33	(2.5)	11	(0.8)	6	(0.4)

Source: SUDORS

Emergency Department Care

Around 25-30% decedents were seen in an emergency department (ED) during the fatal overdose incident these years. (Table 4). Of those decedents seen in the ED following the incident, the majority died in the ED, and the next largest proportion were admitted but later died in the hospital.

Table 4. Decedent seen in ED during fatal incident and subsequent location of death, 2019-2022.

	2019		2020		2021		2022	
	n	(%)	n	(%)	n	(%)	n	(%)
Total	851		1,308		1,458		1,359	
ED Visit Unknown	5	(0.6)	8	(0.6)	13	(0.9)	4	(0.3)
Without ED Visit	602	(70.7)	905	(69.2)	1,069	(73.3)	1,006	(74.0)
With ED Visit:								
Dead on arrival	1	(0.1)	12	(0.9)	12	(0.8)	18	(1.3)
ED/outpatient	145	(17.0)	249	(19.0)	222	(15.2)	214	(15.8)
Hospital inpatient	71	(8.3)	110	(8.4)	120	(8.2)	96	(7.1)
Hospice facility	4	(0.5)	4	(0.3)	1	(0.1)	2	(0.2)
Decedent's home	9	(1.1)	2	(0.2)			1	(0.1)
Other (specify)	11	(1.3)	18	(1.4)	19	(1.3)	17	(1.3)
Death Place Unknown	3	(0.4)			2	(0.1)	1	(0.1)

Source: SUDORS

Substances Contributing to Cause of Death

Toxicology results were used to identify substances contributing to cause of death. For many decedents, more than one substance contributed to the cause of death.

In 2019 to 2022, opiates were the most common substance class that contributed to cause of death (Table 5a), with amphetamine the second most common. Other substance classes commonly contributing to cause of death include cocaine, marijuana, benzodiazepines, antidepressants, and alcohol.

The most common drugs/metabolites contributing to cause of death were fentanyl from 2019 to 2022 (Table 5b). A fentanyl metabolite, 4-ANPP, was the second most common drug/metabolite contributing to the cause of overdose deaths in later years. Other drugs/metabolites included norfentanyl, methamphetamine, and amphetamine.

Table 5a. Top 5 substance classes contributing to cause of death, 2019-2022.

Incident_Year	Substance_Class	n (%)
2019	OPIATE	1,743 (54.2)
	AMPHETAMINE	645 (20.1)
	COCAINE	255 (7.9)
	BENZODIAZEPINES	237 (7.4)
	ALCOHOL	111 (3.5)
2020	OPIATE	3,904 (55.7)
	AMPHETAMINE	1,126 (16.1)
	BENZODIAZEPINES	422 (6.0)
	ANTIDEPRESSANT	304 (4.3)
	COCAINE	249 (3.6)
2021	OPIATE	4,064 (48.7)
	AMPHETAMINE	1,553 (18.6)
	ANTIDEPRESSANT	489 (5.9)
	BENZODIAZEPINES	438 (5.2)
	COCAINE	313 (3.7)
2022	OPIATE	3,955 (52.4)
	AMPHETAMINE	1,402 (18.6)
	COCAINE	362 (4.8)
	MARIJUANA	347 (4.6)
	BENZODIAZEPINES	337 (4.5)

Source: SUDORS

Note: Substances contributing to cause of death exceed decedents as many individuals had multiple substances involved in the death.

Table 5b. Top 5 drugs or metabolites contributing to cause of death, 2019-2022.

Incident_Year	Substance_Name	n (%)
2019	FENTANYL	481 (15.0)
	METHAMPHETAMINE	377 (11.7)
	NORFENTANYL	303 (9.4)
	AMPHETAMINE	265 (8.2)
	MORPHINE	141 (4.4)
2020	FENTANYL	994 (14.2)
	4-ANPP	783 (11.2)
	NORFENTANYL	770 (11.0)
	METHAMPHETAMINE	609 (8.7)
	AMPHETAMINE	516 (7.4)
2021	FENTANYL	1,145 (13.7)
	4-ANPP	1,001 (12.0)
	NORFENTANYL	951 (11.4)
	METHAMPHETAMINE	791 (9.5)
	AMPHETAMINE	758 (9.1)
2022	FENTANYL	1,008 (13.4)
	4-ANPP	963 (12.8)
	NORFENTANYL	938 (12.4)
	METHAMPHETAMINE	703 (9.3)
	AMPHETAMINE	697 (9.2)

Source: SUDORS

Note: Substances contributing to cause of death exceed decedents as many individuals had multiple substances involved in the death.

1. *Norfentanyl is a fentanyl metabolite with a rapid onset and short duration of action. Historically it has been used to treat breakthrough pain and is commonly used as a pre-op pain reliever (<https://premierbiotech.com/innovation/facing-fentanyl-p2/>).*
2. *Despropionyl fentanyl (4-ANPP) is a fentanyl metabolite used for the manufacture of fentanyl and related opioids (<https://www.overdosepreventionstrategies.org/glossary/4-anpp/>).*

Conclusion

SUDORS is a valuable dataset for describing the magnitude and changing nature of the drug overdose epidemic in West Virginia but has several limitations such as including suspected but unconfirmed deaths. The main advantage is that SUDORS data provides information on public safety and healthcare touch points – EMS, law enforcement, and hospital emergency departments – through which individuals with a substance use disorder may be guided to treatment. About 20% of decedents had a prior nonfatal overdose, offering an opportunity for intervention. The SUDORS data also reveal drug class and metabolite trends. In contrast to trends in the illicit drug supply, SUDORS did not provide a clear picture of decedents' prescription history due to low completeness of these variables. Improvements in completeness of these variables could inform future analyses with additional statistics to provide a more complete understanding of prescribing trends and drug diversion.

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