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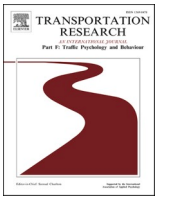

Medical cannabis and driving in Australia: Results from the cannabis as medicine survey 2022–2023 (CAMS-22)

Thomas R. Arkell [a,*], Llewellyn Mills [b,c,d], Jonathon C. Arnold [e,f], Anastasia Suraev [g], Sarah V. Abelev [h], Cilla Zhou [i,j], Nicholas Lintzeris [b,c,d,1], Iain S. McGregor [e,g,1]

[a] Centre for Mental Health and Brain Sciences, Swinburne University of Technology, Hawthorn, VIC, Australia
[b] Specialty of Addiction Medicine, Faculty Medicine and Health, University of Sydney, Sydney, NSW, Australia
[c] Drug and Alcohol Services, South East Sydney Local Health District, Sydney, NSW, Australia
[d] Drug and Alcohol Clinical Research and Improvement Network (DACRIN), Sydney, NSW, Australia
[e] Lambert Initiative for Cannabinoid Therapeutics, The University of Sydney, Sydney, NSW, Australia
[f] Discipline of Pharmacology, Sydney Pharmacy School, Faculty of Medicine and Health, The University of Sydney, Sydney, NSW, Australia
[g] Brain and Mind Centre, Faculty of Science, The University of Sydney, Sydney, NSW, Australia
[h] School of Medicine, University of Notre Dame Australia, Fremantle, WA, Australia
[i] The National Drug and Alcohol Research Centre (NDARC), University of New South Wales, Randwick, NSW, Australia
[j] The National Centre for Clinical Research on Emerging Drugs (NCCRED), c/o University of New South Wales, Randwick, NSW, Australia

A B S T R A C T

As access to medical cannabis continues to expand, understanding how patients perceive and respond to driving-related risks is important for road safety. We conducted a cross-sectional online survey of Australians using cannabis for a medical condition between December 2022 and April 2023. In addition to collecting demographic and clinical information, we assessed self-reported driving under the influence of cannabis (DUIC, defined here as 'driving while high'), driving-related behaviours, and beliefs about impairment. Binary logistic regression was used to identify predictors of past-year DUIC. Of the 2,609 respondents who had driven in the past 12 months, 73 % (N = 1905) were accessing prescribed medicinal cannabis and 28.3 % (N = 750) reported DUIC. Several factors were associated with significantly increased odds of DUIC, including more frequent medical cannabis use, being male, using illicit and smoked cannabis, and believing that cannabis does not impair driving. The most common reason for DUIC was respondents thinking they were unimpaired (N = 518, 69.1 %). While 69 % (N = 1,790) reported that roadside drug testing deterred them from driving after cannabis use, 51 % (N = 1,340) also indicated it influenced their treatment decisions. These findings reaffirm trends identified in earlier CAMS studies and align with international literature demonstrating that perceived risk and enforcement significantly influence DUIC behaviour. Efforts to reduce DUIC among medical cannabis users need to account for the nuances of therapeutic use, noting that high-visibility enforcement strategies like roadside drug testing can reduce risky behaviours but may also restrict treatment choices. Policymakers must strike a balance between road safety and equitable access to medical cannabis.

1. Introduction

Driving under the influence of cannabis (DUIC) continues to be an important public health issue amidst the rising use of cannabis for medical and non-medical purposes. The prevalence of DUIC appears to be growing in Canada and the US (Brubacher, 2022; Myran, 2023; Park, 2024), likely due to evolving perceptions around the safety and social acceptability of cannabis use. Non-medical cannabis

* Corresponding author at: Rm 1009, ATC Building, Swinburne University of Technology, Hawthorn, 3054 Melbourne, Australia.
E-mail address: tarkell@swin.edu.au (T.R. Arkell).
[1] Contributed equally.

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remains illicit in Australia, but the use of cannabis as a prescribed medicine continues to grow. While the number of patients treated with medicinal cannabis is unknown, it is estimated that > 3 million approvals for medicinal cannabis access have been issued since legalisation in 2016 (Therapeutic Goods Adminsitration, 2023; Therapeutic Goods Adminsitration, 2023). This upsurge in medical cannabis usage has been accompanied by a growing diversity of oral, sublingual and inhaled product formulations, with many of these having distinct pharmacokinetic profiles (Arkell, 2020; Spindle, 2021; Zamarripa, 2023).

Research focused on prescribed medicinal cannabis use and driving ability is nascent. Prior research has focused predominantly on non-medical cannabis, generally given at doses intended to produce intoxication (Arkell, 2020; Marcotte, 2022; Ramaekers, Robbe, & O'Hanlon, 2000), findings from which may have little relevance to patients using cannabis to manage a chronic health condition. One recent simulator driving study found no evidence of impaired driving or cognitive function when comparing performance before and after patients self-administered a standard dose of their prescribed cannabinoid medication (mean THC dose = 9.6 mg [oil], 37.0 mg [flower]) (Manning, 2024). Schiemer at al. (Schiemer, 2025) similarly found no change in performance on video-based assessments of driving ability after patients vaporised a standard dose of their prescribe medical cannabis flower (mean THC dose = 50 mg). These early findings suggest that prescribed medical cannabis may not significantly impair driving ability when used as directed to manage a health condition, though larger, controlled trials are required.

The Cannabis as Medicine Survey (CAMS) initiative provides real-world, timely insight into the attitudes and behaviours of medical cannabis users in Australia as the regulatory landscape evolves. In the 2020–2021 iteration of CAMS (CAMS-20), 13.3 % of respondents were using prescribed cannabis only while 62 % were using illicitly sourced cannabis only (Lintzeris, 2022). Over one in four respondents (28 %) admitted to DUIC in the past year, and 49–56 % reported driving within six hours of use, depending on the route of administration (Arkell, 2023). By way of comparison, in a survey of residents in the Australian Capital Territory where cannabis was decriminalised in 2020, 22 % reported driving ≤ 3 h of cannabis use (when DUIC is most likely to occur), and 70 % reported waiting ≥ 7 h (McCartney, 2025). Respondents to CAMS-20 generally perceived non-medical cannabis to be more impairing that medical cannabis, and use of illicit rather than prescribed cannabis was associated with a twofold increase in DUIC.

Since the 2020–2021 iteration of CAMS, the number of approvals for access to medicinal cannabis increased considerably, as did the proportion of respondents reporting prescribed rather than illicit medical cannabis use (Mills, 2024). This study aims to examine DUIC-related behaviours, perceptions, and risk factors among Australian medical cannabis users using data from the latest iteration of the survey (CAMS-22). In doing so, it seeks to build an evidence base that can support tailored education, informed regulation, and harm reduction strategies.

2. Methods

The Cannabis as Medicine Survey 2022–2023 (CAMS-22) was an anonymous, cross-sectional online survey of Australian adults self-reporting cannabis use for medical purposes in the previous year. Survey data were collected between December 2022 and April 2023. Eligible respondents to the survey were Australian residents ≥ 18 years of age who had used cannabis or a cannabinoid product to treat a medical condition within the past 12 months. The survey included questions about demographics, patterns of medical cannabis use, perceived benefits and side effects of medical cannabis use, attitudes towards cannabis policies, general wellbeing, and driving. Full details of the questionnaire can be found in the primary report (Mills, 2024).

2.1. Driving outcome measures

A series of questions relating to driving behaviours and attitudes towards DUIC were presented in the final section of the CAMS-22 survey. The specific questions asked in the driving section are presented in Appendix A. In brief, if a respondent indicated they had driven a motor vehicle in the past 12 months, they were presented with questions relating to past-year DUIC, typical wait times between using cannabis and driving, and experience with roadside drug testing. DUIC was defined as driving while under the influence of cannabis (i.e., while 'high'). Respondents were then asked to respond to statements about the impact of their medical cannabis use on reaction time, focus, lane keeping, speed limit adherence, and risky driving behaviours. Responses were captured on 5-point Likert scales ranging from "strongly disagree" to "strongly agree". Respondents were also asked to separately report whether they believe medical and non-medical cannabis impair driving ability.

2.2. Statistical analysis

Respondents who had driven a motor vehicle in the past 12 months were included in the analyses. Respondents were split into two groups according to the legal status of the cannabis they used: 'Prescribed' users were those respondents who reported prescribed cannabis as their main (or only) source of medical cannabis in the preceding 12 months, whereas 'illicit' users reported mainly sourcing their medical cannabis illicitly. Binary logistic regression was used to investigate the relationship between past-year DUIC (yes/no) and respondent characteristics, prescribed/illicit use, route of administration, belief in whether cannabis impairs driving, and the perceived deterrent effect of roadside drug testing. These variables were selected based on their known relevance to driving behaviours, and with the intention of directly comparing CAMS-22 results against findings from CAMS-18 and CAMS-20 (Arkell, 2020, 2023). All analyses were available-case with no imputation of missing values, and all percentages given are valid N percentages. The threshold for statistical significance was $p < 0.05$. All data were analysed using SPSS (v29, IBM).

3. Results

Table 1 summarises the demographics, characteristics, and medical cannabis use of the 2,609 respondents who reported driving a motor vehicle in the past 12 months. Respondents were mostly male (N = 1,603, 61.4 %) and had a mean (SD) age of 43.5 (13.1). A small percentage of respondents identified as Aboriginal and/or Torres Strait Islander (N = 121, 4.6 %), most held a tertiary qualification (N = 2081, 79.7 %), and most were employed (N = 1,575, 60.3 %). Most respondents reported prescribed cannabis as their main or only source of cannabis (N = 1905, 73.0 %). Vaporisation was the most common route of administration (N = 918, 36.4 %), followed by oral route (N = 826, 32.8 %) and then smoking (N = 434, 19.0 %). Products containing mostly THC were the most common type of medical cannabis used (N = 972, 42.6 %), followed by equal THC/CBD products (N = 546, 23.9 %) and THC only products (N = 434, 19.0 %). The overall proportion of respondents who used medical cannabis daily was 59.1 % (N = 1,543), and the mean (SD) percentage of cannabis use that was considered medical was 80.9 % (22.1 %).

3.1. Driving behaviours and attitudes toward DUIC

Fig. 1 shows typical wait times (length of time typically waited before driving after using medical cannabis) by route of administration in the upper panel and perceived safe wait times (perceived length of time between medical cannabis use and being safe to drive) by route of administration in the lower panel. Based on responses to these two questions, a small percentage of respondents (N = 154, 5.9 %) implied they would typically drive before they felt it was safe to do so. Over half (53.8 %, N = 1,403) implied they would wait for the same amount of time as they thought they were unsafe to drive, and 40.3 % (N = 1,052) implied they would wait longer than their perceived safe wait time before driving.

Few respondents (N = 271, 10.4 %) had been drug tested at the roadside in the 12 months prior, and of those who had been, most (N = 220, 80.9 %) tested negative, while 41 (15.1 %) tested positive and were subsequently convicted. Though most respondents had not been drug tested, many (N = 1,790, 68.6 %) said that the presence of roadside drug testing did deter them from driving after using medical cannabis, and just over half (N = 1,340, 51.3 %) said the presence of roadside drug testing either deterred them from using medical cannabis or affected the type of medical cannabis that they used.

Fig. 2 shows DUIC frequency by route of administration among the 28.7 % (N = 750) of respondents who reported engaging in DUIC in the past year. By far the most common reason for DUIC was that respondents did not think they were impaired (N = 518, 69.1 %). Fewer respondents reported they didn't have an alternative transport option (N = 193, 25.7 %), felt they were impaired but could still drive safely (N = 162, 21.6 %), had another transport option but it was a hassle (N = 30, 4.0 %), or that they did so for another reason (N = 82, 10.9 %).

Past-year DUIC prevalence varied with cannabinoid content, ranging from 9.5 % (14/147) among respondents who primarily used CBD-only products, to 12.1 % (22/182) for mainly CBD products, 22.8 % (124/545) for equal THC/CBD products, 33.3 % (324/972) for mostly THC products, and 35.0 % (152/434) for THC-only products.

Table 1
Respondent characteristics.

	Not DUIC (N = 1859)		DUIC (N = 750)		Total (N = 2609)	
Age, mean, SD	43.8	13.5	42.7	12.3	43.5	13.1
Gender, n, % (N = 2,609)						
Male	1094	58.8 %	508	67.7 %	1603	61.4 %
Female	705	37.9 %	226	30.1 %	931	35.7 %
Non-binary or other	60	3.2 %	16	2.1 %	76	2.9 %
Aboriginal and/or Torres Strait Islander, n, %	78	4.2 %	43	5.7 %	121	4.6 %
Tertiary Education, n, %	1522	81.9 %	558	74.4 %	2081	79.7 %
Employed, n, %	1145	61.6 %	430	57.3 %	1575	60.3 %
Health Condition, n, % (N = 2,584)						
Cancer	15	0.8 %	10	1.3 %	25	1.0 %
Gastrointestinal	44	2.4 %	17	2.3 %	61	2.4 %
Mental health	591	32.1 %	318	42.8 %	909	35.2 %
Neurological	83	4.5 %	24	3.2 %	108	4.2 %
Pain	711	38.6 %	251	33.8 %	962	37.2 %
Sleep	322	17.5 %	97	13.1 %	419	16.2 %
Other	75	4.1 %	26	3.5 %	101	3.9 %
Prescribed user, n, %	1413	76.0 %	492	65.6 %	1905	73.0 %
Main Medical Cannabis Route of Administration, n, %	(N = 2,518)					
Smoked	439	24.6%	386	52.6%	826	32.8%
Vaporised	679	38.0 %	239	32.6 %	918	36.4 %
Oral	662	37.1%	106	14.4%	768	30.5%
Other	5	0.3 %	3	0.4 %	8	0.3 %
Main Medical Cannabis Composition, n, % (N = 2,280)						
THC only	282	17.2 %	152	23.9 %	434	19.0 %
Mostly THC	648	39.4 %	324	50.9 %	972	42.6 %
Equal THC/CBD	421	25.6 %	124	19.5 %	546	23.9 %
Mostly CBD	160	9.7 %	22	3.5 %	182	8.0 %
CBD only	133	8.1 %	14	2.2 %	147	6.4 %

*All percentages given are valid N percentages.

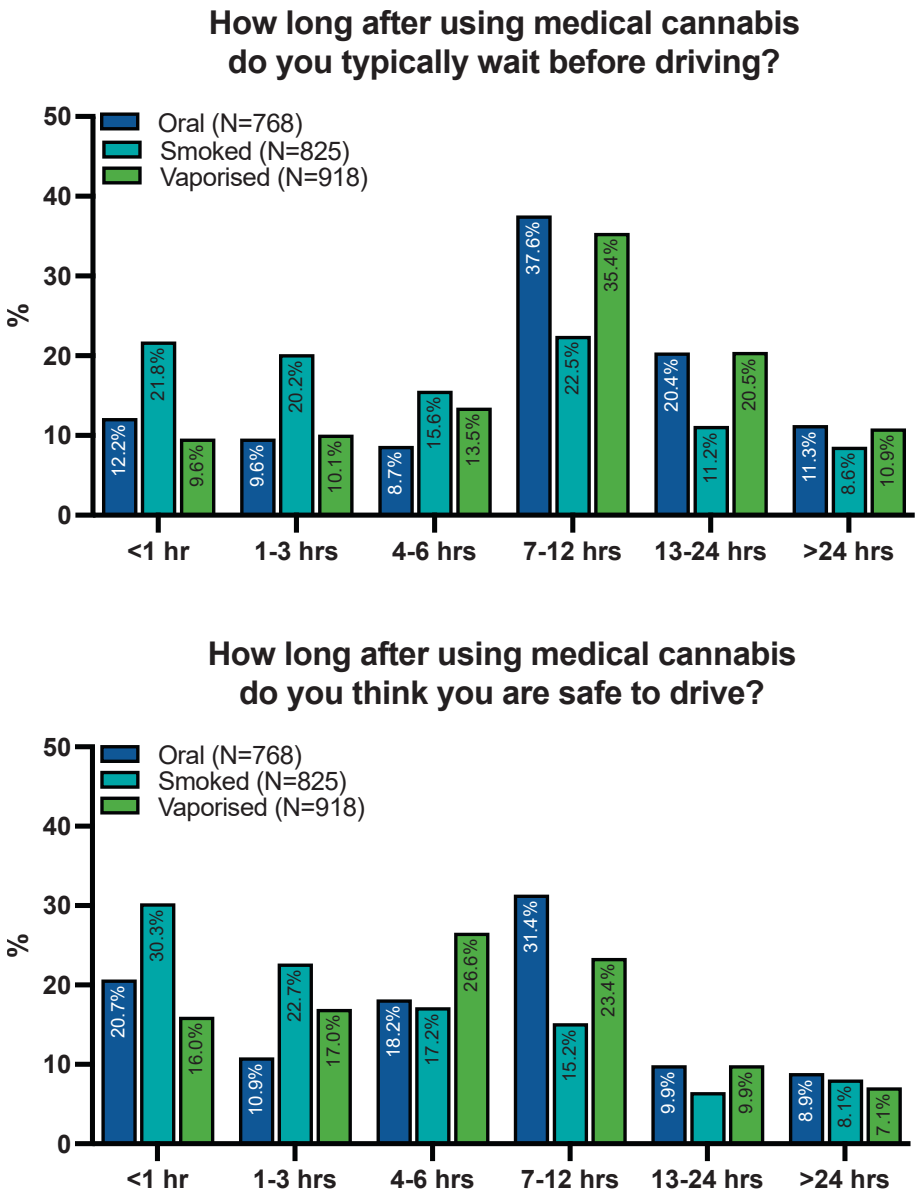

Fig. 1. Typical wait times before driving (upper panel) and perceived safe wait time (lower panel) after using medical cannabis. 'Safe wait time' refers to the amount of time *after* which respondents deem themselves able to drive safely. Columns show percentage of responses for each route of administration. Data from respondents reporting 'other' as their primary route of administration (N = 8) not shown.

3.2. Perceived effects of medical cannabis on driving

Fig. 3 shows the extent to which respondents agreed or disagreed with statements relating to driving after using medical cannabis. For this section, complete data were only available for N = 746 respondents who reported past-year DUIC (see Limitations section). Of these, most agreed or strongly agreed that after using medical cannabis they can accurately assess their driving ability (N = 597, 80.0 %), tend to drive more carefully (N = 627, 84.1 %), and tend to leave a larger gap between them and the car ahead (N = 436, 58.5 %). Respondents were generally neutral about being more in control of the vehicle (N = 416, 55.8 %), and respondents mostly disagreed or strongly disagreed that they are slower to reaction to sudden situations (N = 559, 75.0 %), find it harder to remain focused (N = 622, 83.3 %), find it harder to stick to the speed limit (N = 657, 88.0 %), find it harder to drive in a straight line (N = 698, 93.6 %), or find themselves taking more risks (N = 714, 95.7 %).

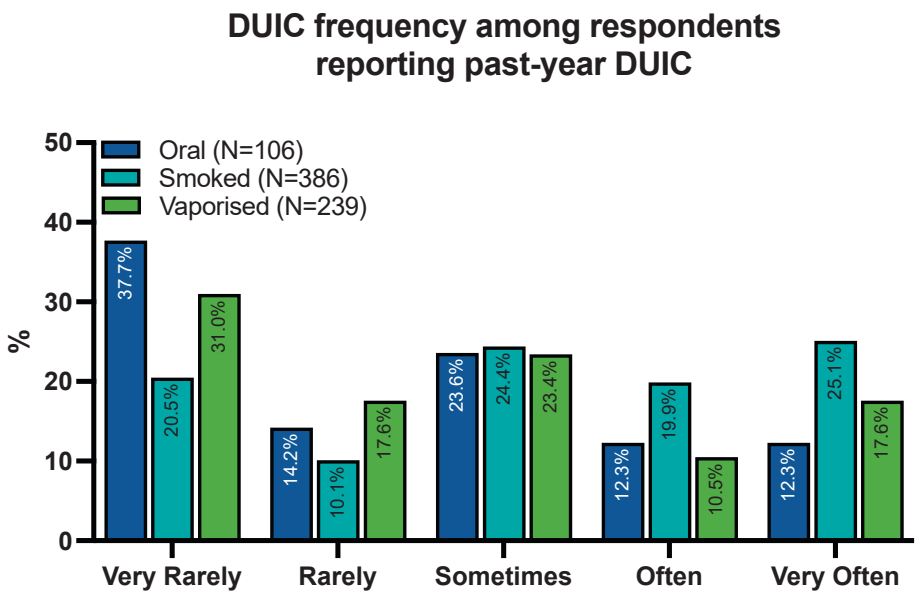

Fig. 2. Frequency of DUIC among respondents who admitted to DUIC in the past year (N = 750). Columns show percentage of responses for each route of administration. Data from respondents reporting 'other' as their primary route of administration (N = 3) not shown.

Fig. 3. Heat map showing perceptions of driving ability after using medical cannabis among respondents who admitted to past-year DUIC (N = 746). Cells show the percentage of respondents endorsing each statement.

3.3. Binary logistic regression

As shown in Table 2, significant predictors of past-year DUIC included gender, frequency of medical cannabis use, route of administration, prior illicit cannabis use, as well as beliefs about the impairing effects of cannabis and the deterrent effect of roadside drug testing. Compared to males, females (OR = 0.61, 95 % CI: 0.49–0.76) and non-binary/other individuals (OR = 0.43, 95 % CI: 0.23–0.83) had lower odds of past-year DUIC. Daily use of medical cannabis was not associated with increased odds of past-year DUIC relative to less than daily use, but there was a positive association between past-year DUIC odds and frequency of use per day.

Table 2
Binary logistic regression output showing association with past-year DUIC.

Variable	Reference category	B	S.E.	Wald	df	Sig.	OR	Lower 95% C.I.	Upper 95% C.I.
Age				8.3	4	0.08			
31-45	18-30	0.06	0.15	0.16	1	0.69	1.06	0.79	1.43
46-55	18-30	0.26	0.17	2.31	1	0.13	1.30	0.93	1.83
56-65	18-30	-0.21	0.20	1.08	1	0.30	0.81	0.55	1.20
66+	18-30	-0.25	0.31	0.66	1	0.42	0.78	0.43	1.42
Not tertiary educated	Tertiary educated	0.05	0.13	0.17	1	0.68	1.05	0.82	1.36
Unemployed	Employed	0.08	0.12	0.51	1	0.48	1.09	0.87	1.36
Gender				22.77	2	<.001			
Female	Male	-0.50	0.12	18.86	1	<.001	0.61	0.49	0.76
Non-binary/other	Male	-0.84	0.33	6.28	1	0.01	0.43	0.23	0.83
Main health condition				8.33	6	0.22			
Gastrointestinal	*Cancer*	-0.69	0.60	1.35	1	0.25	0.50	0.16	1.61
Mental health	*Cancer*	-0.79	0.51	2.41	1	0.12	0.46	0.17	1.23
Neurological	*Cancer*	-1.36	0.57	5.73	1	0.02	0.26	0.09	0.78
Other	*Cancer*	-1.12	0.57	3.90	1	0.05	0.33	0.11	0.99
Pain	*Cancer*	-0.88	0.50	3.07	1	0.08	0.41	0.16	1.11
Sleep	*Cancer*	-0.86	0.52	2.76	1	0.01	0.42	0.15	1.17
Illicit user	Prescribed user	-0.07	0.18	0.14	1	0.71	0.94	0.65	1.34
Belief that medical cannabis impairs driving	Belief that medical cannabis does not impair driving	-0.90	0.17	28.23	1	<.001	0.41	0.29	0.57
Belief that non-medical cannabis impairs driving	Belief that non-medical cannabis does not impair driving	-0.54	0.15	12.43	1	<.001	0.58	0.43	0.79
Deterred by RDT	Not deterred by RDT	-0.56	0.11	25.47	1	<.001	0.57	0.46	0.71
Less than daily medical cannabis use	Daily medical cannabis use	0.06	0.12	0.25	1	0.62	1.06	0.84	1.35
Medical cannabis use frequency				62.81	5	<.001			
2x daily	*1x daily*	0.55	0.17	10.75	1	0.00	1.73	1.25	2.40
3x daily	*1x daily*	0.83	0.19	20.28	1	<.001	2.30	1.60	3.31
4x daily	*1x daily*	1.06	0.22	23.06	1	<.001	2.88	1.87	4.44
5x daily	*1x daily*	1.11	0.23	23.13	1	<.001	3.04	1.93	4.79
≥ *6x daily*	*1x daily*	1.42	0.19	58.22	1	<.001	4.15	2.88	5.97
Illicit cannabis use				18.52	2	<.001			
Ex-illicit	*Current illicit*	-0.09	0.17	0.27	1	0.61	0.92	0.66	1.28
Never illicit	*Current illicit*	-0.68	0.20	11.90	1	<.001	0.51	0.35	0.75
Driving within safe timeframe				56.96	2	<.001			
Drive beyond safe timeframe	*Drive within safe timeframe*	-0.51	0.11	20.28	1	<.001	0.60	0.48	0.75
Drive before safe timeframe	*Drive within safe timeframe*	1.05	0.21	25.41	1	<.001	2.87	1.90	4.32
Attitudes toward legal status of cannabis				7.35	3	0.06			
Cannabis should be legal for medical purposes only	*Cannabis should be legal for all purposes*	-0.43	0.21	4.19	1	0.04	0.65	0.43	0.98
Cannabis should be illegal for all reasons	*Cannabis should be legal for all purposes*	-0.69	0.70	0.97	1	0.33	0.50	0.13	1.98
Don't know	*Cannabis should be legal for all purposes*	0.87	0.62	1.96	1	0.16	2.39	0.71	8.07
Main type MC used				36.90	3	<.001			
Smoked	*Oral*	0.93	0.17	31.64	1	<.001	2.53	1.83	3.50
Vaporized	*Oral*	0.34	0.16	4.43	1	0.04	1.40	1.02	1.91
Other	*Oral*	0.87	0.81	1.16	1	0.28	2.38	0.49	11.53

NB: Significant predictors are highlighted in grey.

Compared to once-daily users, respondents who used medical cannabis six or more times per day had much higher odds (OR = 4.15, 95 % CI: 2.88–5.97) of past-year DUIC. Vaporisation (OR = 1.40, 95 % CI: 1.02–1.91) and especially smoking (OR = 2.53, 95 % CI: 1.83–3.50) were associated with higher odds of past-year DUIC relative to ingestion (oral) as the main route of administration.

Those who had never used cannabis illicitly had lower odds of past-year DUIC than current illicit cannabis users (OR = 0.51, 95 % CI: 0.35–0.75). Beliefs about safe driving time were also influential; driving before it is thought safe to do so was associated with an almost threefold increase in past-year DUIC odds (OR = 2.87, 95 % CI: 1.90–4.32). Respondents who believed that medical cannabis impairs driving (OR = 0.41, 95 % CI: 0.29–0.57) or that non-medical cannabis impairs driving (OR = 0.58, 95 % CI: 0.43–0.79) were both less likely to report DUIC. Finally, the odds of past-year DUIC were lower for those who were deterred from driving by the presence of roadside drug testing (OR = 0.57, 95 % CI: 0.46–0.71).

4. Discussion

This study provides a nuanced examination of driving-related behaviours, attitudes, and perceptions among Australian medical cannabis users, offering valuable and policy-relevant insights into factors influencing decisions to drive under the influence of cannabis. Building upon prior iterations of the CAMS survey (Arkell, 2020, 2023), CAMS 22 benefited from a far higher proportion of people used prescribed rather than illicitly sourced medical cannabis, and a higher number of respondents overall. While most of the questions were carried over from previous surveys to facilitate direct comparisons, this iteration explored motivations for DUIC in more detail and probed perceived safe wait times between use of medical cannabis and driving.

These additional questions showed that while 30 % of respondents reported past-year DUIC, and though 38 % said they thought medical cannabis does impair driving ability, less than 6 % reported driving before they thought it was safe to do so. The proportion of respondents agreeing that medical cannabis impairs driving was noticeably higher here that in CAMS 20 (38 % vs 22 %), potentially mirroring the higher use of THC-based products that may cause impairment and lower use of CBD-based products relative to CAMS 20. Among those who reported DUIC, 21 % did so very often, with 22 % indicating their reason for DUIC was they felt they were impaired but could still drive safely. Surveys have previously found that people who use cannabis regularly often believe they can mitigate impairment by engaging in compensatory strategies such as driving more slowly and leaving larger following distances (Brooks-Russell, 2019; Mills, Freeman, & Rowland, 2023). Confirming this, most respondents who had engaged in past-year DUIC said that after using medical cannabis they think they can accurately assess their driving ability, tend to drive more carefully, and tend to leave a larger gap between them and the car ahead. Because only respondents who admitted to past-year DUIC were shown these questions, the proportion of respondents endorsing each these three statements was notably higher here than in CAMS 20, even though the proportion of respondents admitting to DUIC was very similar in the overall sample (30 % vs 28 %).

Our logistic regression analysis identified several significant predictors of DUIC. First, individuals who believed that medical and/or non-medical cannabis impairs driving ability had significantly lower odds of DUIC. These findings underscore the pivotal role of risk perception in influencing driving behaviours, supporting previous research indicating that individuals who perceive higher risks associated with cannabis-impaired driving are less likely to engage in such behaviour (Boicu, 2024). As with previous CAMS surveys (Arkell, 2020, 2023), frequency of medical cannabis use per day emerged as another significant factor, with participants using medical cannabis on more occasions per day having significantly increased odds of DUIC. Gender differences were also evident, with female participants less likely to report DUIC compared to males. This is consistent with broader traffic safety literature indicating that males are generally more prone to risk-taking behaviours, including driving under the influence of cannabis and other drugs (Lloyd, Lopez-Quintero, & Striley, 2020; Park & Wu, 2019). These results are also consistent with a recent Israeli study of 914 cannabis users (N = 145 with a medical cannabis licence) which found that gender and cannabis use frequency were the two significant predictors of 'high-risk DUIC' (driving within 2 h), while predictors of 'medium-risk DUIC' (driving within 3–6 h) also included having a medical cannabis licence and frequently using cannabis and alcohol together.

Perceptions of police apprehension also significantly impacted DUIC behaviours. As seen in previous CAMS surveys, and as might be expected, participants who were deterred from driving after using medical cannabis by the presence of roadside drug testing had lower odds of DUIC. The proportion of respondents who said they were deterred from driving after using medical cannabis was 69 %, an increase from the 56 % in CAMS 20 and similar to the 65 % in CAMS 18. The rate of conviction for driving with the presence of THC in oral fluid remained very low at 1.6 %. While only 10 % of respondents had encountered roadside drug testing in the previous 12 months, the effectiveness of roadside drug testing as a deterrent suggests that maintaining high-visibility enforcement strategies can reduce DUIC. In addition to being deterred from driving, 51 % of respondents also said that roadside drug testing deterred them from using medical cannabis in general or affected the type of medical cannabis that they used. This clearly highlights the broader impact that roadside drug testing has on patient access to medical cannabis and raises concerns around the impacts of current road safety policy.

These concerns must, however, be viewed in relation to DUIC prevalence. Other factors influencing the likelihood of DUIC included inhalation as a route of administration and current use of illicit cannabis. Smoking cannabis was associated with a 2.5-fold increase in DUIC odds relative to ingestion (oral), while vaporisation was associated with a 40 % increase in DUIC odds. Oral administration of medical cannabis was associated with a more modest 22 % decrease in the odds of DUIC relative to inhaled administration in CAMS 20 (Arkell, 2023), though inhalation was also less commonly reported as the primary route of administration (50 % vs 67 %). Prior use of illicit cannabis was not a significant predictor of DUIC, but respondents who had never used illicit cannabis were half as likely to engage in DUIC relative to those who were current illicit cannabis users. Cannabinoid composition of respondents' main medical cannabis product was excluded as a predictor in this analysis due to there being > 300 missing responses. While this exclusion unfortunately precludes comparison with previous CAMS surveys, the phrasing of the past-year DUIC question as driving while 'high' rather than 'after cannabis use' was intended to implicitly separate out participants using CBD-only products that are non-intoxicating from those using THC-based products.

Whether medical cannabis impairs driving ability to the same extent as non-medical cannabis remains an elusive question that is largely unanswered. As one of the few countries in the world with relatively widespread medical cannabis use and a prescription-only model in which products are dispensed by pharmacist with dosing instructions on the label, Australia provides an ideal research environment for assessing the acute effects of prescribed medical cannabis on driving performance. Several recent studies have found that patients with a range of chronic health conditions exhibit very little change in driving performance or cognitive function after self-administering a standard dose of their prescribed cannabinoid medication (Arkell, 2023; Manning, 2024; Schiemer, 2025), supporting the idea that tolerance can at least partially offset the impairing effects of THC (Ramaekers, Mason, & Theunissen, 2020). However, these studies were naturalistic, assessed pre-post performance at a single point in time, and had small sample sizes. More work is

needed to better understand the complex interplay between medical cannabis and driving, considering that (1) patients may exhibit baseline driving impairments due to their health condition, (2) stable dosing and tolerance to THC materialise over a period of months, (3) patients may be using multiple medical cannabis products in different quantities and at different times of day, and (4) safe driving conversations between patients and health care professionals may not always occur, or may impact patient behaviours differentially.

5. Limitations

Several limitations should be acknowledged. First, the cross-sectional design precludes causal inferences, and self-report data may be subject to recall or social desirability biases. The sample, while sizable, may not be representative of all Australian medical cannabis users. Respondents self-identified as using cannabis for medical purposes, so the veracity of claims made with respect to health condition cannot be verified. Furthermore, recruitment sources have varied with each iteration of CAMS, meaning that comparisons made to previous years may capture random differences in the sample rather than changes in trends over time. Through specific wording of the past-year DUIC question (i.e. have you driven while 'high'), we tried to separate respondents who were using non-intoxicating CBD products from those using THC-containing products, though results showed that approximately 10 % of those primarily using CBD products did in fact report past-year DUIC. We could not ascertain whether those reporting past-year DUIC were simply reporting driving after medical cannabis use, or use of THC products separate from their primary CBD-based product. Finally, due to a branching logic error, only respondents who admitted to past-year DUIC were shown the 'perceived effects of medical cannabis on driving' questions shown in Fig. 3. These data cannot be assumed to accurately reflect the driving-related perceptions of the broader sample.

6. Conclusion

CAMS-22 reaffirms trends identified in earlier CAMS surveys, and findings align with international literature demonstrating that perceived risk and enforcement significantly influence DUIC behaviour. Roadside drug testing is clearly a robust deterrent against driving for many patients but also acts as a barrier to patient access. As cannabis policies continue to evolve, and as patient access continue to expand, efforts to reduce DUIC need to account for the nuances of therapeutic use. Further research is needed to better understand how prescribed medical cannabis impacts driving and cognition.

CRediT authorship contribution statement

Thomas R. Arkell: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Conceptualization. **Llewellyn Mills:** Writing – review & editing, Project administration, Methodology, Investigation, Data curation, Conceptualization. **Jonathon C. Arnold:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Anastasia Suraev:** Writing – review & editing, Methodology, Conceptualization. **Sarah V. Abelev:** Writing – review & editing, Project administration, Data curation. **Cilla Zhou:** Writing – review & editing, Project administration, Data curation. **Nicholas Lintzeris:** Writing – review & editing, Supervision, Methodology, Investigation, Conceptualization. **Iain S. McGregor:** Writing – review & editing, Supervision, Methodology, Investigation, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Prof Lintzeris reports grants from the Australian National Health and Medical Research Council (NHMRC) during the conduct of the study; and research grants from Camurus and Indivior for unrelated work. Prof McGregor reports grants from NHMRC and grants from Lambert Initiative for Cannabinoid Therapeutics during the conduct of the study for projects unrelated to the submitted work; Dr McGregor has patents to WO2018107216A1, WO2017004674A1, and WO2011038451A1 issued and licensed, and patents to AU2017904438, AU2017904072, and AU2018901971 pending. Prof Arnold reports research grants from the NHMRC and from Lambert Initiative for Cannabinoid Therapeutics at the time of the conduct of this research. Prof Arnold has served as an expert witness in various medicolegal cases involving cannabis and has received consulting fees from the World Health Organization (WHO), Medical Cannabis Industry Australia (MCIA) and Haleon (consumer healthcare subsidiary of Glaxo Smith-Kline). He is an inventor on patents WO2019227167 and WO2019071302 issued, which relate to cannabinoid therapeutics. Dr Arkell has received consulting fees from Terra Mater Botanicals. Dr Suraev has received consulting fees from the Medical Cannabis Industry Australia (MCIA) and Haleon (consumer healthcare subsidiary of Glaxo Smith-Kline). No other authors report conflicts of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.trf.2025.103466.

Data availability

Data will be made available on request.

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