

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Pre-Legalization Patterns and Trends of Cannabis Use Among Canadian Youth: Results from the COMPASS Prospective Cohort Study
AUTHORS	Zuckermann, Alexandra; Battista, Katelyn; de Groh, Margaret; Jiang, Ying; Leatherdale, Scott

VERSION 1 - REVIEW

REVIEWER	Mallie J. Paschall Pacific Institute for Research and Evaluation, United States
REVIEW RETURNED	25-Sep-2018

GENERAL COMMENTS	This study examined changes in marijuana use and perceived availability of marijuana from 2012 to 2018 in a cohort of Canadian adolescents participating in COMPASS. Findings indicate that marijuana use prevalence and perceived availability of marijuana have been increasing in years prior to legalization for recreational use. Results also indicate higher rates of marijuana use among subgroups including males and Aboriginal youth. The manuscript is well written and makes a contribution to research on trends in marijuana use among youth, with implications for future research on effects of legalization on youth. The authors appropriately acknowledge study limitations, including the non-representative study sample. Additional information is needed in the Methods section on how the COMPASS survey is administered and survey response rates. In the statistical analysis section, the authors should explain whether analyses adjusted for clustering of observations within schools and/or classrooms, and repeated observations for the same students over time.
-------------------------	--

REVIEWER	Alan Budney Dartmouth College USA
REVIEW RETURNED	03-Oct-2018

GENERAL COMMENTS	Cannabis Use Among Canadian Youth This manuscript describes cannabis use trends over a 6-year period among youth in two Canadian provinces. These data are examined to determine how use patterns (primarily prevalence and frequency) have changed in relation to ongoing changes in the legal status and regulatory provisions related to the use and
-------------------------	---

	sale of cannabis products in Canada. Publishing longitudinal data on cannabis use over time and relating it to this changing legal landscape has merit and contributes data relevant to determining the impact of these changes on availability, use, and attitudes about cannabis. Findings presented in this manuscript show some clear trends, and identify differences in these trends related to gender and ethnicity/race. Generally the manuscript might benefit by providing more clear descriptions of the findings, and more clearly highlight the observed trends. Below I provide some questions, comments, and suggestions that might be considered. Abstract. 1. Most of the more robust observed trends differed by gender and race yet the abstract does not mention these differences. Moreover, the most interesting finding (in my opinion), that occasional use increased, but not weekly use, was also not mentioned. Analyses. 2. Year 6, where the biggest change was observed is also associated with the biggest change in the sample (down more than 20% and surveyed many fewer schools). This leads to the potential importance of “controlling for school” influences. One wonders about whether or not the schools that stopped participating were ones with the lower (or higher) rates of use. I am not sure how you would control for this, but it would seem important to address. Where did the dropout schools rank in terms of distribution of cannabis use? Findings 3. Generally I found the reporting of the findings more confusing than I think it needs to be. I would suggest a general re-organization with text editing to provide a more succinct presentation of the findings. 4. I’m not sure that there is a good reason to include statistics on both never-users, and then provide statistics on lifetime use; are not these the flip side of the same question. This adds confusion to the list of results that are presented – so if it isn’t necessary, it might be considered for omission. 5. I was not sure of the purpose of sometimes reporting absolute changes, and sometimes reporting relative changes (% increase or decrease); it appears arbitrary and adds to confusion in discerning the findings. So if it does not serve a clear purpose, perhaps the manuscript should stick with one model for presenting changes. 6. When prevalence rates are designated as “increases or decreases” it is not clear how this is determined, e.g., statistical significance, absolute amount of change cutoff? 7. Regression analyses section. Here it might be beneficial to highlight findings that differed from the descriptive results reported in the prior section after controlling for three variables. Edits
--	---

	8. I wasn't sure why weekly use labeled "high risk" weekly use on p. 9; this would seem gratuitous and should likely be considered for omission. 9. In the sentence that follows that one, the word "However" should probably be removed; what is discussed is not in contrast to the prior sentence 10. This sentence is awkward: ... "students with different ethnic or racial groups varied less (less than whom)?"
--	---

REVIEWER	Beth Han Substance Abuse and Mental Health Services Administration
REVIEW RETURNED	05-Oct-2018

GENERAL COMMENTS	This is a timely study examining changes in youth cannabis use over the time prior to legalization to explore the impact of the beginning federal discourse around legalization during the 2016/2017 school year. The analyses are straightforward and appropriate. Can the authors spell out COMPASS when first mentioning it in the introduction section on page 1? What were the student response rates over the six years? For the multivariable analyses, can the authors also present the results of grade, school median income, and school urbanicity in Table 2? For the five outcomes, the models do not need to be exactly the same. Have the authors examined potential interaction effects, especially between year and other covariates on the outcomes?
-------------------------	---

VERSION 1 – AUTHOR RESPONSE

Response to Reviewer Comments

Reviewer: 1

Reviewer Name: Mallie J. Paschall

Institution and Country: Pacific Institute for Research and Evaluation, United States

Please state any competing interests or state 'None declared': None declared.

Please leave your comments for the authors below

This study examined changes in marijuana use and perceived availability of marijuana from 2012 to 2018 in a cohort of Canadian adolescents participating in COMPASS. Findings indicate that marijuana use prevalence and perceived availability of marijuana have been increasing in years prior to legalization for recreational use. Results also indicate higher rates of marijuana use among subgroups including males and Aboriginal youth. The manuscript is well written and makes a contribution to research on trends in marijuana use among youth, with implications for future research on effects of legalization on youth. The authors appropriately acknowledge study limitations, including the non-representative study sample.

Additional information is needed in the Methods section on how the COMPASS survey is administered and survey response rates. In the statistical analysis section, the authors should explain whether analyses adjusted for clustering of observations within schools and/or classrooms, and repeated observations for the same students over time.

Author Response

We thank the reviewer for their comments.

Additional information on COMPASS administration and survey response rates has been added to the Methods section.

As several reviewers expressed an interest in the impact of schools in the analysis, we modified the regression models to account for school clustering. Table 2 has been revised with the updated results and minor modifications to the associated Results section paragraph were made to reflect these changes. The modified analyses are described in the revised Statistical Analysis section.

Reviewer: 2

Reviewer Name: Alan Budney

Institution and Country: Dartmouth College USA

Please state any competing interests or state 'None declared': none declared

Please leave your comments for the authors below

Cannabis Use Among Canadian Youth

This manuscript describes cannabis use trends over a 6-year period among youth in two Canadian provinces. These data are examined to determine how use patterns (primarily prevalence and frequency) have changed in relation to ongoing changes in the legal status and regulatory provisions related to the use and sale of cannabis products in Canada. Publishing longitudinal data on cannabis use over time and relating it to this changing legal landscape has merit and contributes data relevant to determining the impact of these changes on availability, use, and attitudes about cannabis. Findings presented in this manuscript show some clear trends and identify differences in these trends related to gender and ethnicity/race. Generally, the manuscript might benefit by providing more clear descriptions of the findings, and more clearly highlight the observed trends. Below I provide some questions, comments, and suggestions that might be considered.

Abstract.

1. Most of the more robust observed trends differed by gender and race yet the abstract does not mention these differences. Moreover, the most interesting finding (in my opinion), that occasional use increased, but not weekly use, was also not mentioned.

Analyses.

2. Year 6, where the biggest change was observed is also associated with the biggest change in the sample (down more than 20% and surveyed many fewer schools). This leads to the potential importance of "controlling for school" influences. One wonders about whether the schools that stopped participating were ones with the lower (or higher) rates of use. I am not sure how you would control for this, but it would seem important to address. Where did the dropout schools rank in terms of distribution of cannabis use?

Findings

3. Generally, I found the reporting of the findings more confusing than I think it needs to be. I would suggest a general re-organization with text editing to provide a more succinct presentation of the findings.
4. I'm not sure that there is a good reason to include statistics on both never-users, and then provide statistics on lifetime use; are not these the flip side of the same question. This adds confusion to the list of results that are presented – so if it isn't necessary, it might be considered for omission.
5. I was not sure of the purpose of sometimes reporting absolute changes, and sometimes reporting relative changes (% increase or decrease); it appears arbitrary and adds to confusion in discerning the findings. So, if it does not serve a clear purpose, perhaps the manuscript should stick with one model for presenting changes.
6. When prevalence rates are designated as "increases or decreases" it is not clear how this is determined, e.g., statistical significance, absolute amount of change cut-off?
7. Regression analyses section. Here it might be beneficial to highlight findings that differed from the descriptive results reported in the prior section after controlling for three variables.

Edits

8. I wasn't sure why weekly use labelled "high risk" weekly use on p. 9; this would seem gratuitous and should likely be considered for omission.
9. In the sentence that follows that one, the word "However" should probably be removed; what is discussed is not in contrast to the prior sentence
10. This sentence is awkward: ... "students with different ethnic or racial groups varied less (less than whom)?

Author Response

We thank the reviewer for their comments.

1. The abstract has been modified to include mention of occasional use, male gender, and non-white race/ethnicity.
2. Schools that dropped out of the COMPASS study reported average cannabis ever-use rates of 31.9%, while schools that remained reported rates of 30.1%. This information has been added to the Methods section under Study Design. As use rates in Y6 were the highest observed, school drop-out is unlikely to have led to an overestimation of the upward trend.
3. The Results section has been simplified, with some statistics removed where not integral to the text.
4. The authors believe it is important to note that most students do not use cannabis. However, the sentence describing trends in never-use has been simplified.
5. Mentions of relative changes have been removed or, where integral to the text, replaced by fold-differences to facilitate distinguishing from absolute percentages.
6. Increases and decreases are discussed in terms of direction of change in percentage points, i.e. purely in a descriptive manner. Statistical significance is only discussed for the regression analysis results.

7. Most findings were similar, and any differences were slight, so this section remains unchanged.
8. The term “high risk” has been omitted as suggested.
9. The word “However” has been removed as suggested.
10. This sentence has been restructured to clarify that there was less variation in occasional use rates than in weekly use rates.

Reviewer: 3

Reviewer Name: Beth Han

Institution and Country: Substance Abuse and Mental Health Services Administration

Please state any competing interests or state ‘None declared’: None declared.

Please leave your comments for the authors below

This is a timely study examining changes in youth cannabis use over the time prior to legalization to explore the impact of the beginning federal discourse around legalization during the 2016/2017 school year. The analyses are straightforward and appropriate. Can the authors spell out COMPASS when first mentioning it in the introduction section on page 1? What were the student response rates over the six years? For the multivariable analyses, can the authors also present the results of grade, school median income, and school urbanicity in Table 2? For the five outcomes, the models do not need to be the same. Have the authors examined potential interaction effects, especially between year and other covariates on the outcomes?

Author Response

We thank the reviewer for their comments.

The COMPASS system has since its inception been adapted to provide a platform of enquiry into a variety of youth health measures not reflected in the original acronym. Spelling out the acronym, therefore, is likely to misinform the reader as to its characteristics. As described in the manuscript, those interested in further details can find extensive descriptions, including technical reports, online.

Student response rates have been added to the Methods section.

Additional discussion of school-level variates is likely to substantially expand upon the scope of the paper, which emphasises the individual level. As the modelling, in addition to accounting for these factors, has now been adjusted to take school clustering into account, we believe the individual-level outcomes should stand alone for this manuscript to maintain focus on the individual side of the story. Future manuscripts are likely to explore school-level aspects in more detail. Presentation of grade-related results will add little, with lifetime use necessarily increasing by grade and age at first use not available for this category (as it is modelled for the subset of grade 12 students).

As this manuscript was intended as an examination of trends in pre-legalization cannabis use over time, interaction effects were not examined. Such an examination would warrant further exploration of factors of interest and would substantially increase the length of the paper, as well as significantly altering its scope, and so has been slated for future publication in other manuscripts.

VERSION 2 – REVIEW

REVIEWER	Mallie Paschall Pacific Institute for Research and Evaluation
REVIEW RETURNED	28-Nov-2018

GENERAL COMMENTS	The authors have adequately addressed reviewers' comments and significantly improved the manuscript. This study makes a contribution to ongoing research on marijuana legalization, availability, normalization and use among adolescents.
-------------------------	--

REVIEWER	Alan Budney Dartmouth College, USA
REVIEW RETURNED	22-Dec-2018

GENERAL COMMENTS	ABSTRACT: I would again strongly suggest the authors do a better job with representing the sub-population focus and findings in the abstract to better alert the reader this focus and the findings in this area. I do not believe that the simple statement, "male and non-white participants were more likely to use cannabis" accurately reflects the findings presented in the paper related to observed subgroup differences
-------------------------	---

VERSION 2 – AUTHOR RESPONSE

Response to Reviewers

Reviewer(s)' Comments to Author:

Reviewer: 1

Reviewer Name: Mallie Paschall

Institution and Country: Pacific Institute for Research and Evaluation

Please state any competing interests or state 'None declared': None declared.

Please leave your comments for the authors below

The authors have adequately addressed reviewers' comments and significantly improved the manuscript. This study makes a contribution to ongoing research on marijuana legalization, availability, normalization and use among adolescents.

Response: We thank the reviewer for their comments.

Reviewer: 2

Reviewer Name: Alan Budney

Institution and Country: Dartmouth College, USA

Please state any competing interests or state 'None declared': none

Please leave your comments for the authors below

ABSTRACT: I would again strongly suggest the authors do a better job with representing the sub-population focus and findings in the abstract to better alert the reader this focus and the findings in this area. I do not believe that the simple statement, "male and non-white participants were more likely to use cannabis" accurately reflects the findings presented in the paper related to observed subgroup differences

Response: We thank the reviewer for their comments.

ABSTRACT: We have revised the abstract as requested and believe it now more accurately reflects the sub-population focus of the paper.