PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Impact of New Cooperative Medical Scheme on the Trend of Catastrophic Health Expenditure in Chinese Rural Households: results from nationally representative surveys from 2003 to 2013
AUTHORS	Xie, Biao; Huo, Minghe; Wang, Zhiqiang; Chen, Yongjie; Fu, Rong; Liu, Meina; Meng, Qun

VERSION 1 – REVIEW

REVIEWER	Zhongliang Zhou Xi'an Jiaotong University, China
REVIEW RETURNED	14-Sep-2017

GENERAL COMMENTS	This study focused on the national level and assessed a 10-year trend of the incidence and severity of CHE using the date of NHSS. Except several English writing, there are many mistakes in the manuscript. However, this research show good and new results. The following are the questions and some mistakes in this manuscript. I have a number of substantial concerns with the paper. Major issues: 1. Increase the methods introduction chapter, not only covering the study design, data collection, but also including how to control the validity and reliability of the research. 2. This paper has some practical innovation, but insufficiency in the theoretical innovation, besides should strengthen research methods. 3. Some statistical tests are needed in table 2 to show whether the changes are significant. 4. How to make sure the sample of each year in this study are representative. Fifthly, in the supplementary data 2, expect the determinant you analysis, several factors you should also take into account. For example, the household size, the marriage of the household's head. Minor issues: 1. The number of the lines in this paper was not in order, then it might have some problems with my review. But it doesn't matter if you understand where I make comments in your paper. 2. In page 2 line 18,"Generalized Estimating Equations (GEE) was"should be " Generalized Estimating Equations (GEE) were" 3. The exact poverty line was not defined.

REVIEWER	YOU Hua Nanjing,China
REVIEW RETURNED	27-Oct-2017

GENERAL COMMENTS	1. The introduction of the GEE generalized equation estimation method is not detailed enough. In this paper, this method is

	mentioned in Page7 line23-29, and it is suggested that this method be supplemented. 2. An advantage of GEE is that, as long as the connection function is correct, the total number of observations is large enough, even if the working correlation matrix selection is not correct, the coefficient estimates and other statistic values of the model still has good statistical properties (asymptotic consistency). The number of samples in 2003 in this paper is 180, the working correlation matrix selection of the GEE may influence the statistic properties of the coefficient and related statistics. Therefore, it is necessary to verify the coefficients and their significance are robust to the working correlation matrix selection.

REVIEWER	Sun Qiang School of Health Care Management, Shandong University, China
REVIEW RETURNED	01-Nov-2017

GENERAL COMMENTS	Page 2, line 42-44, please clarify "in the three years" and also please give specific policy suggestions rather than generally saying "will provide suggestions for further reform". Page 3, line 34-35, only 338 households included, but in page 5, line 46, it was said 180 in 2003, please confirm it. Please elaborate the possible influences caused by big variation of sample sizes in 2003, 2008 and 2013? what are the possible biases of results? How do you resolve them? please clearly adds the units in the table 2-4

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VERSION 1 – AUTHOR RESPONSE

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Reviewer 1 (Comments to the Author)
Major issues:
1. Increase the methods introduction chapter, not only covering the study design, data collection, but also including how to control the validity and reliability of the research.
Response: Thanks for your valuable advice. All data in the Chinese National Health Services Survey (NHSS) was collected using a structured questionnaire, whose validity and reliability had been demonstrated.1-2 We have added corresponding content in the methods section lines 125-126. To control the validity and reliability of statistical analysis, Generalized Estimating Equations (GEE), in view of its advantages, were used to estimate OR and 95% CI for the association between incidence rates of CHE and NCMS reimbursement. We have added the introduction of the GEE in the methods section lines 173-184.

2. This paper has some practical innovation, but insufficiency in the theoretical innovation, besides should strengthen research methods.
Response: We have increased corresponding content in the discussion section in lines 285-288, 304-308 and 328-336. Our study will provide some recommendations for the next phase of health reform for policy-makers. Besides, we have increased the introduction of the GEE in the methods section lines 173-184.

3. Some statistical tests are needed in table 2 to show whether the changes are significant.
Response: Table 4 shows that the changes in table 2 are significant if corresponding 95% confidence intervals of OR do not include 1.

4. How to make sure the sample of each year in this study are representative.

Response: Data used in this study were from the third NHSS in 2003, the fourth NHSS in 2008 and the fifth NHSS in 2013. As the largest nationwide health survey in China, the survey data was representative of the structure of overall national population.3 The sample of each year in this study are representative because all households with hospitalized members covered by NCMS in NHSS were selected.

5. Fifthly, in the supplementary data 2, expect the determinant your analysis, several factors you should also take into account. For example, the household size, the marriage of the household's head.
Response: The number of household members is same with the household size. We have added the employment and marital status of the household's head in Supplementary data 2. The covariates didn't include geographic regions and income levels because data was disaggregated by three geographic regions and four household income levels. Time spent travelling to the nearest medical center was not statistically significant in univariate analysis, therefore it was also not included.

Minor issues:
1. The number of the lines in this paper was not in order, then it might have some problems with my review. But it doesn't matter if you understand where I make comments in your paper.
Response: As suggested, the number of the lines were inserted.

2. In page 2 line 18, "Generalized Estimating Equations (GEE) was" should be "Generalized Estimating Equations (GEE) were"
Response: The question mentioned above has been addressed in the manuscript.

3. The exact poverty line was not defined.
Response: The poverty line is defined as the average food expenditure of households whose food share is in the 45th to 55th percentile range.4 The exact poverty line for 2003, 2008 and 2013 in this study is 2092.34, 2199.17 and 4143.48 RMB per year, respectively.

Reviewer: 2
1. The introduction of the GEE generalized equation estimation method is not detailed enough. In this paper, this method is mentioned in Page7 line23-29, and it is suggested that this method be supplemented.
Response: As suggested, we increase the introduction of the GEE in the methods section lines 173-184.

2. An advantage of GEE is that, as long as the connection function is correct, the total number of observations is large enough, even if the working correlation matrix selection is not correct, the coefficient estimates and other statistic values of the model still has good statistical properties (asymptotic consistency).

The number of samples in 2003 in this paper is 180, the working correlation matrix selection of the GEE may influence the statistic properties of the coefficient and related statistics. Therefore, it is necessary to verify the coefficients and their significance are robust to the working correlation matrix selection.
Response: In this study, we used the quasi-likelihood under the independence model information criterion (QIC) to select the appropriate working correlation matrix.5 Finally, autocorrelation matrix was selected to be the working correlation matrix because it had the smallest QIC value.

Reviewer: 3
1. Page 2, line 42-44, please clarify "in the three years" and also please give specific policy suggestions rather than generally saying "will provide suggestions for further reform".

Response: As suggested, "in the three years" was replaced by "in 2003, 2008 and 2013". Specific policy suggestions had been given in the conclusion lines 347-351.

2. Page 3, line 34-35, only 338 households included, but in page 5, line 46, it was said 180 in 2003, please confirm it.
Response: The question mentioned above has been addressed carefully in the manuscript.

3. Please elaborate the possible influences caused by big variation of sample sizes in 2003, 2008 and 2013? what are the possible biases of results? How do you resolve them?
Response: The NCMS was at the start stage in 2003 and the coverage was very low in rural China. Therefore, the sample size in 2003 was 180 households. The impact of NCMS in 2003, 2008 and 2013 was reflected in the difference in CHE before and after reimbursement and all the analysis was independently conducted in each year. In addition, we focus the overall trend of results from 2003 to 2013 and the sample size in 2003 have little influence on this trend.

4. please clearly adds the units in the table 2-4
Response: The question mentioned above have been addressed in the manuscript.

References
1. Liu Y, Rao K, Wu J, et al. China's health system performance. Lancet 2008;372(9653):1914-23.
2. Center for Health Statistics and Information. Reports of Nation Health Service Survey Summary. 2004.
3. Analysis report of national health services survey in China, 2008. Beijing: Center
for Health Statistics and Information, Ministry of Health China; 2009.
4. Xu K. Distribution of health payments and catastrophic expenditures methodology.
Geneva: Department of Health System Financing, WHO; 2005.
5. Cui J. QIC: Stata module to compute model selection criterion in GEE analyses.
Statistical Software Components, 2006.

VERSION 2 – REVIEW

REVIEWER	YOU Hua Nanjing Medical University
REVIEW RETURNED	11-Dec-2017

GENERAL COMMENTS	The manuscript is interesting, aiming to measure Impact of New Cooperative Medical Scheme on the Trend of CHE in Rural China. And the paper would be more practical if the policy recommendations more organized and focused.

VERSION 2 – AUTHOR RESPONSE

Reviewer 2 (Comments to the Author)
1. The manuscript is interesting, aiming to measure Impact of New Cooperative Medical Scheme on the Trend of CHE in Rural China. And the paper would be more practical if the policy recommendations more organized and focused.
Response: Thanks for your valuable advice. We have revised corresponding content in lines 287-289, 312-315, 333-335, and 367-368.