Author’s response to reviews

Title: After the Fort McMurray wildfire there are significant increases in mental health symptoms in Grade 7-12 students compared to controls

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Brown et al.

Replies to Reviewer Comments

We thank the reviewers and editor for contributing their time and expertise to reviewing our manuscript. We have revised the manuscript based on their comments. We feel it is improved and now ready for publication in BMC Psychiatry.

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Reviewer 1's comment #1:
First, regarding the introduction, it is not clear how this study exactly fills an important gap in trauma research. The authors clearly state that traumatic experiences influence the occurrence of diverse symptoms and disorders, including childhood and adolescence. It would be helpful to get a more detailed view into previous study results, and how the present results contribute to these studies.

Authors' reply:

We have revised the Introduction and Discussion. Please see our revisions in the tracked changes version of the resubmitted manuscript. In addition, we include some of the most relevant sections below:

Introduction, page 7: “The current work investigates the effects of wildfire on mental health in adolescents with a sample size (n=3,070 from Fort McMurray; n=2,976 from Red Deer) that is larger than in any previous study, to our knowledge. This paper adds to a small but important literature on the impact of wildfires and other disasters on adolescent mental health, with implications for policy and service delivery in the aftermath of the 2016 Fort McMurray wildfire and more generally.”

Discussion, page 19-20: “In conclusion, the current results support existing findings which indicate that adolescents are vulnerable to, and adversely impacted by disasters. The present data extends this by comparing the mental health of a large sample (n=3,070) of grade 7-12 students in the disaster impacted community of Fort McMurray to a similarly large sample (n=2,796) of adolescents in the non-disaster impacted community of Red Deer, identifying those in Fort McMurray as more vulnerable and at greater risk of low mental health.”

Reviewer 1's comment #2:

Second, a further issue is linked to the methodology, more specifically, the difference of 2-3 years between data collection in the non-disaster and disaster community, and also the related differences between some instruments. Some adolescents may have experienced other traumatic or stressful life experiences during this time, which might have influenced the occurrence of different symptoms.

Authors' reply:

While we cannot rule out an effect from the 3 year difference in data collection between the Red Deer and Fort McMurray datasets, we argue that any such difference would be small in comparison to the very large impact of the 2016 wildfire in Fort McMurray. We have revised the relevant section of the Discussion accordingly:

Discussion, page 19: “We believe that the Red Deer data provides a compelling community control group given the similarities between communities. Nonetheless, this data was not
specifically collected with this intent. A possible issue could be that, while Red Deer experienced no natural disasters prior to or during the survey period, it is conceivable that the 3 year difference in the time of the surveys may have had a minor impact due to some other effect. However, the 2016 wildfire had such a large impact on Fort McMurray and the findings presented here are so striking that we believe any effect from the 3 year difference in survey times would be much smaller than the effects of the 2016 wildfire.”

The six mental health questionnaires that were collected in both the Red Deer and Fort McMurray surveys were almost identical, except for some small differences described in the Survey Questionnaires section of the Methods (pages 9-11.) We have added additional details in this section including:

Methods, page 10-11: “The order of presentation of the six above questionnaires was randomized for each participant, in both the Red Deer and Fort McMurray surveys, to avoid possible sequence effects whereby earlier questionnaires might have influenced participants’ answers to later questionnaires.”

Methods, page 11: “For the Fort McMurray survey, the three additional questionnaires were asked after the six questionnaires that were shared with the Red Deer survey, to prevent the additional questionnaires from affecting answers in any of the six shared questionnaires.”

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Reviewer 2's comment #1:

Overall the manuscript is very well written and easy to follow. The sample size is considerably large (one major strength of the study) and the statistical analyses that were carried out are appropriate. However, the novelty of the findings is limited. One of the biggest issues with the manuscript is, that the trauma exposure has not been examined in the paper. To my understanding this was due to the fact that trauma exposure and symptoms have not been collected in the control sample.

Authors' reply:

This is correct. We did not have trauma exposure and symptom data for the control sample (Red Deer).

In the Results, we have added more details of trauma exposure as assessed by the CPSS scale for the wildfire affected group (Fort McMurray):

Results, page 17: “PTSD symptom data from the CPSS questionnaire was available only for the Fort McMurray group. For that group, CPSS scores had a mean of 12.8 with standard deviation 11.5. Among Fort McMurray students, 37% met conditions for probable diagnosis of PTSD based on thresholding CPSS scores with a cutoff of 15 (Stewart et al., 2015). CPSS data were not collected for the Red Deer group.”
Reviewer 2's comment #1:

The authors state that "little research has compared population mental health in disaster impacted versus non-disaster impacted communities in order to determine the effects on..." (p.5, l-36 f). However, other studies have assessed trauma exposure in disaster exposed samples (e.g. Weems & Graham, Resilience and Trajectories of Posttraumatic Stress Among Youth Exposed to Disaster. J.Child Adolesc.Psychopharmacol., 2014, 24, 1, 2-8) and by controlling for trauma exposure the impact can be examined. To examine the effects of trauma exposure this is a prerequisite and should be addressed more accurately in the limitations.

Authors' reply:

This is an excellent point. We have made several revisions to address this issue:

Introduction, page 5: “Adolescents are particularly affected by disasters because of their dependence on adults and physical, psychological, and social factors related to their developmental stage. However, only a small number of studies have investigated the effects of natural disaster on adolescent mental health and well-being, either by comparing population mental health in disaster impacted versus non-disaster impacted communities or by comparing members of a disaster impacted community with differing levels of traumatic exposure.”

Introduction, page 6: “Moreover, child and adolescent pre-existing mental health challenges are often exacerbated following exposure to disaster [22]. This is particularly concerning given that individuals’, particularly adolescents’, coping efficacy is an important mediating factor in the post-disaster recovery process and can have a significant impact on long-term mental health outcomes (also see Weems and Graham [23] on differential PTSD symptom recovery trajectories in adolescents exposed to hurricanes).”

Discussion, page 19: “In addition, it would have been useful to compare data for symptoms related to disaster trauma exposure between the Fort McMurray and Red Deer samples. This was not possible as we did not have such data from the Red Deer sample.”

Reviewer 2's comment #2:

Additionally I have the following remarks:

Even though the authors give a citation for the sample description of the Red Deer sample (p. 9, l.4), I would prefer to have some data on this sample, especially response rates etc. in this manuscript.

Authors' reply:
We have added additional details of the Red Deer sample:

Results, page 15: “The survey data from the EMPATHY project in Red Deer was collected from 3,244 participants at baseline (February and March 2014) from three middle schools (serving grades 6-8) and two high schools (serving grades 9-12) in the Red Deer Public School System. For full details of the EMPATHY project, see Silverstone et al. [24,25].”

Unfortunately, we do not have total student enrollment numbers for Red Deer schools at the time of the EMPATHY project, so we cannot report the response rate for that group. However, most of the students in those schools did participate in the study.

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Reviewer 2's comment #3:

Additionally is there more those who did not participate? Do they differ from those who did?

Authors' reply:

Unfortunately, we have no data from individuals who did not participate. The two primary causes of non-participation were absence from school or logistical constraints. That is, some students were not present at school during the data collection. Data collection occurred during regular school hours, so the school systems had to accommodate this. All of the schools put substantial effort and staff time into data collection. It was, none-the-less, logistically impossible to sample every student due to scheduling conflicts, exams, etc. Only a very small number of parents/guardians or students, themselves, actively declined participation. We have added these details to the manuscript:

Results, page 15: “The primary causes of non-participation were student absences from school during the surveys and logistics constraints. Though Red Deer and Fort McMurray schools devoted substantial resources and staff time to survey data collection, the surveys were done during regular class time, and it was logistically impossible to survey some students due to scheduling conflicts, exams, and so on. Fewer than 50 students in each city chose to decline participation in the survey.”

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Reviewer 2's comment #4:

The authors state that mental health support programs have been installed in the aftermath of the disaster. Has this been prior to the assessment? Is there any information on this? This might also have affected the results.

Authors' reply:
The Fort McMurray Public and Catholic School Systems put in place a number of student mental health support programs after the wildfire in May 2016, prior to the survey data collection in November 2017. We have added a list of the mental health programs to the appendix:

Appendix, page 2: “The following mental health programs were put in place to support students in grades 7-9 by the Fort McMurray Public and Catholic Schools after the May 2016 wildfire: Health Program of Study, Student Wellness Action Team (SWAT), Beyond the Hurt Program, Fourth R, Healthy Relationships Training, CBT Group, Signs of Self Injury, Students Assisting Students (SAS), Tell Them From Me Survey (TTFM), Friends (group), Journey of Hope, Heart Math, Kids in the Know, Mindfulness.

The following mental health programs were put in place to support students in grades 10-12 by the Fort McMurray Public and Catholic Schools after the May 2016 wildfire: Healthy Relationships, Mental Health Curriculum Guide for High School, Material within Career and Life Management (CALM) Course, Student Wellness Action Team (SWAT), Students Assisting Students (SAS), High School Guidance Counsellors, Anxiety Presentation, Cognitive Behavior Therapy, PARTY Program, Heart of the Matter, Tell Them From Me Survey (TTFM), PEERS Program (Social Skills), Mindfulness.”

We expect that the Fort McMurray schools' mental health programs did have a positive effect on students' mental health, and the November 2017 survey was done in part to assess the effectiveness of those programs. From a scientific perspective, it would have been valuable to have additional survey data immediately following the 2016 wildfire. However, the schools did not have the capacity for survey data collection at that time, as they were completely occupied with their core mandate of delivering education service and addressing the disruption caused by the wildfire. (The time period after the wildfire was extremely challenging for the schools and the entire community, more generally. For example, smoke damage resulted in large loss of teaching materials and supplies. Many students and teaching staff were made homeless by the fire and were living in temporary accommodations. Students were contending with mental health effects.)

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Reviewer 2's comment #5:

Two small flaws:

Abstract Methods part: "...7-12 grade students from Red deer, Alberta Canada (collected in in 2014..)"

p. 9 l. 34: "between the two cites…": I think it should be "sites"

Authors' reply:

Thank you for pointing these out. We have fixed them.