Author’s response to reviews

Title: A dynamic model and some strategies on how to prevent and control hepatitis C in mainland China

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Responses to the Reviewers' Report (INFD-D-18-01089R2)

Dear Editors and Reviewers,

We would like to thank the editors for giving us another chance to resubmit our manuscript, and also thank the reviewers for giving us constructive suggestions which would help us to improve the quality of the paper. We will submit a new version, which has been modified according to the reviewer’s suggestions. We have rewritten the part which the editor indicated overlap with published studies. Detailed responses will be listed in the following, and it can also be seen in Hepatitis C mode(7-3) - (Highlighted in yellow) and Hepatitis C mode(7-3).tex.

Technical Comments:

1. Please reformat your Declarations section and needs heading according to submission guidelines.

2. Please include 'Ethics approval and Consent to participate' section in your Declarations section.

*Response: We reformat our Declarations section and include 'Ethics approval and Consent to participate' section in it, as stated in Page 10.

Editor Comments:

In addition to the referee comments, please address the following editorial points:
Please edit your manuscript to limit overlap with published studies (see attached screenshots for examples) and ensure all relevant publications are cited.

*Response:
The parts we rewrote are as follows:

1. We change the sentence ‘Every month, the Chinese Center for Disease Control and Prevention (China's CDC) does statistical work on …clinically diagnosed cases.’ into ‘We have found clinical cases of hepatitis C in China every month from 2011 to 2016 from the China Center for Disease Control and Prevention (China’s CDC), which is a public welfare institution organized by the Chinese government to implement state-level disease prevention and control and public health technology management and services. China’s CDC conducts monthly statistics on patients infected with hepatitis C virus in mainland China (i.e., except Hong Kong, Macao and Taiwan) [25] including gender, occupation, date of birth, address, date of onset, date of diagnosis, especially the classification of the disease, which is marked as a clinically diagnosed case.’, as stated in Page 3, lines 19~26.

2. We change the sentence ‘Once an outpatient is diagnosed with HCV infection, he or she will … returned home for treatment under the doctors' permission.’ into ‘Once the HCV-RNA test results indicate that the outpatient is infected with the hepatitis C virus, he or she will need hospitalization. In the case of ignoring the patient's home treatment, we believe that the data provided by the China’s CDC is the number of hospitalizations.’, as stated in Page 3, lines 29~32.

3. We change the sentence ‘The main purpose of this section is to perform … a predictor parameter [32,33].’ into ‘In this section we performed a sensitivity analysis of the basic reproduction number to determine several parameters that have the most influential parameters on the prevalence and transmission of hepatitis C. Sensitivity analysis is a useful tool to identify how closely input parameters are related to predictor parameters and it helps to determine level of change necessary for an input parameter to find the desire value of a predictor parameter [32,33]. If a small change in a parameter can cause a large change in the number of the basic reproduction number, then this parameter is called a sensitivity factor, otherwise called an insensitive factor.’, as stated in Page 9, lines 17~23.

4. We change the sentence ‘sensitivity analysis has been performed using the parameters' value of 2015 given in Table 2’ into ‘We used the 2015 simulated parameter values to perform a sensitivity analysis of the basic reproduction number.’, as stated in Page 9, lines 24~25.

5. We change the sentence ‘Sensitivity indices for the basic reproduction number change with the change in parameter values are given in Table 3.’ into ‘The sensitivity indices of each parameter to the basic reproduction number are shown in Table 3.’, as stated in Page 9, lines 26~27.

6. We change the sentence ‘In this section, sensitivity analysis of the endemic equilibrium has … are shown in Appendix A and values are given in Table 4’ into ‘In this section, we do a sensitivity analysis of the endemic equilibrium to determine the relative importance of the different parameters which are responsible for the prevalence of equilibrium disease. Using the method from Samsuzzoha M [32], we calculate the sensitivity indices of the endemic equilibrium. The relevant detail calculation is shown in Appendix A, and the parameter values are shown in table 4.’, as stated in Page 10, lines 22~26.
The following is a point-to-point response to the two reviewers' comments and suggestions.

Responses to the comments of Reviewers

Based on the comments of reviewers, we give the following responses.

Reviewer #1:

Sensitivity analysis of
3 Results

3.1 Sensitivity analysis of 0
Page 9 line 33-37: "The sensitivity indices and corresponding % value needed to affect a 1% decrease in 0 are shown in Table 3 (e.g., in order to decrease the value of 0 by 1% it is necessary to decrease the value of 0 by 1.7945% or increase the value of 0 by 2.7973%)". The authors changed "1.1945%" to "1.7945%".

As I mentioned before, on Table 3, Parameter: Corresponding % changes reported as '-1.7945'. Should this "1.7945%" be changed to "-1.7945%"?

*Response: As for the reviewer’s concern, we made the following explanation after careful review of relevant information. The negative sign in -1.7945 means reduction, which is it is necessary to decrease the value of 0 by 1.7945% in order to decrease the value of 0 by 1%. Similarly, the positive sign in +2.7973 indicates an increase, which is it is necessary to decrease the value of 0 by 2.7973% in order to increase the value of 0 by 2.7973%.

Fig. 3 Legend Entry Series to drop down bottom (e.g. no control, 2, 2δ, 0.1β 0.1p0.1β0.1β2σ)
*Response: Thank you very much for keenly pointing out this mistake. We have redrawn Figure 3. And as stated in Page 27.

Besides, some languages and typos are revised. We hope that the reviewers find that his/her concerns have been adequately addressed in the revised version. Again, we would like to thank anonymous reviewers for their helpful comments which improved the presentation of this work.

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We have tried our best to revise and improve the manuscript and made great changes in the manuscript according to the editor’s (reviewers) very good comments. Once again, thank you very much for your comments and suggestions.

Sincerely yours

Yong Li