Medical cannabis use in the Australian community following introduction of legal access: The 2018-2019 Online Cross-Sectional Cannabis as Medicine Survey (CAMS-18)

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Abstract

Background : In 2016 the Australian federal government passed legislation enabling a range of cannabis-based products to be prescribed to patients by registered healthcare professionals. An online survey conducted immediately prior to these legislative changes found that the vast majority of respondents at the time were illicitly sourcing cannabis plant matter, smoking was the preferred route of administration, and mental health, chronic pain, and sleep conditions were the most frequently cited reasons for medical cannabis use. This manuscript reports the results of a follow-up survey conducted in 2018-2019, the Cannabis As Medicine Survey (CAMS-18). The goal of this second questionnaire was to examine patterns of use and consumer perspectives regarding medical cannabis use in Australia, two years after the introduction of legal access pathways.

Methods : Anonymous online cross-sectional survey with convenience sample, recruited mainly through online media between September 2018 and March 2019. Participants were adults (18 years or over) residing in Australia who reported using a cannabis product for self-identified therapeutic reasons during the preceding 12 months. The survey measured consumer characteristics; indications and patterns of medical cannabis use; routes and frequency of administration; perceived benefits and harms; experiences and preferred models of access to medical cannabis.

Results : Data were available for 1388 respondents. The main categories of condition being treated with medical cannabis were pain (36.4%), mental health (32.8%), sleep (9.2%), neurological (5.2%) and cancer (3.8%). Respondents reported using medical cannabis on 15.8 (11.2) days in the past 28, by inhaled (71.4%) or oral (26.5%) routes and spending AUD\$82.27 (\$101.27) per week. There were high levels of self-reported effectiveness, but also high rates of side effects. There was uncertainty regarding the composition of illicit cannabinoid products and concerns regarding their possible contamination. Few respondents (2.7%) had accessed legally prescribed medical cannabis, with the main perceived barriers being cost, dis-interest from the medical profession, and stigma regarding cannabis use.

Conclusions : Chronic pain, mental health and sleep remain the main clinical conditions for which consumers report using medical cannabis. Despite two years of legal availability, most consumers in Australia reported accessing illicit cannabis products, with uncertainty regarding the quality or composition of cannabis products.

Introduction

The global trend towards the legalisation of cannabis for medical purposes reflects both the increased robustness of evidence supporting efficacy¹ and increased interest amongst consumers in using cannabis-based therapeutics². In this rapidly changing landscape, it is important for regulators and healthcare providers to understand community use of cannabis for medical purposes, and to determine how changes in medical cannabis legislation may impact patterns of use.

In November 2016, the Australian federal government passed legislation^{3,4} enabling a range of cannabis-based products to be prescribed as unregistered medicines using the Special Access Scheme (SAS) and Authorised Prescriber Schemes^{5,6}, and in December 2016 the Australian Therapeutic Goods Administration (TGA) published clinical guidance⁵ regarding their use for a range of conditions. At the time of writing, more than 25,000 official approvals have been issued to patients to allow access to more than 50 different cannabis-based products including botanical material, oils and sprays^{6,7}. Approvals cover a wide range of conditions but by far the largest category is chronic pain^{8,9}.

Immediately prior to the legislative changes allowing access, our research group conducted an online consumer survey ('Cannabis as Medicine Survey 2016' or CAMS-16) of Australians who had indicated use of a cannabis-based product (either legally or illegally) for the management of a health condition in the preceding 12 months¹⁰. The vast majority of respondents at the time were illicitly sourcing cannabis plant matter, with smoking being the preferred route of administration. Mental health, chronic pain, and sleep conditions were the most frequently cited reasons for medical cannabis use. Respondents generally reported high levels of effectiveness, but also reported significant levels of, mostly minor, side effects.

Here we report the results of a follow-up survey conducted approximately two years after the introduction of these legislative changes. The CAMS-18 survey, which recruited during the last quarter of 2018 and first quarter of 2019, involved many of the same questions as CAMS-16 to enable general comparisons to be made of consumer experiences over time, but also included refinement of various sections including extra questions regarding composition of cannabis products and perceptions of legal prescription cannabis models of care.

As with the CAMS-16 survey, the term 'medical cannabis' used in this paper refers to the term understood by lay people – any licit or illicit cannabis-based product (including plant matter) used to treat or alleviate the symptoms of a self-identified health condition. This does not imply that the cannabis product was indicated or prescribed by a health professional.

Methods

The study used a cross-sectional online survey design with a convenience sample of individuals self-reporting the use of cannabis for therapeutic reasons within the past 12 months. The study was approved by the University of Sydney Human Research Ethics Committee (2018/544). Survey questions examined the following areas:

- a)
medical conditions for which respondents reported using medical cannabis;
- b)
current and lifetime patterns of medical and non-medical cannabis use, including source, route of administration, average frequency and cost.
- c)

perceived benefits and harms associated with medical cannabis use, including side effects (symptom checklist); social and legal implications; and Patient Global Impression of Change (PGIC)¹¹, a 7-item patient-reported rating of symptom change.

d)

the cannabinoid profile that respondents thought they were using (options of tetrahydrocannabinol (THC), cannabidiol (CBD), and THC:CBD combinations).

e)

perspectives on accessing licit medical cannabis products – including the experiences of those who had accessed legally prescribed products, and reasons for not accessing prescribed products for respondents using only illicit products.

Study data were collected and managed using Research Electronic Data Capture (REDCap), a secure web-based platform allowing respondents to directly enter responses online¹².

The CAMS-18 survey was freely accessible to any person who was supplied with the survey URL. The survey was 'live' online for six months (September 2018 to March 2019), and was promoted online using social media and consumer group webpages, and at consumer and professional forums. Eligibility criteria were: (a) informed consent, (b) aged ≥ 18 years, (c) self-identified as a user of cannabis or a cannabinoid product for a medical purpose within the previous 12 months, and (d) resident in Australia.

Statistical Analyses

Descriptive statistics were performed in R version 3.4.1¹³ using the tidyverse¹⁴ package. Only valid responses are reported, with no imputation for missing data. As the number of valid responses varied across different items in the survey, categorical variable frequencies are reported alongside the number of valid responses.

Patient and Public Involvement

The CAMS-16 survey was extensively piloted with medical cannabis users through cooperation with cannabis user organisations across Australia. CAMS-16 item selection and survey design was thus heavily informed by patient and public feedback. CAMS-18 was based on CAMS-16, with minor changes, and was piloted with a group of consumers reporting medical cannabis use for user-acceptance and ease of understanding of the questionnaire.

Results

Respondents

Of the 1804 respondents who commenced the survey, 184 did not meet eligibility criteria, and 192 did not give consent. Data were excluded for 70 respondents who provided no further information beyond demographics questions, 3 respondents who indicated that none of their cannabis use was for medical

purposes, and 7 who provided implausible responses to numerous questions. Of the remaining 1388 respondents, 909 (65%) completed the entire survey.

Most respondents became aware of the survey via social media: 336/1387 (24.2%) through Facebook, and 827/1387 (59.5%) through “Other social media (e.g. Instagram, Twitter, Snapchat)”. Others were recruited through friends (4.7%, 65/1387), medical cannabis providers (2.2%, 31/1387), the Lambert Initiative website (1.7%, 23/1387), doctors/healthcare providers (1.0%, 14/1387), consumer groups (0.9%, 13/1387), traditional media (TV, radio, newspaper) (0.8%, 11/1387), and ‘other’ sources (4.5%, 62/1387).

Participant Characteristics

The majority of respondents (Table 1) were male (57.6%, 799/1387), with a mean age of 43.4 ± 13.9 years. Most respondents were employed (59.2%, 821/1387) and had attained either a trade/vocational certificate or a university degree (78.7%, 1092/1387).

Table 1
Demographic Characteristics of the CAMS-18 Sample (n = 1387)

Characteristic	
Age, mean (SD)	43.4 (13.9)
Gender	560 (40.4%)
Female	799 (57.6%)
Male	28 (2.0%)
Other	
Relationship Status	861 (62.1%)
Partnered (currently in relationship, including defacto and married)	526 (37.9%)
Single (not currently in a relationship, including separated, divorced, widowed)	
Indigenous Status	56 (4.0%)
Aboriginal and/or Torres Strait Islander	1331 (96.0%)
Not Aboriginal and/or Torres Strait Islander	
Highest Education Level Attained	14 (1.0%)
Primary School	278 (20.0%)
Secondary School	461 (33.2%)
Trade or Vocational College	631 (45.5%)
University Degree	3 (0.2%)
Other	
Employment Status	633 (45.6%)
Full-time work	188 (13.6%)
Part-time work	78 (5.6%)
Home duties	77 (5.6%)
Student	63 (4.5%)
Unemployed	128 (9.2%)
Retired	
Note: Missing values excluded from denominator when calculating percentages.	

Cannabis Use

Lifetime cannabis use history indicated that 19.1% (212/1109) had never used cannabis prior to using it for medical reasons, 35.7% (396/1109) reported previous non-medical cannabis use but had quit for 12 months or more prior to initiating medical cannabis use, and 45.2% (501/1109) were using cannabis non-medically at the time they began using it medically.

INSERT Table 1

The mean estimated proportion of cannabis use for medical purposes (as a proportion of total use) was 83.2 ± 20.6% (Table 2). Respondents reported using medical cannabis on a median of 18 days in the past 28 days (IQR = 4, 28; mean = 15.8 ± 11.2).

Table 2
Patterns of Cannabis Use

Characteristic	n	
Age first tried cannabis for any reason, Mean (SD)	1110	20.5 (11.6)
Age first regular cannabis use any reason, Mean (SD)	1110	25.8 (16.3)
Age first regular cannabis use for medical reason, Mean (SD)	1110	32.6 (17.5)
Never used cannabis regularly for any reason, N (%)	1110	134 (12.1%)
Number of days in previous 28 used cannabis for any reason Mean (SD) Median (IQR)	1110	17.3 (10.9) 20 (5–28)
Number of days in previous 28 used cannabis for medical reasons Mean (SD) Median (IQR)	1110	15.8 (11.2) 18 (4–28)
Estimated proportion of cannabis use for medical reasons, mean (SD)	1095	83.2% (20.6%)
Usual number of times using cannabis per day for any reason Mean (SD) Median (IQR)	1110	3.3 (3.7) 2 (1–4)
Weekly cost of medical cannabis, Mean (SD)	1101	\$60.68 (\$94.20)
Weekly cost of medical cannabis with respondents who did not pay excluded, Mean (SD)	812	\$82.30 (\$101.00)
Median (IQR) reported for count variables only. IQR = Interquartile range		

INSERT Table 2

Most respondents consumed their cannabis via an inhaled (71.4%; 788/1104) or oral (26.5%, 293/1104) route, although there was a much stronger preference for oral or vaporised routes of administration than smoked routes (Fig. 1).

INSERT Fig. 1

Composition of Medical Cannabis

Respondents reported they either did not know the composition of their cannabis (25.8%, 284/1103) or that it varied significantly between batches (23.9%, 264/1103). 16.4% (181/1103) reported their medical cannabis contained approximately equal levels of THC and CBD, 21.3% (235/1103) reported it contained predominately THC (with either no, or small amounts of other cannabinoids), 12.2% (135/1103) reported it contained predominately CBD, and 0.4% (4/1103) reported 'other'. Most (63.4%, 699/1105) were concerned about the possibility of contaminants (e.g. heavy metals, pesticides) in their cannabis.

Conditions Treated with Medical Cannabis

Respondents were asked to select from a structured list, up to five health conditions ("All reasons", Table 3), and the main condition (see "Main reason") for their medical cannabis use. The categories most commonly endorsed for "All reasons" were pain (61.6%, 852/1388), sleep (49.1%, 679/1388) and mental health/substance use conditions (44.9%, 621/1388; see Table 3). The most frequent "Main reasons" were anxiety (12.6%, 168/1331), back pain (10.1%, 135/1331), depression (8.5%, 113/1331) and insomnia (7.1%, 94/1331).

Table 3
Conditions reported as reasons for using medical cannabis^a.

Condition	Main reason ^b (n = 1331)	All reasons ^c (n = 1382)
PainTotal	485 (36.4%)	852 (61.6%)
Back	135 (10.1%)	477 (34.5%)
Arthritis	79 (5.9%)	262 (19.0%)
Neuropathy	75 (5.6%)	194 (14.0%)
Other	53 (4.0%)	123 (8.9%)
Fibromyalgia	52 (3.9%)	122 (8.8%)
Mental HealthTotal	437 (32.8%)	621 (44.9%)
Anxiety	168 (12.6%)	450 (32.6%)
Depression	113 (8.5%)	386 (27.9%)
PTSD	82 (6.2%)	191 (13.8%)
Addiction to other substances	13 (1.0%)	67 (4.8%)
ADHD	13 (1.0%)	61 (4.4%)
SleepTotal	123 (9.2%)	679 (49.1%)
Insomnia	94 (7.1%)	573 (41.5%)
Circadian rhythm disorder	9 (0.7%)	74 (5.4%)
Sleep movement disorder	9 (0.7%)	140 (10.1%)
Sleep breathing disorder	8 (0.6%)	55 (4.0%)
Other	2 (0.2%)	8 (0.6%)
CancerTotal	50 (3.8%)	106 (7.7%)
Blood	8 (0.6%)	14 (1.0%)
Other	8 (0.6%)	18 (1.3%)
Gastrointestinal	6 (0.5%)	14 (1.0%)
Brain	5 (0.4%)	15 (1.1%)
Breast	5 (0.4%)	19 (1.4%)
NeurologicalTotal	69 (5.2%)	147 (10.6%)
Epilepsy	26 (2.0%)	45 (3.3%)
Autism	14 (1.1%)	27 (2.0%)
Other	14 (1.1%)	63 (4.6%)
Multiple sclerosis	13 (1.0%)	18 (1.3%)
Dementia	1 (0.1%)	6 (0.4%)
GastrointestinalTotal	40 (3%)	175 (12.7%)
Other	11 (0.8%)	60 (4.3%)
Crohn's disease	10 (0.8%)	19 (1.4%)
Ulcerative Colitis	10 (0.8%)	25 (1.8%)
Irritable Bowel Syndrome	9 (0.7%)	101 (7.3%)
OtherTotal	127 (9.5%)	165 (11.9%)
Auto-immune condition	33 (2.5%)	64 (4.6%)
Gynaecological condition	25 (1.9%)	31 (2.2%)
Other	25 (1.9%)	35 (2.5%)
Infectious disease	9 (0.7%)	12 (0.9%)
Skin condition	9 (0.7%)	43 (3.1%)
a: Five most commonly reported conditions listed in the table; b: respondents could only select one main condition; c: respondents could select up to five conditions that they treated with cannabis.		

INSERT Table 3

Patient Ratings of Effectiveness, Side-Effects and Other Adverse Consequences

The symptoms most often managed with medical cannabis were pain (48.0%, 666/1388), anxiety (44.0%, 611/1388), and sleep problems (31.3%, 434/1388). The overwhelming majority of respondents reported symptom improvement following medical cannabis use (Fig. 2).

INSERT Fig. 2

Side effects were commonly reported (Table 4), although relatively few reported these to be severe and/or intolerable.

Table 4
Side-Effect Profile of Medical Cannabis Use

	Severity	
Side-Effect	Mild and Tolerable	Severe and/or Intolerable
Dry Mouth (n = 977)	601 (61.5%)	23 (2.4%)
Increased appetite (n = 976)	578 (59.2%)	47 (4.8%)
Drowsy (n = 976)	534 (54.7%)	13 (1.3%)
Eye Irritation (n = 974)	294 (30.2%)	8 (0.8%)
Lack of Energy or Fatigue (n = 973)	287 (29.5%)	20 (2.1%)
Anxiety (n = 974)	228 (23.4%)	23 (2.4%)
Memory Impairment (n = 973)	227 (23.3%)	16 (1.6%)
Dehydration (n = 975)	220 (22.6%)	9 (0.9%)
Confusion (n = 975)	144 (14.8%)	9 (0.9%)
Respiratory complaints (n = 973)	141 (14.5%)	5 (0.5%)
Dizzy (n = 974)	137 (14.1%)	6 (0.6%)
Residual bad taste in mouth (n = 973)	135 (13.9%)	12 (1.2%)
Decreased Appetite (n = 975)	127 (13.0%)	8 (0.8%)
Paranoia (n = 973)	111 (11.4%)	9 (0.9%)
Racing heart or palpitations (n = 972)	106 (10.9%)	11 (1.1%)
Sweating (n = 974)	90 (9.2%)	10 (1.0%)
Depressed (n = 974)	87 (8.9%)	15 (1.5%)
Headaches (n = 973)	73 (7.5%)	11 (1.1%)
Sleep disturbance (n = 973)	72 (7.4%)	14 (1.4%)
Diarrhea (n = 974)	65 (6.7%)	7 (0.7%)
Constipation (n = 974)	52 (5.3%)	7 (0.7%)
Nasal Complaints (n = 973)	46 (4.7%)	8 (0.8%)
Gastro-Intestinal Irritation (n = 973)	44 (4.5%)	7 (0.7%)
Allergy (n = 974)	41 (4.2%)	5 (0.5%)
Panic Attacks (n = 973)	38 (3.9%)	8 (0.8%)

	Severity	
Shaking/tremor (n = 972)	37 (3.8%)	4 (0.4%)
Nausea/vomiting (n = 973)	36 (3.7%)	6 (0.6%)
Delusion (n = 974)	24 (2.5%)	4 (0.4%)
Hallucinations (n = 973)	22 (2.3%)	3 (0.3%)
Cannabis hyperemesis (n = 974)	12 (1.2%)	8 (0.8%)
Other (n = 970)	3 (0.3%)	11 (1.1%)

INSERT Table 4

Almost half the respondents (47.6%, 448/942) indicated that the cost of Medical Cannabis placed a significant strain on their finances, 79.7% (751/942) worried about being arrested or other legal problems, and 37.5% (353/942) were worried about employment issues. 9.3% of respondents (88/942) reported they had to undergo workplace drug testing.

Accessing Medical Cannabis

Respondents sourced their medical cannabis mainly from 'recreational dealers' (46.2%, 482/1044), friends or family (25.3%, 264/1044), by growing their own (11.6%, 121/1044), from illicit medicinal cannabis suppliers (7.2%, 75/1044), online suppliers (5.1%, 53/1044) or 'other' sources (4.7%, 49/1044). Only 2.7% of respondents (25/931) indicated they had accessed licit medical cannabis prescribed by a doctor.

When asked why they had not accessed medical cannabis legally, 47.8% (433/906) of respondents indicated they did not know a medical practitioner willing to prescribe, 32.0% (290/906) were not aware they could access medical cannabis legally, 21.2% (192/906) indicated licit cannabis was too expensive, 18.4% (167/906) believed their medical practitioner was not interested or unwilling to prescribe cannabis, 12.7% (115/906) indicated they wanted their medical cannabis use to remain confidential from their healthcare providers, 9.5% (86/906) said they preferred illicit cannabis, and 11.6% (105/906) gave other reasons.

One quarter (26.2%, 289/1101) reported not paying for their cannabis, but indicated they were willing to pay a weekly mean of AUD\$38.33 ± 63.92, (median AUD\$25, IQR: \$10, \$50) for prescribed products. Those respondents who did pay for cannabis estimated spending AUD\$82.30 ± 101.00 per week (median \$50, IQR: \$20, \$100), and indicated that they were willing to pay AUD\$68.67 ± 66.64 (median \$50, IQR: \$25, \$100) for prescribed cannabis products.

Accessing Information about Medical Cannabis

When asked about their decision to try medical cannabis, most (51.5%, 523/1015) indicated that they discovered the benefits on their own (using cannabis and noticed symptoms improved), 10.5% (107/1015) reported internet-based media (e.g. Facebook, Reddit), 9.9% (100/1015) by a friend or family member, 6.5% (66/1015) by a medical cannabis advocacy group, 5.6% (57/1015) by a disease-specific consumer group, 5.0% (51/1015) by a healthcare provider, and the remainder (10.9%, 111/1015) from other sources.

Although the initial interest in medical cannabis was generated by sources other than health professionals, most respondents (63.2%, 641/1015) had discussed their medical cannabis use with a healthcare provider, including their GP (83.6%, 536/641), medical specialist (54.3%, 348/641), psychologist (40.0%, 256/641), nurse (17.5%, 112/641), alternative medicine provider (17.2%, 110/641), and pharmacist (12.9%, 83/641).

Accessing Medically Prescribed Medicinal Cannabis Products

The 25 respondents who had accessed prescribed medical cannabis products had been accessing it for an average of 4.8 ± 3.8 months (median 3, IQR: 2, 6), prescribed by a medical specialist (64%; 16) or GP (36%, 9) for indications including fibromyalgia, multiple sclerosis, neuropathy, epilepsy, autism, Alzheimer's, mesothelioma, post-traumatic stress disorder, and back pain. Respondents estimated 18 ± 22.5 weeks (median 12, IQR: 4, 25) between their first cannabis-specific consultation with their doctor and receiving their first dose of medical cannabis. Although the numbers were too small to draw any firm conclusions, feedback from the 25 respondents who had accessed medical cannabis legally indicated generally positive ratings of their experience of product consistency (17 [68%] preferred licit supplies, 6 [24%] preferred illicit supplies, 2 [8%] no preference); ease of access (15 [60%] preferred licit to 7 [28%] illicit), cost (11 [44%] preferred licit to 8 [32%] illicit), effectiveness (11 [44%] preferred licit to 6 [24%] illicit), fewer side effects (13 [52%] preferred licit to 5 [20%] illicit), and legal status (20 [80%] preferred licit to 2 [8%] illicit).

Attitudes to Regulation of Medical Cannabis

Most respondents (78.3%, 721/921) indicated that people should be able to buy and use medical cannabis without approval by a medical practitioner, 92% (850) that medical cannabis should be part of routine healthcare in Australia, 70.7% (652) that the government should subsidise the cost of medical cannabis and 91.1% (839) that medical cannabis should meet safety standards (e.g. known strength, composition and contaminant-free). Most thought that the Australian regulatory framework for accessing medical cannabis did not work well (91.0%, 838/921), that the cost of licit medical cannabis was prohibitively expensive (62.6%, 577/921), and that the current model was difficult for patients to negotiate (87.3%, 804/921).

Discussion

This survey provides a number of insights into medical cannabis use within the Australian community and updates our understanding of how consumer perspectives since the introduction of legal access pathways in November 2016. In many respects, little has changed in the two years since cannabis was legalised for medicinal purposes in Australia: users are still largely accessing illicit cannabis, self-medicating a similar range of health conditions (chronic pain, mental health and sleep problems), with similar perceived levels of effectiveness, side effects, and social and issues. The current survey recruited a slightly older (43.4 ± 13.9 compared to 37.9 ± 13.4 years) and more educated cohort than CAMS-16. Respondents reported using cannabis on fewer days in the past 4 weeks (15.8 ± 11.2 compared to 19.9 ± 10 days in CAMS-16), although they spent similar amounts for their medical cannabis, averaging just over AUS\$80 per week (compared with under AUD\$70 per week in CAMS-16). These differences in participant characteristics may reflect changes in recruitment sources strategies (more Twitter in CAMS-18 than Facebook), and/or may reflect the changing profile of Australian users.

There is little in the current survey results to suggest that two years of legal medical cannabis access in Australia has transformed the 'landscape' of medical cannabis. The vast majority of respondents had not used the legal avenues available for prescription, with many respondents perceiving difficulties in finding medical practitioners willing to prescribe, and/or citing cost and stigma as barriers. Whilst few study respondents ($n = 25$) had accessed legal medical cannabis, those that had generally had more favourable perceptions regarding the legal form of the drug than those who had only ever used illicit forms. Interestingly the majority of the respondents who used licit medical cannabis preferred it to illicit for its cost ease of access, however cost and ease of access were both endorsed as important barriers to accessing licit medical cannabis by respondents who had never obtained medical cannabis legally.

The predominant continuing use of illicit sources reflects the relatively limited uptake of TGA SAS-B approvals prior to the survey¹¹. In the 6 months prior to September 2018, when the CAMS-18 survey opened, fewer than 1200 patients had been granted SAS-B approvals although approximately 3000 approvals were granted during the study recruitment period (September 2018 to March 2019). However, in the 6-month period following the close of the CAMS-18 survey in March 2019 over 13,000 approvals have been granted⁶. Future surveys will attempt to explore this expansion in regulatory approvals and the impact upon medical cannabis consumers.

Our findings identify ongoing concerns regarding illicit supplies. There was scant knowledge of the composition of the products being used with regard to cannabinoid content (e.g. THC, CBD). This represents a fundamental issue given that the two cannabinoids have quite distinct clinical indications and therapeutic effects. Even for those who thought they knew the composition of their cannabis products, it is worth noting that there is essentially no capacity for consumers to determine the strength or composition of illicit cannabis products in Australia, with no ability for laboratory testing of illicit cannabis products. In a previous study by our group, there was considerable discrepancy between perceived and actual cannabinoid profiles of illicit cannabis supplies used for children with epilepsy¹². Similarly, almost two thirds of respondents were worried about potential contaminants. These are not ideal conditions for any therapeutic intervention in a modern healthcare system.

One positive trend in the current survey relative to CAMS-16 is a move away from smoking (joints, bongs) to non-smoked cannabis-based products – with greater numbers in the current survey using vaporisers and oral liquid extracts, a trend also emerging in other countries^{15–18}. Whilst any non-smoked route is to be preferred, the apparent proliferation of artisanal medical cannabis producers reiterates concerns regarding quality control and standards of production in illicit operations, as highlighted in recent health concerns regarding vapourisation of illicit cannabis-based products^{19,20}.

Demand for medical cannabis products does not seem to be abating. The experience of consumers surveyed here suggests minimal uptake of licit and prescribed products during the first two years, although there are indications that this is changing. The marked increase in SAS approvals since the close of this survey signals improved access to medical providers willing to engage in this area of medicine – coinciding with the emergence of a number of private clinics specialising in medicinal cannabis, which appears to have markedly increased access to medicinal cannabis products. Our survey indicates that medical practitioners (GPs and specialists) continue to be seen as valued sources of information regarding medical cannabis, although Australian GPs themselves feel relatively ‘under-educated’ regarding medical cannabis¹⁹. Finally, whilst most respondents in our survey continued to express disappointment with the legal models of medical cannabis availability, those who had actually pursued the licit avenue reported quite positive experiences.

The study design has inherent limitations, as described previously¹⁰. The reliance on self-report data is potentially associated with inaccurate information, such as incorrect diagnostic conditions, recall difficulties, or misinterpretation of effectiveness or adverse events. Furthermore, there is always likely to be a selection bias in any such survey towards recruiting people with favourable experiences of medical cannabis and cannabis legalisation generally. Whilst we were able to reduce the amount of missing data compared to the CAMS-16 survey, we acknowledge that valid responses to all questions were only available for 65% of respondents.

Conclusions

Our survey reflects the experiences of consumers during the first two years after major regulatory changes permitting medical cannabis access to patients. The early experiences of the small numbers of patients who had accessed legally prescribed products appear positive, although there remain many negative perceptions of access pathways amongst most consumers surveyed. It remains to be seen how many of the individuals using illicit cannabis products for medical reasons legally will transfer to legally prescribed products over time. Until some form of medicinal-grade cannabinoid product is added to the list of medications subsidised by the Australian government via the Pharmaceutical Benefits Scheme, cost seems likely to remain a barrier to widespread use of licit medical cannabis. Another potential concern is the many SAS-B approvals that have been granted for conditions for which there is little evidence and no clinical guidance (e.g. over 800 approvals have been granted to treat anxiety⁸). Given that many in the community are already using illicitly-obtained cannabis to treat their anxiety, depression,

and insomnia there is an urgent need for more clinical trials to investigate the effectiveness of cannabis products for these conditions.

Declarations

Ethics Approval and Consent to Participate: This study was approved by the Sydney University Human Research ethics Committee (2018/544). In order to begin the survey participants were asked to read a linked Participant Information Statement and to tick a check box giving consent for their data to be used in the study

Consent for Publication: Not applicable

Availability of Data and Materials: The datasets used and/or analysed during the current study are available from the corresponding author on request.

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Figures

Figure 1

Most respondents consumed their cannabis via an inhaled (71.4%; 788/1104) or oral (26.5%, 293/1104) route, although there was a much stronger preference for oral or vaporised routes of administration than smoked routes

Figure 2

The symptoms most often managed with medical cannabis were pain (48.0%, 666/1388), anxiety (44.0%, 611/1388), and sleep problems (31.3%, 434/1388). The overwhelming majority of respondents reported symptom improvement following medical cannabis use