Author's response to reviews

Title: Effect of Point of Care Information on Inpatient Management of Bronchiolitis

Authors:

W. James King (king@cheo.on.ca)
Nicole Le Saux (lesaux@cheo.on.ca)
Margaret Sampson (msampson@cheo.on.ca)
Isabelle Gaboury (igaboury@cheo.on.ca)
Mark Norris (mnorris@cheo.on.ca)
David Moher (dmoher@cheo.on.ca)

Version: 2 Date: 17 November 2006

Author's response to reviews: see over
November 6, 2006

Dr Lolu da-Silva
Assistant Editor, BMC-series journals

Re: Manuscript #: 1489980610951895 Effect of Point of Care Information on Inpatient Management of Bronchiolitis

Dear Dr. da-Silva:

Thank you for accepting our manuscript for publication in your prestigious journal. Careful consideration has been given to the comments of the reviewers and the manuscript has undergone appropriate revision. Enclosed is a revision that includes expanded sections that address many of the key issues the reviewers raised.

Responses to specific reviewer comments are attached.

Thank you very much for your consideration. The reviewers have provided helpful comments that have substantially improved the manuscript. I look forward to your comments of the revised manuscript.

Sincerely,

W. James King, MSc MD FRCPC
Medical Director of Informatics
Children’s Hospital of Eastern Ontario
Associate Professor of Pediatrics
University of Ottawa
401 Smyth Road
Ottawa, Ontario, Canada K1H 8L1
Referee 1: Reviewer’s report
Title: Effect of Point of Care Information on Inpatient Management of Bronchiolitis
Version: 1 Date: 17 October 2006
Reviewer: Sophie Gosling
Reviewer’s report:
General

---------------------------------------------------------------------

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

p.8 give statistics on medical students and paediatric residents differences

Done. Page 8 has been revised to the following “Fifty surveys were returned (90% response rate) from medical trainees; 19 (38%) residents and 31 (62%) medical students.”

p 9. If so few of them looked at/found helpful the CEM, how can you be sure this was what was affecting their decisions? Did you ask them that question directly? Give other alternative explanations for change/make it clear you cannot be sure it was the CEM that directly affected this change.

The reviewer’s comments are helpful and I offer the following explanation. While all the medical students stated they did not review the CEM the majority of the residents did review the CEM. All medical student orders are reviewed by the residents so they would have the opportunity to impart the information they had gained from having seen the CEM. While not all residents stated that they found the CEM useful we did see a change in outcome for Bronchiolitis orders (while antibiotic orders for conditions did not change). We do not know of any other changes in implementation strategies during the study period, e.g. written/electronic guidelines, lectures, or handouts, it would be unlikely that they would have only influenced orders for patients with Bronchiolitis.

On page 9 in the discussion of limitations I have added the following “Though we were not aware of any, other changes in bronchiolitis treatment patterns or antibiotic usage during the study period, such as written or electronic guidelines, lectures, or handouts, may have influenced orders.”

p. 10. Reword- ‘All trainees’ to ‘All medical students’ to make it clear that not all the residents were enthusiastic about the CEM.

Agree that this statement is not clear. I have reworded “All trainees” to “The majority of trainees as all junior trainees (including junior residents) and 71% of senior residents were enthusiastic about the CEM.”

Include the survey questions as appendix.

Done as Appendix 1.
Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

p.6 explain how and why you adjusted analyses for age.

Analyses for age were adjusted due to the significant difference between the age groups pre and post intervention. I have changed the text on page 7 from “All subsequent analyses were adjusted for child’s age” to “Due to a significant difference in age between pre- and post-intervention groups, all subsequent analyses were adjusted for child’s age within the regression model.”

p.7 include power calculations and expected effect sizes, and then actual effect sizes of the changes.

There are concerns regarding the utility of post-hoc power calculations in the statistical literature (see The Abuse of Power: The Pervasive Fallacy of Power Calculations for Data Analysis. John M. Hoenig, Dennis M. Heisey. The American Statistician 2001: 55(1); 19-24.). However, in order to give a better representation of the effect sizes of the changes we have included in Table 2 differences in point estimates along with 95% confidence intervals for the outcomes where statistical comparisons between the two study groups were performed.

p.7 p value (0.016) doesn't match p value in table 2 which is quoted as 0.019 (regarding the proportion of patients)

This was a typo and has been corrected. The actual value is 0.019.
I also identified a typo in table 2; the post-intervention group median age is 0.36 (not 0.48 as previously stated).

p.8 remove ‘increased insignificantly’.

Agreed and done.

Discretionary Revisions (which the author can choose to ignore)
p. 7 explain how you arrived at your relative decrease of 37%.

The proportion of patients receiving antibiotics fell from 35% to 22%. The relative decrease would be 35-22/35 = 37%. No change made to manuscript.

What next?: Accept after minor essential revisions
Level of interest: An article whose findings are important to those with closely related research interests
Referee 2: Reviewer's report
Title: Effect of Point of Care Information on Inpatient Management of Bronchiolitis
Version: 1 Date: 23 October 2006
Reviewer: Vitali Sintchenko

Reviewer's report:
This manuscript contributes to the emerging body of knowledge on point-of-care prescribing decision support and focuses on the assessment of the computerised physician order entry system on inpatient management of bronchiolitis. The authors describe the local computerised physician order entry (CPOE) system deployed at the Children's Hospital of Eastern Ontario and explore its effects on the prescribing of antibiotics and bronchodilators. The choice of this high-frequency but often suboptimal decision task seems to be the most important factor that determines the positive findings of the intervention. The data obtained is sound. Although the quasi-experimental time-series design employed in the study is powerful in detecting differences in periods prior to and after the intervention, its internal validity may be affected by historical events such as concurrent antibiotic prescribing studies or educational sessions, the maturation of residents' skills, or the uptake of CPOE (ie compliance with CPOE) recommendations.

This paper will be of interest to clinicians and health informaticians because it provides a good example of how a properly designed and implemented system of prescribing decision support may contribute to the improvement of clinical practice.

Recommendations and questions to authors
In my opinion, the paper requires a minor revision. This paper is well written and descriptive, however, the clarification of some issues is desirable.

1. The most important confounding variable in the before-after approach is the innate characteristics of study participants. The number of clinicians (residents and medical students) that were both given the opportunity to use the CPOE system and did so should be clarified. Did they receive any specific training?

How often did they use the system? How much difference was there between the characteristics of clinicians in both arms of the study?

The reviewer's comments are very helpful. During the period of use of the clinical evidence-based bronchiolitis module there were 55 clinicians that used the CPOE system. Each participant received a 20 minute training session.

We attempted to log the number of users that accessed the CEM during the study but we unable to do so due to the way the software was developed (allowed users to view the information without tracking them). Unfortunately, we do not have detailed information on characteristics of the clinicians other than knowing that a similar number and of trainees (medical students and residents) at similar levels of training were present in each arm of the before-after study.
2. This study design does not control for temporal trends in management, therefore its limitations should be fully described, ie it should be acknowledged that the trial demonstrated associations between the use of intervention, the observed outcomes and the process measures, but could not prove a direct cause-and-effect relationship. The issue of the internal validity of findings should be discussed.

Agreed. The limitations paragraph on page 9 has been rewritten to include these comments.

3. I would like to see a comment on the generalisability of these findings. It would also be appropriate to refer to the body of knowledge on the impact of prescribing decision support that has been accumulating in medial informatics literature (eg Miller RA et al. The anatomy of decision-support during inpatient care provider order entry (CPOE): Empirical observations from a decade of CPOE experience at Vanderbilt. J Biomed Informatics 2005;38:469-485; Kaushal R, et al. Effects of computerised physician order entry and clinical decision support systems on medication safety. A systematic review. Arch Intern Med 2003;163:1409-1416).

From this point of view, two important but different roles for decision support within CPOE (that define the nature of intervention) should be clarified:
(a) providing patient-specific clinical decision support (eg, ‘behind the scenes’ reconciliation of patient-specific information (lab results, allergies, etc) with stored ‘best practice’ rules and issuing alerts or suggestions, and
(b) providing just-in-time, focused education relevant to patient care.

Excellent comments that I have incorporated in revisions of the first two paragraphs in the discussion on pages 8 and 9.

4. Table 3 can be safely omitted from the manuscript.

Agreed and done.

5. Occasional typos (eg, Ribaviran (page 6, line 12) should be corrected.

Corrected.

What next?: Accept after minor essential revisions
Level of interest: An article of importance in its field