

# Alcohol and other drug use before custody among Aboriginal and non-Aboriginal people in New South Wales, Australia

Michael F. Doyle,<sup>1,\*</sup> Farah Al-Ansari,<sup>2</sup> Sharlene Kaye,<sup>3</sup> Megan Williams,<sup>4</sup> Katherine Conigrave,<sup>1,5,6</sup> Julia Bowman<sup>3</sup>

<sup>1</sup>NHMRC Centre of Research Excellence in Indigenous Health and Alcohol, Sydney Medical School, Faculty of Medicine and Health, The University of Sydney, Camperdown, NSW, 2050, Australia

<sup>2</sup>Sydney Medical School, Faculty of Medicine and Health, The University of Sydney, Camperdown, NSW, 2050, Australia

<sup>3</sup>Research Unit, Justice Health and Forensic Mental Health Network, Matraville, NSW, 2036, Australia

<sup>4</sup>Girra Maa Indigenous Health Discipline, School of Public Health, University of Technology Sydney, Broadway, NSW, 2007, Australia

<sup>5</sup>Drug Health Services, Royal Prince Alfred Hospital, Camperdown, NSW, 2050, Australia

<sup>6</sup>Edith Collins Centre (Translational Research in Alcohol Drugs and Toxicology), Camperdown, NSW, 2050, Australia

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## Abstract

**Objective:** Alcohol and other drug (AoD) use is a significant factor in the poor health status of people in prison. Our aim is to explore associations of alcohol consumption with tobacco and illicit drug use among Aboriginal and non-Aboriginal people in prison to inform health services, clinical care and support.

**Methods:** We analysed the alcohol, tobacco and illicit drug use data of the 2015 *Network Patient Health Survey* of adults in custody in New South Wales (n=1,132). A comparative analysis of Aboriginal to non-Aboriginal participants including bi-variant and multivariate analysis was undertaken.

**Results:** Significantly more Aboriginal than non-Aboriginal participants reported alcohol consumption before prison that was consistent with possible dependence. More Aboriginal than non-Aboriginal participants used cannabis on a daily or almost on daily basis before prison. There was significant association between alcohol and cannabis use among Aboriginal participants.

**Conclusions:** There are differences in Aboriginal and non-Aboriginal AoD use patterns, which should be considered when providing treatment and support programs within and post-release from prison.

**Implications for Public Health:** Specific programs are needed to assist Aboriginal people in this population who co-use alcohol and cannabis.

**Key words:** Alcohol, illicit drug, prison, treatment, Aboriginal, non-Aboriginal

## Background

Alcohol and other drug (AoD) use is a significant factor in the already poor health status of people who go to prison.<sup>1,2</sup> As a group, people in prison are more likely to have type two diabetes, be overweight and have poor dental health, among a long list of other health-related problems.<sup>1,2</sup>

Aboriginal and Torres Strait Islander Australians have poorer health outcomes than the general Australian population<sup>3,4</sup> and are vastly overrepresented in prison at 13.5 times the rate of imprisonment of other Australians.<sup>5</sup> Of the potentially preventable burden of disease among Aboriginal and Torres Strait Islander Peoples in the general

population, tobacco contributes 11.9%, alcohol 6.5% and illicit drug use 6.9%.<sup>6,7</sup> Better AoD treatment services in prison and post-release could help contribute to achieving Australia's goal of 'Closing the Gap' which is to have parity in health, education and other indicators including imprisonment between Aboriginal and Torres Strait Islander and other Australians.<sup>3</sup>

Overimprisonment and AoD use issues among First Nations people are seen in countries with similar colonial histories, including Canada and New Zealand.<sup>8</sup> For some Indigenous/First Nations peoples, AoD has been used to cope with stress and trauma experienced as a result of events that can include the systematic removal of children, dispossession of land and the banning of the use of Indigenous

\*Correspondence to: NHMRC Centre of Research Excellence in Indigenous Health and Alcohol, Sydney Medical School, Faculty of Medicine and Health, The University of Sydney, Camperdown, NSW, 2050, Australia. Tel.: +61 02 9515 9726.

e-mail: [michael.doyle@sydney.edu.au](mailto:michael.doyle@sydney.edu.au).

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languages and cultural practises.<sup>9,10</sup> Intergenerational trauma as well as ongoing racism and discrimination continues to impact on the health and wellbeing of Indigenous/First Nations people.<sup>11–13</sup> There are multiple interrelated factors that lead to the involvement of Indigenous/First Nations peoples in the criminal justice system, which include racism and discrimination<sup>12,13</sup>. Addressing these issues is beyond the capacity of health and support services involved with the criminal justice system alone; nonetheless, it is important that Aboriginal and Torres Strait Islander people receive the best possible support and health services while in and during post-release from prison.

Prison is a place where both clinical and behavioural AoD treatment can be provided.<sup>14</sup> In most Australian prisons, there are pharmacotherapies to assist with abstinence and relapse prevention of illicit drug use.<sup>14</sup> For opioid dependence, buprenorphine and methadone programs are available in addition to post-release referrals for this treatment.<sup>14,15</sup> There is no published research into the provision of pharmacotherapies including relapse prevention medications for alcohol use in Australian prisons or post-release. There are a number of pharmacotherapies available for treating alcohol use disorders in Australia in community settings.<sup>16</sup> While efficacy of the available drugs shows modest effects, the results nonetheless demonstrate reduced alcohol consumption by people being treated.<sup>16</sup> Group-based behavioural treatment programs aimed at addressing AoD use are available, though enrolment places can be limited.<sup>14,17</sup> Programs in Australian prisons are generally based on United States programs and may not be culturally suitable for Aboriginal and Torres Strait Islander people and may not address the underlying causes of AoD use such as the intergenerational impact of colonisation.<sup>15</sup> There are a few specific programs developed for Aboriginal and Torres Strait Islander Australians although these have not been evaluated.<sup>15</sup> Group-based programs tend to have a criminogenic focus and are mainly available for sentenced inmates, so those on remand who have not necessarily been convicted of an offence may not have access even though they could receive incidental health benefits from such programs. For people who have long histories of AoD use, it is likely that group programs alone are not sufficient without post-release support including pharmacotherapies.

Providing the best possible clinical care and support in prison, and post-release could improve the health of Aboriginal and Torres Strait Islander and non-Indigenous people in this population<sup>18</sup> and possibly reduce the likelihood of return to prison. While the prevalence of alcohol consumption and of other drug use prior to prison has previously been reported as higher among Aboriginal and Torres Strait Islander people entering prison,<sup>19,20</sup> there has been little attention to the implications of dual or polydrug use. Our aim was to explore associations of alcohol consumption with tobacco and illicit drug use among Aboriginal and non-Aboriginal people in prison to inform health services, clinical care and support.

## Methods

This study reports data from the *2015 Network Patient Health Survey* (NPHS), a cross-sectional periodic survey by the Justice Health and Forensic Mental Health Network (JHFMHN).<sup>2</sup> The NPHS, previously titled *The Inmate Health Survey*,<sup>21–23</sup> assesses physical and mental health status of adults in correctional centres in New South Wales

(NSW), which is the Australian jurisdiction with the largest prison population.<sup>5</sup> An amendment to the original ethical approvals was granted to allow this analysis. As per guidelines, AHMRC approved this manuscript before submission. The NPHS had an Aboriginal governance committee that was formed in 2015 and consisted of members from various sectors across NSW. Cultural sensitivity was maintained in this paper with authors Michael Doyle and Megan Williams both being Aboriginal. In accordance with NSW Health guidelines, we refer to the Aboriginal and Torres Strait Islander participants as Aboriginal participants respectfully hereafter.<sup>24</sup>

## Participants

A stratified random sample of 1,493 people was invited to take part in the NPHS by JHFMHN research staff, with 1,132 (75.8%) voluntarily agreeing to participate and each were compensated \$10 by JHFMHN for their time. Stratification ensured a large enough sample of women and Aboriginal participants for data analysis. Participants had to be able to provide informed consent, be 18 years or older, deemed able to understand questions and provide answers in English.

## Administration and questions

Data were collected face-to-face by trained members of the NPHS research team. The training included Aboriginal cultural awareness. The NPHS is a structured questionnaire with 19 sections, including demographics, drug and alcohol use, mental health and imprisonment history.<sup>2</sup>

AoD use reported here is self-reported use that occurred prior to imprisonment. Alcohol use was assessed using AUDIT(25). The 10 questions in AUDIT are scored with a total possible score of 40. A zero score means no consumption; 1 to 7 indicates low risk consumption; 8 to 15 indicates advice should be given on the reduction of hazardous consumption;  $\geq 16$  to  $\leq 19$  suggests counselling and continued monitoring; and  $\geq 20$  suggests risky consumption and possible alcohol dependence.<sup>25</sup> In our paper, AUDIT scores of  $\geq 8$  to  $\leq 15$  were merged with  $\geq 16$  to  $\leq 19$  and categorised as likely hazardous/harmful alcohol consumption.

Participants were asked about illicit drug use via multiple choice questions on frequency of use of each: (1) ever used, (2) used daily or almost daily in 12 months before prison, (3) ever used in prison, (4) used in the last four weeks, (5) ever injected, and (6) ever injected in prison.<sup>2</sup> Here, we report only on illicit drug use, which was daily or almost daily in the 12 months before prison.

## Analysis

Statistical analysis was conducted using SPSS version 24. Bivariate analysis was used to assess the association of the sociodemographic and substance use characteristics, and the association between AUDIT risk categories and prevalence of regular other drug use. We used chi-square tests to assess significance of any differences. We also used chi-square tests to investigate associations between AUDIT scores and regular other drug use in the 12 months prior to imprisonment among Aboriginal men and women. Logistic regression was used to determine whether type of drug use or demographic factors were predictive of risky alcohol consumption (AUDIT $\geq 8$ ). Any predictor of risky alcohol use that was significant on bivariate analysis was included as an independent variable in logistic regression. In all cases, an alpha level of  $p < 0.05$  was considered significant.

**Table 1: Demographic summary of 1132 participants in the 2015 network patient health survey.**

Characteristics	Male n (%)			Female n (%)			All n (%)		
	Aboriginal	Non-Aboriginal	Total	Aboriginal	Non-Aboriginal	Total	Aboriginal	Non-Aboriginal	Total
Age group (years)									
18–24	81 (24.2)	52 (12.3)	133 (17.6)	35 (21.3)	25 (11.8)	60 (16.0)	116 (23.2)	77 (12.2)	193 (17.0)
25–39	184 (54.9)	195 (46.2)	379 (50.1)	97 (59.1)	111 (52.6)	208 (55.5)	281 (56.3)	306 (48.3)	587 (51.9)
40+	70 (20.9)	175 (41.5)	245 (32.4)	32 (19.5)	75 (35.5)	107 (28.5)	102 (29.0)	250 (39.5)	352 (31.1)
Year 10 completed	143 (42.7)	276 (65.6)	329 (43.5)	77 (47.0)	147 (69.7)	224 (59.7)	220 (44.2)	423 (67.1)	643 (57.0)
Any time in juvenile detention	176 (52.9)	117 (27.8)	333 (44.2)	51 (31.5)	29 (13.7)	162 (43.4)	227 (45.9)	146 (23.1)	373 (33.1)
Number of times in adult prison									
1	1 (0.4)	2 (1.2)	3 (0.8)	2 (2.1)	0 (0.0)	2 (1.4)	3 (0.9)	2 (0.9)	5 (0.9)
Once	207 (91.6)	151 (93.2)	358 (92.3)	81 (85.3)	44 (86.3)	125 (85.6)	288 (89.7)	195 (91.5)	483 (90.0)
Twice	0 (0.0)	0 (0.0)	0 (0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
3+ times	17 (7.5)	9 (5.6)	26 (6.7)	12 (12.6)	6 (11.8)	6 (11.8)	29 (9.0)	15 (7.0)	44 (8.2)
Don't know									

Missing values are not separately listed.  
Any significant results (P-value <0.05) have been bolded.

## Results

### Sociodemographics

Of the 1,132 participants, 66.9% were men (29.6% Aboriginal and 37.3% non-Aboriginal men) and 33.1% were women (14.5% Aboriginal and 18.6% non-Aboriginal women). Twice as many Aboriginal participants were in the youngest age group (18–24 years) than non-Aboriginal (23.2% compared to 12.2%, [Table 1](#)). Significantly less Aboriginal participants had completed year 10 high school compared to non-Aboriginal participants. The number of times in adult prison did not differ significantly between Aboriginal and non-Aboriginal participants. However, almost half of the Aboriginal participants had been in juvenile detention (45.9%, [Table 1](#)), more than twice the proportion for non-Aboriginal participants (23.1%,  $p < 0.001$ ). Aboriginal men were more likely to report having been in juvenile detention than Aboriginal women (52.9% compared to 31.5%,  $p < 0.001$ ).

### Substance use by Aboriginality

There was alcohol consumption data for 1,096 participants (95.4% of Aboriginal participants and 97.9% non-Aboriginal participants). A larger proportion of Aboriginal than non-Aboriginal participants had

AUDIT scores suggestive of alcohol dependence (AUDIT=20+; 26.7% compared to 15.5%,  $p < 0.05$ ). The proportion of Aboriginal women with likely alcohol dependence was double that of non-Aboriginal women (24.5% compared to 11.8%,  $p < 0.05$ , [Table 2](#)). Similarly, the percentage of Aboriginal men with likely alcohol dependence was higher than non-Aboriginal men (27.7% compared to 17.3%,  $p < 0.05$ ).

The biggest difference in regular illicit drug use between Aboriginal and non-Aboriginal participants was in cannabis use (64.8% compared to 49.6%,  $p < 0.05$ , [Table 2](#)). A greater prevalence of cannabis use was observed among both Aboriginal men and women. Significantly more Aboriginal than non-Aboriginal women had used amphetamine type stimulants (ATS) (40.2% compared to 28.9%,  $p < 0.05$ ). The prevalence of other illicit drug use was similar between both groups. While not reported in the table, a smaller percentage of Aboriginal than non-Aboriginal participants (10.6% and 14.9% respectively,  $p < 0.05$ ) neither used illicit drugs regularly nor consumed alcohol at potentially risky levels (i.e. had an AUDIT of <8). The difference in tobacco use was not significant between Aboriginal and non-Aboriginal men (85.1% vs. 80.4%,  $p > 0.05$ ), though more than twice as many Aboriginal women reported using tobacco as non-Aboriginal women (89.4% compared to 42.9%;  $p < 0.004$ , [Table 2](#)).

**Table 2: Alcohol risk and regular substance use in the 12months prior to imprisonment by Aboriginal identity and gender.**

Substance use	Male n (%)		Female n (%)		Total n (%)	
	Aboriginal	Non-Aboriginal	Aboriginal	Non-Aboriginal	Aboriginal	Non-Aboriginal
Alcohol use <sup>b</sup>						
No consumption	63 (19.6)	107 (25.7)	65 (41.9)	95 (46.6)	128 (26.9)	202 (32.6)
Low risk	77 (24.0)	125 (30.0)	28 (18.1)	59 (28.9)	105 (22.1)	184 (29.7)
Harmful/hazardous	92 (28.7)	112 (26.9)	24 (15.5)	26 (12.7)	116 (24.4)	138 (22.3)
High risk/dependent	89 (27.7)	72 (17.3)	38 (24.5)	24 (11.8)	127 (26.7)	96 (15.5)
Tobacco	251 (85.1)	291 (80.4)	135 (89.4)	136 (42.9)	386 (86.5)	427 (80.9)
Cannabis	163 (63.4)	134 (47.5)	78 (67.8)	60 (55.0)	241 (64.8)	194 (49.6)
Amphetamine type stimulants <sup>c</sup>	124 (37.0)	172 (40.8)	66 (40.2)	61 (28.9)	190 (38.1)	223 (36.8)
Heroin	61 (41.8)	54 (40.3)	39 (50.6)	33 (46.5)	100 (44.8)	87 (42.4)
Prescribed methadone/buprenorphine	36 (40.0)	35 (46.7)	34 (57.6)	25 (42.4)	70 (47.0)	57 (44.2)
Non-prescribed methadone/buprenorphine	40 (30.3)	33 (29.7)	24 (46.2)	34 (58.6)	68 (37.0)	57 (33.7)

<sup>a</sup>Regular substance use means daily or almost daily use.

<sup>b</sup>Low risk; AUDIT=1–7, harmful/hazardous; AUDIT=8–19, high risk/dependent; AUDIT=20+.

<sup>c</sup>Amphetamine or methamphetamine. Missing values are not separately listed. Any significant results (P-value <0.05) have been bolded.

Table 3: Level of alcohol risk (by AUDIT category) compared with tobacco and selected regular drug use among Aboriginal participants.

	Licit drugs		Illicit drugs				
	Tobacco	Prescribed methadone/ buprenorphine	Non-prescribed methadone/ buprenorphine	Cannabis	Amphetamine type stimulants <sup>b</sup>	Heroin	Any of these illicit drugs
Alcohol use <sup>a</sup>							
No consumption	101 (26.3)	27 (38.6)	22 (33.3)	50 (20.8)	59 (26.3)	35 (35.0)	89 (25.9)
Low risk	82 (21.4)	19 (27.1)	12 (18.2)	49 (20.4)	52 (23.2)	27 (27.0)	78 (22.7)
Harmful/hazardous	93 (24.2)	09 (12.9)	09 (13.6)	76 (31.7)	50 (22.3)	16 (16.0)	90 (26.2)
High risk/dependent	108 (28.1)	15 (21.4)	23 (34.8)	65 (27.1)	63 (28.1)	22 (22.0)	87 (25.2)
Indicated no use of that drug	35	72	116	131	130	123	92
Missing <sup>c</sup>	80	357	317	128	144	276	63

Bold indicates significant finding  $p = \text{value of } <0.05$ .

<sup>a</sup>Low risk; AUDIT=1–7, harmful/hazardous; AUDIT=8–19, high risk/dependent; AUDIT=20+.

<sup>b</sup>Amphetamine or methamphetamine.

<sup>c</sup>These include participants who refused to answer relevant section or pulled out of the interview before getting to this section.

### Association between alcohol risk and other substance use among Aboriginal participants

On bivariate analysis, there were no significant differences among Aboriginal participants in prevalence of regular use of tobacco, or of prescribed methadone/buprenorphine, or ATS by drinking risk status. However, Aboriginal participants with risky AUDIT scores ( $\geq 8$ ) were more likely to have used cannabis (58.8% vs 41.2%) than low risk/no consumption ( $<8$ ) ( $p=0.006$ , Table 3). There was an association between low risk/no alcohol consumption (AUDIT  $<8$ ) and use of non-prescribed methadone/buprenorphine and heroin.

Factors significant in the bivariate analysis were included in the multivariate analysis. Aboriginal participants who used cannabis daily or almost daily were nearly twice as likely to have an AUDIT score of 8+ (OR= 1.8, 95%CI=1.15–2.72,  $p=0.01$ , Table 4). This association became slightly stronger after controlling for other predictors (age, gender, and heroin use) in logistic regression (AOR= 2.25, 95% CI=1.19–4.25,  $p=0.01$ , Table 4). Daily or almost daily use of tobacco or ATS was not associated with drinking risk status (OR=1.56, CI=0.89–2.72,  $p=0.12$  and OR= 0.87, CI= 0.57–1.34,  $p= 0.54$ , respectively).

In contrast, regular heroin users were less likely to have an AUDIT score of 8+ than others (38.0% vs. 62.0%, OR=0.53, 95% CI=0.31–0.9,  $p=0.02$ , Table 4). This remained significant after controlling for other

non-opioid substance use in logistic regression (AOR=0.49, 95% CI=0.27–0.91,  $p=0.02$ , Table 4). When respondents who regularly misused other opioids (i.e. non-prescribed methadone/buprenorphine, misused opiate analgesics) were grouped together with those who used heroin, the odds of being a risky drinker decreased further (AOR=0.44, 95%CI=0.23–0.84,  $p=0.013$ , Table 5).

### Discussion

The differences in AoD use between Aboriginal and non-Aboriginal people in this study have implications for resourcing, design, delivery and evaluation of health services and support programs aimed at addressing AoD use. Our results indicate that support is needed for specific drugs and for polydrug use, with most participants using more than one substance.

### Demographic differences

The Aboriginal participants were younger than the non-Aboriginal participants and had a lower level of formal education. The intergenerational effects of colonisation and the ongoing effects of discrimination and racism are likely key factors contributing towards the lower education levels and increased likelihood of having been in juvenile detention among Aboriginal participants.<sup>26,27</sup>

Table 4: Level of alcohol risk (by AUDIT category) by demographics and other regular drug use among Aboriginal participants (model 1).

Demographic/ drug use	AUDIT 0-7 (low risk) (n=233)	AUDIT $\geq 8$ (risky) (n=243)	Bivariate analysis		Multivariate <sup>2</sup> analysis		
			OR (95% CI)	P-value	OR (95% CI)	P-value	
Model 1 (predictors: sex, age, cannabis use, heroin use)							
Sex n (%)							
Male vs female	Male	140 (43.6)	181 (56.4)	1.94 (1.31–2.9)	0.001	1.68 (0.9–3.15)	0.100
	Female	93 (60.0)	62 (40.0)				
Age (in years)			N/A	0.99 (0.97–1.0)	0.187	1 (0.97–1.03)	0.990
Regular cannabis use <sup>1</sup> n (%)							
	Yes	99 (41.3)	141 (58.8)	1.8 (1.15–2.72)	0.01	2.25 (1.19–4.25)	0.013
	No	72 (55.4)	58 (44.6)				
	Missing	62	44				
Regular heroin use <sup>1</sup> n (%)							
	Yes	62 (62.0)	38 (38.0)	0.53 (0.31–0.90)	0.02	0.49 (0.27–0.91)	0.023
	No	56 (46.3)	65 (53.7)				
	Missing	115	140				

Bold indicates significant finding  $p = \text{value of } <0.05$ .

<sup>1</sup>Regular is daily or almost daily use.

<sup>2</sup>Variables that were significantly associated with AUDIT risk level in bivariate analysis were examined as predictors in this logistic regression.

**Table 5: Level of alcohol risk (by AUDIT category) by demographics and other regular<sup>1</sup> drug use among Aboriginal participants (model 2).**

Demographic/ drug use	AUDIT 0-7 (low risk) (n=233)	AUDIT ≥8 (risky) (n=243)	Bivariate analysis		Multivariate <sup>2</sup> analysis	
			OR (95% CI)	P-value	OR (95% CI)	P-value
Model 2 (predictors: sex, age, cannabis use, illicit or misused opioid use)						
Sex n (%)						
Male	<b>140 (43.6)</b>	<b>181 (56.4)</b>	<b>1.94 (1.31–2.9)</b>	0.001	<b>2.16 (0.27–0.78)</b>	<b>0.004</b>
Female	93 (60.0)	62 (40.0)				
Age in years	N/A	N/A	0.99 (0.97–1.0)	0.187	0.98 (0.95–1.00)	0.154
Regular cannabis use <sup>1</sup> n (%)						
Yes	<b>99 (41.3)</b>	<b>141 (58.8)</b>	<b>1.8 (1.15–2.72)</b>	0.010	<b>2.06 (1.22–3.48)</b>	<b>0.007</b>
No	72 (55.4)	58 (44.6)				
Missing	62	44				
Regular illicit or misused opioids (Heroin, methadone/ buprenorphine, misused opiate analgesics) use <sup>1</sup>						
Yes	<b>173 (60.3)</b>	<b>114 (39.7)</b>	<b>0.46 (0.26–0.82)</b>	0.009	<b>0.44 (0.23–0.84)</b>	<b>0.013</b>
No	23 (41.1)	33 (58.9)				
Missing	134	160				

Bold indicates significant finding p = value of <0.05.

<sup>1</sup>Regular is daily or almost daily use.

<sup>2</sup>Variables that were significantly associated with AUDIT risk level in bivariate analysis were examined as predictors in this logistic regression.

The NSW 2015 Young People in Custody Health Survey (YPiCHS) provides insights into alcohol consumption, indicating that 91.7% of Aboriginal and 81.5% of non-Aboriginal young people (aged 14–17) had an AUDIT score of >8, indicating the need for an alcohol intervention. It should be noted that the YPiCHS survey tool is not exactly the same as the NPHS; nonetheless, this suggests that many of the Aboriginal participants may have already had a pattern of hazardous alcohol consumption as a young person. While our research looks at a specific point in time, ultimately to overcome these issues, a whole of life approach is needed.<sup>28</sup> The criminal justice system including juvenile detention centres cannot alone provide such a whole of life course approach, but as part of government, the best possible care should be provided from the first point of contact.

There were differences between the AoD use of men and women including between Aboriginal men and women. Women often have different factors around AoD use than men and the provision of AoD treatment and support services to women in prison, including Aboriginal women, needs to take these factors into account.<sup>29</sup> Such factors include that many women may have been subjected to physical or emotional abuse by male partners or they may have been primary carers for their children.<sup>29,30</sup> AoD programs for this population need to take these factors into consideration and for Aboriginal women ensure services are trauma informed and culturally sensitive.<sup>31,32</sup>

### Alcohol consumption

Over half (51.1%) the Aboriginal participants consumed alcohol at hazardous levels for which an intervention should be offered, compared to just over a third of non-Aboriginal participants (37.8%). Of the participants that did not consume alcohol at hazardous levels most used other drugs regularly. The trend toward greater risk from alcohol consumption by Aboriginal participants before entering prison was pronounced. There were over twice as many Aboriginal women with likely alcohol dependence (an AUDIT of ≥20) than non-Aboriginal women, and as such, there is a particular need to ensure AoD programs offered to Aboriginal women aim to address alcohol use problems for women sentenced and held on remand. Additionally, given many of the women may be of childbearing age, programs for both Aboriginal and non-Aboriginal women should

empower them with information about the risk of fetal alcohol spectrum disorder (FASD) for children.<sup>33</sup>

Hazardous alcohol consumption was identified as a contributing factor towards Aboriginal imprisonment in the 1991 Royal Commission into Aboriginal Deaths in Custody. There were several recommendations made around reducing contact with police because of alcohol consumption problems. These included the establishment of Aboriginal operated night patrols whereby people would be picked-up from town or city areas and be dropped off to a home address and, sobering-up shelters whereby intoxicated people could be given a bed for the night, which was meant to be an alternative to being placed in a police cell for the night. Some of these initiatives are still operating today. Given the ongoing high levels of alcohol consumption in this population, it would be appropriate to revisit the recommendation around alcohol consumption problems from the Royal Commission and reinvestigate the initiatives.

Few group treatment programs in Australian prisons focus on alcohol, with most being AoD use generally, illicit drugs focused or a general addiction focus.<sup>14,15</sup> There is limited published research on clinical care for alcohol dependence in prison, including withdrawal support and provision of medication to help prevent relapse upon prison release. Furthermore, most post-release programs in Australia are illicit drug focused,<sup>34,35</sup> though the NSW “Connections” post-release program began supporting people with alcohol use disorders in 2018.<sup>34</sup> Additional group programs for alcohol problems are needed for both Aboriginal and non-Aboriginal people in prison. Further research into clinical AoD treatment services in prison is also needed, to understand the extent of services offered, and uptake of relapse prevention medications for alcohol.

### Cannabis

The use of cannabis in the general community is more prevalent among Aboriginal than non-Aboriginal people.<sup>36,37</sup> Aboriginal participants were significantly more likely to have used cannabis regularly in the 12 months before prison (64.8% vs. 49.6%, p<0.05). Our findings are consistent with other research with similar participant groups in custodial settings.<sup>19,20</sup> For Aboriginal people in prison, cannabis use may be less socially stigmatising than



methamphetamine and heroin use.<sup>38,39</sup> Cannabis may be perceived as less of an issue socially than alcohol because overconsumption of alcohol can result in aggressive behaviour, while cannabis use often has a sedentary effect.<sup>39–41</sup> Nonetheless, cannabis has been found to contribute to poor physical and mental health as well as intimate partner and family relationship problems.<sup>40,41</sup>

Despite high prevalence of cannabis use in this population, there is a dearth of published research about cannabis-focused treatment and support in the Australian prison system. It is not known what clinical support, if any, for cannabis withdrawal at entry to prison is provided, nor what support planning specifically for cannabis use occurs in prison release planning. Research exploring these is essential, as is research into cannabis programs and support, program mapping from in-prison to post-release and programs specifically relevant for Aboriginal people.

### *Cannabis and alcohol*

Cannabis and alcohol in the Australian prison AoD literature have usually been considered separately with limited attention given to co-use. After adjusting for demographic factors, the odds of an Aboriginal participant with risky drinking (AUDIT  $\geq 8$ ) to also use cannabis daily or almost daily was 1.8 times than those without risky drinking (AUDIT  $< 8$ ). The limited Aboriginal and/or Torres Strait Islander-focused research indicates that in two remote Northern Territory communities in 2004, cannabis users were more likely than those who did not use cannabis to consume alcohol.<sup>42</sup> Overall, the use of these two drugs is relatively common in the community.<sup>36,37,40</sup> However, there is limited understanding in Australia of what the implications of this are.

There are several possible reasons for co-use, including the use of the drugs together making the effects of each individual drug stronger and longer lasting, although research findings are not conclusive.<sup>43,44</sup> What is known is that the risk of harm from each, alcohol or cannabis, is greater when used together.<sup>43,44</sup> For example, experimental models using a driving simulator showed greater impairment for co-use than when one or the other was used alone.<sup>44</sup> Furthermore, people who co-use alcohol and cannabis have been found to be more likely to have acute mental health problems, including psychosis.<sup>44</sup> The available literature on treatment and support for people who co-use alcohol and cannabis suggests that use of both drugs should be addressed simultaneously otherwise substitution will likely occur (i.e. when the person stops use of one they increase use of the other).<sup>44,45</sup> There appears to be no available research into approaches to address the co-use of cannabis and alcohol by Aboriginal Australians.

### *Tobacco*

Tobacco became contraband in NSW prisons in August 2015, with all other Australian jurisdictions banning tobacco in prisons around the same time. Between the 2009 and the 2015 NPHS, there was an overall increase in tobacco use<sup>2,23</sup> prior to imprisonment; however, there are no published explanations available for this. A substantial proportion of participants reported being a tobacco smoker before entering prison, with Aboriginal participants more likely than non-Aboriginal to be participants regular smokers (86.5% vs. 80.9%,  $p < 0.01$ ). The proportion of smokers in this sample was almost double

what is observed in the community for Aboriginal people (43.4%) and more than five times that for non-Aboriginal people (15.1%).<sup>46</sup> Although the difference in regular smoking between Aboriginal and non-Aboriginal men was not significant, more than twice as many Aboriginal women (89.4%) than non-Aboriginal women (42.9%) reported tobacco use before prison. It is estimated that 23.3% of the gap in life expectancy, 8.6 years for men and 7.8 years for women, between Aboriginal and non-Aboriginal people is attributable to tobacco use.<sup>47</sup> Given mortality and morbidities related to tobacco, it is essential Aboriginal people in prison (particularly women) are supported to cease use, with post-release supports to maintain cessation, as almost all health benefits from quitting smoking are lost when smoking is resumed.

### *Tobacco, alcohol and cannabis*

Culturally safe programs for Aboriginal people aimed at reducing the use, and harm from tobacco, alcohol and cannabis, which are the most commonly used and easily accessible drugs, should be developed and available in all NSW prisons, and evaluated. A program developed for Aboriginal people should incorporate learning about and understanding the underlying causes of alcohol, cannabis and tobacco use. There is growing evidence that designing group programs for Aboriginal people based on cultural protocols can improve program completion.<sup>48</sup> Additionally, there is a growing body of research that shows combining cultural and western approaches in AoD treatment programs supports participants to address substance use.<sup>48,49</sup>

In-reach models of care are also increasingly recommended, that enable community-based organisations with specific skills to provide health care in prisons.<sup>50</sup> In-reach and the use of Aboriginal health services was recommended by the Royal Commission into Aboriginal Deaths in Custody<sup>51</sup> and subsequent reports since. As the alcohol, cannabis and tobacco use reported here occurred in the community, people leaving prison require ongoing support to reduce harms upon return to the community.

Provision of post-release care for both men and women leaving prison is extremely important, but AoD services in the community are not always accessible, particularly in regional and remote areas.<sup>33,50</sup> Improvements in service provision in prison would need to be matched with post-release care. While there are several post-release care services for AoD use, typically these services are less available in regional and remote locations.

### *Opioid use and alcohol*

Those who used heroin were more likely to be low risk or non-drinkers. These findings are similar to other research,<sup>19,20</sup> although the underlying mechanisms as to why this might occur are unclear. Both alcohol and opioids (including heroin) affect the opioid receptors in the brain<sup>52</sup>. The use of opioids and alcohol together can exacerbate the effects of each substance and complicate clinical treatment.<sup>53,54</sup> Further research is needed to understand why use of opioids including heroin is associated with lower likelihood of alcohol consumption in this population.

## Amphetamine and amphetamine type stimulants use and alcohol consumption

Significantly, more Aboriginal than non-Aboriginal women used ATS (40.2% vs. 28.9% respectively), with the use by Aboriginal women similar to both Aboriginal and non-Aboriginal men. There was no association between ATS use and alcohol consumption risk. The use of ATS by people in the Australian criminal justice system is common.<sup>1,20</sup> There are group treatment programs aimed at addressing the use of ATS and other drugs in Australian prisons and these programs are clearly needed.<sup>14</sup> There has been limited published research into the co-use of ATS and alcohol and an associated increased risk of criminal offending<sup>55</sup>; to inform support programs in prison a better understanding about individual behaviours associated with use is required. For example, how do drug use patterns differ? Is alcohol consumption for some people associated with ATS use, or is alcohol consumed to help with “come down” from a period of ATS use? It could be that addressing alcohol problems is an important step to addressing ATS use and if in turn this helps address individual behaviours that may result in less criminal offending.

## Limitations

The 2015 NPHS is cross-sectional, and participants may have been in prison for months or even years at the time they were surveyed. As such, there may be recall bias on the level of AoD consumption before prison. The use of illicit drugs only recorded frequency and not amount used. All results are self-reported and there could be some bias; some people may under- or over-estimate use to provide what they see as socially suitable answers.

## Conclusion

The JHFMHN is Australia’s largest prison health service provider and the results of the 2015 NPHS have implications for health services in prisons Australia-wide and internationally. While there has been, and should continue to be, much research and many programs to help address the use of amphetamine type stimulants and opioids, these are not the most commonly used substances. The three most commonly used drugs in the community are the same as those that are most commonly used by people entering prison: alcohol, cannabis and tobacco. Examining the consistency of AoD use patterns, including co-use, each time people enter prison can contribute to an understanding of support and treatment needs. Improvements in this support and treatment can contribute to reducing morbidity and mortality, particularly among Aboriginal people who are over-represented in prisons. The co-use of alcohol and cannabis has not garnered sufficient attention in Australia; further effort is needed to understand how to effectively concurrently address co-occurring use of AoD. Prison-based programs addressing comorbid substance use that are culturally safe for Aboriginal people are needed. Such programs need to be extended with continuity of care post-prison release.

## Ethics

The NPHS has approval from the Human Research Ethics Committees (HREC) of JHFMHN (G365/14), Aboriginal Health and Medical Research Council (AHMRC) of NSW (1080/15), and Corrective Services NSW (D15/227697).

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## Author ORCIDs

Michael F. Doyle  <https://orcid.org/0000-0003-2083-8575>

Sharlene Kaye  <https://orcid.org/0000-0002-7657-5105>

## Conflicts of interest

None of the authors have a conflict of interest towards publishing this paper.

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