New Zealand Health Survey 2012/13: characteristics of medicinal cannabis users

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ABSTRACT

AIM: To explore the characteristics of medicinal and non-medicinal cannabis users, and the conditions that were treated with cannabis.

METHODS: The data comes from the New Zealand Health Survey 2012/2013, which sampled 13,009 people, aged 15+ years, living in private or non-private dwellings in New Zealand. Participants self-reported cannabis use and were put into groups: 1) non-users; 2) ex-users; 3) last year users—non-medicinal; 4) last-year users—medicinal. Prevalence was reported for the major demographic subgroups; sex, age and ethnicity. Regression models were then used to find associations between demographic characteristics and cannabis use for groups 3 and 4.

RESULTS/CONCLUSIONS: About five percent (4.6%, 95% CI 4.1–5.1) of those aged 15+ report using cannabis medicinally. This use was associated with being male, younger, less well-educated and relatively poor. While Māori have the highest prevalence of medicinal use, European NZ/Others make up 67.9% (95% CI 62.7–72.6) of medicinal users. Reported medicinal use was associated with reported conditions that were typically hard to manage: pain, anxiety/nerves and depression. Medicinal users were more likely to report chronic pain and pain interfering, moderately or more, with housework and other work.

It is currently illegal to cultivate, possess, supply and use cannabis through the Misuse of Drugs Act 1975.[1] However, the Minister of Health is able to approve the medical use of the cannabis plant, although in practice, the decision has been delegated to the Associate Health Minister Hon Peter Dunne.[2] In 2015, the first application was approved for the use of cannabis oil for a case of "status epilepticus".[2] In the context of this application, Hon Peter Dunne said that this should not be seen as a "significant change in policy".[2]

In 2010, consent was given for use of the cannabis medicine, Sativex, in New Zealand.[3] This medicine is an extract of the cannabis plant and is a standardised product with known levels of psychoactive content—unlike illicit cannabis, which can vary greatly in potency.[4] Sativex is available on application to the Ministry of Health by the patient, the patient's GP and specialist.[4] Sativex is not fully funded by PHARMAC, and is relatively expensive compared to illicit cannabis.[3] As of January 27 2016, 104 applications to prescribe Sativex had been approved in New Zealand.[5] In the same month, a patient who had recurring seizures that her specialist said could lead to coma and death had the medicine fully funded.[6]

As cannabis use is illegal, it is difficult to get information about who is using cannabis medicinally and for what reasons. In 2003, the Green Party of New Zealand randomly surveyed general practitioners and selected hospital specialists about their views on medicinal cannabis.[7] The results showed that 20% of these doctors knew they had patients who were using cannabis medicinally. They also showed that 32% of doctors would consider prescribing medicinal cannabis products if they were legally allowed and 10% of doctors had patients they felt could benefit from cannabis.

In 2006, the Green Party of New Zealand introduced the Misuse of Drugs (Medicinal Cannabis) Amendment Bill, but it was defeated in a conscience vote in 2009.[8] However, other countries have legalised

medicinal cannabis use, eg, Israel in 1996,[9] Canada in 2001,[10] and The Netherlands in 2003.[11] In the US, medicinal cannabis use is illegal at the Federal level, but medicinal use of cannabis is currently legal in 23 states.[12] In Canada and The Netherlands, the government supplies cannabis to users directly or through registered suppliers, allowing them to control quality and supply, whereas in the US, medical cannabis users have to grow or find their own supply, leading to a free market in cannabis.[10,11,13] In California, where medicinal cannabis was legalised in 1996 through a citizen's initiative, any debilitating condition can be treated with cannabis if a physician recommends it.[12] This has led to recreational users being able to access medicinal cannabis through misleading their doctor about their health, or with their doctor's cooperation.[13]

Given the defeat of the Green Party's bill, legalisation of medicinal cannabis is unlikely to happen in New Zealand in the foreseeable future. This leaves practitioners with little information about who uses cannabis medicinally, and why. The aim of this study was to explore the characteristics of medicinal cannabis users using representative national survey data.

Methods

Confidentialised, unit record data from the 2012/2013 New Zealand Health Survey were supplied by the Ministry of Health (MoH) with administration through Statistics New Zealand.[14] The adult data set contains 13,009 respondents, aged 15 years and above, who were living in a private or non-private dwellings, and were from the New Zealand usually resident population. Non-private dwellings include such things as aged care accommodation and student hostels. However, people in hospitals, prisons, dementia units or those in hospital-level care accommodation were excluded, as well as people in meshblocks with sparse populations, and New Zealand's off-shore islands.

The survey used a complex method of sampling that included the means of oversampling Māori, Asian and Pacific people, but the survey has been weighted to produce a representative sample. Estimates produced by these weights form unbiased estimates of population values. The data

set also includes a set of 100 replicate weights which create 100 further estimates. The variance of these estimates around the unbiased estimate gives the sampling variance. For the purpose of this paper, SUDAAN was used to do these calculations.[15]

Results can suffer from bias when the number of respondents that contribute to an estimate are too few, or an estimate may have little meaning if it has large sampling variation. The relative sampling error (RSE) is monitored to check if an estimate has these problems. The MoH advises that estimates with a RSE of 30%–50% should be used with caution, and estimates with RSE over 50% should be considered too unreliable for most practical purposes.[14] In this article, estimates with RSE between 30% and 50% are marked with an asterisk, estimates over 50% are marked with a double asterisk, and estimates that rely on few respondents will be supressed, eg, an estimate of 6.4% with a RSE of 45% will be marked as 6.4*%.

The New Zealand Health Surveys consist of a core questionnaire and rotating modules. In the core questionnaire, survey respondents were asked if they had used cannabis in the last 12 months for recreational or non-medical purposes, or to "get high". In the 2012/13 survey, the tobacco, alcohol and drug use modules were also included, which asked questions about use of those products. Questions used from this module include: lifetime use of cannabis; cannabis use in the last 12 months; and whether cannabis was used in the last 12 months to intentionally treat a range of medical conditions—pain, nausea, depression, anxiety/nerves, other, or none of these. These questions were used to assign people to a category of cannabis use:

1) non-users—respondents who had never used cannabis;

2) ex-users—respondents who had used cannabis but had not done so in the last year;

3) last year users: non-medicinal— respondents who had used cannabis in the last year, but who had not intentionally used it to treat a medical condition;

4) last year users: medicinal—respondents who had used cannabis in the last year, and had intentionally used it to treat a medical condition.

Table 1: Questions and answers used to classify cannabis users.

Main Module	Alcohol and Drug Module			Number of Observations	Classification[1,2]
In the last 12 months, have you used any of the following drugs for recreational or non-medical purposes, or to get high? (Cannabis option)	Have you ever tried cannabis?	Have you used cannabis in the last 12 months?	In the past 12 months, did you intentionally use cannabis to treat pain or any of the following medical conditions?		
Yes	Yes	Yes	Yes	498	**Medicinal User**
			No	587	non-Medicinal User
			Don't Know	8	*non-Medicinal User*
			Refused	9	*non-Medicinal User*
		No		118	*ex-User*
		Refused		6	*non-Medicinal User*
	No			14	*Non-User*
	Don't Know			2	*non-Medicinal User*
	Refused			4	*non-Medicinal User*
No	Yes	Yes	Yes	150	**Medicinal User**
			No	152	*non-Medicinal User*
			Don't Know	5	*Medicinal User*
			Refused	1	*Medicinal User*
		No		3,924	**ex-User**
		Don't Know		7	*ex-User*
		Refused		8	*ex-User*
	No			7,379	**non-User**
	Don't Know			28	*non-User*
	Refused			65	*non-User*
Don't know	Yes	No		6	*ex-User*
	No			16	*non-User*
	Refused			1	*non-User*
Refused	Yes	Yes	No	1	*non-Medicinal User*
		No		5	*ex-User*
		Don't Know		1	*ex-User*
		Refused		2	*ex-User*
	No			3	*non-User*
	Refused			9	*non-User*

Notes: 1 - All identical classifications are similarly coloured. 2- Non-italicised, bolded classifications are classifications where data is consistent and not missing; italicised classifications are either contradictory or have missing data. The following rules were used to define an italicised classification in this order: a) use information from drug module questions only; b) use additional information from main module question if data is missing from drug module questions; and c) any unresolved classification has data for the missing question to be treated as if they answered "No".

Table 2: Count of Classifications by the rules applied.

	Non-Users	Ex-Users	Last Year Use non-Medicinal	Last Year Use Medicinal	Total	Cumulative % classified
No Rule	7,379	3,924	587	648	12,538	96.4
Rule a	42	129	153	0	324	98.9
Rule b	0	15	12	6	33	99.1
Rule c	94	3	17	0	114	100.0
Total	7,515	4,071	769	654	13,009	

Table 3: Prevalence of cannabis use across major demographic variables.

	Non-Users		ex-Users		Last Year Users: non-Medicinal		Last Year Users: Medicinal		p-value for difference between group 3 and 4
	Statisitic	95% CI	Statisitic	95% CI	Statisitic	95% CI	Statisitic	95% CI	
All	58.7	57.7–59.8	30.2	29.3–31.2	6.5	5.9–7.1	4.6	4.1–5.1	0.0000
Sex (row %)									
Female	62.3	60.8–63.8	29.8	28.4–31.2	4.5	3.9–5.3	3.3	2.8–3.9	0.0062
Male	54.9	53.4–56.4	30.7	29.2–32.2	8.5	7.6–9.5	5.9	5.2–6.8	0.0001
Age									
Mean	48.9	48.5–49.2	42.1	41.6–42.6	30.7	29.8–31.7	33.1	31.8–34.4	0.0063
Age Group (row %)									
15–24	56.6	53.8–59.4	19.9	17.7–22.2	14.7	12.6–17.0	8.8	7.3–10.6	0.0000
25–34	43.4	40.3–46.5	38.7	35.7–41.7	10.4	8.6–12.6	7.5	6.1–9.2	0.0222
35–44	46.0	42.9–49.1	43.3	40.1–46.5	6.5	5.3–7.9	4.3	3.4–5.3	0.0057
45–54	49.9	47.4–52.5	41.6	39.1–44.2	4.3	3.5–5.2	4.2	3.3–5.4	0.9412
55+	79.3	77.8–80.6	18.8	17.4–20.2	0.9	0.7–1.3	1.1	0.7–1.6	0.6226
Ethnicity (row %)									
Māori	36.3	33.6–39.0	39.1	36.6–41.6	14.5	12.5–16.7	10.2	8.7–12.0	0.0016
Pacific people	68.2	63.3–72.7	24.7	20.6–29.4	4.9 *	3.2–7.6	2.2 *	1.3–3.5	0.0257
Asian	91.1	88.5–93.1	6.3	4.8–8.2	-	-	-	-	-
European/Other	57.0	55.7–58.3	32.8	31.6–34.1	5.8	5.2–6.6	4.4	3.8–5.1	0.0029

Notes: 1 - an estimate with RSE between 30% and 50% will be marked with an asterisk, estimates with RSE over 50% will be marked with a double asterisk and estimates that rely on a few respondents will be suppressed.

Not all respondents could be assigned to a category, either because they had answered "don't know", or refused to answer a particular question, or because their answer to the question from the core module disagreed with their answer to the questions in the drug use module. Whenever an assignment could not be made directly from the data, the following rules were used to make a classification, and they were done in this order:

a) only use information from drug use module questions;

b) use additional information from main module question if data is missing from drug module questions;

c) any unresolved classification has data for the missing question to be treated as if they answered "No".

The classifications are outlined in Table 1. Table 2 shows the number of people classified into each group according to these rules.

While people who answered "don't know" may be ambiguous as to their classification (eg, they could not remember if they had used cannabis 11 or 13 months ago, or didn't know if a herbal remedy contained cannabis), those people who refused were more likely to be respondents who ought to have answered "yes", but were reluctant to do so; for example, they did not want to admit to a criminal offense. However, since respondents could also lie about use, the categories can be described as "admitted use" rather than "actual use", and therefore are an undercount of "actual use". The size of the groups get smaller when moving from classification 1 to 4 so that putting a respondent in a category with more respondents, rather than a category with fewer (eg, non-user, rather than ex-user), means they make a lesser contribution to the results.

The data were analysed, and proportions, means and their 95% confidence intervals appear in the tables for all four groups, and are commented on in the results section. It is well known that cannabis users and non-cannabis users have different characteristics, however, little is known about the differences between medicinal and non-medicinal users of cannabis, so their responses were modelled, compared, and tested using p-values. If the responses were continuous, they were analysed using

regression methods. If the responses were from a question with two or more options, they were analysed using multinomial logistic regression with a generalised logit link. In both cases, as there was only one class variable, the proportions or means presented in the tables were equivalent to the conditional marginal means outputted by these regression analyses. The difference between the conditional marginal means for groups 3 and 4 were tested, and the associated p-value appears in the tables. As age, sex and ethnicity are known to be associated with cannabis use, the models were re-run with these factors as confounders to see if that changed the interpretation of the differences; if so, this is mentioned.

Results

Prevalence in major demographic factors

Overall, 58.7% (57.7–59.8) of respondents were non-users, 30.2% (29.3–31.2) had used cannabis, but had not done so in the last year, while 6.5% (5.9–7.1) had used cannabis in the last year, but not medicinally, and 4.6% (4.1–5.1) had used it medicinally in the last year (see Table 3). Of the people using cannabis medicinally, 68.6% (61.5–75.0) had also used it recreationally, or for non-medicinal purposes, or to "get high" in the last year.

Sex

Non-users were more likely to be female than male (54.5% (53.5–55.4) vs 45.5% (44.6–46.5), respectively), ex-users were more evenly split (male 50.8% (48.8–52.4), female 49.4% (47.7–51.2)), and last year users were more likely to be male, whether medicinal users (62.9% (57.9–67.6)) or non-medicinal users (63.9% (59.6–67.9)). Of the people using cannabis for medicinal purposes only, 61.0% (51.7–69.7) were male.

Age

Nine percent (8.8% (7.3–10.6)) of 15–24-year-olds said they used cannabis for medicinal reasons, and 14.7% (12.6–17.0) had used it non-medicinally. This age group had the largest proportion of both types of users. They were also the group with the second largest proportion of respondents who have never used cannabis (56.6% (53.8-59.4)), behind the oldest age group, 55+ years, with 79.3% (77.8–80.6). The

Table 4: Demographic information about Cannabis users and non-users.

	Non-Users		ex-Users		Last Year Users: non-Medicinal		Last Year Users: Medicinal		p-value for difference between group 3 and 4
	Statisitic	95% CI	Statisitic	95% CI	Statisitic	95% CI	Statisn	95% CI	
School Qualifications (col %)									
None	27.1	25.6–28.8	21.3	19.7–23.0	24.9	21.5–28.7	33.7	29.1–38.7	0.0056
Year 11/ Form 5	17.7	16.5–18.9	20.3	18.6–22.0	21.5	17.8–25.8	23.3	18.0–29.6	0.6304
Year 12/ Form 6	16.2	14.9–17.6	23.4	21.5–25.4	21.8	17.9–26.3	21.6	17.2–26.7	0.9473
Year 13/ Form 7	17.0	15.7–18.4	26.0	23.8–28.2	27.4	22.4–33.0	16.0	12.2–20.6	0.0008
Non-NZ qualification	22.0	20.6–23.5	9.1	7.6–10.8	4.4	2.7–6.9	5.4	3.4–8.6	0.5171
New Zealand Deprivation Index 2006 (col %)									
Deciles 1 & 2 (least deprived)	21.1	20.0–22.3	21.7	20.1–23.5	11.3 *	7.7–16.4	14.2 *	10.0–19.8	0.3088
Deciles 3 & 4	21.5	20.3–22.8	20.3	18.7–22.1	19.6	15.5–24.5	11.7 *	8.2–16.4	0.0028
Deciles 5 & 6	20.1	19.0–21.2	19.9	18.5–21.4	23.5	18.7–29.1	20.8	15.5–27.4	0.5215
Deciles 7 & 8	19.9	19.0–20.8	19.9	18.8–21.0	21.8	18.3–25.7	21.2	16.9–26.2	0.8464
Deciles 9 & 10 (most deprived)	17.4	16.5–18.3	18.2	16.9–19.5	23.7	20.3–27.5	32.1	27.5–37.0	0.0025
Household									
No of adults (mean)	2.5	2.5–2.6	2.4	2.4–2.5	2.9	2.8–3.1	2.7	2.6–2.8	0.0022
No of children (mean)	0.6	0.5–0.6	0.8	0.8–0.8	0.8	0.7–0.9	0.7	0.6–0.8	0.1665
Income Source (%)									
Income from employer[1]	52.3	50.9–53.8	69.2	67.0–71.3	70.4	66.2–74.3	65.0	59.9–69.8	0.0899
Invalids/sickness/ accident benefits[2]	3.5	3.1–4.0	5.3	4.5–6.2	7.0	4.8–10.0	16.8	13.6–20.5	0.0000
Self-employment[3]	11.1	9.9–12.3	18.5	16.8–20.3	10.6 *	7.7–14.4	9.8	7.2–13.2	0.7488
Unemployment benefit	1.2	0.9–1.6	1.7	1.3–2.1	7.1	5.3–9.5	9.3 *	6.5–13.0	0.2491
Domestic purposes benefit	1.5	1.2–1.8	4.6	3.9–5.3	4.3	3.3–5.8	7.5	5.9–9.4	0.0041
Student allowance	2.5	2.0–3.1	3.0	2.3–4.0	9.2 *	6.2–13.6	6.5 *	4.3–9.5	0.1976
Interest/dividends/ rents/other investments	14.2	12.5–16.1	14.2	12.2–16.4	8.1 *	5.6–11.6	2.9 **	1.5–5.6	0.0063
Retirement age benefits[4]	25.8	25.0–26.6	5.3	4.5–6.2	-	-	-	-	-
Other[5]	4.0	3.4–4.6	5.9	5.0–6.8	7.6 *	5.5–10.5	6.4 *	4.0–10.1	0.5219
No income	9.8	8.9–10.8	4.1	3.4–5.0	6.7	4.7–9.5	5.1 *	3.1–8.0	0.2825
Income (1,000s of dollars per anum, mean)									
Total personal income[6]	34.6	33.4–35.7	48.7	46.7–50.7	35.0	32.0–38.1	33.1	29.8–36.4	0.4186
Household income[7]	33.8	33.1–34.6	41.8	40.7–42.8	37.0	34.1–40.0	32.6	29.9–35.3	0.0379

Table 4 (cont): Demographic information about Cannabis users and non-users.

	Non-Users		ex-Users		Last Year Users: non-Medicinal		Last Year Users: Medicinal		p-value for difference between group 3 and 4
	Statisitic	95% CI	Statisitic	95% CI	Statisitic	95% CI	Statisitic	95% CI	
Current Work Situation (col %)									
Working in paid employment	55.1	53.9–56.3	77.1	75.2–78.8	67.4	63.3–71.3	59.2	53.7–64.5	0.0204
Not working, looking for employment	3.7	3.1–4.3	3.5	2.8–4.5	10.0	7.6–12.9	11.6	8.6–15.6	0.4630
Not working, not looking for employment	39.7	38.5–41.0	18.4	17.0–20.0	20.7	17.2–24.8	28.0	24.0–32.3	0.0148
Other	1.5	1.1–2.0	1.0	0.7–1.4	-	-	-	-	-
Medical Insurance (%)									
Yes	36.0	34.1–37.9	38.8	36.7–41.0	22.5	18.4–27.1	19.7	14.7–26.0	0.4631

Notes: 1 - Wages, salaries, commissions, bonuses etc, paid by an employer; 2 - Invalids or Sickness benefit, regular payments from ACC or a private work accident insurer; 3 - Self-employment, or a business a person owns and works in; 4 - NZ Superannuation or Veterans Pension, other superannuation, pensions or annuities (not the war pension); 5 - Other government benefits (eg war pension) or any other income eg from people outside household; 6 - 20% of the data were missing for this calculation; 7 - 31% of the data were missing for this calculation; 8 - an estimate with RSE between 30% and 50% will be marked with an asterisk, estimates with RSE over 50% will be marked with a double asterisk and estimates that rely on a few respondents will be suppressed.

proportion of those who have never used cannabis in the three middle age groups lies between 43% and 49%.

Prioritised ethnicity

Ten percent of Māori reported using cannabis medicinally (10.2% (8.7–12.0)) and 14.5% (12.5–16.7) reported using cannabis non-medicinally. Māori have the highest rates of medicinal and non-medicinal use and also ex-use (39.1% (36.6–41.6)). However, European New Zealanders/Others make up 64.3% (60.2–68.2) of non-medicinal users and 67.9% (62.7–72.6) of medicinal users.

Demographic factors associated with medicinal use amongst cannabis users

Medicinal users of cannabis were more likely to have no school qualification (33.7% (29.1–38.7)) compared to non-medicinal users (24.9% (21.5–28.7)), and less likely to have qualifications from Year 13/Form 7 (see Table 4).

The New Zealand Deprivation Index 2006 assigns people living in a meshblock to a decile according to certain responses given on the 2006 Census by people living in that meshblock. An index value of Decile 1 represents the least deprivation, while Decile 10 represents the most deprivation. Medicinal users were less likely

to be Deciles 3 and 4 (11.7*% (8.2–16.4)) compared to non-medicinal users (19.6% (15.5–24.5)), and were more likely to be in Deciles 9 and 10 (23.7% (20.3–27.5) vs 32.1% (27.5–37.0)).

Medicinal users had on average 2.7 (2.6–2.8) adults living in their household, whereas non-medicinal users had 2.9 (2.8–3.1). The difference, though small in a practical sense, was statistically significant (p=0.0022). The average number of children in the household was similar.

There were some differences in the income sources of medicinal and non-medicinal users. Medicinal users were more likely to get income from health-related benefits, eg, sickness benefit, invalids' benefit, or regular payments from ACC or a private work accident insurer (16.8% (13.6–20.5) vs 7.0% (4.8–10.0)), or from the Domestic Purposes Benefit (7.5% (5.9–9.4) vs 4.3% (3.3–5.8)), but less likely to get income from investments, eg, interest, dividends, rent, other investments (2.9**% (1.5–5.6) vs 8.1*% (5.6–11.6)).

Respondents were asked about their personal and household income. For these questions, a lot of data was missing: 20% for the former question, and 31% for the latter, of which "don't know" was the response over 85% of the time. However, the proportions of missing data were similar in both

Table 5: The reason for the intentional treatment with cannabis.

Last Year Users: Medicinal		
	Statisitic	95% CI
Medicinal Reason (% of medicinal users)		
Pain	40.1	34.1–46.5
Nausea	11.1	8.2–14.8
Depression	26.0	21.4–31.2
Anxiety/nerves	27.2	22.7–32.3
Other	43.8	36.9–51.0

groups for each question, so if we assume that similar types of people were likely to not respond in each group, the difference in income is probably measuring something real. Under this assumption, household income is lower for medicinal users than non-medicinal users. This is not altogether surprising since the average number of adults in the household was different. Average personal income is similar between the two groups (p=0.4186), but after adjusting for age, sex and ethnicity, average personal income does become significant (p=0.0464) and is lower for medicinal users. This is the only difference that changed its interpretation after making such an adjustment.

Non-medicinal users were more likely to be working (67.4% (63.3–71.3) vs 59.2% (53.7–64.5)), and less likely to be not working and not looking for a job (20.7% (17.2–24.8) vs 28.0% (24.0–32.3)) compared to medicinal users.

Reasons for Use

Medicinal users were asked the reasons that they intentionally treated themselves with cannabis. The most common reason was pain, followed by anxiety/nerves and then depression (see Table 5). The largest grouping was "other" which was not further defined.

In order to understand if the medicinal users' group was different in the proportion of people suffering pain, two further questions were analysed. Respondents were asked if they suffered from chronic pain, which was defined as pain suffered every day (although not always at the same intensity) for 6 months or more, or is likely to be suffered for more than 6 months. Non-users, (17.4% (16.2–18.6)) and ex-users (18.3% (16.6–20.0)) reported similar proportions of respondents with chronic pain. Non-medicinal users reported less chronic pain (10.8% (8.3–13.8)), whereas medicinal users reported a larger proportion of respondents with chronic pain (29.0% (24.5–33.9)). The second question was whether pain suffered within the last 4 weeks interfered with work in the home or elsewhere, with options "not at all", "a little bit", "moderately", "quite a bit", or "extremely". The proportion answering "moderately", "quite a bit", or "extremely" was similar for non-users (14.4% (13.3–15.4)) and ex-users (15.7% (14.1–17.6)), was lower for non-medicinal users (9.9% (7.7–12.8)), and higher for medicinal users (25.8% (21.3–30.8)). For both questions, non-medicinal and medicinal users had significantly different proportions of respondents indicating chronic pain or pain interfering with work at home or elsewhere.

Respondents were asked about whether they felt that cannabis had a harmful effect on their physical or mental health in the last 12 months. The non-medicinal group (6.0% (4.2–8.5)) and the medicinal group (8.4% (6.1–11.5)) both reported similar proportions of physical harm from cannabis use (p=0.2150). However, the non-medicinal group (6.2% (4.3–9.0)) were less likely to report harm to their mental health compared to the medicinal group (11.4% (8.4–15.3), p=0.0129).

Discussion

About 5% of those aged 15+ report using cannabis medicinally. Because this is admitted use, rather than actual use, it is likely that this is an under-estimate of actual use. Alternatively, it could be argued that some respondents may say they need cannabis for medicinal reasons to explain away their illegal use to themselves or to others, making this an over-estimate of use. That a large proportion of cannabis users are medicinal users (41%) and that a large

Table 6: The association of pain and last year marijuana use in a model adjusting for age, sex and ethnicity. The table is reproduced in part from Pledger and Cumming (2010) using data from the New Zealand Health Survey 2002/03.[17]

Last Year Marijuana Use		
	OR	95% CI
Pain		
No bodily pain (reference)	1.00	
Very mild	1.07	(0.80, 1.44)
Mild	**1.55**	(1.18, 2.03)
Moderate	**1.50**	(1.15, 1.94)
Severe	**1.97**	(1.41, 2.75)
Very Severe	**2.74**	(1.36, 5.51)
Type of Pain		
Face, jaw, jaw joint	1.71	(0.96, 3.05)
Chest, ribs, sternum	**1.60**	(1.05, 2.45)
Back	**1.55**	(1.25, 1.92)
Stomach, abdomen, rectum, kidneys, bladder	**1.41**	(1.07, 1.86)
Head	1.25	(0.99, 1.57)
Neck	1.16	(0.91, 1.47)
Joints	1.06	(0.88, 1.29)
Dental, teeth	-	-
Other	0.87	(0.57, 1.32)

proportion of medicinal users (69%) say they also use cannabis recreationally, for non-medicinal purposes, or to "get high", would fit with this latter theory.

On the other hand, there is evidence that medicinal users are using cannabis for medicinal reasons. They reported more uptake of invalids', sickness, and accident benefits, as well as being more likely to report chronic pain, or pain interfering—moderately or more—with household or other work (note that these pain questions were put to respondents before asking about their medicinal use of cannabis). This is more consistent with cannabis being used for a medicinal purpose rather than an excuse for recreational use.

In a near identical survey undertaken 10 years earlier, the New Zealand Health Survey 2002/03, respondents were presented with different, but more specific questions about pain; asking about their levels of pain and where they felt it. The survey also asked one question about cannabis use, which was frequency of marijuana use in the last year (rather than the wider category of cannabis use in the 2012/13 survey).[16] In that data, an association between last year marijuana use and level of pain was found in a logistic regression model that adjusted for age, sex and ethnicity.[17] The odds ratios appeared to increase with pain level. There were also different areas of the body, where last year marijuana users were more likely to feel pain. This data is reproduced from that paper and appears in Table 6.

In the New Zealand Health Survey 2012/13, the proportion of ex-users in the 35–44 and 45–54 age groups is around 42%, compared to 18% for those aged over 55+. This has implications as this cohort of people move out of middle age and into old age with the accompanying increase in age-related ill health. Having experience of cannabis use and its effects means they may be more willing to use cannabis medicinally if they experience ill-health.

The current study has some limitations. The New Zealand Health Surveys are highly complex surveys that have to satisfy a wide variety of users. Therefore, it is not possible to collect precise and detailed information about medicinal users and their use of cannabis. Important clinical information about how medicinal users use cannabis, and for how long, where they get their information from, and if they disclose their use of cannabis to their doctor, would be important next steps in future research, but unlikely to be possible through the New Zealand Health Survey.

The other limitation is that there was missing data and contradictory data around classifying respondents into cannabis-using groups. Although the number of respondents needing to be classified by rules a, b and c was small compared to the survey overall, it is large compared to the group of people who used cannabis in the last year. Sensitivity analysis was done to see if classifying people differently changed the results. The first case was to just use the drug module questions to classify people, and drop those who could not be classified. The second case was similar, but assigned a "yes" at the question where respondents answered "don't know" or refused to answer. In both cases, the answers were similar to those already reported—the estimates usually changed by less than 1 percentage point. The only case where it made a large difference was for prevalences in the smaller ethnic populations, ie, the proportion of Asian people in the non-user group decreased from 91.1% to 89.6%. None of the hypotheses tested changed their interpretation.

There are contradictions in the responses between the main module question about cannabis use and the alcohol and drug module questions. The authors feel that this was due to: 1) the question in the main module being difficult to parse; and 2) that the questions in the main module asking about a range of drug use besides cannabis and the users could do a blanket refusal or "don't know" when they may have been willing to answer for individual drugs, especially "softer" drugs like cannabis, but not heroin. The authors chose to use "admitted use" as their criteria for respondents' inclusion in to cannabis use categories, as this is likely to reflect the type of people who will admit to use in the clinical setting. Even though these caveats must be kept in mind, this paper advances what we know about medicinal users of cannabis.

In earlier research exploring the use of complementary and alternative medicines (CAM) in New Zealand, an association was found between CAM use and being female, middle-aged, relatively rich, well-educated, and of European decent.[18] In this study, medicinal cannabis use was associated with being male, younger, less well-educated and relatively poor. And while Māori have the highest prevalence of medicinal use, by weight of numbers, European NZ/Others are more likely to be medicinal users. In both cases, reported use was associated with reported conditions that were typically hard to manage.[18]

Cannabis users in both groups had reported they felt physical or mental health harm from their cannabis use. It was also the case that a significantly larger proportion of medicinal than non-medicinal users reported that their cannabis use had a negative effect on their mental health. This is an important finding, suggesting that medicinal cannabis users may need to be monitored for the emergence of mental health problems. Making medicinal use of cannabis legal, but only with a prescription, may help reduce the harm to medicinal users as they would be able to get advice about how much cannabis to use, and safer methods of use, such as the use of a vaporiser or as a tea.[11] This is contingent, however, on doctors having the knowledge to give to such users. That medicinal users of cannabis are young and male means that allowing GPs to prescribe the medicinal use of cannabis might mean capturing a group of people who would otherwise not access health care.

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