Comparing rates and characteristics of harms across different pharmaceutical opioids

Australian ambulance attendances 2013-2018

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This project was funded by an untied educational grant from Seqirus. SN is the recipient of an NHMRC Career Development Fellowship (1163961). The Ambo Project and National Ambo Project are funded by the Victorian Department of Health and Human Services, and the Commonwealth Department of Health. Funders had no role in the study design, conduct, analysis, or interpretation.

Background

Similar to other high-income countries, Australian opioid-related mortality has almost doubled in the past decade, and the majority of the deaths are pharmaceutical opioid-related. Despite common extramedical use, few studies examine the relative harms associated with different pharmaceutical opioids. This study aimed to describe rates and characteristics of ambulance attendances related to commonly prescribed pharmaceutical opioids.

Method

Trained research assistants coded clinical records of ambulance attendances from January 2013 to September 2018. Cases were included where recent extramedical (i.e. over- or inappropriate) use of a pharmaceutical opioid significantly contributed to the reason for the ambulance attendance. The total opioid supplied per month in milligrams (mg), was converted to Oral Morphine Equivalents (OME) to produce supply-adjusted rates of attendances. Multinomial logistic regression was used to analyse attendance characteristics by opioid type with morphine as the reference category. (Fig 1; full protocol: http://dx.doi.org/10.1136/bmjopen-2019-029170).

Results

- We identified 14161 ambulance attendances relating to extramedical use of pharmaceutical-opioids, across six Australian jurisdictions.
- In Victoria, the highest rates of opioid-supply adjusted ambulance attendance were for codeine (0.273/100 000mg OME), and oxycodone (0.113/100 000mg OME); lowest rates for fentanyl (0.019/100 000mg OME) and tapentadol (0.005/100 000mg OME). (Fig 2).
- The oxycodone-naloxone-related attendance rate (0.031/100 000mg OME) was lower than for oxycodone as a single ingredient (0.113/100 000mg OME).
- Rates from jurisdictions outside Victoria were broadly consistent.
- Despite significant changes in the volume of supply for different opioids over the study period (e.g. oxycodone supply reduced by ~50% 2014-18), rates of supply-adjusted harm remained relatively stable (Fig 3).
- Fentanyl-related attendances were the most severe, most likely to be an accidental overdose, have naloxone administered, and least likely to be transferred to hospital (compared to morphine; Table 1).
- Codeine-related attendances were more likely to involve co-morbid suicidal thoughts or behaviours, involve younger females and require transport to hospital for further care (compared to morphine).

Discussion

This study represents one of the most detailed population level examinations of pharmaceutical opioid-related harm in Australia. Distinct patterns of harms were observed for different opioids. These highlight the need to consider factors such as drug formulation, to develop nuanced responses to reduce pharmaceutical opioid-related harm, particularly as newer formulations are introduced. Furthermore, policy attention has to date, largely focused on accidental overdose, with less consideration of interventions aimed at intentional harm. Policy makers may consider the role of regulation in addressing harms from pharmaceutical self-poisoning.

Figure 1. Overview of study processes and data sources

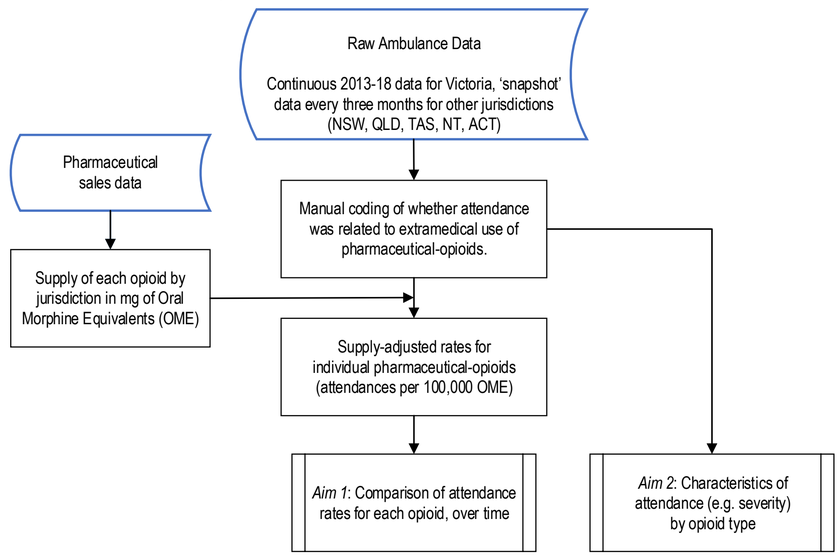

Figure 2. Mean supply-adjusted ambulance attendance rates across pharmaceuticals (Victoria and comparison Australian jurisdictions, 2013-18 average)

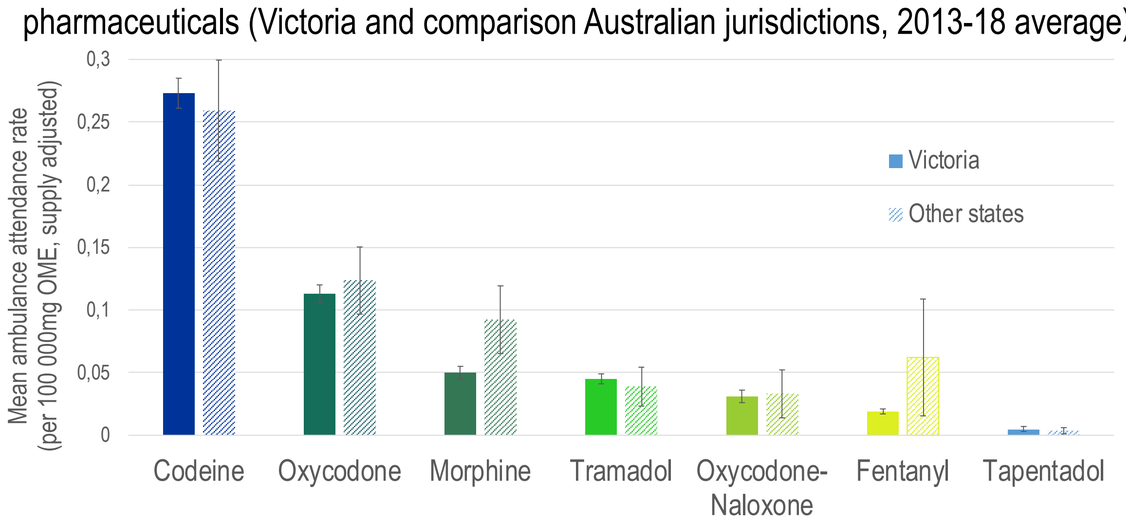

Figure 3. Trends in supply-adjusted Victorian ambulance attendances 2013-2018

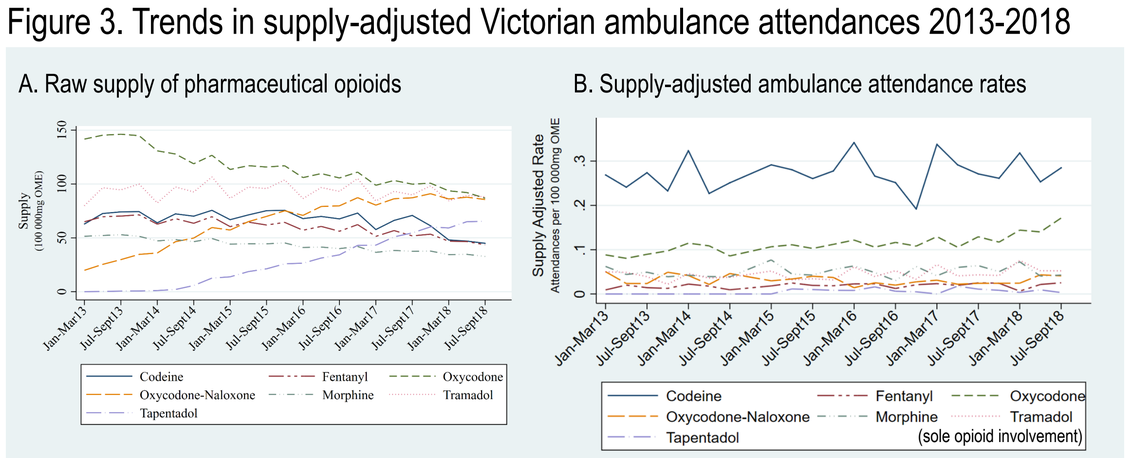

Table 1. Summary of presentation characteristics by opioid

%	All	Codeine	Fentanyl	Oxycodone	Oxycodone -Naloxone	Morphine	Tramadol	Tapentadol	Multiple Opioids
	n=9823	n=3936	n=242	n=2791	n=434	n=474	n=902	n=48	n=992
Severity (moderate to non-responsive; GCS)	14	**10**	**55**	**15**	**8**	23	**13**	6	**16**
Lower respiration (<12 breaths/minute)	16	**11**	**57**	**20**	**26**	28	**14**	10	**21**
Co-morbid suicidal thoughts or behaviours	50	**60**	**5**	**45**	**44**	20	**48**	**52**	**54**
Accidental Overdose	6	**4**	**32**	**5**	**3**	14	**6**	<5 cases	**6**
Non-opioid extramedical pharmaceutical use	51	**51**	14	**50**	**56**	29	**58**	**52**	**64**
Alcohol Intoxication	21	**24**	6	6	16	14	20	13	19

Note. Bolded figures represent odd ratios that are significantly different from morphine (green=lower than morphine, red=higher).