Author’s response to reviews

Title: Costs of potentially inappropriate medication use in residential aged care facilities

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Author’s response to reviews:

6th December 2017

Elham Rahme
BMC Geriatrics

Dear Dr Rahme,

Thank you for the opportunity to revise our manuscript entitled “Costs of potentially inappropriate medication use in residential aged care facilities” (Manuscript number: BGTC-D-17-00328R1).
We thank the editor for their useful comments and we have addressed these in the new version of the manuscript. A detailed point-by-point description of how we have changed the manuscript in response to the comments is provided in this letter. We look forward to hearing from you in due course.

Yours sincerely,

Stephanie Harrison, PhD

Editor Comments:

1. Typo page 6: to be involved the study (insert 'in')

This has been corrected on page 6, line 106.

2. In the statistical analyses section on page 10:

you need a reference that shows that the decision to add 10 to zero costs to overcome the log problem works reasonably well (since other methods exist including the two-step models).

the statement: 'Multi-level linear models of the transformed costs were used to assess the differences in costs of PIMs in different models of care and the total medication costs by exposure to a PIM' is not clear to me. Is-it multi-level models or multivariate models? If it is multi-level models, mention the levels and what the model assess in each level, for clarity. two-level models are used to overcome the zero cost problem, but in that case you do not need the +10 transformation.

Also, as you correctly stated in your response, the log-linear models do not assess the difference in costs but ratio of mean costs. (the log-linear models provide difference in log-costs which as you stated is not meaningful to the reader, so when you transform back to the original scale you get a ratio).
After further reading and discussion with our statistician we have changed our models to two-
part models where costs included many zero values as suggested by the editor. Thank you for the
suggestion. References for the new analysis have also been provided. The statistical analysis
section now reads as follows (page 9, lines 180-194):

“The costs were positively skewed and were therefore log transformed to correct this to a normal
distribution. For the total medication costs there were no zero values and therefore multivariate
linear models of the transformed costs were used to assess the ratio of mean total medication
costs by exposure to a PIM. As the costs of PIMs included many zero values, two-part models
were used to assess the ratio of mean total costs of PIMs [18, 19]. First, a logistic regression
model was used to predict the probability of any cost of PIMs more than zero in a home-like
model of care compared to a standard model of residential care. Second, a log-normal model
weighted by the probability of cost more than zero was used to model nonzero cost of PIMS
associated with residing in a home-like model of care compared to a standard model of
residential care. Models were adjusted for the following potential confounding factors: age, sex,
marital status, activities of daily living as measured by the modified Barthel Index, social
interactions, number of comorbidities, Neuropsychiatric Inventory (NPI) scores and PAS-Cog
scores. The level of statistical significance was set at p<0.05. All analyses were completed using
Stata v.14.0 (Stata Corp LP, College Station, TX, USA).”

3. In tables 1 and 2 (and perhaps other tables as well), please pay attention to the number of
decimals. You need the same number of decimals everywhere for consistency.

All of the decimal places are now one decimal place, except p values which are given in three
decimal places and number of participants which does not have any decimal places. Costs have
two decimal places.

4. 'Residing in a home-like model of care was also associated with 42.4% lower costs of PIMs
over 12 months compared to those in a standard model of residential care (β = -0.239, 95% CI
-0.411 to -266 0.067, p=0.007). Please refer the Table where these results are found and explain
to the reader how you got the 42.4%.

The results for this have changed as we have now changed the analysis to two part models (page
13, lines 260-266):
“The first part of the two-part model (logistic regression model) estimates a significant odds ratio of $e^{(-0.735)}=0.48$ (p=0.008), indicating that the odds of incurring any costs from PIMs was 52% lower for those living in a home-like model of residential care, after adjusting for potential confounding factors. The second part of the model (log-normal model) indicates residing in a home-like model of care was marginally associated (p=0.064) with lower costs of PIMs over 12 months ($\text{mean cost ratio}=e^{-0.277}=75.8\%$, therefore 24.2\% lower costs) after accounting for those with zero costs (Table 5).”

5. In the title or legend of the tables 4-6, mention what model was used for clarity (for example you may say: Table 5. Associations between models of residential care and exposure to a potentially inappropriate medication: logistic regression models. you may also choose to mention it in the legend such as : logistic regression models adjusted for age...)

The type of models has been added to the titles and legends of tables 4 and 5. Table 6 has been removed as tables 5 and 6 were combined as the analysis was changed to two-part models.

6. My preference is to present both medians (quartiles) and means (SD) for skewed data, but I will leave this to the authors to decide.

We have kept this as means (SD) for costs as we think providing both would confuse the reader and not give a clear representation of the results.