Medical cannabis: knowledge and expectations in a cohort of North Island New Zealand general practitioners

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ABSTRACT

AIM: To investigate GP knowledge of the use of cannabis as a medicine and its regulation in New Zealand.

METHOD: A convenience sample of GPs completed a questionnaire during continuing medical education sessions. Key domains investigated were: patient interactions around use of cannabis as a medicine; prescription facilitation and impediments; knowledge of evidence for and against the use of cannabis as a medicine; knowledge of the New Zealand regulatory processes and knowledge of pharmaceutical grade products. Questionnaires were administered between June and October 2018.

RESULTS: There were 42/76 (55%) GPs who stated at least one patient had asked for a cannabis prescription for medical use in the last 12 months and 43/76 (57%) were aware of pharmaceutical grade preparations, the majority Sativex. There were 59/75 (79%) who expressed concerns about future prescribing; however, 63/75 (84%) indicated they would be 'somewhat' or 'very' likely to prescribe a PHARMAC-funded product with good evidence in specific conditions.

CONCLUSION: Some GPs have concerns about prescribing medicinal cannabis. Due to regulatory restrictions, including no currently funded products, and uncertain scientific evidence of efficacy and safety, education programmes will be required to inform the medico-legal, evidential and practical elements of prescribing cannabis as a medicine.

There has been a global shift in both the public perception of the medicinal value of cannabis and regulation of medicinal cannabis products.[1] Cannabis sativa sp. has been used for over 10,000 years in various cultures for the management of health conditions,[2,3] despite a paucity in the medical literature about its efficacy and safety. Cannabis-derived therapeutics have been the focus of contemporary pre-clinical work, but clinical trial programmes have been impeded by the heterogeneity of plant-based products, the quality and consistency of products available and the legality of undertaking trials.[2] High-quality randomised control trials (RCT) of delta-9-tetrahydrocannabinol (Δ9-THC) and cannabidiol (CBD) have led to the development of pharmaceutical grade medications such as Sativex[4] and Epidiolex,[5] and there is growing interest in the therapeutic potential of the other cannabinoids and constituents such as terpenes.[6]

New Zealand is undergoing a period of legislative change, with the passing of the Misuse of Drugs (Medicinal Cannabis) Amendment Bill into law in December 2018[7] and the proposed referendum regarding legalisation of cannabis in 2020.[8] This has been driven by growing interest in the use of cannabis for the treatment of medical conditions.[2] The 2012/2013 New Zealand Health Survey reported that 42% of cannabis users

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considered their use as medicinal in the 12 months prior,[9] despite cannabis-based medicines only infrequently being prescribed. This disparity is likely to reflect a variance of opinion between the perceived medical value of cannabis by users and doctors who typically ground practice in evidence. Overseas studies have shown a high level of patient support for access to medical cannabis compared with a more moderate level of support from doctors, depending on their area of specialty.[10,11] It is unknown if this is similar in the New Zealand population but likely, as New Zealand has an internationally high use of cannabis within its population.[12]

In 2016 there were 3,950 doctors who identified themselves as general practitioners (GPs).[13] Currently GPs require both hospital specialist and Ministry of Health approval to prescribe cannabis-related products (excluding CBD and neurologist-endorsed prescriptions of Sativex for spasticity in multiple sclerosis).[14] As interest in the use of cannabis as a medicine grows, it follows that GPs are likely to be fielding questions from their patients about it and requests for its prescription for a wide range of conditions. Other than Sativex, an oro-mucosal formulation that contains 2.7mg Δ9-THC and 2.5mg CBD per spray that is approved as an adjunct treatment for spasticity in multiple sclerosis,[15] there is no MedSafe approved cannabinoid-based medicine in New Zealand. Sativex is not subsidised by the Pharmaceutical Management Agency (PHARMAC).

This study assessed current GP experience with cannabis as a medicine, including patient interactions and prescribing practices, indications for use, regulatory processes for obtaining cannabis to be used as a medicine, knowledge of Sativex and other cannabinoid products, current prescribing concerns and preferences with respect to future delivery of education around cannabis to be used as a medicine. We hypothesised that GPs in New Zealand would have limited knowledge around the use of cannabis as a medicine due to the current regulatory environment, including possible limited exposure to the management of patients with multiple sclerosis (the sole MedSafe approved indication for a cannabinoid-derived medication), the lack of funded products as well as potentially limited education about cannabis and the endocannabinoid system in both medical schools and vocational training schemes.

Method

Participants

GPs, GP registrars and trainee interns on GP attachments working in general practices throughout the North Island of New Zealand (Northland, Bay of Plenty, Wairarapa and Wellington) were recruited between June and October 2018 using a snowball technique,[16] useful in groups who rarely participate in research. Peer groups and continuing medical education (CME) sessions were the nidus for these snowballs with initial participants identified through the Medical Research Institute of New Zealand GP research network. CME sessions were not associated with cannabis or substance abuse teaching. Specific GP caseloads or special interests (eg, chronic pain) were not established prior or during the recruitment period.

Questionnaires

The full questionnaire is provided in the online supplement. For the purposes of the questionnaire, medical cannabis was defined as “any use of cannabis plants and/or medications derived from cannabis used by a patient to treat a medical condition”.

Participants were asked to complete a paper questionnaire which included the following domains (see Figure 1):

- GP—patient interactions around the use of cannabis as a medicine
- GP prescriptions of cannabinoid medications—facilitation and impediments
- Knowledge of conditions with evidence for or against the use of cannabis as a medicine
- Knowledge of the regulatory process for approvals, import and funding in relation cannabinoid medications
- Awareness of pharmaceutical cannabinoid medications worldwide

The questionnaire was piloted on two GPs. Survey domains did not go through a validation process.

Ideally participants were asked to complete the questionnaire in the presence of a study investigator.

Figure 1: Examples of questions from each domain of the questionnaire.

- "Have you been approached by patients seeking a prescription for medical cannabis products over the past 12 months?" Answers were categorised as none, 1–4, 5–10, 10+.
- "What impediments (if any) occurred when facilitating the request (for prescribed medical cannabis)?" Categories for answers included cost, insufficient evidence base, side effects, insufficient understanding of process, and aware of process but benefit versus cost was inappropriate.
- "What conditions are you aware of that DO have Grade A/Level I RCT evidence for use of medical cannabis products?" and "what conditions are you aware of in which there is substantive evidence of NO benefit to support the use of medical cannabis products but for which products may have been recommended?"
- Completion of a table identifying responsibilities for approval, funding and import of CBD, Sativex and other medical cannabis products
- Of Dronabinol, Sativex, Naboline and Epidiolex, participants were asked to indicate awareness of the product, select primary constituents (THC and/or CBD), indicate if licensed in New Zealand, indicate formulation and estimate the annual cost to the patient for the product.

Data entry and analysis

All data was entered into REDCap (Research Electronic Data Capture).[17] Free text answers were grouped into related categories and reported numerically. Partially completed questionnaires were included in the analysis to the point of completion. If questionnaires had single missing data points such as a blank space in a table where other information had been input and it was clear that by leaving a question blank the participant did not know the answer it was analysed as such, otherwise this was recorded in the database as "No answer given".

Statistics

All submitted questionnaires were included in the analysis. Proportions and 95% confidence intervals were calculated using Java Stat.[18] The proportion denominator was determined by the number of participants who answered that specific area of the questionnaire. Free text answers were grouped into common themes for the purposes of reporting. Ethnicity data was prioritised according to the Health Information Standards Organisation.[19] The sample size represents a convenience sample, while taking into account the central limit theorem that in a sample >30 the distribution of the sample population mean will reflect that of the normal population.[20]

This research was approved by the Victoria University of Wellington Human Ethics Committee (#25835).

Results

A total of 82 potential participants were approached, of which 76 agreed to take part. Fifty-six questionnaires were completed in the presence of a study investigator (73.7%), with the remainder performed without supervision. Participant characteristics are shown in Table 1.

Patient interactions, prescribing practices and impediments

Of the GPs, 42/76 (55.3%) had at least one patient ask them for a medicinal cannabis prescription in the last 12 months (Table 2) most commonly for pain, cancer and palliative care. On request, 14/42 (33.3%) GPs attempted to prescribe, with 13 reporting impediments to prescribing and 7/13 reporting that the patient ultimately received their prescription (Table 2). Eight participants (8/73, 11.0%) reported they had patients who had been prescribed a medical cannabis product, with five reporting that this was specialist prescribed; however, it was not established if this was prior to the GP request. There were 51/75 (68.0%) GPs with patients reporting using illicit cannabis in order to manage medical conditions, mainly for pain, anxiety/depression and cancer/palliative care. Smoking was the preferred form of use (Table 2).

Evidence for use of medicinal cannabis products

Out of 76 GPs, 33 (43.4%) considered there was at least one condition with Grade A/Level 1 RCT[21] for cannabis use in medical

Table 1: Participant characteristics (stratified by experience).

	GP consultant (n)	%	GP registrar (n)	%	Trainee intern (n)	%	Not stated (n)	%	Total (n)	%
Total participants	67	88.2	3	3.9	2	2.6	4	5.3	76	100.0
Gender										
Male	42	55.3	1	1.3	1	1.3	0	0.0	45	59.2
Female	25	32.9	2	2.6	1	1.3	1	1.3	28	36.8
Not stated	0	0.0	0	0.0	0	0.0	3	3.9	3	3.9
Age band										
20–29	0	0.0	2	2.6	1	1.3	0	0.0	3	3.9
30–39	10	13.2	1	1.3	1	1.3	0	0.0	11	14.5
40–49	17	22.4	0	0.0	0	0.0	0	0.0	18	23.7
50–49	18	23.7	0	0.0	0	0.0	0	0.0	18	23.7
60–69	18	23.7	0	0.0	0	0.0	3	3.9	21	27.6
70–79	3	3.9	0	0.0	0	0.0	0	0.0	3	3.9
Not stated	1	1.3	0	0.0	0	0.0	1	1.3	2	2.6
Ethnicity (prioritised to Level 2)										
NZ European	49	64.5	1	1.3	2	2.6	1	1.3	53	69.7
Māori	3	3.9	0	0.0	0	0.0	0	0.0	3	3.9
Chinese	3	3.9	1	1.3	0	0.0	0	0.0	4	5.3
Indian	2	2.6	0	0.0	0	0.0	0	0.0	2	2.6
Other	10	13.2	1	1.3	0	0.0	0	0.0	11	14.5
Not stated	0	0.0	0	0.0	0	0.0	3	3.9	3	3.9

conditions; with the most commonly identified conditions listed in Table 3. A similar proportion (29/76, 38.2%) considered there were specific conditions for which there was clearly no evidence of benefit to support the use of medicinal cannabis products but that they were aware that these products might have been recommended or suggested outside evidence-based medicine, as listed in Table 3.

When asked about medicinal cannabis side effects, 49/76 (64.5%) GPs indicated at least one, with the most commonly stated side effects being drowsiness/sedation, psychosis/schizophrenia, nausea, and weight gain/increased appetite (n=25, 13, 13 and 9 respectively). 2/76 (2.6%) GPs stated there were no side effects, 13/76 (17.1%) did not know and 12/76 (15.8%) did not answer.

Knowledge of pharmaceutical-grade medicinal cannabis products

Just over half of GPs were aware of currently available pharmaceutical-grade cannabinoid preparations (n=43/76, 56.6%). Of these, most were aware of Sativex (n=37/43, 86.1%); 10/37 (27.0%) accurately described it constituents and 12/37 (32.4%) its formulation (Table 4). Of those aware of Sativex, 31/43 (72.1%) indicated they would prescribe it for at least one condition including pain syndromes (n=17), multiple sclerosis (spasticity/pain) (n=16) and epilepsy/seizures (n=11).

Regulatory processes

Less than half of GPs responded to the regulatory section of the questionnaire, with 37/76 (48.7%) answering questions

Table 2: Patient interactions relating to medicinal cannabis products and use of recreational cannabis for medicinal purposes.

	n	%	95% CI
Number of participants receiving patient requests for medicinal cannabis prescriptions	42/76	55.3	43.4–66.7
1–4 patients	38/42	90.5	77.4–97.3
5–10 patients	2/42	4.8	0.6–16.2
10+ patients	2/42	4.8	0.6–16.2
Number of participants attempting to prescribe	14/42	33.3	19.6–49.6
Number of participants with impediments (more than one answer could be given)	13/14	92.9	66.1–99.8
Specialist/ministry approval needed	6/13	46.2	19.2–74.9
Cost prohibitive to patient	6/13	46.2	19.2–74.9
Lack of general knowledge/information	2/13	15.4	1.9–45.5
Put off by assuming responsibility of assuring CBD:THC ratio	1/13	7.7	0.2–36.0
Number of participants not prescribing at time of request	28/42	66.7	50.5–80.4
Reasons for not prescribing at time of request (more than one answer could be given)			
Insufficient evidence base	14/28	50.0	30.7–69.4
Cost	6/28	21.4	8.3–41.0
Insufficient understanding of process	4/28	14.3	4.0–32.7
Clinical benefit vs logistics/cost inappropriate	3/28	10.7	2.3–28.2
Anticipated side effects	0/28	0	0.0–12.3
No answer given	8/28	28.6	13.2–48.7
Number of participants with patients reporting recreational cannabis use for medicinal purposes	51/75	68.0	56.2–78.3
1–4 patients	35/51	68.6	54.1–80.9
5–10 patients	9/51	17.6	8.4–30.9
10+ patients	6/51	11.8	4.4–23.9
No answer given	1/51	2.0	0.0–10.4
Preferred forms of use elicited from patients by participants (more than one answer could be given)			
Smoking	44/51	86.3	73.7–94.3
Edibles	19/51	37.3	24.1–51.9
Other (cannabis drops, oils, vaping, unknown)	8/51	15.7	7.0–28.6

Table 3: GP knowledge of evidence for medical cannabis use and future prescribing concerns.

Response	**Conditions with Grade A/ Level 1 RCT evidence for use is available**			**Conditions with substantive evidence of no benefit for use but GP aware may have been suggested outside evidence-based medicine**		
	n	**%**	**95% CI**	**n**	**%**	**95% CI**
None	17/76	22.4	13.6–33.4	5/76	6.6	2.2–14.7
Didn't know	13/76	17.1	9.4–27.5	15/76	19.7	11.5–30.5
Didn't supply an answer	13/76	17.1	9.4–27.5	27/76	35.5	24.9–47.3
At least one condition	33/76	43.4	32.1–55.3	29/76	38.2	27.3–50.0
Conditions cited	**N**			**N**		
Pain (all types)	19			15		
Epilepsy/seizure	16			7		
Multiple sclerosis	15			0		
Nausea and vomiting	8			1		
Psychological/psychiatric illness	0			12[a]		
Cancer	0			3		
Other	10[b]			11[c]		
Concerns about future prescribing of medical cannabis products (more than one option could be given)				**n**	**%**	**95% CI**
				59/75	78.7	67.7–87.29
Insufficient evidence base				39/59	66.1	52.6–77.9
Cost				19/59	32.2	20.6–45.6
Insufficient understanding of process				31/59	52.5	39.1–65.7
Clinical benefit vs logistics/cost inappropriate				18/59	30.5	19.2–43.9
Side effects				12/59	20.3	11.0–32.8

a: Anxiety; n=5, post traumatic stress disorder (PTSD); n=3, depression; n=3, psychiatric illnesses; n=1.
b: Anxiety; n=2, Parkinson's disease; n=2, arthritis/rheumatological disorders; n=2, depression; n=1, dystonia; n=1, motor neurone disease; n=1, poor appetite; n=1.
c: Headache; n=2, dementia; n=2, cardiovascular disease; n=1, reduce adverse effects of antipsychotics; n=1, head injuries; n=1, autism spectrum disorder; n=1, HIV; n=1, rheumatological disorders; n=1, muscle spasms; n=1.

relating to Sativex funding and 36/76 (47.4%) about its approval. Of those who supplied answers (for which more than one answer could be given), there were an equal number of responses indicating that specialist or MOH approval was needed for a Sativex prescription (n=21/36, 58.3%), with 20/37 (54.1%) indicating that they thought PHARMAC funding was available (Table 5).

59/75 (78.7%) GPs reported concerns about prescribing medical cannabis products in the future (Table 3). 63/75 GPs (84.0%) indicated that if there was a PHARMAC funded, licensed product with good scientific evidence for specific conditions, they would be 'somewhat' or 'very' likely to prescribe this in their day to day practice.

Accessing information

When asked about education 75 GPs responded, with 43/75 (57.3%) stating they had accessed one or more sources of information regarding cannabis use as a medicine. The educational sources accessed were journals (n=19/43, 44.2%), CME sessions (n=13/43, 30.2%), the Ministry of Health Website (n=12/43, 27.9%) and

Table 4: GP knowledge of pharmaceutical-grade medicinal cannabis products.

	N	%	95% CI
Any pharmaceutical grade medicinal cannabis medication	43/76	56.6	44.7–67.9
Nabiximols (Sativex)	37/43	86.1	72.1–94.7
Dronabinol (Marinol)	5/43	11.6	3.9–25.1
Nabilone (Cesamet)	2/43	4.7	0.6–15.8
Epidiolex	1/43	2.3	0.1–12.3
Knowledge of Sativex			
Primary constituents			
THC only	6/37	16.2	6.2–32.0
THC/CBD	10/37	27.0	13.8–44.1
CBD only	15/37	40.5	24.8–57.9
No answer given	6/37	16.2	6.2–32.0
Aware licensed in New Zealand	29/37	78.4	61.8–90.2
Formulation			
Capsule/tablet	1/37	2.7	0.1–14.2
Buccal/sublingual	12/37	32.4	18.0–49.8
Both	7/37	18.9	8.0–35.2
No answer given	17/37	46.0	29.5–63.1
Estimated cost per year to patient (NZ$)			
Less than $10,000	11/37	29.7	15.9–47.0
Greater or equal to $10,000	7/37	18.9	8.0–35.2
No answer given	19/37	51.4	34.4–68.1

other sources (n=15/43, 34.9%). Preferred educational methods were CME sessions (n=54/75,72.0%), followed by CME online modules and information sheets (n=32/75, 42.7% and n=25/75, 33.3% respectively).

Discussion

This study has identified that just over half of 76 GPs surveyed reported having patients ask about medicinal cannabis prescriptions in the past 12 months and two-thirds had patients discuss their use of illicit cannabis for medical reasons. Less than a third of GPs asked attempted to facilitate prescription requests citing cost and the need for specialist/ministerial approval as the largest impediments encountered. Just over half of the GPs were aware of pharmaceutical-grade cannabinoid products, with the majority of them referencing Sativex. Responses to the regulatory questions were limited and suggest uncertainty around the regulatory processes currently in place. Three quarters of participants expressed some concerns about prescribing medicinal cannabis in the future; however, most (four in five) reported that they would be willing to prescribe a PHARMAC-funded prescription medication with Grade A/Level 1 RCT evidence in specific medical conditions. Half of the participants had accessed some educational material about medicinal cannabis, with the majority preferring CME sessions as their future way of having information disseminated.

Table 5: GP knowledge of responsibility for the regulatory process relating to medical cannabis in New Zealand.

Entity responsible for approval of medicinal cannabis products									
	Sativex (n=36)			**CBD (n=21)**			**Other cannabis products (n=9)**		
	n	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Total response rate (out of 76)	36	47.4	35.8–59.2	21	27.6	18.0–39.1	9	11.8	5.6–21.3
PHO	0	0.0	0.0–9.7	1	4.8	0.1–23.8	0	0.0	0.0–33.6
DHB	1	2.8	0.1–14.5	1	4.8	0.1–23.8	1	11.1	0.3–48.3
Specialist	21	58.3	40.8–74.5	8	38.1	18.1–61.6	2	22.2	2.8–60.0
MoH	21	58.3	40.8–74.5	12	57.1	34.0–78.2	6	66.7	29.9–92.5
PHARMAC	12	33.3	18.6–51.0	10	47.6	25.7–70.2	6	66.7	29.9–92.5
Entity responsible for funding of medicinal cannabis products									
	Sativex (n=37)			**CBD (n=25)**			**Other cannabis products (n=13)**		
	n	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Total response rate (out of 76)	37	48.7	37.0–60.4	25	32.9	22.5–44.6	13	17.1	9.4–27.5
PHO	0	0.0	0.0–9.5	0	0.0	0.0–13.7	0	0.0	0.0–24.7
DHB	3	8.1	1.7–21.9	3	12.0	2.6–31.2	0	0.0	0.0–24.7
Patient	16	43.2	27.1–60.5	12	48.0	27.8–68.7	7	53.9	25.1–80.8
MoH	6	16.2	6.2–32.0	1	4.0	0.1–20.4	0	0.0	0.0–24.7
PHARMAC	20	54.1	36.9–70.5	12	48.0	27.8–68.7	7	53.9	25.1–80.8
Entity responsible for the import of medical cannabis products									
	Sativex (n=32)			**CBD (n=25)**			**Other cannabis products (n=11)**		
	n	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Total response rate (out of 76)	32	42.1	30.9–54.0	25	32.9	22.5–44.6	11	14.5	7.5–24.4
Prescribing doctor	5	15.6	5.3–32.8	6	24.0	9.4–45.1	3	27.3	6.0–61.0
Pharmacy	10	31.3	16.1–50.0	9	36.0	18.0–57.5	3	27.3	6.0–61.0
Specialist	4	12.5	3.5–29.0	5	20.0	6.8–40.7	1	9.1	0.2–41.3
MoH	6	18.8	7.2–36.4	3	12.0	2.6–31.2	1	9.1	0.2–41.3
PHARMAC	11	34.4	18.6–53.2	9	36.0	18.0–57.5	5	45.5	16.8–76.6

*PHO: Primary Health Organisation, DHB: District Health Board, MOH: Ministry of Health, PHARMAC: Pharmaceutical Management Agency.

The Misuse of Drugs (Medicinal Cannabis) Amendment Act December 2018 allows for patients with any illness that requires palliation, as determined by a medical doctor or nurse practitioner, a defence against the charge of possession of a cannabis plant or preparation, pipe or utensil.[7] In addition, CBD products were removed from the Misuse of Drugs Regulations 1977, and it was required that the regulations for a Medical Cannabis Scheme to improve access to quality medicinal cannabis products be in place within one year of the law being implemented.[22]

While this legal and regulatory environment for the use of cannabis as a medicine is changing, it does not necessarily follow that the medical profession are prepared for or support these changes. There is no conclusive definition as to what "medicinal cannabis" comprises; be it a pharmaceutical-grade medicine that has undergone the scrutiny of drug development phases or a locally grown cannabis plant that is smoked or from which a preparation is made, with or without the presence of THC. From a prescriber perspective, any cannabis product that has not been developed to a pharmaceutical grade and approved by MedSafe is considered an unapproved medicine, and as such can only be prescribed under Section 25 of the Medicines Act 1981.[23] This means the prescriber assumes responsibility in regards to independently investigating and conveying risks, benefits and contraindications related to the unapproved medication while providing appropriate follow-up if they choose to prescribe it.[24,25]

Currently GPs who feel there is evidence for use of cannabis -based products for their patients and who attempt to facilitate a request find they are impeded by a confusing regulatory process and a high cost to the patient. They report some patients choose to self-manage using an unregulated illicit product, often delivered by smoking. This reported use of illicit cannabis to manage medical conditions is in agreement with the New Zealand Health Survey 2012/2013,[9] suggesting that use of cannabis as a medicine has some currency in the eyes of the public.

There are varying levels of GP knowledge of the evidence for the use of cannabis as a medicine, with the same conditions being described in both the 'Grade A/Level 1 RCT evidence' and 'substantive evidence of no benefit of use' categories. While there is a large amount of peer-reviewed literature available,[2] there is a current lack of high-quality randomised controlled trials. The National Academies of Science, Engineering and Medicine report into the Health Effects of Cannabis and Cannabinoids in 2017 found conclusive/substantial evidence for the use of cannabis-derived therapeutics in three areas: chemotherapy-induced nausea and vomiting, patient-reported multiple sclerosis-related spasticity and the treatment of chronic pain in adults. However, they also specifically stated the need for further research.[2] There are ongoing randomised controlled trials of cannabis products in other medical conditions such as trials of Epidiolex in refractory childhood epilepsy syndromes.[5,26]

Almost half of GPs who participated in this study were aware of Sativex; however, the majority of those could not recall its constituents or its formulation. The majority of GPs were informed as to the potential side effects of using cannabis-based medications, likely reflecting knowledge of the adverse effects of recreational/illicit cannabis use. A minority were aware of the annual cost to patients (approximately $14,500) for the PHARMAC-approved indication for prescribing. This is not unsurprising, as the prevalence of multiple sclerosis in New Zealand was most recently recorded as 73.1/100,000,[27] meaning many GPs may not have experience with patients who have multiple sclerosis and do not have experience prescribing Sativex.

The majority of GPs expressed reservations about prescribing cannabis products in the future but indicated they would likely prescribe an approved medication that was PHARMAC funded and had Grade A/Level 1 RCT evidence for a specific medical condition.

The lack of substantial evidence for the use of cannabis as a medicine in many medical conditions and the relatively recent discovery of the endocannabinoid system is likely to have impacted the potential

education that GPs have received. Overseas studies report that despite the legalisation of medical cannabis products in certain states of the US, the training given at medical schools is limited, with 85% of residents and fellows reporting receiving no training about medical cannabis in medical school or residency and only 9% of medical schools having medical cannabis training in their curriculum.[28] This may reflect that although advocacy for use and legalisation of the products has occurred, the limited strength of evidence for the use of cannabis as a medicine precludes it from being included within the therapeutics section of medical school curricula. Current Australasian curricula concentrates on basic cannabinoid pharmacology; including receptors and signalling pathways, as well as cannabis -related drug tolerance and harms, with discussions around therapeutics if and when substantial evidence for use is available.

There are a range of Australian resources available from the Therapeutics Goods Administration[29] and the Australian Centre for Cannabinoid Clinical and Research Excellence (ACRE)[30] for practitioners to access about the use of cannabis as a medicine. However, with changing regulatory requirements, the addition of New Zealand-focused education modules including regulatory processes involved, cannabinoid products available in New Zealand and supporting evidence for or against their use that is made available for post-graduate doctors, would add to the tools that healthcare professionals can use to have informed conversations with their patients.

This study has limitations in its size, with 76 participants; however, it has strengths in the fact that the majority of questionnaires (73.9%) were undertaken in the presence of a study investigator rather than through an online portal, ensuring answers were based on immediate recall and therefore current knowledge. There is a likelihood that unanswered questions reflect areas that GPs have little or no knowledge, so the positive responses likely indicate the maximal current understanding in the GP community. There is a possibility of selection bias in that all participants were recruited through CME and peer group sessions, so only those doctors that attend these sessions would be approached; however, it is a requirement of the Medical Council of New Zealand that all doctors undertake a CME programme. It is acknowledged specific GPs may have areas of special interest that mean they would receive a higher amount of interest in the use if medical cannabis as a medicine and that this was not established at the time of the questionnaire being undertaken. The sample was small and skewed towards male GPs which may limit the generalisability of the results. There were also a greater number of GPs from urban practices compared with rural practices involved in the study, which also has potential to limit the generalisability.

In conclusion, the Misuse of Drugs (Medicinal Cannabis) Amendment Act 2018 has increased the likelihood that GPs will have patients wanting to discuss the use of cannabis as a medicine. Due to the issue of regulatory restrictions, limited pharmaceutical-grade preparations available in New Zealand and the poor evidence base of efficacy in many conditions, individual GPs may feel the need to take on the responsibility of prescribing an unapproved medication under the Medicines Act. To counter this, it is essential that evidence based, New Zealand-focused education modules are developed to allow GPs and their patients to have informed discussions around the legislative, evidential and practical elements of prescribing cannabis as a medicine.

Appendix

Medicinal cannabis in primary care questionnaire

General knowledge

1. Are you aware of any pharmaceutical-grade cannabis medications available worldwide?

   Yes ○ No ○

   a. If yes, please indicate which medications you are aware of, the primary constituents, whether they are licensed in New Zealand, the delivery route and rough cost to the patient. If no, please continue to page 2.

	Aware of product? (Y/N)	**Primary constituents (tick all that apply)**		**Licensed in NZ? (Y/N)**	**Capsule/ tablet (tick all that apply)**	**Buccal/ sublingual (tick all that apply)**	**Estimated cost per year (NZ $ amt)**
		THC*	**CBD***				
Dronabinol (Marinol)							
Nabiximols (Sativex)							
Nabilone (Cesamet)							
Epidiolex							

*THC= delta-9-tetrahydrocannabinol, CBD= Cannabidiol.

   b. What medical conditions, if any, would you prescribe each medication for?

	Condition 1	**Condition 2**	**Condition 3**	**Don't know**
Dronabinol (Marinol)				
Nabiximols (Sativex)				
Nabilone (Cesamet)				
Epidiolex				

Medical conditions

Cannabis has been suggested as a treatment for numerous medical conditions:

1. What conditions are you aware of that DO have Grade A/Level I RCT evidence for use of medicinal cannabis products? Please list up to 5.

   i) _____

   ii) _____

   iii) _____

   iv) _____

   v) _____

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2. What conditions are you aware of in which there is substantive evidence of NO benefit to support the use of medicinal cannabis products, but for which such products may have been recommended? Please list up to 5.
   i) _____
   ii) _____
   iii) _____
   iv) _____
   v) _____
3. Please list up to 5 side effects that are associated with use of medicinal cannabis products
   i) _____
   ii) _____
   iii) _____
   iv) _____
   v) _____

Regulatory requirements

There are three Ministry of Health categories of cannabis-based products in New Zealand presently. Please mark where the responsibilities of approval, funding and import lie with each (you may tick more than one option):

	Approval				
	PHO	**DHB**	**Specialist**	**MOH**	**PHARMAC**
CBD					
Sativex					
Other					
	Funding				
	PHO	**DHB**	**Patient**	**MOH**	**PHARMAC**
CBD					
Sativex					
Other					
	Import				
	Prescribing doctor	**Pharmacy**	**Patient**	**MOH**	**PHARMAC**
CBD					
Sativex					
Other					

PHO = Primary Health Organisation; DHB = District Health Board; MOH = Ministry of Health; PHARMAC = Pharmaceutical Management Agency.

Professional experience

1. Have you been approached by patients seeking a prescription for medical cannabis products over the past 12 months?

   Yes ○ No ○

   a. If yes, how many patients have approached you?

   1–4 ○ 5–10 ○ 10+ ○

   i) For what condition/s? _____

   _____

   b. Did you facilitate any of the requests?

   Yes ○ No ○

   i) If Yes:

      i. What impediments (if any) occurred when facilitating the request?

      _____

      _____

      ii. Did the patient receive their product?

   Yes ○ No ○

   ii) If No, why not:

   ○ Cost

   ○ Insufficient evidence base

   ○ Side effects

   ○ Insufficient understanding of process

   ○ Aware of process but considered potential clinical benefit vs logistics/cost inappropriate

2. Have any patients for whom you are the named GP been prescribed a medical cannabis product?

   Yes ○ No ○

   a) If yes, who prescribed this?

   Me ○ Another GP ○ Specialist ○

3. Have any of your patients informed you that they are using cannabis for medical conditions in the last 12 months?

   Yes ○ No ○

   a) If yes, how many patients?

   1–4 ○ 5–10 ○ 10+ ○

   i) For what condition/s? _____

   _____

   b) What are they using (tick more than one if required)?

   ○ Cannabis (smoked)

   ○ Cannabis (edible)

   ○ Other (please specify) _____

4. Have you accessed information about medical cannabis from any of the following sources?

   ○ CME session

   ○ Journals

   ○ MOH website

   ○ Other (please detail)

   _____

5. Do you have reservations or concerns in relation to prescribing medical cannabis products, either currently or in the future?

   Yes ◯ No ◯

   a) If yes, please give a reason:

   ◯ Cost

   ◯ Insufficient evidence base

   ◯ Side effects

   ◯ Insufficient understanding of process

   ◯ Aware of process but considered potential clinical benefit vs logistics/cost inappropriate

6. How would you prefer to receive educational content about medical cannabis?

   ◯ CME session

   ◯ CME online module

   ◯ Information sheet

   ◯ Podcast

   ◯ Other (please detail)

   _____

7. If there was a PHARMAC funded, licensed product with good RCT evidence for specific conditions how likely would you be to prescribe this in your day to day practice?

   ◯ Very Likely

   ◯ Somewhat Likely

   ◯ Neutral

   ◯ Somewhat Unlikely

   ◯ Very Unlikely

8. Demographic Information:

   Age (Years):

   ◯ Under 20

   ◯ 20–29

   ◯ 30–39

   ◯ 40–49

   ◯ 50–59

   ◯ 60–69

   ◯ 70–79

   ◯ 80+

   Gender:

   ◯ Male

   ◯ Female

   ◯ Other (please specify)

   _____

   ◯ Prefer not to disclose

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Ethnicity: Which ethnic group do you belong to? (Tick all that apply)

◯ NZ European
◯ Māori
◯ Samoan
◯ Cook Island Māori
◯ Tongan
◯ Niuean
◯ Chinese
◯ Indian
◯ Other (such as Dutch, Japanese, Tokelauan). Please state:

_____

Source: SNZ, 2001 Census

Specialty: _____

◯ Consultant/GP
◯ Senior Registrar
◯ Junior Registrar
◯ Senior House Officer
◯ House Officer
◯ Other (please specify)

_____

Years in practice: _____

Competing interests:
Karen Oldfield, Irene Braithwaite, Giles Newton-Howes and Alex Semprini are members of the Medical Cannabis Research Collaborative (NZ), an impartial collaboration of academics and regulatory experts with an interest in research into the use of cannabis as a medicine. The Medical Research Institute of New Zealand has undertaken research activity that is unrelated to this article for Helius and Whakaora Pharma, both of which are New Zealand-based medicinal cannabis companies. There are no other conflicts of interest to declare.

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