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Title	Characteristics of Canadians likely to try or increase cannabis use following legalization for non-medical purposes: a cross-sectional study
Authors	Harman S. Sandhu HBSc, Laura N. Anderson PhD, Jason W. Busse PhD DC
Reviewer 1	Professor R. Tekanoff
Institution	London, Ont.
General comments (author response in bold)	I applaud the Authors' effort and timely submission of this article, considering the recent legalization of cannabis for recreational purposes, after the legal utilization of medicinal cannabis and cannabinoids in Canada for almost 20 years. I firmly believe that there is a significant need for additional study and research on the pharmacologic effects, clinical uses, and effects on patient well-being and behaviours related to cannabis use, both medically and recreationally. The intent of this cross-sectional study poses some interesting questions related to Canadians' attitudes and behaviors towards recreational cannabis use. Examining the relationship between “intent to use” and “new use” of cannabis and other variables of interest as they exist in the National Cannabis Survey’s defined population at a singular point in time is a significant undertaking, none the less and I credit the authors in this endeavour. The Authors have creatively used a regression model using one source, publicly available NCS data to calculate a predictive outcome, and as a sidebar, providing recommendations and clinical implications. However, in my view, their results fall more into "prediction” category rather than a more accurate "projection" model for a variety of reasons including the fact that all of the NCS data has not been released, nor is the survey completed. Notwithstanding, this is interesting information and in my view, the use of a single source database and regression modeling, including the adjusted modeling, appears thorough enough. The variables however, within the NCS reporting, (Wave 2 interestingly enough not being reported by Stats Can), do not include such characteristics of concomitant drug or alcohol use (a significant contributor toward associated new and increased cannabis use), potential medical use consideration by respondents, (not current use) or suggested price points for acquiring legal cannabis, and its motivator for respondents to adjust usage behaviours. These are variables not included by Stats Can, which in my mind, may have a resultant effect on the potential reporting. **Thank you for your comments and understanding of the importance of studying this topic. We agree that this study is predictive, hence why our recommendations for policy emphasize the need for more research and measurement of actual change and not just prediction. The limitations of no information on concurrent substance use or medical cannabis consideration is a limitation of the survey design and not our study, and as such is not discussed as a limitation.** (Location of Change if Applicable: N/a.) Is this a topic which physicians and healthcare personnel care about? I believe that there is, based on concerns with opiate over usage and the CMA stance on the ratification of Bill –C-45. **N/a.** (Location of Change if Applicable: N/a.)

	Will the Canadian medical community find this an interesting and useful observation? I think that Canadian physicians and HCP will see this as something of interest and a potential warning as it relates to health implications. **N/a.** (Location of Change if Applicable: N/a.) Are there important clinical implications highlighted? The authors require more effort and time on how this will or may impact Canadian health, and potential implications for clinicians. **The main finding of this paper identifies who is more likely to increase their cannabis use. The implications are not just clinical alone, but also extend to public health officials and policymakers. Although it is noted that this is a measure of intentions and not actual change in behavior.** (Location of Change if Applicable: N/a.) Are there recommendations for action or solution? Yes. However for publication in CMAJ, it is my view that these are too general for the reading audience to determine a potential action plan. This requires more in-depth analysis, potentially highlighting the need for more primary care education, a greater emphasis on government interventions for physician and HCP learning needs etc. etc. **As mentioned previously, the nature of this study is predictive and we do not feel confident making specific policy recommendations based on prediction alone. Our recommendation is to conduct future research to compare the pre-post legalization cannabis use rates among these populations and until then to focus efforts on the populations identified in our study.** Does this meet the standard for CMAJ publication, based on information, data generation, limitations, results and discussion? See comments at end of review. **N/a.** (Location of Change if Applicable: N/a.) Abstract: Please provide more emphasis on the “background” and implications on the authors rationale for the study. **We have added two sentences to the abstract background section. Due to the word limit, we are unable to expand further on this section.** (Location of Change if Applicable: See page 2 lines 3-5.) Abstract: Provide a more specific definition of the methodology, utilizing short explanations of logistic regression, bootstrapping and methodology of the aORs and the risk increases to enhance reader/audience understanding. **Again, due to the word limitations we are unable to expand further upon this but ensure that this information is available in the full methods section.** (Location of Change if Applicable: See page 6 lines 5-7 for example.) Abstract: Interpretation should include descriptors of type of respondent likely to change behaviour, condensed limitations and a more substantive, (yet concise) recommendations on implications on public health, beyond the promotion of responsible use which is undoubtedly already top of mind within the medical community, government and public health workers. (if the authors have any insight

	through their referencing or other sources) **We have changed our abstract interpretation section to include the limitation that intention may not translate into behaviour as well describe which populations to closely monitor.** (Location of Change if Applicable: See page 2 lines 20-22.) Introduction: However I might be inclined elaborate on specific points for example to include a subdivision as it relates to the authors statements related to rate of cannabis addiction, with perhaps a more robust comparison of addiction rates to alcohol, opiates and tobacco for a more balanced comparator. As a reader, this information has useful clinical value, and puts the addiction rate into greater perspective compared to other intoxicating substances for consideration in clinical practice. **We agree, thank you for this point. We included rates of alcohol and tobacco as they were reported in the 2017 Canadian Tobacco Alcohol and Drugs Survey.** (Location of Change if Applicable: See page 3 lines 2-5.) Introduction: Statements such as "there are concerns that recreational cannabis may increase use and subsequent harm" required modification or elaboration. Please expound for reader edification and to continue to build your case for your study. **This specific statement has been removed as it did not contribute to our rationale.** (Location of Change if Applicable: N/a.) Introduction: I would also be careful in suggesting that there is a significant correlation of an increase hospital visits as a result of drug use, be more specific on reporting the current and existing data which is related to cannabis use and hospital visits, if possible. **In this case we wanted to focus on the increasing cannabis potency and how it may increase potential for harm. This sentence has been revised.** (Location of Change if Applicable: See page 3 lines 12-13.) Study Design: This is a creative attempt at reporting, observing and using current, existing data. Utilizing and recapitulating data from other sources is an economical feature of any study, none the less, and the study design appears to be well thought out and intentioned to solicit a differing perspective on the NCS data, including potential behavioural changes to recreational cannabis use by the Stats Can respondents. **Thank you for your comment.** (Location of Change if Applicable: N/a.) Statistical Analysis: Confidence intervals are within the range of standard requirements for studies of this nature. **N/a.** (Location of Change if Applicable: N/a.) Statistical Analysis: Please explain briefly the parametric statistical test (Wald), and the statistical test as it relates to the logistic regression modeling being used. (Hosmer-Lemeshow), for clarification and readership learning. **These description and interpretation of these tests has been further described.** (Location of Change if Applicable: See page 6 lines 18-22.) Statistical Analysis: Please identify and clarify how the statistical analysis

	contributed to the data pool, reporting and interpretation. **Data pooling and modification were done prior to analysis as clarified now.** (Location of Change if Applicable: See page 5 line 19.) Results: The authors' reporting appears to be complete and concise as it relates to the study objectives. The use of the graph at the end of the study is well placed, and useful. **Thank you for your comment.** (Location of Change if Applicable: N/a.) Please report any other variables (anecdotal or not and not listed in the graph) other than key demographics which may have contributed to the results either in a positive or negative manner, or provide any reasoning why they are not included. (ie. Respondent consideration for impending medical use?) **These variables were not included in the original survey and therefore as we only accessed and analyzed the collected data, had no control on including or excluding these variables.** (Location of Change if Applicable: N/a.) Interpretation: The authors' interpretation is well articulated and researched. Information which is interesting and topical in relation to the recent legalization is timely. **Thank you for your comment.** (Location of Change if Applicable: N/a.) Interpretation: I would suggest that the authors' also include a short discussion of the CMA policies related to the legalization and use of cannabis for both medical and rec use in Canada as a complement to the Canadian Psychiatric Associations' position statement. If quoting medical association stances, balance the interpretation out, in order to compliment the findings, and potential clinical implications for the Canadian physician to contemplate. **We have reviewed the CMA's recommendations on Bill C-45 and have mentioned a point for restricting access to youth.** (Location of Change if Applicable: See page 9 lines 19-21.) Interpretation: Please include some statements about the potential harms patients may experience, which the authors note in the introduction and the interpretation. This is for edification, clarification and learning of the CMAJ readership. **As this is a population-level study, overall harms are discussed in the introduction and since harms have been shown to be higher for youth and those who use more frequently, this point is brought up in the interpretation.** (Location of Change if Applicable: N/a.) Limitations: There are other variables which have not been reported such as the concomitant use of other drugs and alcohol, and its effect on the intent to increase or newly use cannabis. This was not reported by Stats Can, and of many variables which affect usage, non-reporting of this group at very least, would confound the results, and in my view, underreport the behavioral change in those concomitant users. At minimum, either in the interpretation or limitation section address this particular issue, and how the authors view its impact on their overall results. **As the collection of other variables was outside of our control, we do not believe it would be appropriate to list that as a limitation of our study or reporting. Although these factors may have had an impact, it is difficult to say which way the association would have been affected and perhaps future**

	researchers could explore those variables. (Location of Change if Applicable: N/a.) Limitations: The major contention this reviewer for the consideration by the authors is that these author's submission is the intent to use and the new use analysis is only as good as the variables remain constant up to and after legalization, and this snapshot is only, as an extrapolative analysis of the current available data. **Thank you for your comment. This is a limitation of nearly all cross-sectional studies.** (Location of Change if Applicable: N/a.) Conclusion: I think this section requires some modifications as it relates to potential clinical outcomes and solutions or recommendations, as a result of their reporting. **Our conclusion is based on a careful interpretation of our results. As our results are not based on actual cannabis behaviour change, we are suggesting further monitoring of the populations we identified.** (Location of Change if Applicable: N/a.) Conclusion: Firstly, I do not believe the general medical community is well educated enough to assess risk in cannabis users and this should be addressed and recommendations for action made by the authors. This has been, and continues to be a stigmatized area of clinical practice, where I believe clinicians now have a responsibility to educate themselves, their peers, and their co-workers on both medical and recreational use of cannabis. **This may very well be the case, however a discussion of lack of clinicians' awareness of health risks due to cannabis use may be outside the current and specific scope of our study.** (Location of Change if Applicable: N/a.) Conclusion: Secondly, policy makers and public health officials are still playing catch-up, and it is my recommendation that government play a bigger role in providing education at the grass roots level for users (this has been far below acceptable in my view) and a greater emphasis for policy makers to take an active role in insuring public health officials and Canadian healthcare workers understand the responsibility required to monitor the use of Cannabis in Canada both in and outside of practice. This not only can be done by survey but by the collection of data at the medical practice level, government website (eg Ontario Cannabis) prior to acceptance of any orders, school reporting and monitoring, law enforcement levels, mental health organizations and public service agencies. **Our findings help to suggest populations to monitor more carefully. Survey and monitoring specific to these populations may occur through the means you suggested at the end of this comment.** (Location of Change if Applicable: N/a.) Conclusion: Please provide a more substantive , researched, set of recommendations for clinicians in the conclusion section. This is helpful for the learning and understanding of readership of CMAJ Open. **Again, based on the most appropriate interpretation of our results and considering our limitations, a strong and well-defined set of recommendations for clinicians is something we believe is outside the scope of this study. This may very well be an excellent topic for another paper.** (Location of Change if Applicable: N/a.)

	The use of the charts and references is thorough. **Thank you for your comment.** (Location of Change if Applicable: N/a.)
Reviewer 2	Pamela Leece
Institution	Toronto, Ont.
General comments (author response in bold)	This study investigated the factors associated with intention to try or increase cannabis use post-legalization in Canada, using data from the National Cannabis Survey 2018. An understanding of these factors may be used to tailor public health interventions related to cannabis legalization and mitigate potential adverse health outcomes. The article is well-written and addresses an important question on possible changes in consumption of cannabis post-legalization. Although intent does not necessarily predict use, the authors acknowledge this. A general question about the overall design is why the analysis was not separated for those who never previously used cannabis trying it for the first time pre-legalization, and people who have used/currently use cannabis and may increase their use. I understand that a limitation of the questionnaire design is that it combines "try or increase use" as the behavioural intent, but these groups may still be quite different and may deserve separate analysis. The issue of new vs increased use is not likely adequately addressed by including past 3 month use as a variable in the model. The implications for the intervention approach to these two groups (never vs. current) may also be different. Also consider justifying the choice that "new" use defined for this study does not mean the same as not using ever in the past (only refers to change from not using in the past 3 months). **Thank you for your comment. We agree that the definition of the "new user" would likely be better described in our study as a "trier" compared to those who are looking to increase use. As for a comparison of never have used compared to those who have used, this comparison is not possible due to limitations of variables and items collected in the survey (which is outside of our control). The past 3-month use was the closest variable that would allow us to adjusting the effects of "current" vs "non-user".** (Location of Change if Applicable: "New user" has been replaced with "those looking to try" throughout paper.) Suggest avoiding the term "recreational" in favour of the term "non-medical." The Government of Canada information does not tend to use the term "recreational," and the Task Force report uses the term "non-medical" more frequently. There is public health and academic discussion that the term "recreational" may support the perception that cannabis use is fun/ attractive, whereas "non-medical" may be more neutral. **This is an excellent point. We have changed our title and replaced "recreational" with "non-medical" throughout our paper.** (Location of Change if Applicable: See page 1 line 2.) Suggest "people-first" language (avoiding term "user" vs. "people who use cannabis" – others are preferring "consumer" as less stigmatized than "user") **The term "user" has been replaced with "those who use…" throughout the paper.** (Location of Change if Applicable: N/a.) Background: Paragraph 1: consider CTADS as a reference vs. CCHS using a more recent estimate (2015 vs 2012, although the estimate is similar) https://www150.statcan.gc.ca/n1/pub/82-003-x/2018002/article/54908/c-g/c-g01-

	eng.htm. **Thank you for this reference. We have used the 2017 CTADS as a reference and compared other substances as well.** (Location of Change if Applicable: See page 3 lines 2-5.) Background: Paragraph 2: suggest check 2017 evidence review from NASEM on some specific health outcomes mentioned. Limited evidence for development of any type of anxiety disorder except social anxiety disorder. Suggest clarify regarding chronic bronchitis – evidence of association with more frequent chronic bronchitis episodes but not with development of COPD (also referred to as chronic bronchitis) **This section has been re-written with a focus on where the greatest evidence for associations of public and clinical harm existing with reference to systematic reviews. The note regarding anxiety has been removed and the NASEM guidelines were reviewed. We feel confident that we've summarized enough potential for adverse health outcomes for rationalizing studying cannabis use rates in a population.** (Location of Change if Applicable: See page 3 lines 6-8.) Background: http://nationalacademies.org/hmd/reports/2017/health-effects-of-cannabis-and-cannabinoids.aspx **Thank you for providing this reference.** (Location of Change if Applicable: N/a.) Background: Paragraph 2: suggest clarifying "abuse or dependence" refer to DSMIV criteria **We reviewed this reference again. This estimate of abuse or dependence is only presented as a combined number. We have added concepted to distinguish abuse from dependence.** (Location of Change if Applicable: See page 3 lines 9-10.) Measures: While the term "sex" would be most appropriate to describe male or female, I see that the term gender used in the paper is the same as used in the questionnaire. The authors could consider using the term sex in their own paper, but indicate the term gender is used for the variable in the dataset. **This is an excellent point and something we had discussed in the first draft of our paper. We have included a sentence in our methods about how we report that variable as "sex".** (Location of Change if Applicable: See page 5 lines 16-17.) Measures: Please justify exclusion of physical health and inclusion of mental health. It is possible that physical health is important for some who are "self-medicating" for pain. **The questionnaire does not specify physical health and just asks about general "health". We deemed this variable too broad and vague because it could encompass physical, mental, emotional, and even spiritual health whereas "mental health" was a bit more specific and the results could be interpreted with more focused implications.** (Location of Change if Applicable: N/a.) Results: Paragraph 1: clarify 18.5% likely to try/increase, and 15.7% of these are new users – what is the numerator/denominator for each calculation?

	This was a cross-tabulation of those who had the outcome stratified by those who had used cannabis in the past 3 months. This sentence has been clarified. (Location of Change if Applicable: See page 7 line 20.) Interpretation: Paragraph 2: again, suggest check the NASEM 2017 review regarding limited evidence on the association between cannabis and development of anxiety and depression **We reviewed the NASEM 2017 resource and revised this sentence based on their findings.** (Location of Change if Applicable: See page 9 lines 9-11.) Fig 1: It is unclear to me how the responses in Figure 1 indicate n=29,000,000 +, where the weighted analysis represented around 27,000,000. Suggest clarifying the calculation used. **The responses in Figure 1 represent a summary of the full data available. This means pairwise deletion was used to deal with missing data whereas in the regression analysis we used listwise deletion (e.g. a whole case was deleted if there was missing data for any variable). Since we used two different ways to deal with missing data and reporting, we have added a further explanation in the methods section highlighting this.** (Location of Change if Applicable: See page 5 lines 10-11 and page 6 lines 17-18.)