Author's response to reviews

Title: People with multiple unhealthy lifestyles are less likely to consult primary healthcare.

Authors:

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Author's response to reviews: see over
Reviewer's report #1

Reviewer: Carlos Brotons

Reviewer's report:

Major compulsory revisions
Method section should be further developed: what was the total population from where sample size was randomly selected?, when the study was done and who was responsible of the analysis. It is not clear the meaning of GP consultations within 6 months prior and post survey completion. Why was done that? Was a survey inquiring participants about healthy lifestyles performed, or was data directly obtained from medical records without self reporting measures? It is confusing

Authors: The “Data” subsection of the “methods” section has been amended to provide more information on the survey population and it now reads:

“This study used data on the 267,153 respondents to the 45 and Up Study, a survey carried out between 2006 and 2009 on the health and social wellbeing of individuals aged 45 years and older living in New South Wales, Australia [12]. Participants were sampled from data held by the Department for Human Services (formerly ‘Medicare’), the national provider of universal health insurance in Australia. The survey over-sampled individuals aged 80 years and over and residents of rural areas by a factor of two, with an overall response rate of 18%. Participants gave permission for their survey responses to be linked to a variety of data, including the Medicare Benefits Schedule (MBS). Linkage between the 45 and Up Study and MBS data for the period 2003-2012 was performed by the Sax Institute using a unique identification number for each participant provided by the Department of Human Services and other personal identifying details. The linked data was accessed and analysed through a secure facility which is managed by the Sax Institute. The 45 and Up Study was approved by the Department of Health and Ageing Departmental Ethics Committee and by the University of New South Wales Human Research Ethics Committee (HREC). Ethical approval for this particular study was provided by the NSW Population and Health Services Research Ethics Committee and the University of Western Sydney HREC.”

We have clarified authors’ contribution and year of analysis in the “Authors’ contribution” section at the end of the paper.

In the Methods section we have clarified that the choice of the one year interval to measure GP attendance depends on the necessity to balance sample size and validity. If the time period is too short most people will not have GP attendances, so we do not have enough samples for the analysis. But if it is too long then the independent variables, which come from the survey, may no longer be valid, since health status and related variables might have changed. We have also clarified that the outcome variables were derived from MBS claims data, and also mentioned this again in the discussion as a strength (with self-reporting measures prone to recall bias).

Results
Response rate is not included. It is not clear where the results shown in text come from. All the calculated measures (adjusted/non adjusted), odds in fig 1, should be explained in detailed in methods section how do they were calculated. Why using the scoring 7 and not the 8, which is the worst?
Authors: The response rate has now been included and extra methodological details have been added, such as specification of parameter estimates (odds ratios, incident rate ratios, 95% confidence intervals), outcome variable derivation and construction of the unhealthy lifestyle index.

Why using the scoring 7 and not the 8, which is the worst?
Authors: We refrained from using the category with 8 unhealthy lifestyle in our comparisons because it contains few people. On the other side we wanted to report all 8 categories in order to remain consistent with the original use of the index. Therefore we have added the following text in the section where we describe the index:

“While the index takes values from 0 to 8, in our data there were few people with a value of 8 (0.2% of the sample). Therefore when performing comparisons across index categories we take the category of people with 7 unhealthy lifestyles as the highest scoring group rather than 8, in order to avoid overstating the results and drawing conclusions based on few observations.”

We have also clarified this issue in the legend of Figure 1.

Minor Essential Revisions
It would be interesting for readers to see a brief summary of the 45 and up study.
Authors: We have provided more detail on the 45 and Up Study in the Data section.

Level of interest: An article of importance in its field
Quality of written English: Acceptable
Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests: ‘I declare that I have no competing interests’
Reviewer's report #2

Reviewer: Mark Harris

Reviewer's report: An interesting analysis of data of unhealthy lifestyle from the NSW 45 and up study linked to data on GP consultations from Medicare.

Authors: Thank you for your helpful comments, which we have used to enhance our paper.

Major compulsory revisions
The introduction is very short and does not adequately explore some major issues.

- Notably several Australian studies have shown a relationship between GP consultations and consultation length with socioeconomic status (low SES patients are likely to have more consultations but fewer long consultations).

Authors: We agree that consultation length is an important issue associated with socioeconomic circumstances that may influence the opportunity for prevention. In this paper we have decided not to attempt to account for consultation length because while the visit type is clear in the MBS data, the actual duration of the visit is not recorded. We could obviously assign average consultation times to different MBS items, but this would ignore possible important associations between the actual consultation times and confounders we use and may end biasing the data in an unknown direction. We believe it is an important issue that deserves more attention, and therefore we now mention it both in the introduction (2nd paragraph) and in the discussion.

- Furthermore as the author notes low SES Australians are more likely to have chronic diseases such as diabetes and heart disease and have risk factors for these such as hypertension, obesity and smoking. The statement that patients with multiple unhealthy lifestyles will, therefore, be less likely to consult a GP is not necessarily true (notwithstanding the findings as presented later).

Authors: We have clarified in the introduction that low SES status, risk factors and chronic conditions are all positively correlated and may well lead to higher utilization. We now emphasize that there are two way of looking at the data: with and without adjustment for potential confounders and that we provide results for both.

- In the methods, although it is referenced to a paper, it would be useful to provide a little more information on the index of unhealthy lifestyles. It has been validated in the 45 and up study against self-reported quality of life and psychological distress and correlated this with low socioeconomic neighbourhood. However in the current study it is being analysed against service use. A number of studies have shown particular risk factors to be negatively associated with primary care service use – notably smoking. The authors need to provide more justification of the association of the index rather than one or two of the component risk factors. At the very least the paper should provide a univariate table of the associations with specific component risk factors (like that in table 1).

Authors: We have provided a fuller description of the unhealthy lifestyle index in the Method section of the paper as recommended. This is in substitution for the supplementary table. We have also extended table 2, as recommended, to provide descriptive information on GP consultation
variables by individual components of the unhealthy lifestyle index. Some text has been added to the results section to describe this additional data.

The description of the outcome variables is insufficient. **Authors:** We have provided more information on the derivation of each outcome variable to add clarity (page 3-4), including the stating of which Medicare codes were used (as a replacement for the supplementary table).

The inclusion of the residential aged care and after-hours items (cf Table 2) was very unusual. One might expect that these would have a different distribution and set of associations to items for GP attendances. **Authors:** On reflection, we agree that residential aged care and after-hours items should not have been included and we have removed them.

In the discussion the statement: “Current strategies for placing interventions within primary care settings support secondary prevention (e.g. of complications among people with T2DM), but have less scope for primary prevention (i.e. preventing people from developing T2DM) among a reasonable proportion of people with multiple unhealthy lifestyles” needs to be referenced. The study looked at a broad range of GP items many of which could not be expected to be relevant to primary or secondary prevention. There are however some specific items (eg health assessments) that could be specifically explored. Prevention is not the only issue that this study raises. The paper alludes to the fact that patients with multiple risk factors may have sought care elsewhere. It would be useful to expand on this issue. It is possible that this paper has major implications for the prevention of hospitalisation as patients with multiple risk factors not seeking care from GP may indeed present to hospital ED departments. Improving access to these patients may be a useful strategy for preventing hospitalisation.

**Authors:** The quoted text in the Discussion section (“Current strategies for...”) has been omitted as it was speculative. Although some of the GP items analysed are not directly relevant to primary or secondary prevention, they do contribute to the overall levels of interaction between a participant and primary healthcare. As such, they represent potential opportunities for preventive health. We have cited a recent paper [1] supporting our hypothesis that participants with multiple unhealthy lifestyles are likely to be substituting primary healthcare for secondary healthcare utilisations (classified as ‘avoidable hospitalisations’).


**Minor Revisions**
The title should delete the second sentence as sample size is not appropriate for the title and the sample is confined to one state – NSW. **Authors:** Amended as recommended.
The tables in appendices should be referred to in the paper and attached rather than being appendices.

Authors: We agree and have integrated data from both of the supplementary tables within the manuscript.

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