Author's response to reviews

Title: Cause-specific Inequalities in Mortality in Scotland: Two Decades of Change. A Population-based Study

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Author's response to reviews: see over
Response to reviewers

Reviewer 1 (Oliver Razum)

Major compulsory revisions:
The manuscript, in its present form, leaves some issues and question that should be answered to decide on the validity. In particular, the discussion of limitations of the study design is too brief. In detail:
1. The claim that health inequalities have increased over the past two decades and that death rates in some strata have increased (p. 13) requires that processes of residential migration are negligible, or controlled for. As neither death records nor population data provide information on the individual socio-economic composition of deprivation categories, merely stating the high correlation coefficients for the distribution of deprivation categories from the three Censuses (p. 5) seems unconvincing.. The question remains whether the results are due to an increase in health inequalities or rather an aggravation of residential segregation.
We have added a paragraph to the discussion section addressing this point.
2. The authors report that coding of the NS-SEC was incomplete (p. 6). They do not discuss this limitation nor refer to the NS-SEC based analysis in the interpretation of their findings. This raises the question whether this analysis is relevant for the paper.
We have removed the analysis by NS-SEC from this paper.
3. The authors do not discuss possible secular changes in the coding of causes of death.
We have added a paragraph to the discussion section addressing this point.
4. The authors draw far-reaching conclusions regarding a need for more effective action from central governments. There are inherent, unsupported assumptions in their statement, namely: (i) social policies reduce poverty; (ii) poverty reduction reduces inequality to a relevant degree (which may not be the case if increasing inequality is mainly due to the rich getting richer); and (iii) a reduction in poverty will lead to a decline in health inequalities.
We have amended the conclusion to take these comments into account and to broaden the discussion to policy formation.

Minor essential revisions:
1. The authors state that death rates for both sexes in 2000-02 were less than half those in 1980-82 (p. 7). Based on Table 1 (p. 19) the overall reduction within this period seems to be 30% for males and 25% for females. Only for children aged less than 15 (both sexes) the reduction accounts for more than 50%.
This mistake has been corrected.
2. A population figure for Scotland should be provided. To get an idea about the precision of estimates achieved, CIs for the percent changes could be provided.
The total population is given at the start of the results section.
3. In the first sentence of the second paragraph (p. 10) the year is missing. It should be “...mortality rates was 1:2.1 in 1981 and...”.
This mistake has been corrected.
4. Tables 2 and 4 (p. 20 and 22) lack a footnote explaining the regional acronyms.
Keys have been added to these tables.
Reviewer 2 (Gwenn Menvielle)

Major compulsory revisions:
1. I really have the feeling that the authors wanted to put too much information in one single paper, and at the end the message is not clear. The results section is quite long and it is not always easy to follow the reasoning and the articulations between the different parts. This part should be re-written and certainly shortened.

I think the authors should stick to the following issues:
- Global changes
- By region
- By SES
- Correlation between the two previous results
- Contribution of different causes of death to socioeconomic inequalities.

It is long enough and self-sufficient.

We have restructured the results section under the following headings: changes in mortality, regional differences, deprivation, deprivation and region, and cause-specific impact on inequalities. We have added a brief section on changes in inequalities to address point 2 below.

I have several other suggestions to shorten it:
1a. Table 1 does not include any information by SES or geographical region. It gives an overview of the general situation in Scotland, but the main focus of this paper is to look at the situation by region or by SES. The results from this table are described too precisely.
We have shortened the discussion of table 1.
1b. The authors use an individual measure of the SES in table 5. This I do not see what this table adds to the paper. I would remove these results.
We have removed the analysis by NS-SEC from this paper.
1c. For the results by geographical region, a map would be appreciated. The authors should keep in mind that the geography of Scotland is not familiar to all readers. I would suggest to present with this map the geographical distribution of DepCat and to indicate the regions studied. This map would really facilitate the understanding of the discussion about this issue.
We have added a table (now Table 4) detailing the characteristics of the regions including the relative deprivation in each. To maintain brevity we have kept description of this table to a minimum.

2. It is not always clear what is the main objective of the paper. The title, the objective indicated at the end of the introduction and the results are not always consistent. In addition, as it stands the title is misleading. We have the impression that they will study changes in socioeconomic inequalities in Scotland. It is not what is done in the paper.

The authors should develop more the aspect related to temporal trend in inequalities, both briefly in the results section and at the beginning of the discussion. Do the inequalities increase during the last 20 years? For which causes of death?
We have added a table (Table 6) explicitly considering temporal changes in inequalities by cause.

Lastly, the authors should indicate in the title that they perform analyses by causes of deaths.
We have changed the title as suggested.
3. The discussion is very short, and some aspects should be expanded. Part of their analysis focus on inequalities by region, and they investigate whether these differences are really due to regional differences or whether they are due to socioeconomic differences between regions. This issue is already mentioned in the introduction. The discussion of this issue should be expanded. 

We have expanded the discussion of this issue.

They should briefly explain what the Glasgow effect is. 

We have removed reference to this from the text.

They suggest that the higher mortality rates found in Clydeside are due to “the poorer experience of socially disadvantaged population”. How do they explain this finding? Are there already some Scottish studies investigating this issue?

We have showed that Clydeside contains a socially disadvantaged population.

The authors should also discuss their results related to the temporal trends in socioeconomic inequalities by cause if death. What could explain these results, both the decrease and the increase observed? Are these results also found in other studies? This is particularly relevant for the increase that the authors observed for some causes of death among younger subjects.

We have broadened the discussion to include comparisons with the findings of other studies.

Minor compulsory revisions

Some sentences are not clear

Page 11, first paragraph “ For women, Clydeside rates were also within 6% of the Scottish rate for each DepCat.”

We have rewritten this sentence.

Page 14 “…in the extent to which they explain differences in death rates between different parts of Scotland”. It is not clear what they refers to (these differences or unequal social circumstances?)

We have rewritten this sentence.