

## Reviewer's report

**Title:** Water quality monitoring records for estimating tap water arsenic and nitrate: a validity study

**Version:** 1 **Date:** 27 October 2009

**Reviewer:** Jaymie Meliker

### Reviewer's report:

Major Cumpulsory Revisions

1) Laboratory analysis, p. 6:

- Authors must describe methods used for analyzing arsenic and nitrates. Even established methods vary in their accuracy, and may later be replaced by improved methods.
- Also, the sentence on “quality control” is confusing. What exactly was done?—it is not clear. (one sample, followed by another sample 24 hrs later; and a duplicate sample was collected along with the second sample, and agreement reflects correlation between all of these samples???)

2) Derivation of summary measures from water monitoring data, pp. 6-7:

- Like above, authors need to state the different methods used. Authors must convince reader that they are aware of any problems with the methods used – perhaps they are only reasonably accurate above a certain threshold. Or perhaps certain time periods are less reliable, and sensitivity analyses maybe should be conducted without those earlier time periods to see whether removing the earlier data alters the findings (a version of this type of analysis was conducted and recent measurements were better predictors)? Variability across methods may better explain the findings of better agreement with recent records, as described in the first paragraph of the discussion. Improvements in analytic protocol/methods should at least be considered as an explanation in the discussion.
- Also, what is done with values below detection limit—this must be explained (typical to divide LOD by #2). Given the amount of data, BDLs most likely could just be removed, as well.
- Also, why were arsenic values equal to the MCL considered not valid? This needs to be justified.

The second paragraph in the same section is a bit confusing.

- First, how is there a geographic coordinate for a water source? What does that mean exactly: centroid of a water supply service area; location of the water treatment plant, etc. This must be specified.
- Second, the term “supplier served” is most likely incorrect. The public is served by the water supply. How is the supplier served?

- Also, authors must define “quarter-quarter section” and “section”. Are these BLM sections? Again, is just a centroid used? Considering the emphasis on calculating distances from these points in the analysis, this level of detail is required.

3) In general, the authors need to guide the reader through the paper a bit more. My sense is that the authors want to investigate correlation when only spatial knowledge is known, along with, perhaps, whether or not the water supply was public or private. Knowledge about water supply boundaries and linking a home to a specific water supply appears to be an extra step that the authors think epidemiologists might like to avoid. This needs to be specified more clearly in the manuscript. Otherwise, it doesn't make sense to only compare correlation across distance without also restricting values by unique water supplies.

4) Given the poor correlation (0.29) for arsenic within unique water supplies, the authors should discuss and may want to investigate factors that contribute to this poor correlation. These could include seasonality, mixing of water from multiple wells in varying proportions over time, real temporal variability within a well, variation in analytic method, etc. Some discussion of these factors, and perhaps, whether the correlation improves when controlling for some of these components, might prove helpful in determining when public water supplies are reasonable proxies for household drinking water concentrations.

#### Minor Essential Revisions

- 1) p. 9, first line of first full paragraph, delete “of”
- 2) p. 11, first full para, line 2, “each correctly ordered household”—this is confusing; not sure what is meant here.
- 3) P. 13, last line of first partial paragraph: “ $\mu\text{g/L}$ ”, not “ $\mu\text{/L}$ ”.

**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