Author's response to reviews

Title: Socioeconomic status and exposure to disinfection byproducts in Spain: a cross-sectional study

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Version: 2 Date: 10 August 2010

Author's response to reviews: see over
Dear editor,

The reviewer’s comments were helpful and led us to improve the paper. We attach the revised manuscript with ‘track changes’ to show what was done. Responses to the reviewers are below.

Sincerely,

Gemma Castaño-Vinyals

**Reviewer’s report**
**Title:** Socioeconomic status and exposure to disinfection byproducts in Spain: a case-control study  
**Version:** 1  **Date:** 21 May 2010  
**Reviewer:** cristina bosetti

**Reviewer’s report:**
Minor Essential Revisions
Information on the relation between socio-demographic characteristics and environmental pollution is scanty, particular with reference to DBPs. Thus, the paper adds some interesting data on the issue.
The main limitation of the paper is it merely descriptive approach.
The manuscript could be somehow shortened.

Specific comments
Delete from the title “a case-control study”, since the analyses have been conducted only among the controls of a case-control study.  
**Response:** We have modified the title in response to this comment. If the editor wants to indicate the type of study, we would propose to indicate “cross-sectional study” since it refers to the evaluation of prevalence (of exposure), even though the statistical analysis uses an approach typically used to analyze case-control data.
Through the text and the tables use the term swimming-pool attendance instead of users of swimming-pools.  
**Response:** We have changed the text and tables according to reviewer’s suggestion.

Abstract
Specify that CI stands for confidence interval.  
**Response:** We have specified this in the abstract

Methods
Pag.7, Section on socio-economic status. Specify that information on income is missing for more than 300 subjects.  
**Response:** we have indicated in the text that the response rate for the income variable was lower compared to the rest of variables.
Pag.7, Statistical analysis. It should be clearly stated which is the outcome when estimating the odds ratios.
Response: we have indicated in the statistical analysis section the outcome of the odds ratios

Results
Pag.8, first paragraph. The last part of the paragraph (“A public water supply .....THM level areas drank bottle water” should me moved in the description of Table 2. Moreover, the sentence “there are significant difference... disinfection by-product” of the same paragraph should be deleted.
Response: We agree that this information does not correspond to Table 1, but neither is it shown in Table2. So we left as it is, but as a separate paragraph between the description of the 2 tables.

Pag.8, second paragraph .The first sentence “The most highly educated .... (...)Table2)” should be moved forward in the description of Table 2 (data not shown in the table).
Response: We moved this sentence forward. The information is actually shown in Table 2.

Pag.9, first paragraph. Delete the last part of the first sentence “and drink more bottle water...”.
Response: We have deleted the sentence.

Pag.10, second paragraph. Before this short sentence, it should be stated that previous results apply to water consumption habits at home.
Response: We have added in the text of page 8 and Table 2 that the statistics refer to consumption at home. We have also specified that in page 10.

Discussion
Pag. 11, first paragraph. In the sentence “In our Spanish population,......” delete the part “who tended to live in areas with elevated DBPs”.
Response: We agree that the sentence was not clear and we have deleted “who”

Conclusions
Pag.11-12. Delete the sentence “The use of bottle water as a source....but higher exposure through dermal contact and inhalation”. This has already been said before.
Response: There is indeed some overlap, but we prefer to delete the first sentence of the discussion, since the second sentence also gives information about the direction of the SES association.

Pag. 12. Delete the sentence “Our findings, ....in which our study was conducted.
Response: The sentence has been deleted.

Reference
Specify the authors for Ref 2
The paper by Briggs et al (Social Science and Med 2008) can be also quoted.
Response: We have specified the authors for Ref 2 (anonymous) and added the paper suggested by the reviewer

Tables
Table 1. Delete the missing values, and put a footnote indicating that for some variables there are some missing values. The last two variables should be deleted, since they are also presented in Table 2.
Response: The missing values have been deleted and a footnote included. Also, the last 2 variables in Table 1 have been deleted.

Table 2. Checks the numbers for bottle and spring and wells by educational levels. It seems they have been exchanged.
Response: This was an error on our part. The numbers have been corrected.

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
Reviewer's report
Title: Socioeconomic status and exposure to disinfection byproducts in Spain: a case-control study
Version: 1 Date: 25 May 2010
Reviewer: Sylvaine Cordier

Reviewer's report:
The concept of environmental inequity has rarely been applied to exposure to water disinfection byproducts and this work contributes to knowledge in this field. The presentation of the paper however suffers from imprecision and the message is not clear.

Major comments
There is a mix in the time references used in the water variables across the paper: source of drinking water is the current source, residential THM level appears to be average for all the residences over age 15, but current THM have also been measured...

I think this analysis should be cross-sectional (last residence only for instance). Trying to correlate present behaviour (bottled water consumption) with past average exposure (THM levels) does not make sense.

Response: We agree with the reviewer that there was a mixture of the water variables used across the paper. We have modified table 2 and the text, and included information about the current source of drinking water and the current THM levels, and also the source of drinking water at the longest residence and the average THM levels.

Specific comments
- Why mention “a case-control study” in the title since only the control population is studied? Same in the “study design” section.
  Response: The title has been changed in response to this comment and similar comments of the other reviewers. If the editor wants to indicate the type of study, we would propose to indicate “cross-sectional study” although it is not clearly cross-sectional.

- Discussion 3rd paragraph: it is stated that “subjects with a higher socioeconomic status, who tended to live in areas with elevated DBP, had a lower exposure from ingestion (because of elevated consumption of bottled water)”. This statement is not supported by the results: exposure from ingestion is tap water consumption times THM levels and these figures are not presented in Table 2.
  Response: The sentence in the text has been changed to make it clearer.

- Numbers of subjects drinking bottled water differ widely between Table 1 (n=285) and Table 2 (n=160). I think lines 2 and 3 in the Total column of Table 2 have been switched.
  Response: This was an error. The numbers have been corrected
- The interpretation of Figure 1 is difficult: it shows increased bottled water consumption with time among subjects with high education but the simultaneous trend in THM levels is not taken into account (mentioned at the beginning of the discussion for the first time).

Response: In Figure 1 we have added a line showing the levels of THM in the 3 different periods of time where the consumption of drinking water is shown

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
Reviewer's report

Title: Socioeconomic status and exposure to disinfection byproducts in Spain: a case-control study

Version: 1 Date: 3 June 2010
Reviewer: Elena Righi

Reviewer’s report:
The manuscript evaluated the influence of socioeconomic status (education and income) on personal habits associated with exposure to disinfection by-products (DBPs) in drinking water. This is a specific aspect not well addressed up to now in this area of research, therefore the results of this article could be useful for other researchers in the field. However, before publication the authors should improve the manuscript by addressing some major and some minor essential limitations.

Major Compulsory Revisions
1. The authors used information collected from controls included in a wider Spanish case control study on bladder cancer and DBPs exposure, however this specific part is not a case control study, as cases and controls are not compared, it is more similar to a cross-sectional study: in my opinion this aspect should be better highlighted in the manuscript and the title should be changed.

Response: As noted, the title has been changed in response to this comment and similar comments by the other reviewers. If editor wants to indicate the type of study, we would propose to indicate “cross-sectional study” although it is not clearly cross-sectional.

2. Generalization of the results: are the subjects included in the study (hospital controls with a high frequency of low education and low income level) representative of the general population living in the investigated areas? This issue should be addressed throughout the article (at least in the discussion).

Response: The low educational level observed in the study is similar to the general population in Spain. According to the Spanish National Statistics Institute, the percentage of population between 55-64 years that reached high school or higher education was 16% (http://www.ine.es/daco/daco42/sociales09/sociales.htm), similar to our results (17%). We could not assess in detail the percentages of the other educational levels, as this information was not available.

3. Overall, the discussion should be enlarged and other issues and aspects discussed (eg how different ways of DBP exposure could influence DBP uptake, the difficulties in recoding personal habits influencing DBP exposure, generalization of results to the Spanish general population, the potential influence of many missing data in the socioeconomic variables on the interpretations of the findings,.....)

Response: We have changed the table 2 and figure 1 to clarify some of the issues the reviewer is referring to and added to the discussion, in particular, a sentence at the end of the second paragraph “This perception, if it existed, would affect the type of drinking water consumed, but not other water uses that could lead to exposure to DBPs through inhalation or dermal absorption.” The missing values in the socioeconomic variables only influence the variable income, not educational level.
4. References should be updated and improved as well.

Minor Essential Revisions

Background (and references)

1. the authors should update references on environmental inequity (most articles cited were published in the '90s)
2. references addressing association with adverse reproductive effects should be updated as well (more recent review on the subject have been published)
3. references addressing association with other types of cancer should be added. (both references are on bladder cancer)

Response: All references have been updated.

methods

study design and subjects

4. please indicate the study period

Response: The study period is included in the methods section of the text

5. please add a reference about the Spanish Bladder cancer case- control study

Response: We have added two references about the Spanish Bladder Cancer study (Villanueva et al, 2006, OEM and web CREAL)

6. the reference to table 1 here is not correct (table 1 do no show data on cases and controls)

Response: The reference to table 1 in the methods sections has been deleted

7. How many inhabitants are living in the investigated areas? How was the issue of generalization of the results to the general population addressed? Is the investigated sample representative of the target population?

Response: See response in comment 2

8. 88% of subjects completed a face to face questionnaire, 20% completed an abbreviated version of the questionnaire: the sum is 108%, please explain this data.

Response: There was a mistake in the text. We have deleted the part relating to the critical items questionnaire. The overall response rate for controls was 88%.

chlorination by-products exposure

9. Some exposure index described in the part are not used when reporting statistical analyses and results (e.g. the average daily water consumption, or the combination of duration of bathing/showering and intensity of THM exposure): please clarify this aspect

Response: We have modified the methods section to include the specific information of the variables used in table 2 and the cut points.

10. please give more information on validation of questionnaire on showering, bathing and swimming (e.g. number of subjects, specific agreement for the different habits,..)

Response: We have slightly modified the text to clarify that we evaluated reproducibility of the questions and we have added a reference in the text (Villanueva et al 2007, Am J
Epidemiol – in the methods section there is the information about reproducibility of the questions about water uses.

Statistical analysis
11. Could the authors explain why in the multivariate analyses they adjusted also for average THM levels?
Response: The multivariate analysis was adjusted by THM levels because they were associated with educational level in the bivariate analysis. We repeated the analysis without including THM levels and the results were very similar.

12. The authors say that analyses of water source (and THM) were restricted to subjects with exposure information available at least for 70% of the exposure window examined (form 15 year of age until disease (????) or interview). Is this restriction important for the specific question addressed in this article? Moreover, in the results (table 2) authors refer to the current source of water of subjects not to the principal lifetime source of drinking water.
Response: The date of diagnosis of the disease and the interview date are very close; subjects were recruited just after the diagnosis made by the physicians. The restriction for the 70% of the exposure information available was made to reduce the number of subjects missing years when we ascertained THM exposure data, so to have high quality data.

Results
13. Second paragraph: according to table 2 subjects with primary school incomplete education level are exposed to high levels of THM as well: please consider also this data.
Response: We have changed this second paragraph considering the information that the reviewer suggested.

14. Second paragraph: Please clarify the cutoff choice (26 µg/l) in defining categories of average residential THM level exposure (low and high) and highlight the high number of missing values: (for instance, average THM exposure has been calculated for less than 800 subjects).
Response: We have clarified this information in the methods section, Chlorination by-products section, and also included some footnotes in the tables.

15. Second paragraph: the last sentence is unclear. I believe the meaning is: subjects with primary school education have a two fold higher probability to drink bottled water than illiterate subjects and the more highly educated subjects have a 3 time higher probability to drink bottled water than illiterate subjects.
Response: The sentence has been modified to make it clearer.

16. Third paragraph: the second sentence is unclear. I believe the meaning is: subjects with high school education have a tree fold higher probability to take bath/shower longer than 7 min/day than illiterate subjects and subjects with primary school education have a 1,6 higher probability to take bath/shower longer than 7 min/day than illiterate subjects.
Response: We have added the statistical significance for the comparisons mentioned in the text.

Response: We have added a footnote in table 2.

Response: We have added the meaning of “other” in the legend of figure 1.

Response: We have taken into account all these comments from the reviewer and made the appropriate corrections in the manuscript.