

FINAL EVALUATOR'S comments on revised paper (if any) :

Though the authors attempt to add some flesh to the manuscript, they do so hastily and create more confusion. In my 10+ years of paper review, this is the worse I have seen, especially after it is supposedly revised. The authors should address my initial comments including those below point by point and not simply dodging by saying "All others done". This is not an appropriate way to respond to reviewers comment.

The geology of the District is basically made of the middle Precambrian formation. Most parts of the District are underlain by lower Biriman rocks with few areas such as Bosomkese and Kwannisa underlain by granite. It must be noted that, the lower Birimian rocks formation in the District contain weathered phyllites and schist which account for the substantial deposits of red and white clay in areas such as Tanoso where ceramics, brick and tile and pottery industries are located.

What does the geology of the district have to do with this disease?

I did not see any prevalence modeling in the manuscript. The title is deceptive. I suggest **Modelling Hepatitis B in a high prevalence district in Ghana**

What do you mean by the goal of researchers is to have $C_v < 1$ [14].

Do you mean the public health goal is to reduce the value of C_v below unity via a combination of prevention methods?

We use the SIR model Kermack and Mckendrick and modify it for hepatitis B with vaccination.

The derivation and analysis of the modified SIR mathematical model (SIR), enabled a better understanding of the dynamics of the spread of HBV within the Tano North district population.

The above two statements are contradicting each other. I did not see any derivation, if yes explain how you arrived at the model equations and these should be different from what exist in the literature.

The perturbation analysis of the disease free equilibrium revealed that when the reproductive number R_0 is less than unity the disease free equilibrium is stable, whilst when it is greater than unity the disease free equilibrium is unstable [29].

I did not see any perturbation method being applied in this manuscript.

Please note that "Perturbation theory comprises mathematical methods that are used to find an approximate solution to a problem which cannot be solved exactly, by starting from the exact solution of a related problem. Perturbation theory is applicable if the problem at hand can be formulated by adding a "small" term to the mathematical description of the exactly solvable problem. Perturbation theory is closely related to methods used in numerical analysis"

Figures 1 & 2 are copied from somewhere and should be acknowledged or accompanied with permission to do so. MS word has tools to draw such figures easily.

I suggest the authors seek the help of a native English speaker to help them with the grammar, syntax and semantics pertaining to mathematical modeling of infectious diseases.

The herd immunity threshold shows that about 0.42% of the susceptible population of Tano North district should be **immuned** in order for the disease not **to** result in an epidemic.

From further analysis with a control measure such as vaccination, and having a vaccine efficacy of 95% about 0.44% of the susceptible population should be vaccinated in order to have HBV under total control in the Tano North district.

The conclusion that less than 1% of the susceptible population should be vaccinated to avoid an epidemic is simply erroneous as this value indicates the disease is not of any concern and could be eliminated/eradicated without too much ado.

My question still remains: There is neither new mathematics nor new insights. If the authors cannot address clearly address what we learn from this manuscript that we did not know before, and then I do now see why in the first place the study was even attempted. Please state the novelty of this paper in relation to what already exist out there (in the literature) so that readers will understand why it was important to have this published. In a nutshell, what do we lose if this manuscript is not published? Publication can only be justified if this last question is answered.

Sorry I cannot be more positive and do not wish to review any other revision as I my **final recommendation** is **STRONGLY REJECT**.

Note: Anonymous Reviewer