Reviewer’s report

Title: The association between improved quality diabetes indicators, health outcomes and costs: towards constructing a "business case" for quality of diabetes care- a time series study.

Version: 3
Date: 22 September 2014

Reviewer: Sima Djalali

Reviewer’s report:

Assessment of the revised manuscript

Major Compulsory Revisions:
1) Resolve inconsistencies between objectives, discussion and conclusions; either drop the “Business Case” subject and reframe discussion and conclusions. Done. Please see pg. 16 lines 359-363.

or point out:
- the clear definition of the terms “Business Case” and “Health system with low enrollee turnover” Done please see pg. 16 lines 359-363; pg 14 lines 311-315; pg 3 58-59 THE SENTENCE INSERTED ON PG. 14 GIVES AN EXPLANATION OF “HEALTHSYSTEM WITH LOW ENROLLEE TURN OVER BUT IT IS GRAMMATICALLY INCORRECT. A CLEAR DEFINITION OF “BUSINESS CASE” IS STILL MISSING. THE EXPLANATION ON PAGE 14 LINES 317-321 IS MISLEADING: REFERENCE 2 (BLUMENTHAL) THAT IS GIVEN DOES NOT EVEN CONTAIN THE WORD “BUSINESS CASE”. PLEASE CHECK REFERENCE LIST IF YOU REALLY MEAN THAT ARTICLE.

- which stakeholders of a health system would benefit from such a “Business Case” - what else besides the results of the study, would be necessary to develop such a “Business Case” Done please see the conclusion section pg 16 lines 359-363 FIRST PART (WHO BENEFITS) OK, SECOND PART IS NOT ANSEWERED IN A SATISFACTORY WAY. YOU SHOULD POINT OUT WHAT ELEMENTS OF A BUSINESS CASE ARE DELIVERED BY YOUR WORK AND WHAT ELEMENTS ARE NOT DELIVERED. TO GIVE YOU A HINT: THE ESSENCE OF A BUSINESS CASE IS THE COMPARISON BETWEEN INVESTMENT COSTS AND RESULTING BENEFITS. YOUR WORK CONTRIBUTES AN EVALUATION OF THE BENEFITS – NOT MORE AND NOT LESS. BE CLEAR ABOUT THE FACT THAT INFORMATION ON THE INVESTMENTS ARE NEEDED THAT WERE SPENT IN ORDER TO PRODUCE THESE BENEFITS.

- why and under which circumstances the results of the study are generalizable
Done. Please see the conclusion section pg 16 lines 359-363 OK

2) Adapt abstract and title according to 1) OK

3) Reference and describe the price list of the Israeli Ministry of Health in detail. Done. Please see reference no. 18 OK

Point out:
- What kinds of cost (direct cost, indirect cost…) were included in order to determine the costs of a hospitalization day? Reference no, 18 explains the price list. OK
- How much was a hospitalization day? According to reference no. 18 a hospitalization day costs 2,046 NIS (Israeli Shekel which is 568.5 US$ uptodate)
- Did prices change during the observation period? Prices are stable OK

4) Point out what led to the expectation that improved HbA1c control in 2009 had an effect on hospitalization at least until 2012 Explained above OK THANK YOU – BUT THE EXPLANATION AND THE REFERENCE SHOULD ALSO BE INCLUDED IN THE PAPER

5) Where were data on death events between 2010 and 2012 taken from? Explained. Please see pg. 9 lines 191-193 OK

6) Add a complete description of all statistical analyses used in this study to the Method section. Done Please see pg. 7-8 OK

7) Point out why Poisson regression model was used in addition to GEE models. Done. Please see pg. 7-8 OK

8) Define what is meant with “Global and Dynamic GEE models” and why they were used. Done. Please see pg. 7-8 OK

9) Resolve inconsistencies between text (Results section paragraph 3) and contents of Table 3. Done OK

10) Add a description of the period of observation per patient to the description of the study population’s baseline characteristics (at least mean/standard deviation)
Done Table 1 NOT DONE! YOU ADDED A +/- SIGN TO THE STANDARD DEVIATION OF THE MEAN AGE. MEAN OBSERVATION PERIOD OF THE PATIENTS IS STILL MISSING

11) Describe the distribution of outcome variables, at least: - How many hospitalization days/ED visits were counted per year in total and in average per patient? - How were outliers handled? Count numbers are irrelevant in a time
series design. Regarding outlayers please see the new statistical analysis section. OK

- How many death events were counted? Explained in the statistical methods in details. OK

12) Display results of statistical analyses concerning HbA1c testing and ED visits. Done OK

13) State more precisely what is meant by “One can argue that improved health outcomes and reduced cost result from other factors, such as diabetes co-morbidities, such as cardiovascular disease and personal characteristics and life-style. MHS internal data shows that from 2003 to 2009, the proportion of adult members with any cardiovascular disease has been stable.” (Discussion section, paragraph 15) Done. Please see pg. 16 line 353

STILL MISLEADING!

1) WHY SHOULD THE PRESENCE OF DIABETES-COMORBIDITIES AND CARDIOVASCULAR DISEASE IMPROVE HEALTH OUTCOMES? THE WAY YOU FORMULATE THE SENTENCE, IT SAYS THAT HAVING OTHER DISEASES WOULD IMPROVE PATIENTS’ HEALTH STATUS. ONLY THE “TREATMENT” OF THESE DISEASES COULD IMPROVE PATIENTS’ HEALTH STATUS AND CONFOUND YOUR RESULTS.

2) WHY SHOULD THE STABLE NUMBER OF PATIENTS IN THE CARDIOVASCULAR-DISEASE-(CVD)-REGISTRY DISPROVE THE IDEA THAT THE TREATMENT OF DIABETES-COMORBIDITIES OTHER THAN CARDIOVASCULAR DISEASE, PERSONAL CHARACTERISTICS AND LIFE-STYLE-COUNSELLING COULD ACCOUNT FOR THE OBSERVED OUTCOMES?

3) THE FACT THAT THE NUMBER OF PATIENTS IN THE CVD-REGISTRY HAS BEEN STABLE MIGHT INDICATE THAT THE AMOUNT OF PATIENTS WITH DIABETES AND CARDIOVASCULAR DISEASE HAS BEEN STABLE TOO. THERE WERE NO PATIENTS WITH DIABETES WHO NEWLY DEVELOPED COMORBID CARDIOVASCULAR DISEASE OVER TIME. BUT THIS FACT DOES NOT PROVE THAT THE OBSERVED OUTCOMES ARE NOT CONFOUNDED. IF ALL PATIENTS WITH DIABETES AND CVD RECEIVED A BETTER CVD TREATMENT THIS COULD VERY LIKELY INFLUENCE THE OUTCOMES...IN SUM, THE NUMBER OF PATIENTS IN THE CVD-REGISTRY IS NOT AN ADEQUATE PARAMETER AND DOES NOT SUPPORT THE IDEA THAT THERE ARE NO POTENTIAL CONFOUNDERS.

14) State more precisely what is meant by “with the lack of a control group, the effect of the improvement in the quality indicators on outcomes and cost could be measured.” (Discussion section, paragraph 15) Done, Please see pg. 16 lines
Minor Essential Revisions:
1) Table 3): Add explanation of the abbreviation S.E. (standard error) Done. OK
2) Table 6): Add explanation of the abbreviation NIS (New Israeli Shequel) Done OK
3) Check orthography: “The quality of health care has drawn increasing attention form health care systems during the last two decades” (Background section, paragraph 1) Corrected NO! OBVIOUSLY THE SPELLING OF THE WORD “FROM” IS STILL WRONG (“FORM”)!
4) Check grammar: “In 2004, MHS implemented a "Performance Measurement System" (PMS) that help focus the organization's attention on selected clinical domains including diabetes care.” (Backgrund section, paragraph 3) Done OK
5) Decide whether to use “data” as singular or plural word and use it consistently: “For this task data on death event from the years 2010-2012 were added.” (Statistical Analysis section, paragraph 4); “Although data on hospitalizations specifically related to diabetes are not available, crude national figures indicate a steady increase in hospitalization days between 2000 and 2010 (22).” (Discussion section, paragraph 6); “Data from the United Kingdom has shown that the mortality risk among patients with type 2 diabetes is 1.6 times higher than that of the general population (24).” (Discussion section, paragraph 9); “MHS internal data shows that from 2003 to 2009, the proportion of adult members with any cardiovascular disease has been stable.” (Discussion section, paragraph 15); Done OK
6) Avoid using abbreviations of verbs (can’t instead of cannot): Done “hence, the data can't be appropriately used to substantiate returns on investments in quality.” (Discussion section, paragraph 15) OK

NEWLY FOUND POINTS OF CRITICISM (Minor Essential Revisions)
1) Page 10, paragraph 2: “The poison model”: Check orthography!
2) Table 3: 95%CI in line “HbA1c>9%” is wrong (it must be -0.028, minus sign is missing)

Level of interest: An article whose findings are important to those with closely related research interests
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