Author's response to reviews

Title: Mortality in Dutch hospitals: Trends in time, place and cause of death after admission for myocardial infarction and stroke. An observational study.

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Author's response to reviews: see over
Dear Editorial Team,

Mortality in Dutch hospitals: Trends in time, place and cause of death after admission for myocardial infarction and stroke. An observational study.

We herein submit the revised version of the manuscript “Mortality in Dutch hospitals: Trends in time, place and cause of death after admission for myocardial infarction and stroke. An observational study.” by LCJ Slobbe, OA Arah, A De Bruin and GP Westert to be considered for publication as a Research Article in your esteemed journal. We confirm again that the paper has not been previously published, nor is it being considered by any other journal. We thank the reviewers for their comments which considerably improved the manuscript. We are glad to see that they both find the research questions addressed in our article as important as we do, and fit for publication, after revision.

Below are our responses and pointing out how we revised the manuscript in line with reviewers’ comments.

First review:

The reviewer states that the paper is interesting and well written, and has only some minor amendments. The typographical errors he points out have been corrected.

Second review:

The reviewer finds the research question strong and results compelling, but he raises several important issues to address. The remainder of this cover letter addresses his remarks in detail, we follow the numbering of points by the reviewer.

1. Criticism of stroke definition

1.1 main stroke definition

When we started to do this analysis we wanted to limit ourselves to ischemic stroke cases. However, in an early stage it became clear to us that it would be difficult to separate ischemic cases from some other types of cases, due to differences in coding practices, and because the Dutch hospitals register stroke-cases only to the fourth digit of the ICD9. Research by the data holder Prismant shows - by cross-checking of a large sample of patient files with the register- that in 84% of the cases the attributed diagnoses is exactly correct but in 10% of cases slightly of the mark, but almost always within the correct subgroup of the ICD9-system. Therefore, we decided to use a broader definition including for instance also subdural hemorrhage. We finally agreed upon using the definition of stroke used by M. Goldacre in a study very similar in design to our stud (nr 9 in our reference list), so we could compare results.

This broader definition leaves out one code the reviewer proposes (363.3), but this is an extremely rare condition, with very few cases (0-3 a year over the entire period 1995-2005) in the Dutch hospital register.

The use of a more elaborate definition is impossible, because the fifth digit is not included in the Dutch medical registration for conditions 433.x and 434.x.

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1 For the remaining 6% no comparison was possible, due to a lack of information in the patient files.
We agree with the reviewer that it was unfortunate to describe this broader group as ischemic stroke, and propose to omit this adjective in the description of stroke in the article.

1.2 use of a different definition for stroke in table 1.
We agree with the reviewer that this is unfortunate. However, in the source cited (Health data from Statistics Netherlands) the group CVA (ICD9 430-434, 436-438) forms the closest match to our definition of stroke, and the group coronary heart disease (ICD9 410-414) the closest match to our group AMI. We do not think the difference between definitions used in the research and table one is too much of a problem, because the purpose of the hospital prevalence numbers in table one is to give readers of our article unfamiliar with the health status of the Dutch population some background information on the level in which conditions like AMI or stroke occur in the Netherlands.

We propose to let the numbers stand as it is. Confusion for the reader is unlikely, because we specify the definitions used.

1.3 cause of death definition for stroke in ICD10 terms
The purpose of comparing cause of death with cause of morbidity was not to see if there was an exact match between those, but to examine if a change is visible over time in the proportion of deaths which are attributed to stroke in the death register after an admission for stroke. This would point to an increasing discrepancy between mortality and morbidity registers. In the Netherlands, we have the unfortunate situation that the morbidity (ICD9) and mortality registers (ICD10) use different versions of the ICD, and no exact matching is possible.

We decided to use a broad definition for stroke because if we used a narrow definition even very slight differences in coding practice or the matching problems would lead to the conclusion that a shift was visible. By choosing an even slightly broader ICD10 definition than our ICD9 morbidity definition we would err on the safe side.

Therefore, we propose to let the ICD10 definition stand as it is.

2. Discussion increased death rate after transfer MI cases
a) case-mix of patients transferred
b) effect of transfer on mortality rates of transferred cases

We fully agree with the reviewer that severe cases (with a high mortality-risk) are transferred. For MI we show that transfer significantly affects the magnitude of 30-day mortality reported. However, the effect is not large enough to affect the observed trends as we state in the discussion and we therefore recommend computing only the most easily calculated indicator, with the exclusion of transfer cases.

We think the second point should also be addressed in the discussion because otherwise - in view of the higher death rate- we could give the impression that transfer should be a bad idea, while generally speaking this is not so. Especially in the Netherlands where transfer is often necessary to ensure a patient gets the best treatment, due to the concentration of cardiac surgery in a few major centers.

We have now addressed the reviewer’s concerns in our text.

3.1 focus the discussion on the misleading nature of in-hospital mortality as a relevant indicator of the quality of care, and stress it should be interpreted in context.

In view of the reviewers comment, we have added an extra line at the end of the discussion:
“Therefore, our study cautions against expecting too much from the use of 30-day in-hospital mortality as an indicator, as our research shows it is well worth to study hospital mortality in the broader context of total mortality, and follow-up mortality over longer time-frames”

3.2 delete the paragraph on the feasibility of linkages- superfluous for the audience.

Only two sentences in the discussion refer to the feasibility of the linkage: ,, About 10% of MI and stroke records could not be linked to population and death registers, because people had administrative twins. However, research by Statistics Netherlands indicates that the influence of this on outcomes is limited [12].”

We think these remarks are important for the interpretation, and would like to leave these in the article.

We have made a revised version of our article, which you will find alongside this letter,

We confirm that all authors have read and approved the paper in its revised form. Mr. Slobbe will handle all correspondence about this paper. We look forward to your response.

Sincerely yours,

Laurentius CJ Slobbe, MSc &
Gert P. Westert, PhD

(On behalf of all authors)