Author’s response to reviews

Title: Canadian in-hospital mortality for patients with emergency-sensitive conditions: a retrospective cohort study

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Author’s response to reviews:

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Editor, BMC Emergency Medicine

Uffe Kock Wiil

Re: Manuscript titled “Canadian in-hospital mortality for patients with emergency-sensitive conditions: a retrospective cohort study”

Dear Dr. Wiil,

Thank you for your helpful suggestions concerning our manuscript entitled “Canadian in-hospital mortality for patients with emergency-sensitive conditions: a retrospective cohort study” (manuscript number EMMID-19-00097). The manuscript has now been revised (revisions are highlighted in yellow within the manuscript), with the changes described below in details. We invite you to consider this new improved version.

We hope you find these revisions acceptable and look forward to your response.

Sincerely,

Simon Berthelot, Principal Investigator
1) I am pleased to inform you that it is potentially acceptable for publication in BMC Emergency Medicine, once you have carried out some essential revisions suggested by our reviewers.

Thank you for the encouraging suggestions. We have revised the manuscript as suggested by the reviewers. See below for the details.

REVIEWER #1 – Romain Jouffroy

1) Abstract: please define ED at first occurrence.

We have defined ED at first occurrence in the abstract.

2) Page 11 line 55: I suggest to replace "The ED-HSMR could be used to measure and improve the performance of" by "The ED-HSMR could be used to measure and to assess the improvement of the performance of...."

We have revised the sentence as suggested.

“The ED-HSMR could be used to measure the performance of Canadian hospital systems in emergency care and guide quality improvement initiatives”

3) Methods: please define the type of logistic regression, with fix or random effect.

We have specified that the logistic regression employed fixed effects.
“We estimated the expected number of deaths in 2010-11 or 2011-12 using fixed effects logistic regression models derived from the reference year (2009-10) for each hospital-peer group.”

4) Results: please provide the results and the covariables included in the model. Please present the results of the model fit according to the data.

As the derivation and assessment of logistic regression models have already been reported in a previous publication, we have added a paragraph in the methods section that refers to the previous article and reports the discriminatory power of the four models used in the calculation of the ED-HSMR.

“The discriminatory power and calibration of the risk-adjustment models used to estimate the expected number of deaths for each hospital were reported in a previous publication. Areas under receiver operating characteristic curves of the predictive models used in the ED-HSMR were 0.80, 0.80, 0.80 and 0.81 for the teaching, large-community, medium-community and small-community peer-group hospitals, respectively.”

5) Background: Do the authors take into account in the logistic regression models, the potential variable impact of the center size? In other word, does the model used only fixed effect? Because, as the authors underlined in the discussion, small hospitals represent the majority (58%) of all hospitals and this can affect the results of the logistic regression.

We have revised the methods section to clarify that the probability of death for each patient admitted for an emergency sensitive condition was calculated using one of the four fixed effects predictive models derived from data of similar-size institutions (small, medium, large and teaching). This approach ensured that predicted probabilities for a given centre were calculated only using data from similar types of centres (e.g., data from small centres was used in the logistic regression models to calculate the probability for a small centre).

“Probability of death at patient-level was calculated using the appropriate hospital-peer group specific model (teaching, large community, medium community and small community) from the reference year.”
1) The data analyzed are relatively old (from 2009 to 2012). Please mention this in the limitation section, and describe the consequences of this fact.

We agree with the reviewer and have changed the limitation section to acknowledge this issue.

“Finally, we acknowledge that our data are several years old. However, we believe that our results demonstrate the feasibility of using an ED sensitive condition hospital standardized mortality ratio to measure ED performance as a way to supplement existing wait times and access-to-care indicators.”

2) Please explain in the discussion section how the results might be used in 2019, and by whom. For whom and for what could these results be useful in 2019?

We have better highlighted in the discussion how and by whom these results could be used.

“Moreover, mortality for emergency sensitive conditions appears to be higher than expected in provinces where the proportion of the population living in rural communities is highest. This finding echoes previous reports that highlighted significant disparities in access to high-quality emergency care in Canadian rural communities. In the same way it was done for trauma care across the country, Canadian decision- and policy-makers could use the ED-HSMR to trigger in-depth performance assessment to help identify opportunities for improving emergency care structures and processes to help improve patient outcomes.”

3) Do the authors assume that the situation in the provinces did not change between 2013 and 2019?

The delivery of emergency care has not significantly changed between 2013 and 2019 and it might be reasonable to assume that our results still apply today. However, more importantly, our results demonstrate the feasibility of using an ED sensitive condition hospital standardized
mortality ratio to measure ED performance as a way to supplement existing wait times and access-to-care indicators.

4) Are there any data from 2013 to 2019 that could be compared to the study results?

Unfortunately, we did not find, from a recent literature search, new publications that would provide cross-jurisdictional comparisons in mortality for patients with emergency sensitive conditions. As we obtained our own dataset from the Canadian Institute for Health Information, a new data access request would not be feasible as part of this project.

REVIEWER #2 – Katayoun Jahangiri

1) Did you include private hospitals in your sampling framework?

We have added two sentences in the methods to highlight that Canadian acute care hospitals are all publicly funded and owned.

“Under the Canada Health Act, provinces and territories must provide universal health coverage to their citizens. All Canadian acute care facilities are publicly funded and owned.”

2) In method, You mentioned "hospitals were classified into 4 groups based on academic designation, patient complexity and volume”. Please discuss about why you select these criteria.

We have added a sentence in the methods to explain that the peer-group classification used for the ED-HSMR was imported for comparative purpose from the methodology used by the Canadian Institute for Health Information to calculate an all-cases HSMR. This is a validated approach to classifying hospitals into those with similar structures and patient populations.

“This classification was adopted from the validated methodology used by the Canadian Institute for Health Information to calculate an all-cases HSMR.”
3) I think, the conclusion needs to be written more fully.

We have revised the conclusion as requested.

“These results warrant in-depth evaluations to understand the root causes of the observed regional variation. The ED-HSMR may be a useful outcome indicator to complement existing process indicators in measuring ED performance.”

Reference