Reviewer's report

Title: Systematic Review of School-Based Interventions to Prevent Smoking for Girls

Version: 2 Date: 7 December 2014

Reviewer: Kristin Carson

Reviewer's report:

Major compulsory revisions

1. Reporting of the results need to be clearer. I cannot tell how many of the 33 included studies produced statistically significant results in favour of the intervention. The sub-groups are also unclear. In the methods you indicate that the data will be separated into three groups (please number these sections so that it is clearly three groups under the first paragraph of the 'Data extraction and quality assessment section' beginning 'The content or goals of the intervention were characterised according to the following categories: 1. Gaining knowledge, getting more skills 2. Multiple strategies… etc. as this sentence currently reads like two groups not three). However, the narrative under your results and pooled analysis appears to have all the studies combined together and broken up according to different criteria such as only those included in the pooled analysis, only those with significant results, only those with complete data on smoking. The use of your three pre-specified sub-headings within the results section with reporting of your results under these headings will make the flow easier for the reader. You can still include this other information, but please use clear sub-headings for all of these as well. For example paragraph headings under your results section should include ‘results of the search strategy’, ‘description of included studies’, ‘description of excluded studies’ and ‘effectiveness of intervention’. Under the heading of effectiveness of intervention, you would then include your three pre-specified categories with the results of the studies (pooled and narrative synthesis versions) summarised under each respectively. You should also include sub-totals in your meta-analysis (Figure 3) for each of the three categories, which can be reported in your results section and will give a better indication if any one particular group appears to work better than the others.

2. Data reporting on the secondary objective ‘…to determine which interventions are most successful’ is not clear. A table that includes the different intervention components is needed. This can simply be added to the characteristics tables (currently titled as Table 2, additional file Table 3 and additional file Table 1). Currently under the ‘Interventions’ column for the characteristics of studies table there is only brief mention of the interventions with little meaningful detail provided. For example in Table 3 first intervention description for Ariza study there is only mention that a ‘multi-component program…[with] school free policy, parental intervention and community [involvement], but what the intervention
actually contains (e.g., are there handbooks, peer role-model involvement, intervention based on a psychological theory or does it include incentives or poster competitions etc.) is not reported and needs to be in order for the information to be useful to the reader. This information can then also be used to support your concluding recommendations for which intervention components are more successful (see also point 4 below).

3. Results for each study is also not clear and adding a narrative synthesis within the final column of each table which currently reports only the RR and 95%CI may help clarify this. Even something as simple as adding ‘no evidence of any effect’, ‘statistically significant results in favour of control’ or ‘statistically significant result in favour of intervention’ would help. This would also be a good place to define ‘smoking behaviour’ for each study.

4. I don’t believe sufficient justification for the concluding recommendations in the abstract and conclusion of this review have been made: ‘Combining school based programs with community or mass media interventions and developing girl-specific interventions deserve additional study as potentially more effective interventions’. What evidence from this review suggests that combining school based programs with community or mass media interventions is likely to be more effective as oppose to other policy or home-based interventions for example? In your conclusion you say “We found signals that suggest that adding mass media campaigns or community campaigns to gender-neutral school-based interventions might increase their effectiveness…” but I cannot tell what these ‘signals’ are or where they came from. From what I can deduce from the narrative synthesis under your results heading you had 10 (from 41) intervention arms containing mass media and/or community interventions but I cannot see where it reports how many of these studies produced statistically significant results in favour of the intervention. The term ‘signals’ has also been used in the discussion but I am not clear what these ‘signals’ are. Likewise, the fourth paragraph of the discussion commencing ‘The literature on specific factors…’, what specific factors? This needs to be clarified. You have done this well in the background re: pink coloured cigarette packages that resemble perfume or lipstick boxes etc., but this level of detail is needed for all of your included studies and in the summaries you provide in the results, discussion, conclusion and tables.

5. There is no mention of what the definition of ‘smoking behaviour’ actually is despite this being the primary outcome. I would hazard a guess that this would vary substantially between studies from daily, weekly or monthly tobacco use, ever use of tobacco, intention to use tobacco or ever smoked five or more cigarettes in a year etc. Considering these studies are all being pooled together in one meta-analysis it is important to know if the outcomes that are being pooled are all the same. Can you please include the ‘smoking behaviour’ outcome measures used for each study in the characteristics of included studies table and add a caution to your discussion to say that you are pooling studies reporting ‘smoking behaviour’ in a variety of different ways, meaning that your results need to be interpreted with caution. This may also be part of the reason for your
significant heterogeneity.

6. Give a description in your discussion as to the reasons for the substantial heterogeneity present in the pooled analysis. This is actually substantial heterogeneity (as evident by the p-value associated with your I-squared statistic in your meta-analysis of p<0.000 and if you review the current literature about interpreting I-squared statistics (such as that reported in the Cochrane Handbook which you reference) a result of 76.2% is actually classified in the highest of the four categories being “75% to 100%: considerable heterogeneity”. It is usually recommended in the presence of considerable heterogeneity that meta-analysis actually not be performed as the data is too unreliable. If you do however plan on keeping your meta-analysis you need to add a caution within your discussion re: people interpreting your results need to consider the substantial heterogeneity present.

7. Although there is mention of adjustments for clustering occurring with calculation of the effective sample size for each trial and intervention group, it is not clear what the authors did with this information and how they adjusted the data within the meta-analysis accordingly. This is also not mentioned in the online protocol (which appears to have been added somewhat retrospectively with all aspects of the review reported to have been completed before the protocol was registered). This needs to be clear in the methods and discussion added about how the clustering and level of analysis errors may affect the integrity of the data in the discussion of this review. Level of analysis errors relate to randomisation occurring at the school or community level whilst outcome data are reported at the level of individual participant.

8. In methods under data synthesis and analysis you report that for trials with more than one intervention group you only included data from the intervention arm with the largest published effect for the pooled analysis. This essentially means that interventions are being missed that meet your inclusion/exclusion criteria. It also adds a bias to your outcomes with over estimation of the true treatment effect. I would suggest you re-do this analysis for multi-arm studies using recommendations for analysis from the Cochrane Handbook which you reference earlier. There are two ways to better address these types of studies 1) you can include full n-values for both intervention arms as if they were two separate studies (or 3 or 4 depending on how many intervention arms are included) and then divide the results of the control population between them. Option 2 allows you to combine the results of the two intervention arms together (or 3 or 4 depending on how many arms) as if they were one intervention. The second option can only be conducted if the characteristics of the participants and interventions can be deemed similar enough to be pooled together.

Minor essential revisions

9. P-values need to be added in the text and tables where statistically significant results were observed.

10. Grey literature appears to be missing from the search strategy such as
examination of ongoing studies or online clinical trial registries or review of bibliographies from included studies or contact with authors etc. Although there is some mention of ‘reference mining’ under the second paragraph of the methods section, this is not reported in the search strategy in the supplementary file or under the heading of ‘Data Sources and Searches’. This needs to be added to the limitations in the discussion and if reference lists of included studies were searched this needs to be specified.

11. The first paragraph under your methods where the n-values for your search strategy have been reported needs to be moved under your results section. The results of the search are part of your ‘results’.

12. Were studies only included if they reported outcome data on smoking behaviour e.g., number of children smoking at baseline compared to follow-up? This needs to be clear in the methods second paragraph where you describe inclusion/exclusion criteria.

13. There does not seem to be any table 1 in the main file with Table 2 and Figures 1, 2 and 3 only. The labelling of your Figures and Tables within the text also appears to be off. For example, under your methods you report Additional File 1 next to your search strategy information but Additional File 1 appears to relate to your characteristics of included studies.

14. The title of your Figures and Tables also need to be amended and in some places where there is no title, added. The titles need to reflect the content better. For example “Additional file Table 1. Evidence Table for prevention of smoking: intervention on gaining knowledge and/or more skills” could be “Table 1: Characteristics and results for interventions designed to gain knowledge and/or more skills”.

15. Although you say that information about funding sources and ethnicity were collected I can’t see this reported in any of the tables or text. Please add it.

16. Discussion as to the reasons for the one significant study in favour of the intervention and the one in favour of the control is needed. Why were these studies significant and what aspects of these studies were different to the other studies showing no evidence of any effect?

17. Sub-headings within your discussion are also needed. This is very long and would be easier to read if broken up within sections.

Discretionary revisions

Why was a sub-group or sensitivity analysis for specific ‘girl-tailored’ interventions not considered? This would make sense to me especially considering the primary objective of this review was to study the effect of school-based interventions on smoking prevention for girls and there is later mention of girl specific studies being included? This would appear to be a limitation for this review.
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 have co-authored a Cochrane manuscript with Willem J. J. Assendelft, one of the co-authors on this manuscript titled 'Training Health Professionals in smoking cessation'. I have no other competing interests to declare.