Unintentional Prescription Opioid-Related Overdose Deaths: Description of Decedents by Next of Kin or Best Contact, Utah, 2008–2009

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BACKGROUND: Little is known about the characteristics that may predispose an individual to being at risk for fatal overdose from prescription opioids.

OBJECTIVE: To identify characteristics related to unintentional prescription opioid overdose deaths in Utah.

DESIGN: Interviews were conducted (October 2008–October 2009) with a relative or friend most knowledgeable about the decedent's life.

SUBJECTS: Analyses involved 254 decedents aged 18 or older, where cause of death included overdose on at least one prescription opioid.

KEY RESULTS: Decedents were more likely to be middle-aged, Caucasian, non-Hispanic/Latino, less educated, not married, or reside in rural areas than the general adult population in Utah. In the year prior to death, 87.4 % were prescribed prescription pain medication. Reported potential misuse prescription pain medication in the year prior to their death was high (e.g., taken more often than prescribed [52.9 %], obtained from more than one doctor during the previous year [31.6 %], and used for reasons other than treating pain [29.8 %, almost half of which "to get high"]). Compared with the general population, decedents were more likely to experience financial problems, unemployment, physical disability, mental illness (primarily depression), and to smoke cigarettes, drink alcohol, and use illicit drugs. The primary source of prescription pain medication was from a healthcare provider (91.8 %), but other sources (not mutually exclusive) included: for free from a friend or relative (24 %); from someone without their knowledge (18.2 %); purchase from a friend, relative, or acquaintance (16.4 %); and purchase from a dealer (not a pharmacy) (11.6 %).

CONCLUSIONS: The large majority of decedents were prescribed opioids for management of chronic pain and many exhibited behaviors indicative of prescribed medication misuse. Financial problems, unemployment, physical disability, depression, and substance use (including illegal drugs) were also common.

INTRODUCTION

Overdose deaths involving prescription painkillers (opioid analgesics) have reached epidemic levels in the United States.[1] In 2008, the age-adjusted rate of death from opioids was 4.8 per 100,000, nearly four times the rate in 1999.[2] In 2009, over 15,000 people died from overdoses involving opioids.[3] This number is more than three times greater than the 4,000 people who died from opioid-related drug overdoses in 1999.[4]

Nonmedical use of opioids is a common and growing problem. In 2010, one in 20 people in the United States, age 12 or older, used these drugs without a prescription or with the intent of getting "high."[4] Prior studies indicate that groups at greatest risk to abuse or overdose on prescription pain relievers are men, middle-aged adults, people in rural counties, whites and American Indian or Alaska Natives, those suffering from mental disorders, and those with a history of alcohol abuse or illicit substance use.[4–11] However, more can be learned about the characteristics of and circumstances surrounding those most likely to abuse and overdose on prescription pain relievers.

Because of the challenges of collecting information about the history of decedents, limited research is available

regarding characteristics that might predispose someone to a fatal prescription opioid overdose. The purpose of this study was to provide more in-depth information about persons who died from an opioid-related drug overdose, as provided by next-of-kin or best contact interviews. Characteristics examined included demographics, chronic pain, financial problems, mental stability, substance use, and patterns of pain medication use. Identifying these characteristics may help design intervention strategies to reverse the escalating trends in opioid abuse and overdose.

METHODS

Setting and Participants

Decedents were identified from records of the Utah Office of the Medical Examiner (OME) in Utah during October 26, 2008–October 25, 2009. Manner and causes of death (COD) were determined by OME on the basis of scene-of-death investigation, autopsy, and toxicology findings. The OME is authorized under Title 26 of the Utah Code, Chapter 4, Section 7 to investigate several types of death, including deaths resulting from poisoning or overdose of drugs and deaths under suspicious or unusual circumstances.[12] All suspected or possible drug overdose cases during this time period were included as candidates for interviewing the next of kin. Inclusion criteria were the presence of specific drugs (from a list of 66) or types of drugs (including methadone, oxycodone, hydrocodone, fentanyl, and others), or key words (intoxication, drug [multi-, poly-, mixed], overdose, prescription, medication, toxicity, substance abuse), in any death certificate field listing COD or contributing factor. Individuals were excluded if they were less than 12 years of age, not a resident of Utah, a suicide or homicide, cases were undetermined in the first four COD fields, or if the cause of death was solely caused by carbon monoxide, household cleaners, or alcohol. International Classification of Disease (ICD) codes were not used in this study because they lacked the necessary specification. OME personnel updated and maintained a list of potential interview candidates. The list was provided to the interviewers.

This study received approval from the Utah Department of Health (UDOH) institutional review board and was approved by a Human Research Protection Coordinator at the Centers for Disease Control and Prevention (CDC). Funding for this study was provided by Utah Department of Human Services, Division of Substance Abuse and Mental Health and grant 1R21CE001612-01 from CDC.

Design Overview

A data collection instrument was designed to document information regarding decedents from their next of kin or best contact. Questions were included on the basis of existing substance use, health-related questionnaires and feedback from health professionals. The questionnaire is available online. The instrument was pretested to establish validity among seven volunteers who had experienced the death of a family member from drug overdose.

Interviews were conducted by trained interviewers by telephone, with persons who were identified by OME death-scene investigators as either next of kin or best person to contact.

Those identified as potential interviewees for the study were contacted no sooner than a month following the death of the person being investigated, in order to allow the person to grieve and also so they could learn more about the circumstances surrounding the death. Each time an interviewer attempted to contact an interviewee but was unsuccessful, a note was made of the date and time of the attempted contact, along with a brief explanation of the nature of the call (i.e. no answer, not home, left a message to call back, answering machine, wrong number, busy, disconnected, etc.). A few cases that involved nonworking telephone numbers were referred back to OME personnel, who followed-up with law enforcement agencies or funeral service organizations to seek contact information. Almost all interviews were conducted within 1–6 months of the decedents opioid-related drug overdose. A few interviews were conducted 7–12 months after the person's death, because of scheduling problems or difficulty locating the individual. Interviews typically lasted 30–40 min. Interviewers followed scripts for introducing the questionnaire, leaving telephone messages, and responding to participants' study-related questions. Interviewers referred all participants' case-specific questions to OME.

In 33 instances, two people were identified as being appropriate to contact. Merging was completed following a predetermined logic to decide which response was to be assigned for data entry when conflicting answers were received. Logic was designed to accept an answer that provided a greater amount of information. Decedents with multiple interviews were tracked, and the number of questions with conflicting answers among multiple interviews was recorded and entered into the survey database. The average number of conflicting responses per case was 13, with a range of 4 to 24 conflicting responses among all cases with multiple interviews. Almost all of these conflicting responses were resolved using the predetermined logic. In a couple situations where the differences were not resolved, the responses were treated as missing.

Epi Info™ Version 3.5.1 (Centers for Disease Control and Prevention, Atlanta, Georgia) was used for data entry of completed questionnaires and to facilitate creation of the survey database in Microsoft® Access® 2007 (Microsoft

Corporation, Redmond, Washington). Double entry was performed for all questionnaires. The two databases were compared and all discrepancies were reviewed for accuracy. Changes were made manually to the master database. Interview data were linked to decedent COD, body mass index (BMI), sex, and age data from the OME database, and to education level, race/ethnicity, county of residence, and marital status data from death certificates.

Because heroin is metabolized to morphine in the body, only decedents for whom source of morphine identified during toxicology testing was determined to have been prescription morphine were identified as prescription opioid-related deaths. Among reports where morphine was identified during toxicology testing but where source of the morphine was not stated by OME (*n*= 69), morphine source was determined by further review of OME records as follows: (1) from prescription morphine (*n*=34) if evidence existed of recent prescription morphine use (prescription morphine at scene of death, evidence of current morphine prescription, or report by witness to OME investigator that morphine had recently

been used); (2) from heroin (*n*=14) if evidence existed of recent heroin use (illicit drug paraphernalia at scene of death, recent needle punctures identified on autopsy, or report by witness to OME investigator that heroin had recently been used); or (3) undetermined (*n*=21), if neither or both of (1) and (2) prescription morphine or heroin criteria were met.

Additional Data Sources

The demographic profile of decedents was compared with population survey data available from the U.S. Census Bureau and the Centers for Disease Control and Prevention.[13,14] Prevalence of financial problems, chronic conditions, substance use or abuse, and psychiatric disorders among decedents was compared with the distribution of these problems, conditions, uses, and disorders in the general population. Comparison data were obtained from national surveys conducted by the Centers for Disease Control and Prevention, the U.S. Census Bureau, the National Center for Health Statistics, the World Health
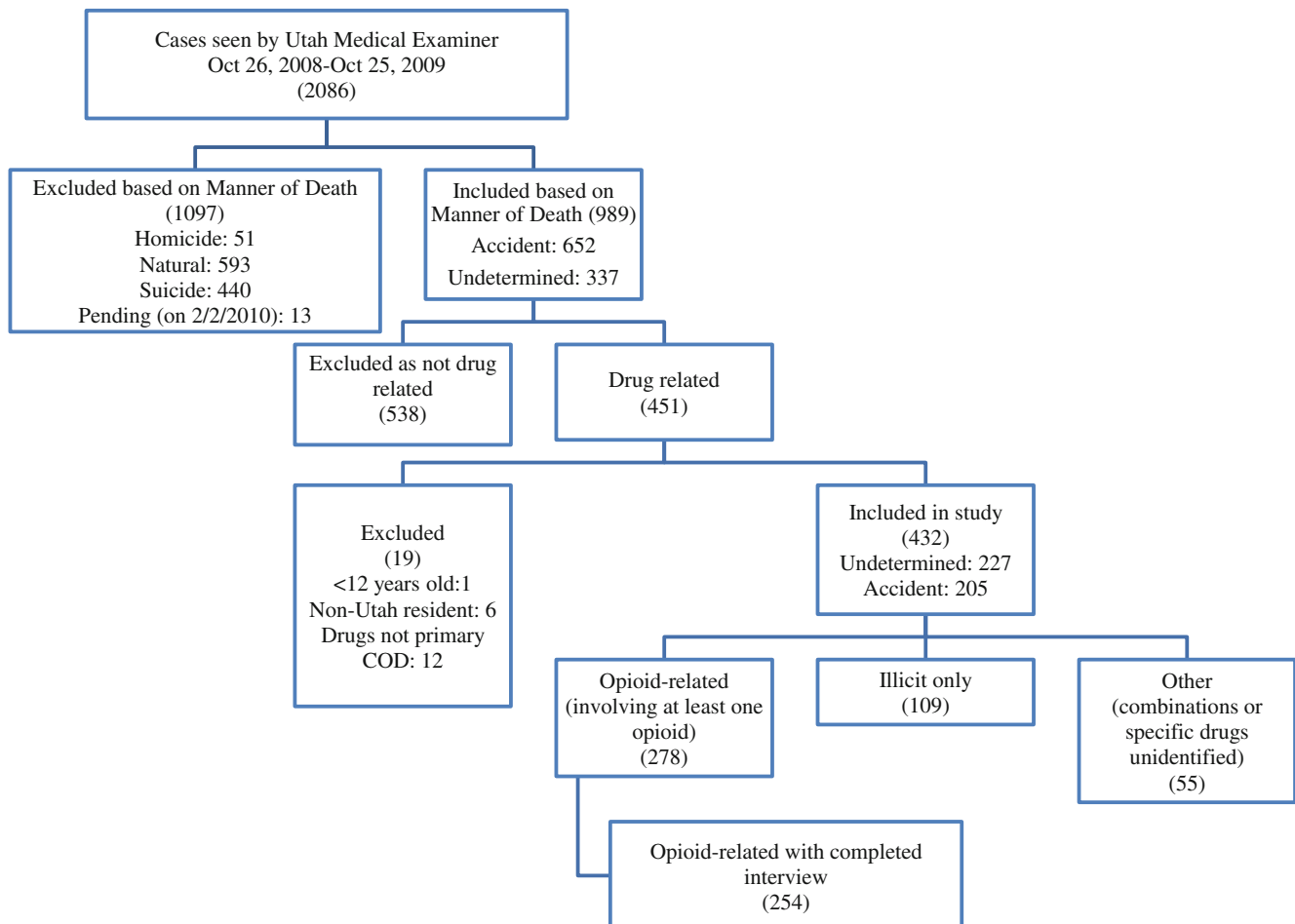

Figure 1. Flowchart of cases seen by the Office of Medical Examiner in Utah, October 2008 through October 2009.

Organization, and the U.S. Substance Abuse and Mental Health Data Archive.[14,17–21]

Statistical Analysis

Descriptive statistics were used to summarize the data. Bivariate analyses were conducted and assessed by using the chi-square test for independence. Ninety-five percent confidence intervals were calculated for the percentages. Statistical significance was based on the two-sided hypothesis and the 0.05 level. Analyses were performed by using SAS® version 9.3 (SAS Institute Incorporated, Cary, North Carolina, 2010).

RESULTS

During the study period, 432 unintentional drug overdose deaths were investigated by OME. A total of 278 had at least one prescription opioid as a COD (Fig. 1). Opioid-related unintentional deaths involving only prescription opioid pain medications did not differ significantly from deaths where both prescription and illicit drugs were involved with respect to sex, age, race/ethnicity, marital status, and urban/rural setting of residence. Therefore, we combined these categories and report on all deaths in which a prescription opioid was included as a COD. Interviews were completed for 254 (91.4 %) of prescription opioid-related decedents and were included in our analysis.

Demographic characteristics of those involved in an opioid-related death are presented in Table 1. Compared with the Utah population aged 18 years and older in 2009, decedents were more likely to be middle-aged, Caucasian, non-Hispanic/Latino, less educated, not currently married, or reside in rural areas.

Overall, 225 (88.6 %) decedents were reported to have suffered from pain. Back pain was most common (*n*=113, 50.2 %), followed by leg, knee, foot, or hip pain (76, 33.8 %), and head, jaw, neck, or face pain (66, 29.3 %). Less common causes of pain included fibromyalgia (17, 7.6 %), shoulder or arm pain (16, 7.1 %), and arthritis (13, 5.8 %).

Of the 254 decedents, 222 (87.4 %) were identified by the interviewees as having taken prescription pain medication within a year of their death. The primary source for the prescription pain medications was directly from a healthcare provider (91.8 %), although other sources were identified (Table 2). Other non-mutually exclusive sources included for free from a friend or relative, theft, purchase from a friend, relative, or acquaintance, purchase from a dealer (not a pharmacy), and purchase off the internet.

Among 76.0 % of decedents, there was reportedly concern among parents, siblings, spouses, children, friends, or relatives about the decedent's misuse of prescription pain medication. A healthcare provider had expressed concern about the misuse of prescription pain medication for 33.0 % of the decedents. Regarding the pain medication prescribed by a healthcare

Table 1. Unintentional Opioid-Related Drug Deaths in Utah According to Selected Demographic Variables, October 2008–October 2009

	Decedents		Utah Population 2009		Chi-square
	No.	**%**	**No.**	**%**	***P* Value**
Sex					
Men	135	53.2	953,770	49.9	0.302
Women	119	46.8	957,137	50.1	
Age					
18–24	20	7.9	337,085	17.6	< 0.001
25–34	67	26.4	441,598	23.1	
35–44	59	23.2	333,883	17.5	
45–54	75	29.5	313,140	16.4	
55+	33	13.0	485,201	25.4	
Race					
Caucasian	251	98.8	1,801,756	94.3	0.002
Other	3	1.2	109,151	5.7	
Hispanic or Latino					
Yes	10	3.9	248,418	13.0	< 0.001
No	244	96.1	1,662,489	87.0	
Education					
Less than High School	47	18.5	112,744	5.9	< 0.001
High School or GED	94	37.0	531,232	27.8	
Some College–no degree	91	35.8	687,927	36.0	
College degree or higher	22	8.7	579,005	30.3	
Marital Status					
Currently married	87	34.3	1,314,70	68.8	< 0.001
Divorced/separated	88	34.6	135,674	7.1	
Never married/ Widowed	79	31.1	460,529	24.1	
Residence					
Urban	198	77.9	1,662,489	87.0	< 0.001
Rural	56	22.1	248,418	13.0	

Data sources for the Utah Population, aged 18 years and older: References [13] and [14]

provider in the year prior to their death, interviewees reported that 52.9 % took more than prescribed, 42.4 % had visited more than one doctor to get more prescription pain medication, and 29.8 % used pain medications for reasons other than to treat pain. Among those reported to have used prescription pain medication for reasons other than to treat pain in the year prior to their death, these reasons included recreational use (48.4 %), self-medication for depression (25.0 %), self-

Table 2. Nonprescription Sources of Pain Medication Among Unintentional Opioid-Related Drug Deaths

Did (*name of decedent*) ever get prescription pain medications …	No.	%	95 % CI
For free from a friend or relative	54	24.0	18.7–30.0
From someone without person's knowledge (theft)	41	18.2	13.4–23.6
By purchasing from friend, relative, acquaintance (non-dealer)	36	16.4	11.4–21.1
Purchasing from a dealer (not a pharmacy)	25	11.6	7.1–15.4
Purchasing on-line	7	3.1	0.9–5.5
Any other source	9	4.0	1.5–6.6

Multiple responses could be given
This table applies to 222 decedents who were reported to have been prescribed at least one pain medication by a physician the year prior to their death

Table 3. Frequency of Unintentional Opioid-Related Drug Deaths According to Selected Financial Problems, Chronic Conditions, and History of Substance Abuse

	Decedents, Utah			Comparisons		
	No.	%[*]	95 % CI[*]	% (Year)	Description[†]	Reference
Financial						
Financial problems in 2 months prior to death	149	59.8	53.7–65.9	14.3 (09)	U.S. Poverty	[15]
Employed in 2 months prior to death	92	36.8	30.7–42.8	61.4 (09)	Utah	[14,16]
				82.0 (09)	Male, U.S.	
				73.0 (09)	Female, U.S.	
Had health insurance at the time of death	172	70.8	65.1–76.5	83.3 (09)	U.S.	[16]
Chronic conditions						
Physical disability	120	47.8	41.6–54.0	32.0 (09)	U.S. 1+ difficulty or complex activity limitation	[17]
Mental illness	138	55.9	49.7–62.1	47.4 (07)	U.S. (ever)	[18]
Hospitalized for a psychiatric reason (in lifetime) —Excluding treatment for substance abuse	62	44.6	38.4–52.9			
History of substance use/abuse						
Tobacco (ever)	195	78.3	73.1–83.4	24.9 (09)	Utah	[14]
				44.7 (09)	U.S.	
Tobacco use in the past 30 days	156	57.4	51.3–63.6	18.4 (08–09)	Utah Ages 12+	[19]
				28.0 (08–09)	U.S. Ages 12+	
Alcohol (ever used)	221	88.4	84.4–92.4	82.9 (09)	U.S. Ages 12+	[20]
Alcohol (at least one drink in past 30 days)	150	59.1	52.9–65.1	28.1 (08–09)	Utah Ages 12+	[19]
				51.8 (08–09)	U.S. Ages 12+	
Any illicit drug use (ever)	154	61.4	55.2–67.4			
Marijuana (ever)	127	54.7	48.5–61.1	41.7 (09)	U.S. Ages 12+	[20]
Cocaine (ever)	77	34.7	28.7–40.9	14.7 (09)	U.S. Ages 12+	[20]
Heroin (ever)	52	22.8	17.5–28.3	1.5 (09)	U.S. Ages 12+	[20]
Methamphetamine (ever)	67	29.9	24.2–35.9	8.0 (09)	U.S. Ages 12+	[20]
Hallucinogens (ever)	36	16.5	11.8–21.4	14.8 (09)	U.S. Ages 12+	[20]
Hospitalized for substance abuse (in lifetime) [‡]	203	79.9	75.0–84.8			
Visited emergency room for substance abuse (in lifetime) [‡]	196	77.2	72.0–82.3			

[*]*The denominator was not always 254 because of "don't know" responses, which were not included in the percent calculation*
[†]*Ages 18 years and older, unless otherwise specified*
[‡]*Including tobacco, alcohol, prescribed or over the counter medications, of illicit drugs*

medication for anxiety (15.6 %), and self-medication for sleep disorder (4.6 %).

Decedents were described further in Table 3. In comparison with other Utah and U.S. statistics, decedents were reported to have previously experienced greater financial problems, unemployment, physical disability, mental illness, alcohol drinking, tobacco use, and illicit drug use. Fifty-three (21 %) of decedents had used illicit drugs during the 30 days prior to their death.

Frequency of diagnosed mental illness reported for the decedents is presented in Table 4. The most common disorder was depression, followed by bipolar disorder, anxiety, Attention deficit hyperactivity disorder (ADHD),

and schizophrenia. Decedents experienced significantly greater levels of depression, bipolar disorder, anxiety, and schizophrenia than the general population.

DISCUSSION

This study provided an in-depth assessment of persons who died from an opioid-related drug overdose, based on next-of-kin or best contact interviews. Compared with the Utah adult population, decedents were more likely to be men, middle aged, non-Hispanic Caucasians, less educated, single, and residing in a rural area. Previous research has identified that

Table 4. Reported Types of Diagnosed Psychiatric Disorders Among Unintentional Opioid-Related Drug Deaths

	Decedents, Utah			Comparisons		
	No.	%	95 % CI	% (Year)	Description[*]	Reference
Depression	76	29.9	24.3–35.6	16.1 (08)	U.S. (ever)	[21]
Biopolar	45	17.7	13.0–22.4	1.7 (07)	U.S. (ever)	[21]
Anxiety	34	13.4	9.2–17.6	12.3 (08)	U.S. (ever)	[21]
Attention deficit hyperactivity disorder	11	4.3	1.8–6.8	4.1	U.S. Ages 18–44	[22]
Schizophrenia	9	3.5	1.3–5.8	0.6 (07)	U.S. (ever)	[21]

Multiple responses could be given
Other disorders mentioned included sleep (3, 1.2 %), eating (1, 0.4 %), and learning (1, 0.4 %)
[*]*Ages 18 years and older, unless otherwise specified*

men have a higher risk of opioid-related death than women.[4,7,9] Moreover, one study showed that in a group of individuals prescribed opioids for chronic pain, men had a higher incidence of physician-reported aberrant drug behaviors than women.[11] Findings that opioid-related drug deaths more likely involved people of middle age, Caucasians, and of rural residency is also consistent with previous studies.[4,9,23] A study assessing characteristics of veterans with chronic use of opioids found that the risk of abuse/dependence was greater among middle-aged, male, white, and divorced, single, or separated, individuals.[24] Finally, another study showed that lower education was associated with higher opioid misuse among chronic opioid therapy recipients.[25]

An excess of prescribed pain medication is implied, given the large number of decedents who were able to obtain prescription pain medication for free from a friend or relative, from someone without the person's knowledge, or by purchasing it from a friend, relative, or other sources. This may be partly due to a tendency of health-care providers to prescribe more pain medication than is used by the recipient. For example, previous studies have shown that opioids were prescribed more than needed after minor surgeries,[26] among veterans with mental health diagnoses,[27] and in urological patients.[28]

Over half of decedents with prescribed pain medication in the year prior to their death took more than prescribed, over 40 % had visited more than one doctor to get more prescription pain medication, and about 30 % used pain medications for reasons other than to treat pain. This emphasizes a need for closer monitoring at the health care–practitioner level. Prescription drug monitoring programs can help identify individuals who are obtaining controlled substances from multiple providers, but have not been shown to reduce overdose deaths.[29]

Many of the decedents had concurrent indications of financial problems, unemployment, physical disability, depression, and substance use (including illegal drugs). The prevalence of these factors were greater among decedents than in the Utah adult population. The complexity of these associations cannot be fully understood from the current study design. Yet, previous research has identified mental illness,[23,30–39] tobacco smoking,[35] and illicit drug use[23,30,31] as primary risk factors for opioid-related abuse and death. It may be that financial problems, unemployment, and physical disability contribute to opioid-related deaths, because of their association with depression and substance use. It may also be that tobacco smoking is associated with opioid abuse because of its addictive tendencies, and because tobacco smoking is associated with other substance use disorders and mental illness, probably because of shared risk factors.[36–38]

Nearly half of all decedents had experienced physical disability. Patients with chronic pain often have psychological and chronic disease comorbidities, inadequate coping skills, sedentary lifestyles, and complex treatment history.[39]

Pain, particularly chronic pain, is often linked to an inability to work.[40–42] This is consistent with only 36.8 % of decedents being employed during the 2 months prior to their death. About 56 % of decedents had experienced mental illness, with depression the most commonly diagnosed disorder. Depressive symptoms have been associated with self-reported opioid abuse and adverse events.[6,7,25]

The majority (61.4 %) of decedents had previously used illicit substances. Previous researchers have demonstrated high rates of illicit substance abuse among prescription drug decedents.[8–11] Having a non-opioid substance abuse problem was revealed to be among the most pertinent predictors of misuse or abuse of prescription opioids.[7] The high prevalence of tobacco smoking and illicit drug use among decedents (e.g., 21 % were reported to have used illicit drugs in the 30 days prior to their death) indicates that the population group of chronic pain patients who have a substance use disorder is an appropriate target for interventions. Research also indicates that substance use disorders might go unrecognized among patients treated with prescription opioids.[8] Closer monitoring with urine drug testing may help identify some individuals at risk for overdose.

A limitation of this study was the lack of a direct comparison group. We used sample and census data from Utah and the U.S. to provide rough comparisons with our results, but did not have data on the population of individuals who are prescribed opioids; it is likely that many of the observed differences are present for this entire group and may not help to identify the subset who are at risk for overdose. In addition, potential for recall bias, social desirability bias, and knowledge bias existed among those interviewed because awareness of the details of the decedent's life varied among contacts. Some questions were more prone to bias, such as illicit drug use and nonprescription sources of pain medication. Bias may have also occurred if knowledge that a person died from an opioid-related drug overdose caused the interviewee to overestimate or underestimate the presence of selected risk factors (e.g., depression). Finally, the time after the decedent's death until the interview varied from 1 to 12 months. Although almost all interviews occurred within 5 months, recall bias may increase with longer time between the death and the interview.

CONCLUSION

Deaths from an unintentional opioid-related overdose in Utah primarily occurred among individuals who were prescribed opioids for chronic pain. Many were reported to have exhibited behaviors indicative of misuse, and to have abused illicit drugs in the year prior to their death. Most had a history of a substance use disorder and suffered from a concurrent mental illness. Our findings reinforce the

need for more judicious prescribing of opioids, and closer monitoring of those who are prescribed these drugs.

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