Reviewer's report

Title: Computerized clinical decision support system for diabetes in primary care does not improve quality of care: a cluster-randomized controlled trial

Version: 0 Date: 23 Aug 2019

Reviewer: Patrick O'Connor

Reviewer's report:

This is a manuscript that will be of wide interest to those interested in clinical decision support (CDS), and which reports the results of Belgian cluster-randomized trial of a diabetes CDS intervention in primary care practices. I have several specific comments on the manuscript:

1. The CDS intervention did not improve either process or outcomes of care, principally because it was used in less than 2% of eligible cases. This point is not emphasized in the manuscript, and needs more emphasis including in the abstract/conclusions section, and the Discussion sections of the manuscript. It would also be helpful to note in the Introduction that careful perusal of prior CDS systems for outpatient diabetes care that failed (Meigs et al, Montori et al) had very low use rates, and systems that succeeded (K Peterson et al; O'Connor et al 2010 Ann Fam Med; Sperl-Hillen et al 2018 JAMIA; E. Kharbanda et al eGEMS) had high use rates. In the Discussion section I suggest mentioning that if a system is not used, you cannot tell if it works or not. First, you have to get it to be used.

2. Please comment in the Discussion section on why the CDS was infrequently used. There are clues in the survey data that are included in this manuscript. Focus sharply on this question, especially if you want to do a follow-up study with a system that may have a better chance of working.

3. A prior publication in Implementation Science provides more detail on this project. However, it is very important that the present manuscript include a paragraph (and maybe some Figures) that describe and illustrate the actual content of the CDS as seen by the primary care clinician. The absence of this in the present manuscript sends the reader on a wild goose chase through the literature. Please fix this major omission.

4. The 6-month and 12-month follow-up periods are too short to detect changes in glucose control and lipid control. This is a design limitation of the study. Please provide the reader with the average length of time between the initial and follow-up measures for BP, A1c, and LDL. These data are very important. Since the study was only 12 months long, and the patient's first visit may not occur at the go-live date for the CDS, the mean follow-up time is going to be too short to detect changes (plus the 2% use rate). Please also indicate whether (a) the analysis was
limited to those that had a second visit, or (b) what you did with those who only had one visit, or one A1c or LDL value--state whether you carried the last value forward.

5. The manuscript is unclear about the "intent-to-treat" analysis. The abstract says 51 PCPs were randomized, but the results appear to include data from only 29 practices. Line 394 and Line 381 indicate why some practices were lost. Please consolidate this information in one place.

6. It would be a great contribution to the literature to create a "box" that lists major challenges that eroded the success of the intervention such as: follow-up time was too short; practices drop out because of IT problems; very low use rates; some docs felt CDS was inaccurate (was it inaccurate or incomplete?); etc.

7. Only about 100 diabetes patients per practice were analyzed. Were their any exclusion criteria for using a patient in the analysis? Please state them (age, type of diabetes, number of visits, etc.).

8. You report changes in A1c, LDL, and BP for all patients. However, at baseline many patients were already at goal. Please add additional results reporting the changes in A1c, BP, and LDL only for the subset of patients who were above clinical goal at baseline.

9. Line 137: Please state how you defined the "baseline time point."

10. Line 143: The CDS included "diabetes specific reminders and suggestions." Please expand on this and show the interface the clinicians saw. State whether the CDS was designed to be given to or shared with patients, and whether the CDS suggestions were prioritized in any way, or listed in a certain sequence. Generally speaking, prioritized CDS is more useful than non-prioritized CDS to primary care clinicians.

11. In addition to diabetes CDS, how many other CDS suggestions were provide at each visit, on average. You give (line 243 ff. the mean number of diabetes CDS messages per practice per month. How many were delivered a the average diabetes visit of a single patient? In my medical group, reminders have been deemed ineffective except for cancer prevention and immunizations, and we are actively eliminating reminders.

12. Line 3245: Many clinicians deemed the reminders to be "irrelevant." Say which ones were most irrelevant. If you were revising the CDS, how would you re-design it? That advice could help readers a LOT.
13. Did you do a pilot test? Why not?

14. I hope you will re-load and try again.

15. You need some newer references.

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