Author's response to reviews

**Title:** Pneumonia burden in elderly patients: a classification algorithm using administrative data

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**Burden of pneumonia in elderly in-patients: a classificatory algorithm based on administrative data.**

Dear Editor,

We are very grateful to the two reviewers. Their comments let us improve our manuscript. We followed their suggestions and made changes as requested.

A revision of the written English was also made, as suggested. The title has been changed in: “**Pneumonia burden in elderly patients: a classification algorithm using administrative data**”

Please enclosed you will find the answers to the reviewers’ comments.

We hope our work will satisfy the Editorial Office.
We are looking forward to hearing from you.
Sincerely.

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**ANSWERS to Reviewer 1**

**Reviewer's report**

**Title:** Burden of pneumonia in elderly in-patients: a classificatory algorithm based on administrative data.  
**Version:** 2  
**Date:** 6 September 2013  
**Reviewer:** Masafumi Seki

1 First of all, contents of HCAP patients were too unclear. HCAP were usually include the old person's pneumonia (=aspiration pneumonia, by host factor, usually related with ‘stroke’) and pneumonia due to Multi-drug resistant pathogens (=MDR pneumonia, by pathogen factor). Which was dominant in this data? (Maybe aspiration?)

Thank you for this comment. However, pneumonia etiology is difficult to be described using claims data. In order to answer your question, we examined the etiology of pneumonia subtypes based on the ICD-9-CM codes. Unfortunately, for over 76% of all pneumonia the specific organism was unknown. Among the remaining 24% of cases, some differences in the etiology were evident.

We added a sentence in the Results section: “For over 76% of all pneumonia the specific organism is unknown. Among the remaining 24% of cases, some differences in the etiology are evident, with HCAP being more frequently caused by Pseudomonas and Staphylococcus aureus”.

See Result section pg 8 first four lines. In the revised version we reported the first ten most common etiologies in new table (Table 2).

On the other hand, for acute stroke there were evident differences between pneumonia subtypes (HCAP, 4.3%, PNP 8.5%, 0.8% CAP).” We added information on “acute stroke same admission” in Table 1.

Furthermore, these ratio and number of HCAP were vastly dependent on the specific environment of region, facilities, and countries. For example, HCAP in US (MDR dominant) and Japan (aspiration dominant) were very different because of difference of insurance system, ratio of MDR, and population of old people. The author should discuss and showed more detailed information about them in Lazio, Italy, compared with other countries.

We agree with your comment. In the discussion section we added more details on the characteristics of the Italian Health System in comparison with other countries. See Discussion pg 9 last paragraph.

2 According to #1, the number of HCAP patients may be usually more than PNP and CAP. Why HCAP patients were less than those of PNP and CAP? Were the
old guys in Italy in their own houses, and carry to hospital? Therefore, did they calculated not HCAP, but CAP? On the other hand, length of stay was < 10 days in HCAP might be very short, suspected the young guys who had common cold / traffic accident recently were also included the HCAP, too?

Your comment gave us the opportunity to check our figures and confirm them. Moreover, we found our findings consistent with others. In a recent prospective work in Italy about patient aged 18 or older, Venditti reported that 62% had CAP, 25% had HCAP and 14% hospital acquired pneumonia (ref 6). In a Spanish observational study Carratalà et al reported that of all cases of pneumonia, 17% were HCAP and 83% were CAP (ref 7). However, in our study the number of HCAP could be underestimated because we did not have information on the residence in a nursing home or long – term care facility for the years under study. However, the analysis of data pertaining to year 2011, when the information on residence was available, supports the view that such a risk is of negligible size.

We added sentences in Discussion section (pg 10 last few lines bottom and –pg 11 first lines)

3 In page 7, COPD and respiratory failure was more in HCAP/CAP than PNP? It maybe strange.

The diagnosis of COPD and respiratory failure refer to the patient’s conditions prior to admission and not to those characterizing the study. Accordingly, these associations should not be considered as measures of pneumonia severity, but as an index of health status prior to the hospitalization. Furthermore, PNP frequently complicates the clinical course of previously healthy people undergone major surgical procedure or chemotherapy and so on. Thus, the observed differences seem to be logical.

4 In page 9, the authors concluded this study clearly demonstrated that that the three subtypes of pneumonia identified on the basis of administrative data correspond to distinct clinical and epidemiological entities, but look similar in Table 1.

We agree that differences are not striking, however they are evident specially with regard to comorbidity and outcomes. Nevertheless, we smoothed our conclusions as follows: “Results from present study suggest that three types of pneumonia are characterized by important differences in demographic/social and clinical profiles as well as in the impact on health care”.

See Discussion pg 8 first sentence.

5 According to #4, the authors should add’ p value’ in each item in Table 1

We added ‘p value’ in the Table 1.

ANSWERS to Reviewer 2

Reviewer's report
Title: Burden of pneumonia in elderly in-patients: a classificatory algorithm based on administrative data.
Page 2, line 14: Authors describe ‘Comorbidity status was more severe in HCAP…’ Although there were more numbers of comorbidities in HCAP, severity was not evaluated in this study.

Thank you for your suggestion. We tried to obtain information on severity from our data by defining two new variables: 1) use of continuous invasive mechanical ventilation (any procedures) and 2) admission, discharge, or transition to the intensive care unit in the same admission.

See the new sentence in the Methods pg 6 (lines 7-9 from the bottom). We added the new results on this point in Table 1.

Page 7, line 3: According to the figure 1, the incidence of HCAP in people aged 80+ does not seem to be a lower proportion, except people aged 90+ in 2006 and 2007.

We agree with your comment. We corrected this sentence in the text. See Results last sentence pg 8.

Page 15, table 1: Private Nursing home is listed in the part of ‘Type of hospital’ Private Nursing home does not sound like hospital but sound like nursing home. If this is nursing home, the type of pneumonia will be HCAP.

In the Table 1 we changed the variable label in "Public, Teaching and Private"