



SDI FINAL EVALUATION FORM 1.1

PART 1:

Journal Name:	British Journal of Mathematics & Computer Science
Manuscript Number:	2014_BJMCS_10040
Title of the Manuscript:	An Age- Structured Model for the spread of Buruli ulcer : Analysis and Simulation in Ghana

PART 2:

FINAL EVALUATOR’S comments on revised paper (if any)	Authors’ response to final evaluator’s comments
60-65: “The evolution of the equilibrium analysis of an age-structured composition model [21], <u>was begun</u> (NO NO NO) by the introduction of the existence results and formulation of age-structured models Gurtin and MacCamy [16] and Venturino [11]. Barbu [15] developed mathematical theory behind age-structured populations [3] and studied nonlinear age-dependent population and predator prey dynamics.” <i>Please I recall my first remarks (since you said OK in your previous Authors’ response to final evaluator’s comments):</i> <i>see [Population Models Structured by Age, Size, and Spatial Position, G.F. Webb in Structured Population Models in Biology and Epidemiology (Pierre Magal · Shigui Ruan (Eds.)), 2009, Springer]: “The earliest models of age structured populations, due to Sharpe and Lotka in 1911 [104] and McKendrick in 1926 [92] established a foundation for a partial differential equations approach to modelling continuum age structure in an evolving population.”</i> <i>I point out also the fact that the author had not studied the stability of equilibria (disease free equilibrium or endemic equilibrium) nor explain in which state (endemic or disease free) is the population of Ghana.</i> 122- $\Omega = \left\{ (g) \in (L^\infty(Q))^2 \mid 0 \leq g(a,t) \leq Bi.eP \right\}$ “Bi.eP” means what? Moreover the definition of g as an element of L^∞ square should be clarified. 124-125- said <i>In two lines : why?</i> to satisfy the system. 125-133: Numbering equations on the right or the left (not under these equations). 148- $f(a) \begin{cases} \frac{1}{5} \sin^2 \left(\pi \frac{(a-15)}{30} \right) & \text{if } 15 \leq a \leq 40; \\ 0 & \text{otherwise} \end{cases}$ “f(a)=” and	



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space between mathematical expression (...), “if” and the inequalities with a .

153- “ $B_H(0) = B_H 0$.” Should be written as in line No 190: $0 \leq B_{H0} \leq B$

200-201-202 The presentation/form of the expression of L on characteristics should be improved.

205: “The fixed point of the map L was derived, meeting the conditions” (without “.”) **WHICH CONDITIONS?**

210: There is a notational problem with notation Ω : it is a number, the size of a set or a set itself? **YOU MAY CORRECT IT BEFORE ANY PUBLICATION.**

PLEASE: NUMBERING YOUR RESULT LIKE THIS THEOREM.

219- Li : write with “i” indexed.

225- it is “sup” instead of “max” in $|L_j(S, I, R, B_H)| \leq \max\{B_{H0}\} + D_2 B \Omega \leq 2B$

242: In addition, the Jacobian for this transformation...” *Please define clearly the transformation.*

250: “the terms made up of the Si...” index I in S_i.

264: $\theta(a) = \begin{cases} 1/365 \text{ for } a \leq 15 \text{ year} \\ 1/2.363 \text{ for } a > 15 \text{ year} \end{cases}$ “, year(s)”

277-278: $\left| \alpha \frac{\Delta x}{\Delta t} \right| \leq 1$

For a given spatial discretization Δx , this produces a restriction on the time step as $\Delta t \leq \Delta x / |\alpha|$

I had already ask (check from expression 277 !) to permute Delta t and Delta x in $\Delta t \leq \Delta x / |\alpha|$

It will have bad effect on the stability of your numerical scheme: correct please that error. You get instead a restriction in space step.

295-296: $S(a, 0) = \begin{cases} 0, \text{ if } 0 \leq a \leq 40, \text{ weeks} \\ d, \text{ if } a > 40, \text{ weeks} \end{cases}$

$R(a, 0) = \begin{cases} 0, \text{ if } 0 \leq a \leq 40 \text{ weeks} \\ d, \text{ if } a > 40 \text{ weeks} \end{cases}$

“if0” “ifa”

302: space between mathematical expression and units,

$d = \frac{20,000(\text{humans})}{50(\text{weeks} / \text{year}) \times 60(\text{year})} \approx 8.33 \text{ humans} / \text{weeks}$



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332-334: *Why the three figures a-b-c are quite similar?*
362-363: “We also observe that Mycobacterium ulcerans spread is facilitated by the behaviour of humans”. *Where are the justifications of this proposition in your study? I rather see it as a perspective. But you could also support your statement by showing the importance of the rates ρ_1 and ρ_2 .*
384: ”M.(2005).” *What is M ?*
392 (ref. 8) is similar to 432 (ref. 22): **Webb, G. 1985. Theory of Non-linear Age-Dependent Population Dynamics, Marcel Dekker, New York. AND Webb, G. 1985. Theory of Nonlinear Age-Dependent Population Dynamics, Marcel Dekker, New York.** Be careful with references.
395-396: Bonyah, E ., Owusu-Sekyere E . 2012. Modelling of Buruli Ulcer Prevalence in Amansie West District, Ghana. International Journal of Sciences (ISSN 2305-3925), *please the volume, the Number of the series/Journal?*

410-411: [14] World Health Organization. Buruli ulcer: Number of new cases of Buruli ulcer reported (per year). Assessed *WHEN and WHERE?*
424- [19] World Health Organization. Buruli Ulcer (2001). Diagnosis of Mycobacterium ulcerans **Dis- ease.** *(please correct)*
434: “Poc. Edinburgh Math...” *Proc.*
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GENERAL COMMENTS: in any study like this, there is a parameter named “reproduction number” or “basic reproduction rate”: where are yours in this manuscript? This parameter is important when an author want to present stability of steady states (Disease Free Equilibrium/DFE or Endemic Equilibrium/EE) and say in which state is the population where the data has been taken.
(see for example: <http://www.math.u-bordeaux1.fr/%7Eaducro100p/pdf/DM-nonlinearity.pdf> or H. W. Hethcote, The Mathematics of Infectious Diseases, SIAM Review, 42:2 (2000), 599 - 653.)

Note: Anonymous Reviewer