Notification to co-authors of submission to International Journal of Health Geographics IJHG-D-20-00061

em.ijhg.0.6af3b8.4416cdf2@editorialmanager.com <em.ijhg.0.6af3b8.4416cdf2@editorialmanager.com> on behalf of International Journal of Health Geographics Editorial Office <em@editorialmanager.com> Thu 30/04/2020 11:38 AM To: Aswi <aswi@connect.qut.edu.au> IJHG-D-20-00061 Evaluating the impact of a small number of areas on spatial estimation Aswi Aswi; Susanna M Cramb; Earl Duncar; Kerrie Mengersen

Dear author:

You are receiving this email because you have been listed as an author on a manuscript recently submitted to International Journal of Health Geographics. The manuscript details are below.

Title: Evaluating the impact of a small number of areas on spatial estimation Authors: Aswi Aswi; Susanna M Cramb; Earl Duncan; Kerrie Mengersen Corresponding author: Dr Susanna M Cramb

If you are not aware of the submission, or if you should not be listed as contributing author, please notify the Editorial Office. Contact details for the Editorial Office are available under "Contact Us" on the journal website.

Kind regards,

Editorial Office International Journal of Health Geographics <u>https://urldefense.com/v3/_https://ij-</u> <u>healthgeographics.biomedcentral.com/__;!!NVzLfOphnbDXSw!W4ubhPeWImuXrDIZ6JCFS719REmeyMA0zXqAQuE4-ZTimOpfEm9wWszIHWIJ72i4JDo\$</u>

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Date:	12 Jun 2020
То:	"Susanna M Cramb" susanna.cramb@qut.edu.au
From:	"International Journal of Health Geographics Editorial Office" lakshmi.bharathi@springernature.com
Subject:	Your submission to International Journal of Health Geographics - IJHG-D-20-00061

IJHG-D-20-00061 Evaluating the impact of a small number of areas on spatial estimation Aswi Aswi; Susanna M Cramb; Earl Duncan; Kerrie Mengersen International Journal of Health Geographics

Dear Dr Cramb,

Your manuscript "Evaluating the impact of a small number of areas on spatial estimation" (IJHG-D-20-00061) has been assessed by our reviewers. Although it is of interest, we are unable to consider it for publication in its current form. The reviewers have raised a number of major points which we believe would improve the manuscript and may allow a revised version to be published in International Journal of Health Geographics.

Their reports, together with any other comments, are below. Please also take a moment to check our website at https://www.editorialmanager.com/ijhg/ for some additional comments that were saved as online-only attachment.

If you are able to fully address these points, we would encourage you to submit a revised manuscript to International Journal of Health Geographics. Once you have made the necessary corrections, please submit online.

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Please be aware that we may investigate, or ask your institute to investigate, any unauthorised attempts to change authorship or discrepancies in authorship between the submitted and revised versions of your manuscript.

The due date for submitting the revised version of your article is 05 Jul 2020.

I look forward to receiving your revised manuscript soon.

Best wishes, Prof. Maged Nabih Kamel Boulos, MBBCh, MSc (Derm), MSc (Med Inform), PhD, FHEA, SMIEEE Founder & Editor-in-Chief, International Journal of Health Geographics Direct e-mail: mkamel@medicad.com https://ij-healthgeographics.biomedcentral.com/

Reviewers' reports (n =3; consensus: MAJOR):

Reviewer #1: Review of Manuscript: Evaluating the impact of a small number of areas on spatial estimation by Aswi, Cramb, Duncan, Mengersen.

Summary: The authors explore the impact of the number of small areas on 5 different Bayesian models commonly-used in spatial modelling. Using a simulation study, they explore the impact of low/high spatial autocorrelation, low/high disease counts, and 8 different grid sizes across the 5 models. Using WAIC for determining the best model and modified Moran's I for

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assessing goodness-of-fit, the authors highlight the challenges of identifying spatial patterns when the number of areas are small and that model performance varied based on the different scenarios. Overall, the Leroux model seems to perform best more often than others and the independence model performed worst more often than other models explored.

General Comments: This work can be very useful as a guideline as to which models perform best in small area studies. The authors do a nice job of clearly discussing the different models and perform a nice simulation study to demonstrate their performance. The simulation study set-up was very clear and simple and the results I think will provide useful guidance to researchers.

Major Comments:

* ANOVA

o I am not sure that using ANOVA on WAIC values (Table 2) is necessary - Table 1 with the mean WAIC values and 95% credible intervals is perhaps sufficient. Since most of Table 2 shows significant differences, this table does not seem to really tell me much more.

o I am also unfamiliar with using ANOVA with WAIC values and applying a frequentist method to Bayesian values. We already anticipate that they will be different because across different models and simulation scenarios. Additionally, given the range of WAIC values bounded to be > 0 and a sample size of 50 simulated datasets, I am surprised that the ANOVA assumptions were satisfied without the need for any transformation. Perhaps this could either be excluded or citation provided where others have done this, I have admittedly not seen this before.

* Figures

o Unfortunately the resolution on the visualization was very low and I could not understand the figures.

o When introducing the Case Study (lines 161 - 167), it would be great to also include a map of dengue cases in Indonesia in the 5 time periods as this is a spatial study. It may also help the reader gain intuition about the MMI estimates from Table 3.

* Localised models: Could the authors please expand on how they define a cluster and identify the clusters/number of areas? Later on lines 278-279 they discuss that the G= 3 model consisted of three groups and on line 301 in the Results section they discuss how G=3 had three groups but G1, G2, and G3 consisted of 3, 10, and 1 areas. It is not clear how an area, cluster, or group are defined and identified. Is a cluster defined as a set of contiguous cells with elevated risk compared to the background or differently? Is a cluster circular or is it not defined by shape, how is it identified? Are areas defined to be administrative subregions of the study area? This further relates to lines 261-264 where the authors say "The preferred localized model with G=3 in 2002 consisted of three groups while in 2010 only consisted of two groups" - how different are 2 and 3 groups really? Could it be that the same area is covered but the real difference is 2 separate relative risks versus 3 separate relative risks in the subregion? It is hard to say that G=2 vs. G=3 are substantively that different from each other without knowing more.

Minor Comments:

* Line 78: When the authors discuss the simulation study and the level of counts is generated by a small and large Poisson rate, what is large and small? Could you please provide lambda in these cases?

* Line 102: The authors state that they use a first order matrix. This could be a semantics thing, but my understanding is that they use a first order neighborhood structure (rook's case) and binary spatial weights. Could you please clarify?

Line 123: In parentheses, should this be (ICAR) as you are talking about the intrinsic conditional autoregressive prior?
Line 158: Was the modified Moran's I test of the residuals tested and if so, was alpha = 0.05 and was it tested under randomization or the normal approximation?

* Line 161-167 (Case Study): The authors discuss the study area used in the data example, but can they explain a bit more? How many km^2 is the area?

* Line 164: In describing the case study, the authors say that "the reason for choosing these years is that they have approximately the same absolute MMI estimate, but have different mean and variances on the observed case". Could they elaborate a bit more - why does it matter that the absolute MMI is the same but mean and variances differ? It is not clear for those who would want to set-up a study based on your results.

* Line 198 (Table 1): Do you mean LA HC = low autocorrelation and *high* counts?

Line 199 (Table 1): Do you mean HA HC = high autocorrelation and *high* counts?

* Line 200: I found the bolding to be confusing. I would expect one model to be bolded per row which would indicate the lowest mean WAIC. My understanding is that in cases where multiple models are bolded per row (for example, Area 2 x 2 BYM, Leroux, and Localised G=2) that indicates that the models performed similarly. Either that should be explicitly stated in line 200 or please select 1 "best" model and add in the caption how that was determined.

* Line 263-264: The authors state "Note that this outlier was a valid observation so was not removed in the analysis". It is not clear what observation was an outlier.

* Line 299: "Localised with G=3 model had the highest MMI estimates (-0.65)...". Did you mean the highest *absolute* highest MMI?

Reviewer #2: The authors present an interesting paper. The results might be expanded in a future study (mixed counts, boundaries, number of neighbours..)

The discussion needs considerable expansion. Especially where the authors make methodological choices, these should be discussed:

- the choice of G=2 and 3

- in real world scenarios low and high counts are typically mixed. Applicability of results to real world scenarios.

- low count mean 1 and high count mean 10. This choice seems arbitrary. Even in your case study, you had one year with a median of 86. It would be helping the applicability of the results , if the authors would include a even higher "high count" scenario in the method and results.

- discussion of comparability etc. of case study findings with simulation findings

- appropriateness of Bayesian spatial analysis on just 4 areas, as your results and conclusion suggests.

some minor comments:

- Background page 2, line 43 "linear combination" : one would understand the intention of this sentence, however, a wide

6/18/2020

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variety of link functions is used, in your instance the linear combination is (as mostly used for Poisson/ NegBin/ count models) on the log of the mean, so in terms of the mean this could be considered a multiplicative relationship. This sentence might be reconsidered.

-Discussion (4, or even 9 areas) : how would be spatial patterns and autocorrelation in only 4 areas be interpreted? This low number of areas would be considered an extreme case and one might even question the appropriateness of Bayesian spatial analysis.

Reviewer #3: Please log-in online to download copy of the comments from this reviewer - filename: IJHG 20 00061 review.docx

There is additional documentation related to this decision letter. To access the file(s), please click the link below. You may also login to the system and click the 'View Attachments' link in the Action column.

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ASWI UNM <aswi@unm.ac.id>

FW: Confirmation of revised submission to International Journal of Health Geographics - IJHG-D-20-00061R2

Susanna Cramb <susanna.cramb@qut.edu.au>

To: ASWI UNM <aswi@unm.ac.id>, Kerrie Mengersen <k.mengersen@qut.edu.au>, Earl Duncan <earl.w.duncan@gmail.com>

7 September 2020 at 16:56

FYI, and thanks everyone (especially Aswi) for all your work on this!

Warmly, Susanna

-----Original Message-----

From: em.ijhg.0.6dd0ad.11f939a6@editorialmanager.com <em.ijhg.0.6dd0ad.11f939a6@editorialmanager.com> On Behalf Of International Journal of Health Geographics Editorial Office Sent: Monday, 7 September 2020 6:55 PM

To: Susanna Cramb <susanna.cramb@qut.edu.au>

Subject: Confirmation of revised submission to International Journal of Health Geographics - IJHG-D-20-00061R2

IJHG-D-20-00061R2

Evaluating the impact of a small number of areas on spatial estimation Aswi Aswi; Susanna M Cramb; Earl Duncan; Kerrie Mengersen International Journal of Health Geographics

Dear Dr Cramb,

Thank you for the revised version of your manuscript 'Evaluating the impact of a small number of areas on spatial estimation' submitted to International Journal of Health Geographics.

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ASWI UNM <aswi@unm.ac.id>

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Susanna Cramb <susanna.cramb@qut.edu.au>

To: "aswi@unm.ac.id" <aswi@unm.ac.id>, Earl Duncan <earl.w.duncan@gmail.com>, Kerrie Mengersen <k.mengersen@qut.edu.au>

9 September 2020 at 17:25

Congratulations Aswi & everyone!

From: em.ijhg.0.6ddb6b.d73a088a@editorialmanager.com <em.ijhg.0.6ddb6b.d73a088a@editorialmanager.com> on behalf of International Journal of Health Geographics Editorial Office <em@editorialmanager.com> Sent: Wednesday, 9 September 2020 4:45 PM To: Susanna Cramb <susanna.cramb@qut.edu.au> Subject: Decision has been reached on your submission to International Journal of Health Geographics - IJHG-D-20-00061R2

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Dear Dr Cramb,

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Articles in this journal may be held for a short period of time prior to publication. We look forward to publishing your manuscript.

Best wishes, Prof. Maged Nabih Kamel Boulos, MBBCh, MSc (Derm), MSc (Med Inform), PhD, FHEA, SMIEEE Founder & Editor-in-Chief, International Journal of Health Geographics Direct e-mail: mkamel@medicad.com https://urldefense.com/v3/__https://ij-healthgeographics.biomedcentral.com/__;!!NVzLfOphnbDXSw!RcRjbVv0mEGewH_JzAC52j7zI_ dFYXw2RKd5hUEf3IY0bGq4oquQYAr3rwKx3l2fjDmp3w\$ Comments:

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Dear all,

Thank you very much for all your help and support.

Best Regards,

ASWI [Quoted text hidden]

Kerrie Mengersen <k.mengersen@qut.edu.au>

9 September 2020 at 18:01

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9 September 2020 at 17:27

12/19/22, 3:49 PM

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To: Susanna Cramb <susanna.cramb@qut.edu.au>, "aswi@unm.ac.id" <aswi@unm.ac.id>, Earl Duncan <earl.w.duncan@gmail.com>

Woo hoo! Congratulations Aswi! Thanks everyone :) Kerrie

From: Susanna Cramb <susanna.cramb@qut.edu.au> Sent: Wednesday, September 9, 2020 7:25:10 PM To: aswi@unm.ac.id <aswi@unm.ac.id>; Earl Duncan <earl.w.duncan@gmail.com>; Kerrie Mengersen <k.mengersen@qut.edu.au> Subject: Fw: Decision has been reached on your submission to International Journal of Health Geographics - IJHG-D-20-00061R2

[Quoted text hidden]