Reviewer’s report

Title: Effects of changes in health insurance reimbursement level on outpatient service utilization of rural diabetics: Evidence from Jiangsu Province, China

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Reviewer: Su Liu

Reviewer’s report:

Major compulsory revisions:

1. The current literature review as part of the introduction is weak. The authors claimed that “to the best of our knowledge, there are no studies that analyze the impact of outpatient reimbursement level changes on health service utilization.” In fact, the literature on how changes in insurance copayment or coinsurance rate might affect utilization is quite extensive, the most seminal one being the RAND experiment (see Manning et al. 1987 AER paper). Evidence of moral hazard has been well established internationally. It’s important to include it in the literature review, and address how the paper contributes to its advancement.

2. Equation 3 (though it was not denoted) that was used to describe the model for this study has some serious problems:
   a. The symbols are very confusing; suggest using similar style as equations 1 and 2, including subscription, to make them consistent.
   b. More importantly, I don’t think the use of i is appropriate. It leads to serious misinterpretation of the model estimated later on. The current equation suggests a one-to-one match of Yi and Pi, which does not seem to be the case as reflected in the results tables (e.g. in table 3, the estimation of Y1, there are two Ps, from what I can tell).
   c. Related to comment 2b, I also think the description of P is misleading. The authors said “P is a dummy variable indicating the extent of policy change…” To me, P simply is a dummy variable representing each of the two counties where there is policy change (as opposed to the control county where there is none).

3. I do not understand why in Table 3, each of the counties with policy changes was estimated separately (through Diff-amount 2 and Diff-amount 3), whereas in Table 4, they are combined together (through only one Diff-rate)? The changes in the reimbursement rates in Gaoyou and Rudong are quite different – they should have been estimated separately in Table 4. Why didn’t the authors do so? There needs to be a solid explanation here.

4. I have a few concerns about how findings are interpreted and policy recommendations made in the discussions:
   a. Paragraph 3, the authors said, “generally speaking, raising yearly maximum reimbursement amounts for outpatient visits by rural residents with type 2 DM
should be advocated”. I generally agree with this, but one must notice, the current policy did not just raise the reimbursement for people with chronic conditions, it’s for all people—should one worry about the negative impact of moral hazard? Or suggest differentiated policy treatment?

b. Paragraph 4, the calculation of the average after-reimbursement OOP expenses per patient seems to be wrong! If one were to use simple multiplying as suggested by the paper, 152.3 x (1-22.80%) = 117.57, NOT 34.72. Unless I completely got this wrong, the OOP difference between different levels of institutions should be much larger than what the paper currently described. Please double check. In fact the data provided in Table 5 do not seem to be consistent with the text description. If table 5 is correct, and consider this is per outpatient visit, for someone from rural with DM, the difference does add up to be quite significant.

c. Paragraph 5, The authors said “Compared with those aged 18-30, patients in younger and older age groups were more likely to visit village clinics. Therefore, THCs and county-level hospitals should be made more accessible to younger and older patients, in order to facilitate better access, if their health conditions require care at higher-level institutions.” I think this policy recommendation sounds very strange: who do you mean by “younger and older” patients, everyone except 18-30 aged? There could be a simple explanation behind this finding: 18-30 are much more likely to be migrant workers working in counties rather than staying behind in villages (like children and elderly). They chose the institution because it’s more easily accessible (there could be other reasons as well, but I doubt it’s due to conditions requiring care differently).

d. Paragraph 7, regarding the finding on females, if I’m understanding this right, Y2+Y3+Y4 should be equal to 100%, right? So if females are less likely to visit village clinics and THCs, by definition, shouldn’t they be more likely to visit county-level hospitals?

Minor essential revisions:

1. There are quite a few grammar mistakes and typos throughout the manuscript. Suggest authors review it carefully and the language to be edited thoroughly. For example (not a complete list),

   a. Introduction. Paragraph 2. Please make sure you use NRCMS consistently, instead of switching to NCMS.

   b. Same paragraph, the sentence after reference [9] – I can’t understand it. Suggest rewording.

   c. Data. Paragraph 2. “rass-roots” should be “grass-roots”.

   d. Discussions. Paragraph 3. “It has been shown that low utilization of health services in rural China is often due to the heavy economic burden of diseases [4].” I don’t think burden of disease is the right phrase to use here. Did the authors mean economic burden of seeking treatment, or high OOP?

2. One of the paper’s contributions was said to be “the first attempt to conduct a tracer illness study in order to control possible biases associated with studying
several diseases together.” I didn’t quite follow this argument in the beginning (in the abstract, as well as end of paragraph 5 under introduction). As I read the paper, I think what the authors meant simply is that previous studies have looked at a large population without controlling for heterogeneity across different diseases. Regardless of whether I interpret this right, I think the authors should make a better effort explaining the argument and claiming this contribution.

3. In describing the hypotheses, it would be more helpful if the authors could attempt to specify the direction of expected changes (whether it’s positive or negative), as opposed to just saying “change of X would affect Y”.

4. Data. Paragraph 1. “(The data collected by us are available upon request)” – is this data different from “the province-level NRCMS management database”? There is only one single data source, right?

5. Clarification please:
   a. How were the type 2 diabetic outpatients identified in the data? Through diagnosis code, such as ICD-9?
   b. Why was the analysis limited to individuals aged 10 years and over? Is this due to data availability or some other concerns?
   c. Data. Paragraph 2. Figures quoted here for proportions of visits to different level of institutions referred to just Jiangsu or the whole China?

6. Table 2. Suggest add in descriptive statistics for the outcome variables as well.

7. Table 5. See my earlier comment 4b in the last section. Also please clarify if the numbers presented here are “average total medical expenses” or “average OOP expenses”.

Discretionary revisions:
1. Results. Paragraph 1. It would be good if the authors could attach a dollar value to the “9.1% increase in total outpatient expenses as a result of 40 yuan increase in max reimbursement amount”. I was also wondering how many patients exceeded the max amount, or just stayed barely under? That might have more policy implications than just the percent increase.

Level of interest: An article of limited interest

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:
I declare that I have no competing interests.