Reviewer’s report

Title: A cross-sectional study examining convergent validity of a frailty index based on electronic medical records in a Canadian primary care program

Version: 0 Date: 22 Nov 2018

Reviewer: Dae Kim

Reviewer’s report:

General Comments

In this paper by Abbasi and colleagues, they seek to validate the electronic Frailty Index (eFI), which has been implemented in UK primary care electronic medical records (EMR), with a clinically assessed frailty index based on comprehensive geriatric assessment (FI-CGA) in a Canadian geriatric specialty health care clinic. This is an important and salient issue in geriatrics, trying to enhance frailty case identification for further clinical management by automating frailty index calculations in EMR. The authors found that eFI and FI-CGA were strongly correlated (rho=0.72) and eFI was associated with age, number of chronic conditions, and number of medications. However, eFI tended to underestimate FI-CGA, on average, by 0.05 in the study population, particularly for women (eFI mean 0.31 vs FI-CGA mean 0.38), those with history of falls (0.35 vs 0.42), and those with urinary incontinence (0.35 vs 0.45). The authors acknowledged limitations of small sample size and limited generalizability.

Major Comments

1. The eFI here was manually calculated by a trained research assistant by manual review of all EMR information available (billing codes, diagnostic codes, problem list, medication list, and free-text notes), which is very different from automated calculation of eFI based on Read codes at the point of care in UK. Thus, the work presented here is not an evaluation of eFI. Although it is not easy to implement eFI in the primary practices participating in this study, the manual process of calculating eFI should mimic how eFI is calculated as much as possible (i.e., only limiting to billing codes and diagnostic codes).

2. Another important information missing is how much ("look-back" period) of EMR data were used to calculate eFI. It is implied it did not include the actual CGA visit itself, but otherwise it is unclear. Obviously, detection of chronic conditions may improve as look-back period is applied. It also does not seem to be from the last visit, or from a single point in time as visit notes were used as a data source as well. Was there any minimal number of medical visits or minimal length of look-back period required for calculation of eFI?

Specific Comments
1. The r from the Pearson correlation will by definition match the simple linear regression's r², as they are computing the same thing. The p value from a simple Pearson correlation would also be expected to match that from the linear regression identically. Thus it's unclear why both are necessary.

In the discussion (page 6, fourth paragraph), the authors discuss sex difference in FI-CGA levels. They do not discuss why the sex difference was not observed in eFI level.

2. As a cross-sectional analysis, lack of clinical outcomes does not allow comparing the predictive performance of eFI and FI-CGA. This should be mentioned as a limitation.

Minor Comments

1. Abstract, line 50: type in Methods section "enrolment"

2. Discussion, page 6, line 24: "celling" should be "ceiling".

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

No

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

Yes

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