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**Abstract** | This research investigates fentanyl use among police detainees participating in the Drug Use Monitoring in Australia program.

Three percent of respondents tested positive to fentanyl and/or norfentanyl during urinalysis, and 11 percent reported lifetime fentanyl use. Non-prescribed fentanyl use was associated with use of and dependence on other drugs in the past 12 months. Three percent of all detainees believed they had used an illicit substance mixed with fentanyl. No detainees who tested positive to fentanyl reported using the drug in the past 12 months.

These findings suggest fentanyl contamination may be occurring in the Australian illicit drug market.

## Is there fentanyl contamination in the Australian illicit drug market?

Alexandra Voce and Tom Sullivan

Fentanyl is a highly potent synthetic opioid prescribed for the treatment of severe pain that is often used for non-medical purposes. The opioid crisis in North America saw a rise in non-prescribed and unintentional use of fentanyl, and an associated increase in synthetic opioid related deaths (Hedegaard, Miniño & Warner 2018). While fentanyl-related mortality is low in Australia, a large proportion of overdose deaths involved the injection of fentanyl diverted from the medical system (Roxburgh et al. 2013). Further, there is emerging evidence of unintentional fentanyl use in Australia, with recent cases identified in Sydney (NSW Health 2020) and Melbourne (Barratt et al. 2019; Rodda et al. 2017). Drawing on urinalysis and self-reported fentanyl use data, this study aims to investigate the prevalence and patterns of fentanyl use among police detainees, examine the polydrug use of fentanyl and other licit and illicit substances, and compare reported fentanyl use with urinalysis results.

## Method

This study used data from the Australian Institute of Criminology's Drug Use Monitoring in Australia (DUMA) program. The DUMA program collects data about drug use, criminal offending and socio-demographic characteristics from individuals detained at selected police stations and watch houses in Perth, Brisbane, Adelaide and Sydney (Voce & Sullivan 2019). In July and August 2019, 566 participants responded to a special fentanyl addendum that asked about their use of fentanyl and its analogues, patterns of use, reasons for use, polydrug use, and perceptions of the drug. Interviewers also asked respondents to provide a voluntary urine sample, which was tested for fentanyl and other drugs. Respondents were mostly male (81%,  $n=460$ ), non-Indigenous (76%,  $n=430$ ), and had a median age of 33 (interquartile range=26–41). Seventy-nine percent ( $n=418$ ) of eligible detainees voluntarily provided a urine sample.

The Forensic and Analytical Science Service of NSW Health Pathology performed fentanyl immunoassay screening on all urine samples. As is routine for the DUMA program, samples were screened for amphetamines, benzodiazepines, cannabis, cocaine, opioids, 6-monoacetylmorphine (a heroin metabolite), methadone and buprenorphine.

The fentanyl immunoassay screening had a cut-off of 1ng/mL for fentanyl but had poor cross-reactivity towards particular fentanyl analogues such as carfentanil. Thus, samples that tested positive for fentanyl or other opioids were also subjected to confirmatory testing to ascertain the specific drug present in the urine. Confirmatory testing was performed using liquid chromatography–tandem mass spectrometry, with sensitivity in the sub-ng/mL range, allowing a large range of fentanyl analogues to be detected. The confirmatory testing cut-offs for fentanyl and its analogues were greater than or equal to 0.1µg/L, except for despropionylfentanyl and sufentanil, both of which had cut-offs greater than or equal to 0.5µg/L.

The laboratory provided the urinalysis test results in electronic format. Two respondents from Adelaide completed the DUMA core survey and tested positive to fentanyl, but were excluded from further analyses as they did not complete any items in the fentanyl addendum.

## Results

### Urinalysis

Confirmatory urinalysis testing indicated that three percent of detainees ( $n=13$ ) tested positive to fentanyl and/or its major metabolite norfentanyl (see Table 1). Two detainees in Sydney also tested positive to the fentanyl analogue  $\beta$ -hydroxyfentanyl (0.5%).

**Table 1: Detainees testing positive to fentanyl**

	<i>n</i>	%
Adelaide ( <i>n</i> =76)	2	2.6
Brisbane ( <i>n</i> =156)	7	4.5
Perth ( <i>n</i> =131)	2	1.5
Sydney ( <i>n</i> =55)	2	3.6
National ( <i>n</i> =418)	13	3.1

Note: Base is the total number of detainees who provided a urine sample

Source: AIC DUMA collection 2019 [computer file]

Eleven of the 13 detainees (85%) who tested positive to fentanyl also tested positive to methamphetamine, although these detainees constituted only a small proportion (5%, *n*=11) of all those who tested positive to methamphetamine. Among the 13 detainees who tested positive to fentanyl, two (15%) also tested positive to 6-monoacetylmorphine (a heroin metabolite), both in Sydney. This overlap constituted 18 percent of the total number who tested positive for heroin. Almost one-third of detainees who tested positive to fentanyl also tested positive to buprenorphine (31%, *n*=4). Relative to detainees who tested positive to fentanyl, those who tested negative to fentanyl were significantly less likely to test positive to methamphetamine (47%, *n*=192;  $\chi^2(1)=6.98$ ,  $p=0.008$ ,  $\Phi=0.13$ ), heroin (2%, *n*=9;  $\chi^2(1)=8.51$ ,  $p=0.004$ ,  $\Phi=0.14$ ), and buprenorphine (8%, *n*=32;  $\chi^2(1)=8.37$ ,  $p=0.004$ ,  $\Phi=0.14$ ).

### Reported fentanyl use

Overall, 11 percent (*n*=65) of detainees reported having used fentanyl in their lifetime, ranging from 10 percent in Perth (*n*=20) to 14 percent in Sydney (*n*=10). Most of these (68%, *n*=44) had used non-prescribed fentanyl. Four percent (*n*=23) of respondents reported using fentanyl in the past 12 months, with two percent using non-prescribed fentanyl in that period (*n*=14).

Seventy-three percent (*n*=32) of non-prescribed fentanyl users had used fentanyl from a transdermal patch, typically by injecting the solution extracted from the patch (*n*=29). A small number of fentanyl users had either inhaled a nasal spray (7%, *n*=3) or swallowed or injected a lozenge (7%, *n*=3).

Relative to detainees who had never used non-prescribed fentanyl, respondents who reported using non-prescribed fentanyl were significantly more likely to have used methamphetamine, heroin, cocaine and benzodiazepines during the past 12 months (see Table 2). These detainees were also more likely to self-report dependence on heroin and methamphetamine in the past 12 months.

**Table 2: Self-reported drug use and dependence in the past 12 months, by reported lifetime non-prescribed fentanyl use**

	Lifetime fentanyl use		No fentanyl use		$\chi^2$ test ( $p$ -value); $\Phi$
	$n$	%	$n$	%	
<b>Drug use in the past 12 months</b>					
Methamphetamine	42	95.4	277	53.4	$\chi^2(1)=29.25$ ( $p<0.001$ ); $\Phi=0.23$
Cannabis	30	68.2	298	57.2	$\chi^2(1)=2.01$ ( $p=0.156$ ); $\Phi=0.06$
Heroin	19	43.2	51	9.8	$\chi^2(1)=41.56$ ( $p<0.001$ ); $\Phi=0.27$
Alcohol	32	72.7	385	73.9	$\chi^2(1)=0.03$ ( $p=0.866$ ); $\Phi=-0.01$
Cocaine	13	29.6	88	16.9	$\chi^2(1)=4.71$ ( $p=0.030$ ); $\Phi=0.09$
Benzodiazepine	30	69.8	161	31.1	$\chi^2(1)=26.46$ ( $p<0.001$ ); $\Phi=0.22$
<b>Drug dependence in the past 12 months</b>					
Methamphetamine dependence	22	50.0	149	28.8	$\chi^2(1)=8.58$ ( $p=0.003$ ); $\Phi=0.12$
Cannabis dependence	9	20.5	99	19.2	$\chi^2(1)=0.04$ ( $p=0.833$ ); $\Phi=0.01$
Heroin dependence	10	22.7	28	5.4	$\chi^2(1)=19.42$ ( $p<0.001$ ); $\Phi=0.19$

Source: AIC DUMA collection 2019 [computer file]

No detainee who tested positive for fentanyl reported ever using any form of fentanyl. Detainees also under-reported their use of other drugs, but to a lesser degree—about half of those who tested positive for methamphetamine (54%,  $n=110$ ) and two-thirds of those who tested positive for cannabis (63%,  $n=113$ ) reported using these drugs in the 48 hours before their arrest.

Almost two-thirds of non-prescribed fentanyl users (59%,  $n=26$ ) reported having used the drug simultaneously with other substances, particularly methamphetamine ( $n=14$ ). Three percent of the total sample ( $n=17$ ) reported that they had taken an illicit substance mixed or laced with fentanyl or a fentanyl-related substance—most commonly heroin ( $n=6$ ) or methamphetamine ( $n=5$ ).

## Discussion

Three percent of detainees tested positive to fentanyl or the fentanyl metabolite norfentanyl. This was similar to the proportion who reported using fentanyl in the past 12 months (4%)—and the same proportion who reported using fentanyl in the past 12 months in separate studies in 2016 and 2018 (both 3%; Sullivan & Patterson 2018). However, no detainee who tested positive for fentanyl in this study reported ever using any form of fentanyl. Two respondents in Sydney also tested positive for  $\beta$ -hydroxyfentanyl, a highly potent and rarely reported fentanyl analogue (Hendrickson et al. 2019).

The discrepancy between urinalysis results and reported use may reflect unwitting use of fentanyl and possible fentanyl contamination of other illicit drugs. This interpretation is supported by data suggesting three percent of detainees had used drugs mixed or laced with fentanyl. These results align with recent unpublished evidence of unintended use of fentanyl-type substances in Melbourne in 2019 (Barratt et al. 2019) and Sydney in 2020 (NSW Health 2020). Prior to this study, the only published evidence of possible fentanyl contamination in Australia was a cluster of nine overdose deaths in Melbourne in 2015 (Rodda et al. 2017). Researchers suspected these cases involved fentanyl-laced heroin, as they occurred within two months, were in close geographical proximity, and resulted in positive toxicology tests for fentanyl and heroin (Rodda et al. 2017). Fentanyl contamination is well documented in illicit drug markets in the United States and Canada (Amlani et al. 2015; Hayashi et al. 2018).

Fentanyl use may also have been under-reported because some respondents failed to associate the application of transdermal fentanyl patches with illicit drug abuse and thus neglected to report it. The validity of self-report measures is lower among police detainees relative to the general population (Miller, Donnelly & Martz 1997), but these metrics are improved when clear assurances of confidentiality are provided (Darke 1998). The size of the discrepancy between urinalysis and reported fentanyl use is unlikely to be attributable to under-reporting alone.

Most detainees who tested positive to fentanyl (11 of 13) also tested positive for methamphetamine, and recent methamphetamine use and dependence was significantly more likely among those who reported non-prescribed fentanyl use compared to other detainees. The overlap between fentanyl and methamphetamine use may suggest detainees are using fentanyl to ease the symptoms of methamphetamine withdrawal, or 'speedballing' these drugs—combining an opioid and a stimulant to produce an intense high (Leri et al. 2004; Li, Wessinger & McMillan 2005). This is consistent with North American evidence suggesting fentanyl is used to enhance the effect of stimulants such as methamphetamine or cocaine (LaRue et al. 2019).

Some respondents who used methamphetamine may also have unintentionally consumed fentanyl, in the form of fentanyl-contaminated methamphetamine (LaRue et al. 2019). In February 2020, New South Wales Health issued a warning that fentanyl-related substances were being sold as methamphetamine and cocaine powder within Sydney, after several individuals experienced acetylfentanyl toxicity from unwittingly consuming the drug (NSW Health 2020). Given the prevalence of methamphetamine use among some populations in Australia, evidence of combined methamphetamine–fentanyl use may suggest that fentanyl use could accelerate if it became more widely available.

These results provide an early warning of possible unintended fentanyl use in Australia, particularly among people who use other illicit drugs. The study also provides evidence of the combined use of fentanyl and methamphetamine, which may represent intentional use of fentanyl to ease withdrawal symptoms or to produce an intense high. It has been argued Australia is unlikely to follow the trajectory of fentanyl misuse seen in North America due to key differences in these illicit drug markets (Brown & Morgan 2019). This study reinforces the need for prevention strategies specific to the Australian context in targeting fentanyl availability, patterns of use and harms.

## References

URLs correct as at February 2020

- Amlani A et al. 2015. Why the FUSS (fentanyl urine screen study)? A cross-sectional survey to characterize an emerging threat to people who use drugs in British Columbia, Canada. *Harm Reduction Journal* 12: 54
- Barratt MJ et al. 2019. Early cases of unintended use of illicit fentanyl confirmed through urinalysis in 2019, Melbourne, Australia. Paper to the Australasian Professional Society on Alcohol and Other Drugs Conference, Hobart, 10–13 November. <http://www.apsadconference2019.com.au/>
- Brown R & Morgan A 2019. The opioid epidemic in North America: Implications for Australia. *Trends & issues in crime and criminal justice* no. 578. Canberra: Australian Institute of Criminology. <https://aic.gov.au/publications/tandi/tandi578>
- Darke S 1998. Self-report among injecting drug users: A review. *Drug & Alcohol Dependence* 51: 253–63
- Hayashi K et al. 2018. Substance use patterns associated with recent exposure to fentanyl among people who inject drugs in Vancouver, Canada: A cross-sectional urine toxicology screening study. *Drug & Alcohol Dependence* 183: 1–6
- Hedegaard H, Miniño AM & Warner M 2018. *Drug overdose deaths in the United States, 1999–2017*. NCHS Data Brief no. 329. Hyattsville, MD: National Center for Health Statistics
- Hendrickson R, Akpunonu P, Hughes AR & Gerona R 2019. Highly potent fentanyl analogs: Apnea from exposure to small quantities of  $\beta$ -hydroxyfentanyl and furanylfentanyl. *Clinical Toxicology* 57(9): 813–815
- LaRue L et al. 2019. Rate of fentanyl positivity among urine drug test results positive for cocaine or methamphetamine. *JAMA Network Open* 2(4): e192851
- Leri F, Stewart J, Tremblay A & Bruneau J 2004. Heroin and cocaine co-use in a group of injection drug users in Montréal. *Journal of Psychiatry & Neuroscience* 29(1): 40–47
- Li M, Wessinger W & McMillan D 2005. Effects of amphetamine-CNS depressant combinations and of other CNS stimulants in four-choice drug discriminations. *Journal of the Experimental Analysis of Behavior* 84(1): 77–97
- Miller M, Donnelly B & Martz R 1997. The forensic application of testing hair for drugs of abuse. In L Harrison & A Hughes (eds), *The validity of self-reported drug use: Improving the accuracy of survey estimates*. Research monograph no. 167. Rockville, MD: National Institute on Drug Abuse: 146–160
- New South Wales Health 2020. *Warnings over fentanyl risk in Sydney*. Media release, 22 February. Sydney: New South Wales Government. [https://www.health.nsw.gov.au/news/Pages/20200222\\_00.aspx](https://www.health.nsw.gov.au/news/Pages/20200222_00.aspx)
- Rodda L et al. 2017. A cluster of fentanyl-laced heroin deaths in 2015 in Melbourne, Australia. *Journal of Analytical Toxicology* 41(4): 318–324
- Roxburgh A et al. 2013. Trends in fentanyl prescriptions and fentanyl-related mortality in Australia. *Drug & Alcohol Review* 32(3): 269–75
- Sullivan T & Patterson E 2018. *Fentanyl use by police detainees remains unchanged*. Statistical Bulletin no. 13. Canberra: Australian Institute of Criminology. <https://aic.gov.au/publications/sb/sb13>
- Voce A & Sullivan T 2019. *Drug use monitoring in Australia: Drug use among police detainees, 2018*. Statistical Report no. 18. Canberra: Australian Institute of Criminology. <https://aic.gov.au/publications/sr/sr18>

**Alexandra Voce is a Research Officer at the  
Australian Institute of Criminology.**

**Tom Sullivan is a Senior Research Analyst at  
the Australian Institute of Criminology.**

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GPO Box 1936  
Canberra ACT 2601, Australia  
Tel: 02 6268 7166

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