Reviewer’s report

Title: Early detection of viral influenza activity in the community by monitoring clinical diagnoses of influenza in hospital emergency departments

Version: 1 Date: 20 March 2007

Reviewer: Tom Burr

Reviewer’s report:

General
1. Is the question posed by the authors new and well defined?

Yes.

2. Are the methods appropriate and well described, and are sufficient details provided to replicate the work?

Not quite. Details given below, in compulsory revision suggestion.

3. Are the data sound and well controlled?

Yes.

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?

Not quite. Again, see details below in the compulsory revision suggestions.

5. Are the discussion and conclusions well balanced and adequately supported by the data?

Not quite. Again, see details below in the compulsory revision suggestions.

6. Do the title and abstract accurately convey what has been found?

Not quite. Again, see details below in the compulsory revision suggestions.

7. Is the writing acceptable?

Yes. The writing is quite good and I believe the paper can be accepted if the compulsory revisions are satisfactory.
Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)
These compulsory revisions need not require a lot of time, but:
1) Is there a practical suggestion to detect the onset of influenza season using ED data and to show that ED data would typically detect the season before the positive test results tend to? (note that I think the number of test orders and/or the fraction of positive results might complement the no. of positive results)

My understanding: at the end of each year you fit a spline to capture longer-term trends (seasonality mainly) and other terms to capture daily effects retrospectively to the entire year. This is useful to determine, as you did, that there might be a tendency to see large positive forecast errors in the ED data prior to the test order: (but see my next comment). This approach does not lend itself to actually detecting the onset of flu season more quickly (and how might the onset be defined?)
2) The ED residuals cannot truly be white noise (in practice, they almost never are) or there would be no cross correlation with the positive lab results residuals. This is OK, but make this point clearly in the revision, and: what lags were examined and do small but statistically significant correlations at negative lags seem to arise due to actions happening near the onset of the flu season(s)? Please provide statements regarding exploratory evaluation to convince me that this very small but statistically significant (unless a lot of lags were examined and you didn't property account for multiple testing??) correlation is "real" and explainable (arising, say due to "action" associated with the beginning of the annual peak) and therefore potentially exploitable (how might it be exploited in "real time", per my remarks in (1) above).

If you convince me that this is "real," I'd settle for remarks involving "we have no practical suggestion" for how to actually exploit this tendency, but the retrospective approach (involving retrospective spline fitting to capture the long term trend ) reveals a real pattern. Basically: I'm not yet convinced that you found a real pattern and I don't see why a lag of 3 days would occur if you date lab results to the day of lab order.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
Fig 2 vs Fig 3:
I cannot see how the log of the spline fit should be so large (approx 2 in some instances) when the maximum count is approx 60. Do the other terms in the "quasi poisson" regression add negative contributions? Also, write the "final model" as Expected(log(counts)) or instead, add an error term.

Any guess why you can't remove terpomal correlation from all series?

Discretionary Revisions (which the author can choose to ignore)
Explain (conjecture?) why you seem to find that the positive influenza test results lag the ED influenza by 3-4 days even though you use the date of test orders rather than the date of the positive test. Can you say anything about the tendencies for more or less test orders as a function of time or year? I assume there is no "sentinenal physician" concept in which influenza tests are routinely ordered throughout the year simply for flu surveillance rather than because of the MD's best guess that influenza might be the illness.

Related: might there be a tendency for more test orders after influenza seems to be on the rise? Related: why not record the number of lab tests, and the number of positive results. You are using only the number of positive results, but also available in perhaps more timely manner is the number of test orders.