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

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Reviewer: Hla-Hla (Rosie) Thein

Reviewer's report:

Abstract: It would be better to add some more detail under 'Conclusion'.

1 Background

1. Recently (18 July, 2018), the World Health Organization (WHO) estimates that approximately 71 million people have chronic hepatitis C virus (HCV) infection worldwide and approximately 399,000 people die each year after HCV diagnosis, mostly from cirrhosis and hepatocellular carcinoma (HCC) (http://www.who.int/news-room/fact-sheets/detail/hepatitis-c).


3. In the European region, approximately 14 million people are chronically infected with HCV, representing about 20% of the global burden of disease due to HCV infection (http://www.euro.who.int/__data/assets/pdf_file/0009/377253/fact-sheet-hepatitis-c-eng.pdf).


5. On line 39, the authors have added 'following acute infection, chronic hepatitis could be ensured 13.7 + 10.9 years later, chronic active hepatitis could be ensured 18.4 + 11.2 years later, cirrhosis of the liver could be ensured 20.6 + 10.1 years later, and hepatocellular carcinoma could be ensured in 28.3 + 11.5 years'. These results are not found in this reference 'Thomson BJ, Finch RG, Hepatitis C virus infection, Clin. Microbiol. Infect. 2005; 11: 86-94'.

2 Model

2.2 Model Formulation

Figure 1: Regarding acutely infected individuals (Ia), would it be $\rho_1\alpha$ instead of $\rho_2\alpha$ and progress to the chronic stage with the ratio (Ic), would it be $\rho_2\delta$ instead of $\rho_1\delta$?

2.3 Parameter estimation

Are these values correct?

Where, the optimal values of parameters are listed in Table 2, and the each initial condition from 2011 to 2016 is fixed as $(4.23 \times 10^7, 3.81 \times 10^5, 100, 7.46 \times 10^4, 469, 4.08 \times 10^7), (3.66 \times 10^7, 8.54 \times 10^4, 116, 3.08 \times 10^4, 436, 1.10 \times 10^7), (9.01 \times 10^7, 4.18 \times 10^5, 118, 105, 653, 4.80 \times 10^7), (7.07 \times 10^7, 4.64 \times 10^5, 6.51 \times 10^4, 6.12 \times 10^4, 577, 8.98 \times 10^7), (5.36 \times 10^7, 3.48 \times 10^5, 9.10 \times 10^4, 6.17 \times 10^4, 698, 4.52 \times 10^7), (2.66 \times 10^7, 9.71 \times 10^5, 100, 8.81 \times 10^4, 646, 5.83 \times 10^7)$.

3 Sensitivity analysis of $\Re$

Line 22-25: The authors reported that 'The sensitivity indices and corresponding % value needed to affect a 1% decrease in $\Re$ are shown in Table 3 (e.g., in order to decrease in the value of $\Re$ by 1% it is necessary to decrease the value of $\beta_2$ by 1.1945%......'. On Table 3, $\beta_2$ Corresponding % changes reported as '-1.7945'. Please change it accordingly.

Minor comments

1. It would be good to include definitions under Table 1 parameters, Table 2 $\Re$ and Figure 1. Also include definition for 'HFMD'.

2. Please change Reference numbers. In the text they should be [1], [2] instead of [3], [3-5] instead of [4-6], [6] instead of [9], [7], etc. e.g. Reference #2 should be after Reference #10 and this link 'https://www.healthline.com/health/hepatitis-c-incubation-period' is an error. Please use this link which is available: 'https://www.healthline.com/health/hepatitis-c-incubation-period#2'.

3. Under 'Background', line 15, ribonucleic acid (RNA) to add.

4. References to change. For example:
   * Dazley JS, Srimuluru LD, Slim J. Decompensated HCV patients with comorbidities including HIV who are medically treated are shown to minimize decompensation related admissions and

5. Also add page numbers.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

Yes

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

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