PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Does exposure to cigarette brands increase the likelihood of adolescent e-cigarette use? A cross-sectional study.
AUTHORS	Best, Catherine; van der Sluijs, Winfried; Haseen, Farhana; Eadie, Douglas; Stead, Martine; Mackintosh, Anne Marie; Pearce, Jamie; Tisch, Catherine; MacGregor, Andy; Amos, Amanda; Miller, Martine; Frank, John; Haw, Sally

VERSION 1 - REVIEW

REVIEWER	Jennifer Duke RTI International USA
REVIEW RETURNED	29-Jul-2015

GENERAL COMMENTS	This paper explores the association between e-cigarette use and intentions and retail cigarette brand recognition, tobacco outlet density, and frequency of unsupervised leisure time as a proxy for potential exposure. This is an interesting new area of interest given the increase in e-cigarette use and pending regulations. General: Because the use of one cross-sectional wave to examine these associations limits the ability to drawn strong conclusions, as does the small sample size, this manuscript would benefit from a clearer description of the process through which these variables should account for variation in the e-cigarette outcomes. The primary goal is examining the relationship of tobacco advertising and e-cig use/intentions. Currently, the manuscript does not explain why a key measure, exposure to e-cigarette advertising, is missing. In drawing conclusions about the independent variables and their associations with e-cigarette use, namely tobacco product recognition and "hanging out in parks", the study does not describe an alternative and likely scenario - unmeasured variables account for the relationships shown. Family/friends' smoking status and family/friends' e-cigarette use are not included in models. Brand recognition for e-cigarettes may be the driver of the association; it is not a variable in the study but is likely to have a very high correlation with cigarette brand recognition. Also, given the increase in multiple tobacco product use among youth, other tobacco product use or trial may affect e-cigarette use and intentions. "Hanging out" is introduced as a proxy for exposure in the introduction, but it is a variable related to other risky behaviors. A variety of risky behaviors not explored here may explain the relatively small but significant findings related to brand recognition. These complicated associations and missing variables do not allow for strong conclusions within a cross-sectional study.

Introduction
The introduction begins with a description of e-cigarette advertising, but this is not measured in the study.
This statement is general "Smoking initiation is not associated with exposure to other types of product advertising" with no citation. General media use is positively associated with smoking initiation and has been well documented in antitobacco mass media evaluations. Are you referring to product advertising at the point of sale?
What is the role of e-cigarette advertisements or brand recognition on youth use and intentions? If the authors did not collect data on this topic, what is the rationale for examining an association with tobacco advertising and brand recognition? Is it a proxy or independent influence? One study on the topic is cited (18) and an overlap is briefly noted, but further discussion of this topic upfront as well as in the limitation section would be useful.
"Hanging out" is introduced as a proxy for exposure in the introduction, but it is a variable related to other risky behaviors as noted in the discussion. Given the large ORs for this finding, it may be helpful to fully explain this concept and related research literature in more detail in the introduction.

Methods and Results
Why were there two variables created for smoking status? The crossover between current smokers and ever smokers is confusing. Consider using one variable with multiple categories to accurately categorize all youth with one variable.
Given the increase in multiple tobacco product use among youth, other tobacco product use or trial may affect e-cigarette use and intentions. Was this information collected?
For intention to try e-cigarettes, why was ever use of e-cigs not included, else why wasn't this model conducted among those who were never users of e-cigarettes?
Family/friends' smoking status and/or family/friends' e-cigarette use are not included in these models but may partially explain youth use and intentions.
What is the relationship between sensation seeking and hanging around street/park? SS is mentioned in relationship to risky behaviors, but the "hanging" measure is described as a proxy for potential exposure to POS advertising in introduction.
Discussion
What is the explanation for density as related to e-cig intentions but unrelated to trial of e-cigarettes? This is one of the most interesting measures but yields mixed findings across the two main models..
Given that the reported associations may be related to constructs not included in the models, more caution in the discussion is warranted.

Minor
Pg 16, lines 2-12. This discussion is not directly from the study findings.
Pg 16, line 16 Are you referring to experimentation with cigarettes?
Pg 16, line29-30 The statement that e-cigarettes are less addictive than traditional cigarettes is overstated.

REVIEWER	Olalekan Ayo-Yusuf Sefako Makgatho Health Sciences University, Medunsa, South Africa and Harvard School of Public Health, Boston, USA
REVIEW RETURNED	31-Jul-2015

| GENERAL COMMENTS | General comment: This study investigates the environmental factors associated with e-cigarette use in a population of UK adolescents and found that higher brand recognition was an important determinant of previous use and intention to use e-cigarettes. Although limited by its cross-sectional design and the use of a non-representative sample, the findings reported have the potential to influence policy.
 The author might want to consider the following detailed comments that might help improve the paper:
 Abstract:
 1. Pg2; line 53: Remove 'the' between the words 'around' and 'in the street…….
 Method
 2. Pg6; lines54-57: could author(s) indicate total numbers of secondary schools surveyed and the target sample size?
 3. Pg8; line3: Can the author add why they have grouped together 'not current smokers' and 'never smokers'? Is this not likely to have biased the association between current smoking and e-cigarette use, and even current age, towards the null?
 4. Pg9; line 30: Does this imply that a quarter of the sample was dropped from final analysis? If so, it would be important to present a table of analysis or at least a result of some demographic characteristics of those pupils dropped. This is important as another 10% of those in analytical sample did not complete the question on brand recognition (see Table 1).
 5. Pg9; line 38: Is there a reason for using two different statistical software for analysis?
 6. Pg9: line 45: Why was threshold for inclusion in the model set at p<0.08? It is rather an unusual level? It is not uncommon to have use 0.10 or 0.25, but not 0.08.
 7. Mm
 8. Pg 27; Table 2: Given this was a cluster sampling, it is important to clarify If the 'df' reported here have taken account of design effects. These do not seem so. Please clarify as it might result in Type I statistical error if analysis had not taken account of design effect.
 Discussion
 9. Pg13: lines 52-57: It is not necessary to repeat the results here. So, I suggest the authors consider removing the figures from the brackets (including that which appears on pg14 line 1)
 10. Pg 17; line 7: '…there 52% males…..' It seem a word is missing here. Please address similar concern throughout the paper by proof reading again. Another example of typo error is on pg23;line 45: The reference number should be 29 and not 289. |

VERSION 1 – AUTHOR RESPONSE

REVIEWER 1 COMMENT

Currently, the manuscript does not explain why a key measure, exposure to e-cigarette advertising, is missing.

What is the role of e-cigarette advertisements or brand recognition on youth use and intentions? If the authors did not collect data on this topic, what is the rationale for examining an association with tobacco advertising and brand recognition? Is it a proxy or independent influence? One study on the topic is cited (18) and an overlap is briefly noted, but further discussion of this topic upfront as well as in the limitation section would be useful.

RELATED COMMENT
Brand recognition for e-cigarettes may be the driver of the association; it is not a variable in the study but is likely to have a very high correlation with cigarette brand recognition. To further investigate the very important issue raised by the reviewer regarding the impact of e-cigarette advertising we re-ran the analysis with e-cig advertising recall as a covariate. When e-cigarette advertising is included in the model cigarette brand recognition remains a significant predictor. This analysis is included in the Appendix supplementary tables.

AUTHOR RESPONSE
The introduction has been rewritten making a stronger case for an association between tobacco brand awareness and e-cig use.
E-cigarettes promise the benefits of smoking without the health or social costs. We test the hypothesis that the young people who will be most susceptible to this idea will be those who are already convinced of the positive aspects of smoking through exposure to cigarette brands. This hypothesis allows that exposure to e-cigarettes in their social environments is very likely to be an important moderating factor for e-cigarette uptake together with many of the other known risk factors for smoking/e-cigarette use in young people e.g. poor school attainment, sensation seeking, and binge drinking . In addition, other research in this area by Agaku and Ayo-Yusuf indicates there is a direct link between tobacco advertising.
Unfortunately we did not have a measure of e-cigarette use among family or friends to test this in the models. We have added this as a study limitation.

Brand recognition for e-cigs in 2014 is not likely to be very high due to the instability of this market. There have been no publications to date to our knowledge measuring e-cigarette brand recognition in young people.

REVIEWER 1 COMMENT
1 In drawing conclusions about the independent variables and their associations with e-cigarette use, namely tobacco product recognition and "hanging out in parks", the study does not describe an alternative and likely scenario - unmeasured variables account for the relationships shown. Family/friends' smoking status and family/friends' e-cigarette use are not included in models.

Family/friends' smoking status and/or family/friends' e-cigarette use are not included in these models but may partially explain youth use and intentions.

AUTHOR RESPONSE
This is an importnat point thank you. We have re-run the analyses with smoking status of parents and best friends included in the models. These outputs are included in the Appendix. The brand awareness variable remains significant in the model showing that while these are also important contributing factors to e-cigarette uptake they do not eliminate the relationship between brand awareness or tobacco outlet density and e-cig uptake.

Unfortunately we do not have friends or family e-cig use. This has now been added to the study limitations. These data will also be collected in future survey waves

REVIEWER 1 COMMENT
1 Also, given the increase in multiple tobacco product use among youth, other tobacco product use or trial may affect e-cigarette use and intentions.

Given the increase in multiple tobacco product use among youth, other tobacco product use or trial may affect e-cigarette use and intentions. Was this information collected?

AUTHOR RESPONSE
We agree that young people who experiment with different types of tobacco products (and those who binge drink and use marijuana) are probably also more likely to use e-cigarettes. However these behaviours all probably share common risk factors. Multiple experimenters are more likely to try e-cigs but that is unlikely to explain a link between cig advertising and e-cig use.

We do not have information on the use of other substances/ tobacco products so could not test these in the models.

REVIEWER 1 COMMENT
1 "Hanging out" is introduced as a proxy for exposure in the introduction, but it is a variable related to other risky behaviours. A variety of risky behaviors not explored here may explain the relatively small but significant findings related to brand recognition.
"Hanging out" is introduced as a proxy for exposure in the introduction, but it is a variable related to other risky behaviors as noted in the discussion. Given the large ORs for this finding, it may be helpful to fully explain this concept and related research literature in more detail in the introduction.

What is the relationship between sensation seeking and hanging around street/park? SS is mentioned in relationship to risky behaviors, but the "hanging" measure is described as a proxy for potential exposure to POS advertising in introduction.

AUTHOR RESPONSE
Yes we agree that we should clarify that 'hanging out in the street or park' is probably related to e-cigarette experimentation in two ways- as an opportunity for environmental exposure to externally visible aspects of Point of sale displays or people smoking in local environment and as a measure of parental supervision. Low levels of parental supervision are known to be related to smoking initiation. We have added this second aspect to the introduction.

Additional time hanging around in the street or park probably gives time and space for young people with higher levels of sensation seeking to act on these impulses plus gives exposure to possible new ways to seek out new sensations.

REVIEWER 1 COMMENT
1 Intro- This statement is general "Smoking initiation is not associated with exposure to other types of product advertising" with no citation

AUTHOR RESPONSE
The section containing this statement has been removed during editing of the introduction.

REVIEWER 1 COMMENT
1 Why were there two variables created for smoking status? The crossover between current smokers and ever smokers is confusing. Consider using one variable with multiple categories to accurately categorize all youth with one variable.

AUTHOR RESPONSE
Yes we agree it would be preferable to combine these two measures as a single variable. However due to the low proportion of outcomes in the 'intention to try e-cigarettes' analysis combining the two variables into a single three level variable makes the resulting models unstable. We have included the two varaibles in order to capture the importance of current smoking and ever smoking as influences on e-cigarette uptake.

REVIEWER 1 COMMENT
1 For intention to try e-cigarettes, why was ever use of e-cigs not included, else why wasn't this model conducted among those who were never users of e-cigarettes?

AUTHOR RESPONSE
When those who have tried e-cigarettes are removed from analysis the numbers are too low to make any analysis possible with the same variables.

REVIEWER 1 COMMENT
1 What is the explanation for density as related to e-cig intentions but unrelated to trial of e-cigarettes? This is one of the most interesting measures but yields mixed findings across the two main models.

AUTHOR RESPONSE
This could be a timing effect. Early experimentation is less related to Point of Sale exposure because expansion of e-cig point of sale displays and advertisement into small retail outlets has been fairly recent.

REVIEWER 2 COMMENT
1 Pg 16, lines 2-12. This discussion is not directly from the study findings.

AUTHOR RESPONSE
This section has been deleted.

REVIEWER 2 COMMENT
Pg 16, line 16 Are you referring to experimentation with cigarettes?

AUTHOR COMMENT
Yes the reference refers to the onset of dependence after trying smoking. We have tried to clarify this statement further it now reads 'Experimentation with nicotine can increase risk of addiction as tobacco dependence has been shown to develop rapidly after the onset of intermittent cigarette smoking (27,28).'

REVIEWER 2 COMMENT
Pg 16, line29-30 The statement that e-cigarettes are less addictive than traditional cigarettes is overstated.

AUTHOR RESPONSE
This sentence has been deleted

REVIEWER 2 COMMENT
2 Abstract:
1. Pg2; line 53: Remove 'the' between the words 'around' and 'in the street…….

AUTHOR RESPONSE
The additional word has been deleted.

REVIEWER 2 COMMENT
2. Pg6; lines54-57: could author(s) indicate total numbers of secondary schools surveyed and the target sample size?

AUTHOR RESPONSE

The total number of secondary schools surveyed was four. The target sample size was 1633. The number of schools (4) and the target sample size have been added into the paper.

REVIEWER 2 COMMENT
3. Pg8; line3: Can the author add why they have grouped together 'not current smokers' and 'never smokers'? Is this not likely to have biased the association between current smoking and e-cigarette use, and even current age, towards the null?

AUTHOR RESPONSE
As noted above, we agree it would be preferable to combine the two smoking status variables into a single variable but unfortunately comparing the two smoking categories to a never smoker reference category splits the sample too much given our sample size.

REVIEWER 2 COMMENT
4. Pg9; line 30: Does this imply that a quarter of the sample was dropped from final analysis? If so, it would be important to present a table of analysis or at least a result of some demographic characteristics of those pupils dropped. This is important as another 10% of those in analytical sample did not complete the question on brand recognition (see Table 1).

AUTHOR RESPONSE
A table (Table 8) giving demographic information of excluded cases is given in the Appendix.

REVIEWER 2 COMMENT
5. Pg9; line 38: Is there a reason for using two different statistical software for analysis?

AUTHOR RESPONSE
The syntax for the Principal Component Analysis used to derived the FAS variable was written by another member of the project team in SPSS whereas the majority of analysis for this paper was done in Stata as this was preferable for its logistic regression post-estimation and survey functionality. We have deleted the reference to SPSS from the text as the majority of the analysis related to this paper was conducted in Stata.

REVIEWER 2 COMMENT
2 6. Pg9: line 45: Why was threshold for inclusion in the model set at $p<0.08$? It is rather an unusual level? It is not uncommon to have use 0.10 or 0.25, but not 0.08.

AUTHOR RESPONSE
Yes Hosmer Lemeshow recommend 0.25 but we restricted this to 0.08 as otherwise all variables would have met criteria. After considering the reviewer's comment this has now been changed to 0.05 in order to be consistent with usual practice.

REVIEWER 2 COMMENT
2 8. Pg 27; Table 2: Given this was a cluster sampling, it is important to clarify If the 'df' reported here have taken account of design effects. These do not seem so. Please clarify as it might result in Type I statistical error if analysis had not taken account of design effect.

AUTHOR RESPONSE
Design corrected F statistics are now reported for the bivariate associations.

REVIEWER 2 COMMENT
2 9. Pg13: lines 52-57: It is not necessary to repeat the results here. So, I suggest the authors consider removing the figures from the brackets (including that which appears on pg14 line 1)

AUTHOR RESPONSE
The odds ratios and confidence intervals in brackets have been deleted from the text.

REVIEWER 2 COMMENT
2 10. Pg 17; line 7: '…there 52% males…..' It seem a word is missing here. Please address similar concern throughout the paper by proof reading again. Another example of typo error is on pg23;line 45: The reference number should be 29 and not 289.

AUTHOR RESPONSE
Thank you- these errors have been corrected.

VERSION 2 – REVIEW

REVIEWER	Prof OA Ayo-Yusuf Sefako Makgatho Health Sciences University, MEDUNSA, South Africa
REVIEW RETURNED	01-Nov-2015

GENERAL COMMENTS	This paper has greatly improved with additional information in the introductory section. I just have a few comments for consideration; Comment 3: Authors should include their response in the limitation section as this is fundamental. comment 9. p13: I meant that the figures for ORs and other figures reported in the discussion section be removed, but the authors also went on to remove the ORs reported in the result section. Please consider leaving the ORs as reported in the results section. Finally, I see the added variables of peer and parental smoking were significant in the bivariate analysis (Table 4), why then were these variables not included in the regression model in Table 5?

VERSION 2 – AUTHOR RESPONSE

We are very grateful for the reviewer's careful consideration of the revised manuscript. The actions we have taken to address the reviewer's comments are detailed below:
The reviewer states "Comment 3: Authors should include their response in the limitation section as this is fundamental". We agree this is an important limitation and have added this into the limitations section of the discussion. The section reads "An additional limitation is that it would have been preferable to combine the two smoking status variables into a single variable. However, comparing two smoking categories to a never smoker reference category reduced the numbers in each category too far for meaningful statistical analysis given the very low rates of current smoking reported in this sample"
The reviewer states "comment 9. p13: I meant that the figures for ORs and other figures reported in the discussion section be removed, but the authors also went on to remove the ORs reported in the result section. Please consider leaving the ORs as reported in the results section." We have put the ORs back into the result section on pages 13 &14.
The reviewer states "Finally, I see the added variables of peer and parental smoking were significant in the bivariate analysis (Table 4), why then were these variables not included in the regression model in Table 5?" We agree that under the selection process used for the analysis we should include these

variables in the final models. We have now included the peer and parental smoking variables in the analyses shown in table 3 and 5. Additonal text has been added to the results to reflect this. We have also added a short section to the discussion covering the importance of best friend smoking in e-cigarette use and intention to use. The section reads "Young people with a best friend who smoked tobacco had three times the odds of having tried an e-cigarette and eight times the odds of intending to try e-cigarettes than those who did not report having a best friend who smoked. Choi and Foster (26) found similar results in young adults (20-28yrs) and White and colleagues (27) in adolescents (14-15 yrs). In addition, Choi and Foster found that those with a friend who smoked were more likely to believe e-cigarettes less addictive than tobacco cigarettes. The authors suggest that this is because information about e-cigarettes is spread through social networks. Another possible explanation for the association between having friends who smoke and e-cigarettes use in young people may be due to clustering of experimentation within social groups."