Author's response to reviews

Title: Utilization of delivery care for rural women in China: does the New Cooperative Medical Scheme (NCMS) make a difference? A population-based cross-sectional study

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Title: Utilization of delivery care for rural women in China: does the New Cooperative Medical Scheme (NCMS) make a difference? A population-based cross-sectional study

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Author's response to reviews: see over
Dear Editor,

We have now corrected the paper (MS: 2051661291426391) according to the requests. We would like to thank the reviewers for their helpful comments. Below are the detailed comments and our response to them.

Reviewer: Manuela De Allegri

Major revisions:
1. The authors differentiate between insured and non-insured women on the basis of whether the person has obtained reimbursement for the delivery services or not. This is not an adequate indication since the literature (see in particular the work by Ranson et al. on the SEWA experience in India) has clearly shown that in schemes which use ex-post reimbursement, many insured people do not claim the reimbursement they are entitled to. It would be advisable to use the insurance status declared during the interview process.

Response: The women in the NCMS group only need to pay for the rest costs after being reimbursed by NCMS when using the delivery services. Some women with unauthorized pregnancies cannot get reimbursement from NCMS even if they have participated in the scheme. Of course, maybe there are some insured women do not claim the reimbursement even they are entitled to. This paper wants to see the relationship between financial reimbursement and delivery services utilization. So actual reimbursement rather than membership was used as the basis of classification. Some clarification has been made about the objective and conclusions of this manuscript. Please see page 2, page 4 and page 8.

2. In addition, if the specific aim is to assess the impact of NCMS on facility-based delivery and relative out of pocket payment, then women with other insurance coverage should be excluded from the analysis or constitute a group of its own. Methodological decisions ought to be coherent with the research question.

Response: There are 16 women who were reimbursed by other health insurance. They were not excluded for the small sample size. In addition, maybe some women actually mistake the reimbursement sources, of course these cases were very scarce. We have added some sentences to explain this in the part of method and discussion. Also the title was changed slightly to keep a consistency with this. Please see page 1, page 4 and page 7.

3. The analysis of the data is very weak. Controlling for a few demographic characteristics when comparing women with NCMS and women with no NCMS is not sufficient to take into account the problem of self-selection, i.e. the fact that women with NCMS are likely to differ in a number of both observable and non-observable characteristics from women with no NCMS. Differences in utilization and in expenditure are likely to be the product of this underlying difference (self-selection into the scheme, since the scheme is voluntary). The authors should look into models that can control for this self-selection, for example
models using Heckman correction estimates or propensity score analysis.

Response: We appreciate the suggestion about statistical analysis. Heckman correction estimates and propensity score analysis are useful methods to balance the confounding effect from some observable characteristics. We will use the recommended methods in the following studies to analyze the impact of the NCMS status on maternal health care utilization. Two variables, distance and county, have been added in multivariable regression to control the confounding effects when comparing the outcome variables between different groups. In addition, the conclusion has been modified with less causality to evaluate the impact of the reimbursement from NCMS. Please see the part of abstract (page 2) and conclusions (page 8), as well as table2.

4. The results are presented in a very confusing manner. Odds ratios are presented in tables which also display simple percentage distributions. I find it appropriate to indicate a p-value for the percentage distributions, but not an odds ratio derived from a regression model. The reader is confused and cannot really understand what the OR refers to. I would suggest adding a table with the complete results of the regression models. The reader may be interested to see the effect of the other variables included in the model.

Response: We agree and the OR has been deleted. All the other variables entered the regression model has been indicated below the tables. Please see table 2 and table 3.

5. The sampling procedures are not clear. First, more information is needed on the overall number of townships and villages in the area and the proportion sampled. And then, how can the authors be sure that they have managed to include all women who had given birth during the given time period when the identification of the women was dependent upon doctors and maternity care workers? Is there any possibility that women had been pregnant and not come in contact at all with healthcare personnel? If this is possible, then the sampling procedures might have left out a number of women. This should be discussed openly.

Response: The above information was added in the part of background and method. Some women who had given birth during the given time period maybe have been left out if she registered in the study counties but didn’t live in the local area for most time, the local healthcare personnel may not know whether she came into pregnancy or not. These women were not included in the target population. Maybe we did not make it clear and we have clarified that the target population was resident women in the part of method. Please see page 3 and page 4.

6. The schemes benefit packages and reimbursement modalities need to be explained in more detail for the reader to be able to understand the results. For instance, the finding that insured women (although as said above, I have some doubts on the accuracy of the classification as insured) had lower out of pocket spending even before considering the insurance reimbursement appears surprising. To fully judge the finding, the reader needs to know: are providers informed upon registration that a woman is insured and therefore are forced to charge less? Or is the difference due to the fact that insured women are
more aware of their rights and less likely to be induced into consuming additional services or being charged more? Or yet again, is part of the delivery cost directly covered by the NCMS scheme? I know that it is impossible to ascertain retrospectively whether insured women received fewer services than non-insured ones, but a number of other relevant information on the schemes and their procedures can be given to allow the reader to contextualize the findings. Lower spending remains especially surprising given the longer (especially before delivery) length of stay. Could it be due to the fact that insured women plan their delivery and ask to have it induced to minimize the potential risk of complications (although I am not sure that induced delivery reduces this risk)?

Response: We have added some sentences to explain the reimbursement modalities and the different payments in the part of method. Please see page 5. The total length of stay at hospital was used in the revised manuscript, instead of the length of stay before and after delivery, to avoid the difficulty to understand the results for readers, since the total length of stay was not different between the NCMS and Non-NCMS groups. Please see table 2, page 6 and page 7.

Minor comments:
1. The whole issue of distance is excluded in the model and therefore in the discussion. I would like the authors to motivate their decision. Otherwise, the reader may easily deduce, like I did, that the absence of difference in utilization patterns across levels of care may be due to distance. Furthermore, the literature on health insurance is clear: the further people live from facilities, the less likely to enroll. I am surprised to see that distance was not included in the models at any stage.

Response: We agree and the distance has been included in multivariable analysis when comparing the differences of delivery services utilization between the NCMS and Non-NCMS groups. Please see table 2 and page 6.

2. The authors need to provide a conversion rate into US dollars for the local currency.

Response: We agree and the conversion rate into US dollars has been added. Please see page 6.

3. The entire discussion on CS on page 8 is too long and too distant from the results presented in the paper. It is enough to state once that insurance status does not appear to have induced an increase in the rate of CS utilization, although the overall rate of CS remains higher than what recommended by the WHO.

Response: We agree and have reduced the discussion on CS according to the above suggestions. Please see page 7.

4. It is not clear whether the question on perception of out of pocket payment for insured
women refers to what they had to pay for the services in total (including the part reimbursed) or just what they were left to pay after the insurance reimbursed them.
Response: We agree and have added some sentences in the part of method to clarify this. Please see page 5.

5. Some language editing would be beneficial, but is not essential.
Response: Some language editing has been made.
Reviewer: Tuohong Zhang

Reviewer's report:
The study population came from two counties from Shannxi province. Please specify how many samples from each county, and whether there is difference between NCMS participation.
Response: The above information has been added in the part of results. Please see page 5.

It is important to know whether the women have been paid by other fund except NCMS. The authors stated that there are some women participated other kind of insurance. However, in some poor western Chinese countries, there are some national or international program supporting hospital delivery.
Response: we agree that it is important to know the other reimbursement sources except NCMS. It is true that there are two program in Zhen'an county supporting hospital delivery during the study period. One is the project of reducing maternal mortality and eliminating the newborn tetanus (RE), and another is the project of reimbursing hospital delivery (RHD). We have added these information in the part of method. Please see page 5.

Please specify what is ‘formal’ hospital
Response: We have changed ‘delivery at formal hospital’ to ‘delivery at hospital’, since using the former may have cause some misunderstands and make the reader think there are some differences. Please see page 7.