Review of: "An Optimal Control for Ebola Virus Disease with a Convex Incidence Rate: Imputing from the Outbreak in Uganda"

Kengne Ndé Jacques[1]

1 Université de Dschang

Potential competing interests: No potential competing interests to declare.

Description

The authors formulate a compartmental model given by six ordinary differential equations to describe the transmission of Ebola virus disease. A qualitative analysis and numerical experiments of the model are performed. Then, an optimal control problem is formulated to find cost-effective solutions. This problem is solved numerically.

Comments

Major remarks

1. In Page 4, authors may have to check their hypothesis H2 again on the convex incidence rate (, , ,).
2. In Page 6, in the transmission flow diagram, you indicated that recovered individuals can become susceptible again, do you have any literature or reference that talk about that assertion?
3. In Page 7, authors stated that “In this work, an assumption that the overall death rate ($+_0+$ $_1$) is greater than or equal to the cremation/burial rate (s) is made. If this condition is not met, it implies that the deceased individuals totally disappear from the community and the class of D in the model is inappropriate.” I’m confused with the above statement. Please check it again carefully.
4. The authors study their model without investigating the model properties: existence, positivity and uniqueness of solutions. I suggest that they should establish the basis properties of the model.
5. I’m not convinced that the expression of the disease-free equilibrium point given in page 7, Section 2.1.1, is correct. Since authors have defined the compartment D in page 4 as “the dead sub population D(t), individuals who die both a natural death and EVD induced death.”
6. In Page 8, I’m not convinced that the expression of the reproduction number $_0$ (2.5) is correct. Please check it again carefully.
7. In Page 9, I’m not convinced that systems (2.7) and (2.8) are correct. For instance: the expression of $_2$ is not correct. Please authors should correct it.
8. I’m confused that the authors have defined parameters $_{0,}$ $_1$ two times differently in the manuscript. Please they should clarify it.

9. The endemic equilibrium point is not rigorously investigated. Authors should discuss about the existence and the number of solutions.
10. I'm not convinced that systems (3.7), (3.9) and (3.10) in pages 11-12 are correct. Authors should check it carefully.
11. They should give the benefits of optimal control problem to improve the importance of their work.

Minor remarks

1. There are many misprints in the manuscript. The authors must carefully peruse the paper in order to correct all the mistakes. For instance:

a. In the keywords, page 1, write "convex incidence rate" instead of "Convex incidence rate" and "zoonotic diseases" instead of "Zoonotic of diseases".
b. On page 2, Line 3, reformulate the sentence "Since it was first discovered in Africa was in 1976 [2]."
c. On page 2, line 18, put a full stop at the end of sentence "…cases EBV has reportedly been".
d. In the Abstract authors write "hypothesize" and in the introduction they rather write "hypothesise". They should harmonize it in the hole manuscript. (e) On page 4, line 5, put a space between "diseases [21]." and "Mathematical".

f. In system (2.2), write "S" instead of " * ". The same problem is seen in systems (2.6), (3.1) and (3.2).
g. All figures in the manuscript could not be presented clearly. They should be enlarged appropriately.
h. Please, the authors should check the format of referencing carefully, including the names of authors, like reference [17] using the full or abbreviated name. Etc…

Conclusion

The topic is interesting and worth to be investigated. The aims are clearly stated. The model is described in details. However, I have many concerns regarding this manuscript at this stage and I'm afraid it does not reach the required level of significance.