Reviewer’s report

Title: Urinary bisphenol A and pubertal development in Chinese school-aged girls: a cross-sectional study

Version: 0 Date: 20 Feb 2017

Reviewer: Laura McGuinn

Reviewer’s report:

Summary: The authors conducted a cross-sectional study on the association between bisphenol A exposure and pubertal development. Data for the analyses came from three schools in Shanghai and the final sample consisted of 655 girls aged 9-18. The age of onset of pubertal development is continuing to decline, and environmental toxicants are thought to play a role. Thus, the paper addresses an important public health concern. The comments below will help to improve the clarity of the manuscript:

ABSTRACT

The authors may wish to explain in the abstract what PH2 and PH5 represent in your study.

Lines 37-40: I would suggest removing the "But the associations were not statistically significant after potential confounders were controlled" sentence.

INTRODUCTION

Page 3, line 52: Please include a reference for the "one of the environmental stressors to developing children is bisphenol A (BPA)" statement.

Page 4, line 84: The authors should clarify that they're using Tanner stages to assess onset of pubarche and thelarche in girls.

METHODS

P6, line 118: Please clarify how creatinine was adjusted for.

P6, line 120: Please clarify whether the same trained physician conducted all Tanner staging assessments.

Unclear why the authors chose to categorize BPA exposure as exposed (>LOD) and unexposed (<LOD). If the rationale was because so many girls were <LOD, then the authors should clarify this. Studies will often replace levels below the LOD with (LOD/square root of two). Did the
authors consider this approach? Alternatively, the "<LOD" category could be kept as is, and then the ">LOD" group could be categorized at the median, for instance. This way the readers would be able to see the distribution of the BPA exposure. Overall, the manuscript could be improved by providing further rationale for the categorization of BPA exposure.

Please provide a more detailed rationale for the restriction by age for each of the outcomes. The current research question is difficult to investigate using a cross-sectional study, thus the authors attempt to address this issue by restricting the outcomes to certain age groups. However, this greatly limits the sample size. Further, the rationale for the chosen cut-offs is unclear. It would be helpful if the authors indicated (perhaps in table format) a) how many girls were B2+/PH2+ and b) how many had reached menarche. It would also be helpful if the authors conducted sensitivity analyses to assess if the results for each of the outcomes change with different age cut-offs.

The authors may wish to clarify that Tanner staging is used to assess stages of breast and pubic hair development and B2+ and PH2+ represent onset of puberty.

How were the covariates chosen? Did the authors consider previous literature or create a directed acyclic graph? Please be more specific here.

Please describe the covariates in more detail. For example, how was an unbalanced diet defined? Why was a cut-off of 10 chosen for the depression score? How was sleeping quality evaluated? This additional information would greatly improve the clarity of the manuscript.

Did the authors consider a formal assessment of mediation for BMI? The discussion of mediation by BMI is a bit sparse. Either the mediation by BMI should be omitted from the paper, or discussed further.

RESULTS

Table 1: Please describe how urban/rural status was defined.

The number of missing observations for each variable is included in a footnote under the table. This information would be better represented as a row under each variable to help with the clarity of the results.

Table 1: It would be helpful to include the age distribution in the table. For instance, the authors could categorize age as "9-12" and "13-18" as that's how it's commonly presented in the other tables.

Table 2: The exposure distribution by age is a bit unnecessary, particularly because the authors do not assess stratum specific estimates by age. Instead this information could be presented in a separate table, or in Table 1. Unclear how the percentages in Table 2 are calculated. For instance, what does the 0.0% represent? It's worth clarifying that the total sample size for adjusted analyses is 573, and indicating that 82 girls had missing data.
Table 3: Similarly, the distribution by age is a bit distracting, particularly when the authors do not stratify by age. Further, unclear why age 12 is omitted from the table?

**DISCUSSION**

Page 9, line 189: This is a bold statement given your study design. There's no way of assessing causality with cross-sectional data. This sort of statement may be appropriate for a longitudinal study design where the outcomes are assessed in the same group of girls, but may be a bit misleading with cross sectional data.

Page 10, line 219: Would be worth clarifying that girls could be exposed to BPA through other routes of exposure, not just diet.

The limitations section is a bit sparse. The authors may wish to expand on the limitations of using cross-sectional data, i.e. it's tricky to assess associations due to difficulties with temporality. The authors may also want to address the limitations of the way BPA exposure was categorized, or the fact that 40% of participants were below the LOD.

Page 11, line 228: What about the menarche results? This is worth commenting on.

**Level of interest**

Please indicate how interesting you found the manuscript:

- An article of importance in its field

**Quality of written English**

Please indicate the quality of language in the manuscript:

- Acceptable

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