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Evaluating opioid overdose using the National Violent Death Reporting System, 2016

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ABSTRACT

Background: Unintentional opioid overdose death rates have increased nearly 500% in Connecticut from 1999 to 2016, resulting in a major public health crisis. Two primary types of opioids have been implicated in these fatalities – illicit and pharmaceutical. The objective of this study is to describe the epidemiology of fatal unintentional opioid overdoses by type.

Methods: Using the National Violent Death Reporting System, rates of unintentional opioid-related overdose death in Connecticut were calculated. Demographic and contextual characteristics (e.g., substance misuse, mental health issues), and concomitant drug use (e.g., benzodiazepines, cocaine) were compared by opioid type.

Results: In 2016, 867 victims of fatal unintentional opioid overdose were identified in Connecticut. The majority of deaths involved illicit opioids (79.6%). Overall, victims were mostly male, white, non-Hispanic, and aged 25–54 years. Victim sex, age, and contextual characteristics differed significantly according to opioid type. For illicit opioid deaths, victims were predominantly male, aged 44 and under, and more often had a history of substance misuse. In contrast, among pharmaceutical opioid deaths, the split between males and females was significantly less pronounced, victims were mostly aged 45 and over, and mental health diagnoses, a physical health problem and concomitant drug use were more prevalent.

Conclusions: Based on our findings, efforts to curb opioid-related overdose should be specific to opioid type. Interventions pertaining to pharmaceutical opioids should target females and older adults, whereas interventions for illicit opioid use should target younger audiences.

1. Introduction

Fatal unintentional opioid overdose is a significant public health issue in the United States (US) and in Connecticut (Centers for Disease Control and Prevention (CDC, 2017b). In 2016, unintentional drug overdose was the leading cause of injury death across the nation, and 69% of these deaths involved opioids (Centers for Disease Control and Prevention (CDC, 2017b, 2017c). Between 1999 and 2016, the age-adjusted death rate for unintentional opioid overdose increased from 2.1 to 11.9 per 100,000 population in the US, and from 3.9 to 23.3 per 100,000 population in Connecticut (Centers for Disease Control and Prevention (CDC, 2017c). Connecticut in particular has been one of the most affected states, with the eighth highest age-adjusted opioid overdose death rate in the nation in 2016 (Centers for Disease Control and Prevention (CDC, 2017c).

The recent upward trend in unintentional opioid-related overdose rates is attributed largely to heroin and fentanyl (Hedegaard et al., 2017; Rudd et al., 2016b). In the years 2011–2013, the rate of heroin-related drug overdose deaths in the US nearly doubled from 1.4 per 100,000 to 2.7 per 100,000 (Jones et al., 2015). However, prescription opioids have also played a large role in the emergence of the opioid epidemic. The number and availability of legitimate opioid prescriptions parallels the diversion (from legal to illegal channels of distribution and use) and abuse of prescription opioids, and the related adverse consequences (Dart et al., 2015). Prescription opioid misuse is also shown to be the greatest risk factor for heroin initiation and use (Rudd et al., 2016a). Studies have shown that the majority (75% or more) of new heroin users begin with a prescription opioid (Cicero et al., 2014; Mars et al., 2014). Individuals who first become dependent on prescription opioids and later transition to heroin do so as a cheaper, more widely available alternative (Cicero et al., 2015; Mars et al., 2014). However, emerging literature suggests that an increasing number of

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individuals are initiating opioid use with heroin as opposed to prescription opioids (Cicero et al., 2017). Together, prescription and illicit opioids have spawned an opioid epidemic that significantly burdens the nation.

Recent efforts have been made at the national, state and local levels to reduce opioid-related morbidity and mortality. Strategies and policies have focused on areas such as improving prescribing practices for opioids, establishing limits on opioid prescriptions, increasing access to opioid antagonists, and expanding access to addiction treatment programs (Dowell et al., 2016; Dube, 2017; Murphy et al., 2016). However, the opioid epidemic has yet to wane, and there is still much to be learned. In particular, additional research is needed to understand how intervention efforts should be targeted by opioid type (e.g., illicit or pharmaceutical). Personalized interventions can help maximize resources while eliciting the greatest impact on the populations most at risk. Therefore, the purpose of this study is to describe the epidemiology of fatal unintentional opioid overdoses in Connecticut by identifying and distinguishing sociodemographic and contextual characteristics of victims, according to the opioid type (e.g., illicit or pharmaceutical). The results will elucidate risk factors for opioid use according to type, and guide the development of interventions and policies intended to minimize the incidence of fatal unintentional opioid-related overdose deaths.

2. Methods

2.1. Data source and study population

Detailed case data obtained from the National Violent Death Reporting System (NVDRS) were evaluated for fatal overdoses occurring in Connecticut in 2016; data are maintained by the Connecticut Department of Public Health and funded by the Centers for Disease Control and Prevention (CDC). NVDRS and its methodology are described in further detail elsewhere (Blair et al., 2016; Crosby et al., 2016). Information is obtained from death certificates, and reports from the medical examiner's office and law enforcement. The study population included all unintentional drug overdose deaths in Connecticut in 2016 (including residents, non-residents and victims of unknown residence) where the manner of death was an accident and the cause of death was opioid related.

2.2. Measures

Victims were categorized by the primary exposure of the opioid type causing the death. The primary outcome of interest was the rate of death. Opioid type was classified as involving either illicit or pharmaceutical opioids. Deaths that involved both illicit and pharmaceutical opioids were categorized as illicit opioid deaths. Deaths that involved pharmaceutical opioids but no illicit opioids were categorized as pharmaceutical opioid deaths. We dichotomized this variable to investigate the impact of illicit opioid involvement versus no illicit opioid involvement in opioid-related deaths. Illicit opioids were defined to include heroin, suspected illicit fentanyl, and fentanyl analogues. Pharmaceutical opioids were defined to include all prescription opioid medications (e.g., oxycodone, hydrocodone, methadone, buprenorphine, pharmaceutical fentanyl).

Covariates in this analysis included victim demographic (age, sex, race/ethnicity, county of residence, town of residence rural status) and contextual characteristics (diagnosed mental health problem, history of alcohol misuse, history of substance misuse, history of any opioid misuse, history of prescription opioid misuse, history of heroin use, ever treated for substance use disorder, previous overdose, and physical health problem). Detailed toxicology results were also obtained for each victim.

Contextual characteristics were originally abstracted from medical examiner and law enforcement narratives that provided details on a victim's social and medical history as well as the events leading up to or contributing to the death. A diagnosis of mental health problem was defined to capture victims who had at least one diagnosis, but victims may have had multiple mental health diagnoses. A physical health problem was defined to include pain, recent injuries, or other debilitating and significant conditions. A history of substance misuse was defined as a perceived problem with or addiction to drugs other than alcohol. Any use of illicit drugs was categorized as substance misuse. For prescription drugs, substance misuse included using prescription drugs not prescribed to the victim or intentionally taking more than a prescribed dosage for the purpose of euphoric feelings.

Race/ethnicity was classified as white, non-Hispanic; black, non-Hispanic; Hispanic; and other, non-Hispanic. The race/ethnicity classification of other, non-Hispanic was defined to include Asian, Native Hawaiian or Other Pacific Islander, and American Indian or Alaska Native. Rural towns were defined to include "all towns with a population census of 10,000 or less and a population density of 500 or less people per square mile" and all other towns were designated as non-rural (Connecticut State Office of Rural Health, 2017).

2.3. Statistical analysis

Descriptive statistics were calculated using univariate analyses. Chi-square tests were conducted to compare the frequency of pharmaceutical opioid deaths and illicit opioid deaths. Crude and specific incidence rates were computed and compared by sex, age, race/ethnicity, county of residence, and town of residence rural status. Rates were calculated by dividing the number of unintentional opioid deaths by the total population at risk (Backus and Mueller, 2016a, 2016b). Statistical significance was set at $P \leq .05$ and all analyses were conducted using IBM SPSS Statistics version 24 (IBM Corp., 2016).

3. Results

In 2016, 933 unintentional drug overdose deaths occurred in Connecticut. Among those, 867 cases were found to be opioid related and identified for this analysis. Overall, victims were predominantly male (74.7%), white, non-Hispanic (78.8%), and approximately half were between the ages of 25 and 44 (49.4%). Rates of death were highest among these groups as well. See Table 1 for an enumeration of the frequency and rate of unintentional opioid fatalities. The rate of unintentional opioid overdose deaths in males (37.1 per 100,000) was three times that of females (12.0 per 100,000). Three Connecticut counties (New London, Hartford and New Haven) had rates of death higher than the overall state death rate.

The majority of all unintentional opioid-related deaths (82.5%) had at least one other drug type present in victims' toxicology screens (See Table 2). Benzodiazepines (34.3%), alcohol (31.1%), cocaine (31.0%), antidepressants (22.0%) and marijuana (20.6%) were most commonly present. Most deaths (79.6%, $n = 690$) involved illicit opioids compared to 18.9% ($n = 164$) of deaths that were caused by pharmaceutical opioids (See Table 3). The remaining 1.5% ($n = 13$) of deaths were caused by an unspecified opioid type.

Among deaths involving illicit opioids, victims were primarily males (79.6%); white, non-Hispanics (78.0%); under the age of 45 (62.9%); and residents of non-rural towns (88.6%). When comparing the incidence of unintentional opioid fatalities involving illicit and pharmaceutical opioids, we found significant differences in the frequencies of sex, age, town of residence rural status and contextual characteristics (Table 3). Males were the majority group in both types of fatality; however, the proportion of fatalities in males was significantly greater in deaths involving illicit opioids ($p < 0.0001$). Among pharmaceutical opioid deaths, the split between males and females was significantly less pronounced. Whereas females only accounted for 20.4% of illicit opioid deaths, they accounted for 46.3% of pharmaceutical opioid deaths. Furthermore, only 13.6% of deaths among males were

Table 1
Demographic and Geographic Characteristics, Unintentional Opioid-Related Overdose Death Rate Per 100,000 Population, Connecticut, 2016 (N = 867).

Characteristics	Total, n (%)[a]	Rate
Total	867	24.2
Sex		
Male	648 (74.7)	37.1
Female	219 (25.3)	12.0
Race/Ethnicity		
White, non-Hispanic	683 (78.8)	27.9
Black, non-Hispanic	65 (7.5)	17.0
Hispanic	104 (12.0)	18.5
Other, non-Hispanic	10 (1.1)	5.5
Age group, years		
0–14	0 (0.0)	0
15–24	62 (7.2)	12.5
25–34	231 (26.6)	52.3
35–44	197 (22.7)	46.6
45–54	221 (25.5)	42.2
55–64	141 (16.3)	27.9
≥65	15 (1.7)	2.7
County of residence[b]		
Fairfield	150 (17.3)	15.9
Hartford	245 (28.3)	27.5
Litchfield	37 (4.3)	20.3
Middlesex	36 (4.2)	22.0
New Haven	215 (24.8)	25.1
New London	79 (9.1)	29.3
Tolland	30 (3.5)	19.9
Windham	25 (2.9)	21.5
Town of residence rural status[b]		
Rural	49 (5.6)	14.9
Non-rural	754 (88.5)	23.2

[a] Percentages may not sum to 100 due to missing or unknown values.
[b] Three percent (n = 26) of victims had an out-of-state residence, and 2.7% (n = 23) of victims had an unknown residence state.

caused by pharmaceutical opioids versus 34.7% of deaths among females. When comparing by age, nearly 70% of pharmaceutical opioid fatalities involved persons aged 45 and over, while over 60% of illicit opioid fatalities involved persons aged 44 and under. Although most pharmaceutical opioid deaths were among older adults, 31.6% of females who died due to pharmaceutical opioids were of childbearing age, aged 15–44 years (not shown).

The presence of other drugs was significantly higher in pharmaceutical opioid deaths than in illicit opioid deaths, P = .007. When comparing the two opioid types, antidepressants (P < .001), antipsychotics (P = .001), benzodiazepines (P < .001) and muscle relaxants (P < .001) were present significantly more often among pharmaceutical opioid deaths. Conversely, among illicit opioid deaths, cocaine (P < .001) and marijuana (P = .01) were most prevalent. There were no significant differences in the presence of alcohol or amphetamines by opioid type, P = .16 and P = .51, respectively.

A history of substance misuse was the most prevalent contextual characteristic among all fatal unintentional opioid-related overdoses (77.9%), and was present significantly more often among illicit opioid deaths (83.0%) than among pharmaceutical opioid deaths (57.9%), P < .001. A history of any opioid misuse and a history of heroin use were present in 48.8% and 37.9% of all deaths, respectively, but were significantly more likely among illicit opioid deaths, P < .001 for both. Evidence of ever being treated for a substance use disorder was present in 20.0% of deaths and was not found to differ significantly by opioid type, P = .31.

A mental health diagnosis was present in 36.6% of all deaths, and most frequent among pharmaceutical opioid deaths (58.5%) than among illicit opioid deaths (31.7%), P < .001. Nearly 15% of all victims had an identified physical health problem at the time of death. Among these, there was a statistically significant difference between pharmaceutical opioid deaths (31.1%) and illicit opioid deaths (11.0%), P < .001.

4. Discussion

This study provides recent data on fatal opioid-related overdoses in Connecticut, highlighting the burden of the opioid crisis in the state and identifying important sociodemographic and contextual characteristics of victims. The highest death rates were seen among males, white, non-Hispanics, and victims aged 25 to 54 years. These results mirror national trends, but Connecticut rates were consistently higher than national rates in 2016 according to data from the CDC, underlining the heightened impact of opioids in the state (Centers for Disease Control and Prevention (CDC, 2017c).

The low prevalence of pharmaceutical opioid fatalities in our study population is likely attributed to the low opioid prescribing rates in Connecticut, which are among the lowest in the US (CDC, 2017a). This suggests that Connecticut's elevated rates of unintentional opioid-related death may be explained by the region's large supplies of illicit opioids: the Northeast has a high prevalence of heroin use as well as availability of both heroin and fentanyl (Drug Enforcement Administration (DEA, 2017). Connecticut is also geographically situated along well-established drug trafficking routes in the Northeast, between two of the nation's major heroin markets: Boston and New York City (Drug Enforcement Administration (DEA, 2017). Nearby states like Massachusetts, Rhode Island and New Hampshire have had similarly bleak unintentional opioid-related death rates (Centers for Disease Control and Prevention (CDC, 2017c).

When comparing deaths related to illicit and pharmaceutical opioids, some interesting demographic differences arise. First, we found significant sex differences in the type of opioid use. Although males were the majority in each group, nearly half of deaths in females were

Table 2
Toxicology of Unintentional Opioid-Related Overdose Deaths by Opioid Type Involved, Connecticut, 2016.

Other drugs present in toxicology[a]	All deaths (N = 867) n (%)	Deaths caused by pharmaceutical opioid(s) only (n = 164) n (%)	Deaths caused by illicit opioid(s) (n = 690) n (%)	P value
Any other drug	715 (82.5)	148 (90.2)	559 (81.0)	**0.007****
Alcohol	270 (31.1)	59 (36.0)	207 (30.0)	0.164
Amphetamines	28 (3.2)	7 (4.3)	20 (2.9)	0.514
Anticonvulsants	41 (4.7)	15 (9.1)	25 (3.6)	**0.005****
Antidepressants	191 (22.0)	60 (36.6)	130 (18.8)	< **0.001*****
Antipsychotics	59 (6.8)	21 (12.8)	37 (5.4)	**0.001****
Benzodiazepines	297 (34.3)	100 (61.0)	192 (27.8)	< **0.001*****
Cocaine	269 (31.0)	27 (16.5)	241 (34.9)	< **0.001*****
Marijuana	179 (20.6)	22 (13.4)	156 (22.6)	**0.012***
Muscle Relaxants	35 (4.0)	20 (12.2)	15 (2.2)	< **0.001*****

Note: Boldface indicates statistical significance (*p < 0.05, **p < 0.01, ***p < 0.001).
[a] May include multiple drugs per victim; Drugs listed may not have contributed to the death.

Table 3
Demographic and Contextual Characteristics of Unintentional Opioid-Related Overdose Deaths by Opioid Type, Connecticut, 2016 (N = 867).

Characteristics	All deaths *n* (%)	Deaths caused by pharmaceutical opioid(s) only *n* (%)	Deaths caused by illicit opioid(s) *n* (%)	*P* value
Total	867 (100.0)	164 (18.9)	690 (79.6)	
Sex				
Male	648 (74.7)	88 (53.7)	549 (79.6)	< **0.001*****
Female	219 (25.3)	76 (46.3)	141 (20.4)	
Race/Ethnicity				
White, non-Hispanic	683 (78.8)	136 (82.9)	538 (78.0)	0.182
Black, non-Hispanic	65 (7.5)	10 (6.1)	54 (7.8)	
Hispanic	104 (12.0)	13 (7.9)	89 (12.9)	
Other, non-Hispanic	10 (1.1)	3 (1.8)	6 (0.9)	
Unknown/missing	5 (0.6)	2 (1.2)	3 (0.4)	
Age group, years				
0–14	0 (0.0)	0 (0.0)	0 (0.0)	< **0.001*****
15–24	62 (7.2)	1 (0.6)	61 (8.8)	
25–34	231 (26.6)	27 (16.5)	202 (29.3)	
35–44	197 (22.7)	23 (14.0)	171 (24.8)	
45–54	221 (25.5)	62 (37.8)	153 (22.2)	
55–64	141 (16.3)	47 (28.7)	93 (13.5)	
≥65	15 (1.7)	4 (2.4)	10 (1.4)	
Town of residence rural status				
Rural	49 (5.6)	16 (9.8)	33 (4.8)	**0.023***
Non-rural	767 (88.5)	143 (87.2)	611 (88.6)	0.726
Unknown/missing	51 (5.9)	5 (3.0)	46 (6.7)	0.115
Contextual characteristics				
Diagnosed mental health problem[a]	317 (36.6)	96 (58.5)	219 (31.7)	< **0.001*****
History of alcohol misuse	187 (21.6)	49 (29.9)	135 (19.6)	**0.005****
History of substance misuse[b]	675 (77.9)	95 (57.9)	573 (83.0)	< **0.001*****
History of any opioid misuse	423 (48.8)	59 (36.0)	360 (52.2)	< **0.001*****
History of prescription opioid misuse	76 (8.8)	25 (15.2)	51 (7.4)	**0.003****
History of heroin use	329 (37.9)	23 (14.0)	304 (44.1)	< **0.001*****
Ever treated for a substance use disorder	173 (20.0)	28 (17.1)	145 (21.0)	0.307
Previous overdose	67 (7.7)	13 (7.9)	54 (7.8)	> 0.99
Physical health problem[c]	127 (14.6)	51 (31.1)	76 (11.0)	< **0.001*****

Note: Boldface indicates statistical significance (*p < 0.05, **p < 0.01, ***p < 0.001).
[a] May include multiple diagnoses per victim.
[b] Excludes alcohol misuse.
[c] Includes pain, recent injuries, or other debilitating and significant conditions.

attributed to pharmaceutical opioids. A study by Rudd et al. of opioid-related overdose deaths in the US in 2015 found a similar result where in females, natural and semi-synthetic opioids (e.g., morphine, oxycodone and hydrocodone) were most commonly implicated (41.4% and 43.0%, respectively) (Rudd et al., 2016b). Our finding is relevant when considering that almost a third of these females were of childbearing age. This is of importance as neonatal abstinence syndrome (NAS), a constellation of withdrawal symptoms experienced by newborns with in-utero opioid exposure, is steadily increasing in Connecticut (Smart and Jivapong, 2016p). Infants with NAS symptoms experience irritability, nutritional deficiencies, and irritable bowel symptoms so severe as to warrant extended hospitalization. The long-term adverse health and economic outcomes are unknown.

We also found significant differences in age distribution according to opioid type. Specifically, illicit opioid users were significantly younger than those using pharmaceutical opioids. This difference may be explained by the fact that older adults are more likely to use prescription opioids (CDC, 2017a). However, the difference in fatality is indicative of a need for further study in this age group. Although deaths in this analysis were classified as unintentional, it is known that suicide deaths are often misclassified. It is also known that poisonings are an easily accessible and effective means of suicide completion.

In contrast to pharmaceutical opioid fatalities, over 60% of illicit opioid fatalities occurred in younger individuals, aged 44 years and under. Similarly, in a study using 2015 national data on opioid-involved overdose deaths, heroin was the most commonly implicated opioid among victims aged 44 years and younger (Rudd et al., 2016b). These deaths are more likely a result of recreational drug use, and require a very different approach to intervention than deaths in the pharmaceutical group. A study of heroin-related overdose deaths in Baltimore found that increased availability of opioid agonist treatment was significantly associated with a reduction in the number of fatal heroin overdoses (Schwartz et al., 2013). Expanding access to medication-assisted treatment programs may prove effective in reducing illicit opioid-related fatalities, especially among younger individuals as our findings suggest.

This study also emphasizes important contextual characteristics of victims that factor into unintentional opioid overdose deaths. A history of misuse of and addiction to substances was common among both opioid types. Specifically, a history of any opioid misuse was present in over a third of pharmaceutical opioid deaths and over half of illicit opioid deaths. Previous studies have demonstrated an association between substance misuse or substance use disorders and overdose deaths (Bohnert et al., 2012; Hempstead, 2006; Olfson et al., 2017). In particular, research suggests that a history of substance use disorder is perhaps the strongest risk factor for opioid-related overdose mortality (Webster, 2017). Despite the high incidence of substance misuse history in this study, only a small percentage of victims had ever been treated for a substance misuse problem, regardless of the opioid type involved. However, failure to receive treatment is not uncommon. According to the 2016 National Survey on Drug Use and Health, only 17.9% of people who needed substance use treatment received any treatment in the past year (Substance Abuse and Mental Health Services Administration (SAMHSA, 2017). This result highlights an increased need to facilitate and support access to addiction treatment options.

A diagnosed mental health problem was also common among deaths. Coupled with substance misuse issues, these results are consistent with prior studies that show that substance use disorders and

mental illness are common comorbidities. People with a mental health disorder are more likely to also experience a substance use disorder, and vice versa (Substance Abuse and Mental Health Services Administration (SAMHSA, 2017). Historically, substance misuse and mental health treatment systems have operated disjointedly, but the overlapping nature of mental illness and substance use disorders suggests a need for comprehensive and integrated treatment options that target both conditions concurrently (Drake et al., 2001; Kelly and Daley, 2013).

In addition to opioids, other drugs were also commonly present in victims' toxicology screens and varied by the opioid type causing the death. Both opioid type groups were similar in regard to alcohol and amphetamines. Benzodiazepines and antidepressants were present significantly more often among pharmaceutical opioid deaths, while among illicit opioid deaths cocaine and marijuana were present more significantly. These results are consistent with prior studies demonstrating that the combination of drug types in drug overdose deaths is a common occurrence across the US (Ruhm, 2017; Warner et al., 2016). The presence of other drugs in unintentional opioid-related overdose deaths signals an important area for further exploration into how combinations of drugs are being used, prescribed or mixed into other street drugs. Prevention efforts to reduce opioid-related drug overdoses should incorporate strategies to address concurrent drug use in addition to opioids.

4.1. Limitations and strengths

This study is subject to a number of limitations. First, the data in this study are limited to one state and a single year, which limits external validity. However, by examining the most current data in an isolated area, the results are highly relevant to local prevention efforts that can target the specific study population. Second, information about contextual circumstances obtained for this study was originally abstracted from medical examiner and law enforcement narratives, and was limited to what was available in those reports. Since medical examiner and law enforcement narratives depend largely on information provided by friends or family of the victim, they may at times be incomplete, resulting in an underestimation or misrepresentation of contextual circumstances. Medical examiner and law enforcement narratives still remain rich data sources that provide invaluable, in-depth information beyond what can be gleaned from death certificates alone. Third, results from toxicology reports do not distinguish between fentanyl manufactured for pharmaceutical use and illicitly-manufactured fentanyl, so opioid type categorization was based on scene evidence indicating either illicit drug use (e.g., syringes, or powder) or pharmaceutical drug use (e.g., transdermal patches) provided in medical examiner and law enforcement reports. However, our findings are consistent with prior data that indicate that most cases of fentanyl-related morbidity and mortality have been linked to illicitly-manufactured fentanyl (Centers for Disease Control and Prevention (CDC, 2015; Somerville et al., 2017). Our study also did not look at whether the pharmaceutical opioids involved in these deaths were prescribed to the victim or not, as these data are often unknown or incomplete. Incorporating linked data from the Connecticut Prescription Monitoring and Reporting System could help alleviate this issue and provide insights into whether the pharmaceutical opioids were obtained through legitimate or illegal channels of distribution. Lastly, by only analyzing unintentional opioid-related deaths, and excluding deaths of intentional or undetermined manner, as well as nonfatal overdoses, the findings presented are an underestimate of the true burden of opioid-related overdose in Connecticut, but do help to understand an important aspect of the opioid epidemic.

4.2. Conclusions

Fatal unintentional opioid overdose is a significant public health issue in Connecticut that has only worsened in recent years (Centers for Disease Control and Prevention (CDC, 2017c). While pharmaceutical opioids and illicit opioids both contribute to the opioid epidemic, they affect distinct populations that deserve unique interventions. The findings of this study can inform prevention efforts to curb opioid-related overdose according to opioid type.

Interventions related to illicit opioids should target younger audiences aged 44 years and under, while efforts geared toward pharmaceutical opioids should concentrate on females and adults aged 45 years or older. Both opioid types deserve specialized approaches that incorporate key characteristics affecting each identified population. For illicit opioid-related deaths, expanding access to medication-assisted treatment programs may prove effective. In addition, any prevention programs, intervention activities and policies should also incorporate strategies to address the factors of substance misuse, mental health problems, and concomitant drug use that are frequently present in victims of unintentional opioid overdose death. By employing a personalized approach for each target population, we can help maximize public health resources and facilitate the greatest impact on reducing the burden of opioid overdose death.

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Contributors

Each of the authors contributed substantially to this study. All authors were involved in conceptualizing and designing the study. HA Clinton performed the data analysis, and wrote the article. All authors interpreted the data, reviewed and edited drafts of the article, and read and approved the final article.

Conflict of interest

No conflict declared.

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