PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Education Against Tobacco (EAT) - A quasi-experimental prospective evaluation of a programme for preventing smoking in secondary schools delivered by medical students: a study protocol
AUTHORS	Brinker, Titus; Stamm-Balderjahn, Sabine; Werner, Seeger; Groneberg, David

VERSION 1 - REVIEW

REVIEWER	Severin Haug Swiss Research Institute for Public Health and Addiction
REVIEW RETURNED	09-Apr-2014

GENERAL COMMENTS	The study protocol describes the design of a quasi-experimental study which aims at testing the efficacy of a student-delivered program to prevent smoking initiation in pupils. The novel intervention studied might provide a low-cost measure for tobacco prevention in secondary schools. General comments Study title The target group and study design should be integrated in the study title Background The introduction might benefit from shortening the paragraphs on smoking prevalence rates and productivity loss caused by smoking and by providing more detailed information on previous school based smoking prevention programs like the smoke-free class competitions, their efficacy and their strengths and weaknesses. Furthermore the authors might report on the result of their recently reported school-based smoking prevention program which is mentioned in the abstract and on how it is associated to the intervention described in the protocol. Objective The study objectives and hypothesis should be stated more clearly and concisely, e.g. by using a numbered list. Methods Study design Some points concerning the study design might be addressed in more detail: 1. Who are persons not meeting the inclusion criteria (Figure 1)? 2. What are parallel classes of the same school? Does every intervention class has a parallel class? What if all classes from a

	certain grade want to participate in the intervention? Participants and sample size The authors should add the relevant data from their recently published study which were used for the sample size calculation (e.g. smoking prevalence rates, size of the school classes…). Furthermore, the authors should consider a potential design effect as pupils are nested within school classes, which are nested within schools. This might result in a larger sample required. Intervention The two intervention parts might be described in more detail. Which intervention elements will be provided, how are they related to the elements mentioned in the cited Cochrane Review? Outcomes The primary outcome should be described more precisely e.g. “the primary outcome is the 7-day-point prevalence smoking abstinence rate defined according to the criteria formulated by the SRNT, i.e. not smoking even a puff within the previous 7 days”. Statistical analyses Using Chi-Square and t-tests might not be appropriate for the study design used. The quasi-experimental design might result in significant baseline differences between the study groups. The proposed methods do not allow to control for these potential baseline differences. Therefore more sophisticated methods like Generalized Estimation Equation Models or Regression Analysed should be used for analyzing the data. Discussion The current discussion mainly contains information which might be relevant for the Introduction section. Instead of this, the authors should elaborate on the strengths and limitations of their study. What is innovative, what is already known, … and particularly on the limitations of their quasi-experimental study design which might bias their results and how they might handle these biased data. Additional comments The paper might benefit from professional proofreading by a native English speaking person.

REVIEWER	Laetitia Minary Nancy University Hospital France
REVIEW RETURNED	24-Apr-2014

GENERAL COMMENTS	Introduction: Page 3, line 55: Financial costs of smoking are not confined to indirect costs such as productivity losses. Direct costs such as health care have to be considered. Page 4, line 3: The transition between financial cost and smoking among adolescent is difficult. Page 4: Ideas must be grouped. For example, the first paragraph refers to cigarette consumption, then it refers to water-pipe consumption and the second paragraph go back to first cigarette consumption.

	Page 4 line 40: Some international references are missing (ex : O'Laughlin publications) Page 5 line 16 : erroneous reference (cochrane 2006) Page 5 line 30: A brief description of the program is missing. How is it low cost ? Is the program the same as the cited program (Stamm-Balderjahn 2012) with the exception of physician? Objectives : Objective is not clearly formulated and many perspectives of the study are listed. These elements should be integrated in the discussion section. Method : Page 7 line 3: A case-control study is retrospective. It is preferable to identify such study as a quasi-experimental prospective evaluative study inclunding 2 measures (at baseline and 6 months after intervention). The method section must be restructured: • Design: « Design » section should integrate 'The survey will be…' (page 7 line 3) until '…in a given grade is selected for the control group' (page 7 line 16). • Data collection: This section should integrate (under the paragraph (page 7 line 35) 'For the collection of the data…'): 'To maximize the external validity…' until '…for the completion of the questionnaire' (without 'the envelopes will be opened […] at the Goethe University Francfort' which must be added in the data management and analysis section). Page 8 line 3: 'The period of time…' until '…6 months thereafter' must come in paragraph design after '…with quasi-experimental design' (page 7 line 5). Figure 1: Concerning the baseline assessment: Maybe some students will be older than 15. How to avoid interviewing older than 15 years if all the class must complete the questionnaire? Exclusion should be considered also after baseline assessment. • Eligibility criteria: The geographical area concerned should be informed. Page 8, line 33: you should indicate (as in figure 1) ' visiting classes six to eight'. • Sample size calculation : To understand the calculation, hypothesis on the expected probability must be cited. • Intervention : Who give the information during the first session ? Could you precise the objective of the second session? Is there discussion on predefined themes? The analysis of the effect of gender, culture and educational level seems to constitute a secondary objective of the study and should be integrated in the objectives section. But perspectives about such analysis must be integrated in the discussion section. • Outcomes Primary outcome is not clear: is it the difference of prevalence of tobacco use between the 2 measures? What is the objective? preventing tobacco use initiation or led to smoking cessation among smokers? Or both? Other secondary outcomes could be percentage of former smokers and new smokers in the 2 groups. • Statistical analysis Logistic regression is appropriate to identified predictors of the

	smoking behavior, however I don't understand which variable will be analysis through an univariate variance analysis. What is defined as attitudes towards smoking? Discussion: Page 14, line 13: 40.8% of smokers: At baseline or 6 months after intervention? What about strengths and limitations of this study?

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name Severin Haug
Institution and Country Swiss Research Institute for Public Health and Addiction
Please state any competing interests or state 'None declared': None declared

The study protocol describes the design of a quasi-experimental study which aims at testing the efficacy of a student-delivered program to prevent smoking initiation in pupils. The novel intervention studied might provide a low-cost measure for tobacco prevention in secondary schools.

General comments

Study title
The target group and study design should be integrated in the study title

Reply: We followed your suggestion and integrated the target group and the study design in the study title.

Background
The introduction might benefit from shortening the paragraphs on smoking prevalence rates and productivity loss caused by smoking and by providing more detailed information on previous school based smoking prevention programs like the smoke-free class competitions, their efficacy and their strengths and weaknesses. Furthermore the authors might report on the result of their recently reported school-based smoking prevention program which is mentioned in the abstract and on how it is associated to the intervention described in the protocol.

Reply: We kept the smoking prevalence rates short and deleted the productivity loss information as Ms. Minary suggested to only mention direct health care costs related to smoking. In addition, we included the presentation of two previous evaluated school-based programs: The "Smoke-free class competitions" and the German "non-smoking is cool" program and discussed their efficacy, strengths and weaknesses.

Objective
The study objectives and hypothesis should be stated more clearly and concisely, e.g. by using a numbered list.

Reply: We have put our study objectives and the related questions into a numbered list.

Methods
Study design
Some points concerning the study design might be addressed in more detail:
1. Who are persons not meeting the inclusion criteria (Figure 1)?

Reply: We edited the section “elegibility criteria” and clarified your question: “Students aged 10 to 15 attending grades six to eight of a secondary general, intermediate, grammar, or comprehensive school are eligible. Older or younger students, or students from other school types are persons who do not meet the inclusion criteria.“

2. What are parallel classes of the same school? Does every intervention class has a parallel class? What if all classes from a certain grade want to participate in the intervention?

Reply: We edited the “Intervention” section in the “Methods” section to answer your questions: “To keep confounding factors to a minimum, the parallel class of intervention classes in a given grade is selected for the control group. All participating schools were asked in advance to split their grades into two class-groups with the same performance level on their own. Schools who would not agree with the splitting were excluded. Parallel classes are defined as control classes which are in the same grade as the intervention class, have the same performance level as the intervention class and visit the same school as the intervention class. Consequently, all classes have parallel classes. In addition, we chose to do the follow-up after six months so the control group could receive the intervention in the same school year (after data collection is complete) which made it easier for us to cooperate with the schools.“

Participants and sample size
The authors should add the relevant data from their recently published study which were used for the sample size calculation (e.g. smoking prevalence rates, size of the school classes…). Furthermore, the authors should consider a potential design effect as pupils are nested within school classes, which are nested within schools. This might result in a larger sample required.

Reply: In the first version of our study protocol we used the “Students in the Hospital” data in order to calculate the sample size. However, we finally decided to use a more recent publication and its data for grammar schools, as in the city of Gießen mainly schools with a high performance level were chosen for the intervention. In contrast, the “Students in the Hospital” publication mainly focussed on schools with a low education level. We added the relevant data in the section “sample size calculation”. We considered the potential design effect of pupils being nested within school classes which are nested within schools and discussed it in the discussion section (limitations).

Intervention
The two intervention parts might be described in more detail. Which intervention elements will be provided, how are they related to the elements mentioned in the cited Cochrane Review?

Reply: We followed your suggestion and described the intervention in more detail in the methods section. In addition, we mentioned the elements of the intervention and how they are related with the results of the cited Cochrane Review.

Outcomes
The primary outcome should be described more precisely e.g. “the primary outcome is the 7-day-point prevalence smoking abstinence rate defined according to the criteria formulated by the SRNT, i.e. not smoking even a puff within the previous 7 days”.

Reply: We decided to quantify the number of cigarettes smoked on a daily, weekly and mothly basis.

Statistical analyses
Using Chi-Square and t-tests might not be appropriate for the study design used. The quasi-experimental design might result in significant baseline differences between the study groups. The proposed methods do not allow to control for these potential baseline differences. Therefore more

sophisticated methods like Generalized Estimation Equation Models or Regression Analysed should be used for analyzing the data.

Reply: You are right in your comment and we are sorry that this paragraph was formulated misleadingly. We want to use Chi-Square and t-test to proof whether significant differences between the baseline-groups exist. For the longitudinal analysis to determine the programs' effects on smoking behavior we will use logistic regression analysis. We have revised this paragraph and hope our analysis intentions will become more clearly.

Discussion
The current discussion mainly contains information which might be relevant for the Introduction section.
Instead of this, the authors should elaborate on the strengths and limitations of their study. What is innovative, what is already known, … and particularly on the limitations of their quasi-experimental study design which might bias their results and how they might handle these biased data.

Reply: We absolutely agree with you and followed your suggestions. We discussed the strengths and limitations and discussed the bias caused by our quasi-experimental study design.

Additional comments
The paper might benefit from professional proofreading by a native English speaking person.

Reply: After we created our marked-up-copy, we paid a native speaking person (Mrs. Suzyon Wandrey, Berlin) for professionally proofreading our manuscript. Thank you for your kind guidance which is highly appreciated.

Reviewer: 2
Reviewer Name Laetitia Minary
Institution and Country Nancy University Hospital
France
Please state any competing interests or state ‘None declared’: None declared

Introduction:
Page 3, line 55: Financial costs of smoking are not confined to indirect costs such as productivity losses. Direct costs such as health care have to be considered.

Reply: We agree with you and made the changes as suggested.

Page 4, line 3: The transition between financial cost and smoking among adolescent is difficult.

Reply: We added a paragraph between those topics in order to avoid confusion: We do not want to make a transition between the financial costs and the smoking prevalence among adolescents.

Page 4: Ideas must be grouped. For example, the first paragraph refers to cigarette consumption, then it refers to water-pipe consumption and the second paragraph go back to first cigarette consumption.

Reply: We grouped the ideas as suggested.

Page 4 line 40: Some international references are missing (ex : O’Laughlin publications)

Reply: We did not find relevant O’Laughlin publications concerning primary prevention. However, we

added references in order to describe comparable school-based programs as suggested by Mr. Haug: The smokefree-class-competitions (SFC) and the “non-smoking is cool” program.

Page 5 line 16 : erroneous reference (cochrane 2006)

Reply: Thank you, we corrected it.

Page 5 line 30: A brief description of the program is missing. How is it low cost ? Is the program the same as the cited program (Stamm-Balderjahn 2012) with the exception of physician?

Reply: We now added a more detailed description of our curriculum in the Methods section to keep the Background section short. The intervention is low cost as the schools only need to pay 25 Euro per participating class in order to refinance the EAT project (we added this information as suggested). That is about 1 Euro per pupil. The cited program (Stamm-Balderjahn 2012) does not use the same curriculum as the EAT program. EAT has a different curriculum (social competence and social influence curriculum) and is delivered within a school-setting whereas the cited program (Stamm-Balderjahn 2012) takes place in a hospital setting and uses a multimodal approach among other differences. As we now decided to present other programs in the Background section and used a different publication for our sample size calculation, it becomes more clear, that the programs are not directly related.

Objectives :
Objective is not clearly formulated and many perspectives of the study are listed. These elements should be integrated in the discussion section.

Reply: We agree with you and integrated the study perspectives into the discussion section. In addition, we clearly formulated our objectives and related research questions in the form of a numbered list.

Method :
Page 7 line 3: A case-control study is retrospective. It is preferable to identify such study as a quasi-experimental prospective evaluative study inclunding 2 measures (at baseline and 6 months after intervention).

Reply: We agree with your comment and made the changes as suggested.

The method section must be restructured:
• Design:
« Design » section should integrate ‘The survey will be…’ (page 7 line 3) until ‘…in a given grade is selected for the control group’ (page 7 line 16).
• Data collection:
This section should integrate (under the paragraph (page 7 line 35) ‘For the collection of the data…’): ‘To maximize the external validity…’ until ‘…for the completion of the questionnaire’ (without ‘the envelopes will be opened […] at the Goethe University Francfort’ which must be added in the data management and analysis section).
Page 8 line 3: ‘The period of time…’ until ‘…6 months thereafter’ must come in paragraph design after ‘…with quasi-experimental design’ (page 7 line 5).

Reply: Thank you for giving us helpful advice on how to structure the methods section. We agree with you and followed all of your suggestions.

Figure 1: Concerning the baseline assessment: Maybe some students will be older than 15. How to

avoid interviewing older than 15 years if all the class must complete the questionnaire? Exclusion should be considered also after baseline assessment.

Reply: We agree with you. In accordance, we edited Figure 1 and added the possibility of exclusion after baseline assessment.

• Eligibility criteria:
The geographical area concerned should be informed.

Reply: We informed the geographical area concerned via the ministry of cultural affiairs in Hessen, Germany. To clarify this, we added a sentence to the “eligibility criteria” section: “The geographical area concerned (Gießen and surrounding villages) was informed via the ministry of cultural affairs in Hessen, Germany.“

Page 8, line 33: you should indicate (as in figure 1) ‘ visiting classes six to eight’.

Reply: We agree with you and added this information to the cited sentence.

• Sample size calculation :
To understand the calculation, hypothesis on the expected probability must be cited.

Reply: We agree with you and added detailed information about the sample size calculation.

• Intervention :
Who give the information during the first session?

Reply: Medical students (at least two and up to six). We clarified this in the Intervention section in the Methods section.

Could you precise the objective of the second session? Is there discussion on predefined themes?

Reply: We precised the objectives in relation to the results of the recent Cochrane Analysis (as suggested by Mr. Haug) of the first and the second session. There are predefined themes which we now describe in our intervention section: “Both parts educate the adolescents about the strategies of the tobacco industry to influence their decision in an unobjectice manner (social influence), about peer pressure (social influence), decision making and about skills how they can deal with challenges in their life in a healthy way (social competence). In addition, the participants discuss relevant information for their age group e.g. why nonsmokers look usually more attractive, have more money to buy things or are in better shape for physical education.“

The analysis of the effect of gender, culture and educational level seems to constitute a secondary objective of the study and should be integrated in the objectives section. But perspectives about such analysis must be integrated in the discussion section.

Reply: We followed your suggestions and added the secondary objectives to our objectives section. Our perspectives of the study were again integrated in the discussion section.

• Outcomes
Primary outcome is not clear: is it the difference of prevalence of tobacco use between the 2 measures? What is the objective? preventing tobacco use initiation or led to smoking cessation among smokers? Or both?

Reply: Primary prevention of smoking is our primary objective and helping smokers to quit is our secondary objective. We have clarified our objectives in the objectives section of the manuscript. The primary outcome is the percentage difference between smokers and nonsmokers in the two study arms at baseline and 6 months after the intervention.

Other secondary outcomes could be percentage of former smokers and new smokers in the 2 groups.

Reply: You are right with your comment. We have added these secondary outcomes (percentage of former smokers and new smokers in the two groups).

• Statistical analysis
Logistic regression is appropriate to identified predictors of the smoking behavior, however I don't understand which variable will be analysis through an univariate variance analysis. What is defined as attitudes towards smoking?

Reply: Sorry for formulating that paragraph misleadingly. We ment exclusively the intention to smoke. We completely revised and reformulated the text in the "statistical analysis" section. Now we discuss categorial and continuous variables.

Discussion:
Page 14, line 13: 40.8% of smokers: At baseline or 6 months after intervention?

Reply: Sorry, we should have written that more precisely right away. We corrected the sentence: "The results indicated that 40.8% of the participants were smokers at baseline, among whom 79% stated that they also smoked water pipes."

What about strengths and limitations of this study?

Reply: We added the strengths and limitations in the discussion section. Thank you for your kind guidance which is highly appreciated.

VERSION 2 – REVIEW

REVIEWER	Severin Haug Swiss Research Institute for Public Health and Addiction
REVIEW RETURNED	30-May-2014

GENERAL COMMENTS	The authors did a good job in improving this study protocol, however, I have still some points which were not adressed appropriately and should be adressed in order to improve the paper: 1. The efficacy of the smoke-free class competitions is less clear than described by the authors. A more balanced view would result from including the latest Cochrane Review on this topic: Johnston, V., Liberato, S., & Thomas, D. (2012). Incentives for preventing smoking in children and adolescents. Cochrane Database of Systematic Reviews(10). 2. The primary outcome ("percentage difference between smokers and nonsmokers") is still not defined precisely. The paper might benefit from a precise operationalisation or definition what a smoker or nonsmoker is, e.g., " I did not smoke even a puff in my entire life" or "I did not smoke more than 10 cigarettes in my life...

	3. A potential design effect resulting from the fact that pupils are nested within school classes, was not considered in the sample size calculations. Considering the Intraclass-correlation (ICC) and the average class sizes might result in a larger sample required.

REVIEWER	Laetitia Minary Nancy University Hospital
REVIEW RETURNED	16-Jun-2014

GENERAL COMMENTS	The content of the manuscript is clearer but some points still need improvement: Method: The order of the sections is not clear and should be modified: - "Intervention" section should appear after the "Participants" section -"Participants" section should appear after "Design" section and it should include only "Eligibility criteria" because "sample size calculation" section must be presented in "statistical analysis" section and "Legal approval" section must be considered as a single section - Lines 10 to 36 p 11 ("The questionnaire contains... to fix this problem") should be incorporated in the "data collection" section - "Data management» section (without "analysis"): The step of the study should be respected (supervision of completion, envelope sealing, opening envelopes, data entry, data analysis). This section should be incorporated as a paragraph in the data collection section. - "Gender, cultural, social aspects" sections: These sections justify the analysis of the influence of factors like gender, culture or social characteristics on the efficacy of the intervention. Thus such information should appear in introduction. However, in the "statistical analysis" section, these factors should be specified: page 14, line 45: "the effects of predictors (like gender, culture, social characteristics) o the smoking behavior..." "Outcomes" section: This point is still not clear. According to the statistical analysis described in the "analysis" section, we have the impression that the primary outcome is the prevalence of smokers or non-smokers at 6 months (what seems the most relevant). Could you please clarify this point? Line 22 page 10: I don't understand why the authors speak about "parallel" classes instead of control group. Line 48 page 10: I am not sure that it maximizes external validity. Maybe the authors want to speak about "confidentiality"? Line 43 page 14: "There must be no significant....": In general, the use of a quasi-experimental study involve differences between groups at baseline. Discussion: The subtitle (strengths and limitations) should be removed

VERSION 2 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name Severin Haug
Institution and Country Swiss Research Institute for Public Health and Addiction
Please state any competing interests or state 'None declared': None declared

The authors did a good job in improving this study protocol, however, I have still some points which were not adressed appropriately and should be adressed in order to improve the paper:

1. The efficacy of the smoke-free class competitions is less clear than described by the authors. A more balanced view would result from including the latest Cochrane Review on this topic: Johnston, V., Liberato, S., & Thomas, D. (2012). Incentives for preventing smoking in children and adolescents. Cochrane Database of Systematic Reviews(10).

Reply: Thank you for providing us with this excellent reference. We edited our statement on the SFC program including the results and conclusions of the cited Cochrane Review.

2. The primary outcome ("percentage difference between smokers and nonsmokers") is still not defined precisely. The paper might benefit from a precise operationalisation or definition what a smoker or nonsmoker is, e.g., " I did not smoke even a puff in my entire life" or "I did not smoke more than 10 cigarettes in my life...

Reply: We specified our Outcomes section in accordance to your suggestions. The primary outcome is the prevalence of smokers and non-smokers at 6 months after the intervention. A smoker is defined as a pupil who claims to smoke at least "once a month" within the survey. Those pupils who claim not to smoke at all are defined as non-smokers. In accordance to their answers within the survey, non-smokers will be divided in "former smokers" and in "non-smokers who have never smoked before".

3. A potential design effect resulting from the fact that pupils are nested within school classes, was not considered in the sample size calculations. Considering the Intraclass-correlation (ICC) and the average class sizes might result in a larger sample required.

Reply: We highly appreciate your critical statement on our sample size calculation as this matter was discussed among our team aswell. However, as the study has an explorative character and we had no precise results from previous studies we decided not to set an ICC-value.

Thank you for your kind guidance which is highly appreciated.

Reviewer: 2
Reviewer Name Laetitia Minary
Institution and Country Nancy University Hospital
Please state any competing interests or state 'None declared': None declared

The content of the manuscript is clearer but some points still need improvement:

Method:
The order of the sections is not clear and should be modified:

- "Intervention" section should appear after the "Participants" section
-"Participants" section should appear after "Design" section and it should include only "Eligibility criteria" because "sample size calculation" section must be presented in "statistical analysis" section and "Legal approval" section must be considered as a single section
- Lines 10 to 36 p 11 ("The questionnaire contains... to fix this problem") should be incorporated in the "data collection" section
- "Data management» section (without "analysis"): The step of the study should be respected (supervision of completion, envelope sealing, opening envelopes, data entry, data analysis). This section should be incorporated as a paragraph in the data collection section.

Reply: Thank you for providing us with precise directions on how to structure the Methods section in an appropriate way. We followed all your instructions.

- "Gender, cultural, social aspects" sections: These sections justify the analysis of the influence of factors like gender, culture or social characteristics on the efficacy of the intervention. Thus such information should appear in introduction. However, in the "statistical analysis" section, these factors should be specified: page 14, line 45: "the effects of predictors (like gender, culture, social characteristics) o the smoking behavior..."

Reply: We made the changes as suggested: The justifications for the gender, cultural and social characteristics were integrated into the Background section.

"Outcomes" section: This point is still not clear. According to the statistical analysis described in the "analysis" section, we have the impression that the primary outcome is the prevalence of smokers or non-smokers at 6 months (what seems the most relevant). Could you please clarify this point?

Reply: The primary outcome is the prevalence of smokers and non-smokers at 6 months after the intervention.

Line 22 page 10: I don't understand why the authors speak about "parallel" classes instead of control group.

Reply: We specified our control group with the term “parallel classes” in order to clarify why they are a suitable control group as suggested by Reviewer 1.

Line 48 page 10: I am not sure that it maximizes external validity. Maybe the authors want to speak about "confidentiality"?

Reply: Thank you. We followed your suggestion and used the term “confidentiality”.

Line 43 page 14: "There must be no significant....": In general, the use of a quasi-experimental study involve differences between groups at baseline.

Reply: This is correct. However, in order to have comparable study groups it is necessary that there is no significant difference.

Discussion: The subtitle (strengths and limitations) should be removed

Reply: We removed the subtitle.

Thank you for your kind guidance which is highly appreciated.