Author's response to reviews

Title: Record linked retrospective cohort study of 4.6 million people exploring ethnic variations in disease: myocardial infarction in South Asians

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Version: 2 Date: 9 March 2007

Author's response to reviews:

Reviewers's report

Record linkage of census, mortality and hospitalisation databases to explore ethnic Title: variations in disease: ethical creation of a retrospective cohort study
Version: 1 Date: 19 December 2006
Reviewer: seeromanie harding
Reviewers's report:
General
This is an exciting initiative, a record linkage exercise to determine ethnic differences in events, survival and mortality from MI in Scotland, worthy of publication.
Both papers: Given that a detailed report on these studies is available on the web, I would urge the authors to combine the 2 papers and focus on the potential use of the data.

Response: We have followed this advice and the result is a more authoritative paper.

Paper 2: The South Asian population is considerably younger than the Non-south Asian population (84% of South Asian women under age 45 years compared with 59% of Non South Asian) and the age specific incidence rates and Kaplan- Meier survival curves based on small number of events/deaths. I would suggest moderating the comments to reflect that the ethnic difference could be due to the younger age distribution, present survival curves and days survived (Table 2) for only those aged 55-84 years (the oldest age group is least reliable due to the very small number of South Asians) and mention the need for linkage of events over longer periods to improve the reliability of effect sizes.

Response: We have analysed the data in a number of ways and the differences cannot be explained by age effects. We included age (in five groups), sex and previous admission for diabetes in the Cox model. We have now presented the age adjusted Kaplan-Meier curve and age specific data in the text. With this approach, there is no need for curtailing the analysis to a specific age group (which reduces the amount of data, which is already sparse).

The small number of cases in South Asians means the precision is low, and we have emphasised this.

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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)

Paper 1
1. As implied above, this paper could be shortened and merged with paper 2. It would seem appropriate particularly to shorten the bits on computing details avoiding jargon such as 'hashing', 'partitioning' etc.

Response: We have followed this guidance, although the jargon relating to probability matching is quite important-those in the field will want it for clarity.
2. It would interesting to show the ethnic differences in matching at each stage - i.e. on matching CHI to Census, this merged record to morbidity, to mortality etc. - rather than the overall matching percentages by ethnicity.

Response: We could not calculate ethnic matching rates at each stage because the hashing technique and secure environment was designed to exclude 'back tracking' i.e. ethnicity was added to the database very late with no possibility of tracing ethnicity to an earlier stage. A separate project is likely to take place on this matter in the next couple of years.

3. It would be helpful to clarify when and how the matching of the mortality records was done. Were death records linked to the merged record containing both census and morbidity records?

Response: Death records were linked to hospital discharges before the project started. The paper states this.

Were there ethnic differences in mismatching of these records to the census or to the morbidity or to both?

Response: Both, presumably, though the mismatch has not been analysed separately. We would be in a position to do this in phase 2 of this project which will begin later this year.

4. It would be useful for researchers planning to construct similar data sets to elaborate further the statement on 'strategies a human checker employs to decide whether a pair match is 'good''. For example, were there more mismatches for women due to changes in names on marriage?

Response: A good pair match requires careful description of partitioning, as described in the paper. Mismatching by sex is not known (though worthy of study in future)-we suspect higher likelihood of false positives - but partitioning was designed to prevent this

5. The section on ethics could be substantially reduced as this would differ in different settings.

Response: We have reduced it slightly, but the ethical aspects are vitally important, wherever research is done.

Paper 2
Methods
1. To avoid confusing the reader, suggest that the methods refer only to the data used here - Census 2001, admissions April 2001-2004 and deaths April 2001-2003. Delete reference to discharges 1981-2004 as it seems that the data covering the period 1981-March 2001 were not used?

Response: The data prior to March 2001 were used to define new cases and co-morbidities, so need to be mentioned. we used a hospital data to December 2003 and this is now clarified.

2. Elaborate on how statistical adjustments were done for the hazard ratios. Refer to comment above re censoring of analyses to avoid the confounding from differences in age distributions.

Response: We have done this.

1. Table 1 Add 95% Confidence intervals and p-values for differences between rates for South Asians and Non South Asians.

Response: We didn't do this originally because we couldn't find a method for calculating confidence intervals for differences in standardised rates. We have now calculated adjusted rate ratios using Poisson regression, which is similar to what the referee is requesting.

2. Table 2 could be amended to show results of Cox models, showing hazard ratios and number of deaths for those aged 55-84 years, unadjusted and adjusted for deprivation.

Response: We have done this and the analysis is included in the text (for reasons above, particularly the number of cases in South Asians, we have included all cases, and not restricted analysis to one age group).
3. It is interesting that the gender difference in survival for the South Asians is different from that of the Non-south Asians. Do the authors have any ideas why?

Response: The sex difference is interesting but is outside the scope of the current paper. Our new age-adjusted curve shows much less difference in non-South Asians. For South Asians, the curve for women is based on only 10 people and we would not wish to speculate or reach conclusions until we have more data.

Discussion
1. The authors may find the following paper useful

Response: We are aware of this paper and have published a critique of it (http://www.bmj.com/cgi/eletters/327/7414/526).

2. Given the small number of deaths, it is difficult to censor the data adequately but some discussion about the bias from having admissions (2001-2004) and deaths (2001-2003) for different periods would be useful.

Response: We have clarified that the death and hospital data that we used were from the same time period.

3. There are a few sentences in the discussion which need some elaboration/linking to the preceding sentences. For example - Page 8 3rd para, last sentence beginning 'South Asians are less likely to get...'. also page 9, 1st para, last sentence beginning with 'Anatomical differences'.

Response: We have improved on the English.

Accept after minor What next?: essential revisions
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

Reviewer's report 2
Record linkage of census, mortality and hospitalisation databases to explore ethnic Title: variations in disease: ethical creation of a retrospective cohort study
Version: 1 Date: 5 January 2007
Reviewer: Niklas Hammar
Reviewer's report:
General
Improved utilisation of routinely collected data from hospital records, death certificates and censuses by record linkage has a substantial potential for public health. This paper describes how this kind of data can be linked on a national basis in Scotland without access to unique personal identifiers and with great care to strict data protection legislation and confidentiality. In this respect the paper represents an important contribution.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)
There is rather extensive experience of record linkage between mortality and morbidity data and census data in the Nordic countries that should be acknowledged, discussed and referenced.

Response: We agree that there is such experience and have papers describing linkage methods on census record subsets in mainland Europe. We have now acknowledged examples of such work, and cited a typical example in the introduction. UK data systems prevent such approaches to linkage.

It is unclear why the authors determined that a linkage of 80% or more for all ethnic groups would be adequate. Was this driven by the data or by theoretical considerations?

Response: The decision was based on general experience (anything less than 80% would indicate poor
A differential misclassification of disease due to differences in the linkage proportions would bias relative risk estimates comparing incidence rates in different ethnic groups.

Response: We agree that this was a possible problem that we acknowledge, but we do not think that it would be large. However, this issue will need to await future work for a definitive answer. We have noted the issue in the discussion.

Was the estimated false positive rate in the matching of less than 0.1% applicable in all phases of the matching process? For example, do we know that this was the case in matching the census records to the CHI records?

Response: We present this work on the quality of linkage as a reasonable indicator, but presently we cannot be sure it applies to the specific linkage of CHI to census. In phase 2 of our project, now funded, we are planning extra checks of this kind.

We think one of the interesting features of our paper is an estimate of the false positive rate. Normally false positive rates are not stated in linkage studies. Ours suggests a very small value but also gives reasons. We think there is a reasonable indication from one linkage (CHI to discharges) to the other (CHI to census) because the criteria for checking the partitions were tougher in the latter compared with the former. Explaining the method of checking partitions requires a detailed description -which is beyond the current paper, but we think the methods do outline the principles.

It is stated that the method can be applied in a relatively cheap, quick and in many countries feasible way. This probably depends on the local setting including the quality of the data at hand. It would be of importance to get a more detailed description of the time and resources involved and of the basic requirements for the method to be reasonably feasible.

Response: The context of the statement needs to be interpreted in comparison with alternatives. In Scotland, as in many other countries, ethnicity is not recorded on health records. It takes a huge effort and expense to prospectively achieve reasonably accurate and comprehensive ethnic group data.

The phase 2 of this project has just been funded and aims to produce data for four major health priorities/diseases over 30 months at a cost of GBP300,000. We have noted this in the conclusions.

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

Discretionary Revisions (which the author can choose to ignore)

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 importance in its field
Quality of written English: Acceptable
Statistical review: Yes, and I have assessed the statistics in my report.
Declaration of competing interests:
I declare that I have no competing interests.