Reviewer's report

Title: Frailty index of deficit accumulation and falls: data from the Global Longitudinal Study of Osteoporosis in Women (GLOW) Hamilton cohort

Version: 1 Date: 19 March 2014

Reviewer: Sarah ST Tom

Reviewer's report:

This paper takes an important step in linking the Frailty Index with health outcomes in older women, with falls as the primary outcome, and fractures, death, and overnight hospitalizations as secondary outcomes. This paper also helps us understand how to move towards an efficient Frailty Index, as no universally accepted model currently exists. While the paper has a strong foundation, I suggest the following points for consideration:

Major Compulsory Revisions

1. On line 50, please elaborate on why falls are an important public health issue.

2. In the background section, please state the hypotheses you are testing in terms of the direction of association you expect between the Frailty Index and the outcomes.

3. In Tables 3 and 4, it would be helpful to have a sense of the association between Frailty Index and the outcomes in a model that adjusts for fewer risk factors, for example a model that is only age-adjusted. Comparison of the minimally-adjusted and fully-adjusted models will help the reader understand whether the risk factors included in the model confound the associations between Frailty Index and the health outcomes.

4. Please clarify the data collected regarding fractures. If the respondents reported date of fracture, then the Cox model is appropriate. However, if the respondents only reported whether or not they had a fracture in the previous year, the analysis should use a discrete-time model, rather than a continuous-time model.

5. I appreciate the sensitivity analysis of the falls variable. However, I wonder if it is sufficient to consider new incident falls versus recurring falls and to exclude the models using baseline falls. The measures of new incident versus recurrent falls implicitly account for baseline falls. By including models for baseline falls only, I start to think more about reverse causality, and whether the falls contribute to the Frailty Index. If you choose to retain the models with baseline falls, please provide justification.

Minor Essential Revisions

1. Please clarify the use of the cutpoint for imputations in lines 176 and 178. I
have difficulty with the current wording in understanding which methodology was used for missing values of < 10% of observations versus # 10%.

2. In line 274, instead of stating “significant findings,” I suggest you state the direction of the relationships instead.

3. Please ensure that the number matches for noun and adjective/adverb/verb pairs throughout the text.

4. In Table 2, please confirm whether the term should be “limits” or “limitations” for the rows regarding Activities of Daily Living.

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests.