Reviewer’s report

Title: Geographical differences in whooping cough in Catalonia, Spain, from 1990 to 2010.

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Reviewer: Hélène BROUTIN

Reviewer’s report:

Exploring the whooping cough (WC) dynamics is always interesting in the current context of complex epidemiology of this persistent disease. Data used look interesting and are well described.

Results are well described but the study remains with many specific questions that should be investigated with this data set.

Major Compulsory Revisions

1- A map of the Catalonia with counties limits and different colors for urbans vs rural counties and location of Big cities should be informative to help the interpretation of the results (rural counties aggregated ? isolated ?).

2- Results section. « In 1990, 33 counties were considered as rural, 8 as urban. In 2010, 31 counties were rural and 10 urban »…. The definition implies a change in number of rural/rural counties every year… how thus was built the rural and urban time series…. Data from one county can be included in rural aggregation in few years and in urban aggregation for the other years…. That is not clear… please clarify this point and provide more details in supplementary material for instance… A time series is supposed to be the number of cases in the same spatial unit…

3- Fig 2 : it looks that the dynamics are different in rural and urban counties, which is interesting to explore but frustrating since it is not done fully in the manuscrit.. A single graph with the 2 curves (urban vs rural) would help to see the differences (e.g. the epidemics in 1996 that we see at the Catalonia level is largely due to an epidemics in rural counties but does not concern the urban countries…

4- The only information given by the authors is incidence globally higher in urban (I am surprised with that when I see Fig 2) and the trend (methods used to define it = the red lines in fig 2, not clear) is different between rural and urban… A graph showing the proportion of cases by year in rural vs in urban counties should be interesting. We do not see the results of seasonality test or spectral analyses of both time series to look at periodicity. A cross analysis would be informative on the synchrony or delay between the time series. The results shown are poor and do not bring very relevant information. Additional analyses of the 2 time series should be performed to make the manuscrit rich enough in new insights for publication.

5- Vaccination data are not presented… it should be crucial to have an idea
about the evolution/change of VC over time and the difference between urban and rural. Authors mention that DTP3 coverage is similar between rural and urban… is that true during the whole period ? what about the vaccine coverage of boosters ? That should be added to the manuscript.

6- Results sections : » In 20 years of the study, the incidence rate was higher in urban countries for 9 years and in rural for 4 years. … What about the 7 other years ?

7- « In the whole period, the rate was higher in urban counties »…. How can it be the case if that happens only 9 years among 20 years…. ? please clarify this paragraph..

8- Authors mention a specific study for the period 2003-2010 with individual data… it is a pitty that did not consider the age distribution of cases since it is a crucial research question in the pertussis field currently in the context of boosting questionning.

Minor Essential Revisions
1- Abstract : « WC is a communicable disease whose incidence has increased in recent years »… please add « in some vaccinated countries », since it is not systematic everywhere…

2- Background section : « Introduction of the vaccine reduced the incidence but did not change these intervals, suggesting endemic circulation of Bp. » I guess, « intervals » mean « periodicity »… periodicities did increased after vaccination in all countries (you cite Broutin et al 2010 later in your ms but there are also country-specific paper that showed that). Vaccination reduced incidence and increased periodicity, also changed the age distribution of cases (increasing mean age at infection for instance) and that argues for the impact of vaccination on transmission too, not only on disease.

3- Table 1 is supposed to present incidences for rural and urban and thus correspond to the Figure 1 /figure 2… which is not the case for 1990-1991 and 1992… with high incidences in the table.

Level of interest: An article whose findings are important to those with closely related research interests

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

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests