A mathematical model of the dynamics of lymphatic filariasis in Caraga Region, the Philippines

Pamela Kim N. Salonga, Victoria May P. Mendoza, Renier G. Mendoza and Vicente Y. Belizario Jr

Article citation details
R. Soc. open sci. 8: 201965.
http://dx.doi.org/10.1098/rsos.201965

Review timeline
Original submission: 31 October 2020
Revised submission: 13 April 2021
Final acceptance: 7 June 2021

Note: Reports are unedited and appear as submitted by the referee. The review history appears in chronological order.

Review History
RSOS-201965.R0 (Original submission)

Review form: Reviewer 1

Is the manuscript scientifically sound in its present form?
Yes

Are the interpretations and conclusions justified by the results?
Yes

Is the language acceptable?
Yes

Do you have any ethical concerns with this paper?
No

Have you any concerns about statistical analyses in this paper?
No
Recommendation?
Accept with minor revision (please list in comments)

Comments to the Author(s)
There are several instances where the authors use the expressions "in this paper, in this work, in this section. They can minimize this. For example, "In this study, minimizing the infected mosquito ..." can be replaced by "Herein, we minimize the infected mosquito ..."

Review form: Reviewer 2

Is the manuscript scientifically sound in its present form?
Yes

Are the interpretations and conclusions justified by the results?
No

Is the language acceptable?
Yes

Do you have any ethical concerns with this paper?
No

Have you any concerns about statistical analyses in this paper?
No

Recommendation?
Major revision is needed (please make suggestions in comments)

Comments to the Author(s)
The result section needs to be re-written with more emphasis on the percent improvement of the vaccine application for each scenario. Emphasis should be made to show how the model is different from previously existing in literature.

Decision letter (RSOS-201965.R0)

We hope you are keeping well at this difficult and unusual time. We continue to value your support of the journal in these challenging circumstances. If Royal Society Open Science can assist you at all, please don't hesitate to let us know at the email address below.

Dear Ms Salonga

On behalf of the Editors, we are pleased to inform you that your Manuscript RSOS-201965 "A mathematical model of the dynamics of lymphatic filariasis in Caraga Region, the Philippines" has been accepted for publication in Royal Society Open Science subject to minor revision in accordance with the referees' reports. Please find the referees' comments along with any feedback from the Editors below my signature.
We invite you to respond to the comments and revise your manuscript. Below the referees’ and Editors’ comments (where applicable) we provide additional requirements. Final acceptance of your manuscript is dependent on these requirements being met. We provide guidance below to help you prepare your revision.

Please submit your revised manuscript and required files (see below) no later than 7 days from today’s (ie 07-Apr-2021) date. Note: the ScholarOne system will ‘lock’ if submission of the revision is attempted 7 or more days after the deadline. If you do not think you will be able to meet this deadline please contact the editorial office immediately.

Please note article processing charges apply to papers accepted for publication in Royal Society Open Science (https://royalsocietypublishing.org/rsos/charges). Charges will also apply to papers transferred to the journal from other Royal Society Publishing journals, as well as papers submitted as part of our collaboration with the Royal Society of Chemistry (https://royalsocietypublishing.org/rsos/chemistry). Fee waivers are available but must be requested when you submit your revision (https://royalsocietypublishing.org/rsos/waivers).

Thank you for submitting your manuscript to Royal Society Open Science and we look forward to receiving your revision. If you have any questions at all, please do not hesitate to get in touch.

Kind regards,
Royal Society Open Science Editorial Office
Royal Society Open Science
openscience@royalsociety.org

on behalf of Professor Joshua Ross (Associate Editor) and Mark Chaplain (Subject Editor)
openscience@royalsociety.org

Reviewer comments to Author:
Reviewer: 1

Comments to the Author(s)
There are several instance where the authors use the expressions ...in this paper, in this work, in this section. They can minimize this. For example, "In this study, minimizing the infected mosquito ..." can be replaced by "Herein, we minimize the infected mosquito ..."

Reviewer: 2

Comments to the Author(s)
The result section needs to be re-written with more emphasis on the percent improvement of the vaccine application for each scenarios. Emphasis should be made to show how is the model different from previously existing in literature.

===PREPARING YOUR MANUSCRIPT===

Your revised paper should include the changes requested by the referees and Editors of your manuscript. You should provide two versions of this manuscript and both versions must be provided in an editable format:
one version identifying all the changes that have been made (for instance, in coloured highlight, in bold text, or tracked changes);
a 'clean' version of the new manuscript that incorporates the changes made, but does not highlight them. This version will be used for typesetting.
Please ensure that any equations included in the paper are editable text and not embedded images.

Please ensure that you include an acknowledgements' section before your reference list/bibliography. This should acknowledge anyone who assisted with your work, but does not qualify as an author per the guidelines at https://royalsociety.org/journals/ethics-policies/openness/.

While not essential, it will speed up the preparation of your manuscript proof if you format your references/bibliography in Vancouver style (please see https://royalsociety.org/journals/authors/author-guidelines/#formatting). You should include DOIs for as many of the references as possible.

If you have been asked to revise the written English in your submission as a condition of publication, you must do so, and you are expected to provide evidence that you have received language editing support. The journal would prefer that you use a professional language editing service and provide a certificate of editing, but a signed letter from a colleague who is a native speaker of English is acceptable. Note the journal has arranged a number of discounts for authors using professional language editing services (https://royalsociety.org/journals/authors/benefits/language-editing/).

===PREPARING YOUR REVISION IN SCHOLARONE===

To revise your manuscript, log into https://mc.manuscriptcentral.com/rsos and enter your Author Centre - this may be accessed by clicking on "Author" in the dark toolbar at the top of the page (just below the journal name). You will find your manuscript listed under "Manuscripts with Decisions". Under "Actions", click on "Create a Revision".

Attach your point-by-point response to referees and Editors at Step 1 'View and respond to decision letter'. This document should be uploaded in an editable file type (.doc or .docx are preferred). This is essential.

Please ensure that you include a summary of your paper at Step 2 'Type, Title, & Abstract'. This should be no more than 100 words to explain to a non-scientific audience the key findings of your research. This will be included in a weekly highlights email circulated by the Royal Society press office to national UK, international, and scientific news outlets to promote your work.

At Step 3 'File upload' you should include the following files:
-- Your revised manuscript in editable file format (.doc, .docx, or .tex preferred). You should upload two versions:
  1) One version identifying all the changes that have been made (for instance, in coloured highlight, in bold text, or tracked changes);
  2) A 'clean' version of the new manuscript that incorporates the changes made, but does not highlight them.
-- An individual file of each figure (EPS or print-quality PDF preferred [either format should be produced directly from original creation package], or original software format).
-- An editable file of each table (.doc, .docx, .xls, .xlsx, or .csv).
-- An editable file of all figure and table captions.
Note: you may upload the figure, table, and caption files in a single Zip folder.
-- Any electronic supplementary material (ESM).
-- If you are requesting a discretionary waiver for the article processing charge, the waiver form must be included at this step.
If you are providing image files for potential cover images, please upload these at this step, and inform the editorial office you have done so. You must hold the copyright to any image provided.

A copy of your point-by-point response to referees and Editors. This will expedite the preparation of your proof.

At Step 6 'Details & comments', you should review and respond to the queries on the electronic submission form. In particular, we would ask that you do the following:

-- Ensure that your data access statement meets the requirements at https://royalsociety.org/journals/authors/author-guidelines/#data. You should ensure that you cite the dataset in your reference list. If you have deposited data etc in the Dryad repository, please only include the 'For publication' link at this stage. You should remove the 'For review' link.

-- If you are requesting an article processing charge waiver, you must select the relevant waiver option (if requesting a discretionary waiver, the form should have been uploaded at Step 3 'File upload' above).

-- If you have uploaded ESM files, please ensure you follow the guidance at https://royalsociety.org/journals/authors/author-guidelines/#supplementary-material to include a suitable title and informative caption. An example of appropriate titling and captioning may be found at https://figshare.com/articles/Table_S2_from_Is_there_a_trade-off_between_peak_performance_and_performance_breadth_across_temperatures_for_aerobic_scope_in_teleost_fishes_/3843624.

At Step 7 'Review & submit', you must view the PDF proof of the manuscript before you will be able to submit the revision. Note: if any parts of the electronic submission form have not been completed, these will be noted by red message boxes.

Author's Response to Decision Letter for (RSOS-201965.R0)

See Appendix A.

RSOS-201965.R1 (Revision)

Review form: Reviewer 2

Is the manuscript scientifically sound in its present form?
Yes

Are the interpretations and conclusions justified by the results?
Yes

Is the language acceptable?
Yes

Do you have any ethical concerns with this paper?
Yes

Have you any concerns about statistical analyses in this paper?
Yes
Recommendation?
Accept as is

Comments to the Author(s)
The paper has been revised and changes for the better has been made.

Decision letter (RSOS-201965.R1)

We hope you are keeping well at this difficult and unusual time. We continue to value your support of the journal in these challenging circumstances. If Royal Society Open Science can assist you at all, please don't hesitate to let us know at the email address below.

Dear Ms Salonga,

It is a pleasure to accept your manuscript entitled "A mathematical model of the dynamics of lymphatic filariasis in Caraga Region, the Philippines" in its current form for publication in Royal Society Open Science. The comments of the reviewer(s) who reviewed your manuscript are included at the foot of this letter.

Please ensure that you send to the editorial office an editable version of your accepted manuscript, and individual files for each figure and table included in your manuscript. You can send these in a zip folder if more convenient. Failure to provide these files may delay the processing of your proof. You may disregard this request if you have already provided these files to the editorial office.

You can expect to receive a proof of your article in the near future. Please contact the editorial office (openscience@royalsociety.org) and the production office (openscience_proofs@royalsociety.org) to let us know if you are likely to be away from e-mail contact -- if you are going to be away, please nominate a co-author (if available) to manage the proofing process, and ensure they are copied into your email to the journal.

Due to rapid publication and an extremely tight schedule, if comments are not received, your paper may experience a delay in publication.

Please see the Royal Society Publishing guidance on how you may share your accepted author manuscript at https://royalsociety.org/journals/ethics-policies/media-embargo/. After publication, some additional ways to effectively promote your article can also be found here https://royalsociety.org/blog/2020/07/promoting-your-latest-paper-and-tracking-your-results/.

Thank you for your fine contribution. On behalf of the Editors of Royal Society Open Science, we look forward to your continued contributions to the Journal.

Kind regards,
Royal Society Open Science Editorial Office
Royal Society Open Science
openscience@royalsociety.org

on behalf of Professor Joshua Ross (Associate Editor) and Mark Chaplain (Subject Editor)
openscience@royalsociety.org
Reviewer comments to Author:
Reviewer: 2

Comments to the Author(s)
The paper has been revised and changes for the better has been made.

Follow Royal Society Publishing on Twitter: @RSocPublishing
Follow Royal Society Publishing on Facebook:
https://www.facebook.com/RoyalSocietyPublishing.FanPage/
Read Royal Society Publishing’s blog:
https://royalsociety.org/blog/blogsearchpage/?category=Publishing
13 April 2021

Prof. Mark Chaplain
Mathematics Subject Editor
Royal Society Open Science

Dear Prof. Chaplain;

Greetings!

We would like to submit our revised article (ID: RSOS-201965) titled "A mathematical model of the dynamics of lymphatic filariasis in Caraga Region, the Philippines" for possible publication in Royal Society Open Science.

Thank you for seeing the merits of our work. We appreciate all the valuable comments and recommendations of the reviewers. We modified the manuscript accordingly. Our detailed response to the reviewers can be found below.

We also made some changes to make the presentation of the paper clearer. These changes are written in blue text (see lines 215-217 and the caption in Table 3). The text in lines 238-245, which were previously in Section 3c, were transferred to Section 2b since these are information on the data. Furthermore, the manuscript is formatted according to the template provided.

If you have questions regarding this submission, please do not hesitate to contact me using the below-mentioned email address.

We are hoping for a favorable response. Thank you very much.

Respectfully,

Pamela Kim N. Salonga
Corresponding Author
Institute of Mathematics
University of the Philippines Diliman
pksalonga@math.upd.edu.ph
Response to Reviewer 1
The changes in the manuscript addressing the comments of Reviewer 1 are colored magenta.

| Comment                                                                 | Response                                                                                                                                 |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| There are several instance where the authors use the expressions ...in this paper, in this work, in this section. They can minimize this. For example, "In this study, minimizing the infected mosquito ..." can be replaced by "Herein, we minimize the infected mosquito ..." | Thank you for your suggestion. We scanned the whole manuscript and modified the expressions containing “in this paper, in this work, in this section”.  

Please see lines 144, 174, 234, 260-261, 339-340, and 409. |
Response to Reviewer 2
The changes in the manuscript addressing the comments of Reviewer 2 are colored red.

| Comments                                                                 | Response                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The result section needs to be re-written with more emphasis on the percent improvement of the vaccine application for each scenarios. | Your comments have greatly improved the presentation of our results.  
To emphasize the improvement of the vaccine application, we added a table that shows the percent reduction in the infectious population when the optimal control using different implementation costs is applied. Please see Table 4 on page 17. The discussion of these results can be found in lines 449-451, 455-458, and 461-462. The caption of Figure 6 is also modified.  
Furthermore, we modified parts of the manuscript to highlight the impact of mass drug administration (MDA) in controlling the spread of lymphatic filariasis (LF), reflected by the results obtained in the sensitivity analysis and parameter estimation. Please see lines 207, 384-390, 417-420, 476-478, and 480-481. |
| Emphasis should be made to show how the model is different from previously existing in literature. | We appreciate this suggestion.  
To the best of our knowledge, our study provides the first mathematical model of LF in the Philippines. Compared to existing models, we consider a more realistic representation of MDA wherein the antifilarial drugs are given to all eligible individuals in the population, infected and uninfected alike.  
In the existing models of LF found in the literature, the parameter values are either assumed or obtained from existing malaria models. In our paper, we use Philippine filariasis data to estimate model parameters to have more meaningful insights. We used current techniques (e.g. sensitivity analysis using LHS and PRCC, bootstrapping, and uncertainty analysis) to quantify uncertainty in the obtained parameters estimates.  
We modified the manuscript to emphasize these contributions and to highlight the difference of our model from the existing models in the literature.  
Kindly refer to lines 91-98, and 112-122. |