Reviewer's report

Title: Determinants of cesarean delivery: a classification tree analysis.

Date: 19 March 2014

Reviewer: Mirko Di Martino

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Determinants of cesarean delivery: a classification tree analysis (REVIEW)
Elisa Stivanello, Paola Rucci, Jacopo Lenzi, Maria Pia Fantini.

General comments.
The topic covered by the authors is undoubtedly of great relevance and interest. In fact, international concern over increases in caesarean sections deliveries have prompted the World Health Organization to suggest that cesarean delivery (CD) rates should not exceed 10% - 15% of the total number of births that occur in industrialized countries. Rates above this threshold could be considered inappropriate, and maternal and neonatal benefits may no longer outweigh the costs and risks associated with this procedure.

The authors conducted a study in an Italian region with a CD rate of about 30%. The aim was to identify which combinations of demographic, clinical and organizational variables best distinguish cesarean from vaginal deliveries. Therefore, the research question is well defined. However, this topic has already been discussed in many scientific papers. The originality of this work lies in the statistical methodology. In fact, classification and regression tree analyses have never been used to predict CD. The differences obtained using different approaches are always interesting and are described in detail in the discussion. The limitations of the study are clearly stated and primarily refer to the type of Health information system (Administrative databases) that they used.

Major Compulsory Revisions.
• Authors should describe more extensively what this study adds to the scientific knowledge already available.

Minor Essential Revisions.
• Page 2, line 45. The conclusions in the abstract seem very vague. Probably, it would be useful to discuss briefly the concepts of "appropriateness of CD" and "audit activities."
• Page 10, line 227. It is not clear what the authors mean: "primiparous women" or "women with no previous cesarean sections".
• Among the "organizational variables", activity volumes (number of births per year) and hospital type were considered in the analysis. These variables refer to a higher hierarchical level than the primary unit of interest (the “birth”, which can be vaginal or surgical). This could alter the statistical properties of the
classification trees (in the statistical literature this question is still open and there are no unique solutions to handle multilevel structures in the context of classification trees). Therefore, I propose to make a further sensitivity analysis excluding these “contextual” variables and then compare the results.

Minor revisions.
List of abbreviations, page 11, line 265: replace “CeAP” with “CedAP”.

Level of interest: An article of importance in its field

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.