Author's response to reviews

Title: Factors influencing hospital length of stay outliers

Authors:

Alberto Freitas (alberto@med.up.pt)
Tiago Silva-Costa (tcosta@med.up.pt)
Fernando Lopes (fernando@med.up.pt)
Isabel Garcia-Lema (ilema@med.up.pt)
Armando Teixeira-Pinto (tpinto@post.harvard.edu)
Pavel Brazdil (pbrazdil@inescporto.pt)
Altamiro Costa-Pereira (altamiro@med.up.pt)

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Authors: Alberto Freitas, Tiago Silva-Costa, Fernando Lopes, Isabel Garcia-Lema, Armando Teixeira-Pinto, Pavel Brazdil and Altamiro Costa-Pereira

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Dear editor,

We are pleased to submit a revised version of the manuscript previously entitled "Factors influencing hospital length of stay outliers”. Below we detail our response to the reviewers’ helpful comments.

Yours sincerely,

Alberto

Alberto Freitas (corresponding author)
Assistant Professor
Dpt. of Health Information and Decision Sciences, Faculty of Medicine, University of Porto
Al. Prof. Hernâni Monteiro
4200-319 Porto
Portugal
Telephone: +351 22 551 3622
Email: alberto@med.up.pt
Response to reviewer Ceu Mateus:

Thank you again for all your valuable comments.

1. The title should be changed to reflect the fact that authors are only interested in analysing the factors influencing high length of stay outliers

[Authors] --> We changed the title to “Factors influencing hospital high length of stay outliers”

2. In page 5, where the authors refer that “Originally, key components of the DRG based inpatient resource allocation model were the DRG weights, hospital case mix indexes, hospital blended rates and total number of discharges” I think that they meant “total number of equivalent discharges” otherwise identified outliers (low and high) would not be taken into account for funding/billing purposes.

--> Yes, it is more correct to refer to the total number of discharge equivalents.

3. In page 6 the authors refer to “minor production” it is not clear what they are meaning with that.

--> We included additional information in the paper to clarify this point.

4. It should be clarified that, in page 6, where the authors say ”for inpatients with third payer coverage high length of stay is still covered by a fixed rate, regardless of the DRG in which the hospitalization is classified” what occurs is the following “for inpatients with third payer coverage inpatient days above the high trim point are still covered by a fixed rate (per diem), the same regardless of the DRG in which the patient is grouped.”

--> We accepted your suggestion to clarify that point.

5. In page 5 authors mention that DRGs are used in Portugal since 1990 and in page 6 they present results for the number of outliers for 1989 and 1990 based in the same analysis produced by Bentes et al..

--> Coding started in January 1989 (Circular Normativa N.1) but only in 1990 was produced legislation about prospective payment.

6. It is not clear if Bentes et al. mentioned in page 6 looked at all outliers (high and low) or only at high outliers as the authors. This information is relevant for the comparison done.

--> We clarified this point: “long-stay patients (high LOS outliers)”

7. The database seems incomplete for the year of 2009, with approximately half of the cases of the other years. This point is not clarified along the paper. Furthermore the number of outliers for year 2009 is the highest.

--> We also clarified this point; year 2009 is not complete (we only had access to approximately half of the records of that year)
8. If the authors only used two economic groups (page 9) why did they classify the hospitals in four groups? Economic groups should be recoded as a binary variable: group 1 and group 2.

--> Yes, in fact in the original hospital classification (Relatório de Retorno Nacional, 2006) hospitals were classified in 4 groups. For the purpose of our analysis, we compared only group I with all the others, but, for a better understanding of the hospitals included in this study, we present in table 2 the case mix for each economic group, and because of that we did not rename the variable categories otherwise.

9. Variables listed by authors from page 8 to page 10 sometimes refer to patient level characteristics and sometimes to hospital level characteristics. Variables should be better organized so it is easier for the reader to understand which is the level of analysis being taken under consideration

--> Thank you for your suggestion; we rearranged variables according to the level of analysis.

10. In page 10 the sentence “we used logistic regression models… “ should end as “with high LOS outliers”. In the next sentence instead of “will” it seems that “with” is more adequate.

--> We corrected these two points.

11. Authors do not identify the year of the Portaria from where the relative weights were taken to calculate the casemix index mentioned in page 15.

--> We included that identification (Portaria N.º 132/2009)

12. The authors should explain more clearly the following statement “if hospitals had been able to easily control the volume of high LOS outliers, then it would be expectable to find some influence in the evolution of the case mix over the years”.

--> We tried to explain more clearly that statement.

13. In page 16 the authors say “… part of these outlier cases could be prevented, and so, extra funding would be a reward of poor patient management” but in page 17 they say “outliers have influence in hospital costs and therefore should be considered in the financing of hospitals”. However it is not clear which outliers are acceptable and should be funded and which are unacceptable and should be paid.

--> We also included additional information about this situation.

14. How can we assess the increasing complexity of patients mentioned by the authors in page 17? How can that be considered by hospitals managers to inform hospital costs differences?

--> We can use not only case mix indexes but also comorbidity indexes (e.g. Charlson, Elixhauser).