Reviewer's report

Title: Evaluation of a Natural Experiment in the National Dental Practice-Based Research Network on Treatment for Early Dental Decay

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Reviewer: Theodorus G (Dirk) Mettes

Reviewer's report:

1. Is the question posed by the authors new and well defined?
Relevant question for implementation of best evidence in dental care. Quite innovative in this field. The research question is clear and well defined. Not quite clear is what is meant by ‘greater concordance’ and ‘disseminate knowledge’ and ‘practice patterns’? It is also unclear which cut off points for statistic and clinical improvements have been used?

2. Are the methods appropriate and well described, and are sufficient details provided to replicate the work?
Methods are in general appropriate described, improvements are needed regarding the description of inclusion and exclusion criteria, regarding the used levels analysis, especially for care providers which have not been explicitly described (provider characteristics).

Statistical methods description needs further improvement: which statistical analyses have been conducted precisely (step by step including measures and outcomes)?

Example: page 11: ‘a series of multivariate logistic, mixed effect . . . were estimated. More explicit: reporting intraclass correlations and explained variance of different applied levels?

The motivation of the performed analysis sequence of four steps is not clear and raise serious questions?. What is missing is an clear overview of the variables applied in the multilevel analysis and the results of each step should be documented for the reader...

3. Are the data sound and well controlled?
The data described are sometimes confusing, especially regarding the counting of the diagnostic codes on page 9 and 10 showing substantially differences (errors in calculation). Numbers described in the text are not always in agreement with the total numbers described in Table 1. (see additional remarks)

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
Improvements should be made in reporting data in methods and results section (see above).
More clarity (relevant information) is needed to improve readability. Text and tables should speak for themselves. Tables need consistent improvement according to the current standards of reporting.

5. Are the discussion and conclusions well balanced and adequately supported by the data?
Some improvements should be made (see additional remarks). Questioning the evidence base of the existing and applied CPG. More elaborate on social theory-driven behavior and the confounding influence of an alternative intervention during the time period (financial incentive) on clinical performance of the three groups? It looks like the results of this study are partly ‘under pressure’
More discussion on how to implement results of PBRN activities (conceptually) is preferable especially on the provider-, patient and practice levels used in this study.

6. Do the title and abstract accurately convey what has been found?
Title could probably more focus on practice change and knowledge translation regarding adherence towards CPG on early dental decay clinical performance in relation to PBRN.

7. Is the writing acceptable? yes

Remarks Reviewer
First of all, this research is of importance as an innovation in dental clinical research, so the authors should be complimented with their research work in PBRN.
Given the contemporary standards of reporting in implementation research substantial improvements should be made. In general these improvements focus on more specific description of the intervention, more clarity in method text, also in tables and figures, more insight in statistical procedures and the motivation of the sequence in which the multilevel analysis were carried out.

ADDITIONAL REMARKS/ SUGGESTIONS:

ABSTRACT
Title: see remark above
Objective: is correct

Results:
• Some data are described with p-values, others with OR. More consistent reporting.

Conclusions:
• ‘PBRN can generate evidence’ is that true? Text Suggestion: PBRN could contribute to knowledge translation of best evidence into clinical practice.
BACKGROUND

• Reporting mainly research on CPG implementation in medical care. There exist also some recent research of implementation of CPGs in dental care (Bahrami et al 2004, van der Sanden et al 2005, Mettes et al 2010).

• Extensive description again on PBRN in medical care regarding professional behavior and PBRN. Is there any additional research on networks in dental care in US or Europe?

• Paragraph sentence: ‘this current study’ employed etc. regarding ‘the diagnosis and treatment of early carious lesions” Next sentence: to study the impact on practice patterns or provider patterns or both?

• Next sentence: Evidence supports….could you report how conclusive this evidence is? And more specific : what was the specific CPG-recommendation to adhere to in this study? Which specific professional tasks/performance acts are behind the different diagnostic codes.

DATA COLLECTION

To improve readability of the manuscript some improvements should be done:

• It would be preferable to describe this section of data collection with explicit inclusion and exclusion criteria for the two sources.

• Furthermore, method of collection data and results should be fully separated here. The results (number of identified codes found) should be described in the result section.

• The counting of numbers is not always appropriate: especially page 9 and 10: for instance, page 10 given the remaining 204,113 diagnostic codes which have changed in 204,112 in the next sentence and the 95,531 missing codes. the outcome should be 108,581 instead of the 107,581 as described.

• Elaborate on the three possible reasons why 95,531 codes were missing is interesting but not relevant to describe in the method section. Discussion section would be more appropriate perhaps with some thoughts on the quality of record keeping in dental care?

• What should be more explicitly described here is an overview of provider characteristic (table) as important part of the multilevel analysis (yet described as ‘demographic data’ in the text). The patient demographics table also raise questions: what is meant by ‘number of findings’ and ‘co-occuring findings’?

ANALYSIS

• What is missing is an clear overview of the variables applied in the multilevel analysis and the results of each step should be documented for the reader.. ?.

RESULTS

• It would preferable to describe in more detail results of provider demographics (characteristics) to give insight in the group of professionals.

DISCUSSION
• Some discussion on what could be seen as an relevant change in provider behavior from a clinical perspective?

• How consistent and solid was the evidence in the CPG referred to in this study? In case of a small evidence base adherence by providers could be questioned?

• Evidence based decision making relies on scientific evidence, clinical expertise and context as well as on patient preferences. Is something known about these patient preferences regarding the restoration decisions in this study?

• Changing professional behavior is complex and substantial research has been conducted over the past decades. Theory-driven approaches to professional behavior change and current knowledge extends Friedson reference (1971) in the text. A review from Eccles et al., 2005 Journal of Clinical Epidemiology could be helpful to elaborate on this important topic.

• The dissemination of best evidence in groups (social environment of peers): exploring some possible others determinants or factors than mentioned (PBRN) here could be interesting.

• The role of opinion leaders, competent peers and experts in transfer of knowledge has been discussed in this section. A reference to research evidence is preferable.

• A main confounding problem is the additional intervention (2010-2011), mentioned in the discussion section. As described ‘pay-for-performance’ incentives could be effective in changing professional behavior. In what way could this financial intervention affect the results in this study? And should ‘this intervention’ not be adjusted for in the analysis? Or could you looking at Figure 1 (blue line) give a explanation why this group of practitioners, in contrast with both other groups did not change performance any more?

• The impact of the national meeting: is this implementation tool cost effective given the small improvement overall?

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests:

no competing interest at all