Author's response to reviews

Title: National and subnational hypertension prevalence estimates for the Republic of Ireland: better outcome and risk factor data are needed to produce better prevalence estimates

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Author's response to reviews: see over
Dear Editor

Many thanks for the review of the manuscript for “National and subnational hypertension prevalence estimates for the Republic of Ireland: better subnational data are needed to produce better subnational prevalence estimates.”

Please find attached a revised manuscript. The authors’ responses to the issues raised by the reviews are included below in red text.

Kind regards
Steve Barron
(SB)
REFEREE 1

Reviewer's report

Title: National and subnational hypertension prevalence estimates for the Republic of Ireland: better subnational data are needed to produce better subnational prevalence estimates

Version: 2 Date: 31 October 2013

Reviewer: Lana Augustincic Polec

Reviewer's report:
Minor Essential Revisions are needed in terms of labelling Figure 3 (please see the detailed response in the word document).
SB: Done

Discretionary revisions are needed in terms of sentence structure, use of tenses and alike.
SB: Done

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:
As a peer reviewer, I have no conflict of interest in relation to the paper.

Additional material

Please find the following suggestions for your consideration:

ABSTRACT
“... reported doctor-diagnosed, hypertension was significantly related ...”
SB: We assumed that this should read “reported, doctor-diagnosed hypertension” and made this change throughout the manuscript.

BACKGROUND
Paragraph 2
“These estimates describe the pattern of disease in ...”
SB: Not changed because the sentence refers to subnational estimates in general, rather than only these subnational hypertension estimates in particular.

National model of hypertension risk
· Data sources very well described.
  · “... living in private households was selected from the country’s GeoDirectory, the Irish address database.”
  
  SB: Done

Measurements
· “All survey respondents were asked if, in the last 12 months, they were reported by a doctor ...”
  SB: We didn’t change this because we think the sentence in the original manuscript (“All survey respondents were asked if, in the last 12 months, they had been told by a doctor that they had high blood pressure) is a more accurate description of the survey question.

· Table 1: consider formatting the table so that categories are one below another. They may be clearer to follow (please see the example). I am unsure of the space restrictions for the paper.

  Explanatory variable Categories
  Sex Male
  Female
  Age 18-34 years
  35-44 years
  45-54 years
  55-64 years
  65-74 years
  75+ years
  Ethnicity White
  Non-white
  Etc.
  SB: Done

· “All survey respondents were asked if, in the last 12 months, they had been told by a doctor that they had high blood pressure (yes/no)”
  SB: We’re not sure what change has been suggested – this is the sentence that appears in the original manuscript.

· “medication for high blood pressure (yes/no)
  SB: We’re not sure what change has been suggested – these are the words that appear in the original manuscript.

· “Respondents were defined”
  SB: Done

· This is very good, however, unsure how much detail the Journal requires
  e.g. “The selection procedure (SAS Version 9.2 PROC LOGISTIC, entry p-value = 0.05, exit p-value = 0.05)"  
  SB: We decided to retain this level of detail unless advised otherwise by the editor.

· Were weights applied in the analysis since this was a national sample (e.g. for region)?
  SB: Yes weights were applied in the analysis. We have now:
  • Provided more detail of the weighting in the “Data sources” section: “The full sample distribution and the sub-sample distributions were weighted to population totals (for age, gender, marital status, economic status, education, occupational category, ethnicity, household size, and geographic region) using the Quarterly National Household Survey (QNHS) [10] and Census 2006 [11].”
 Explicitly stated that weighted data was used in the analysis at the start of the “Statistical modelling” section: “All models were developed using weighted data.”

- “based on the Chi-Square statistic adjusted for other explanatory ...”
  SB: Done

- Instead of: “There were two criteria used to decide ...”
  Consider: “Two criteria were used to decide whether ...
  i) data on the explanatory variables needed to be available for LHOs s
  ii) the prevalence estimates for LHOs needed to be satisfactory ... number of cases had to have a relative standard error ”
  SB: Done

- The subnational model’s age group risk estimates were multiplied by the corresponding LHO age group population count estimates to evaluate the number of adults with doctor-diagnosed hypertension in 2007.
  SB: We decided to retain the word “estimate” rather than change it to “evaluate” because we think it’s a more appropriate word.

- It was estimated in 2007 that 12.6% (95% CI = 11.7% - 13.4%) of adults aged 18+ years in the Republic of Ireland had doctor-diagnosed hypertension.
  SB: We’ve changed the tense of the sentence to past: “It was estimated that 12.6% (95% CI = 11.7% - 13.4%) of adults aged 18+ years in the Republic of Ireland had doctor-diagnosed hypertension in 2007.”

Summary of findings
- “Based on national health survey data, census data and population estimates, this paper describes a systematic and rigorous approach to develop a consistent set of national and subnational estimates of the prevalence of hypertension in the Republic of Ireland.”
  SB: We’ve revised this sentence to “This paper describes a systematic and rigorous approach to develop a consistent set of national and subnational estimates of the prevalence of hypertension in the Republic of Ireland”

- “The method described here (see Figure 1) has a number of advantages.”
  SB: We’re not sure what change has been suggested – this is the sentence that appears in the original manuscript.

- “In our study, the total prevalence of hypertension (diagnosed and undiagnosed; 62% among adults aged 45+ years) includes people who had ...”
  SB: Done

- “The Irish Longitudinal Study on Ageing (TILDA) estimated that 43% of adults aged 50+ years have ...
  SB: Done

- “Amongst the group aged 45+ years the majority of cases were undiagnosed (62%) ...”
  SB: Done

- “They highlight the need for services to manage diagnosed hypertension cases and to detect and manage undiagnosed cases.”
  SB: Done
Figure 3. Consider describing in the map title or elsewhere what the additional little enlarged map presents (e.g. Dublin?).

SB: We have included the following legend with Figure 3: The enlarged section on the right side of the map shows the ten Local Health Offices in the Dublin region.
REFEREE 2

Reviewer's report

Title: National and subnational hypertension prevalence estimates for the Republic of Ireland: better subnational data are needed to produce better subnational prevalence estimates

Version: 2 Date: 13 November 2013

Reviewer: Michael Soljak

Reviewer's report:

Is the question posed by the authors well defined?
No. The authors do not mention in the aims e.g. identification of risk factors and their odds.

SB: We feel that the aim of the paper was to describe a method to produce national and subnational prevalence estimates with limited data. The identification of risk factors and risks was a part of doing this rather than the aim itself. The aim of the paper is now clearly described in the last paragraph of the “Background” section.

2. Are the methods appropriate and well described?
The statistical methods are appropriate. However I do not understand why only doctor-diagnosed hypertension was modelled (noting comment below about incidence vs prevalence). The authors say the aim was to develop "a consistent set of national and subnational estimates of the prevalence of hypertension in a country", but they have only modelled already diagnosed disease. Our attached paper shows high levels of under-diagnosis. So why not model risk factors for overall prevalence?

SB: Doctor-diagnosed hypertension was available for the main sample of 10,000+ adults aged 18+. Physically measured hypertension (and therefore undiagnosed hypertension) was only available for a physical measurement subsample of 1,000+ adults aged 45+

We modelled doctor-diagnosed hypertension because:
- It was the outcome available for a more age groups (18+ v 45+)
- It was the outcome available for a larger sample (10,000+ v 1,000+)

We have made this rationale clearer at the beginning of the “Statistical modelling “section.

We also acknowledged the limitation of the outcome and the high level of under-diagnosis in the “Results” and “Discussion” sections.

There is no evidence of internal validation e.g. prediction of caseness by the model in the dataset.

Area under ROC curves was not carried out to determine sensitivity and specificity, and to determine the loss between an optimal multivariable model and local estimates.

SB: We have now included AUROC statistics in the “Results” section.

Were there any interactions e.g. between age and sex?
SB: No interactions were included in the modelling because of small sample sizes.

The method by which local prevalence was calculated is not described.
SB: This is described in the “Calculating the estimated number of cases in the subnational populations” section (page 10).

Multiple imputation of predictors could be used for respondents who did not have a physical exam.
SB: We don’t think that multiple imputation would have been appropriate for respondents who didn’t have a physical exam because:

- Only people aged 45+ years had a physical exam and values for 45+ years are not relevant to younger age groups (18-44 years)
- Only about 20% of respondents aged 45+ years had a physical exam and it is not be valid to impute values for the remaining 80% based on this 20%

3. Are the data sound?
The dataset is a representative national survey, but the authors do not state if households or individuals are the sample frame.
SB: We’ve updated the “Data sources” section to include these details.

However one of the outcomes is patient-reported doctor diagnosed disease. According to the paper, patients were "asked if, in the last 12 months, they had been told by a doctor that they had high blood pressure". This question is appropriate for diagnosed incidence not prevalence, for the latter it should be ever told.
SB: The survey question doesn’t tell us if the occurrence of hypertension in the previous 12 months represents a new case or a previously existing case. Therefore, we think that the survey question more closely relates to period prevalence (ie having the condition within the previous 12 months) rather than incidence.

The authors should say more about how BP was measured: once or several times? With what device?
SB: Full details have now been included in the “Measurements” section.

Also the definition should also include physically measured hypertension (#140mmHg SBP or #90mmHg DBP) AND were using anti-hypertensive medication as well as OR.
SB: Done

Does the manuscript adhere to the relevant standards for reporting and data deposition?
I was very surprised that the only local data available was an age breakdown. The local English model includes deprivation and ethnicity. Table 1 mentions deprivation scores and social class so why were these not included in the models? This is likely to be an important predictor. If only age is available locally, why bother to fit a regression model?
SB: Table 1 lists the variables that are included in the stepwise selection algorithm. We’ve changed the “Methods” text and title of Table 1 to make this clearer. Seven of these variables were selected as significant predictors of doctor-diagnosed hypertension. After applying our statistical modelling criteria, four of these (age, BMI, smoking, fruit and veg consumption) were retained to form the national model. Of these four only age was available for subnational areas and so age formed the subnational model. We’ve tried to illustrate this flow in Figure 1.

Regression modelling was used to identify risk factors that were important predictors of hypertension. Identifying important risk factors highlights what risk factor data we need to produce better prevalence estimates.

5. Are the discussion and conclusions well balanced and adequately supported by the data?
Yes, a range of other surveys are discussed. Some of this material should be moved to the Background to give readers more context and understanding of other prevalence studies.
SB: We’ve referenced the variation in hypertension prevalence between Irish surveys in the “Background” section.

6. Are limitations of the work clearly stated?
The problem of small sample size for BP measurement is acknowledged.
Multiple imputation could be used for missing i.e. unrecorded data.
SB: See comment above on imputation.

7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?
Generally, but they do not mention the English model (http://www.apho.org.uk/DISEASEPREVALENCEMODELS), or the validity of patient reports.
SB: We have now acknowledged the APHO prevalence models in the “Background” and “Discussion” sections.

8. Do the title and abstract accurately convey what has been found?
No, it does not include the data source i.e. cross-sectional survey or method e.g. risk factors.
SB: We would like to retain the original title as it emphasises the lack for data for subnational prevalence estimation.

9. Is the writing acceptable?
Generally good, but the explanation of local variable selection is poor.
SB: We’ve revised this explanation to make it clearer.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Not suitable for publication unless extensively edited
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’