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Abstract | The opioid epidemic in North America has attracted considerable international concern because of the scale of the problem and the high rate of overdose deaths. This paper explores the factors that have contributed to the opioid epidemic in the United States and Canada, and reviews the current situation in Australia.

There is little evidence that Australia is on the same trajectory as the United States or Canada, or that fentanyl, particularly illicit fentanyl, has penetrated the Australian drug market as it has overseas. There is, however, evidence of an increase in harm associated with pharmaceutical opioids and heroin, despite a fall in heroin use.

This paper highlights the importance of being vigilant about the potential for similar problems in Australia, and continuing to monitor key indicators of opioid availability, use and harm. Responses to opioid misuse and overdose must be relevant to the Australian context.

The opioid epidemic in North America: Implications for Australia

Rick Brown and Anthony Morgan

Introduction

The opioid crisis in North America has resulted in increasing overdose death rates in both the United States and Canada and contributed to a decline in average US life expectancy (Redfield 2018). There were more than 70,000 drug overdose deaths in the United States in 2017—a 10 percent increase when compared with 2016—of which almost 48,000 were the result of opioids and more than 28,000 were attributable to synthetic opioids (Hedegaard, Miniño & Warner 2018). In 2017, the rate of opioid overdose deaths in the United States was 15 deaths per 100,000, while the rate in Canada between January and June 2018 was 11 apparent opioid-related deaths per 100,000 population (Hedegaard, Miniño & Warner 2018; Special Advisory Committee on the Epidemic of Opioid Overdoses 2018). The scale of the problem led the US President to declare the crisis a national public health emergency, and governments in both countries have invested significant resources in tackling the problem and its underlying causes (Canadian Centre on Substance Use and Addiction 2017; Christie et al. 2018).

The aim of this paper is to identify factors that contributed to the opioid epidemic in the United States and Canada, including those that may or may not be relevant to the Australian context. It builds on articles by Larance et al. (2018) and Gisev et al. (2018a), drawing on recent data to examine how Australia compares with North America. More specifically, the paper documents the historical context in which opioid use in its various forms grew to epidemic proportions in North America and examines the likelihood that similar trends could be observed in Australia. Given its impact in North America in recent years, particular attention is paid to the misuse of fentanyl and its relevance to Australia. Although it is recognised that other opioids have also been problematic in North America, fentanyl and its derivatives are of particular concern because of their potency and lethality.

This study is based on a review of relevant empirical research from academic, government and non-government sources. Academic sources included CINCH, PubMed, Proquest Criminal Justice Database and Ebsco Criminal Justice Abstracts with full text. Government and non-government sources included major health agencies as well as the US National Criminal Justice Reference Service, the US Substance Abuse and Mental Health Services Administration, the Canadian Centre on Substance Use and Addiction and Australia's National Drug and Alcohol Research Centre. In compiling this summary of key issues, preference was given to robust empirical research and data collections. Key findings are presented in two parts. The first explores the social and environmental conditions, key events and the features of synthetic opioids that led to the current epidemics in the United States and Canada. The second describes the relevance of this to the Australian context.

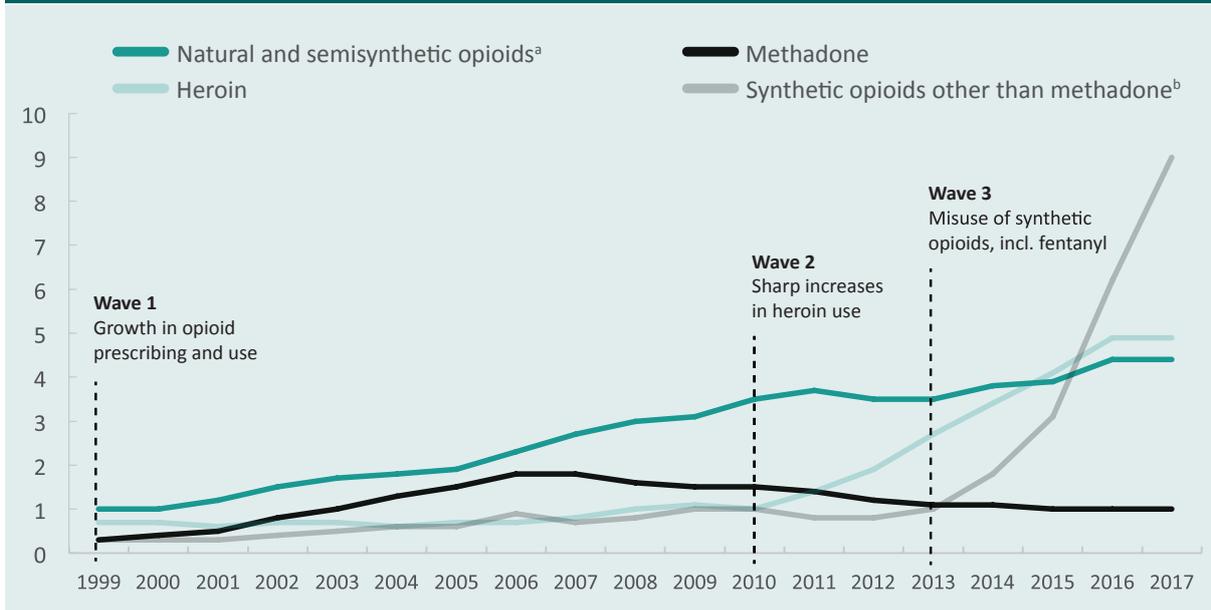
Terminology

Throughout this paper, the terms *illicit* and *non-medical* are used in relation to drug use. The term *illicit drugs* refers to narcotic substances consumed by individuals that have been either manufactured or distributed illegally, whether or not the substance is prohibited by law. The term *non-medical* specifically refers to prescription pharmaceuticals that have been obtained (through doctor-shopping or diversion from the legitimate supply) for recreational use or to support a drug dependency, rather than for their intended therapeutic purposes. Pharmaceuticals obtained for non-medical use can be considered a subset of illicit drugs as their sale for non-therapeutic purposes typically represents illegal activity.

What led to the opioid epidemics in the United States and Canada?

The problems with synthetic opioid use, particularly fentanyl, in the United States and Canada can largely be traced to earlier medicinal prescribing practices. Indeed, the current situation can be seen as the third of three waves that have affected North America over the past three decades. A growth in opioid prescribing and use was followed by a rise in heroin use, which subsequently led to the widespread availability and use of fentanyl. These distinct but interconnected waves coincide with significant changes in the rates of drug overdose deaths in the United States since 1999 attributable to different categories of opioids (Figure 1).

Figure 1: Age-adjusted drug overdose death rates, by opioid category, United States (per 100,000 population)



a: Commonly prescribed opioids, including morphine, oxycodone and hydrocodone

b: Including both prescribed and illicitly manufactured synthetic opioids, such as fentanyl, fentanyl analogues and tramadol

Source: Hedegaard, Miniño & Warner 2018 (Figure 4)

Wave 1: Growth in opioid prescribing and use

The first wave of the opioid epidemic began in the late 1980s with a change in attitude towards the use of opioids to treat chronic non-cancer related pain. Previously, pain relief had largely focused on non-pharmaceutical treatment, such as cognitive behavioural therapy. However, research began to demonstrate that chronic pain could be managed over the long term using opioids (Portenoy & Foley 1986), although the quality of the evidence was subsequently called into question (Kolodny et al. 2015).

In the early 1990s pharmaceutical companies began to manufacture extended release opioids delivered in new ways, including nasal sprays and transdermal patches, as well as pills (Dasgupta, Beletsky & Ciccarone 2018). This included the release in 1995 of the oxycodone product OxyContin™, which became the market leading prescription opioid for more than a decade.

Between 1995 and 2010, prescription opioid use grew rapidly in the United States, quadrupling in a 10-year period (Gallagher 2018). OxyContin™ alone made sales of US\$2.8b between 1995 and 2001 (Meier 2007). In Canada by 2008, prescription opioids were reported to be the fourth most commonly used substance for recreational use (after alcohol, tobacco and cannabis; Belzak & Halverson 2018).

The growth in prescription opioid use can be explained by various factors affecting both demand and supply, including:

- increased demand for treatment of chronic pain related to musculoskeletal disorders in an ageing population, obesity, increased survival after injury and cancer, and increasing frequency and complexity of surgery (Dasgupta, Beletsky & Ciccarone 2018);

- a more favourable attitude among peak bodies such as the American Pain Society and the American Academy of Pain Medicine towards using opioids to treat chronic pain (Kolodny et al. 2015);
- an aggressive marketing and sales campaign by pharmaceutical companies that included funding pain-related educational programs; supporting and promoting research in favour of opioid use; lobbying for increased opioid use; and making payments to physicians through a compensation scheme, resulting in substantial civil penalties for misleading marketing (Dasgupta, Beletsky & Ciccarone 2018; Dhalla, Persaud & Juurlink 2011; Kolodny et al. 2015; Meier 2007); and
- subtle encouragement by the US federal government through the use of satisfaction surveys that asked hospital patients to rate how often staff did 'everything they could to help you with your pain' (Kolodny et al. 2015).

The widespread use of prescription opioids for pain relief led to a rise in opioid dependence and opioid-related overdoses in the United States and Canada. Opioid dependence affected those using for both medical and non-medical purposes, with the number of new non-medical users peaking in the United States in 2002 with 2.7 million new users (Kolodny et al. 2015). Between 1999 and 2004, opioid-related deaths in the United States (resulting from medical or non-medical use) rose by 52 percent in large urban areas and by 371 percent in rural areas, reflecting the greater illicit use of prescription opioids in rural areas (Unick et al. 2013).

From around 2011, the medical environment in which opioids had been widely prescribed began to change, with significant supply-side contractions. Increased concern about the risks of opioid dependence and overdose from both medical and non-medical use led to changes to prescribing guidelines in both the United States and Canada, emphasising the harms of opioids (Gallagher 2018). Monitoring of prescribing practices by doctors (to identify inappropriate opioid prescribing by physicians and doctor-shopping by patients) also became widespread, with prescription drug monitoring programs rolled out in most US states during the 1990s and early 2000s (Substance Abuse and Mental Health Service Administration 2017). In 2010, OxyContin™ was reformulated to make it difficult to crush or dissolve for intravenous use, thereby reducing diversion of pharmaceutical opioids for illicit use. As a result of these changes, prescription opioids became harder to obtain, yet there remained a large number of individuals who were dependent on prescription opioids for both medical and non-medical use (Alpert, Powell & Pacula 2018).

Wave 2: A sharp increase in heroin use

Between 2010 and 2015, heroin use in the United States and Canada rose sharply, especially among those who had been using prescription opioids for non-medical use. In the United States, the increase was greatest among non-Hispanic white users, rising by 75 percent between 2008 and 2011 (Martins et al. 2015).

This pattern of heroin use was partly a result of displacement from prescription opioids, with medical and non-medical users seeking cheaper and more readily available alternatives. There is some evidence to suggest that the perception of risk associated with heroin use declined among non-medical prescription opioid users during this period, suggesting its use may have become more acceptable (Votaw et al. 2016).

Increased heroin use was also a result of a supply-side shock to the market, with a rapid growth in the amount of high quality heroin entering the United States (especially the east coast) from Mexico. The US Drug Enforcement Administration reported a 143 percent increase in heroin seizures between 2010 and 2015, while the price of heroin dropped to record low levels (Ciccarone 2017).

The rise in heroin use led to a sharp increase in heroin-related overdose deaths. Between 2011 and 2016, the age-adjusted rate of heroin overdose deaths rose from 1.5 to 5.1 per 100,000 population. This rate increased by 34 percent per year between 2011 and 2014 and by 20 percent per year in 2015 and 2016. While in 2011 the drug associated with the highest number of overdose deaths was oxycodone (accounting for 14% of all drug overdose deaths), this was replaced by heroin between 2012 and 2015 (accounting for 25% of drug overdose deaths by 2015; Hedegaard, Trinidad & Warner 2018).

Examining variation between US states, Alpert, Powell and Pacula (2018) found an association between the reformulation of OxyContin™ in 2010, which made it more difficult to misuse, and subsequent increases in heroin use. They estimated that an additional percentage point of non-medical use of OxyContin™ in a state before its reformulation increased heroin overdose deaths by 2.8 to 3.6 deaths per 100,000 population in 2013 (after its reformulation).

Wave 3: Misuse of synthetic opioids, especially fentanyl

Fentanyl is a synthetic opioid that is produced in a laboratory and not derived from the opium poppy. It is approximately 100 times more potent than oral morphine and is commonly used for the treatment of acute pain and cancer (Australian Institute of Health and Welfare (AIHW) 2018a). The fentanyl epidemic emerged in North America in around 2013. It can be viewed as a development arising from the heroin epidemic, targeting the same market with a more powerful opioid that can be used as an alternative to heroin or, more commonly, mixed into the heroin supply. Beletsky and Davis (2017) argued that this is a consequence of the Iron Law of Prohibition, which predicts that illicit substances become more concentrated over time as a means of reducing the bulk of the commodity to be transported, while maximising profit.

The mixing of fentanyl into the heroin supply—especially during times of increased demand for heroin—has received mixed responses from users. Some have reported that they dislike the experience of using the drug and fear overdose due to its potency (Mayer et al. 2018). However, others have noted that fentanyl overdose deaths can advertise its potency, driving increased demand (Boddiger 2006). Users in Vancouver, Canada reported difficulty obtaining heroin that was not mixed with fentanyl, highlighting the ubiquity of the drug in the illicit opioid supply (Mayer et al. 2018).

Reasons for the growth in fentanyl use include:

- the importation of cheaply produced fentanyl from China. Ciccarone (2017) reported that the US Office of National Drug Control Policy recorded a 426 percent increase in the weight of fentanyl powder imported from China seized in 2016;
- the ability to purchase very small quantities via cryptomarkets (Gilbert & Dasgupta 2017). Ball, Broadhurst and Trivedi (2019) estimated that each day 16 kilograms of fentanyl are available through cryptomarkets;

- the involvement of Mexican drug cartels exporting to the United States and Canada (Gilbert & Dasgupta 2017); and
- the poorly regulated global chemical distribution system, which has allowed ‘research chemicals’ to be imported for use in fentanyl manufacture with little risk of sanction (Gilbert & Dasgupta 2017).

As a result of these trends, fentanyl overdose deaths have increased in recent years. In Canada, 53 percent of opioid-related deaths in 2016 involved fentanyl or one of its analogues (Belzak & Halverson 2018). In the United States, fentanyl became the top cause of drug overdose deaths in 2016, accounting for 29 percent of such fatalities. Between 2015 and 2016 the number of fentanyl overdose deaths in the United States more than doubled, from 8,251 to 18,335 deaths. Where fentanyl was identified as the primary drug used, another drug was also present in 69 percent of cases, highlighting the extent to which fentanyl is mixed with other substances. Heroin was used in 32 percent of these cases, and cocaine in 25 percent (Hedegaard, Trinidad & Warner 2018).

Risk of fentanyl overdose death has also been associated with younger age (under 34 years), non-Hispanic black ethnicity, higher levels of education (beyond high_school) and the use of cocaine or other stimulants at time of death (Nechuta et al. 2018). One unintended consequence of increased drug law enforcement activity has been the increased risk of fentanyl overdose among those released from prison in the past year, possibly due to reduced drug tolerance during incarceration (Brinkley-Rubinstein et al. 2018).

Other factors to consider

In addition to the drug market related factors outlined above, a number of other issues may be relevant to the three opioid epidemics. First, an increase in socio-economic disadvantage may have played an important role. This is especially true among lower middle-class white households that experienced a decline in living standards and reduced economic opportunities in a post-industrial economy, exacerbated by the global financial crisis (Dasgupta, Beletsky & Ciccarone 2018).

Second, the US government response to the three epidemics focused on supply-side factors and failed to sufficiently address the demand for illicit opioids. Given that the United States has a largely market-driven health sector and relatively limited publicly funded health care, this led to under-investment in treatment programs for opioid dependence, such as opioid agonist therapy (Beletsky & Davis 2017; Kertesz 2017). In contrast, the Canadian government focused more on demand-side factors. In November 2016, a joint statement of action to address the opioid crisis was signed by 54 partners operating at the national, jurisdictional and local levels. Of the 202 commitments made in the statement, 60 percent were focused on prevention and treatment, while only two percent were focused on law enforcement (Canadian Centre on Substance Use and Addiction 2017).

Third, the approach to real-time monitoring of opioid prescribing differs between countries. In the United States, prescription drug monitoring programs have been developed over the past two decades and are now established in all 50 states, allowing physicians and pharmacists to record and review prescriptions on central databases. Although these programs vary in coverage, access and use between states, and although their implementation has been criticised, they provide a means of monitoring overprescribing and doctor-shopping (Alexander, Frattaroli & Gielen 2015). There is mixed evidence of effectiveness, but research has found that prescription drug monitoring programs with certain features are associated with a reduction in fatal overdoses (Fink et al. 2018).

Such systems are less developed in Canada and Australia. In Canada prescription drug monitoring programs are available in seven of the 10 provinces (Donroe, Socias & Marshall 2018). While the Victorian government has recently introduced real-time script monitoring, Australia does not have a national monitoring system; however, the introduction of My Health Record, a national database of health records, could to some extent allow prescriptions to be monitored (Campbell et al. 2019).

Finally, opioid overdose deaths in both the United States and Canada during each wave of epidemic tended to involve multiple substances. For example, 82 percent of opioid-related deaths in Canada between January 2016 and June 2017 involved one or more non-opioid substances (Belzak & Halverson 2018). This suggests that the solutions must address not only opioid misuse but substance abuse more widely.

How does this compare to the Australian experience?

Increasing harms associated with pharmaceutical opioids

According to the AIHW (2018a), the number of pharmaceutical opioid prescriptions dispensed increased by nine percent and the number of people prescribed opioids increased by four percent between 2012–13 and 2016–17. However, on average, the prescriptions dispensed were for smaller quantities and lower doses, meaning that the rate of oral morphine equivalent (OME) measured in milligrams per 1,000 population—a measure adjusting for the difference in opioid potency—remained relatively stable over that period.

Notably, AIHW data show that the net increase in opioid prescriptions was driven primarily by an increase in oxycodone prescribing. The number of oxycodone prescriptions and the number of people prescribed oxycodone increased by 30 percent and 33 percent, respectively. Conversely, the number of fentanyl prescriptions dispensed decreased by 19 percent and the number of people prescribed fentanyl decreased by 25 percent between 2012–13 and 2016–17. These changes in oxycodone and fentanyl prescriptions resulted in a decrease in the daily OME mg per 1,000 population of 21 percent. This contrasts with the findings from earlier research indicating significant increases in fentanyl prescribing (AIHW 2017a; Roxburgh et al. 2013), even as recently as 2014–15, which suggests prescribing practices have been changing recently. Oxycodone remains the most used pharmaceutical opioid, accounting for 34 percent of all opioid OME doses prescribed, followed by tramadol (17%) and fentanyl (11%).

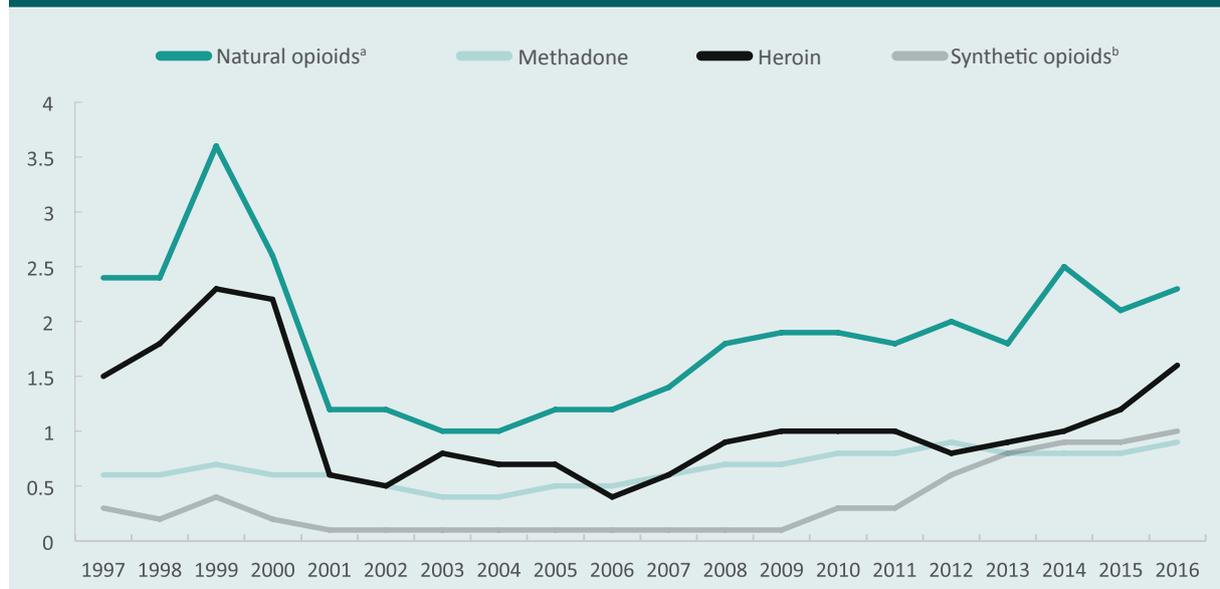
Analysis of fentanyl use based on wholesale data has shown that transdermal patches constitute the majority of total fentanyl use, but also that there is significant variation across geographic areas (Gisev et al. 2018b). Fentanyl use is highest in less populated and more remote locations, and in areas with greater socio-economic disadvantage and a higher proportion of older people (Gisev et al. 2018b), consistent with pharmaceutical opioid use more generally (AIHW 2018a).

In 2016, pharmaceutical opioids were involved in more opioid deaths and hospitalisations than heroin (AIHW 2018a). The age-standardised rate of hospitalisations with a principal diagnosis of opioid poisoning increased by 25 percent between 2007–08 and 2016–17, while the rate of hospitalisation with any diagnosis of opioid poisoning increased by 38 percent (AIHW 2018a). While the rate and increase in hospitalisations with a principal diagnosis of opioid poisoning was higher for males, the rate of hospitalisations with opioid poisoning as any diagnosis was consistently higher among females. In 2016–17, emergency department presentations and hospitalisations for opioid poisoning were highest among people in the lowest socio-economic group.

Opioid deaths (from medical and non-medical use combined) increased by 62 percent between 2001 and 2016, but remained lower than the peaks observed during the late 1990s (AIHW 2018a). Further analysis of these data reveal this increase was largely the result of an increase in accidental (as distinct from intentional) opioid deaths and in pharmaceutical opioid deaths (as distinct from heroin; Roxburgh et al. 2018). Of the 1,045 opioid induced deaths among Australians aged 15 to 64 years, 498 (48%) were attributed to naturally derived opioids (eg morphine, codeine and oxycodone), 357 (34%) were attributed to heroin, 214 (20%) were attributed to synthetic opioids (eg fentanyl and tramadol) and 205 (20%) were attributed to methadone (Figure 2). Deaths could be attributed to more than one substance—in 2016, 11 percent of deaths were attributed to both heroin and pharmaceutical opioids (Roxburgh et al. 2018).

It is more difficult to determine the number of deaths and hospitalisations attributable to specific opioids, such as fentanyl, because of the way in which opioids are classified. Analysis of fentanyl-related deaths using data from the National Coronial Information System has shown that fentanyl deaths have increased in Australia (in line with trends in synthetic opioid deaths more broadly), but that mortality is currently low (Roxburgh et al. 2013).

Figure 2: Age-standardised rate of opioid deaths, by opioid category, Australia (per 100,000 population)



a: Including codeine, morphine, oxycodone, hydromorphone and buprenorphine

b: Including fentanyl, tramadol and tapentadol

Source AIHW 2018a (Table S3.19)

Although the data in Figure 2 are not directly comparable with the data presented in Figure 1, it is evident that opioid death rates have not increased in Australia as they have in the United States. The same is also true when Australian and Canadian data are compared (AIHW 2018a).

Nicholas, Lee and Roche (2011) identified a range of factors that contributed to increases in the use of and harm attributable to pharmaceutical opioids, including:

- the increased availability of different varieties of opioids;
- hospital discharge practices that resulted in patients using medications longer than necessary;
- limited access to viable alternatives to pharmaceutical opioids, including pain management programs and non-opioid pain treatment medicines;
- problems accessing drug treatment programs experienced by drug dependent opioid users; and
- pressure on prescribers experiencing intimidation by some patients, leading to inappropriate prescribing.

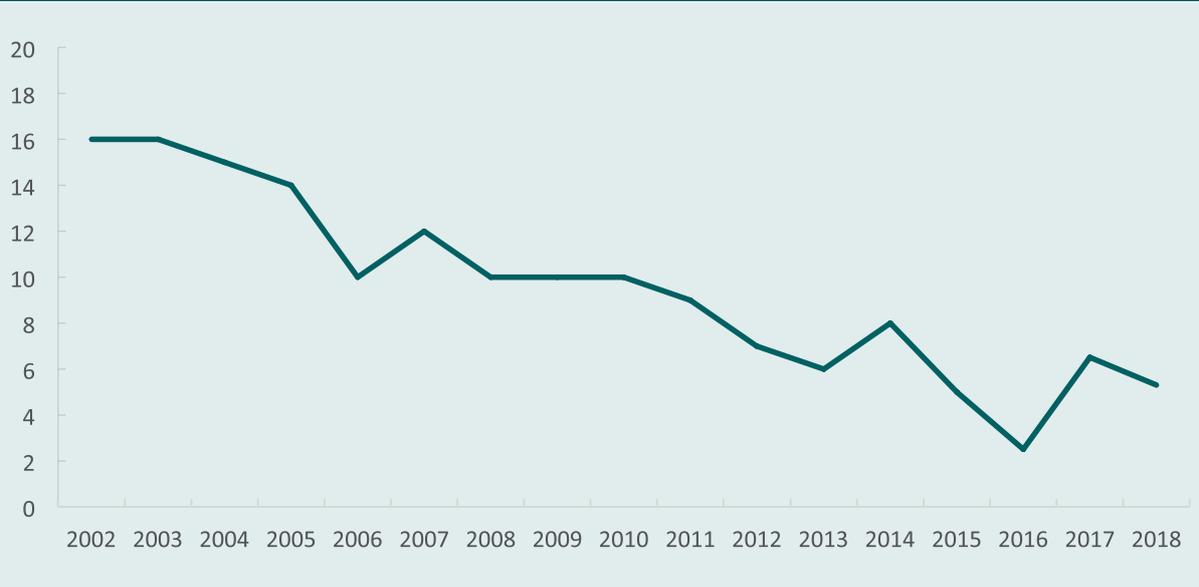
They also noted that changing demographics were likely to create increased demand for pharmaceutical opioids in future. For example, an ageing population is likely to increase demand for effective pain relief for age-related illnesses, such as osteoarthritis and cancer.

A small heroin market, with recent increases in use, hospitalisations and deaths

Heroin use has changed little over the past decade. Data on seizures and arrests indicate that the heroin market has remained small and stable since 2007 (Australian Criminal Intelligence Commission 2018). Estimates based on wastewater analysis indicate that about 750 kilograms of heroin were consumed in Australia in the 12 months to August 2018 (compared, for example, with 9,847 kilograms of methamphetamine; Australian Criminal Intelligence Commission 2019). Annual interviews with people who inject drugs conducted as part of the Illicit Drug Reporting System have also shown that heroin use in the past six months has decreased since data collection commenced in 2000 but remained relatively stable since the mid-2000s (Peacock et al. 2018). The proportion of police detainees who have tested positive for heroin as part of the Drug Use Monitoring in Australia (DUMA) program has gradually fallen since 2002 (Patterson et al. 2018). In 2016, just 2.5 percent of detainees tested positive for heroin, the lowest level on record. However, there was a statistically significant rise to 6.5 percent in 2017, before stabilising at 5.3 percent in 2018 (Figure 3).

The increase in heroin use observed in DUMA is consistent with recent trends in deaths attributable to heroin, which rose from 0.6 to 1.6 deaths per 100,000 between 2007 and 2016 (AIHW 2018a). Similarly, in 2016–17 the rate of hospitalisations with a principal diagnosis of heroin poisoning was the highest recorded since 2006–07; however, the rate of hospitalisations fluctuated over this period, and opioid poisoning hospitalisations were more likely to be a result of pharmaceutical opioids (AIHW 2018a). Finally, while heroin is the most common principal drug of concern for all opioid treatment services, the number of closed treatment episodes for heroin decreased 30 percent since 2007–08 (AIHW 2018b). Conversely, the number of closed treatment episodes for alcohol and other drugs, and for other types of opioids, increased over this period (AIHW 2018b).

Figure 3: Adult police detainees who tested positive to heroin, by year (%)



Source: Drug Use Monitoring in Australia [computer file]

Mixed evidence about non-medical use of fentanyl, and little evidence of illicit fentanyl use

There is, to date, mixed evidence of a rise in the non-medical use of fentanyl. Data from the most recent National Wastewater Drug Monitoring Program report (Australian Criminal Intelligence Commission 2019) revealed the population-weighted average consumption was higher in December 2018 in both rural areas and capital cities compared with when testing commenced in August 2016. This is despite evidence of a decline in fentanyl prescribing. Fentanyl consumption was considerably higher in regional areas compared with capital cities. However, this measure does not distinguish between prescribed and non-medical use.

In a study of opioid use and overdose among clients of Sydney's Medically Supervised Injecting Centre over a three-year period between 2012 and 2015, Latimer et al. (2016) found a tenfold increase in fentanyl injections, although these accounted for less than two percent of all opioid injections and one percent of all drug injections over the period. They noted that the increased use of fentanyl coincided with the reformulation of OxyContin™ in Australia in early 2014 (later than the reformulation in the United States), suggesting some level of displacement. Importantly, the risk of overdose from fentanyl injections was twice the risk of overdose from injecting heroin and eight times the risk of overdose from injecting other pharmaceutical opioids (Latimer et al. 2016). Geddes et al. (2018) found that fentanyl injectors were, in addition to being more likely to experience overdose, more likely to be Indigenous, to report frequent injection and to inject in public than other people who inject illicit drugs.

While in the United States more deaths have been attributable to illicit fentanyl than to heroin, Roxburgh et al. (2018) report that in Australia there have only been single case studies of deaths from illicit fentanyl (ie formulations not available pharmaceutically), and little evidence of deaths occurring in large numbers. Conversely, a large proportion of deaths have been found to involve the injection of diverted fentanyl from patches (Roxburgh et al. 2017). The number of synthetic opioid-related deaths (including fentanyl-related deaths) has increased over the past two decades, and it has also increased as a proportion of all opioid-related deaths, but this figure does not distinguish medical and non-medical use (Australian Bureau of Statistics 2017).

The extent of non-medical use or misuse of opioids has also been measured using population surveys. According to the 2016 National Drug Strategy Household Survey, almost four percent of Australians aged 14 or over had misused a painkiller/analgesic or opioid in the past 12 months (AIHW 2017b), making this category of drugs the second most commonly misused after cannabis. One percent of Australians aged 14 years or over reported the non-medical use of fentanyl in the previous 12 months (AIHW 2017b). Consistent with data on use more generally, non-medical use of painkillers/analgesics and pharmaceutical opioids was significantly higher in the lowest socio-economic group than the highest group, and significantly higher in remote and very remote areas than in major cities (AIHW 2018a).

A survey of 1,044 police detainees conducted in 2018 as part of the Australian Institute of Criminology's Drug Use Monitoring in Australia program found that three percent of detainees reported having used fentanyl in the past 12 months (Sullivan & Patterson 2018). Importantly, there was no change between 2016 and 2018 in the use of fentanyl by detainees in the previous 12 months, with rates of self-reported use stable at three percent (Sullivan & Patterson 2018). Rates of self-reported use of buprenorphine, oxycodone, methadone and morphine were also stable over this period.

The most common reason that detainees started to use fentanyl was that it had been prescribed for medical reasons; however, in both 2016 and 2018 the majority of detainees who used fentanyl were non-medical users. Most of these users were given fentanyl by family or friends (ie diverted fentanyl). This is consistent with evidence on non-medical pharmaceutical drug use more generally, based on previous surveys of police detainees (Patterson, Sullivan & Ticehurst 2018) and a systematic review of prior research (Hulme, Bright & Nielsen 2018).

A limitation of self-report data is that detainees may not be aware they had consumed fentanyl. The unwitting consumption of fentanyl when combined with other substances is a significant problem in the United States and Canada. Urinalysis testing for fentanyl and fentanyl analogues, including carfentanil, will be introduced as part of the Drug Use Monitoring in Australia program in 2019. Notably, a recent pilot study recruited people who inject heroin from a medically supervised injecting centre in Sydney and conducted instant urine screening to detect unintentional fentanyl consumption, and no cases of fentanyl-laced heroin were detected (Barratt et al. 2018).

Conclusion

The current problems with synthetic opioid use, particularly fentanyl, in the United States and Canada reflect the consequences of a problem that has emerged over an extended period. The epidemic has occurred in three waves, beginning with significant growth in opioid prescribing and use, followed by a rise in the use and availability of heroin, and then by the widespread use and availability of fentanyl, including illicit fentanyl. The cumulative impact of these three waves has been significant.

To date, there is limited evidence of an equivalent problem in Australia. Although opioid prescribing has increased overall, prescription practices have changed in recent years, such that prescriptions dispensed are for lower doses and smaller quantities. Fentanyl prescribing in Australia has decreased in recent years. The harms associated with pharmaceutical opioids have increased, as has non-medical use of pharmaceutical opioids, although not at the rate observed in the United States and Canada. This led Nicholas, Lee and Roche (2011: xii) to argue several years ago that 'Australia is well placed to intervene at this relatively early stage of the trajectory of problems before they reach the level being experienced in these countries'. Even though the rate of fatal opioid-related overdoses has risen since then, the same can still be said now. Campbell et al. (2019), Larance et al. (2018) and Gisev et al. (2018a) have each called for timely and proactive supply, demand and harm reduction measures to be implemented in Australia to reduce the harms associated with pharmaceutical opioids.

Heroin use and availability have not increased to the same extent in Australia as in the United States and Canada, although a recent increase in deaths attributable to heroin has coincided with a fall in treatment episodes. Further, levels of non-medical use of fentanyl appear relatively stable, and most non-medical users appear to use fentanyl diverted from legal sources. Interventions to reduce the harms associated with synthetic opioids, including fentanyl, should be developed to reflect the situation in Australia.

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