Author’s response to reviews

Title: Associations Between Open Drain Flooding and Pediatric Enteric Infections in the MAL-ED Cohort in a Low-Income, Urban Neighborhood in Vellore, India

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To the Editors of BMC Public Health,

Enclosed please find our manuscript titled “Associations Between Open Drain Flooding and Pediatric Enteric Infections in the MAL-ED Cohort in a Low-Income, Urban Neighborhood in Vellore, India.” In this manuscript, we sought to evaluate associations between open drain flooding, drain exposures, and enteric infection. We combined data from an observational study (SaniPath), assessing flooding and prevalence of open drains with robust, longitudinal data on enteric infections from The Etiology, Risk Factors and Interactions of Enteric Infections and Malnutrition and the Consequences for Child Health and Development (MAL-ED) study site in Vellore, India. The MAL-ED study’s collection and robust laboratory diagnostic testing of repeated asymptomatic and symptomatic stool specimens over the first two years of life of children born into the cohort provided a unique dataset for assessing comprehensive enteric infection in young children and associations with environmental conditions, including flooding. We used spatial and survey data to identify areas where flooding occurs, supplementing these data with monthly rainfall totals from the India Meteorological Society. We observed that children living near drains that flooded had 4% increased odds of enteric infection per cm of monthly rainfall, and children in a spatial cluster of flooding—downstream on the drainage network—had 5% increased odds of enteric infection per cm of rainfall. As the rainiest months averaged more than 10cm of rainfall, these results suggest significantly increased (by 40-50%) odds of enteric infection in these children due to their household’s location alone. Increasing frequency of drain contact was not associated with increased odds of enteric infection, suggesting that the associations detected were geographically mediated rather than a function of the child’s frequency of contact. These findings provide some of the first robust, observational evidence of the risks posed by open drain systems that are ubiquitous in low-income, urban settings.

We believe this study will be of interest to your readers because it builds on previous sanitation studies (e.g. Beyene et al. 2015, Acharya et al. 2013, Kwiringira et al. 2014) and spatial analyses (e.g. Santos et al. 2014), and provides new, robust evidence to support the consideration and improvement of the entire sanitation chain (i.e. fecal sludge management beyond the toilet) to reduce pediatric enteric infection in high density urban areas. To our knowledge, while other quantitative microbial risk assessments have highlighted the potential role of open drains in enteric infections, this study is the first to examine these associations in a longitudinal cohort using robust outcome measures over the first two years of the child’s life.
Critically, please note that this is a RESUBMISSION of PUBH-D-17-01694, per Ms. Pafitis’s direction. I have attached, as an additional file, the email correspondence around this manuscript, which was rejected after 3-4 rounds of review because of an inability to contact the associate editor and reviewer. I have also included a response letter to the reviewer’s single comment (from the last round of review), per Ms. Pafitis’s direction, and have included the track-changes version of the manuscript. We have thus made all changes requested to-date on this manuscript, and look forward to corresponding quickly about any final changes.

Finally, we note that Figure 1 is our own figure and not taken from another source. The base map is from Open Street Maps, with proper attribution in the map itself.

Many thanks,

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