Misuse of Prescription and Illicit Drugs in Middle Adulthood in the Context of the Opioid Epidemic

By: Rachel W. Faller, Jennifer Toller Erausquin, and Thomas P. McCoy

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Abstract:

Background: The United States' opioid epidemic continues to escalate overdose deaths. Understanding its extent is complicated by concurrent misuse of other prescription or illicit drugs, increasing risk for overdose. Current surveillance using electronic medical records and police data has limitations and frequently fails to distinguish middle-aged adults from other age groups in reporting. *Objectives:* The purpose of this analysis is to (1) describe characteristics of middle-aged US adults who report misusing prescription and illicit drugs and (2) evaluate if misusing prescription opioids increases risk of misusing other drugs. *Methods:* We analyzed data from 12,300 adults ages 32–42 from Wave V of the Add Health study collected from 2016 to 2018. Self-reported past 30-day misuse of prescription sedatives, tranquilizers, stimulants, and opioids as well as cocaine, crystal methamphetamine, heroin, and other illicit drugs were analyzed for associations with demographic characteristics in weighted bivariate analysis and multivariable logistic regression. *Results:* Those misusing prescription opioids were more likely to misuse prescription sedatives, tranquilizers, and stimulants compared to those not misusing prescription opioids. Those misusing prescription opioids were also more likely to misuse heroin, crystal meth, cocaine, and other illicit drugs. Higher levels of education and personal income were protective for prescription opioid misuse, any prescription drug misuse, and any illicit drug misuse. Race/ethnicity was not significantly associated with prescription opioid misuse. *Conclusions/Importance*: Our analysis shows those misusing prescription opioids are at high risk of misusing other prescription and illicit drugs. Practitioners and researchers should consider concurrent drug misuse when treating and studying opioid misuse disorders.

Keywords: Opioid epidemic | concurrent drug misuse | prescription opioids | polydrug misuse | Add Health

Article:

The US opioid epidemic is a persistent public health challenge, largely driven by misuse of prescription opioids. Complicating the understanding of and public health response to the epidemic is that people misusing prescription opioids may also misuse other prescription or illicit drugs, which are often stronger and cheaper. Misusing more than one drug increases risk for overdose. Among people 12 years or older misusing opioids in 2016, 2.6% misused only heroin while 5.4% misused both prescription opioids and heroin (Ahrnsbrak et al., 2017). Other studies have shown higher prevalence of prescription opioid misuse disorders among those with other substance misuse disorders (B. Han et al., 2015).

In addition to increasing risk of overdose, concurrent misuse of prescription opioids with other drugs makes public health surveillance difficult. Current surveillance of opioid misuse primarily relies on electronic medical record (EMR) data and police reports. However, many EMR and police data systems do not distinguish legitimate use from misuse and may miss those not seeking medical care or coming into contact with police (Casey et al., 2016; Hall et al., 2017; Masi, 1965; Police Executive Research Forum (PERF), 2017; Zehtabchi et al., 2011). Self-reported data can fill this gap by identifying drug misuse patterns in those without medical care access or contact with police.

Another limitation in current surveillance is in reporting. Despite unique attributes as an age group, middle-aged adults are often neglected as a distinct population. They are typically overlooked in reports on opioid misuse in specific age groups (e.g. adolescents, young adults, or older adults) or are subsumed within a broader adult age category (e.g. ages 18–65). As a result, we have limited knowledge about the potentially unique needs and risks of middle-aged adults in opioid misuse.

To address these limitations in current surveillance, we used self-reported data from a nationally representative survey of middle-aged adults to answer the following questions: (1) What are the characteristics of middle-aged adults who are misusing prescription and illicit drugs? and (2) Are middle-aged prescription opioid misusers more likely to concurrently misuse other drugs compared to non-misusers?

Methods

We analyzed data on adults ages 32–42 from Wave V of the National Longitudinal Study of Adolescent to Adult Health (Add Health), collected between 2016 and 2018 (n = 12,300). We used survey analysis methods, including applying weights accounting for the study's cluster sampling design and oversampling of specific underrepresented demographic groups, resulting in a nationally-representative sample (Chantala & Tabor, 2010).

Measures

Demographic characteristics were participant self-reported age, sex, highest level of education obtained, personal income, and race/ethnicity. We coded race/ethnicity as multiracial when more than one option was selected.

Prescription drug misuse was defined as using a prescription not prescribed to the individual, using a higher dose than prescribed, using more frequently or for a longer period than prescribed, or using for the feeling/experience the drug causes. We defined *any* past 30-day prescription drug misuse as misuse of at least one of the four types of prescription drugs asked about on the survey (opioids, sedatives, tranquilizers, stimulants). Similarly, we defined *any* past 30-day illicit drug use as use of at least one of the four types of illicit drugs asked about on the survey (cocaine, crystal meth, heroin, other illicit drug).

Analysis

Weighted percentages were estimated after adjustment for subdomains (Graubard & Korn, 1996). Bivariate analyses for prescription drug misuse and illicit drug use by demographic characteristics were conducted with weighted cross-tabulations. Adjusted odds ratios (AORs) were estimated from multivariable weighted logistic regression for *prescription opioid misuse*, *any prescription drug misuse*, and *any illicit drug use* by demographic characteristics. In addition, we determined AORs for concurrent drug misuse in those misusing prescription opioids compared to those not misusing prescription opioids. Analyses were performed in SAS v9.4 (SAS Institute, Cary, NC). A two-sided p-value < 0.05 was considered statistically significant.

Results

Sample characteristics are presented in Table 1. Overall, weighted estimates show 11.5% reported misusing at least one of the prescription drugs asked about on the survey in the past 30 days. About 7.3% reported misusing prescription opioids. About 4% used any of the listed illicit drugs.

Table 1. Sample description (N_u = 12,300).

Characteristic	**Sample *n*, (Unweighted %), {Weighted %, [95% CI]}**	
Sex		
Male	5,239 (42.6)	{50.3, [49.0, 51.6]}
Female	6,818 (55.4)	{49.7, [48.4, 51.0]}
Missing*	243 (2.0)	
Year of birth		
1974–1976	832 (6.8)	{7.5, [6.2, 8.7]}
1977–1979	6,782 (55.1)	{50.3, [44.6, 56.0]}
1980–1982	4,418 (35.9)	{42.2, [35.7, 48.8]}
Missing	268 (2.2)	
Age (years)**		37.9 ± 0.119
Race/Ethnicity		
White	6,864 (55.8)	{66.6, [60.9, 72.3]}
Black	2,216 (18.0)	{14.6, [10.8, 18.3]}
Hispanic	1,262 (10.3)	{8.1, [5.4, 10.9]}
Asian	607 (4.9)	{2.9, [1.7, 4.1]}
Pacific Islander	77 (0.6)	{0.3, [0.1, 0.6]}
American Indian/Alaska Native	66 (0.5)	{0.6, [1.0, 1.0]}
Other	31 (0.3)	{0.2, [0.1, 0.3]}

Characteristic	Sample *n*, (Unweighted %), {Weighted %, [95% CI]}	
Multiracial	895 (7.3)	{6.7, [5.6, 7.7]}
Missing	282 (2.3)	
Education		
<High school	499 (4.1)	{5.6, [4.4, 6.7]}
High school/GED	1,751 (14.2)	{16.5, [14.8, 18.3]}
Some college	2,918 (23.7)	{25.3, [23.7, 26.8]}
Associate degree	1,943 (15.8)	{16.1, [14.9, 17.2]}
Bachelor's degree	2,995 (24.3)	{23.1, [21.1, 25.2]}
Graduate degree	1,929 (15.7)	{13.5, [11.8, 15.1]}
Missing	265 (2.2)	
Personal Income		
<$5,000	1,166 (9.5)	{11.3, [9.6, 13.2]}
$5,000–$14,999	949 (7.7)	{8.7, [7.3, 10.2]}
$15,000–$24,999	1,092 (8.9)	{9.9, [8.5, 11.6]}
$25,000–$39,999	1,943 (15.8)	{16.3, [14.5, 18.2]}
$40,000–$74,999	3,814 (31.0)	{31.6, [29.3, 34.1]}
≥$75,000	2,890 (23.5)	{22.2, [19.5, 25.1]}
Missing	203 (3.6)	
Past 30-day prescription drug misuse		
Opioid	831 (6.8)	{7.3, [6.4, 8.0]}
Sedative	331 (2.7)	{3.0, [2.5, 3.4]}
Tranquilizer	350 (2.8)	{3.4, [2.8, 3.9]}
Stimulant	327 (2.7)	{2.8, [2.3, 3.3]}
Any prescription misuse	1,327 (10.8)	{11.5, [10.5, 12.5]}
Past 30-day illicit drug use		
Cocaine	238 (1.9)	{2.1, [1.7, 2.6]}
Crystal meth	111 (0.9)	{1.1, [0.8, 1.4]}
Heroin	32 (0.3)	{0.4, [0.2, 0.6]}
Other drug(s)	151 (1.2)	{1.4, [1.1, 1.7]}
Any illicit use	418 (3.4)	{3.9, [3.3, 4.4]}

Note. *Missing denotes observations with missing or nonpositive weights, missing design variables, or missing values. Weighted %'s are given from domain analysis for non-missing data. N_u denotes unweighted sample size. **Numbers represent weighted mean ± standard error of the mean (*SEM*).

Table 2 presents the weighted prevalence of past 30-day drug misuse for each type of drug by demographic characteristics. Higher proportions of American Indian/Alaska Native (AI/AN) (12.2%), Black (8.4%), and Pacific Islander participants (11.1%) misused prescription opioids than Whites (7.2%). Females reported a higher percentage of past 30-day misuse of all prescription drugs except opioids, which a slightly higher proportion of males reported misusing (7.4% among males compared with 7.2% among females). We observed a gradient effect in misuse by education level, with higher percentages of those with less than a high school education misusing prescription and illicit drugs than those with a graduate degree.

Table 2. Weighted prevalence (in %) of past 30-day drug misuse by demographics.

	Prescription drug misuse				Illicit drug use			
	Sedatives	**Tranquilizers**	**Stimulants**	**Opioids**	**Cocaine**	**Crystal meth**	**Heroin**	**Other illicit**
Sex								
Male	2.5	2.7	2.5	7.4	2.7	1.3	0.40	1.9
Female	3.5	4.1	3.2	7.2	1.5	0.89	0.45	1.0
Year of birth								
1974–1976	2.4	3.2	3.6	10.6	1.5	1.5	0.19	0.21
1977–1979	3.3	3.1	2.9	7.0	2.2	0.67	0.29	1.3
1980–1982	2.7	3.8	2.6	7.0	2.2	1.6	0.63	1.8
Race/Ethnicity								
White	3.0	3.7	3.0	7.2	1.8	1.2	0.43	1.3
Black	2.9	1.9	1.9	8.4	2.0	0.45	0.06	1.6
Hispanic	2.9	3.3	2.1	5.1	3.2	0.57	0.29	1.3
Asian	2.1	1.6	1.7	6.1	4.5	0.83	0.0	2.0
Pacific Islander	2.5	0.4	4.7	11.1	0.0	3.1	0.0	0.06
AI/AN	0.39	1.6	3.3	12.2	5.3	2.9	0.0	2.5
Other	3.1	0.0	2.6	3.8	0.0	8.0	0.0	0.0
Multiracial	3.3	4.3	4.5	8.7	3.2	1.9	1.6	2.1
Education								
<High school	4.7	4.8	4.6	9.8	3.0	4.2	0.90	2.0
High school/GED	3.6	3.9	3.4	10.4	2.4	1.8	0.83	1.1
Some college	3.4	4.2	3.2	9.0	2.3	1.4	0.66	1.9
Associate's	2.9	3.6	3.3	6.5	2.6	0.96	0.14	0.95
Bachelor's	2.5	2.5	2.1	5.6	2.0	0.42	0.14	1.7
Graduate	1.6	2.0	1.5	3.2	0.79	0.00	0.13	0.71
Personal income								
<$5,000	3.8	5.7	3.3	11.2	1.9	2.5	1.0	2.0
$5,000–14,999	4.1	5.8	4.5	11.4	2.9	4.0	1.2	2.7
$15,000–24,999	3.8	4.1	3.4	9.6	2.4	1.3	0.47	1.8
$25,000–39,999	3.2	3.1	3.9	7.8	2.1	1.2	0.88	1.2
$40,000–74,999	2.6	2.3	2.4	6.0	2.1	0.52	0.07	0.91
≥$75,000	2.1	2.9	1.7	4.4	2.1	0.08	0.00	1.4

Table 3. Multivariable weighted logistic regression modeling of drug misuse outcomes.

Independent Variable	**Prescription opioid (n_u = 11,723)**			**Any prescription drug (n_u = 11,685)**			**Any illicit drug (n_u = 11,671)**		
	AOR	**(95% CI)**	***p***	**AOR**	**(95% CI)**	***p***	**AOR**	**(95% CI)**	***p***
Sex		*df* = 1	.601		*df* = 1	.135		*df* = 1	<.001
Male (Ref)	–	–	–	–	–	–	–	–	–
Female	.94	(.76, 1.18)	.601	1.13	(.96, 1.34)	.135	.51	(.38, .70)	<.001
Age (years)	1.02	(.97, 1.08)	.371	1.02	(.97, 1.06)	.489	.95	(.88, 1.02)	.148
Race/Ethnicity		*df* = 7	.304		*df* = 7	.596		*df* = 7	.143
White (Ref)	–	–	–	–	–	–	–	–	–
Black	.99	(.76, 1.28)	.924	.88	(.69, 1.12)	.282	.75	(.45, 1.25)	.263
Hispanic	.62	(.41, .94)	.026	.76	(.55, 1.06)	.109	1.15	(.74, 1.79)	.523
Asian	.98	(.55, 1.76)	.951	.89	(.57, 1.41)	.625	2.13	(1.14, 4.00)	.018
Pacific Islander	1.48	(.51, 4.35)	.471	.89	(.31, 2.56)	.821	1.01	(.23, 4.46)	.986
American Indian	1.31	(.72, 2.36)	.377	.96	(.55, 1.65)	.873	1.89	(.99, 3.61)	.053

Independent Variable	Prescription opioid (n_u = 11,723)			Any prescription drug (n_u = 11,685)			Any illicit drug (n_u = 11,671)		
	AOR	**(95% CI)**	***p***	**AOR**	**(95% CI)**	***p***	**AOR**	**(95% CI)**	***p***
Other	.43	(.08, 2.43)	.338	.46	(.12, 1.76)	.254	1.94	(.31, 12.2)	.476
Multiracial	1.13	(.76, 1.69)	.529	1.10	(.80, 1.50)	.557	1.19	(.68, 2.08)	.548
Education		*df* = 5	.006		*df* = 5	<.001		*df* = 5	.019
<High school	.88	(.59, 1.30)	.521	1.04	(.75, 1.43)	.818	1.24	(.71, 2.16)	.455
High school/GED (Ref)	–	–	–	–	–	–	–	–	–
Some college	.90	(.67, 1.21)	.472	.97	(.75, 1.25)	.795	1.10	(.76, 1.60)	.598
Associate degree	.66	(.48, .92)	.014	.82	(.62, 1.07)	.141	1.00	(.59, 1.69)	.993
Bachelor's degree	.62	(.45, .86)	.004	.67	(.51, .88)	.005	.96	(.65, 1.43)	.843
Graduate degree	.39	(.23, .66)	<.001	.45	(.31, .67)	<.001	.38	(.21, .69)	.002
Personal income		*df* = 5	<.001		*df* = 5	<.001		*df* = 5	<.001
<$5,000	1.43	(1.01, 2.01)	.044	1.25	(.91, 1.72)	.173	1.58	(.91, 2.77)	.106
$5,000–$14,999	1.43	(1.01, 2.01)	.044	1.48	(1.10, 2.00)	.010	2.50	(1.38, 4.51)	.003
$15,000–$24,999	1.19	(.82, 1.72)	.361	1.19	(.87, 1.64)	.272	1.30	(.69, 2.45)	.416
$25,000–$39,999 (Ref)	–	–	–	–	–	–	–	–	–
$40,000–$74,999	.84	(.62, 1.12)	.229	.88	(.69, 1.13)	.317	.87	(.53, 1.42)	.563
≥$75,000	.66	(.46, .94)	.021	.80	(.63, 1.03)	.081	.87	(.53, 1.43)	.583

**Note*. (Ref) denotes reference category. n_u = unweighted sample size.

Table 4. Odds ratios of other prescription and illicit drug misuse for prescription opioid misusers vs. non-misusers.

	% User	**% Non**	**AOR**	**95% CI for AOR**	***p*-value**
Prescription misuse					
Sedatives	20.6%	1.6%	16.3	(12.0, 22.1)	<.001
Tranquilizers	23.0%	1.9%	15.7	(11.5, 21.3)	<.001
Stimulants	16.8%	1.8%	11.2	(7.89, 15.8)	<.001
Illicit drug use					
Cocaine	10.2%	1.5%	7.39	(5.06, 10.8)	<.001
Crystal Meth	6.1%	0.73%	8.85	(5.02, 15.6)	<.001
Heroin	3.9%	0.16%	25.7	(9.70, 68.2)	<.001
Other illicit drugs	4.5%	1.2%	3.92	(2.28, 6.74)	<.001

**Note*. % User = Weighted percentage of opioid misusers with particular other drug use; % Non = weighted percentage of non-misusers with particular other drug misuse.

Table 3 gives results (adjusted odds ratios, AORs) from multivariable weighted logistic regression modeling of drug misuse outcomes. Overall, education and personal income were the two factors significantly associated with each of the three outcomes: prescription opioid misuse, any prescription drug misuse, and any illicit drug misuse. Those with a graduate degree were significantly less likely to misuse for all drug misuse outcomes when compared to those with a high school education or GED. A personal income <$14,999 was significantly associated with prescription opioid misuse, while an income >$75,000 was significantly protective for prescription opioid misuse compared to those making $25,000 to $39,999.

Finally, as shown in Table 4, those misusing prescription opioids had significantly higher odds of misusing all other prescription and illicit drugs compared to those not misusing prescription opioids. Of the prescription drugs, those misusing prescription opioids were most likely to also

misuse prescription sedatives (AOR = 16.3), followed by tranquilizers (AOR = 15.7) and stimulants (AOR = 11.2) (all $p < 0.001$). Those misusing prescription opioids had significantly higher odds of misusing illicit drugs, including heroin (AOR = 25.7), followed by crystal meth (AOR = 8.85), cocaine (AOR = 7.39), and other illicit drugs (AOR = 3.92) (all $p < 0.001$).

Discussion

Our results show middle-aged adults misusing prescription opioids have increased odds of concurrently misusing other prescription and illicit drugs compared to those not misusing prescription opioids. Prescription sedatives, prescription tranquilizers, and heroin were most likely to be concurrently misused by prescription opioid misusers. Concurrent misuse of these drugs is not surprising since their physical effects on the body are similar to those of prescription opioids.

Studies of other age groups have found similar patterns in concurrent drug misuse. For instance, one study found adults 50 years and older misusing prescription opioids over the past year were more likely to misuse prescription tranquilizers (AOR = 10.02), sedatives (AOR = 4.08), and stimulants (AOR = 3.88) compared to those who did not misuse opioids (B. H. Han et al., 2019). These results in older adults are similar to the results in middle-aged adults in our study, with prescription tranquilizers most likely to be misused, followed by sedatives and stimulants.

Another study assessing trends in prescription opioid misuse among those 12 years and older found those misusing opioids over the past year were significantly more likely to misuse prescription sedatives/tranquilizers (AOR = 46.02), prescription stimulants (AOR = 18.91), heroin (AOR = 28.74), and cocaine (AOR = 3.99) compared to those not misusing opioids (Jones, 2017). Again, these results align with results from our study in middle-aged adults: drugs with similar physical effects to prescription opioids (i.e. heroin, prescription tranquilizers, and prescription sedatives) were more likely to be concurrently misused.

In addition to the above findings, we found higher levels of education and personal income are protective for prescription opioid misuse, any prescription drug misuse, and any illicit drug use. One study found similar results in young adults (ages 12–25 years). Young adults not in college were more likely to misuse prescription opioids and\sedatives/tranquilizers; however, those in college were more likely to misuse prescription stimulants (Schepis et al., 2018).

Overall, we found race/ethnicity was not a significant factor for prescription opioid misuse. This finding is inconsistent with the "whiteness" typically associated with the opioid epidemic (Netherland & Hansen, 2017). While these findings could be a result of the sample being limited to middle-aged adults, they could also indicate the epidemic is affecting other demographics. Jones (2017) found while rates of misuse among non-Hispanic whites decreased about 16% between 2003 and 2014, rates among non-Hispanic Blacks increased 26% (Jones, 2017). These results, when compared to our results, suggest demographics of the opioid epidemic may be shifting; however, longitudinal analyses are needed to confirm these results.

This analysis of self-reported, nationally representative data show middle-aged adults misusing prescription opioids are at risk of misusing other prescription and illicit drugs. Practitioners and

researchers should consider concurrent drug misuse when treating and studying opioid misuse. In addition, the lack of significant differences in misuse by race/ethnicity indicates the opioid epidemic may no longer be a "white" problem. However, more research on this outcome is needed.

Limitations

Although data were weighted to be nationally representative, findings are based on cross-sectional associations. Finally, as with any stigmatized behavior, substance misuse may be underreported; therefore, our results may be underestimated.

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Declaration of interest

The authors have no conflicts of interest to disclose.

References

Ahrnsbrak, R. , Bose, J. , Hedden, S. L. , Lipari, R. N. , & Park-Lee, E. (2017). *Key substance use and mental health indicators in the United States: Results from the 2016 National Survey on Drug Use and Health* (SMA 17-5044; p. 86). SAMHSA. https://www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2016/NSDUH-FFR1-2016.pdf

Casey, J. A. , Schwartz, B. S. , Stewart, W. F. , & Adler, N. E. (2016). Electronic health records and population health research.*Front Public Health Serv Sys Res, 5*(5), 15–22. https://doi.org/10.13023/fphssr.0505.03

Chantala, K. , & Tabor, J. (2010). *Strategies to perform a design-based analysis using the add health data* (p. 19). Carolina Population Center, University of North Carolina at Chapel Hill. http://www.cpc.unc.edu/projects/addhealth/documentation/guides/weight1.pdf

Graubard, B. I. , & Korn, E. L. (1996). Survey inference for subpopulations. *American Journal of Epidemiology* , *144* (1), 102–106. https://doi.org/10.1093/oxfordjournals.aje.a008847

Hall, V. , Lynfield, R. , Wright, N. , Hiber, L. , Palm, J. , & Christensen, J. (2017, April). *Deaths associated with opioid use and possible infectious disease etiologies among persons in the unexplained death (UNEX) surveillance system—Minnesota, 2006-2015*. CDC EIS Conference, Atlanta, GA. https://www.cdc.gov/media/dpk/cdc-24-7/eis-conference/pdf/Infectious-disease-complicates-opioid-overdose-deaths.pdf

Han, B. , Compton, W. M. , Jones, C. M. , & Cai, R. (2015). Nonmedical prescription opioid use and use disorders among adults aged 18 through 64 years in the United States, 2003-2013. *JAMA* , *314* (14), 1468–1478. https://doi.org/10.1001/jama.2015.11859

Han, B. H. , Sherman, S. E. , & Palamar, J. J. (2019). Prescription opioid misuse among middle-aged and older adults in the United States, 2015-2016. *Preventive Medicine* , *121* , 94–98. https://doi.org/10.1016/j.ypmed.2019.02.018

Jones, C. M. (2017). The paradox of decreasing nonmedical opioid analgesic use and increasing abuse or dependence - An assessment of demographic and substance use trends, United States, 2003-2014. *Addictive Behaviors* , *65* , 229–235. https://doi.org/10.1016/j.addbeh.2016.08.027

Masi, A. T. (1965). Potential uses and limitations of hospital data in epidemiologic research. *American Journal of Public Health and the Nation's Health* , *55* (5), 658–667. https://doi.org/10.2105/ajph.55.5.658

Netherland, J. , & Hansen, H. (2017). White opioids: Pharmaceutical race and the war on drugs that wasn't. *BioSocieties* , *12* (2), 217–238. https://doi.org/10.1057/biosoc.2015.46

Police Executive Research Forum (PERF) . (2017). *The unprecedented opioid epidemic: As overdoses become a leading cause of death, police, sheriffs, and health agencies must step up their response*. PERF. http://www.policeforum.org/assets/opioids2017.pdf

Schepis, T. S. , Teter, C. J. , & McCabe, S. E. (2018). Prescription drug use, misuse and related substance use disorder symptoms vary by educational status and attainment in U.S. adolescents and young adults. *Drug and Alcohol Dependence* , *189* , 172–177. https://doi.org/10.1016/j.drugalcdep.2018.05.017

Zehtabchi, S. , Nishijima, D. K. , McKay, M. P. , & Mann, N. C. (2011). Trauma registries: History, logistics, limitations, and contributions to emergency medicine research. *Academic Emergency Medicine* , *18* (6), 637–643. https://doi.org/10.1111/j.1553-2712.2011.01083.x