

# Pain, Cannabis Species, and Cannabis Use Disorders

NICOLE L. COHEN, B.A.,<sup>a</sup> ADRIENNE J. HEINZ, PH.D.,<sup>a,b</sup> MARK ILGEN, PH.D.,<sup>c,d</sup> & MARCEL O. BONN-MILLER, PH.D.<sup>a,b,e,f,\*</sup>

<sup>a</sup>National Center for PTSD, Veterans Affairs Palo Alto Health Care System, Menlo Park, California

<sup>b</sup>Center for Innovation to Implementation, Veterans Affairs Palo Alto Health Care System, Menlo Park, California

<sup>c</sup>Veterans Affairs Center for Clinical Management Research, Ann Arbor, Michigan

<sup>d</sup>Department of Psychiatry, University of Michigan, Ann Arbor, Michigan

<sup>e</sup>Center of Excellence in Substance Abuse Treatment and Education, Philadelphia VA Medical Center, Philadelphia, Pennsylvania

<sup>f</sup>Department of Psychiatry, University of Pennsylvania Perelman School of Medicine, Philadelphia, Pennsylvania

**ABSTRACT. Objective:** The purpose of this study was to examine whether individuals who used medical cannabis for chronic pain were at increased risk for cannabis use problems compared with individuals who used medical cannabis for other reasons (e.g., anxiety, insomnia, and muscle spasms). An additional aim was to determine whether individuals who used cannabis for chronic pain, as well as those who reported greater within-group pain levels, demonstrated a species preference (i.e., sativa, indica, hybrids) and the extent to which species preference was associated with cannabis use problems. **Method:** Participants were 163 medical cannabis users (77% male), recruited from a medical marijuana dispensary in California, who completed assessments of medical cannabis use motives, history, preferences (species type), and problems,

as well as current pain level. **Results:** Individuals who used cannabis to manage chronic pain experienced fewer cannabis use problems than those who did not use it for pain; among those who used it for pain, the average pain level in the past week was not associated with cannabis use problems. Furthermore, individuals who used cannabis for chronic pain were more likely to use indica over sativa. Preference for indica was associated with fewer cannabis use problems than preference for hybrid species. **Conclusions:** Individuals who use cannabis to manage chronic pain may be at a lower risk for cannabis use problems, relative to individuals who use it for other indications, potentially as a function of their species preference. (*J. Stud. Alcohol Drugs*, 77, 515–520, 2016)

**P**AIN MANAGEMENT IS THE MOST commonly reported reason for seeking medical cannabis (Bonn-Miller et al., 2014; Walsh et al., 2013). With the recent legalization of medical cannabis in several U.S. states, the number of medical cannabis users has substantially increased, in part because of the perceived effectiveness of cannabis in ameliorating chronic pain (Abrams et al., 2007; Lynch & Campbell, 2011). Although chronic pain is a qualifying condition in all U.S. medical cannabis states, there is growing concern regarding the development of cannabis-related problems among those who use cannabis to manage pain.

Preliminary evidence suggests that individuals who use medical cannabis to manage pain may actually be at a lower risk for problematic cannabis use patterns than those who report using medical cannabis for other reasons. A recent descriptive study (i.e., no inferential statistics) of a sample of individuals who used medical cannabis observed that individuals who indicated using cannabis for chronic pain reported lower quantity and frequency of use, and fewer

problems associated with use, than did individuals who used it for other conditions (Bonn-Miller et al., 2014). Although other studies have highlighted negative consequences associated with using cannabis for pain management (e.g., central nervous system depression, mood disturbances, and acute psychosis; Martín-Sánchez et al., 2009), no studies have directly investigated whether use for chronic pain is associated with potential use problems, such as cannabis use disorders.

Cannabis is composed of multiple cannabinoids, with previous research primarily focused on  $\Delta$ -9-tetrahydrocannabinol (THC), the primary psychoactive compound, and cannabidiol (CBD). These particular cannabinoids, or combinations thereof, have been shown to differentially affect specific medical conditions (e.g., anxiety, chronic pain; Crippa et al., 2009; Notcutt et al., 2004) and yield different side effects associated with cannabis use (e.g., paranoid symptoms, memory impairment, and psychotic experiences; Englund et al., 2013; Fadda et al., 2004; Schubart et al., 2011). For instance, a composition of cannabis containing both THC and CBD was found to have more analgesic properties than one with THC alone (Johnson et al., 2010). In addition, compositions of cannabis containing high levels of THC and low levels of CBD have been associated with increased risk for memory impairment and psychosis (Englund et al., 2013). Accordingly, different cannabis species (e.g., indica, sativa, and hybrid) may have different effects as a function of their cannabinoid concentrations.

At present, there is an extraordinary dearth of research regarding the extent to which these psychological and

Received: June 2, 2015. Revision: September 12, 2015.

This work was supported by a donation to Marcel O. Bonn-Miller from the San Francisco Patient and Resource Center, and a Department of Veterans Affairs Rehabilitation Research and Development Career Development Award–2 awarded to Adrienne J. Heinz. The expressed views do not necessarily represent those of the Department of Veterans Affairs.

\*Correspondence may be sent to Marcel O. Bonn-Miller at the National Center for PTSD, Veterans Affairs Palo Alto Health Care System, 795 Willow Rd (152-MPD), Menlo Park, CA 94025, or via email at: Marcel.Bonn-Miller@va.gov.

physical outcomes differ as a function of cannabis species. Furthermore, although previous research suggests that indica species may contain higher levels of THC, on average, than sativa species (Hillig & Mahlberg, 2004), actual cannabinoid concentrations can vary within as well as between species and are often untested by sellers of medical cannabis. This is problematic, because medical cannabis is primarily sold to consumers based on cannabis species classification, instead of cannabinoid concentration. Indeed, the only study to demonstrate preference for a particular cannabis species as a function of medical condition found that those who report using cannabis for pain relief were more likely to choose indica over sativa (Pearce et al., 2014). Although novel, the study by Pearce et al. (2014) did not provide data on participant pain levels, nor did it account for hybrid cannabis species (representing at least one third of available medical cannabis) or explore how symptom-species associations differentially relate to cannabis use problems.

As the number of individuals who use medical cannabis expands, it is crucial to better characterize cannabis use preferences, patterns, and consequences among individuals who elect to use cannabis. Given the observation that individuals use medical cannabis primarily for pain management (Ilgen et al., 2013), the objective of the present study was to build on the research by Pearce and colleagues (2014) by documenting differential associations between those who use medical cannabis for pain management and those who do not, as well as within-pain-group differences in reported pain levels, in terms of species preference and cannabis use problems. It was hypothesized that individuals who used cannabis for chronic pain would experience fewer cannabis use problems compared with individuals who used cannabis for other reasons (e.g., anxiety, insomnia, and muscle spasms). Second, the present study sought to explore the association between pain level and cannabis use problems among those who reported using cannabis for chronic pain. Finally, the current study aimed to determine whether individuals who used cannabis for chronic pain, as well as those who reported greater within-group pain levels, demonstrated a species preference (i.e., sativa, indica, hybrids), as well as the extent to which species preference was associated with cannabis use problems.

## Method

### Participants

Participants were 163 medical cannabis users (77% male;  $M_{\text{age}} = 40.4$  years,  $SD = 14.3$ ) recruited from a cannabis dispensary in California. To participate, individuals were required to be 18 years of age or older and a current patient receiving cannabis for a physical or mental health condition from a medical cannabis dispensary in California. The majority of participants had graduated high school (97%), with

57% having obtained a 4-year college or graduate/professional degree. In terms of race and ethnicity, 67.1% of the respondents identified themselves as White, 7.5% as Black/non-Hispanic, 6.8% as Hispanic, 3.7% as Black/Hispanic, 3.1% as Asian, and 11.8% as "other."

### Procedure

All procedures were approved by the Veterans Affairs (VA) and Stanford University Institutional Review Boards. Individuals acquiring medical cannabis at a dispensary were approached by a research assistant with a flyer describing the study and were provided with the opportunity to participate. Study procedures were described, and individuals, if interested in participating, were asked to provide written informed consent. Participants then completed a series of paper-and-pencil self-report questionnaires, described below.

### Measures

*Demographics, cannabis use history.* Participants completed a demographic questionnaire assessing gender, age, education level, and race/ethnicity. The Marijuana Smoking History Questionnaire (MSHQ; Bonn-Miller & Zvolensky, 2009) was used to assess the frequency and history of cannabis use. To assess the quantity of use, participants were asked, "How much cannabis do you usually use per week?" and were provided with responses of 1 g, 2 g, 3–5 g, 6–8 g, 9–12 g, or more than 12 g. The Medical Marijuana Patient Questionnaire (MMPQ; see Appendix A at the end of this article) was developed for the current study and has not been previously published. The MMPQ was used to determine the reasons that participants used medical cannabis (i.e., "What condition(s) have led you to seek out medical cannabis [i.e., what is it prescribed for]?"); participants could select one or more medical conditions and indicate the length of time they used marijuana for medical purposes. For the present study, participants were categorized as using cannabis for chronic pain or not.

*Cannabis strains and species preference.* The MMPQ (see Appendix A) was also used to query participants regarding the name of the cannabis strain they used most often (e.g., Grand Daddy Purple, White Widow). A subset of cannabis strains was batch tested by the dispensary to assess THC content, and the results of the tests were published on the dispensary website. Data on the THC content of preferred cannabis strains were available for 75 participants. The cannabis strain name was also paired with information provided by the dispensary to identify the species (i.e., indica, sativa, or hybrid).

*Cannabis use problems.* The eight-item Cannabis Use Disorders Identification Test–Revised (CUDIT-R; Adamson et al., 2010) was used to assess cannabis use problems within

the past 6 months. A sum of the eight items was taken to yield a total score, which could range from 0 to 32 (Adams et al., 2010). Internal consistency for the CUDIT-R in the current sample was .74.

**Pain.** The Pain Numeric Rating Scale (PNRS) was used to evaluate average pain severity during the past week. Participants responded to a single question, "How would you rate your usual level of pain during the last week?" using an 11-point scale (0 = *no pain* to 10 = *worst pain imaginable*). The PNRS has been shown to be a highly reliable assessment of pain (Ferraz et al., 1990).

## Results

### Descriptives

See Table 1 for descriptive statistics. More than half of the sample ( $n = 90$ ; 55%) reported using cannabis for chronic pain management. Participants were retained for analyses if they endorsed a motive for cannabis use ( $n = 163$ ). However, individuals with incomplete CUDIT data ( $n = 14$ ), missing PRNS estimates ( $n = 9$ ), missing responses on the index of quantity of cannabis used per week ( $n = 5$ ), or missing responses on the MSHQ ( $n = 2-17$ ) were excluded from subsets of analyses. Participants were heavy users, with 67% ( $n = 109$ ) reporting use of cannabis at least 30 times in the last month, and 37% ( $n = 60$ ) at least 60 times in the past month. The preferred method of cannabis consumption was vaporizers ( $n = 45$ ; 31%), followed by joints or blunts ( $n = 32$ ; 22%), pipes ( $n = 32$ ; 22%), water pipes ( $n = 23$ ; 16%), oral ingestion (8%), and other (1%). Chi-square analyses demonstrated that the method of consumption did not vary as a function of pain group. The majority of participants used an average of 3–5 g per week ( $n = 55$ , 35%), followed by 6–8 g ( $n = 30$ , 19%), 2 g ( $n = 25$ , 16%), 1 g ( $n = 20$ , 13%), and 9–12 g ( $n = 17$ , 10%), with 7% ( $n = 11$ ) consuming more than 12 g per week. Based on the subset of samples of medical cannabis that were tested for THC level, THC composition for indica, sativa, and hybrid species was 15.80% ( $SD = 2.87$ ,  $n = 4$ ), 15.85% ( $SD = 4.97$ ,  $n = 17$ ), and 20.82% ( $SD = 5.69$ ,  $n = 54$ ), respectively.

Participants who used cannabis for chronic pain reported higher average pain in the past week ( $M = 5.13$ ,  $SD = 2.55$ ) than those who did not use it for chronic pain ( $M = 1.83$ ,  $SD = 2.09$ ),  $t(151.97) = -8.85$ ,  $p < .01$ ,  $d = 1.42$ . Average grams of cannabis used per week did not differ as a function of use for chronic pain,  $t(156) = 0.98$ ,  $p > .05$ . However, individuals who used cannabis for chronic pain reported a greater number of years of regular cannabis use ( $M = 18.01$ ,  $SD = 13.25$ ) compared with those who did not use it for chronic pain ( $M = 13.93$ ,  $SD = 11.78$ ),  $t(159) = 2.04$ ,  $p < .05$ ,  $d = 0.33$ . Age at first use, initial age at regular use, number of quit attempts, years of medical cannabis use, average number of times smoked in the past month, and average number

TABLE 1. Descriptive statistics for cannabis use history, patterns, and problems; species preference; cannabis pain motives; and perceived pain relief

Variable	<i>M</i> ( <i>SD</i> )
Age first used cannabis	16.64 (5.43)
Age started regularly using cannabis	23.05 (10.24)
No. of cannabis quit attempts	1.04 (1.94)
No. of years spent regularly smoking cannabis	16.19 (12.74)
No. of years using medical cannabis	10.80 (10.40)
No. of times smoked in the past month	54.84 (44.93)
No. of times smoked on an average day in the past week	3.09 (2.47)
Cannabis Use Disorder Identification Test–Revised	10.83 (5.33)
Pain Numeric Rating Scale	3.64 (2.86)
	<i>n</i> (%)
Use for chronic pain	90 (55)
Prefer indica <sup>a</sup>	29 (18)
Prefer sativa <sup>a</sup>	49 (30)
Prefer hybrids <sup>a</sup>	83 (52)

Notes:  $N = 146-161$ , due to missing data. No. = number. <sup>a</sup>Only among participants endorsing use for chronic pain.

of times smoked per day in the past week did not differ as a function of use for chronic pain. Among individuals who used cannabis for chronic pain, average pain in the past week was positively associated with average number of grams of cannabis used per week ( $r = .29$ ,  $p < .01$ ) and negatively associated with age at first use ( $\rho = -.31$ ,  $p < .01$ ); no other relations emerged between average pain level and cannabis use history and patterns.

### Pain and cannabis use problems

Individuals who used cannabis for chronic pain had fewer cannabis use problems ( $M = 9.84$ ,  $SD = 4.67$ ) compared with those who did not use it for chronic pain ( $M = 11.70$ ,  $SD = 5.35$ ),  $t(146) = 2.26$ ,  $p < .05$ ,  $d = -0.37$ . Among participants who reported cannabis use for chronic pain, average pain in the past week was not correlated with cannabis use problems ( $\rho = .04$ ,  $p = .70$ ).

### Pain and cannabis species preference

Individuals who reported using cannabis for chronic pain demonstrated a stronger preference for indica,  $\chi^2(2) = 11.07$ ,  $p < .01$ . Follow-up analyses excluding hybrid users indicated that, among indica and sativa users (48%;  $n = 78$ ), 72% of indica users versus 43% of sativa users reported using cannabis for chronic pain,  $\chi^2(1) = 6.40$ ,  $p < .05$ . Among individuals who used cannabis for chronic pain, average level of pain in the past week did not significantly differ as a function of species preference,  $F(2, 83) = 2.51$ ,  $p = .09$ ,  $\eta_p^2 = .06$  (indica:  $M = 6.00$ ,  $SD = 0.56$ ; sativa:  $M = 4.24$ ,  $SD = 0.55$ ; hybrid:  $M = 5.14$ ,  $SD = 0.38$ ).

### *Cannabis species preference and cannabis use problems*

Cannabis use problems were observed to vary as a function of species preference, such that individuals who preferred indica reported significantly lower levels of cannabis use problems than individuals who preferred hybrids,  $F(2, 146) = 3.49, p < .05, \eta_p^2 = .05$ . No group differences in cannabis problems emerged between sativa and hybrid users or between indica and sativa users: sativa ( $M = 10.39, SD = 4.61$ ), indica ( $M = 8.56, SD = 4.21$ ), hybrid ( $M = 11.54, SD = 5.40$ ). Among individuals who used cannabis for chronic pain, cannabis use problems did not significantly differ as a function of species preference,  $F(2, 80) = 2.81, p = .07, \eta_p^2 = .07$  (sativa:  $M = 10.75, SD = 5.12$ ; indica:  $M = 7.61, SD = 2.89$ ; hybrid:  $M = 10.35, SD = 4.85$ ).

### **Discussion**

The present study sought to determine relations among cannabis use for chronic pain, average past-week reported pain level, cannabis species preference, and cannabis use problems. Results demonstrated that individuals who used cannabis for pain management had fewer cannabis use problems than individuals who used it for other reasons, a finding with a magnitude associated with clinical significance (Bruno et al., 2013). Indeed, although individuals who used cannabis for chronic pain reported a longer use history, they did not use it in greater quantities or frequencies or experience more negative consequences from using cannabis than did individuals not using it for pain.

Findings also indicated that individuals who used cannabis for chronic pain were more likely to choose indica over sativa, and the use of indica was associated with fewer cannabis problems. The observed pattern is in line with anecdotal evidence and previous research illustrating a preference for indica among individuals living with various chronic pain conditions (Pearce et al., 2014). Importantly, although between-group differences were observed for chronic pain, among individuals who used cannabis for chronic pain, no significant relations were observed between average pain level and cannabis use problems or species preference. These findings together indicate that the motive for medical cannabis use (i.e., pain management) appears to hold more relevance for cannabis use problems and patterns than specific pain levels.

This study highlights that potential consequences associated with medical cannabis use may differ as a function of use motive and species most often used. Using cannabis for the purpose of alleviating pain is a form of coping, and previous literature illustrates that coping motives are associated with a heightened risk for problematic use (Bonn-Miller & Zvolensky, 2009). However, it appears that a more granular measurement of symptom-specific coping motives may provide a more nuanced view of how different types of coping motives are differentially associated with negative outcomes.

With increasing legalization of medical cannabis, research on the factors (e.g., motive, species type) that may contribute to cannabis use problems is sorely needed to better inform consumers, clinical providers, and policy makers.

### *Limitations and future research*

Although the present study possesses a number of strengths (e.g., an ethnically diverse community sample) and is the first to examine both cannabis use consequences and species preference among individuals who use cannabis to manage chronic pain, several limitations and areas for future research should be noted.

First, the cross-sectional nature of the study precludes the ability to infer causal relations. Thus, randomized controlled trials using a longitudinal design are needed to determine whether different species of cannabis may indeed be more effective in addressing chronic pain and the extent to which they are associated with negative use outcomes and side effects over time.

Second, given that the current sample was modest in size and recruited from only one dispensary in California, findings need to be replicated in larger and more representative samples of individuals who use medical cannabis. These research efforts should also consider how other risk factors associated with chronic pain (e.g., depression; Turk et al., 1995), and how different types of chronic pain (e.g., neuropathic pain, back pain, cancer-related pain), might interact to influence consequences associated with using cannabis to manage pain.

Third, future research should assess the comparative efficacy, including differences in side effects, of cannabis relative to opioids or other more traditional pharmacological approaches to pain management. Such efforts would aid in the contextualization of the observed associations within the framework of existing pain management techniques.

Fourth, cannabis strain, and associated cannabinoid compositions, are not regulated or uniform, and thus may vary widely across dispensaries. In addition, only a subset of cannabis strains was tested for cannabinoid concentration. Future research aimed at replicating and extending the present findings should strive to include objective testing of each strain used among a wide range of dispensaries across the United States and internationally, to increase confidence in, and generalizability of, results.

Finally, given the breadth of pain types, researchers should consider how cannabis-species preference and use outcomes might differ as a function of the specific pain condition (e.g., multiple sclerosis, fibromyalgia, back injury).

### **References**

- Abrams, D. I., Jay, C. A., Shade, S. B., Vizoso, H., Reda, H., Press, S., . . . Petersen, K. L. (2007). Cannabis in painful HIV-associated sensory neu-

- ropathy: A randomized placebo-controlled trial. *Neurology*, *68*, 515–521. doi:10.1212/01.wnl.0000253187.66183.9c
- Adamson, S. J., Kay-Lambkin, F. J., Baker, A. L., Lewin, T. J., Thornton, L., Kelly, B. J., & Sellman, J. D. (2010). An improved brief measure of cannabis misuse: The Cannabis Use Disorders Identification Test-Revised (CUDIT-R). *Drug and Alcohol Dependence*, *110*, 137–143. doi:10.1016/j.drugalcdep.2010.02.017
- Bonn-Miller, M. O., Boden, M. T., Bucossi, M. M., & Babson, K. A. (2014). Self-reported cannabis use characteristics, patterns and helpfulness among medical cannabis users. *American Journal of Drug and Alcohol Abuse*, *40*, 23–30. doi:10.3109/00952990.2013.821477
- Bonn-Miller, M. O., & Zvolensky, M. J. (2009). An evaluation of the nature of marijuana use and its motives among young adult active users. *American Journal on Addictions*, *18*, 409–416. doi:10.3109/10550490903077705
- Bruno, R., Marshall, S., & Adamson, S. J. (2013, November). *Screening for DSM-5 cannabis dependence using the Cannabis Use Identification Test-Revised (CUDIT-R)*. Poster presented at the Australasian Professional Society on Alcohol and Other Drugs, Brisbane, Australia.
- Crippa, J. A., Zuardi, A. W., Martín-Santos, R., Bhattacharyya S., Atakan, Z., McGuire, P., & Fusar-Poli, P. (2009). Cannabis and anxiety: A critical review of the evidence. *Human Psychopharmacology: Clinical & Experimental*, *24*, 515–523. doi:10.1002/hup.1048
- Englund, A., Morrison, P. D., Nottage, J., Hague, D., Kane, F., Bonaccorso, S., . . . Kapur, S. (2013). Cannabidiol inhibits THC-elicited paranoid symptoms and hippocampal-dependent memory impairment. *Journal of Psychopharmacology*, *27*, 19–27. doi:10.1177/0269881112460109
- Fadda, P., Robinson, L., Fratta, W., Pertwee, R. G., & Riedel, G. (2004). Differential effects of THC- or CBD-rich cannabis extracts on working memory in rats. *Neuropharmacology*, *47*, 1170–1179. doi:10.1016/j.neuropharm.2004.08.009
- Ferraz, M. B., Quaresma, M. R., Aquino, L. R., Atra, E., Tugwell, P., & Goldsmith, C. H. (1990). Reliability of pain scales in the assessment of literate and illiterate patients with rheumatoid arthritis. *Journal of Rheumatology*, *17*, 1022–1024.
- Hillig, K. W., & Mahlberg, P. G. (2004). A chemotaxonomic analysis of cannabinoid variation in *Cannabis* (Cannabaceae). *American Journal of Botany*, *91*, 966–975. doi:10.3732/ajb.91.6.966
- Ilgen, M. A., Bohnert, K., Kleinberg, F., Jannausch, M., Bohnert, A. S., Walton, M., & Blow, F. C. (2013). Characteristics of adults seeking medical marijuana certification. *Drug and Alcohol Dependence*, *132*, 654–659. doi:10.1016/j.drugalcdep.2013.04.019
- Johnson, J. R., Burnell-Nugent, M., Lossignol, D., Ganae-Motan, E. D., Potts, R., & Fallon, M. T. (2010). Multicenter, double-blind, randomized, placebo-controlled, parallel-group study of the efficacy, safety, and tolerability of THC:CBD extract and THC extract in patients with intractable cancer-related pain. *Journal of Pain and Symptom Management*, *39*, 167–179. doi:10.1016/j.jpainsymman.2009.06.008
- Lynch, M. E., & Campbell, F. (2011). Cannabinoids for treatment of chronic non-cancer pain: A systematic review of randomized trials. *British Journal of Clinical Pharmacology*, *72*, 735–744. doi:10.1111/j.1365-2125.2011.03970.x
- Martin-Sánchez, E., Furukawa, T. A., Taylor, J., & Martin, J. L. R. (2009). Systematic review and meta-analysis of cannabis treatment for chronic pain. *Pain Medicine*, *10*, 1353–1368. doi:10.1111/j.1526-4637.2009.00703.x
- Notcutt, W., Price, M., Miller, R., Newport, S., Phillips, C., Simmons, S., & Sansom, C. (2004). Initial experiences with medicinal extracts of cannabis for chronic pain: Results from 34 ‘N of 1’ studies. *Anaesthesia*, *59*, 440–452. doi:10.1111/j.1365-2044.2004.03674.x
- Pearce, D. D., Mitsouras, K., & Irizarry, K. J. (2014). Discriminating the effects of *Cannabis sativa* and *Cannabis indica*: A web survey of medical cannabis users. *Journal of Alternative and Complementary Medicine*, *20*, 787–791. doi:10.1089/acm.2013.0190
- Schubart, C. D., Sommer, I. E., van Gastel, W. A., Goetgebuer, R. L., Kahn, R. S., & Boks, M. P. (2011). Cannabis with high cannabidiol content is associated with fewer psychotic experiences. *Schizophrenia Research*, *130*, 216–221. doi:10.1016/j.schres.2011.04.017
- Turk, D. C., Okifuji, A., & Scharff, L. (1995). Chronic pain and depression: Role of perceived impact and perceived control in different age cohorts. *Pain*, *61*, 93–101. doi:10.1016/0304-3959(94)00167-D
- Walsh, Z., Callaway, R., Belle-Isle, L., Capler, R., Kay, R., Lucas, P., & Holtzman, S. (2013). Cannabis for therapeutic purposes: Patient characteristics, access, and reasons for use. *International Journal on Drug Policy*, *24*, 511–516. doi:10.1016/j.drugpo.2013.08.010

## Appendix A

### Medical Marijuana Patient Questionnaire

**1. How long have you been using marijuana for medicinal purposes?**

\_\_\_\_\_ Years      \_\_\_\_\_ Months

**2. What condition(s) have led you to seek out medicinal marijuana (i.e., what is it prescribed for)?**

- |                                       |                                    |  |   |
|---------------------------------------|------------------------------------|--|---|
| <input type="checkbox"/> Chronic pain | <input type="checkbox"/> Appetite  | <input type="checkbox"/> Seizures      | <input type="checkbox"/> Multiple sclerosis |
| <input type="checkbox"/> Anxiety      | <input type="checkbox"/> Nausea    | <input type="checkbox"/> Stress        | <input type="checkbox"/> HIV/AIDS           |
| <input type="checkbox"/> PTSD         | <input type="checkbox"/> Insomnia  | <input type="checkbox"/> Cancer        | <input type="checkbox"/> Other _____        |
| <input type="checkbox"/> Depression   | <input type="checkbox"/> Epilepsy  | <input type="checkbox"/> Glaucoma      | <input type="checkbox"/> Other _____        |
| <input type="checkbox"/> Nightmares   | <input type="checkbox"/> Headaches | <input type="checkbox"/> Muscle spasms | <input type="checkbox"/> Other _____        |

**3. Please list the names/strains of marijuana that you use, in order from most often used to least often used. Please skip if you don't know this information.**

Most often used: \_\_\_\_\_

Second most often used: \_\_\_\_\_

Third most often used: \_\_\_\_\_

Fourth most often used: \_\_\_\_\_

**4. On a scale of 1 to 5, how well has the use of marijuana helped your condition(s)?**

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

**5. If marijuana has helped your condition(s), what has it been most helpful for?**

\_\_\_\_\_

\_\_\_\_\_

**6. Is there anything that marijuana has not helped?**

\_\_\_\_\_

\_\_\_\_\_