Reviewer's report

Title: Phthalates and diet: a review of the food monitoring and epidemiology data

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Reviewer: Ruthann Rudel

Reviewer's report:

This is an interesting and generally clearly written and balanced review of literature on phthalate exposure from food. A strength is that the authors have approached the question three different ways - by compiling data on phthalate concentrations in various foods, by reviewing epi studies that show associations between dietary patterns and phthalate levels, and by estimating dietary intakes and comparing them with reference values.

Major Compulsory Revisions

1. In the 3rd paragraph of background the authors state that diet is the most significant exposure pathway for DBP and BBP (as well as DEHP) but this is not supported by the literature. The authors omitted (and should include) an important study by Koch, Lorber et al. published in 2013 that follows urinary phthalate excretion in individuals fasting for 48 hours. This study provides strong evidence that food is an important source of exposure to DEHP, DINP, and DIDP but not DiNP, DnBP, or BBP. Similarly, Rudel et al. 2011 found the dietary intervention reduced DEHP but not DBP or BBP metabolites; and Fromme 2007 conclude that DBP and BBP are not primarily from diet.

Minor Essential Revisions

2. Methods - This sentence is unclear and inadequately referenced: "We reported on phthalate species found predominately in food (DEHP, DiBP, DnBP and BBzP) and shown to be related to diet in epidemiology studies (DEP, DnOP and DMP)." What are the criteria for "found predominately" determination? Also include citations for epi studies referred in last part of that sentence.

3. Methods - Define your criteria for "biologically relevant phthalate species" and also clarify calculation method described in the second half of that sentence "were reported in 50% of summary measures at the defined concentrations." Do you mean that each study yielded a single summary measure for each phthalate-food type they measured?

4. Methods - Define criteria and reference your statement that DEHP has the "greatest toxicity." Do you mean most potent for anti-androgen effects? Earl Gray work could be a basis for this statement but possibly he reports DiBP as slightly more potent.

5. Methods - complete this sentence "These groups may have the greatest
susceptibility to the effects of DEHP because xxxxxxxxxx (ref).

6. Methods (and Results-Estimation of Dietary Intake) - I suggest changing "we also examined actual consumption," which is vague, to "we also estimated phthalate intake based on xxxx four different types of diets and three different age groups" And then explain the four different diets include one meant to reflect average US based on NHANES and three based on various permutations of USDA guidelines.

7. Last sentence of methods - clarify - "total intake was calculated as the sum of the intake from individual food groups."

8. Results - the first paragraph of results presents some detection frequency estimates for individual phthalates based on food measurements summarized in Table S1. The methods for making these calculations are not fully described, but more importantly, I think the data in Table S1 could be made much more accessible and informative by converting to a figure - possibly a heat-map style. <DL vs >DL values should be clearly differentiated. Alternatively, if the authors keep it as a table it would be clearer if values >DL are made bold to differentiate them from <DL values. Also in this section, is it worth calling attention to apparently high DEP and DMP frequency of detect since the levels were low (as the authors point out in the next sentence) and since those compounds have not been shown to have the same anti-androgenic toxic effects as the other phthalates being discussed?

9. Results - provide reference for "Consumption of vegetables was associated with increased DEP exposure in two studies . . ." I believe authors are referring to Colacino study of NHANES. Here and in discussion, I think it is worthwhile to discuss this more. My impression is that Colacino findings are inconsistent with most of the others, so perhaps there is a problem with that study. Also, related point is that the finding of decrease LMW phthalates in Temple Stay could be attributed to these phthalates being commonly used in toiletries and fragrances, and exposure to these may have also been reduced during the intervention. This should be addressed also in Discussion where temple Stay study is discussed.

10. Results - paragraph on Grains - fix language - rice was not found at low levels, phthalates were

11. Results - I think the text describing associations between phthalate levels and dietary patterns in Trasande is divided into 2 paragraphs but should be in one, or intro to 2nd should be clarified.

12. Results - when discussing the Rudel 2011 intervention finding of reduced DEHP metabolites, add that they did not see any significant reduction in DEP, DBP, or BBP metabolites. Also, the list of potential sources of phthalates from diaries in this study may be incomplete - with some sources not ascertained, so this should be clarified.

13. Discussion: "elimination of these products from the diet led to a decrease in MnBP and DEHP metabolites in an intervention [46-47]." ADD that in ref 48 no
reduction in MnBP was observed.

14. Discussion: "In comparison to current regulations" - change regulations to guidelines

15. Table 2 add Koch and Lorber 2013; add that Rudel 2011 did not see change in DEP, BBP, DBP with intervention.

16. Table 3 footnote b - if this is from Table S1, then show in Table S1 how these numbers are calculated

Discretionary Revisions

17. Methods - "Using a conservative approach . . ." I suggest avoiding or defining term "conservative"

Level of interest: An article of importance in its field

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