Reviewer's report

**Title:** Vaccination against 2009 pandemic H1N1 in a population dynamical model of Vancouver, Canada: timing is everything

**Version:** 1  **Date:** 29 June 2011

**Reviewer:** Gerardo Chowell

Reviewer's report:

There is a clear need to evaluate the impact of public health interventions implemented during the 2009 A/H1N1 influenza pandemic. This article makes an important contribution by assessing the impact of vaccination campaigns conducted in the Greater Vancouver Area during the second pandemic wave and evaluate the impact of other vaccination strategies (uniform, parent-children). Specifically, the authors present a detailed structured model with age groups and activity levels, which is tailored to epidemiological data of the novel H1N1 virus and assess three different vaccination strategies including an actual vaccination campaign based on real data. I have a few comments on the paper.

1. The authors model vaccination strategies during the second pandemic wave, but the dependence of this wave on earlier wave(s) of infection is not clearly discussed or described. In particular, the levels of susceptibility across age groups/activity level groups and consequently the reproduction number will be affected by the intensity of earlier waves (R0) and any social distancing interventions during the earlier pandemic period. For instance, recent results indicate that spring and summer waves in Mexico generated significant morbidity levels with high attack rates were observed in Southeastern states of Mexico in the summer, but the subsequent fall pandemic wave had a relatively mild to moderate impact in this region probably due to significant herd immunity levels acquired during the summer wave. It is also possible that early waves generate significant burden on specific populations (e.g., school age children [11]) which could obviously have important effects on targeted vaccination strategies in later waves of infection.

2. Authors assume R0=1.4. What would be the value of R after taking into account background immunity in the population acquired from earlier pandemic waves?

3. Authors model a vaccination period of 8 weeks and vary this length in a sensitivity analysis. It seems that constant vaccination rates per day were used, but it was not mentioned in the main text.

4. It could mention briefly in the discussion the role of Vaccine distribution rates and the behavior change parameter.

5. The model is validated using H1N1pdm data. It is not clear form the text the source of the data and how these data was collected. This could be described in...
a Data section.

6. Authors state that the model predicted incidence across age groups and month – how was the model adjusted to data? Was any optimization process implemented to achieve a fit of the model to data?

7. Authors found that timing of start of vaccination campaign plays a major role on the final morbidity and mortality outcomes. This is in line with prior studies (see Chowell et al. Plos One 2009)

**Level of interest:** An article of outstanding merit and interest in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests