Reviewer's report

Title: Measuring change in health status of the elderly at the population level: The transition probability model

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Reviewer: Donna M Wilson

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I read through the manuscript a number of times, in part because it is great to see consideration of low to moderate and high users of health care services, and there are so few current nation-wide or province-wide or state-wide reports on health services utilization available (in this time of recession and rapid chronic illness rate increase as well as rapid population aging) to inform decision and policy makers. I also read some of the cited articles to make sure I understood the method chosen and the rationale for this method, as well as the discussion arising from the findings. Although of much interest to me, unfortunately, I cannot recommend acceptance of this manuscript as it is currently written, with much of my concern oriented to the research method. Please see the following comments for consideration:

Major compulsory revisions and minor essential revisions.

- the biggest concern is justifying why collective counts of this diverse set of health services are used as the point of investigation. There is a great difference between an admission to hospital (which could last 4 days or 4 months) and a prescription for a medication or a blood test done after a visit to a doctors office. Also, please indicate why daysurgery and outpatient clinic visits were not used in this count. About 90% of all surgeries are done on an ambulatory basis, and I imagine that a higher proportion of tests and exams/non-surgical procedures are done in outpatient clinics.

- Please indicate specifically why drug claims or medication prescriptions are used in the count, as medications are supposed to keep people well and out of hospital presumably. Medication prescriptions/claims may show more about fee-for-service physician practice, generic medication substititition, and other health system issues than seniors health and their use of health services.

- the introduction needs to be rewritten as it is not at all clear why this study would be of interest or relevance to readers. The first two paragraphs either need to be removed entirely or revised considerably for readability and value.

- justify why this study focused ONLY on seniors - people 65 and older - as it is now becoming evident that some young people are VERY high users of very high tech hospitals and other health services, and that a large proportion of health services are used by 86% of the public - people under the age of 65. Please justify for the readers why this study should ONLY focus on seniors and also how
this study can be used without promoting ageism. For instance, the US hs utilization lit often reports Medicare data findings, an accessible database which of couuse limits the focus to seniors, and this literature serves to emphasize seniors as a high use group.

- please consider revising the study method to include people of all ages, so you can certify that there is a need to focus on seniors aged 65+ OR provide findings from the 0-64 age group that help to frame this study of 65+ year olds. For instance, it is possible and likely that the use of diagnostic and treatment-oriented health services escalates in mid life. Care near the end of life, particularly when the people is 85 or 90 or 95 will be very different from that of a younger person with a serious health issue.

- please justify why you took out people who did not appear for 2 years in the data, as opposed to not excluding people who died - as it is possible in these databases to determine who died. this issue is further confounded by figure 1 that graphs utilization by people who died. There is also no provision in this study for people who died one day after the beginning of each study year and those who used health services over the year before death.

- please justify why you did not follow a defined set of people year by year or over time, but instead used annual full population findings, with new people entering each year and some leaving each year. These include people who moved into the province, and people who aged from 64 to 65. Please keep this point in mind as you outline the method and findings.

- please justify why you do not focus on each health service separately, but instead collectively count total use of these select services, as you may find increased utilization of some services with aging and declines in other... For instance, one would expect to see an increase in nursing home use with aging.

- please revise the findings section, and the discussion/conclusion, as they are not clearly written for the reader. This is a complex study and paper at best, so perhaps eliminating the focus on gender might help to clarify if there is a shift with aging from low to high utilization.

- please consider the concern that someone who is 85 or older today is part of unique cohort, born in a unique time and with unique life-long events impacting their health and wellbeing; just as people who are 65-84 are a unique cohort, 45-64 another unique group, etc - as each could have very different health services utilization based on the historical time they lived through. Assuming that each generation will age and use health services in the same way that people aged 65+ now use health services is a major concern, particularly as health technology developments have such an impact on delivery patterns. This concern is illustrated by the cohort of children today who are unlikely to live as long as their grandparents.

- I do not understand why chronic illness becomes a focus in the later part of this paper, as there are no data findings presented on diagnoses or co-morbidities or
an increase in co-morbidities with aging.

- the emphasis on risk in the conclusion is of great interest, as high users one year have the potential to be high users the next, although it is also possible that this utilization pattern can be changed, such as through nursing home entry.

- In closing, I would have liked to be able to advise acceptance as written, but I hope my comments will help the authors either rethink the method from this study or help them revise the report of this study.

Level of interest: An article of limited interest

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

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare I have no competing interests.