Reviewer's report

Title: Patient, Physician, Encounter, and Billing Characteristics Predict the Accuracy of Syndromic Surveillance Case Definitions

Version: 2 Date: 10 January 2012

Reviewer: James Buehler

Reviewer's report:

Major Compulsory Revisions

None

Minor Essential Revisions

I do not consider the comment below to be a "minor" point from the scientific perspective but it is “minor” in that it should be very easy to address. The check-box below forces me to say that the authors can "chose to ignore" this recommendation, but I would advise against ignoring it.

The primary concern I raised regarding the initial submission concerned the scope of the manuscript's promise and its conclusions relative to the findings. The authors have succinctly addressed that concern by adding the statement (Page 16) that, “…whereas our study identified characteristics associated with the PPV of syndrome definitions, future research is needed to quantify the impact of our ‘improved’ syndrome definitions on surveillance system performance and public health practice.” I concur.

This additional statement, however, is now in conflict with the statement in the opening section of the Discussion (Page 13) that, “These predictors [of syndromic surveillance case definition accuracy] can be used to reduce syndromic surveillance system false-positive alerts, either by focusing on the data most likely to be accurate, or by adjusting the observed data for known biases and performing surveillance using the adjusted values.” This latter statement is not substantiated by the findings, as the authors did not study whether improvements in the predictive value of syndrome classifications do indeed result in fewer false-positive alerts based on observed disease trends. While plausible, there are multiple reasons why this might not be true. A key unresolved issue with respect to this question is that the authors did not define what represents a “true positive” versus a “false positive” alert, especially from the perspective of the practicing epidemiologist. For example, is a "true alert" one that simply determines that an increase in a certain type of illness has occurred? Or, is it one that a practicing epidemiologist would conclude identifies a situation that merits further attention. Does the definition of a "true alert" depend on whether that initial assessment identifies a situation that merits a full-scale investigation or on whether that investigation determines that a disease outbreak of public health concern is indeed occurring? Rather than sort through all this, it
would be much simpler to tone down the statement that opens the Discussion.

Discretionary Revisions
None

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**
No change from initial review.