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Title: Subgroups of people who make frequent emergency department visits in Ontario and Alberta: a retrospective cohort study	
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Reviewers' comments	Authors' Reply
Reviewer 1: Christopher Fernandes	
Institution: Hamilton Health Sciences/McMaster University, Emergency Medicine	
This paper aimed to characterize patients who make frequent ED visits, and identify subgroups in this population for Alberta and Ontario. The authors generally succeed with these objectives.	We thank the Editor for their positive comments. Despite challenges in synthesizing this data, we believe that our analysis adds importantly to the collective understanding of this complex patient group.
Abstract--Not all patients who visit EDs frequently are high-risk (see the next sentence). It is misleading to include the "short duration" subgroup in this analysis, as they would really be scheduled visits, and in fact are reducing overcrowding rather than increasing it (since they generally avoid admission through their ED visits). Introduction--p.3, lines 9-10--This sentence sets up an expectation that you are describing patients who make unscheduled frequent ED visits.	We agree wholeheartedly with the Reviewer's reservation. NACRS includes an "ED Visit Indicator" flag, the intent of which is to differentiate "true" ED visits from scheduled revisits. We used this flag to exclude visits identified as being pre-scheduled, however its reliability and accuracy are limited. We suspect that our cohort inadvertently captures some people whose frequent ED use includes scheduled revisits, and hypothesize that our "short duration" subgroup comprises some of these patients. However, we do not have a reliable way of confirming our suspicion with the data we have available. Excluding data without confirmation would likely introduce bias and error. We feel that the best approach is to transparently declare the limitations of our data and analyses. Therefore, we have added a detailed discussion about our limited ability to confirm and exclude suspected pre-scheduled visits in the Limitations section.
Methods--p.4, lines 23-25--This is a key sentence. Does it now exclude patients who are presenting for repeat cellulitis visits and/or antibiotics?	The "ED Visit Indicator" variable, when used correctly, should identify people who were told to come back to the ED for any reason (including for antibiotic treatments). However, the reliability and accuracy of its use by ED visit coders in Ontario and Alberta are unclear. We have discussed this uncertainty in our Limitations section.
p.5, lines 10-12--your 2 references do not actually demonstrate either validity or reliability of CTAS in general. The validation study is only on a small subgroup of ED patients. Further, which version of CTAS is being used (as there is a difference in inter-rater reliability based on the CTAS version)?	The Canadian Triage and Acuity Scale has been validated in multiple large studies in various settings, including in a Japanese cohort of 38,414 adults ≥ 16 years where higher triage levels were predictive of overall and ICU admission. Additionally, a 2015 meta-analysis showed good inter-rater reliability pooled over 14 studies. We

	<p>have added these references to our mention of the CTAS.</p> <p><i>Kuriyama A, Ikegami T, Kaihara T, Fukuoka T, Nakayama T. Validity of the Japan Acuity and Triage Scale in adults: a cohort study. Emergency Medicine Journal 2018;35:384-88.</i></p> <p><i>Mirhaghi A, Heydari A, Mazlom R, Ebrahimi M. The Reliability of the Canadian Triage and Acuity Scale: Meta-analysis. N Am J Med Sci 2015; 7(7): 299-305.</i></p> <p>During the study period, the 2008 revision of the CTAS would have been used until the 2012 revision was e-published in 2013. The 2012 revisions were minor and unlikely to have substantially impacted inter-rater reliability. Updated and detailed descriptions of CTAS and its versions may be found at the following website (which has been added as a reference):</p> <p><i>CTAS-ETG: Canadian Triage and Acuity Scale, Echelle de triage et de gravité. Available from: http://ctas-phctas.ca/?page_id=294 (accessed September 2, 2021).</i></p>
<p>Results--p. 7, line 42--what proportion is this of total ED visits in Ontario and Alberta?</p>	<p>We have now disaggregated all data by province in the Results section and Tables.</p>
<p>p. 8, lines 5-15--this is the key paragraph.</p>	<p>We agree that this descriptive data provides an important characterization of people with frequent ED use.</p>
<p>p. 8, lines 26-33--I have a problem with this subgroup, since they are really a group that has scheduled ED visits, and should really be excluded or accounted for some other way. I agree that they could receive care in some other way, but they do not generally use a high proportion of resources, nor are they usually admitted.</p>	<p>We agree wholeheartedly with the Reviewer's reservation. As we have outlined in our response above, while we attempted to exclude scheduled ED revisits using the "ED Visit Indicator" variable, we have no way of reliably identifying scheduled revisits that were not flagged appropriately. Our hypothesis is that Subgroup 1 comprised many patients with scheduled revisits, however without a method of reliably confirming our suspicion, excluding this subgroup would introduce bias and error. We have therefore elaborated on this limitation in our Limitations section.</p>
<p>p.8-p.9--it would be interesting to tease out if the rural association with frequent ED use was associated with a particular subgroup.</p>	<p>Thank you for this insightful comment. We have performed our cluster analysis among patients with urban versus rural residences and found that our four patient subgroups remained similar in their characteristics and relative size. We provide this additional analysis for the Reviewers' interest but have not integrated the additional results into our texts or tables due to considerations of length.</p>

<p>Interpretation--p. 10, lines 5-8--this is a key weakness of this paper. Inability to recognize this subgroup as scheduled ED visitors results in a label of frequent users, and inappropriate skewing of the data and resource management.</p>	<p>We wholeheartedly agree. As detailed above, we used the “ED Visit Indicator” flag within NACRS to identify “true” ED visits, and differentiate them from scheduled ambulatory care, however the reliability and completeness of this flag is unknown. We therefore we have no way to identify and verify suspected scheduled return visits that may have been inaccurately labeled with the “ED Visit Indicator.” We have added a thorough discussion of our inability to reliably confirm and exclude all scheduled revisits in our Limitations section.</p>
<p>p.11, lines 15-22--the mental health subgroup's needs suggest the need for managed care plans for these individuals.</p>	<p>We thank the Reviewer for this helpful suggestion. We have added managed care plans in the list of potential supports that should be considered for this patient group, in our Interpretation section.</p>
<p>Limitations--one other limitation is the inability to identify linkages with family physicians, which could help divert significant volumes of these patients away from the ED.</p>	<p>We thank the Reviewer for this helpful suggestion. We have added an inability to identify linkages with family physicians to our Limitations section.</p>
<p>References--The number of references could be significantly reduced. Not all the references are useful or relevant.</p>	<p>We thank the Reviewer for this helpful suggestion. We have cut a number of superfluous references.</p>
<p>Reviewer 2: Soo Chan Carusone</p>	
<p>Institution: Casey House, Toronto, Ont.</p>	
<p>Thank you for the opportunity to review the paper “Subgroups of people who make frequent emergency department visits in Ontario and Alberta: a retrospective cohort study”. I think it is important work to be shared and is quite well written. I have a number of comments organized by section.</p>	<p>We thank the Reviewer for their positive comments. We appreciate the opportunity to share our interesting findings, that we hope will contribute to improved care for this complex patient group.</p>
<p>Abstract: You currently write “people who visits emergency departments (EDs) frequently are high risk...” can you please clarify what you mean by “high risk” in this context.</p>	<p>We have clarified that these patients are high risk for mortality in the Abstract section.</p>
<p>The results section (of the abstract) currently starts with “Over 2.6 million patients annually made frequent ED visits...” this seems somewhat misleading as, if I understand correctly, “frequent ED visits” is defined as a predetermined percentage of the population.</p>	<p>We thank the Reviewer for pointing this out. We have revised our initial statement, and clarified in the Methods that our cohort is defined as patients whose visit numbers are in the top 10% in each fiscal year.</p>
<p>In the interpretation section (of the abstract) you say “visit acuity and substance use-related presentations are increasing among people who visit EDs frequently”. I’m not sure if you are</p>	<p>We thank the Reviewer for this helpful comment. We have revised the referenced sentence to highlight that visit acuity and admission rates have increased over the study period, and to</p>

<p>summarizing/restating the results of THIS work or are combining it with other evidence that has been published but suggest you state instead that it “increased” (and perhaps include the specific years) as the data collected in this work includes only data up to 5 years ago.</p>	<p>clarify that we are referring to the study years, 2011/12 to 2015/16.</p>
<p>Methods: I apologize, I am not a statistician, but it is unclear to me when you determined eligibility in the “frequent ED visit” cohort. I thought it would be in an Index year and then they would be “followed” over subsequent years. However, it appears that for each fiscal year the groups are defined separately – I am not sure the paper title of “retrospective cohort study” is the best description of this design. I also think language like “From 2011/12 to 2015/16, a growing proportion of their visits were triaged as...” suggesting, to me, that it is a consistent/defined group of individuals.</p>	<p>We apologize that we did not clearly describe the process of our study cohort creation. Our study cohort comprises patients in the top 10% of most frequent ED visitors for each fiscal year. This cohort was created by CIHI prior to our team’s analysis (CIHI’s Dynamic Cohort). CIHI repeats the cohort selection process in each fiscal year, adding patients for that fiscal year and updating data for patients previously selected.</p> <p>We have added a detailed description of CIHI’s methodology to create the Dynamic Cohort, and have clarified that the cohort of people making frequent ED visits is repeated annually, in the Study Design, Setting, and Participants subsection of the Methods.</p> <p>Our study examines a cohort of people who make frequent ED visits over time: the cohort is dynamic because CIHI refreshes it annually. We have therefore left the title as a “retrospective cohort study,” however, we are open to editorial direction as to the best description of our design.</p>
<p>On this note, it would be interesting to see the proportion of the frequent ED group that is consistent across years (and how this likely differs by subgroup).</p>	<p>We agree, and have submitted another paper to CMAJ Open (currently being considered for publication) specifically comparing subgroups of people within CIHI’s Dynamic Cohort, who demonstrate consistent versus short-term frequent ED use.</p>
<p>Results: Table 3 has the number of patients in each sub-group but I think it would be helpful in the text, where the characteristics of the subgroups are being presented, to also give context to the size (or relative size) of the different subgroups.</p>	<p>We thank the Reviewer for this helpful suggestion. We have added the total n and relative size of each subgroup among our Ontario and Alberta cohorts in the “Subgroups of People with Frequent ED Visits” section of the Methods.</p>
<p>In the results section you report that the individuals in the high ED use group are more likely to be admitted, however you do not mention that they are not more likely to be of the resuscitation level and slightly less likely to be urgent – are you assuming this is an indicator of the capacity and external resources/social</p>	<p>We thank the Reviewer for this astute observation. We agree that this discrepancy warrants discussion. When we disaggregated our data by province, we found that people with frequent ED visits were more likely to be admitted in both provinces, more likely to be triaged in the highest CTAS categories in Ontario, but less likely to be triaged as such in Alberta, compared</p>

<p>determinants of health informing the decision to admit? I think this warrants discussion.</p>	<p>to people with non-frequent ED visits. We have highlighted these observations in the Results section. We have also added two sentences to the second paragraph of the Interpretation section discussing that social complexities or lack of community follow-ups to enable safe discharge may be influencing decisions to admit these patients.</p>
<p>Interpretation/Limitations: You acknowledge that “ethnicity” was not an available variable. I think that it is important to acknowledge, perhaps in your interpretation, that there are known barriers, stigma and racial discrimination that impact health equity, access and quality of care, and that it is critical to further understand and consider these in follow-up research and the design of interventions.</p>	<p>We thank the Reviewer for their insightful comment – we wholeheartedly agree. In response to this suggestion, we have added two sentences to our Interpretation section that acknowledge that our lack of ethnicity data is an important gap in our ability to interpret our data. Furthermore, we suggest that future studies must seek to understand the effects of barriers, stigma, and racial discrimination on equity, access, and quality of care for racialized minorities in the design of effective interventions targeted toward people who use EDs frequently.</p>