Reviewer's report

Title: Incubation periods of viral gastroenteritis: a systematic review

Version: 3 Date: 19 May 2013

Reviewer: Jonathan Zelner

Reviewer's report:

This is a thorough, well-constructed and well-written paper on an important topic. The authors are absolutely correct to highlight the fact that the latent period estimates used in dynamic models of GI pathogen transmission are too often arbitrary and not grounded in data. Accurate estimates of the distribution of latent periods for viral pathogens that cause gastroenteritis is important for obtaining meaningful transmission parameter estimates when applying dynamic models to data. I believe that with some additional analysis, the authors will have made a very strong contribution towards closing this gap in the literature.

Major Compulsory Revisions:

1. My concerns relate to the choice of a log-normal distribution for analysis of all of the latent period data. Although the authors cite several studies that show that log-normal distributions can explain incubation periods of acute infectious diseases, it would be more convincing if they demonstrated this via quantitative (AIC, BIC) comparisons of the goodness-of-fit for a log-normal distribution versus, e.g., a gamma or weibull distribution. The authors should present a comparison with at least 1 (but preferably more) alternative distributions.

2. In addition, providing estimates of an Erlang distribution (gamma with an integer shape parameter) fit to the latent period data would make these findings invaluable for researchers constructing transmission models for these pathogens. Since the authors state this as a goal of their analysis, this area deserves additional attention.

An Erlang distribution with shape parameter k and mean duration x can be included in a compartmental model as k compartments, each with expected (exponentially distributed) sojourn time x/k. Because transmission models used for these analyses are typically compartmental, estimates of the latent period based on the Erlang distribution are easy to plug in to these models. In addition, comparisons of the quality of fit of these model-ready distributions against the best-fitting distribution would provide a guide for interpreting modeling results based on these estimates.

Minor Essential Revisions:

1. Figure 2 would be more informative if it contained another row showing the fit of these distributions to the data, i.e. plotting the fitted log-normal distribution against the histogram of the latent period data. If space limitations preclude this
from being in the main text, it should be included in the supplementary materials.

**Level of interest:** An article of importance 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.