

Reviewer's report

Title: Using Breath Carbon Monoxide to Validate Tobacco Smoking in Remote Australian Indigenous Communities.

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Reviewer: Martin A Javors

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The stated purpose of this study was to examine the specificity and sensitivity of a BCO test and determine an optimal BCO cutoff level for validating self-reported tobacco smoking in indigenous Australians in Arnhem Land, Northern Territory (NT) in 400 participants #16 years of age. 260 were smokers and 60 were non-smokers. The authors contend that BCO measurements were a useful tool to recruit participants and concluded that the strong agreement between self-report and BCO levels warrants further investigation as a health promotion tool in the communities studied.

Overall, this is an interesting and well written paper. The authors have made an effort to identify a BCO cutoff that identifies accurately nonsmokers from smokers in a special population of which about 50% are smokers. Nevertheless, there are a few important points that the authors should consider.

Major compulsory

1. Most of the participants with self-reported smoking status and BCO levels were admitted smokers (260/320). The BCO levels are not needed to identify these participants as smokers, but BCO levels might be useful as positive feedback while they are trying to quit. The authors should state more explicitly the purpose of using a breathalyzer in this unique population. It was hinted that it might be a useful tool to engage the population and reduce harmful smoking, but it was not clear exactly how this might be accomplished.
2. For the purpose of defining an accurate BCO cutoff between smokers and nonsmokers, the definition of smoking status is not optimal in my opinion. First, a BCO level is not useful to identify smoking beyond the previous 24 hours because of its short half life. Yet, several participants who admitted not smoking during the previous 24 hours were still included as smokers. It is not reasonable to expect that these participants would have BCO levels above almost any cutoff. Second, the authors must decide whether to include Cannabis smokers in the smoker group or to exclude them from the analysis. It seems clear that they are not nonsmokers. The most accurate BCO cutoff for identifying nonsmokers and smokers would likely be lower if these participants were reclassified. In my opinion, these data support a cutoff of 5 ppm or lower. Also, modifications to classification of subjects might eliminate the difference between males and females, allowing the authors to combine the data and obtain a more valid cutoff.

Minor Compulsary

3. Given the high percentage of indigenous Australians that smoke regularly (50%), the authors should comment on the effect of second hand smoke on BCO levels. In particular, in the DISCUSSION (p 16), the authors cite a previous study that reported 15% false positives but made no mention of second hand smoke. On the other hand, in the results in this report, it does not appear that second hand smoke contributes to false positives. This may be due to the small number of nonsmokers included in the analysis.

4. The authors should state how and how often the breathalyzers were calibrated. This is an important feature of accurate measurement of BCO levels.

5. The authors reported that BCO levels were significantly higher in males than females, but did not report the number of cigarettes per day which might easily explain the difference. In general, the authors should give more information about the number of cigarettes smoked if possible.

6. In the ABSTRACT (Methods), the authors reported that 400 participants were interviewed for the study. In the ABSTRACT (Results), the authors stated that the results are from 320 participants, 260 smokers and 60 nonsmokers. In the RESULTS, it was stated that 300 of 400 participants interviewed were self-reported tobacco users (p 10). There are more examples of apparent discrepancies among the numbers of smokers, nonsmokers, participants, etc. The authors should make the distinctions among these groups more clear. Perhaps a table defining the groups of participants would help the reader.

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

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.

Marty Javors