Reviewer’s report

Title: The impact of pandemic (H1N1) 2009 virus compared with seasonal influenza epidemics on intensive care admissions in New South Wales, Australia, 2007 to 2010: a time series analysis.

Version: 4 Date: 24 August 2012

Reviewer: Baltazar Nunes

Reviewer’s report:

The article entitled “The impact of pandemic (H1N1) 2009 virus compared with seasonal influenza epidemics on intensive care admissions in New South Wales, Australia, 2007 to 2010: a time series analysis.” has the objective “…to compare the impact of recent seasonal and pandemic influenza epidemics on demand for intensive care in the general population, in pregnant, and in Aboriginal people.”, as stated by the authors.

In the reviewer opinion the need for indicators of the impact of influenza epidemics (pandemic and seasonal), on the intensive care admissions, is important in order to estimate the health service needs during influenza epidemics, which enables costs estimation and gives support to the hospital resources management. On the other hand, understanding the epidemiological circumstances, that could be associated with a higher impact on intensive hospital care admissions, is also useful in the scope of the specific public health measures to mitigate the influenza epidemics impact on the most vulnerable population groups.

Although the importance of the information and knowledge that the article results can provide, there are methodological questions that must be analysed and answered before we can interpret the results and take conclusions.

Major Compulsory Revisions

1. Along the manuscript and also in the objectives statement and key messages, the authors use the word “demand” to refer to what they are estimating in terms of impact. The data available are weekly rates of intensive care hospital admission, and the authors are estimating excess rates of intensive care hospital admission during influenza epidemics. These figures don’t measure the “…demand for intensive care…”, to estimate the demand the authors would need to measure the needs (fulfilled and not fulfilled) for intensive care treatment during the influenza epidemics. So the reviewer encourages the authors to revise entire manuscript taking this into consideration. The authors must state precisely what are they estimating in terms of impact, and keep the term along all the text.

2. To estimate the baseline for intensive care hospital admission, in the absence of influenza epidemics, the authors have used a Serfling-type approach fitting a robust regression model to the times series without removing the influenza
epidemics periods. They also claim that using a robust regression model does not require the removal of influenza epidemic periods, given that the method is robust to the existence of outliers in the data: the influenza epidemics impacts. This statement must be supported by a reference that shows that both baselines (with and without epidemic periods) do not differ or by an additional analysis by the authors showing the similitude between the baselines. These results can be provided has supplementary material. Additionally a reference for the specific robust regression method used must be provided.

3. The excess intensive care hospital admissions associated with influenza epidemics were estimated by “the difference between the observed and baseline predicted admission rates and then summed over all weeks of the influenza period.” Has it can be understand the authors sum all the differences, positive or negative, statistical significant or not. How are the authors accounting for random variation around the baseline in the excess estimates? Not all positive differences above the baseline can be attributed to influenza epidemics during an influenza epidemic, given that there is random variation. Is this random error included in the confidence interval, the authors should clarify this and also the method to calculate the CI for the excess estimates.

4. How the baseline does explain ICU admissions in the absence of influenza epidemics? This is important in order to understand if the model proposed is adequate for the observed data. The model fit diagnosis outside the epidemic periods must be provided in order to evaluate the quality of the baseline estimations; this should include model assumptions evaluation, goodness of fit measures and autocorrelation of residuals.

5. The method used to estimate the baseline when the ICU admission outside the epidemic periods is rare is not clear. The authors state that they use a constant value, an average. What data is included in the average calculus?

6. The authors have use robust regression to estimate the baseline for a counts time series with small numbers, like ICU admission in the age group <17 years, pregnant women and aboriginal what is the behaviour of this method with this type of time series, shouldn’t the authors have used a more adequate distributional model for counts? Like Poisson?

Minor essential revisions

1. In the paper title the word virus is not necessary.
2. Abstract line 4 and page 5 line 4: “to compare the impact...” change to “...to estimate and compare the impact...”
3. Abstract, Results line 7 (from the end) “...per 100,000 inhabitants...”
4. Introduction, 2nd paragraph line 2 “...with A(H1N1)pdm influenza virus sub-type...”
5. Also in the 2nd paragraph of the introduction the authors state “...a substantial number of pregnant...” and “...there was also a high level of severe illness...” and further on the 3rd paragraph line 3 (from the end) “A substantial proportion of...”. These are very unspecific sentences; the authors should be complement
with more information so that the reader can understand better the impact of the statement.

6. Page 8, 4th paragraph, line 2 “… influenza, compared with a maximum of 28 in other years, which was observed in 2010.” Do the authors refer to other years or other epidemic periods?

7. Page 8, line 3 (from the end) “…respiratory ICU admission…”

8. Page 13, line 6 (from the end) “…a higher rate of excess admission to ICU…”

Discretionary revisions

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests.