Author's response to reviews

Title: Geographic correlation between deprivation and risk of meningococcal disease: an ecological study

Authors:

Dr Christopher J Williams (Chris.Williams@hertsmere-pct.nhs.uk)
Lorna Willocks (Lorna.Willocks@hpa.org.uk)
Ian R Lake (i.lake@uea.ac.uk)
Prof Paul R Hunter (paul.hunter@uea.ac.uk)

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PDF covering letter
Changes to manuscript

p. 1 Updated addresses for Chris Williams & Lorna Willocks, altered sequence of comma/superscript for author list
p. 2 Changed “geographical information systems” to “a geographical information system”.

p. 4 Changed “geographical information systems” to “a geographical information system”. Changed “Wales (Fone et al, 2003)” to “Wales[16]”

p. 5 Moved last paragraph of Background to second paragraph in Methods.

p. 7 Changed “Microsoft access” to “Microsoft Access”

p. 7 Changed “population)..” to “population).”

p. 7 Changed “might have a higher incidence rate in this group, simply because there are more susceptible individuals” to “might have a higher overall incidence rate, simply because there are more susceptible individuals”

p. 13 Changed “northeast Thames study” to “northeast Thames study[14]”

p. 14 Sentence “The loss of 42% of cases from the analysis, due mainly to lack of postcode documentation, means that the rates quoted will be 42% lower than the true incidences.” removed.

p. 17 “Competing interests: none declared” changed to “None declared.” Added “and have read and approved” to last sentence.

Fone et al now correctly referenced [16]

References re-formatted and corrected

Responses to reviewers

Marilyn Ruiz:

Major essential revisions: None

Minor essential revisions

1. The existing papers on this topic (cited in references 14-16) do reach similar conclusions, but there are material differences and additions included in the work submitted. The northeast Thames study did not show a statistically significant trend for increased meningococcal incidence with deprivation. I would argue that the inclusion of the maps, and in particular the mapping of ward incidence (Fone et al present maps which pinpoint raw case data by postcode), allows (1) visual comparison of deprived wards and wards with high incidence and (2) consideration of the location of major or minor urban centres. The area studied was large, and included both urban and rural areas. Because of the visual suggestion that deprivation and meningitis were concentrated in urban areas, we tested the hypothesis that population density was the cause of the relationship, but found that deprivation alone predicted incidence best (last paragraph p. 13).

2. Has been changed to “a geographical information system”
3. Changed to “Information on whether each case was part of a cluster was also not available, so clusters could not be excluded.” Ideally the first case (shown by date of case) of a cluster would be included but not the other cases. The data set supplied was limited for confidentiality reasons, and did not include information on the date of onset or whether a case was part of a cluster.

4. Changed, and Fone et al correctly referenced

5. Changed

6. Whilst this paragraph may be unnecessary from a purely academic viewpoint, I think that it is important to suggest useful applications for this kind of work. I hope to pursue this further with the team at CDSC Eastern at a later date. The other studies cited (14-16) include similar “applicability and further work” paragraphs.

7. Changed to “might have a higher overall incidence rate, simply because there are more susceptible individuals”

**Discretionary revisions**

1. The serogroup is important as there is some evidence that different serogroups show different epidemiology (group B causing more sporadic cases), and also because vaccines exist for group C, A and W135 but not for group B.

2. This may have reduced the number of cases from a relatively affluent area, but on a ward basis there should be no relationship between ward Townsend score and the likelihood of the postcode being recorded – i.e. it is unlikely that this loss conceals a larger number of cases from affluent wards.

**Reviewer: Maria N Tsolia**

**Major compulsory revisions**

1. The data was indeed collected retrospectively – this was due to the time and resource limitations of the main author. I was aware of the need to include all possible data and to avoid bias in data collection.

2. The enhanced surveillance system includes data from multiple sources (notifications, laboratory confirmed cases and cases reported directly to CCDCs). The total case numbers from the enhanced surveillance are used to assess the validity of other sources such as notifications alone.

3. A limited dataset was supplied for reasons of confidentiality. It did not include information on whether each case was confirmed or probable.

4. I have noted this potential bias and have tried to look for possible effects by looking at difference in age and origin of report (p. 8 and p.14)

5. Again this information was not available in the dataset obtained, but could usefully be looked at in further studies. Given that immunisation was rolled out in different age groups sequentially from 1999, this particular dataset would not have been appropriate in looking at the impact of the vaccine. Ethnicity/race is not recorded in the enhanced surveillance data and would

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1 Enhanced surveillance of meningococcal disease: weeks 14-26/03. CDR weekly 29th August 2003 13 (35): p.9
have required a separate study of individual households, and we were reluctant to make further enquiries of families where a member had recently had a serious illness.

**Minor essential revisions**
1. This paragraph has been moved as suggested
2. Fone et al is now properly referenced (16)
3. I have not calculated relative risks with confidence intervals for all age categories. For the under 5’s the relative risk is 1.87 (CI 1.28-2.73 so significant) and for 15-19s the RR is 2.72 with a wider CI (still significant as not including 1.0) of 1.27-5.86.
4. Reference added
5. Sentence removed

**Discretionary revisions**
1. Population density was not used interchangeably with overcrowding. The northeast Thames study did look at the overcrowding part of the Townsend index, but the study presented here only looked at population density (ward population / ward area).
2. This may be the subject of further work – I did not have the urban/rural designation for each ward.