Reviewer's report

Title: Improving the Estimation of the Burden of Risk Factors: An Illustrative Comparison of Methods to Measure Smoking Attributable Mortality

Version: 1 Date: 21 August 2014

Reviewer: David Homa

Reviewer's report:

Overall, the manuscript was well written. It contributes to the literature in demonstrating how estimation of attributable burden can be performed when population exposure and outcome data linked at the individual level is available, and how this method can improve on traditional methods (e.g., PAF). Given that relatively few countries or other jurisdictions have the appropriate data to use this approach, this paper will be probably be of most interest to investigators who are interested in population attributable burden estimation.

Major Compulsory Revisions
None

Minor Essential Revisions
1) The U.S. Surgeon General published updated smoking attributable mortality for the U.S. for 2005-2009 (2014; Chapter 12). These estimates were based on updates to the CDC SAMMEC methodology that include updated relative risks (reflecting increase in smoking related RRs, particularly in women, since CPS-II) and more age strata used in calculation to better reflect changes in risk with increasing age (4 age strata vs. 2 used in past estimates). These changes do address in part some of the limitations that the authors describe in part about PAF methods. Some discussion should be provided in context to the 2014 SGR report.

2) Abstract, sentence 2: "Many jurisdictions" is an overstatement - authors admit in discussion that many countries do not have the data needed to implement their method. "Some" or "certain" is more appropriate.

3) There are spacing problems throughout the manuscript, with words running together.

4) Pages 5 and 8: A better description of CPS II is needed, especially the data period you are using for relative risk estimates. Is it 1982-1988 or another period?

5) Pages 8-9: Please clarify approach used to compute smoking attributable mortality using PAF approach. For example, did you use CPS II relative risks cited in 1989 SGR and used in past by CDC SAMMEC? Did you follow CDC SAMMEC methodology for computing SAM using this approach (e.g, across
gender and age (35-64 years and 65+ years)? Were conditions consistent with those cited by US Surgeon General as having a casual association with smoking or another sources (e.g., IARC).

6) Reference 17 seems to include 2 references and should be fixed.

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

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**

I declare that I have no competing interests.