Reviewer's report

Title: Modeling the containment of the accidental laboratory escape of potential pandemic pathogens

Version: 1 Date: 12 August 2013

Reviewer: Sally Blower

Reviewer's report:

Minor Essential Revisions:

This is an extremely interesting, very thorough and important manuscript that deals with the accidental lab escape of potential pandemic pathogens.

1) Figure 1 should be divided into two figures (currently 1A) and (currently 1C and 1D) and a Table (currently 1B). The population density (shown in Figure 1A) is almost impossible to visualize. I suggest leaving very low density areas white and beginning the color scale at a higher density so that the color scale provides more information.

2) Figure 3 could also be split into 2 or 3 Figures.

3) In Figure 4 why is the second point higher than the first point?

4) The authors present chronological timelines in Figure S1. The authors should also – in the main text - present a chronological time line for the reference case and the baseline case. Also the authors should present the chronological time line - in the main text - for a scenario that generates a high number of cases (but less than 1,000) and lasts a long time (but less than a year). Including a doubling time graph (as shown in Figure S1B) in the main text would also be very helpful.

5) The lines in Figure 3A and 3D are very jagged. Can they be smoothed either by conducting more simulations or - or if this is too time consuming - using a smoothing function?

6) Some of the more important results presented in the SM should be moved into the main text; for example, the comparison of Paris with Rotterdam.

7) In the introduction and discussion the authors should briefly discuss other potential pandemic pathogens that have different properties than influenza, eg. XDR/MDR TB, small pox, anthrax, plague.

8) Can the authors include information on how many labs are working on BSL-3 in the European countries the authors discuss? Are they located in rural or urban areas? In the discussion can this be mentioned for the US? Can the authors include information on how many (on average) individuals handle potential pandemic (i.e., dangerous) pathogens at these labs?
9) The authors should include in the introduction (as has been included in the discussion)– to put in context – the value of R0 for strains of seasonal influenza and more transmissible strains of influenza.

10) The authors should label the first 4 paragraphs in the current section labeled “Results & Discussion” as “Methods”.

11) The authors should briefly discuss – in the discussion - how effective contact tracing is in households, schools and the community: for example, SARS, MDR TB, MERS.

12) The terminology “demographic structure” “social structure” “socio-demographic” should be defined/explained in the text.

13) The authors describe a simulated epidemic as an outbreak if it results in more than 1,000 cumulative cases in less than a year. This information should be included in the Methods contained within the paper and not in the text at the end of the paper. What is the justification for using such a long time scale? How are outbreaks generally defined in the “real-world; e.g., by the CDC and the WHO? If possible the authors should mention some examples that have been used.

14) Can the authors present or discuss (if rerunning simulations is too time consuming) the distribution of the length of outbreaks for some of the results?

15) In non-outbreak situations how many cases are likely to occur before the transmission chain fades away? What is the likely persistence time of non-outbreaks? How will it be possible to determine if a slow outbreak is occurring (spread out over many months) or if a “non-outbreak” that will fade away is occurring? Isnt it highly probable that control interventions are going to be put in place for a “non-outbreak” that continues to slowly unfold over several months? If a “non-outbreak” is unfolding shouldn’t interventions be put in place even if the “non-outbreak” would fade away without interventions ; i.e., shouldn’t interventions be put in place for ethical reasons?

16) I suggest changing “baseline case” to “non-intervention case” as using both baseline case and reference case is somewhat confusing.

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**

I declare I have no competing interests.