Reviewer's report

Title: Age-prioritized use of antivirals during an influenza pandemic

Version: 1 Date: 17 May 2009

Reviewer: Gerardo Chowell

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Age–prioritized use of antivirals during an influenza pandemic

By Merler, Ajelli and Rizzo

In this paper the authors explore optimal and suboptimal intervention strategies for the control of influenza transmission using antiviral medications based on treatment and prophylaxis strategies depending on antiviral stockpile size. The paper is clearly written and enjoyed reading it. The authors carry out an ample set of simulations based on influenza epidemiology and use of antiviral drugs. The authors' conclusions support the World Health Organization recommendation that individual countries stockpile sufficient antivirals to cover 25% of their populations. I only have a couple of comments on the assumed epidemiological patterns for epidemic and pandemic influenza.

1. The authors assume R0 to be in the range 1.4-2.0. Larger values of R0 have been estimated (e.g, see summary Table on R0 values for the 1918 influenza pandemic in Chowell & Nishiura, 2008). Suggest to extend their R0 range of values to include a higher R0 value of about 3.

2. The authors do not make any explicit assumptions on the age-specific clinical and mortality rates. Rather the resulting age-patterns presented in figure 2 are emerging from their simulation results, which is quite interesting to make this comparison. The authors compare resulting age-specific fraction of clinical cases with that of the 1918 influenza pandemic. I suggest considering two explicit age-specific assumptions on patterns of morbidity/hospitalization and mortality rates. The first assumption could follow that of the typical influenza profile where infants and seniors have the highest hospitalization/mortality rates. Perhaps this could be parametrized using epidemiological data from Italy. The second assumption could resemble that of pandemics where a clear age-shift in mortality towards younger populations has been documented (see for example Olson et al, Andreasen et al) and could affect the prioritization of antiviral medications when the objective is to reduce the number of severe cases and/or deaths. I believe the incorporation of these assumptions together with the variation of R0 intensities could inform interventions strategies for epidemic and pandemic influenza.

3. Another characteristic feature of pandemics is that they typically appear in a series of waves often unexpectedly in Spring-Summer season. Please discuss
how the appearance of a series of pandemic waves could affect your conclusions.

References


Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests