

Latest Trends in Opioid-Related Deaths: Exploring differences among men and women

Background

Recent trends in opioid prescribing and related adverse events have suggested that there may be important differences in these patterns between men and women. For example, in 2015, 55% of prescription opioid recipients were women, while the ODPRN's recent report found that 66% of opioid-related deaths were among men.¹ Furthermore, gender differences in patterns of injection drug use exist, and several national reports have identified women who inject drugs as a particularly high risk population who would benefit from additional harm reduction services.^{2,3} For these reasons, and given stakeholder feedback received following the publication of our April 2017 report on trends in opioid-related deaths across Ontario, we have generated this supplemental report outlining some of the trends and characteristics of opioid-related deaths, stratified by sex.

Methods

We used the same cohort described in our April 2017 [report](#)¹ to investigate trends in the number and rate of opioid-related deaths occurring in Ontario between 1991 and 2015. Briefly, we examined the rate of opioid-related deaths between 1991 and 2015 by sex using population estimates from Statistics Canada as the denominator. Further, we examined differences in demographic characteristics and drug involvement between men and women using data from 2015. In this latter analysis, we studied the 714 (97.3%) opioid-related deaths from 2015 for which we knew the sex of the person who died. Differences between men and women were determined using one-way ANOVA and chi-squared tests. We used a type 1 error rate of 0.05 as the threshold for statistical significance.

Results

The rate of opioid-related deaths in Ontario increased among both men and women over the study period, with the rate remaining higher among men compared to women throughout the 25-year period (**Figure 1**). In 1991, the rate of opioid-related

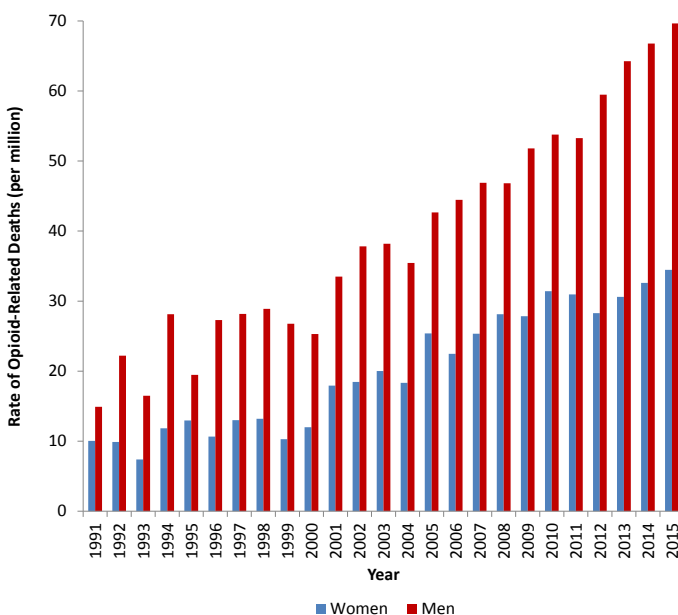
deaths was 48% higher among men (14.9 deaths per million) compared to women (10.1 deaths per million), with this difference growing over time. Between 1991 and 2015, the rate of opioid-related mortality rose 367% among men compared to a 243% increase among women. Therefore, by 2015, the rate of opioid-related deaths among men was double that of women (69.6 vs. 34.5 deaths per million).

We observed several important differences in demographic characteristics and the manner of opioid-related deaths between men and women (**Table 1**). In particular, women who died of an opioid-related cause were, on average, older than men, of a lower socioeconomic status, and more likely to live in rural areas. Compared with men, opioid-related deaths among women were twice as likely to be by suicide (8.9% vs. 18.6%, respectively).

Table 1: Characteristics of Individuals Dying of an Opioid Overdose in Ontario in 2015, Stratified by Gender

Characteristics	Men (N=472)	Women (N=242)	P-value
Age (Mean (SD))	41 (13)	47 (14)	<0.01
Income Quintile			
1 (lowest income)	150 (31.8%)	94 (38.8%)	0.06
2	75 (15.9%)	46 (19.0%)	0.29
3	95 (20.1%)	32 (13.2%)	0.02
4	75 (15.9%)	31 (12.8%)	0.27
5 (highest income)	56 (11.9%)	26 (10.7%)	0.66
Missing	21 (4.4%)	13 (5.4%)	0.58
Rural Location of Residence			
Missing	18 (3.8%)	12 (5.0%)	0.47
Manner of Death			
Accidental	409 (86.7%)	183 (75.6%)	<0.01
Suicide	42 (8.9%)	45 (18.6%)	<0.01
Undetermined/ Other	21 (4.4%)	14 (5.8%)	0.43

Figure 1: Rate of Opioid-Related Deaths in Ontario, Stratified by Gender



Similar proportions of opioid-related deaths involved a single opioid among men and women; however, the types of opioids involved in these deaths differed considerably between the two groups (**Table 2**). In particular, single-opioid deaths involving fentanyl or heroin were much more likely to occur among men, while those involving oxycodone, morphine, or hydromorphone were more common among women. Among deaths involving multiple opioids, there were no differences in fentanyl and hydromorphone involvement between sexes; however differences in oxycodone, morphine and heroin involvement persisted.

Opioid-related deaths among women were much more likely to also involve non-opioid prescription drugs, such as antidepressants, benzodiazepines, antipsychotics and antihistamines. For example, 44% of men versus 64% of women were taking a benzodiazepine, and 31% of women versus 10% of men were taking an antihistamine at the time of death. In contrast, the deaths among men were more likely to involve cocaine and stimulants.

Table 2: Characteristics of Drugs Involved in Fatal Opioid Overdoses in Ontario in 2015, Stratified by Gender

Characteristics	Men (N=472)	Women (N=242)	P-value
Single Opioid Involved	276 (58.5%)	139 (57.4%)	0.79
Fentanyl	92 (19.5%)	22 (9.1%)	<0.01
Oxycodone	39 (8.3%)	27 (11.2%)	0.21
Morphine	17 (3.6%)	19 (7.9%)	0.01
Heroin	17-21 (3.6-4.4%)*	≤5*	0.04
Hydromorphone	50 (10.6%)	38 (15.7%)	0.05
Codeine	≤5*	≤5*	0.04
Methadone	57 (12.1%)	25 (10.3%)	0.49
Multiple Opioids Involved	192 (40.7%)	103 (42.6%)	0.63
Fentanyl	67 (14.2%)	33 (13.6%)	0.84
Oxycodone	58 (12.3%)	49 (20.2%)	0.01
Morphine	63 (13.3%)	42 (17.4%)	0.15
Heroin	59-63 (12.5-13.3%)*	≤5*	<0.01
Hydromorphone	74 (15.7%)	37 (15.3%)	0.89
Codeine	94 (19.9%)	39 (16.1%)	0.22
Methadone	41 (8.7%)	14 (5.8%)	0.17
Other Opioids	38 (8.1%)	29 (12.0%)	0.09
Unknown Number of Opioids Involved	≤5*	0	0.15
Other Drugs Involved			
Cocaine	181 (38.3%)	49 (20.2%)	<0.01
Cocaine & Fentanyl	75 (15.9%)	19 (7.9%)	<0.01
GHB**	≤5*	≤5*	0.98
Benzodiazepines	207 (43.9%)	156 (64.5%)	<0.01
Antipsychotics	56 (11.9%)	42 (17.4%)	0.04
Antihistamines	49 (10.4%)	76 (31.4%)	<0.01
Stimulants	111 (23.5%)	46 (19.0%)	0.17
THC**	19 (4.0%)	7 (2.9%)	0.44
Tricyclic Antidepressants	30 (6.4%)	35 (14.5%)	<0.01
Other Antidepressants	138 (29.2%)	132 (54.5%)	<0.01

*Suppressed to comply with privacy requirements. Where required, ranges are provided to protect the privacy of individuals.

**Acronyms: GHB (Gamma- hydroxybutyrate), THC (Tetra-hydrocannabinol).

Discussion

In this supplementary analysis of sex differences in opioid-related deaths in Ontario, we found that the rate of opioid-related deaths is increasing among both men and women, but is accelerating more quickly among men. These patterns could be influenced by a number of factors, including different prescribing practices and illicit drug use behaviours between men and women. For example, men are more likely to inject drugs⁴, and women who inject drugs are more likely to borrow or share needles which may influence their risk of overdose.⁵ Further, a study conducted in Ontario

found that men were 44% more likely to escalate to high dose prescription opioids compared to women, which may put them at higher risk of opioid overdose.^{6,7} As high dose opioid prescribing has increased in Ontario over the past two decades⁸, this may have impacted men more than women.

Furthermore, in our analysis we found that opioid-related deaths among men were more likely to involve illicit opioids (i.e. heroin), fentanyl (which may have illicit or prescribed source), and other non-opioid drugs that are often used recreationally such as cocaine and prescribed stimulants. In contrast, opioid-related deaths among women are more likely to involve prescription opioids and concomitant use of opioids with other prescription medications, such as benzodiazepines and antidepressants. Given the inherent inconsistencies in drug potency and content among illicit drugs, these patterns of drug use may be influencing the different trajectories of opioid-related death rates that have been observed between men and women in Ontario. This suggests that policy-makers and harm reduction workers may want to consider the different drug use profiles between sexes when designing and implementing overdose prevention programs.

Conclusion

Given their rising rates, opioid-related deaths remain an important issue that requires attention among both men and women in Ontario. This report demonstrates important differences in the patterns and characteristics of opioid-related deaths between men and women. This highlights a need for engagement with people who use drugs and harm reduction workers to help identify the underlying drivers of these differences to promote more impactful policy and program design.

References

- Gomes T, Greaves S, Martins D, et al. Latest Trends in Opioid-Related Deaths in Ontario: 1991 to 2015. Toronto April 2017.
- Cavalieri W, Riley D. Harm Reduction in Canada: The Many Faces of Regression. In: Pates R, Riley D, eds. Harm Reduction in Substance Use and High-risk Behaviour: International Policy and Practice. London: Wiley-Blackwell; 2012.
- Intersections of Mental Health Perspectives in Addictions Research Training. Gender-Informed Prevention & Harm Reduction for Substance Use. 2015; <http://addictionsresearchtraining.ca/wp-content/uploads/2015/06/infosheet-Gender-based-prevention03.pdf>. Accessed May 18, 2017.
- Canadian Centre on Substance Abuse. National Treatment Indicators Report. 2015; <http://www.ccsa.ca/Resource%20Library/CCSA-National-Treatment-Indicators-Report-2015-en.pdf>. Accessed May 18, 2017.
- Evans JL, Hahn JA, Page-Shafer K, et al. Gender differences in sexual and injection risk behavior among active young injection drug users in San Francisco (the UFO Study). *J Urban Health*. 2003;80(1):137-146.
- Kaplovitch E, Gomes T, Camacho X, Dhalla IA, Mamdani MM, Juurlink DN. Sex Differences in Dose Escalation and Overdose Death during Chronic Opioid Therapy: A Population-Based Cohort Study. *PLoS One*. 2015;10(8):e0134550.
- Gomes T, Mamdani MM, Dhalla IA, Paterson JM, Juurlink DN. Opioid dose and drug-related mortality in patients with nonmalignant pain. *Arch Intern Med*. 2011;171(7):686-691.
- Spooner L, Fernandes K, Martins D, et al. High-Dose Opioid Prescribing and Opioid-Related Hospitalization: A Population-Based Study. *PLoS One*. 2016;11(12):e0167479.

For more information

Gomes T, Greaves S, Martins D, et al. Latest Trends in Opioid-Related Deaths in Ontario: 1991 to 2015. Toronto. April 2017. <http://odprn.ca/research/publications/latest-trends-in-opioid-related-deaths-in-ontario-1991-to-2015/>