Reviewer's report

Title: Male commuters in North and South England: risk factors for the presence of faecal bacteria on hands

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Reviewer: Rebecca Coulborn

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Review of Manuscript “Male commuters in North and South England: risk factors for the presence of faecal bacteria on hands”

This research is interesting and important. The authors pose their research question well, clearly state the limitations of the study, and adhere to the relevant standards and ethical principles of research among human subjects. Significant strengths of the manuscript include its foundation upon earlier published work, and data which address a significant gap in the body of literature on the assessment of hand hygiene in the community setting.

However, these are a number of issues that should be addressed:

Major Compulsory Revisions

1) Methods:
   a. There is no discussion of whether or not the swabs were conducted by multiple individuals. If multiple individuals collected specimens, this would need to be assessed in the analysis to determine whether the differences observed between the locations are associated with differences in the collection of data.

   b. What was the basis for choosing the particular collection methodology (a sterile cotton swab moistened with sterile water run once up and down the pad side of each finger and thumb of the dominant hand)? Is this the most ideal method? Reference?

   c. Reference needed for charcoal transport tube.

   d. Was there any relationship between the males sampled? Were only males traveling independently or one male from a group assessed, or were samples taken from multiple males traveling together in the same group (i.e., groups of colleagues/friends, not strangers)? If the latter, was correlation explored?

2) Methods, Questionnaire:
   a. More details on the questions and format of responses are needed. For example:

      i. What was the time period considered for the different behaviors? Same day,
past week, etc?

ii. Were participants asked to jot down their age or bubble in an age category?

iii. Was type of pet (ex: bird, dog, indoor only, indoor and outdoor) differentiated?

iv. What constituted “contact with children” and was age of child considered?
One would expect contact with a child less than 5 years of age to represent a different type of exposure than contact with a child 10 years of age.

b. The authors refer to “questions 3-8 on personal hygiene (listed in Table 1)” but then list only 5 questions in Table 1. This is a bit confusing.

3) Score:

a. If the median score was 13-14, why were the groups for assessment chosen as 0-4, 5-7, 8-10, and 11+?

b. How would someone get a hygiene score of “0” as presented in Table 4?

c. Based on Table 4, it appears that participants who answered “Never” or “Rarely” to four hygiene questions (Table 1) were analyzed in a separate group from those who answered “Never” or “Rarely” to all five questions. Wouldn’t a cut off at 5 instead of at 4 be more informative? Perhaps 0-4 actually represents 1-5?

4) Methods, Statistical analysis:

a. The authors need to state the alpha cut points for signifying statistical differences when comparing categorical, binary, and ratio (i.e. “continuous”- I believe this term is more widely understood) variables. Did authors use $P < 0.05$?

b. Similarly, the authors need to state the criterion for exclusion of variables from the multivariate model. Did they do this by hand or was it automated in their statistical software?

5) In the discussion section, the authors state on the last page, starting on line 5: “However previous studies, mostly in developing countries have not found microbiological methods useful for the study of hygiene behavior.[11]”

a. It would be beneficial to cite more than one study.

b. Consider revising this sentence, as the various studies that have conducted microbiological assessments in the community setting are limited, and vary greatly in methodologies and explored outcomes.

c. Furthermore, the statement appears contradicted by Shahid et al, 1996. (PubMed Identifier 8870400)

Minor Essential Revisions

1) Terms/notations are not presented consistently throughout the text (i.e. “C” versus “c”, “MacConkey 3 agar” versus “MacConkey agar #3”, “API 20E” versus
“API20E”).

2) There are typos and numerous extra or omitted spaces throughout the manuscript that need correction.

3) Spelling out the abbreviations (on first mention) throughout the text would improve the manuscript’s clarity and accessibility. For example:
   a. Introduction, Lines 4-5: “bn/year by [4].”
   b. Methods, Culture of organisms: “Staph.”; “h”; “API20E”

4) Given the inclusion of microbiological assessment, adding some background information to the introduction on the types of bacteria generally considered to be of faecal origin, concentrating on those presented in the manuscript, would be very helpful.

5) Methods-Culture of organisms:
   a. The paragraph beginning with “Purple MacConkey broth contains lactose…” needs revision. It is very cumbersome to read.
   b. The company and product codes (ex: Oxoid CM0115) should be presented on first mention of the particular broths/agar, not later in the paragraph.

6) The abbreviations in the tables need explanatory footnotes.

Discretionary Revisions

1) Logistic regression analysis of the hygiene score using at or above versus below the median would be nice to see, especially given concern for recall and measurement bias. Alternatively, perhaps the authors might explore factor analyses.

2) I suggest that the authors also mention that the association between hand contamination and age independent of other factors may be due to differences in skin flora or health of participants.

3) Given overall conclusions, consider presenting additional analyses comparing the northern cities as one group to the southern cities as another.

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.