Author's response to reviews

Title: Modeling the variations in pediatric respiratory syncytial virus seasonal epidemics

Authors:

Molly Leecaster (molly.leecaster@hsc.utah.edu)
Per Gesteland (per.gesteland@hsc.utah.edu)
Tom Greene (tom.greene@hsc.utah.edu)
Nephi Walton (nephi.walton@utah.edu)
Adi Gundlapalli (adi.gundlapalli@hsc.utah.edu)
Robert Rolfs (rrolfs@utah.gov)
Carrie Byington (carrie.byington@hsc.utah.edu)
Matthew Samore (matthew.samore@hsc.utah.edu)

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Author's response to reviews: see over
Dear Editors,

Thank you for your consideration of this revised manuscript. The reviewers’ comments have helped us to improve the quality of the study; we appreciate their time and efforts. As requested, changes have been made with track changes except for changes to Tables and Figures.

Respectfully yours,
Molly Leecaster

Response to Reviewers’ comments:

Reviewer: Erik Volz

Major Compulsory Revisions
1. The linear regression analysis relates observed quantities for the detected fraction of the epidemics. Although they would follow the theory for an epidemic, the goal was to provide a description of the relationship among epidemic characteristics. The relationship in the limited range for this study is approximately linear. The portion of the manuscript has not been modified.
2. The model has been reformulated to incorporate births and deaths.
3. The Schwarz Criterion (sometimes called the BIC) was used. This term is now used in the manuscript. It is calculated for the RSE and the form you suggested, labeled in the manuscript as RMSE.
4. The model has been reformulated to model multiple seasons together and include age stratification for children under 2 years old and all others.
5. The figure has been corrected.
6. The grid search description has been expanded.

Minor Essential Revisions
1. The language pertaining to the association between exponential growth and epidemic characteristics has been modified throughout the manuscript.
2. The analyses performed on varying week thresholds is now included in the manuscript.
4. The value $t_0$ is the observed epidemic start while $\alpha$ represents the unobserved epidemic start. With the reformulated model over several seasons and cycle nature of the transmission parameter, the epidemic start is considered more carefully with the other estimated parameters.
5. The variables describe the number of individuals. The differential equations have been edited to more clearly reflect the frequency dependency in the model.
6. Physicians’ expert opinion is that the detected cases do not change their actions after detection and that “treatment” does not generally reduce infectivity for RSV.
7. We have added the suggested fit statistic as well.
Reviewer: Gerardo Chowell

ABSTRACT:
The model has been reformulated to include all people; limiting the detection to those under 2 years old.

DATA:
The comment (Please describe exactly the type of data being used. The authors mention hospitalization and notification data, but it is not clear exactly the type data being used in their paper) was addressed by separating the paragraph describing the data used from the previous description of the sampling protocol and the text was made more concrete.

REGRESSION ANALYSIS:
The epidemic characteristics have been defined more clearly and Figure 1 has been revised to show weekly incidence instead of cumulative incidence.

SEIDR MODEL:
The set of differential equations has been revised to fit the more standard format the reviewer suggested.
The model has been reformulated.

RESULTS and CONCLUSIONS:
These sections have been modified.