Author's response to reviews

Title: The use of Cincinnati Prehospital Stroke Scale during telephone dispatch interview increases the accuracy in identifying stroke and Transient Ischemic Attack symptoms

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Author's response to reviews: see over
To the Editor
BMC Health Services Research

Dear Editor,

We provided to give a point-by-point response to the concerns and revised our manuscript.

**Reviewer's report**

**Title:** The use of Cincinnati Prehospital Stroke Scale during telephone dispatch interview increases the accuracy in identifying suspected stroke and Transient Ischemic Attack

**Version:** 2 **Date:** 24 July 2013

**Reviewer:** Brian Buck

**Reviewer's report:**

This is overall a well written study cross-sectional study of the impact of the use of the CPSS on EMS dispatcher recognition of TIA/stroke symptoms. This is a large multi-centre study that includes over 18 thousand patients.

Major Compulsory Revisions

1) There is an important limitation in this study that is only addressed in the final paragraph. The gold standard for TIA/stroke is a diagnosis of TIA/stroke by ambulance health personal. EMS personal are certainly trained to recognize TIA/stroke symptoms but the final clinical diagnosis of TIA/stroke is complex and can not be confirmed without further investigations. Stroke mimic rates are 20% or higher. With TIA especially there are a number of common conditions with similar presentations.

Without knowing the final diagnosis we do not know for sure that CPSS is improving accuracy with reference to the true gold standard. I agree as the authors state that the CPSS increases the concordance between dispatch and EMS. From a logistical perspective this is important us perhaps all that matters.

My main suggestion is that limitation has to be stated at the outset in the introduction otherwise it seems to the reader as an oversight as it is left until the very end of the paper. You might want to specifically state that you are not looking at the accuracy of identifying stroke / TIA as stated in the title but rather stroke / TIA symptoms.

**RE:** We agree with the reviewer. In our study there is no gold standard for TIA/stroke and we are not interested in having a gold standard for the final diagnosis. What it is interesting about this study in terms of the practical impact that it can have on pre-hospital emergency care is the ability to identify stroke and transient ischemic attack symptoms during the phone call. In the previous version we called these symptoms “suspected stroke/TIA” but this definition was ambiguous: what is a “true suspected stroke”?

We changed “suspected stroke/TIA” into “stroke/TIA symptoms” throughout the paper (including the title and the aim of the paper).

We thank the reviewer for his suggestion.

Is there any means to confirm the final diagnosis? This ultimately would strengthen the paper?

**RE:** Unfortunately, there are no means to confirm the diagnosis in our study. A real gold standard would allow us to measure the accuracy of dispatch as well as on-site visit in identifying stroke and TIA only through symptoms. Such information would surely be interesting but has no impact on the operative problem of optimizing the dispatch accuracy in identifying those cases requiring a stroke or TIA pre-hospital pathway.

In the new version of the discussion we tried to clarify this point (page 11 lines 11-13; page 13 lines 3-5).
Reviewer's report
Title: The use of Cincinnati Prehospital Stroke Scale during telephone dispatch interview increases the accuracy in identifying suspected stroke and Transient Ischemic Attack
Version: 2 Date: 18 July 2013
Reviewer: James McKinney

Reviewer's report:
The authors present an observational cross-sectional multicenter study assessing the accuracy of emergency service dispatch utilization of the Cincinnati Prehospital Stroke Scale to identify potential stroke patients. This is a potentially important study with significant implications pertaining to early identification of stroke patients and appropriate resource utilization. This is an understudied piece of the stroke “chain of survival”. The authors observed findings highlight the importance of using a validated stroke screening tool, such as the Cincinnati Prehospital Stroke Scale, to appropriately identify stroke patients calling emergency services and dispatch appropriate personnel to care for that patient.

RE: We thank the reviewer for his encouraging comments.

Major Compulsory Revisions:
1. Page 7, line 1: Was information on the data form collected prospectively or retrospectively. If this data was collected retrospectively by chart abstraction, (which I assume it was, as you state there was no change to routine practice) how might this bias your results? Please address in discussion.

RE: Data were collected prospectively: the study period was defined in 2010, before starting the study. We adopted informatics tools to be used online to record the essential data in the phone call (different solutions for each CO or, in some cases, for groups of COs) requiring almost no additional work to the call centre operators. All these tools were enhancements or integrations of the existing software; in some cases, these informatics tools were permanently installed and in the future, data could be collected either prospectively or retrospectively. In some other cases the data collection tools required additional work (at the end of the day or for the data managers) and consequently their use was discontinued at the end of the study period. Finally, in 18 Operative Centres, the existing software already collected the required information. We tried to make this clearer in the methods section (page 7 lines 8-11) and we added a sentence in the discussion to mention the possible bias introduced by the prospective data collection (page 13 lines 3-5).

2. Page 9, Line 4: Please clarify (probably in the methods) whether the variable of interest was simply performing/documenting the CPSS, regardless of whether positive or negative, or only those patients with positive CPSS.

RE: The variable of interest was only “performing and documenting” the CPSS. In particular, the main analysis was performed using the OC as statistical unit and the proportion of cases in which CPSS was performed and reported was used as characteristic of that centre. (page 8 lines 1-3).

Minor Essential Revisions:
1. Page 6, last line: Please clarify what you mean by “more or less systematically”. Were dispatch personnel trained on the CPSS? How was use of CPSS documented?

RE: We have rewritten the sentence (page 7 lines 1-2).

2. Page 10, Last line: You reported no data on true/total negatives, how does this data support a claim that CPSS use increases specificity?

RE: True negatives are all the dispatches (which were a few million). Furthermore, the incidence of the disease did not change much among the Italian regions. Under these conditions positive predictive values are mostly determined by specificity. Nevertheless, we changed the sentence (page 11 line 5).
3. Page 11, Line 5: You address the potential selection bias on an individual level of patients identified by dispatch as possible stroke/TIA are likely to be determined by EMS. Please also address the potential bias that using the same screening tool (CPPS) by dispatch and EMS may introduce into results.

RE: We added a sentence about a possible effect of “induced agreement” due to the knowledge of CPSS phone results by the on-site health personnel (page 11 lines 8-13). This bias can be particularly relevant for the analyses at the individual level, but not for those at OC level.

4. Table 1. add p-values for analyses of baseline variables.

RE: Table 1 has a purely descriptive purpose. There is no underlying hypothesis to test, i.e. we are not comparing the distribution of covariates in the different groups (TP, FN, FP). Consequently, we did not perform any statistical test and we did not report any p value.

5. Add abbreviation key to all tables/figures

RE: We thank the reviewer. We added footnotes and legends to all tables and figures.

Discretionary Revisions
1. Figure 1. Consider changing overlap of circles to be more representative of sample size. It appears as if there were significantly more false negatives, while in fact there were 2x’s as many true positives.

RE: We changed the circles in figure 1 in order to reflect the relative dimension of the groups.