Author's response to reviews

Title: Demand for emergency health service: factors associated with inappropriate use

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Author's response to reviews: see over
Dear Ms Anita Makri:

Thank you for allowing us to resubmit our manuscript. We have revised our paper according to the helpful comments received from our two reviewers. We have made the following specific changes in response to the reviewers’ comments:

**Referee 1:**

**Rewier:** Jon Nicholl

**Major Compulsory Revisions**

1. Firstly, there is the question of recall bias, manifest here by questions about the validity of self reports of PHIC access and utilisation in the past 12 months. One can easily imagine self-referred patients with relatively minor conditions justifying their attendance by reporting lack of PHIC access and mis-remembering their utilisation.

   We have acknowledged the possibility of recall bias in the Discussion section (page 14, last paragraph):

   “Some of the variables concerning PHC utilization and access relied on recall over the past 12 months, which could have resulted in recall bias. However, Reijneveld(29) showed good to excellent agreement between retrospective self-report and registered utilization of health care with the same recall period.”

2. Secondly, there are no non-attenders. The correct design for a study of ‘risk factors’ for inappropriate attendance looks at a group of people with a minor condition which is not appropriate for the ED, and compares the ED (inappropriate) attendance rate between groups with different characteristics. The analysis in this study is based only on attenders and compares the proportion of attenders with some characteristic who did so inappropriately with the proportion with some other characteristic who inappropriately attended. These proportions are determined both by their numerator, the numbers inappropriately attending, and their denominator, which includes the number of appropriate attenders. If some group of patients has a relatively high incidence of conditions needing appropriate attendance, this group will have a low inappropriate attendance prevalence ratio, even if their propensity to attend with a minor and inappropriate problem is the same as in another group. Thus the PR is determined as much by their need to attend appropriately as by their propensity to attend inappropriately. For example,
consider age. Older people have a higher incidence of serious health problems and we should expect them to have a high incidence of appropriate attendance. We should expect therefore that their attendances are ‘rich’ in appropriate attendances, and this is just what we find. The authors over interpret the PR as showing factors associated with inappropriate attendance, but they may just be factors associated with appropriate attendance.

We acknowledge that including non-attenders in the denominator would have produced valid estimates of the population-based prevalence of inappropriate ER use. However, the prevalence of ER use in the general population is very low, and the sample size required to produce precise population-based estimates of inappropriate ER use would be correspondingly very large. We believe that useful information on the correlates of inappropriate ER use can still be generated from a study (such as ours) confined to the population of those attending the ER service. The prevalence ratios for the determinants of inappropriate ER use generated by our study are analogous to odds ratios from a case-control study in which we compared “cases” (inappropriate ER use) to “controls” (appropriate ER use).

Minor Essential Revisions
3. There is the question of generalisability. As would be expected, and as the authors recognise, inappropriate attendance is very context dependent. It is less clear whether the ‘risk’ factors for inappropriate attendance are also site dependent but this needs some discussion

We believe that our findings are generalizable to other municipalities in Brazil. Several of our findings are also consistent with associations reported from similar studies carried out in other parts of the world.

4. table 2 has gone awry. The PRs by time of day are clearly wrong if the reported prevalences of inappropriate attendance are right.

Thank you for noting this error. The prevalence of the “Shift during which the ER visit took place” was corrected on table 2.

5. the methods says that the multivariate analysis was carried out by “poisson regression, as appropriate for…”. This is ambiguous. I assume they mean “…by poisson regression, using robust variance estimates as appropriate for…. if they don’t mean this their methods are clearly shown by ref 24 to be wrong.

…using robust variance estimates,… was added on page 7, last paragraph.
6. there are some minor but acceptable mistakes in the English throughout, however the discussion and particularly the conclusion are very poor and must be re-written.

We have substantially rewritten the discussion and conclusion sections.
Referee 2:

Reviewer: Albert Lee

Major Compulsory Revisions

1. The methodology section needs to be strengthened. The sampling method is unclear.

- Why the authors only selected age 15 years or older? Why only 13 days were included?
  As added in the 1st paragraph of Methods
  This age group was chosen because this is the age group in which the outcome criteria were validated.
  Moreover, we targeted adults because in order to include children it would be necessary to study a different range of factors that led to their seeking ER care. We agree with the importance of inappropriate use of ER in children; however this would have necessitated a different study design.

- How did they select these 13 days to ensure a representative sample which would be generalized to the whole population?
  As added in the 1st paragraph of Methods
  …including a regular proportion of weekdays and weekends (9 weekdays, 3 weekend days and 1 holiday). This number of days was chosen to reach the estimated sample need.

- For the criteria of severity, the authors need to justify why attending for radiology of any type is regarded as emergency condition. In many countries, routine radiology would be done in primary care setting.
  We used a previously validated, standardized criteria. To preserve comparability with previous studies which used the same criteria, we were not supposed to change them.

- The authors need to include sample size calculation. They have set the scene at the end of method section but did not come up with the actual sample size.
  We did a sample size calculation prior to initiating the project. However after doing the field work we felt it was more appropriate to show the (posterior) statistical power that we had to evaluate the studied associations taking into account the size of the studied population. We rewrote the 2nh paragraph of Methods indicating the precision in estimating the prevalence of inappropriate use of ER.

2. The features of Brazilian public health service should be described under background rather than method section. More details on primary health care development would be useful.
The paragraphs were moved to Background and details on primary health care were added.
3. Although having regular doctor and previous visit to PHC were not found to be a significant factor, number of shifts per day at PHC centre and unavailability of appointment elsewhere were found to be significant. More discussions need to focus on primary care development in Brazil in rectifying the problem. Lack of social support was also found to be significant. One would expect the authors to come up with a proposed model of care to minimize inappropriate utilization of emergency services.

The considerations about how to rectify the PHC problem was enlarged in the conclusion. The discussion on social support was expanded (page 15 last paragraph of discussion).

The discussion section is rather thin. The study has generated very interesting results and should be discussed further.

Parts of the discussion and the conclusion section were rewritten to expand on our findings and their implications.

With these changes, we hope our manuscript is now acceptable for publication. Thank you again for allowing us to revise and resubmit our paper.

Sincerely,

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