Author's response to reviews

Title: Rainfall and sentinel chicken seroconversions predict human cases of Murray Valley encephalitis in the north of Western Australia.

Authors:

Linda A Selvey (linda.selvey@curtin.edu.au)
Cheryl A Johansen (cheryl.johansen@uwa.edu.au)
Annette K Broom (Annette.broom@pathwest.wa.gov.au)
Catarina Antao (catarinantao@gmail.com)
Michael D Lindsay (Michael.lindsay@health.wa.gov.au)
John S Mackenzie (J.Mackenzie@curtin.edu.au)
David W Smith (David.smith@health.wa.gov.au)

Version: 3 Date: 6 November 2014

Author's response to reviews: see over
The Editor
BMC Infectious Diseases

Dear Editor

Re manuscript number: 6744843691311651, ‘Rainfall and sentinel chicken seroconversions predict human cases of Murray Valley encephalitis in the north of Western Australia.’

Thank you for the opportunity to revise our manuscript in response to the reviewers’ comments. We have provided a detailed response to the reviewers’ comments below. We hope that our revised manuscript will be satisfactory and we look forward to hearing from you.

Response to reviewers’ comments.

Reviewer 1: William K Reisen
Reviewer's report:
General: Selvey et al. used 22 years of published and unpublished surveillance and rainfall data to establish a statistically predictive association. Not unexpected for this arid environment, antecedent rainfall was correlated with seroconversions in chickens and both factors generally preceded the detection of human cases. Exceptions to the model seemed associated with water conservation and management programs. The paper was generally well done and will be of use to public health workers in Western Australia to provide information of human risk before cases occur.

We agree like most of these types of statistical models the significant associations do not really address the mechanisms that allow persistence/introduction or enable early amplification. We agree with this. The science of the mechanisms allowing persistence/introduction or early amplification is really interesting but is out of scope of this paper.

Unfortunately an active intervention response to these surveillance data and predictions would be difficult considering the large area and small population base. Yes this is the major challenge we have in preventing cases of MVEV in Western Australia and the Northern Territory. That is why we rely on potentially less effective strategies such as communication to those who are potentially at risk.

Minor comments:
P5,L14: Interestingly the purported Aedes interseasonal host most likely does not feed frequently on birds? I wonder then how they become infected? There is some evidence that these mosquitoes are opportunistic feeders on birds. This has now been addressed in the introduction. Page 5 line 4
P7,L9: So these problems relate to seroconversion, but there are also delays following
the time of infection which is ca. 5-10 d before IgG aby levels are diagnostic in chickens? With a 2-wk bleeding schedule, seroconversion could miss infection by 3-4 wks and therefore actually be closer to these rain events. This is an important point and we have made reference to this point in the discussion.
P7,L17: Human cases were detected entirely by passive case detection? Were all the cases neuroinvasive? Yes, the cases were entirely detected by passive case detection. We have included this in the methods. Page 9 line 7.
P15,L21: Humans generally are a poor indicator of MVEV activity because they are not part of the basic transmission cycle and disease expression varies with previous exposure and other factors including case recognition. Therefore, a firm relationship between seroconversions to rainfall is probably more important in understanding risk. We agree but have not made any changes to the manuscript based on this comment.
P16,L16: I have never been to this area of Australia, but I have been curious as to what draws in the ardeid birds that normally feed on fish and other aquatic related fauna after these rainfall events. That is a very good question. There are very limited data on the feeding habits of most Australian water birds (for reference see RT Kingsford and FI Norman, 2002. Australian waterbirds – products of the continent’s ecology. Emu, 102, 47-69). However, most water birds are fairly eclectic in their feeding patterns, presumably to enable them to adapt to the non-permanent nature of many of Australia’s wetlands. An important amplifying host, the Rufous Night Heron, for example, is known to feed on a wide variety of insects, crustaceans, fish and amphibians. It is amazing how frogs, insects and crustaceans multiply rapidly after rainfall, even in these remote areas. We haven’t made any changes to the manuscript based on this comment.

Reviewer 2.

Reviewer:Sylvie Lecollinet
Reviewer's report:
The manuscript by Selvey L.A. et al "Rainfall and sentinel chicken seroconversions predict human cases of Murray Valley encephalitis in the north of Western Australia" is an remarkable epidemiological study on risk factors associated to the occurrence of bird seroconversions and human cases of Murray encephalitis. The study was appropriately designed and offers a comprehensive analysis of extended data collections (1990-2013). We thank the reviewer for these comments.
I would recommend the article for publication in BMC Infectious Diseases

Minor Essential Revisions
1. Methods, page 6, line 24: could the authors add a reference for the use of the 3H6 antibody This has been done.
2. Results found not consistent with the model should be highlighted in appendix 1. This has been done and the results have been highlighted in yellow.

Discretionary Revisions
3. Results, page 9, line 18: delete the coma after “per month” This has been done.
4. Results, page 11, line 19: delete “beta” after “50” This has been done.
5. Discussion, page 20, lines 4-6: the sentence would need clarification We have clarified this sentence now.
6. Bibliography, page 26: when were accessed the internet pages referred as ref 21 and 22 This was not included in the bibliography because the BMC style does not
include it. However, we have included the access dates for these references on the understanding that they can be deleted if not required.

7. Bibliography, page 27, reference 28 “using sentinel chickens and mosquitoes” The typo in this reference has been corrected.

Reviewer 3

Reviewer: Mike A. Drebot
Reviewer's report:
The manuscript by Selvey et al "Rainfall and sentinel chicken seroconversions. Western Australia” describes a study looking at the correlation of rainfall and chicken seroconversions to risk of MVEV infections in humans. The paper is well written, the experimental design thorough & complete and the data of public health relevance. We thank the reviewer for these comments.

Discretionary Revision:
The authors may wish to comment on whether any information regarding mosquito numbers and species identification were carried out at the study sites. Unfortunately because of logistical and resource constraints, mosquito surveillance in the Kimberley study sites was only undertaken annually, and in the Pilbara region even less consistently. This means that we cannot look for relationships between these data and the sentinel chicken surveillance data. We have added a sentence to this effect in the introduction. Page 5 line 19.

Regards

Linda A Selvey