Author’s response to reviews

Title: Environmental justice and drinking water quality: Are there socioeconomic disparities in nitrate levels in U.S. drinking water?

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Author’s response to reviews:

We are grateful to the reviewers for reviewing our revised manuscript. We have considered Reviewer 1’s suggestions and have edited the manuscript in response to these comments, as described below.

Reviewer reports:

Reviewer #1:

The manuscript is greatly improved after revisions. While I understand that the goal of the analysis was not finding the most parsimonious model, I still think the lack of a model-building process is disappointing, if for no other reason than the fact that the authors may have had more support for their claims about what is driving the association between socio-economic factors, water system size, and nitrate concentration. In its current form, we have no sense of how model estimates change in the face of each additional variable. The authors assumed region to be a modifying variable and therefore stratified analyses by region, before testing for this interaction in the models with water system or county demographic factors. If all variables were significant in the final model, the final covariate list should have been preserved in the model building process.
Response: We thank the reviewer for reviewing our revised submission. In response to her comments, we have revised and added to our manuscript in several ways.

In building our models, we have included a backward elimination step where we have removed covariates that are not significantly associated with the outcome (p >0.05) and do not show evidence of being confounders (removing them does not change the effects estimates for other covariates by more than 10%). Nearly all covariates were retained through this process, and in several instances when one or two covariates were not retained, the effect estimates generally did not change substantially. Nevertheless, going through this process is responsive to Reviewer #1’s initial concerns about some variables appearing to contribute little to the models, and also demonstrated that most of the covariates with p>0.05 should still be retained in the model because they show evidence of being confounders.

To gain a better understanding of how the associations between nitrate and each of the variables in our model are influenced by the other covariates, we have provided unadjusted regression results in Table S7 for all of the covariates in the nationwide models (both continuous and binary), and incorporated some of these results into the discussion. In some cases, for instance for race and ethnicity, effect estimates were similar in both unadjusted and adjusted models, whereas other effect estimates changed more substantially (e.g., poverty). We acknowledge that the approach we have used to build our models does not indicate which specific covariates lead to these changes in the Discussion.

We agree that it makes sense to consider region in our adjusted models since we later stratify according to region, and because the summary statistics in Table 1 suggest regional differences in nitrate concentrations and demographic characteristics. Accordingly, we have included region as a covariate in our nationwide adjusted models. According to these updated models, we observed different rankings in terms of highest and lowest nitrate depending on whether the model outcome was nitrate concentration or likelihood of high nitrate. We have included some additional discussion of differences among regions according to adjusted and unadjusted models and presented regional effect estimates in Tables 3 and 4.

Reviewer #3:

I am satisfied with the responses to my original comments. No further revisions are needed.
Response: Thank you for reviewing our revised manuscript and your many helpful suggestions in response to our initial submission.