**Article details: 2021-0131**
**Title:** People who make frequent emergency department visits based on persistence of frequent use in Ontario and Alberta: a retrospective cohort study
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**Reviewer 1:** Christopher Fernandes
**Institution:** Emergency Medicine, Hamilton Health Sciences/McMaster University
General comments (author response in bold)

This paper attempts to delineate the characteristics and needs of different groups that frequently use the ED in 2 different provinces.

Abstract--nice summary.
**We thank the Reviewer for their positive comment**

Introduction--p. 3, line 19--why introduce a new term of "high users"?
**We thank the Reviewer for pointing out this discrepancy. We have removed the term "high users" from our Introduction. For consistency we have changed our terminology throughout the paper to "frequent" instead of "high," except where directly referencing the Dynamic Cohort of high system users, which is CIHI's chosen terminology.**

p.3, lines 51-53--It is unclear from the introduction why you suddenly introduce new subgroups of long-term, medium-term, and short-term. Your previous paragraph and references describe short-term and long-term frequent users.
**Thank you for this helpful comment. As outlined in the response to Comment #21, 22, and #23 above, we have revised our analysis to categorize our cohort based on number of years of frequent ED use (one to five), among people who met the frequent ED use threshold in our most recent year of data, April 1st, 2015 to March 31st, 2016, rather than our previous usage groupings.**

Please see revised Methods, Results, and Tables.

Methods--p. 5, lines 5-18--These subgroups again seem very artificial.
**We agree. As outline above, we have revised our analysis to categorize our cohort based on number of years of frequent ED use (one to five), among people who met the frequent ED use threshold in our most recent year of data, April 1st, 2015 to March 31st, 2016 rather than our previous usage groupings.**

Please see revised Methods, Results, and Tables.

p. 5, line 43--Reference 23 which is used for this line describes the validity of CTAS for elderly ED patients--not what you described. Further, have the latest revisions of CTAS been tested for reliability?
**The Canadian Triage and Acuity Scale has been validated in large cohort studies including all adults ≥16 years old, and is predictive of overall and ICU admissions. Additionally, a recent meta-analysis demonstrated that CTAS has good inter-rater reliability, over multiple revisions and in multiple settings. We have added these**

**additional details to the "ED Visits" section of the Methods. We have also added the following references to support CTAS' validity and reliability:**
**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.**
**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.**

Results--p. 7, lines 25-34/Table 1--The results would almost suggest that the medium-term and long-term groups could be combined into one.
**Thank you for this helpful comment. We agree that our previous groupings did not optimally describe our data. As outlined in the response to Comments #21 and 23 above, we have revised our analysis to categorize our cohort based on number of years of frequent ED use (one to five) rather than our previous usage groupings.**

Please see revised Methods, Results, and Tables.

Tables 2 and 3 include only 2015-2016 in the heading. Is this an error?
**Please note our revised Tables 1 and 2. In response to comment #22 above, we now present data for people who made frequent ED visits in our most recent year of data, April 1st, 2015 to March 31st, 2016, and subcategorize them based on number of years during the study timeframe from 2011/2012 to 2015/2016 (one to five) that they met the frequent ED use threshold. We intentionally characterize patient and healthcare utilization characteristics using our most recent year of data, April 1st, 2015 to March 31st, 2016.**

Interpretation--p. 9, lines 3-55-This paragraph would suggest that the resource needs for both the medium- and long-term groups are deficient, both in terms of long-term care and complex care needs. The issues of alcohol and substance use, as well as mental health needs, have been identified previously in other papers. What do the results in this paper add to the literature?
**We thank the Reviewer for their insightful comments. Our population-level analysis provides a unique longitudinal characterization of frequent ED use in two large Canadian provinces, a distinctive opportunity afforded by CIHI's annually updated Dynamic Cohort, which provides information about patients' transitions into and out of frequent ED use over time. Our analysis demonstrates that people who visit EDs frequently have differential characteristics based on the persistence of their frequent use, and contributes new evidence that many of their characteristics follow a gradient based on degree of persistence.**
**We have added this discussion of the unique addition of our results to the existing literature to the Interpretation section.**

Limitations--The issues of family physician attachment and prescription medication misuse have previously been identified as key variables in understanding this population. These are major limitations to this paper, as you have identified
**We thank the Reviewer for this comment.**

Conclusion--The conclusions do not fit with the gist of your paper, which argues throughout for identification of 3 subgroups. You now speak of only 2 subgroups in your summary.

**We have revised the Conclusion section to better reflect the messages of our paper: that people who make frequent ED visits with increasing persistence over multiple years have distinct characteristics. Our conclusion now matches our revised analysis that it no longer subcategorizes people with frequent ED use into short-term, medium-term, and long-term subgroups, but rather examines characteristics across a gradient of increasing persistence of frequent ED use.**

References--The number of references could be significantly reduced. Not all the references listed are necessarily useful in understanding this population.
Is reference 33 in submission, in press, or published?
**We agree, and have reduced the number of references accordingly.**
**Reference 33 has been published. We have updated the reference to reflect this.**

**Reviewer 2:** Val Ginzburg
**Institution:** Emergency Department, Humber River Regional Hospital
General comments (author response in bold)

I applaud your attempt to address important issues faces ED however I have fundamental concerns about quality of the data and its analysis.
**We thank the Reviewer for their encouragement. We agree that our data has limitations, which we hope that we have transparently and adequately acknowledged. Nonetheless, we believe that our analysis adds importantly to the understanding of this complex patient group and hope to have the opportunity to share our learnings with the clinical and academic community.**

First, your choice of defining use based on then year during which visits occurred has muddied the issue. Others who studied this issue used set criteria of number of visits per year. In your study the medium group is up to 4 year which makes it almost identical to the long-term group while the other end of this group is 1-2 yr is equal to the short-term group. This leads to an incorrect analysis at the end.
**We acknowledge this valid concern. As requested, we have removed the short-, medium-, and long-term classifications. As outlined in our response to Comments #21 and #23 and Reviewer comments above, we have revised our analysis to categorize our cohort based on number of years of frequent ED use as an ordinal variable (one to five) rather than our previous usage groupings.**

Please see revised Methods, Results, and Tables.

You citing 7,8 indicating 4.5-8% account for up 30% visits while in your study only 1.4% (long-term) group account for 9% frequent visit while medium group account for 46%. This difference in results should have alerted you to incorrect approach that you have took from onset.
**We thank the Reviewer for their insightful observation. We agree and have removed the referenced citation indicating that 4.5-8% of patients account for 30% of visits. Inconsistency in definitions of frequent ED use is an ongoing challenge in this field of work; the Reviewer is correct that our characterization based on persistence of frequent use likely has identified a different subset of patients than that referenced in the citation.**

Second, the facts that mental health, low socioeconomic status, lack of primary care, comorbidities account for frequent use of ED has been well documented throughout the

literature. Thus, this article to doesn't add anything to the body of knowledge we already have.

**We appreciate this constructive criticism, however, we respectfully disagree. As outlined in our response to Reviewer 1 above, our population-level analysis provides a unique longitudinal characterization of frequent ED use in two large Canadian provinces. Our access to CIHI's Dynamic Cohort, which annually updated a cohort of people with frequent ED use, offered us a rare opportunity to understand patients' transitions into and out of frequent ED use over time. We have people with frequent ED use have distinct patient and healthcare utilization characteristics depending on the persistence of frequent use, and that many characteristics appear to follow a gradient based on the degree of persistence of frequent ED use. These findings have implications for targeting and planning effective interventions.**

**We have added a discussion of the unique addition that our study contributes to the body of knowledge on people with frequent ED use to the Interpretation section.**

Lastly, what would have been an important questions to ask are
Who comprises the group of people who visit ED 1 a year, 5 a year and over 10 times a year?

**We agree that characterization of people who make frequent ED visits based on degree of frequent use is an important question. We addressed this question in a parallel manuscript also being currently considered for publication in CMAJ Open. This manuscript reports on our application of cluster analysis to characterize subgroups of people with frequent ED use. We included annual visit number in our clustering algorithm, along with additional demographic and visit pattern variables that enhance the nuance of our characterization. We did find that annual visit number was an important differentiating factor among the identified subgroups.**

**We hope to have the opportunity to share the results of that work with the Reviewer.**

What conditions were most prevalent: mental health and substance use will likely top the chart but what other conditions that cause people frequently to visit ER. These conditions could provide directions in which resources can be allocated in the primary prevention to avoid ER visit.

**We thank the Reviewer for these important comments, and we agree. Tables 1 and 2 show diagnoses related to ED visits and admissions for subgroups of people with different numbers of years of frequent ED use. Some notable observations include a prevalence of heart failure and COPD exacerbation in all subgroups, and an increasing prevalence of alcohol withdrawal among subgroups with the most persistent frequent ED use (four and five years).**

**We have highlighted these observations in the Results section. Additionally, we have added the following sentence to our Interpretation section in recognition of the Reviewer's final point:**

***Additionally, differences in clinical presentations (e.g., higher substance use and alcohol-related presentations among the most persistent subgroups) provide directions for resource allocation.***