

Drug Overdose Deaths with Evidence of Counterfeit Pill Use — United States, July 2019–December 2021

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Abstract

Using data from CDC's State Unintentional Drug Overdose Reporting System, this report describes trends in overdose deaths with evidence of counterfeit pill use during July 2019–December 2021 in 29 states and the District of Columbia (DC) and characteristics of deaths with and without evidence of counterfeit pill use during 2021 in 34 states and DC. The quarterly percentage of deaths with evidence of counterfeit pill use more than doubled from 2.0% during July–September 2019 to 4.7% during October–December 2021, and more than tripled in western jurisdictions (from 4.7% to 14.7%). Illicitly manufactured fentanyls were the only drugs involved (i.e., caused death) in 41.4% of deaths with evidence of counterfeit pill use and 19.5% of deaths without evidence. Decedents with evidence of counterfeit pill use, compared with those without evidence, were younger (57.1% versus 28.1% were aged <35 years), more often Hispanic or Latino (18.7% versus 9.4%), and more frequently had a history of prescription drug misuse (27.0% versus 9.4%). Smoking was the most common noningestion drug use route among deaths with evidence of counterfeit pill use (39.5%). Overdose prevention messaging that highlights the dangers of pills obtained illicitly or without a prescription (because they might be counterfeit), encourages drug product testing by persons using drugs, and is tailored to persons most at risk (e.g., younger persons) could help prevent overdose deaths.

Introduction

Drug overdose deaths are at historically high levels in the United States, with a preliminary estimate of more than 105,000 deaths in 2022 (1). The proliferation of counterfeit pills, which are not manufactured by pharmaceutical companies, but are typically made to look like legitimate pharmaceutical pills (frequently oxycodone or alprazolam), is complicating the illicit drug market and potentially contributing to these deaths* (2). Counterfeit pills often contain illicitly manufactured fentanyls (IMFs), illicit benzodiazepines (e.g., bromazolam, etizolam, and flualprazolam), or other illicit drugs, and can increase overdose risk because the pills might expose persons to drugs they did not intend to use.

* <https://www.dea.gov/press-releases/2022/12/20/drug-enforcement-administration-announces-seizure-over-379-million-deadly>

Methods

Jurisdictions participating in CDC's State Unintentional Drug Overdose Reporting System (SUDORS)[†] entered information about unintentional and undetermined intent drug overdose deaths from death certificates, postmortem toxicology reports, and medical examiner and coroner reports. Quarterly percentages of overdose deaths with evidence of counterfeit pill use were calculated among 30 jurisdictions[§] with complete data for July 2019–December 2021. Further, decedent demographics, the drugs involved, and the circumstances of overdose deaths with and without evidence of counterfeit pill use were examined among 35 jurisdictions[¶] with complete data for 2021. Evidence of counterfeit pill use was determined by reviewing free-text narratives that describe each death in SUDORS. Deaths were flagged for review by text searches indicating potential evidence, and narratives were separately reviewed by two coauthors.**

[†] <https://www.cdc.gov/drugoverdose/fatal/sudors.html>

[§] Alaska, Arizona, Arkansas, Colorado, Connecticut, Delaware, District of Columbia, Georgia, Illinois, Kansas, Kentucky, Maine, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Virginia, Washington, and West Virginia. Arkansas, Illinois, Pennsylvania, and Washington reported deaths from counties that accounted for ≥75% of drug overdose deaths in the respective state in 2017, per SUDORS funding requirements; all other jurisdictions reported deaths from the full jurisdiction. Jurisdictions were included if complete data (including medical examiner or coroner reports for ≥75% of deaths) were available for all of July 2019–December 2021. Analysis was restricted to decedents with an available medical examiner or coroner report.

[¶] In addition to the 30 jurisdictions included in trend analyses, analyses of decedent demographics, drugs involved, and circumstances of overdose deaths with and without evidence of counterfeit pill use also included Iowa, Louisiana, Maryland, Michigan, and Nebraska. Arkansas, Illinois, Louisiana, Pennsylvania, and Washington reported deaths from counties that accounted for ≥75% of drug overdose deaths in the respective state in 2017, per SUDORS funding requirements; all other jurisdictions reported deaths from the full jurisdiction. Jurisdictions were included if complete data (including medical examiner or coroner reports for ≥75% of deaths) were available for all of January–December 2021. Analysis was restricted to decedents with an available medical examiner or coroner report.

** To identify evidence of counterfeit pill use, deaths were flagged if the SUDORS counterfeit pills checkbox was checked or text narratives describing each death contained certain substrings (e.g., “counterf” or “M-30”). Narratives for flagged deaths were coded to have evidence of counterfeit pill use (and types) or not; coding discrepancies were resolved by collective consensus of coauthors. Deaths were flagged using substring searches for variations on oxycodone brand names if no oxycodone (or metabolites) were detected by postmortem toxicology testing; the same approach was used for alprazolam. Because oxycodone and alprazolam are the drugs most commonly mimicked by counterfeit pills, counterfeit pill type was coded as oxycodone, alprazolam, or unspecified (e.g., witnesses reported that the decedent used “counterfeit pills” but did not indicate the type of pharmaceutical pills mimicked), and the pills were categorized mutually exclusively for analyses: oxycodone but no alprazolam, alprazolam but no oxycodone, both oxycodone and alprazolam, or unspecified.

Evidence of counterfeit pill use included 1) pills found at the overdose scene that were identified as counterfeit (e.g., by witnesses, law enforcement, medical examiners, or coroners); 2) pills that tested positive for drugs other than what they appeared to contain; 3) pills appearing as oxycodone with no oxycodone detected on postmortem toxicology, or appearing as alprazolam with no alprazolam detected; 4) unmarked pills; and 5) witness report that the decedent used pills, but none of the drugs detected by toxicology testing are available in legitimate pill form. Analyses were performed using SAS software (version 9.4; SAS Institute). This activity was reviewed by CDC and conducted consistent with applicable federal law and CDC policy.^{††}

Results

During July 2019–December 2021, a total of 106,293 overdose deaths occurred among 30 jurisdictions. The overall quarterly percentage of overdose deaths with evidence of counterfeit

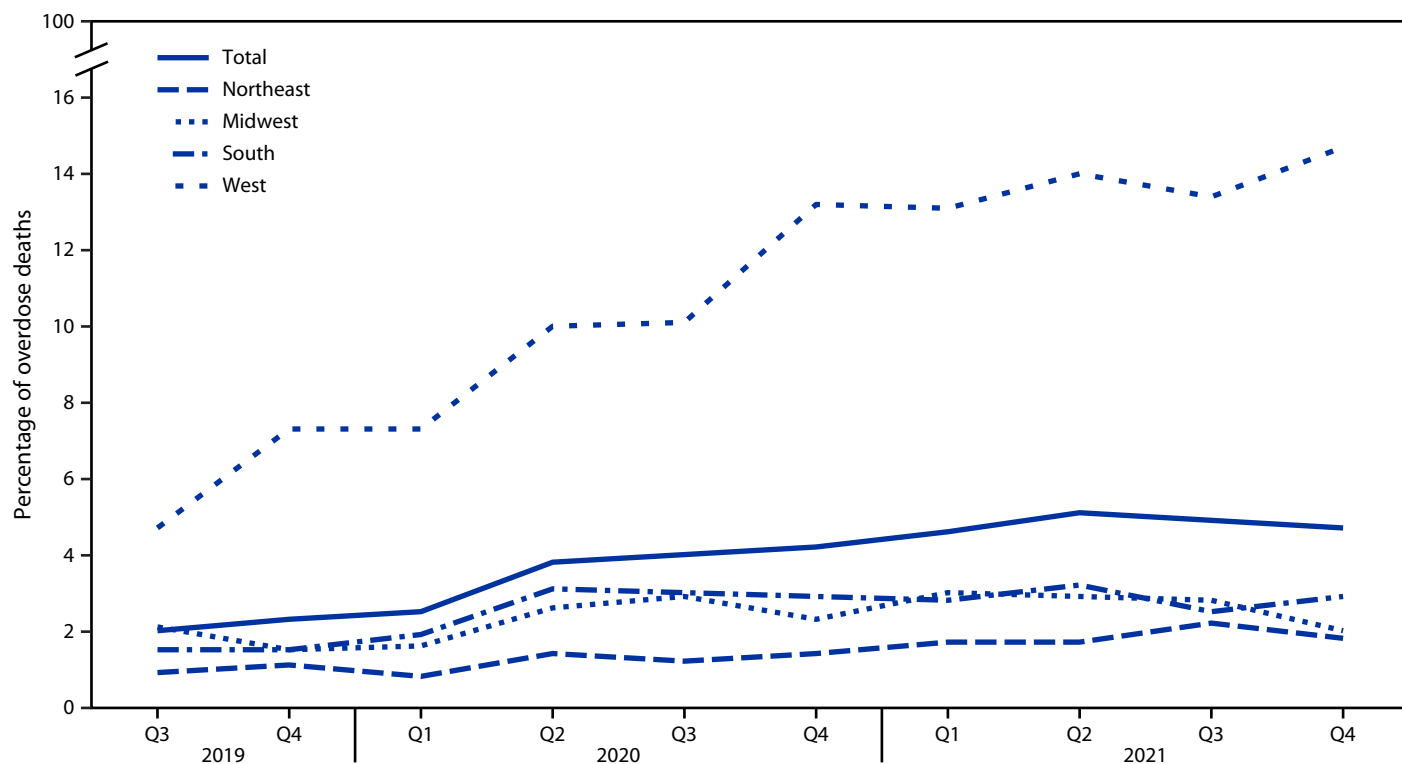
pill use increased from 2.0% during July–September 2019 to 4.7% during October–December 2021 (Figure), driven by an increase from 4.7% to 14.7% in western jurisdictions.^{§§} Percentages remained below 4% in all other regions.

Among 54,768 overdose deaths during January–December 2021 in 35 jurisdictions, 2,437 (4.4%) had evidence of counterfeit pill use (Table 1). Decedents with evidence of counterfeit pill use were younger than those without evidence (57.1% versus 28.1% were aged <35 years) and a higher percentage was Hispanic or Latino (Hispanic) (18.7% versus 9.4%). More than one half (55.8%) of overdose deaths with evidence of counterfeit pill use occurred in western jurisdictions compared with 16.3% of deaths without evidence of counterfeit pill use.

^{§§} U.S. Census Bureau regions were used to stratify jurisdictions into geographic regions (https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf). Trend analyses included eight of nine jurisdictions, five of 12 jurisdictions, nine of 17 jurisdictions, and eight of 13 jurisdictions in the Northeast, Midwest, South, and West U.S. Census Bureau regions, respectively. Analyses of overdose characteristics included eight of nine jurisdictions, eight of 12 jurisdictions, 11 of 17 jurisdictions, and eight of 13 jurisdictions in the Northeast, Midwest, South, and West regions, respectively.

^{††} 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

FIGURE. Percentage of drug overdose deaths with evidence of counterfeit pill use, by quarter* and U.S. Census Bureau region† — State Unintentional Drug Overdose Reporting System, 30 jurisdictions, July 2019–December 2021



Abbreviations: Q1 = quarter 1; Q2 = quarter 2; Q3 = quarter 3; Q4 = quarter 4.

* Quarters were defined as Q1 (January 1–March 31), Q2 (April 1–June 30), Q3 (July 1–September 30), and Q4 (October 1–December 31).

† Analysis included some, but not all, of the jurisdictions in each U.S. Census Bureau region. *Northeast:* Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, Pennsylvania, Rhode Island, and Vermont; *Midwest:* Illinois, Kansas, Minnesota, Ohio, and South Dakota; *South:* Arkansas, Delaware, District of Columbia, Georgia, Kentucky, North Carolina, Oklahoma, Virginia, and West Virginia; *West:* Alaska, Arizona, Colorado, Nevada, New Mexico, Oregon, Utah, and Washington.

TABLE 1. Characteristics of drug overdose deaths with and without evidence of counterfeit pill use — State Unintentional Drug Overdose Reporting System, 35 jurisdictions,* 2021

Characteristic	Evidence of counterfeit pill use, no. (%)		Total, no. (%) N = 54,768
	Yes n = 2,437	No n = 52,331	
Sex			
Female	684 (28.1)	15,391 (29.4)	16,075 (29.4)
Male	1,753 (71.9)	36,940 (70.6)	38,693 (70.6)
Median age, yrs (IQR)	32 (25–42)	43 (33–54)	42 (33–54)
Age group, yrs[†]			
<15	9 (0.4)	96 (0.2)	105 (0.2)
15–24	545 (22.4)	2,978 (5.7)	3,523 (6.4)
25–34	837 (34.3)	11,624 (22.2)	12,461 (22.8)
35–44	544 (22.3)	13,542 (25.9)	14,086 (25.7)
45–54	284 (11.7)	11,377 (21.7)	11,661 (21.3)
55–64	178 (7.3)	9,932 (19.0)	10,110 (18.5)
≥65	40 (1.6)	2,776 (5.3)	2,816 (5.1)
Race or ethnicity[†]			
American Indian or Alaska Native, non-Hispanic	77 (3.2)	830 (1.6)	907 (1.7)
Asian, non-Hispanic	15 (0.6)	274 (0.5)	289 (0.5)
Black or African American, non-Hispanic	336 (13.9)	11,015 (21.2)	11,351 (20.8)
Native Hawaiian or other Pacific Islander, non-Hispanic	4 (0.2)	41 (0.1)	45 (0.1)
White, non-Hispanic	1,485 (61.2)	34,487 (66.2)	35,972 (66.0)
Hispanic or Latino	454 (18.7)	4,893 (9.4)	5,347 (9.8)
Multiple races, non-Hispanic	54 (2.2)	475 (0.9)	529 (1.0)
U.S. Census Bureau region[§]			
Northeast	237 (9.7)	12,693 (24.3)	12,930 (23.6)
Midwest	322 (13.2)	12,855 (24.6)	13,177 (24.1)
South	517 (21.2)	18,270 (34.9)	18,787 (34.3)
West	1,361 (55.8)	8,513 (16.3)	9,874 (18.0)
Drugs involved[¶]			
Any opioid	2,348 (96.3)	42,917 (82.0)	45,265 (82.6)
Any IMFs**	2,267 (93.0)	37,807 (72.2)	40,074 (73.2)
IMFs only ^{††}	1,009 (41.4)	10,226 (19.5)	11,235 (20.5)
Heroin ^{§§}	126 (5.2)	6,596 (12.6)	6,722 (12.3)
Any stimulant	964 (39.6)	29,020 (55.5)	29,984 (54.7)
Cocaine	428 (17.6)	15,148 (28.9)	15,576 (28.4)
Methamphetamine	561 (23.0)	14,629 (28.0)	15,190 (27.7)
Prescription stimulants ^{¶¶}	45 (1.8)	935 (1.8)	980 (1.8)
Any benzodiazepine	334 (13.7)	6,505 (12.4)	6,839 (12.5)
Illicit benzodiazepines***	128 (5.3)	733 (1.4)	861 (1.6)
Common IMF adulterants detected^{†††}			
Acetaminophen	69 (3.1)	701 (1.9)	770 (1.9)
Caffeine	617 (27.3)	6,675 (17.9)	7,292 (18.4)
Diphenhydramine	116 (5.1)	3,394 (9.1)	3,510 (8.9)
Levamisole	40 (1.8)	919 (2.5)	959 (2.4)
Lidocaine	30 (1.3)	930 (2.5)	960 (2.4)
Xylazine	48 (2.1)	2,963 (7.9)	3,011 (7.6)
Drug use history			
Prescription drug misuse ^{§§§}	657 (27.0)	4,917 (9.4)	5,574 (10.2)
Illicit drug use ^{¶¶¶}	945 (38.8)	21,586 (41.2)	22,531 (41.1)
Noningestion route of drug use****			
Injection	280 (11.5)	10,270 (19.6)	10,550 (19.3)
Smoking	962 (39.5)	9,071 (17.3)	10,033 (18.3)
Snorting	817 (33.5)	7,415 (14.2)	8,232 (15.0)
Other circumstances or decedent history			
Previous overdose	359 (14.7)	5,724 (10.9)	6,083 (11.1)
Naloxone administered [†]	651 (26.7)	10,858 (20.8)	11,509 (21.1)
Overdosed at home [†]	1,586 (67.3)	30,248 (62.6)	31,834 (62.8)
Potential bystander present ^{††††, §§§§}	1,572 (64.5)	23,246 (44.4)	24,818 (45.3)
Fatal drug use witnessed ^{§§§§§}	614 (25.2)	4,088 (7.8)	4,702 (8.6)

See table footnotes on the next page.

TABLE 1. (Continued) Characteristics of drug overdose deaths with and without evidence of counterfeit pill use — State Unintentional Drug Overdose Reporting System, 35 jurisdictions,* 202

Abbreviations: IMF = illicitly manufactured fentanyl; SUDORS = State Unintentional Drug Overdose Reporting System.

- * Alaska, Arizona, Arkansas, Colorado, Connecticut, Delaware, District of Columbia, Georgia, Illinois, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Virginia, Washington, and West Virginia. Arkansas, Illinois, Louisiana, Pennsylvania, and Washington reported deaths from counties that accounted for $\geq 75\%$ of drug overdose deaths in the respective state in 2017, per SUDORS funding requirements; all other jurisdictions reported deaths from the full jurisdiction. Jurisdictions were included if complete data (including medical examiner or coroner reports for $\geq 75\%$ of deaths) were available for all of January–December 2021. Analysis was restricted to decedents with an available medical examiner or coroner report.
- † Missing values were excluded from calculations of percentages. Percentages might not sum to 100% because of rounding.
- § Analysis included some, but not all, of the jurisdictions in each U.S. Census Bureau region. *Northeast:* Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, Pennsylvania, Rhode Island, and Vermont; *Midwest:* Illinois, Iowa, Kansas, Michigan, Minnesota, Nebraska, Ohio, and South Dakota; *South:* Arkansas, Delaware, District of Columbia, Georgia, Kentucky, Louisiana, Maryland, North Carolina, Oklahoma, Virginia, and West Virginia; *West:* Alaska, Arizona, Colorado, Nevada, New Mexico, Oregon, Utah, and Washington.
- ¶ A drug was considered involved if it was listed as a cause of death on the death certificate or in the medical examiner or coroner report. Percentages sum to $>100\%$ because drug categories are not mutually exclusive.
- ** Fentanyl was classified as likely illicitly manufactured using toxicology, scene, and witness evidence. For the 8% of deaths involving fentanyl that had insufficient evidence for classification as illicit or prescription, fentanyl was classified as illicit because the vast majority of fentanyl overdose deaths involve illicit fentanyl. All fentanyl analogs except alfentanil, remifentanil, and sufentanil, which have legitimate human medical use, were included as IMFs.
- †† IMFs were the only drugs listed as cause of death by medical examiners or coroners on the death certificate. Ethanol was not considered a drug for this analysis; some deaths included as IMFs only involved ethanol.
- §§ Drug entries coded as heroin were heroin and 6-acetylmorphine. In addition, morphine was coded as heroin if detected along with 6-acetylmorphine or if the scene, toxicology, or witness evidence indicated presence of known heroin adulterants or impurities (including quinine, procaine, xylazine, noscapine, papaverine, thebaine, or acetylcodeine), injection, illicit drug use, or a history of heroin use.
- ¶¶ Drug entries coded as prescription stimulants were amphetamine (in the absence of methamphetamine), armodafinil, atomoxetine, dextroamphetamine, levoamphetamine, lisdexamfetamine, mephentermine, methylphenidate, modafinil, and propylhexedrine. Also included as prescription stimulants were brand names and metabolites of these drugs.
- *** Drug entries coded as illicit benzodiazepines were 4'-chloro deschloralprazolam, adinazolam, alpha-hydroxyetizolam, bromazolam, clonazolam, delorazepam, deschloroetizolam, diclazepam, etizolam, flualprazolam, flubromazepam, flubromazolam, metizolam, nitrazolam, nordiclazepam, and pyrazolam.
- ††† Limited to IMF-involved deaths among jurisdictions with toxicology reports available for $\geq 75\%$ of deaths during this period (resulting in the same 35 jurisdictions) and to deaths with an available toxicology report (deaths with evidence of counterfeit pill use: 2,258; deaths without evidence of counterfeit pill use: 37,352; and overall: 39,610).
- §§§ Includes history of prescription opioid or prescription benzodiazepine misuse.
- ¶¶¶ Includes history of IMF, heroin, cocaine, or methamphetamine use.
- **** Only noningestion routes of drug use are presented because the counterfeit pill definition depended largely on scene or witness evidence of pill use. SUDORS guidance is to endorse evidence of ingestion when pills are found or reported to be used, if no indication of use by another method (e.g., crushed for snorting). Therefore, evidence of ingestion would be falsely elevated among decedents with evidence of counterfeit pill use. The percentage of deaths with no route of use evidence would be falsely elevated for the same reason; therefore, that information is not presented. Evidence of injection, smoking, and snorting are not mutually exclusive; a death could have evidence of more than one of these routes.
- †††† For SUDORS, a potential bystander is defined as a person aged ≥ 11 years who was physically nearby either during or shortly preceding a drug overdose and potentially had an opportunity to intervene or respond to the overdose. This definition includes any persons in the same structure (e.g., same room or same building, but different room) as the decedent during that time; a family member who was in another room during the fatal incident would be considered a potential bystander if they might have had an opportunity to provide lifesaving measures (e.g., naloxone administration), if adequate resources were available, and if they were aware that an overdose event could occur. Persons in different self-contained parts of larger buildings (e.g., a different apartment in the same apartment building) would not be considered potential bystanders.
- §§§§ Criteria used to define evidence of counterfeit pill use are related to this circumstance; therefore, it might be overrepresented in deaths with evidence of counterfeit pill use.

Higher percentages of deaths with evidence of counterfeit pill use involved IMFs^{¶¶} (93.0% versus 72.2%) and illicit benzodiazepines^{***} (5.3% versus 1.4%) compared with deaths without evidence. IMFs were the only drugs involved in 41.4% of deaths with evidence of counterfeit pill use versus 19.5% of deaths without such evidence. Xylazine was detected less often among IMF-involved deaths with evidence of counterfeit pill

use (2.1%) than among other IMF-involved deaths (7.9%). A higher percentage of decedents with evidence of counterfeit pill use compared with those without evidence had a history of prescription drug misuse (27.0% versus 9.4%). Smoking was the most common noningestion drug use route^{†††} among

††† Smoking as a route of drug use indicates that the decedent inhaled drugs through the mouth. In SUDORS, evidence of smoking includes witness reports of smoking and drug paraphernalia at the overdose scene associated with smoking or inhalation such as pipes, stems, tinfoil, and vape pens. Only noningestion routes of drug use are presented because the counterfeit pill definition depended largely on scene or witness evidence of pill use. SUDORS guidance is to endorse evidence of ingestion when pills are found or reported to be used, if no indication of use by another method (e.g., crushed for snorting). Therefore, evidence of ingestion would be falsely elevated among decedents with evidence of counterfeit pill use. The percentage of deaths with no route of drug use evidence would be falsely elevated for the same reason; therefore, that information is not presented. Route of drug use is intended to capture illicit drug use or prescription drug misuse; however, evidence of route cannot be linked with specific drug use.

¶¶ Fentanyl was classified as likely illicitly manufactured using toxicology, scene, and witness evidence. For the 8% of deaths involving fentanyl that had insufficient evidence for classification as illicit or prescription, fentanyl was classified as illicit because the vast majority of fentanyl overdose deaths involve illicit fentanyl. All fentanyl analogs except alfentanil, remifentanil, and sufentanil, which have legitimate human medical use, were included as IMFs.

*** Drug entries coded as illicit benzodiazepines were 4'-chloro deschloralprazolam, adinazolam, alpha-hydroxyetizolam, bromazolam, clonazolam, delorazepam, deschloroetizolam, diclazepam, etizolam, flualprazolam, flubromazepam, flubromazolam, metizolam, nitrazolam, nordiclazepam, and pyrazolam.

deaths with evidence of counterfeit pill use (39.5%) and was highest in western jurisdictions (55.1%).

More than one half of deaths with evidence of counterfeit pill use had evidence of counterfeit oxycodone, either alone (55.2%) or with evidence of counterfeit alprazolam (3.9%) (Table 2). When evidence of counterfeit oxycodone was

documented, compared with evidence of counterfeit alprazolam only, higher percentages of decedents were Hispanic (oxycodone only: 19.9%, both oxycodone and alprazolam: 17.9%, alprazolam only: 7.0%). The highest percentages of deaths with evidence of counterfeit oxycodone only (66.4%) and both counterfeit oxycodone and alprazolam (43.2%)

TABLE 2. Characteristics of drug overdose deaths with evidence of counterfeit pill use, by counterfeit pill type — State Unintentional Drug Overdose Reporting System, 35 jurisdictions,* 2021

Characteristic	Counterfeit pill type, [†] no. (%)			
	Oxycodone only n = 1,346	Alprazolam only n = 415	Oxycodone and alprazolam n = 95	Unspecified n = 581
Sex				
Female	382 (28.4)	135 (32.5)	21 (22.1)	146 (25.1)
Male	964 (71.6)	280 (67.5)	74 (77.9)	435 (74.9)
Median age, yrs (IQR)	32 (25–42)	33 (26–41)	26 (22–35)	34 (27–43)
Age group, yrs[§]				
<15	6 (0.4)	1 (0.2)	0 (—)	2 (0.3)
15–24	324 (24.1)	86 (20.7)	38 (40.0)	97 (16.7)
25–34	452 (33.6)	147 (35.4)	32 (33.7)	206 (35.5)
35–44	279 (20.7)	105 (25.3)	11 (11.6)	149 (25.6)
45–54	163 (12.1)	41 (9.9)	8 (8.4)	72 (12.4)
55–64	98 (7.3)	30 (7.2)	4 (4.2)	46 (7.9)
≥65	24 (1.8)	5 (1.2)	2 (2.1)	9 (1.5)
Race or ethnicity[§]				
American Indian or Alaska Native, non-Hispanic	50 (3.7)	7 (1.7)	1 (1.1)	19 (3.3)
Asian, non-Hispanic	6 (0.4)	6 (1.4)	1 (1.1)	2 (0.3)
Black or African American, non-Hispanic	203 (15.2)	58 (14.0)	14 (14.7)	61 (10.6)
Native Hawaiian or other Pacific Islander, non-Hispanic	2 (0.1)	0 (—)	1 (1.1)	1 (0.2)
White, non-Hispanic	780 (58.3)	307 (74.0)	58 (61.1)	340 (58.9)
Hispanic or Latino	266 (19.9)	29 (7.0)	17 (17.9)	142 (24.6)
Multiple races, non-Hispanic	31 (2.3)	8 (1.9)	3 (3.2)	12 (2.1)
U.S. Census Bureau region[¶]				
Northeast	100 (7.4)	79 (19.0)	11 (11.6)	47 (8.1)
Midwest	138 (10.3)	86 (20.7)	17 (17.9)	81 (13.9)
South	214 (15.9)	175 (42.2)	26 (27.4)	102 (17.6)
West	894 (66.4)	75 (18.1)	41 (43.2)	351 (60.4)
Drugs involved**				
Any opioid	1,312 (97.5)	385 (92.8)	94 (98.9)	557 (95.9)
Any IMFs ^{††}	1,302 (96.7)	333 (80.2)	92 (96.8)	540 (92.9)
IMFs only ^{§§}	671 (49.9)	79 (19.0)	31 (32.6)	228 (39.2)
Heroin ^{¶¶}	36 (2.7)	43 (10.4)	6 (6.3)	41 (7.1)
Any stimulants	464 (34.5)	203 (48.9)	39 (41.1)	258 (44.4)
Cocaine	207 (15.4)	100 (24.1)	24 (25.3)	97 (16.7)
Methamphetamine	270 (20.1)	107 (25.8)	16 (16.8)	168 (28.9)
Prescription stimulants ^{***}	17 (1.3)	16 (3.9)	1 (1.1)	11 (1.9)
Any benzodiazepines	149 (11.1)	102 (24.6)	26 (27.4)	57 (9.8)
Illicit benzodiazepines ^{†††}	20 (1.5)	71 (17.1)	18 (18.9)	19 (3.3)
IMFs and stimulants	433 (32.2)	158 (38.1)	37 (38.9)	238 (41.0)
IMFs and illicit benzodiazepines	19 (1.4)	55 (13.3)	16 (16.8)	18 (3.1)
Pills marked as M-30^{§§§}	889 (66.0)	NA	31 (32.6)	NA
Drug use history				
Any opioids	648 (48.1)	163 (39.3)	47 (49.5)	265 (45.6)
Prescription opioids	311 (23.1)	54 (13.0)	25 (26.3)	73 (12.6)
IMFs	201 (14.9)	27 (6.5)	6 (6.3)	102 (17.6)
Heroin	147 (10.9)	92 (22.2)	14 (14.7)	99 (17.0)
Benzodiazepines	86 (6.4)	114 (27.5)	29 (30.5)	45 (7.7)
Cocaine	174 (12.9)	46 (11.1)	12 (12.6)	86 (14.8)
Methamphetamine	178 (13.2)	44 (10.6)	5 (5.3)	122 (21.0)

See table footnotes on the next page.

TABLE 2. (Continued) Characteristics of drug overdose deaths with evidence of counterfeit pill use, by counterfeit pill type — State Unintentional Drug Overdose Reporting System, 35 jurisdictions,* 2021

Abbreviations: IMF = illicitly manufactured fentanyl; NA = not applicable; SUDORS = State Unintentional Drug Overdose Reporting System.

* Alaska, Arizona, Arkansas, Colorado, Connecticut, Delaware, District of Columbia, Georgia, Illinois, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Virginia, Washington, and West Virginia. Arkansas, Illinois, Louisiana, Pennsylvania, and Washington reported deaths from counties that accounted for $\geq 75\%$ of drug overdose deaths in the respective state in 2017, per SUDORS funding requirements; all other jurisdictions reported deaths from the full jurisdiction. Jurisdictions were included if complete data (including medical examiner or coroner reports for $\geq 75\%$ of deaths) were available for all of January–December 2021. Analysis was restricted to decedents with an available medical examiner or coroner report.

† Categories are mutually exclusive: counterfeit oxycodone without counterfeit alprazolam, counterfeit alprazolam without counterfeit oxycodone, both counterfeit oxycodone and alprazolam, or unspecified counterfeit pill type (e.g., witness reported that the decedent used “counterfeit pills” but did not indicate the type of pharmaceutical pills mimicked).

‡ Missing values were excluded from calculations of percentages. Percentages might not sum to 100% because of rounding.

¶ Analysis included some, but not all, of the jurisdictions in each U.S. Census Bureau region. *Northeast:* Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, Pennsylvania, Rhode Island, and Vermont; *Midwest:* Illinois, Iowa, Kansas, Michigan, Minnesota, Nebraska, Ohio, and South Dakota; *South:* Arkansas, Delaware, District of Columbia, Georgia, Kentucky, Louisiana, Maryland, North Carolina, Oklahoma, Virginia, and West Virginia; *West:* Alaska, Arizona, Colorado, Nevada, New Mexico, Oregon, Utah, and Washington.

*** A drug was considered involved if it was listed as a cause of death on the death certificate or in the medical examiner or coroner report. Percentages sum to $>100\%$ because drug categories are not mutually exclusive.

†† Fentanyl was classified as likely illicitly manufactured using toxicology, scene, and witness evidence. For the 8% of deaths involving fentanyl that had insufficient evidence for classification as illicit or prescription, fentanyl was classified as illicit because the vast majority of fentanyl overdose deaths involve illicit fentanyl. All fentanyl analogs except alfentanil, remifentanil, and sufentanil, which have legitimate human medical use, were included as IMFs.

‡‡ IMFs were the only drugs listed as cause of death by medical examiners or coroners on the death certificate. Ethanol was not considered a drug for this analysis; some deaths included as IMFs only involved ethanol.

¶¶ Drug entries coded as heroin were heroin and 6-acetylmorphine. In addition, morphine was coded as heroin if detected along with 6-acetylmorphine or if the scene, toxicology, or witness evidence indicated presence of known heroin adulterants or impurities (including quinidine, procaine, xylazine, noscapine, papaverine, thebaine, or acetylcodeine), injection, illicit drug use, or a history of heroin use.

*** Drug entries coded as prescription stimulants were amphetamine (in the absence of methamphetamine), armodafinil, atomoxetine, dextroamphetamine, levamphetamine, lisdexamfetamine, mephentermine, methylphenidate, modafinil, and propylhexedrine. Also included as prescription stimulants were brand names and metabolites of these drugs.

††† Drug entries coded as illicit benzodiazepines were 4'-chloro deschloroalprazolam, adinazolam, alpha-hydroxyetizolam, bromazolam, clonazolam, delorazepam, deschloroetizolam, diclazepam, etizolam, flualprazolam, flubromazepam, flubromazolam, metizolam, nitrazolam, nordiclazepam, and pyrazolam.

‡‡‡ Counterfeit pills that often contain IMFs or other illicit drugs are frequently marked with “M-30” to mimic legitimate oxycodone 30-mg pills. Pills marked M-30 found at the overdose scene or reportedly used by the decedent were defined as counterfeit oxycodone pills if no oxycodone was detected by postmortem toxicology testing.

occurred in western jurisdictions. Decedents were youngest when there was evidence of both counterfeit oxycodone and alprazolam; among these deaths, 40.0% occurred among persons aged 15–24 years and 73.7% occurred among persons aged <35 years. IMFs were the only drugs involved in 49.9%, 19.0%, and 32.6% of deaths with evidence of counterfeit oxycodone, counterfeit alprazolam, and both oxycodone and alprazolam, respectively. Nearly one in five deaths with evidence of counterfeit alprazolam (alprazolam only: 17.1%, both alprazolam and oxycodone: 18.9%), and 1.5% of deaths with evidence of counterfeit oxycodone only involved illicit benzodiazepines.

Discussion

This report highlights four key findings. First, although the overall percentage of overdose deaths with evidence of counterfeit pill use remained below 6%, it more than doubled from July–September 2019 (2.0%) to October–December 2021 (4.7%); the percentage more than tripled in western jurisdictions. Second, the percentage of deaths with evidence of counterfeit pill use involving only IMFs was more than double the percentage among deaths without evidence of counterfeit pill use. Third, decedents with evidence of counterfeit pill use more often were younger, Hispanic, and had prescription drug misuse history, compared with those without evidence of

counterfeit pill use. Finally, smoking was the most common noningestion route of drug use among deaths with evidence of counterfeit pill use.

Evidence of counterfeit pill use more than tripled in western jurisdictions, indicating IMFs, which are frequently present in counterfeit pills, are infiltrating drug markets in western U.S. states. Historically, white-powder IMFs have been less prevalent in western states because of difficulty mixing with predominantly black tar heroin prevalent in that region (3). The highest percentages of deaths with evidence of counterfeit oxycodone use (both alone and with counterfeit alprazolam) were in western jurisdictions, whereas nearly one half of deaths with evidence of counterfeit alprazolam use only were in southern jurisdictions. This finding suggests that exposure to different types of counterfeit pills and drugs might vary by region. Prevention and education materials that incorporate local drug seizure data and information about regional drug markets might be particularly effective at highlighting relevant counterfeit pill types and reducing deaths.

A substantial proportion of deaths with evidence of counterfeit pill use involved only IMFs. Because counterfeit pills often contain IMFs, and only IMFs were involved in these deaths, it suggests that the counterfeit pills that were used likely contained the drugs that caused death. Common IMF adulterants (e.g., xylazine) differed for deaths with and without evidence

of counterfeit pill use, suggesting potential different sources for IMFs in pills versus powder. Potency and purity of IMFs might also vary by form,^{§§§} which can affect overdose risk. Nearly one in five deaths with evidence of counterfeit alprazolam use involved illicit benzodiazepines, which have varying and unpredictable potency (4). Effective overdose prevention messaging would stress that persons should only use legitimate pharmaceutical pills that are prescribed to them, and emphasize that pills obtained illicitly or without a prescription might contain highly potent drugs. Access to fentanyl test strips^{¶¶¶} and drug-checking services^{****} to facilitate drug product testing can help persons who use pills be aware of their contents, and implement appropriate harm reduction measures such as having naloxone available and never using drugs while alone, as indicated in CDC's Stop Overdose resources.^{††††}

Decedents with evidence of counterfeit pill use were considerably younger, more often Hispanic (particularly with evidence of counterfeit oxycodone), and more frequently had a history of prescription drug misuse than those without evidence of counterfeit pill use. Counterfeit pills have been marketed toward younger persons,^{§§§§} who might have more recently started using drugs and have lower tolerance. Younger persons might also exhibit more risk-taking behaviors than do older persons, and engage less with harm reduction services (5). The higher percentage of Hispanic decedents could reflect the younger age of this population and the demographics of western states where evidence of counterfeit pill use was more common; nonetheless, it might still have implications for access to and use of prevention messaging materials and harm reduction services. It is important to ensure that prevention messaging and harm reduction outreach are tailored to younger persons and the Hispanic population to address potential engagement, language, or other barriers. The Drug Enforcement Administration's One Pill Can Kill campaign, which highlights the dangers of counterfeit pills, has provided materials tailored to parents and caregivers, with some translated into Spanish.^{¶¶¶¶} The higher percentage of decedents with prescription drug misuse history among deaths with evidence of counterfeit pill use, compared with those without

such evidence, could indicate a transition from using prescribed medications to obtaining pills illicitly. Discontinued access to prescription drugs might increase overdose risk and negative health outcomes (6); providers should screen patients for opioid misuse or use disorder when opioid prescriptions are changed and link to evidence-based treatments, including medications for opioid use disorder as outlined in the 2022 CDC Clinical Practice Guideline for Prescribing Opioids for Pain (7).

Smoking was the most common noningestion route of drug use among deaths with evidence of counterfeit pill use and was more than twice as common among deaths with evidence of counterfeit pill use than among those without evidence; in western jurisdictions, >50% of deaths with evidence of counterfeit pill use had evidence of smoking. The higher percentage of deaths with evidence of drug use by smoking might reflect recent general shifts from injecting drugs to smoking them in western states (8) or could be specific to counterfeit pill use methods (9). Injection is often considered the riskiest route of drug use; although there are additional risks inherent in injecting drugs (e.g., bloodborne infections), other routes such as smoking can carry similar overdose risk because of rapid drug absorption (10). Harm reduction services that expand outreach to persons using drugs by methods other than injection, such as smoking, and provide education about safer smoking practices and risks related to smoking, might be most successful at addressing diverse drug use patterns.

Limitations

The findings in this report are subject to at least three limitations. First, analyses might not be generalizable beyond the included jurisdictions. Second, counterfeit pill use documentation relied upon completeness of medical examiner and coroner reports and is likely underestimated; underestimation likely varies within and between jurisdictions. Finally, the definition for evidence of counterfeit pill use included pills found or reported to be at the overdose scene; some overdose deaths might be included as having evidence even if the decedent did not use the pills.

Implications for Public Health Practice

Counterfeit pills can expose new populations to highly potent drugs such as IMFs and illicit benzodiazepines, and persons using pills might not be aware of their contents. Drug overdose prevention and education efforts that are tailored to persons most at risk and include outreach to those who do not frequent traditional harm reduction services, might be most successful. Overdose deaths might be reduced with effective prevention messaging by federal, state, and local public health entities that 1) highlights the dangers of pills obtained illicitly or without a prescription, 2) emphasizes the importance of taking only pills that were prescribed, and 3) encourages drug product testing.

^{§§§} <https://www.dea.gov/sites/default/files/2022-05/FPP%20Report%20January%202022.pdf>

^{¶¶¶} <https://www.cdc.gov/stopoverdose/fentanyl/fentanyl-test-strips.html>

^{****} <https://aspe.hhs.gov/sites/default/files/documents/79e1975d5921d309ed924148ef019417/drug-checking-programs.pdf>

^{††††} <https://www.cdc.gov/stopoverdose/index.html>

^{§§§§} <https://www.dea.gov/press-releases/2022/08/30/dea-warns-brightly-colored-fentanyl-used-target-young-americans>; https://www.dea.gov/sites/default/files/2022-03/20220208-DEA_Social%20Media%20Drug%20Trafficking%20Threat%20Overview.pdf

^{¶¶¶¶} https://www.dea.gov/sites/default/files/2022-11/DEA-OPCK_Parent%20flyer_V2.pdf; <https://www.dea.gov/onepill-toolbox>

References

Summary

What is already known about this topic?

Counterfeit pill availability in the United States is increasing; drug overdose deaths are at historically high levels.

What is added by this report?

Evidence of counterfeit pill use in overdose deaths more than doubled from July–September 2019 to October–December 2021, and tripled in western U.S. states. Decedents with evidence of counterfeit pill use, compared with those without such evidence, were younger, more often Hispanic or Latino, and more frequently had a history of prescription drug misuse and drug use by smoking.

What are the implications for public health practice?

Overdose prevention messaging that highlights the dangers of pills obtained illicitly or without a prescription, encourages drug product testing by persons using drugs, and is tailored to persons most at risk (e.g., younger persons) could help prevent overdose deaths.

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