Reviewer's report

Title: Waterborne microbial risk assessment: a population-based dose-response function for Giardia spp (E.MI.R.A study)

Version: 2 Date: 13 March 2006

Reviewer: Pierre Payment

Reviewer’s report:

General
The authors have attempted to use their database on information on endemic illnesses to provide a quantitative microbial risk assessment (QMRA) during the EMIRA studies and compare it to existing data (microbial occurrence and disease outcome). While the end-result appear to validate some of their hypotheses there are several flaws that render the whole process dubious.

First, occurrence data is based on a limited set of analysis and very few positives values for cysts. Furthermore, even if the authors state that their method is 50% efficient (from a previous paper) this has not been validated in the present study: water matrix differences can significantly impact the efficiency of these methods. With a detection limit of 10 cysts/100 litres this could imply that false negatives have been reported or that some values are severely underestimated.

Second, it is based on the hypothesis that cysts are uniformly distributed. The authors fail to recognize that the homogeneity reported by Payment et al. (1997) was for highly polluted river water (not treated water) severely impacted by untreated sewage. In the present paper, the source water is relatively clean as suggested by the occurrence data (less than 1 cyst/litre). This hypothesis would need to be redefined.

Third, the association between cyst occurrence and the incidence of ADC becomes an extremely difficult exercise. Defining the true incidence of giardiasis or cryptosporidiosis is certainly hazardous. This is well illustrated in the recent papers showing that even in outbreak situation, assignment of a causal relationship is difficult.

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In summary, the exercise presented by the authors has some value in defining how to perform a QMRA and to include the multifactorial facets of the exercise. However, I would seriously question any conclusion that suggests that the numbers show a relationship between the observed ADC and any of the occurrence data. Not being a statistician a critical review by a statistician expert at QMRA would be required.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)
Downplay the significance of the observed relationship. Include in the discussion the 2 papers by Robertson et al (2006)

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

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Discretionary Revisions (which the author can choose to ignore)

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**What next?:** Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

**Level of interest:** An article of limited interest

**Quality of written English:** Acceptable

**Statistical review:** Yes

**Declaration of competing interests:**

I declare that I have no competing interests