Reviewer’s report

Title: Surveillance of Device Associated Infections and mortality in a major Intensive Care Unit in the Republic of Cyprus

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Reviewer: Cristiano Alicino

Reviewer's report:

In this study, authors present the results of the surveillance of device associated infections in an intensive care unit of a major public general hospital in the southern of Cyprus. In particular, the study aimed to assess the incidence of device associated healthcare infections (DA-HAIs) and the related mortality and costs.

The aim of this study is relevant and its results allow to improve the knowledge about the epidemiology and the impact of DA-HAIs in the intensive care setting. Moreover, the surveillance is methodologically well structured, the subject treated is of crescent importance and the article is well written. However, some major limitations affect the overall quality of the manuscript which could be acceptable after the Authors have responded to many compulsory revisions, namely:

- Authors tried to assess the costs related to DA-HAIs. The cost estimation was based on US cost per HAI rates published by Scott II and the cost estimation was calculated by multiplying the number of infections with the lowest and the highest estimation reported by Scott II. However, following the methods stated by the authors, I have obtained different results, i.e. the number of CLABSI registered during the one-year surveillance was 21, the lowest and the highest costs for CLABSI were $7,288 and $29,156, therefore the total costs for CLABSI ranged from $153,048 to $612,276. Please check your computations for all the DA-HAIs or explain in more details the methods followed for the cost estimation.

In addition, the authors estimated the costs related to DA-HAIs on the basis of the current hospital bed cost per ICU day. However, it is not clear whether this cost accounts also for the diagnostic exams, the antibiotic therapy and other procedures for the diagnosis and the treatment of DA-HAIs. Please, clarify this issue.

Finally, the results and the limits of the cost estimation were not discussed in the "discussion" section. I suggest or to improve all the cost estimation analysis or to remove it from the paper.

- Please report in more details the objectives of the study at the end of the introduction.
- In the methods section, please describe in more details the setting of the study reporting the name of the hospital, its characteristics (is it a primary, a secondary or a tertiary hospital? Is an adult hospital or also paediatric patients can be admitted? the number of yearly admission, etc.)

- In the methods section, please describe in more details the inclusion and the exclusion criteria adopted for the enrolment of patients.

- Should the patients or their legal tutors sign an informed consent before the enrolment in the surveillance?

- Discussion section, page 11, line 41-43. Authors stated that "LOS was correlated with the time of the occurrence of the first DA-HAI" but the correlation between LOS and time of occurrence of first DA-HAI has not been assessed with proper statistical methods. You can only state that patient with DA-HAIs had a median LOS longer than patients without DAI-HAIs.

- In table 1, all percentages are miscalculated. Please, check carefully your computations. Moreover the percentages of the variables "infection on admission" were reported for row instead of for column (as done for the other variables). Finally, I suggest to add a column with the results of the overall population.

Some minor revisions need to be addressed, namely:

- Please at the first use of any acronym, please report for which this stand (in the abstract and in the text)

- Introduction, page 4, line 12, please specify that CLABI, VAP and CAUTI are the three most common DA-HAIs in intensive care units as reported in the reference 6

- methods section, page 6 lines 7-9, please report which types of samples from lower respiratory tract were used for the diagnosis of VAP (BAL, BAS, other)

- methods section, page 4, line 52-53, you reported that the nurse to patient ratio is one to two (corresponding to 0.5), but in the following sentence you stated that during the day time shift the nurse per bed ratio is 0.75 whereas during the afternoon and night shift the nurse per bed ratio is 0.5. Please, clarify.

- results section, page 8, line 10-12, please report also the percentage of the males and substitute & with and.
- results section, page 8, line 39-41, please clarify what you mean for device utilization. Maybe you intended that the proportion of patients that were exposed to mechanical ventilation was 70%, those exposed to central catheters were 58% and so on.

- results section, page 8-9, the figure 1 is not informative so I suggest to remove it and the related comment in the section. I suggest the authors to report only the median time before the identification of DA-HAIs and the median time after the identification of the first DAI until discharge without any inference (remove the p-value).

- Please consider to add a multivariable analysis to study the factors associated with HA-DAIs mortality in addition to the computation of crude mortality rate. Some variables could potentially influence the excess of mortality

- Results section, page 10, chapter "resistance", please remove all the acronyms for bacteria and antibiotics.

- Conclusions: the study reported the DA-HAIs incidence and not DA-HAIs prevalence, please modify accordingly.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

No

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

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Please indicate the quality of language in the manuscript:

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