Reviewer's report

Title: Estimation of benchmark dose of urinary cadmium as the reference level for renal dysfunction: A large sample study in five cadmium polluted areas in China

Version: 1 Date: 5 March 2015

Reviewer: Paul Scott

Reviewer's report:

Overall this paper is a good contribution to the current literature examining the relationship between urinary cadmium concentrations and urinary beta microglobulin levels. The authors estimate benchmark dose levels in terms of ug/g cr that range from 1.00 to 3.66 for male and female populations in five Chinese provinces. I recommend publication with minor revisions.

I have two general comments. First, the authors should consider discussing further the differences and similarities among the five provinces with respect to cadmium exposure. It was unclear to me why these five provinces were selected for this study and if there were any major differences between them. I would recommend discussing any major industries in these provinces that use cadmium or if they are in areas with historical cadmium drinking water contamination or anything similar that would indicate that these populations have high exposures to cadmium. Currently in the paper, the only thing discussed is the range of soil cadmium levels. This is a discretionary revision.

Second, I would strongly recommend dropping the BMD and BMDLs based on a 5% added risk. The standard level used for the majority of BMD analyses is 10%. The level of 5% is typically only used for either steep dose-response curves or for irreversible or frank adverse health effects. The data in this study meet neither criteria. The discussion of the BMDLs based on 5% is misleading when they are compared other BMDLs or health standards based on a 10% added risk. This is a minor essential revision.

I have some specific comments on the paper that are discussed below:

Page 5, line 81: "Four Big Pollution Diseases" should be lower case.

Page 6, line 101: The range of Cd soil concentrations for the Hubei province looks like it is within the range of background soil Cd levels found in other parts of the world. As stated in the general comments, the authors should consider providing more discussion on why they expect the urinary Cd levels in these provinces to be elevated.

Page 7, lines 119 - 120: This sentence should be revised by deleting ", and in the case of children, from their parents." because based on Table 1, all of the participants are older than 35 years.
Page 16, line 310: The actual range of BMDLs estimated in this study was 1.00 to 3.66 ug/g, if the BMDLs based on 5% added risk are dropped and the maximum BMDL from males in Guizhou province is used.

**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.