

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Triage in Preventive Child Health Care: a Prospective Cohort Study of Care Use and Referral Rates for Children at Risk
AUTHORS	Bezem, Janine; Kocken, Paul; Kamphuis, Mascha; Theunissen, Meinou; Buitendijk, Simone; Numans, Mattijs

VERSION 1 – REVIEW

REVIEWER	Ronny Cheung Evelina London Children's Hospital Guy's and St Thomas' NHS Foundation Trust London
REVIEW RETURNED	16-Mar-2017

GENERAL COMMENTS	<p>This paper describes a large scale change in practice in well child assessments over a large geographical region. The main outcome is whether the addition of a “pre-assessment” visit from a nurse has implications for rates of referral and further assessments compared to standard care.</p> <p>This is generally well written but a major criticism is the confusing terminology used throughout to describe the various stages of assessment. The terms “pre-assessment” “routine assessment”, “follow up assessment”, “assessment on request” and “referrals for assessment” are interspersed throughout but without each being clearly defined. Some definitions (ir ideally different terms) would be helpful. A diagrammatic representation of the various assessments in each arm would clarify this greatly.</p> <p>As I understand it, the “pre-assessment” is synonymous with the “triage”, and the triage approach essentially consists of one nurse assessment which then filters out the initial “doctor assessment” (which would have been the first and sometimes only visit in the standard care model). If this is the case then really the intervention of the triage method should consist of both the nurse and doctor visit, with onward referrals or subsequent follow up visits being the main outcome. The need for a ‘first’ doctor assessment in the triage arm is important to assess the resource implication of the intervention but is clearly not directly comparable across the two arms, as the authors seem to suggest. This all adds to a rather muddled feel to the paper which needs addressing.</p> <p>Otherwise the paper is well written and the project design, methods and results are well described. As a result of the confusion though between all the terms as described above (and how they are occasionally used interchangeably) I have found it very difficult to identify what the results actually show, and how to interpret the discussion.</p>
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	While there is mention of cost analysis in a previous study suggesting the intervention cost is a third less than the standard care, there is no attempt to relate this to the overall resource use (ie change in referrals, follow up visits etc) which is the purpose of the paper. Some simple analysis on this point would considerably strengthen the reader's ability to understand whether this intervention is actually cost effective, or whether it simply shifts the cost from the visits themselves to further downstream.
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REVIEWER	Katherine Hobbs Knutson, MD MPH Duke University Health System, North Carolina, USA
REVIEW RETURNED	11-Apr-2017

GENERAL COMMENTS	<p>This study addresses a very important issue and sheds light on methods of delivering preventive care that may improve efficiency. However, the paper is poorly written, and so the objectives, approach, methods, and results are unclear. From the tables in the results section, I can see that important information may be gleaned from this evaluation. But the communication of these results in the body of the paper is poor. I recommend that the authors ask an outside seasoned health services researcher to review and edit the paper prior to resubmission.</p> <p>Overall comments:</p> <ol style="list-style-type: none"> 1. The authors need to clearly state the study objectives at the beginning (including in the abstract) and carry those objectives throughout the paper. The most clear statement of the objectives that I could find was on page 10 lines 48-54. However, at line 50, the term "routine assessments" needs to be defined earlier in the paper and that term used consistently throughout the paper. I don't know if "routine assessments" means the assessments provided by the front line nurses, all of the baseline assessments completed by the PCH professionals (in either the triage or usual method), or something else. Also in line 50, the authors refer to the "number" of children when I think they mean a rate – this issue is addressed next. 2. Throughout the paper, the authors shift between language on the absolute number of children versus reporting a rate. Because the baseline numbers of the index population are different, the authors should exclusively report the rate or proportion, not the absolute number, of children with each outcome. This is a problem in the abstract lines 42-50; page 10 line 50; page 12 line 56; page 13 lines 27-34; page 16 lines 1-19, page 17 lines 45-52. 3. The results section should be organized with large headers defining the type of problem (weight, vision, or psychosocial) and the results of each outcome clearly defined within those headers. Or the authors could create large headers with each study outcome, organized clearly within those headers according to the health problem (weight, vision, or psychosocial). In the current writing, the results are not clearly defined, and so communication of the findings is severely compromised. 4. For the second study outcome evaluating referrals from parents or school professionals, throughout the paper, the reporting should be on rates of referral, not absolute number.
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	<p>The denominator for the rate should be number of children, or number of professionals (teachers, school administrators). The index population numbers of children and school staff are different for the study groups, so reporting on absolute numbers is not helpful.</p> <p>5. There needs to be a single title for the triage method and a single title for the usual method that is used throughout the document. At the top of page 7, for example, these titles should be introduced as the two different systems are being defined.</p> <p>Specific comments:</p> <ol style="list-style-type: none"> 1. Abstract line 9, define “assistants” as PCH assistants and list their educational title. 2. Abstract line 15, define “pay more attention.” Does this mean the professionals have more time in the encounter, have improved focus on certain issues, or something else? 3. Abstract line 17, define “extra” PCH care. Is this referrals to external sites or repeat PCH evaluations? 4. Abstract line 25-30, describe that these study groups were stratified. Also “services” is actually a geographic region I think – this term should be defined. 5. Abstract line 38, see the “overall comments” number 4 above. 6. Abstract line 54-56, conclusion needs to be revised to better reflect the main objectives and findings of the study. 7. Page 6 line 19, explain why reducing workloads for physicians and nurses is important. 8. Page 6 line 23, define “task shifting” 9. Page 6, line 23-24, define “return consultations by nurses.” Are these follow up visits after an initial evaluation? If so, then why are there more return visits? i.e. Are the nurses better at making connections with patients and so they are more likely to engage in care, or are they less efficient than physicians and so patients have to return multiple times to achieve the same outcome compared to physicians? 10. Page 6, line 30 define the benefits of the task shifting for patients. 11. Page 6 line 31 should indicate that this the purpose of PCH services in the Netherlands. Preventive health services elsewhere may have a different focus. 12. Page 6 line 50-52, please fix the sentence structure. The sentence is not clear. 13. Page 6 line 54-56, need to flesh out this assertion. Why does the PCH program need to be more flexible? Is there a backlog of referrals, long wait list, is the need for evaluation seasonal, or something else? Is there a problem accessing these evaluations?
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	<p>14. Page 7 line 5, clearly name the people who do the initial evaluation in the triage method – are these PCH assistants? If so, please call them PCH assistants throughout the document. Furthermore, at this point label the PCH physicians and nurses as “PCH professionals” and refer to them only as PCH professionals throughout the document. This will substantially improve clarity.</p> <p>15. Page 7 line 37, “attendance” is unclear. Whose attendance? The child? Or maybe the authors intend to say “completed PCH evaluation.”</p> <p>16. Page 7 line 48, it appears that the phrase “extra attention” is used incorrectly. I think the authors are trying to say the PCH professionals are able to see a higher volume of children. This is stated more clearly on page 10 lines 48-50.</p> <p>17. Page 8 line 23, define what a “PCH service” is. From the paper, it sounds like this is a geographic region.</p> <p>18. Page 8 line 29 should potentially read “was randomly selected from these 4 services”?</p> <p>19. Page 8 line 35-36, define “referral rate.” Is this the referral from the initial assessment by the PCH assistant in the triage method, the referral from the PCH evaluation by professionals to further PCH evaluation, or the external referrals following PCH evaluation by professionals?</p> <p>20. Page 8 lines 39-41 and 50-54 should be included in the results section, not the methods.</p> <p>21. Page 8 line 50, define what is being evaluated here. Did you look at school records for the request? What is the process for school staff or parents making these requests and how were data collected and reviewed? This information is provided on page 10 lines 38-42.</p> <p>22. Page 9 lines 10-27 “assessments on request” and line 42 “follow-up assessment” are not clear. This language should be consistent throughout the paper – are these the assessments requested by the parents and school professionals, by the PCH assistant in the triage method, or by the PCH professional following evaluation? The authors should pick a title for each of these types of assessments, define them early in the paper, and use consistent language throughout.</p> <p>23. Page 9 line 15, do you look at referrals to PCH made by parents and school professionals that were not fulfilled? This would be an important measure of efficiency to compare between the two methods.</p> <p>24. Page 9 line 21, “checked manually” for what?</p> <p>25. Page 10 line 7-11, identifying socioeconomic status (SES) by census tract and postal code should be listed as a limitation of the study in the discussion. Or cite a reference indicating that the population within these census tracts and postal codes are homogeneous. I would suspect that it is possible for people of different SES to be living in the same geographic region. Also in the results (table 1), despite choosing the PCH sites based on SES, the study groups were not matched on SES.</p>
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	<p>So this method of identifying SES by census tract and postal code may be an acceptable proxy, but has limitations.</p> <p>26. Page 11 lines 5-15 is unclear due to language and sentence structure. Need to rewrite.</p> <p>27. Page 11 lines 17-19, what is "general referral?" See comments for number 22 above that also apply here.</p> <p>28. Page 11 lines 5-31, it doesn't appear that gender was included in the analysis, but gender is reported as a variable later.</p> <p>29. Page 11 line 27, define "type of approach." Again, consistent language would be helpful here.</p> <p>30. Page 11 lines 5-31, was there correction for multiple comparisons? Or was this needed?</p> <p>31. Page 11 lines 33-51, the authors need to communicate that the rates of referrals made by parents/school professionals and the rates of completed evaluations for these children referred by parents/school professionals were calculated. From this information, the authors can improve our understanding of changes in efficiency between the two service delivery methods.</p> <p>32. Page 13 line 11 define "PCH assessments." It appears these are defined on page 13 lines 42-44.</p> <p>33. Page 13 lines 15-23, define "extra care." What is the difference between extra care, referral for further PCH evaluations and external referrals?</p> <p>34. Page 13, these results could indicate that by the triage method, children with more severe problems are being identified earlier and referred. This would be a meaningful outcome. However, I can't tell if this is an appropriate interpretation of the results. Also I don't know if this is true for all 3 health conditions – need to break down the results by health condition to make this clear.</p> <p>35. Table 1, in the first column define assessments by who is conducting them, i.e. "PCH assistants" or "PCH professionals" (the physicians and nurses).</p> <p>36. Table 1, put a marker next to significant results.</p> <p>37. Table 1, it appears that for the psychosocial problems there is no difference in outcomes from the 2 service delivery methods. Again, this would be an important finding indicating that the triage method is more efficient (i.e. same outcome at lower cost, or some outcome with improved capacity or access). If this is a correct interpretation, then it needs to be clearly communicated in the body of the paper.</p> <p>38. Page 15 lines 3-21, need to be careful to point out the rate of referral by parents/school staff and the rate of completed evaluation for these children referred by parents/school staff. Comparison of these rates would help clarify if the triage method results in improved access to PCH services.</p>
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	<p>39. Table 3, it appears there is no difference in outcome comparing these methods. If this is true, then this again would show the triage method is more efficient (see number 37 above).</p> <p>40. Page 16 lines 1-19 should be presented according to the health condition (vision, weight or psychosocial).</p> <p>41. Page 16 line 11, what does “targeting of PCH care” mean? I think the authors are referring to efficiency.</p> <p>42. Page 16 lines 27-31, this assertion is not founded based on the results of this paper. Specifically, there are no data on what actually happened during the PCH evaluations by either method. Need to soften this to say that this is a possible explanation.</p> <p>43. Page 16 lines 44-56, it is possible that the psychosocial problem was resolved during the PCH evaluation by professionals (nurses and doctors).</p> <p>44. Page 17 lines 13-19, this information should have been included in the methods section. Page 19 lines 50-56, the conclusions should be revised to communicate the most pertinent findings of the study, according to the study</p>
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REVIEWER	Jose M Rodriguez-Llanes European Commission Joint Research Centre, Italy
REVIEW RETURNED	26-May-2017

GENERAL COMMENTS	<p>Statistical Review</p> <p>Thanks for the opportunity to review the statistics of this manuscript.</p> <p>The authors wrote that "A sample of primary schools, stratified for socio-economic status (low, middle and high status) and urban or rural area was randomly selected: 20 schools that used the triage approach were matched with 21 schools that used the usual approach. The socio-economic status of the schools was determined using national census statistics".</p> <p>The authors need to provide more details on the matching process. For example, did they use a 1:1 matching ratio, and if so how did they deal with the unequal number of schools. Did the authors use exact matching based on the joint distribution of these two variables? A table, maybe in the Annex, could be used to explain this.</p> <p>It is also not clear what was the duration of the cohort of two samples of around 1000 children. While in the second part they said it lasted 12 months.</p> <p>The authors wrote in page 9 "For the sake of completeness, a random sample of the dataset from the PCH records was checked manually".</p>
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	<p>What was the exact size of this sample and what was the outcome of the assessment. What was the level of data completeness, and what actions taken, if required?</p> <p>All findings in the paper are expressed as Odd Ratios (OR) though they are no mentioned in the methods (statistics section). An adequate description is required.</p> <p>The reasoning for using Chi Square or Fisher tests needs to be explain.</p> <p>The sample sizes reported in the methods are larger than in the results. If sample attrition occurs, the authors should explain it either with a flow diagram or in the body text.</p> <p>The authors need to confirm that this is a prospective and not a retrospective cohort. They mention that they used registered data. If the authors collected the data retrospectively using existing registries, they should call the study a 'retrospective cohort'.</p>
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REVIEWER	Katherine Donegan Medicines and Healthcare products Regulatory Agency, UK
REVIEW RETURNED	08-Jun-2017

GENERAL COMMENTS	<p>Statistical reviewer comments:</p> <p>Abstract</p> <p>1) Some clarity is needed as to the comparisons being made in the results presented.</p> <ul style="list-style-type: none"> “Overall, more children were referred to additional PCH assessments (OR 1.3, 95%-C.I. 1.0-1.6)” – it is not completely clear what the two groups being compared are or which is being used as the baseline. “Fewer children from the two age groups” – these two age groups should be defined. <p>Article summary</p> <p>2) It would be useful if the potential implications of the fourth bullet point (“We were not allowed...”) could be included.</p> <p>Procedures</p> <p>3) Figure 1: A note should be added explaining why there are any differences between the number presented in this version of the figure and the figure presented in reference 20 which is based on the same study. For example, in this figure 444 children were referred using the triage approach following routine assessment but in Figure 1 in ref 20 this figure was 424. It appears that these data are from the same study and that the data cut off time is the same (December 2012).</p> <p>Results</p> <p>4) Exact p-values should be presented in Table 1 rather than just indicating which were significant.</p>
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	<p>With such small numbers in some groups is it unsurprising that few differences were found but presenting all p-values could help understand better the potential for more subtle differences in the two groups.</p> <p>5) There is clearly some missing covariate data (e.g. usual approach routine = 923 children but 468 ≤ 8 years and 436 ≥ 9 years suggests that age was missing for 19 children). The number of children with missing covariate data should be highlighted and the STROBE checklist updated.</p> <p>6) Absolute numbers should always be presented alongside the reported percentages.</p> <p>7) It would be useful for p-values to be presented alongside the confidence intervals for the odds ratios.</p> <p>8) Care should be taken that when comments such as “that there were more referrals to additional PCH assessments” are made. It might be useful if this was clarified – is it more in absolute and/or proportional terms?</p> <p>9) There is quite a lot of repetition in the text of the data in Table 2. This could be reduced for brevity.</p> <p>Discussion</p> <p>10) Given the missing covariate data (as discussed in comment 5 above) there needs to be a justification regarding why the analyses have not accounted for it and the potential implications of it on the results.</p> <p>11) It is stated that “Fewer children from both age groups were referred to external services when triage was used rather than the usual approach”. However, I couldn’t find where the results are to fully justify this conclusion.</p> <p>12) The discussion would benefit from consideration of the power of this study to assess potentially important differences and the potential robustness of extrapolating from a small number of schools.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Ronny Cheung

Evelina London Children's Hospital, Guy's and St Thomas' NHS Foundation Trust, London

1. This paper describes a large scale change in practice in well child assessments over a large geographical region. The main outcome is whether the addition of a “pre-assessment” visit from a nurse has implications for rates of referral and further assessments compared to standard care. This is generally well written but a major criticism is the confusing terminology used throughout to describe the various stages of assessment. The terms “pre-assessment” “routine assessment”, “follow up assessment”, “assessment on request” and “referrals for assessment” are interspersed throughout but without each being clearly defined. Some definitions (or ideally different terms) would be helpful. A diagrammatic representation of the various assessments in each arm would clarify this greatly. As I understand it, the “pre-assessment” is synonymous with the “triage”, and the triage approach essentially consists of one nurse assessment which then filters out the initial “doctor assessment” (which would have been the first and sometimes only visit in the standard care model). If this is the case then really the intervention of the triage method should consist of both the nurse and doctor visit, with onward referrals or subsequent follow up visits being the main outcome. The need for a ‘first’ doctor assessment in the triage arm is important to assess the resource implication of the intervention but is clearly not directly comparable across the two arms, as the authors seem to suggest. This all adds to a rather muddled feel to the paper which needs addressing.

[RESPONSE]: We can imagine that the terminology used to describe the different stages of the assessment procedures may be confusing. The pre-assessments accessible to all children are conducted by PCH assistants, who select children with health concerns for a follow-up assessment by a PCH physician or nurse. We have modified the text in the Background section to clarify the different assessment stages and the differences between the two approaches. In addition, we have added Figure 1, a glossary of the various types of assessment used in the two approaches.

We have modified the following sentences in the Background section.

From: A PCH assistant first assesses children with a strict pre-assessment protocol based on questionnaires completed by parents and schoolteachers and face-to-face screening. The PCH assistant refers only the children with suspected health concerns to a follow-up assessment by a PCH physician or nurse.

To: In the triage approach, children are pre-assessed by a PCH assistant using a strict protocol which includes the completion of questionnaires by parents and teachers and face-to-face screening (that covers areas such as growth, hearing and vision). Only children with suspected health concerns are selected by the PCH assistant for follow-up assessment by a PCH physician or nurse. The triage approach results in less involvement of physicians and nurses in routine assessments.

And we have added following sentences in the Background section.

PCH assessments traditionally provide snapshots of the dynamic process of development and growth of children at isolated points in time, even though most children will have no problems at those times. PCH should improve its accessibility, be more available for children and parents throughout the school period, and offer care when it is needed.

The reviewer has a good point that the initial doctor assessment in the triage approach is not comparable with the assessment by the doctor in the usual approach. However, in our study we are interested in whether the differences between the two approaches have an impact on the referral rates by PCH to extra care and to the extra assessments and we do not compare the two doctor assessments.

2. Otherwise the paper is well written and the project design, methods and results are well described. As a result of the confusion though between all the terms as described above (and how they are occasionally used interchangeably) I have found it very difficult to identify what the results actually show, and how to interpret the discussion.

[RESPONSE]: See also our comment above. We hope the clarification of the terminology will also clarify the results and discussion.

3. While there is mention of cost analysis in a previous study suggesting the intervention cost is a third less than the standard care, there is no attempt to tolerate this to the overall resource use (ie change in referrals, follow up visits etc) which is the purpose of the paper. Some simple analysis on this point would considerably strengthen the reader's ability to understand whether this intervention is actually cost effective, or whether it simply shifts the cost from the visits themselves to further downstream.

[RESPONSE]: We agree with the suggestion that the triage approach is cost-effective is based solely on a comparison of the costs of routine assessments in the two approaches. An examination of the costs of extra care and referrals would require new data collection and analysis and this is outside the scope of the research questions covered by this manuscript. Further research is needed to study the costs of onward referrals and subsequent assessments to determine whether the triage approach is actually cost-effective.

We have modified and moved the following text from the Implications for practice section to the Further research section.

From: The costs required to assess all children have to be in balance with the extra care for children with specific needs. Our study of the costs of triage showed that this approach to routine PCH assessments, with the shifting of tasks from physicians to PCH assistants, resulted in a cost reduction of about one-third for the 5 to 6 years age group while providing basic care for all children. A minimal cost reduction was found for the 10 to 11 years age group[28].

To: Our study of the costs of the routine assessments in the two approaches showed that the triage approach resulted in a cost reduction of about one-third for the age group of 5 to 6 years and a minimal cost reduction for the age group of 10 to 11 years [28]. Further research is needed to study the costs of onward referrals and subsequent assessments to determine whether the triage approach is actually cost-effective.

Reviewer: 2

Katherine Hobbs Knutson, MD MPH
Duke University Health System, North Carolina, USA

Comment: This study addresses a very important issue and sheds light on methods of delivering preventive care that may improve efficiency. However, the paper is poorly written, and so the objectives, approach, methods, and results are unclear. From the tables in the results section, I can see that important information may be gleaned from this evaluation. But the communication of these results in the body of the paper is poor. I recommend that the authors ask an outside seasoned health services researcher to review and edit the paper prior to resubmission.

[RESPONSE] We have reviewed the manuscript. Further, we have modified the text in the Background section to clarify the different stages of assessments and the differences between the two approaches and we have added Figure 1 to describe the different assessment types used in both approaches. See also our response to comment 1, reviewer 1.

Overall comments:

1. The authors need to clearly state the study objectives at the beginning (including in the abstract) and carry those objectives throughout the paper. The most clear statement of the objectives that I could find was on page 10 lines 48-54. However, at line 50, the term "routine assessments" needs to be defined earlier in the paper and that term used consistently throughout the paper. I don't know if "routine assessments" means the assessments provided by the front line nurses, all of the baseline assessments completed by the PCH professionals (in either the triage or usual method), or something else. Also in line 50, the authors refer to the "number" of children when I think they mean a rate – this issue is addressed next.

[RESPONSE] The routine assessments are defined as the health assessments accessible for all Dutch children using a pre-defined age schedule conducted by means of a triage approach or by the usual approach. We have modified the text in the Background section to clarify the different types of assessments and the differences between the two approaches and we have added Figure 1 to describe the different assessment types used in both approaches> See also our response to comment 1. We have checked the manuscript for the consistent use of terminology.

We have also provided a clearer description of the objectives of the study throughout the manuscript. We have modified the sentence in the Abstract section as follows.

From: We explored the impact of triage and task shifting on extra PCH care and referral by PCH.

To: The objective of the study was to examine the impact of triage and task-shifting on care for children at risk, identified by PCH or parents and schools.

And in the Background section:

From: We addressed the following research questions:

To: It addresses the following research questions.

2. Throughout the paper, the authors shift between language on the absolute number of children versus reporting a rate. Because the baseline numbers of the index population are different, the authors should exclusively report the rate or proportion, not the absolute number, of children with each outcome. This is a problem in the abstract lines 42-50; page 10 line 50; page 12 line 56; page 13 lines 27-34; page 16 lines 1-19, page 17 lines 45-52.

[RESPONSE] We have now exclusively reported the rates instead of numbers of children throughout the manuscript. Please find below the modified sentences cited by the reviewer.

We have modified the sentence in the Abstract section as follows.

From: Overall, more children were referred to additional PCH assessments (OR 1.3, 95%-C.I. 1.0-1.6), mainly in the 5 to 6 years age group (OR 1.9, 95%-C.I. 1.3-2.7). Fewer children from the two age groups were referred to external services in the triage approach than in the usual approach (OR 0.4, 95%-C.I. 0.3-0.7). More PCH assessments were performed on request in the triage approach (OR=4.6, 95%-C.I. (3.0-7.0)).

To: Overall, a higher referral rate to additional PCH assessments was found for the triage approach than for the usual approach (OR 1.3, 95%-C.I. 1.0-1.6), mainly in the age group of 5 to 6 years (OR 1.9, 95%-C.I. 1.3-2.7). We found a lower rate of referral to external services in the triage approach (OR 0.4, 95%-C.I. 0.3-0.7) and a higher referral rate to PCH assessments on request (OR=4.6, 95%-C.I. 3.0-7.0).

And we modified the sentence in the Study outcomes section as follows.

From: The secondary outcomes were the number of children receiving assessments on request, including the party requesting the assessment and rates of referral to further PCH assessment or to external services.

To: The secondary outcomes were the rates of PCH assessments on request, and rates of referral to additional PCH assessment and to external services resulting from these assessments.

And we have modified the sentences in the Referral to additional PCH assessments or to external services section as follows:

From: We did not find differences between the total numbers of children referred to extra care (in other words, the children referred to additional PCH assessments and/or to external services) in the two approaches

To: We did not find any differences between the total group of children referred to extra care (in other words, the children referred to additional PCH assessments and/or to external services) in the two approaches

And in the same section:

From: We found no difference between the triage and usual groups in terms of the total number of referrals of children with psychosocial problems to extra care.

To: We found no difference between the triage and usual groups in the percentage of children with psychosocial problems who were referred to extra care.

We have modified the following sentences in the Discussion section as follows.

From: We did not find any differences between the total numbers of children referred to extra care in the two approaches. However, more children aged 5 to 6 years and fewer children aged 10 to 11 years were referred to additional PCH assessments. Fewer children from both age groups were referred to external services when triage was used rather than the usual approach.

To: We did not find any differences between the total sum of referral rates to additional PCH assessments and external services in the two approaches. However, the referral rate to additional PCH assessments was higher in children aged 5 to 6 years and lower in children aged 10 to 11 years in the triage approach. The referral rates to external services were lower for both age groups when triage was used rather than the usual approach.

And in the same section:

From: More PCH assessments at the request of these parties were found in the triage approach but these findings must be treated with caution because of the low numbers involved.

To: Higher rates of PCH assessments on request were found in the triage approach but these findings must be treated with caution because of the low numbers involved.

3. The results section should be organized with large headers defining the type of problem (weight, vision, or psychosocial) and the results of each outcome clearly defined within those headers. Or the authors could create large headers with each study outcome, organized clearly within those headers according to the health problem (weight, vision, or psychosocial). In the current writing, the results are not clearly defined, and so communication of the findings is severely compromised.

[RESPONSE] We thank you for your suggestion of organising the Results section using headers defining the type of the health problem. We have reorganised the Results section and have added headers in italics for each health problem.

4. For the second study outcome evaluating referrals from parents or school professionals, throughout the paper, the reporting should be on rates of referral, not absolute number. The denominator for the rate should be number of children, or number of professionals (teachers, school administrators). The index population numbers of children and school staff are different for the study groups, so reporting on absolute numbers is not helpful.

[RESPONSE] We have adopted your recommendation to report rates instead of numbers throughout the manuscript. The denominator for the rate is always the number of children belonging to a specific part of the study group. See also our reply to comment 2. The number of professionals is not used anywhere as the denominator for the rate.

5. There needs to be a single title for the triage method and a single title for the usual method that is used throughout the document. At the top of page 7, for example, these titles should be introduced as the two different systems are being defined.

[RESPONSE] We have now used triage approach and usual approach throughout the manuscript. We have introduced both approaches in the Background section as the two different systems used for the two study groups and in Figure 1.

Specific comments:

1. Abstract line 9, define “assistants” as PCH assistants and list their educational title.

[RESPONSE] We have modified the following sentence in the Abstract section as follows.

From: Assistants carried out pre-assessments of all children to select children for follow-up assessments by a physician or nurse.

To: PCH assistants carried out pre-assessments of all children to select children for follow-up assessments by a physician or nurse.

And we have modified the following sentence in the Background section.

From: In the usual approach, all children are assessed by a PCH physician or nurse, who will sometimes receive support from PCH assistants.

To: In the usual approach in PCH all children are initially assessed by a PCH physician or nurse, who will sometimes receive support from PCH assistants who have been trained at the secondary vocational level that focuses specifically on medical issues.

And we have added the following sentence to the Background section.

In the triage approach children are pre-assessed by a PCH assistant.

2. Abstract line 15, define “pay more attention.” Does this mean the professionals have more time in the encounter, have improved focus on certain issues, or something else?

[RESPONSE] The involvement of PCH assistants in the routine assessments in the triage approach creates time for physicians and nurses to pay extra attention to children at risk which means additional PCH assessments targeting certain health problems. However, there was it was not possible to include this information in 300 words in the Abstract.

We have deleted the following sentence in the Abstract section.

We aimed to study the potential opportunities for PCH physicians and nurses to pay more attention to children at risk.

3. Abstract line 17, define “extra” PCH care. Is this referrals to external sites or repeat PCH evaluations?

[RESPONSE] We have modified the following sentence in the Abstract section as follows.

From: We explored the impact of triage and task shifting on extra PCH care and referral by PCH.

To: The objective of this study was to examine the impact of triage and task-shifting on care for children at risk, identified by PCH or parents and schools.

4. Abstract line 25-30, describe that these study groups were stratified. Also “services” is actually a geographic region I think – this term should be defined.

[RESPONSE] We have modified the following sentences in the Abstract section as follows:

From: An observational prospective cohort design was used with an analysis of the basic registration data from the preventive health assessments for 1897 children aged 5 to 6, and 10 to 11 years.

A comparison was made between two PCH services in the Netherlands using the novel triage approach and two PCH services providing the usual approach.

To: An observational prospective cohort design was used with an analysis of the basic registration data from the preventive health assessments for 1897 children aged 5 to 6, and 10 to 11 years from a sample of 41 schools stratified by socio-economic status, region of PCH service and urbanisation.

5.Abstract line 38, see the "overall comments" number 4 above.

[RESPONSE] We have modified the sentences in the Abstract section as follows.

From: Overall, more children were referred to additional PCH assessments (OR 1.3, 95%-C.I. 1.0-1.6), mainly in the 5 to 6 years age group (OR 1.9, 95%-C.I. 1.3-2.7). Fewer children from the two age groups were referred to external services in the triage approach than in the usual approach (OR 0.4, 95%-C.I. 0.3-0.7). More PCH assessments were performed on request in the triage approach (OR=4.6, 95%-C.I. (3.0-7.0)).

To: Overall, a higher referral rate to additional PCH assessments was found for the triage approach than for the usual approach (OR 1.3, 95%-C.I. 1.0-1.6), mainly in the age group of 5 to 6 years (OR 1.9, 95%-C.I. 1.3-2.7). We found a lower rate of referral to external services in the triage approach (OR 0.4, 95%-C.I. 0.3-0.7) and a higher referral rate to PCH assessments on request (OR=4.6, 95%-C.I. 3.0-7.0).

6.Abstract line 54-56, conclusion needs to be revised to better reflect the main objectives and findings of the study.

[RESPONSE]We have modified the conclusion in the Abstract section as follows:

From: Targeted assessments in the triage approach to PCH provide extra opportunities to devote extra PCH care to vulnerable children with specific health needs.

To: The triage approach provides extra opportunities to deliver PCH assessments and PCH assessments on request for children at risk, and it also results in fewer referrals to external services.

7.Page 6 line 19, explain why reducing workloads for physicians and nurses is important.

[RESPONSE] In line with the quoted study, we expect that reducing the workloads of physicians and nurses will enhance quality of care and patient satisfaction.

We have modified the sentences in the Background section as follows:

From: Changes and improvements to health care systems could be accomplished by means of the introduction of triage and the shifting of tasks between health care professionals, possibly producing the following benefits: the optimal use of the skills and expertise of health care professionals, reduced workloads for physicians and nurses, improvements to the accessibility of health care, and greater patient satisfaction[9, 10].

To: Changes and improvements to health care systems could be accomplished by means of the introduction of triage and the shifting of tasks between health care professionals. Task-shifting is defined as the delegation of existing tasks to current or new professionals who have less and/or more specific training[10]. Triage and the task-shifting may result in the more optimal use of the skills and expertise of health care professionals and reduce workloads for physicians and nurses. This could improve quality of care and result in greater patient satisfaction[9,10].

8.Page 6 line 23, define "task shifting"

[RESPONSE] We have added the following sentence to the Background section to define shifting of tasks.

Task-shifting is defined as the delegation of existing tasks to current or new professionals who have less and/or more specific training[10].

9. Page 6, line 23-24, define "return consultations by nurses." Are these follow up visits after an initial evaluation? If so, then why are there more return visits? i.e. Are the nurses better at making connections with patients and so they are more likely to engage in care, or are they less efficient than physicians and so patients have to return multiple times to achieve the same outcome compared to physicians?

[RESPONSE] The quoted research shows more return consultations overall, in other words additional assessments after the initial visit. The study quoted in the manuscript states that nurses take more time for additional visits, and this probably results in more satisfied patients. No reasons are given explaining why nurses have more return consultations.

We have modified the sentence in the Background section as follows:

From: Research in primary care shows that task-shifting from physicians to nurses dealing with chronic disorders results in more return consultations by nurses but that the number of referrals to secondary care is similar for nurses and physicians.

To: Research in primary care shows that shifting tasks from physicians to nurses dealing with chronic disorders results in more additional assessments by nurses after the initial visit of the patient and that the number of referrals to secondary care is similar for nurses and physicians.

10. Page 6, line 30 define the benefits of the task shifting for patients.

[RESPONSE] In line 18-20 we described the benefits of task-shifting for patients: improved quality of care and greater patient satisfaction.

11. Page 6 line 31 should indicate that this the purpose of PCH services in the Netherlands. Preventive health services elsewhere may have a different focus.

[RESPONSE] We agree that preventive health services may have a different focus in other countries. The quoted literature [8,15] indicates that in several countries preventive child health services provide vaccinations and offer routine health assessments aimed at monitoring child growth and development and preventing child health problems.

12. Page 6 line 50-52, please fix the sentence structure. The sentence is not clear.

[RESPONSE] We have modified the sentence in the Background section as follows.

From: The referral of children to the appropriate services according to their needs, which is also a feature of primary care is an essential component of the health screening programmes delivered by PCH[18].

To: The referral to the services appropriate to the needs of the children is an essential component of the health screening programmes delivered by PCH[18]

13. Page 6 line 54-56, need to flesh out this assertion. Why does the PCH program need to be more flexible? Is there a backlog of referrals, long wait list, is the need for evaluation seasonal, or something else? Is there a problem accessing these evaluations?

[RESPONSE] The PCH programme needs to be more flexible to respond to changing health demands. The flexible delivery of care of PCH for children at risk is important because case-finding should be a continuing process. In the usual approach, PCH professionals visit elementary schools only a few times a year to assess children at set ages (5 to 6 and 10 to 11 years). The PCH programme needs to deliver care that responds to the care needs of children as they arise in response to health issues and stressful events in the lifecycle of children such as parental divorce or unemployment.

We have added the following sentences to the Background section.

PCH assessments traditionally provide snapshots of the dynamic process of development and growth of children at isolated points in time, even though most children will have no problems at those times. PCH needs to improve its accessibility, be more available for children and parents throughout the school period, and offer care when it is needed.

14. Page 7 line 5, clearly name the people who do the initial evaluation in the triage method – are these PCH assistants? If so, please call them PCH assistants throughout the document. Furthermore, at this point label the PCH physicians and nurses as “PCH professionals” and refer to them only as PCH professionals throughout the document. This will substantially improve clarity.

[RESPONSE] We have used the term PCH assistants throughout the manuscript.

PCH physicians, nurses and assistants are all considered professionals. They all perform different tasks in the PCH care process. We have therefore maintained the terms ‘nurses’ and ‘physicians’ in the manuscript.

15. Page 7 line 37, “attendance” is unclear. Whose attendance? The child? Or maybe the authors intend to say “completed PCH evaluation.”

[RESPONSE] We have modified the sentence in the Background section as follows.

From: We conducted a pilot study of the triage approach that compared attendance and referral rates in the triage and the usual approach.

To: A pilot study of the triage approach that compared appointment attendance and referral rates in the triage and the usual approach was conducted before the present study.

16. Page 7 line 48, it appears that the phrase “extra attention” is used incorrectly. I think the authors are trying to say the PCH professionals are able to see a higher volume of children. This is stated more clearly on page 10 lines 48-50.

[RESPONSE] We have modified the sentence in the Background section as follows.

From: This study aimed to investigate the effect on PCH referrals of a redesign of routine child health assessments to include triage and task-shifting.

To: This present study examined the impact of triage and task-shifting on care for children at risk identified by PCH or by external parties such as parents and schools.

And we have deleted the following sentence in the Background section:

In the present cohort study, we looked at whether the triage approach provides more opportunities for PCH professionals to devote extra attention to children at risk of health problems in terms of additional PCH assessments and PCH assessments on request.

17. Page 8 line 23, define what a “PCH service” is. From the paper, it sounds like this is a geographic region.

[RESPONSE] We have defined PCH services.

We have modified the sentence in the Study sample section as follows:

From: The study was conducted with routine and administrative data from four PCH services in the Netherlands.

To: The study was conducted with routine and administrative data from four PCH services active in four separate regions in the Netherlands.

And added the following sentence.

Each PCH service covers a population of around 125,000 children from birth to the age of 18 years.

18. Page 8 line 29 should potentially read “was randomly selected from these 4 services”?

[RESPONSE] We agree with your suggestion and we have modified the sentence in the Study sample as follows:

A sample of primary schools, stratified for socio-economic status (low, middle and high status), region of the PCH service and urban or rural area, was randomly selected from these four services: 20 schools that used the triage approach were matched with 21 schools that used the usual approach.

19. Page 8 line 35-36, define “referral rate.” Is this the referral from the initial assessment by the PCH assistant in the triage method, the referral from the PCH evaluation by professionals to further PCH evaluation, or the external referrals following PCH evaluation by professionals?

[RESPONSE] We have modified the sentence in the Study sample section as follows:

From: To study the referral rates, the study included all the children from the selected schools aged 5 to 6 and 10 to 11 years who were offered a routine assessment.

To: To study the referral rates to additional assessments and external services, the study included all the children from the selected schools aged 5 to 6 and 10 to 11 years who were offered a routine assessment.

20. Page 8 lines 39-41 and 50-54 should be included in the results section, not the methods.

[RESPONSE] To aid to the reader and to describe the size of the study sample, we kept the figures relating to the study samples in the methods section and we added the following sentences to the Results section.

To study the rates of referral to additional PCH assessments and external services, we compared a sample of 1008 children who were eligible for a pre-assessment in the triage approach with a sample of 986 children who were eligible for an assessment in the usual approach (Figure 2). To investigate the rates of PCH assessments on request a sample of 4050 children in the schools where the triage approach was used was compared with a sample of 4611 children in the schools where the usual approach was adopted.

21. Page 8 line 50, define what is being evaluated here. Did you look at school records for the request? What is the process for school staff or parents making these requests and how were data collected and reviewed? This information is provided on page 10 lines 38-42.

[RESPONSE] We have kept the information about how data were collected and reviewed in the Data collection section.

We have modified the sentences in the Study sample section to clarify the process of the assessments on request as follows:

From: In addition to routine PCH assessments, we also investigated PCH assessments of children at the request of parties such as parents, school professionals and professionals working in well-child care (we refer to these assessments hereinafter as ‘PCH assessments on request’). To address this research question, we included all children attending the schools selected for this study in a period of 12 months.

To: In addition to routine PCH assessments, we also investigated PCH assessments on request. To study the referral rates to PCH assessments on request, we followed all children attending the schools selected for this study for a maximum of 12 months (the reference population).

22. Page 9 lines 10-27 "assessments on request" and line 42 "follow-up assessment" are not clear. This language should be consistent throughout the paper – are these the assessments requested by the parents and school professionals, by the PCH assistant in the triage method, or by the PCH professional following evaluation? The authors should pick a title for each of these types of assessments, define them early in the paper, and use consistent language throughout.

[RESPONSE] We have defined the various types of assessments in the Background section and added Figure 1, glossary of terms. See also our reply to the comment of reviewer 1.

23. Page 9 line 15, do you look at referrals to PCH made by parents and school professionals that were not fulfilled? This would be an important measure of efficiency to compare between the two methods.

[RESPONSE] We agree that it is important, in order to measure efficiency, to know whether children referred by school professionals or parents were actually assessed. We were able only to measure and register the children who attended a PCH assessment.

24. Page 9 line 21, "checked manually" for what?

[RESPONSE] We checked manually whether the data in the data file correlated with the registered digital PCH records.

We have modified the sentences in the Data collection section as follows:

From: For the sake of completeness, a random sample of the dataset from the PCH records was checked manually.

To: For the sake of completeness, we compared a random sample of the analysis data file with the data in the PCH records.

25. Page 10 line 7-11, identifying socioeconomic status (SES) by census tract and postal code should be listed as a limitation of the study in the discussion. Or cite a reference indicating that the population within these census tracts and postal codes are homogeneous. I would suspect that it is possible for people of different SES to be living in the same geographic region. Also in the results (table 1), despite choosing the PCH sites based on SES, the study groups were not matched on SES. So this method of identifying SES by census tract and postal code may be an acceptable proxy, but has limitations.

[RESPONSE] We have cited a reference to indicate that our method of identifying SES by census tract and postal code is acceptable to obtain a homogeneous population.

26. Page 11 lines 5-15 is unclear due to language and sentence structure. Need to rewrite.

[RESPONSE] We have modified the following sentences in the Statistical analyses section.

From: Secondly, we assessed the referral rates from pre-assessment to follow-up assessment in the triage approach. We also assessed the referral rates in general (additional PCH assessment and to external services combined) for the two approaches and separately for additional PCH assessment and external services.

To: Secondly, we studied the rates of referral to follow-up assessments in the triage approach. We also made separate analyses of the referral rates separately to additional PCH assessment and external services and the sum of referrals to additional PCH assessments and to external services.

We have also modified the following sentence in the Statistical analyses section:

From: We tested differences in rates of referral between the two approaches using three separate logistic regression analyses with the outcome variables general referral, referral to additional PCH assessment and referral to external services.

To: We tested differences in rates of referral between the two approaches using three separate logistic regression analyses with the outcome variables 'referral to additional PCH assessment', 'referral to external services' and 'the sum of referrals to additional PCH assessments and external services'.

27. Page 11 lines 17-19, what is "general referral?" See comments for number 22 above that also apply here.

[RESPONSE] We agree that the term "general referral" is not clear. See also the reply to comment

28. Page 11 lines 5-31, it doesn't appear that gender was included in the analysis, but gender is reported as a variable later.

[RESPONSE] We have modified the sentence in the Statistical analyses section as follows.

From: Our first step was to assess differences in background characteristics between the two cohorts using chi-square tests.

To: Our first step was to assess differences in background characteristics such as gender, age and socio-economic status between the two cohorts using chi-square tests.

29. Page 11 line 27, define "type of approach." Again, consistent language would be helpful here.

[RESPONSE] We modified the sentence in the Statistical analyses section as follows.

From: Because routine PCH assessments were made in the 5 to 6 and 10 to 11 years age groups, the interaction effects of child age and the type of approach on the outcome measures were studied.

To: Because routine PCH assessments were made in the age groups of 5 to 6 and 10 to 11 years, the interaction effects of child age and the type of approach (in other words, the triage and usual approaches) on the outcome measures were studied.

30. Page 11 lines 5-31, was there correction for multiple comparisons? Or was this needed?

[RESPONSE]

We did not correct for multiple comparisons. This was not necessary due to the low number of comparisons. We performed analyses with a Bonferroni correction using three outcome measurements: sum of referrals to additional PCH assessment and external services, referral to additional PCH assessment and referral to external services. These analyses were repeated for visual, weight and psychosocial problems. The number of tests was within acceptable limits and the interaction analysis was completed to explore differences in age groups.

31. Page 11 lines 33-51, the authors need to communicate that the rates of referrals made by parents/school professionals and the rates of completed evaluations for these children referred by parents/school professionals were calculated. From this information, the authors can improve our understanding of changes in efficiency between the two service delivery methods.

[RESPONSE] See our reply to comment 23.

32. Page 13 line 11 define "PCH assessments." It appears these are defined on page 13 lines 42-44.

[RESPONSE] We have defined the various types of assessments in the Background section and in the glossary in Figure 1. See also our reply to the comment 22.

33. Page 13 lines 15-23, define "extra care." What is the difference between extra care, referral for further PCH evaluations and external referrals?

[RESPONSE] We have defined extra care in the Background section and in the glossary of Figure 1. Extra care comprises additional PCH assessments and referral to external services.

34. Page 13, these results could indicate that by the triage method, children with more severe problems are being identified earlier and referred. This would be a meaningful outcome. However, I can't tell if this is an appropriate interpretation of the results. Also I don't know if this is true for all 3 health conditions – need to break down the results by health condition to make this clear.

[RESPONSE] We gave the following explanation for the differences in the results in the Discussion section: "The differences between the referral rates can be attributed to the different processes used to identify health problems in the two approaches. In the two-step triage approach, children requiring follow-up (in other words, children with suspected health problems) are assessed twice. After the pre-assessment by the PCH assistant, the PCH physician or nurse and the parents need to focus only on the suspected health problems. In this follow-up assessment, more time may be available to provide advice, recommendations and reassurance. This can reduce the need for referral to external services."

In another part of our study we found that the subgroup of children with overweight included more children with a BMI indicating obesity and that significantly higher SDQ scores were found in the subgroup of cases with psychosocial problems when the triage approach was used than with the usual approach[20]. It is possible that these children had more referrals to additional PCH assessments.

35. Table 1, in the first column define assessments by who is conducting them, i.e. "PCH assistants" or "PCH professionals" (the physicians and nurses).

[RESPONSE] The first row of table 2 states the PCH professional who conducted the assessment.

36. Table 1, put a marker next to significant results.

[RESPONSE] As requested by reviewer 4, these are now exact p-values.

37. Table 1, it appears that for the psychosocial problems there is no difference in outcomes from the 2 service delivery methods. Again, this would be an important finding indicating that the triage method is more efficient (i.e. same outcome at lower cost, or some outcome with improved capacity or access). If this is a correct interpretation, then it needs to be clearly communicated in the body of the paper.

[RESPONSE] In the case of the health problems overweight and psychosocial problems, we found lower referral rates to external services when the triage approach was used. We have discussed these findings in the Discussion section.

38. Page 15 lines 3-21, need to be careful to point out the rate of referral by parents/school staff and the rate of completed evaluation for these children referred by parents/school staff. Comparison of these rates would help clarify if the triage method results in improved access to PCH services.

[RESPONSE] See reply to comments 23 and 31.

39. Table 3, it appears there is no difference in outcome comparing these methods. If this is true, then this again would show the triage method is more efficient (see number 37 above).

[RESPONSE] The results of table 3 show clear differences the rates for PCH assessments on request when the two approaches were compared. These are reported in the Results section.

40. Page 16 lines 1-19 should be presented according to the health condition (vision, weight or psychosocial).

[RESPONSE] We have stressed the type of health conditions in the text, using italics at the beginning of a paragraph.

41. Page 16 line 11, what does "targeting of PCH care" mean? I think the authors are referring to efficiency.

[RESPONSE] We agree that the word targeting causes confusion. We have therefore removed it from the text.

We modified the following sentence in the Discussion section as follows.

From: We compared the rates of referral to additional PCH assessments or external services after the identification of health concerns during routine assessments with either the triage approach or the usual approach and explored whether this could improve the targeting of PCH care.

To: We compared the rates of referral to additional PCH assessments or external services after the identification of health concerns during routine assessments with either the triage approach or the usual approach.

42. Page 16 lines 27-31, this assertion is not founded based on the results of this paper. Specifically, there are no data on what actually happened during the PCH evaluations by either method. Need to soften this to say that this is a possible explanation.

[RESPONSE] We modified the following sentence to soften the assertion in the Discussion section.
 From: In this follow-up assessment, more time is available to provide advice, recommendations and reassurance.

To: In this follow-up assessment, more time may be available to provide advice, recommendations and reassurance.

43. Page 16 lines 44-56, it is possible that the psychosocial problem was resolved during the PCH evaluation by professionals (nurses and doctors).

[RESPONSE] We have added the following sentence to the Discussion section.

The lower referral rate to external services in the triage approach may also be explained by the fact that problems – minor psychosocial problems, for example – are resolved in the period between the pre-assessment and the follow-up assessment.

44. Page 17 lines 13-19, this information should have been included in the methods section.

[RESPONSE] We have added the following sentence in the Methods section.

In the usual approach all children aged 5 to 6 years are assessed by a physician and children aged 10 to 11 years are assessed by a nurse. When medical problems are suspected, nurses are required to refer the child for an additional PCH assessment by a physician. In the triage approach all children are pre-assessed by a PCH assistant and follow-up assessments are conducted by PCH physicians and nurses.

45. Page 19 lines 50-56, the conclusions should be revised to communicate the most pertinent findings of the study, according to the study

[RESPONSE] See our reply to comment 6 above.

Reviewer: 3

Jose M Rodriguez-Llanes
 European Commission Joint Research Centre, Italy
 Statistical Review

Comments:

1. The authors wrote that "A sample of primary schools, stratified for socio-economic status (low, middle and high status) and urban or rural area was randomly selected: 20 schools that used the triage approach were matched with 21 schools that used the usual approach. The socio-economic status of the schools was determined using national census statistics".

The authors need to provide more details on the matching process. For example, did they use a 1: 1 matching ratio, and if so how did they deal with the unequal number of schools. Did the authors use exact matching based on the joint distribution of these two variables? A table, maybe in the Annex, could be used to explain this.

[RESPONSE]: A sample of primary schools was stratified for socio-economic status (low, middle and high status) and urban or rural area and then randomly selected from the four PCH services. To obtain a sufficient number of children for both the triage group and the usual group we had to select 20 schools that used the triage approach and 21 schools that used the usual approach.

We succeeded in fully matching the schools with regard to their socio-economic status and urbanisation. We have modified the following sentence in the Study sample section as follows:
 From: A sample of primary schools, stratified for socio-economic status (low, middle and high status) and urban or rural area was randomly selected: 20 schools that used the triage approach were matched with 21 schools that used the usual approach.

To: A sample of primary schools, stratified for socio-economic status (low, middle and high status), region of the PCH service and urban or rural area was randomly selected from these four services. To obtain sufficient and equal numbers of children for both study groups (in other words, the triage and usual approach) 20 schools that used the triage approach were matched with 21 schools that used the usual approach.

2. It is also not clear what was the duration of the cohort of two samples of around 1000 children. While in the second part they said it lasted 12 months.

[RESPONSE]: In the Data collection we stated the following: "Children in the study sample who received triage pre-assessments or assessments as usual were included from January to April 2012. Children who were referred for assessment on request were included from January till December 2012. The children requiring a triage follow-up assessment and PCH assessments on request were followed after their inclusion until December 2012."

We have modified the sentence in the Study sample section as follows:

From: To address this research question, we included all children attending the schools selected for this study in a period of 12 months.

To: To study the rates of PCH assessments on request, we followed all children attending the schools selected for this study for a maximum of 12 months.

3. The authors wrote in page 9 "For the sake of completeness, a random sample of the dataset from the PCH records was checked manually". What was the exact size of this sample and what was the outcome of the assessment. What was the level of data completeness, and what actions taken, if required?

[RESPONSE] We compared the data in the dataset of a random sample of 182 children with the data in the PCH records. We checked whether missing data were indeed not available in the PCH records, including in fields that were not included in the analysis data file. No differences were found and so no further action was taken.

We have modified the sentence in the Data collection section.

From: For the sake of completeness, a random sample of the dataset from the PCH records was checked manually.

To: For the sake of completeness, we compared a random sample of the analysis data file with the data in the PCH records. No differences were found.

4. All findings in the paper are expressed as Odd Ratios (OR) though they are not mentioned in the methods (statistics section). An adequate description is required.

[RESPONSE] We have added the following sentence to the Statistical analyses section:

Adjusted Odd Ratios (OR) were calculated in all logistic regression analyses.

5. The reasoning for using Chi Square or Fisher tests needs to be explained.

[RESPONSE] We have modified the sentence in the Statistical analyses section as follows to explain the use of Chi Square or Fisher tests:

From: We also assessed whether children were referred by different parties (school, parents, well-child care, other) in the two approaches using chi-square and Fisher's exact tests (categories were tested separately).

To: We also assessed whether children were referred by different parties (school, parents, well-child care, other) in the two approaches. Due to the small number of children referred in the usual approach it was not possible to adjust for background characteristics. We therefore used chi-square and Fisher's exact tests (categories were tested separately).

6. The sample sizes reported in the methods are larger than in the results. If sample attrition occurs, the authors should explain it either with a flow diagram or in the body text.

[RESPONSE] The sample sizes reported in the Method section are indeed larger than in the results due to the difference between the number of children who received an appointment for an assessment and the number of children attending an assessment. See also the reply to comment 20 of reviewer 2.

We have added the number of children who received an appointment assessment to figure 2.
We have added the following sentences to the Results section:

To study the rates of referral for additional assessments and external services, appointments were arranged for 1008 children for a pre-assessment in the triage approach and for 986 children for an assessment in the usual approach. Finally, we compared a sample of 1008 children who attended a pre-assessment in the triage approach with a sample of 986 children who attended an assessment in the usual approach (Figure 2). To investigate the rates of PCH assessments on request a sample of 4050 children in the schools where the triage approach was used was compared with a sample of 4611 children in the schools where the usual approach was adopted.

And deleted the following sentences in the Methods section:

A sample of 1008 children who received the triage approach was compared with a sample of 986 children who received the usual approach. This resulted in a sample of 4050 children in the schools where the triage approach was used and 4611 children in the schools where the usual approach was adopted.

7. The authors need to confirm that this is a prospective and not a retrospective cohort. They mention that they used registered data. If the authors collected the data retrospectively using existing registries, they should call the study a 'retrospective cohort'.

[RESPONSE] All data obtained were routinely registered by PCH professionals during the study period. We collected data in real time from the start of the study period January 2012 until the end December 2012. This is therefore a prospective study.

We have modified the sentence in the Data collection as follows:

From: This study drew on routinely registered digital PCH records to collect data on rates of referral to additional PCH assessments and to external services following the detection of health problems during routine PCH assessments.

To: Study data were registered in digital PCH records during the study period.

Reviewer: 4

Katherine Donegan

Medicines and Healthcare products Regulatory Agency, UK

I have commented only from a statistical perspective as requested by the journal. In general the statistical methods chosen, the presentation of them, and their interpretation is appropriate although I have a number of comments that are listed in the attached document.

Statistical reviewer comments:

Abstract

1. Some clarity is needed as to the comparisons being made in the results presented.

[RESPONSE] We have modified the sentence in the Abstract section as follows:

From: Overall, more children were referred to additional PCH assessments (OR 1.3, 95%-C.I. 1.0-1.6), mainly in the 5 to 6 years age group (OR 1.9, 95%-C.I. 1.3-2.7).

To: Overall, a higher referral rate to additional PCH assessments was found for the triage approach than for the usual approach (OR 1.3, 95%-C.I. 1.0-1.6), mainly in the age group of 5 to 6 years (OR 1.9, 95%-C.I. 1.3-2.7).

2. "Fewer children from the two age groups" – these two age groups should be defined.

[RESPONSE] We have modified the sentence in the Abstract section as follows.

From: Fewer children from the two age groups were referred to external services in the triage approach than in the usual approach (OR 0.4, 95%-C.I. 0.3-0.7). More PCH assessments were performed on request in the triage approach (OR=4.6, 95%-C.I. (3.0-7.0)).

To: We found a lower rate of referral to external services in the triage approach (OR 0.4, 95%-C.I. 0.3-0.7) and a higher referral rate to PCH assessments on request (OR=4.6, 95%-C.I. 3.0-7.0).

Article summary

3. It would be useful if the potential implications of the fourth bullet point ("We were not allowed...") could be included.

[RESPONSE] We have modified the sentence below in the Article summary section to include the potential implication.

From: We were not allowed to analyse the individual details of the children referred to additional PCH assessments or to external services because of the absence of informed consent.

To: We were not able to monitor the outcome of the referrals to additional PCH assessments or to external services because we were not allowed to analyse the individual details of the children in the absence of informed consent.

Procedures

4. Figure 1: A note should be added explaining why there are any differences between the number presented in this version of the figure and the figure presented in reference 20 which is based on the same study. For example, in this figure 444 children were referred using the triage approach following routine assessment but in Figure 1 in ref 20 this figure was 424. It appears that these data are from the same study and that the data cut off time is the same (December 2012).

[RESPONSE] Thank you for this finding. The correct number of children referred to follow-up assessment in the triage approach is 444. Due to a typing error, there was an incorrect number in Figure 1 in ref 20.

Results

5. Exact p-values should be presented in Table 1 rather than just indicating which were significant. With such small numbers in some groups is it unsurprising that few differences were found but presenting all p-values could help understand better the potential for more subtle differences in the two groups.

[RESPONSE] We have added p-values to Table 1 and Table 3.

6. There is clearly some missing covariate data (e.g. usual approach routine = 923 children but 468 <=8 years and 436 >=9 years suggests that age was missing for 19 children). The number of children with missing covariate data should be highlighted and the STROBE checklist updated.

[RESPONSE] We have added the number of children with missing data for each variable in the footnote to Table 1. In addition, we have updated the STROBE checklist.

7. Absolute numbers should always be presented alongside the reported percentages.

[RESPONSE] We have now exclusively reported the rates instead of numbers of children throughout the manuscript. See also our reply to reviewer 2, comments 2 and 4.

8. It would be useful for p-values to be presented alongside the confidence intervals for the odds ratios.

[RESPONSE] We have added p-values alongside the confidence intervals for the odds ratios in table 2.

9. Care should be taken that when comments such as “that there were more referrals to additional PCH assessments” are made. It might be useful if this was clarified – is it more in absolute and/or proportional terms?

[RESPONSE] We have now reported rates only instead of numbers throughout the manuscript. See also the reply to comment 2 of reviewer 2.

We have modified the sentences in the Abstract section as follows:

From: Overall, more children were referred to additional PCH assessments (OR 1.3, 95%-C.I. 1.0-1.6), mainly in the 5 to 6 years age group (OR 1.9, 95%-C.I. 1.3-2.7). Fewer children from the two age groups were referred to external services in the triage approach than in the usual approach (OR 0.4, 95%-C.I. 0.3-0.7). More PCH assessments were performed on request in the triage approach (OR=4.6, 95%-C.I. (3.0-7.0)).

To: Overall, a higher referral rate to additional PCH assessments was found for the triage approach than for the usual approach (OR 1.3, 95%-C.I. 1.0-1.6), mainly in the age group of 5 to 6 years (OR 1.9, 95%-C.I. 1.3-2.7). A lower rate was found for referral to external services in the triage approach (OR 0.4, 95%-C.I. 0.3-0.7), as well as a higher referral rate to PCH assessments on request (OR=4.6, 95%-C.I. (3.0-7.0)).

10. There is quite a lot of repetition in the text of the data in Table 2. This could be reduced for brevity.

[RESPONSE] We have deleted some text for brevity in Table 2.

11. Given the missing covariate data (as discussed in comment 5 above) there needs to be a justification regarding why the analyses have not accounted for it and the potential implications of it on the results.

[RESPONSE] There was very little missing data. Only six children with missing data about socio-economic status were excluded from the logistic regression analyses comparing the rates of referral between the two approaches. In addition, another 19 children with missing data about age were excluded from the tests for interaction effects. Because these numbers were so low, we have not provided an explanation in the analyses. We do not expect any effect on the results.

We have added the following sentence to the Statistical analyses section: Missing data were excluded from the regression analyses.

12. It is stated that “Fewer children from both age groups were referred to external services when triage was used rather than the usual approach”. However, I couldn’t find where the results are to fully justify this conclusion.

[RESPONSE] In the Results section we described: “A closer look at these referrals indicates that there was a higher referral rate for additional PCH assessments (OR 1.3, 95%-C.I. 1.0-1.6) and a lower referral rate to external services in the triage approach than in the usual approach (OR 0.4, 95%-C.I. 0.3-0.7).” The results are presented in table 2, in the row “children referred to additional PCH assessment and/or external services”.

13. The discussion would benefit from consideration of the power of this study to assess potentially important differences and the potential robustness of extrapolating from a small number of schools.

[RESPONSE] The power was based on proving a difference in rates of detected health problems of 3% between the two approaches. This would imply that 860 children would have to be included in both groups to find a difference with an alpha of .05 and a power of .80. We were able to include more children in our study groups. The number of children that emerged following the assessments on request in our study did not meet this criterion for power. This part of the study was merely intended for an exploratory analysis (see table 3).

We have added the following sentence to the Strengths and limitations section.

Although the power conditions to study the referral rates on request were not met in the analyses, the differences between the approaches were large enough to find significant associations.

VERSION 2 – REVIEW

REVIEWER	Ronny Cheung Evelina London Children's Hospital, London, UK
REVIEW RETURNED	14-Jul-2017

GENERAL COMMENTS	<p>Thank you for the opportunity to review this revised manuscript.</p> <p>It is much more clearly explained and I am now able to follow the flow of this paper in a way I wasn't able to manage before.</p> <p>However I still think there are some major problems with this paper as it stands. Comments are below.</p> <p>Comments:</p> <p>p.19 line 5: As I understand it this refers to the 107 vs 27 children referred externally . if so then I am not sure this really constitutes a small number! Also another possible explanation is some mistrust from the school professionals of the PCH assistant triage system, which should be included in the explanation. Further, this difference has potential for a great deal of difference in terms of cost benefit between the two models so must be made explicit.</p> <p>P19 line 24-25: I don't think you can say on the one hand the numbers are too small to rely on (see comment above on line 5) and then here say that the differences are large enough to find significant differences. Please make these two comments consistent.</p> <p>p.20: Implications for practice and future research sections: I still believe this section is seriously undermined by two things – lack of any cost benefit analysis, and also lack of any outcome other than onward referral. For example, the major risk of task shifting to less-skilled staff is the risk of under-recognition of problems and this makes no attempt to define the clinical quality. This would be acceptable if the paper instead focused on the efficiency side but without any cost benefit analysis this is not addressed either. This is a complex model (with differences between age groups, nurses/doctors and assistants involved not to mention direct referrals to internal and external agencies by school professionals) that it is very difficult to know if this is a model that is helpful or not. Nor do the conclusions make this clear.</p>
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	<p>P21 Conclusions: I do not think from your findings that the sentence "The triage approach reduces the referral rate to external services" is justified. This is only true if you discount the higher direct external referrals, which is 23 in the triage method and 2 in the usual method – and I do not think analysis of the new model can be done by excluding the direct referrals, which include children who have been displaced and are subject to the same outcome and costs as, whether they were referred from schools or from doctors as previously. This combined total is not statistically explored in your results section so cannot be justified.</p> <p>P57 – This new figure is very welcome and helps to explain the model better. However the numbers are rather confusing and do not seem to add up?</p>
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REVIEWER	Katherine Donegan Medicines and Healthcare products Regulatory Agency
REVIEW RETURNED	21-Jul-2017

GENERAL COMMENTS	<p>In general, I am happy with the responses provided by the authors regarding my previous review. There are just a couple of very minor points that I would like to pick up on.</p> <p>Firstly, in relation to point 7 I made (Absolute numbers should always be presented alongside the reported percentage), I agree with reviewer 2 that consistency is important and that the rate is the more useful figure to quote given changes in the denominator. However, I would also argue that where an exact percentage is quoted inclusion of the absolute numerator and denominator figures that have been used to calculate the rate can be useful to the reader in helping them to see exactly what rate is being referred to by enabling them to link the rates to the absolute numbers presented in the tables.</p> <p>Secondly, in relation to point 12 (It is stated that "Fewer children from both age groups were referred to external services when triage was used rather than the usual approach". However, I cannot find where the results are to fully justify this conclusion.) I note the author's response but still think some clarity would be useful here. As it is currently worded it sounds as though separate analyses have been calculated for each of the two age groups both of which show that fewer children were referred when triage was used. However, the authors point towards analyses that suggest that this comparison has been made only in the combined group including all ages rather than separately. It is not clear if this is being driven by a larger difference in one age group or smaller differences in both age groups. Therefore, I would suggest either changing the wording of the sentence the authors refer to from "Fewer children from both age groups were referred" to "Overall, fewer children were referred". Alternatively, separate analyses for each of the two age groups could be presented.</p>
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VERSION 2 – AUTHOR RESPONSE

Reviewer: 1

Ronny Cheung

Evelina London Children's Hospital, Guy's and St Thomas' NHS Foundation Trust, London

It is much more clearly explained and I am now able to follow the flow of this paper in a way I wasn't able to manage before.

However I still think there are some major problems with this paper as it stands. Comments are below.

Comments:

1. p .19 line 5: As I understand it this refers to the 107 vs 27 children referred externally . if so then I am not sure this really constitutes a small number! Also another possible explanation is some mistrust from the school professionals of the PCH assistant triage system, which should be included in the explanation. Further, this difference has potential for a great deal of difference in terms of cost benefit between the two models so must be made explicit.

[RESPONSE]: The '107 versus 27 children' refers to the subgroup of children assessed by PCH at the request of other parties such as school professionals who suspect that the children have health problems. We think there is little chance that this difference is caused by mistrust from the school professionals of the triage approach, because school professionals and other parties are given the opportunity to refer children directly to PCH physicians or nurses any time. For routine assessments which are only done only twice in a primary school period, children are invited at the ages 5 to 6 and 10 to 11 years. Therefore school professionals and other parties are explicitly invited to request PCH assessments for children of other age groups than pre-defined for the routine assessments in order to reach all children in need of care. A standard procedure is also that school professionals are asked to select the children who need extra attention by PCH because of potential risk factors, prior to the pre-assessments. These children are always referred by the PCH assistants after the pre-assessment to a follow-up assessment by a physician or nurse, which is part of the triage routine assessment. However, we did not study the reasons of school professionals for referral to PCH assessments on request. Because this lack of knowledge and also the fact that besides the mandatory routine assessments by PCH assistants, a system of direct referral to PCH physicians and nurses is provided, even for children eligible for routine assessments we did not include the potential explanation of mistrust in the PCH assistant's role in the paper.

To explain the option of the PCH assessments on request we have added the following sentence in the Background section.

"PCH assessments on request are intended for children from age groups other than those pre-defined for the routine assessments in order to reach all children in need of care."

And we added the following sentence on this subject in the Discussion section:

"However, we did not study the reasons for referral to PCH assessments on request."

We agree that 107 vs 27 are not small numbers and we have therefore modified the following sentence in the Discussion section.

From: Higher rates to PCH assessments on request were found in the triage approach but these findings must be treated with caution because of the low numbers involved

To: "Higher rates were found for PCH assessments on request in the triage approach."

Indeed, the costs of PCH assessments on request and the onward referrals are expected to be higher in the triage approach than in the usual approach given the fact that more children are assessed by PCH on request (107 versus 27). However, the triage approach was developed to reduce the use of manpower and funding to conduct PCH routine assessments and to release those resources for the conduct of PCH assessments on request for children with specific health-care needs. More research will be needed to examine the potential impact on cost benefits associated with the differences in the number of PCH assessments on request in the two approaches. In our paper, we advise further research in this area, but this analysis of cost-benefit is outside the scope of this paper.

We have changed the following sentences in the Discussion section.

From: We examined the results of the PCH assessments on request (made with the aim of devoting more attention to children at risk).

To: "We examined the results of the PCH assessments on request. The triage approach was developed to reduce the cost of routine assessments and release resources to conduct PCH assessments on request for children with specific health-care needs."

We will further discuss the reviewer's question about cost benefits in our answer to comment 3.

2. p. 19 line 24-25: I don't think you can say on the one hand the numbers are too small to rely on (see comment above on line 5) and then here say that the differences are large enough to find significant differences. Please make these two comments consistent.

[RESPONSE]: We have made these two comments consistent and therefore modified the following sentence in the Discussion section.

From: Higher rates to PCH assessments on request were found in the triage approach but these findings must be treated with caution because of the low numbers involved

To: "Higher rates were found for PCH assessments on request in the triage approach."

3. p.20: Implications for practice and future research sections: I still believe this section is seriously undermined by two things – lack of any cost benefit analysis, and also lack of any outcome other than onward referral. For example, the major risk of task shifting to less-skilled staff is the risk of under-recognition of problems and this makes no attempt to define the clinical quality. This would be acceptable if the paper instead focused on the efficiency side but without any cost benefit analysis this is not addressed either. This is a complex model (with differences between age groups, nurses/doctors and assistants involved not to mention direct referrals to internal and external agencies by school professionals) that it is very difficult to know if this is a model that is helpful or not. Nor do the conclusions make this clear.

[RESPONSE]: The main results of this study were for the triage approach: a higher referral rate to additional PCH assessments, mainly in the age group of 5 to 6 years, a lower referral rate to external services, both as a result after the routine assessments. A higher rate of PCH assessments conducted at the request of parties such as school professionals was found in the triage approach. These isolated outcomes of our study may not be sufficient, but in conjunction with other parts of our research project, they are materially important and very relevant. The issue of access to PCH as well as the detection quality are studied in a separate paper. We found a comparable accessibility and detection quality for the triage and usual approaches(1). Furthermore, we recently published a cost analysis of conducting PCH routine assessments of the two approaches(2). This study showed that the triage approach resulted in a cost reduction of about one-third for the age group of 5 to 6 years and a minimal cost reduction for the age group of 10 to 11 years.

We understand your criticism concerning the lack of benefit analysis and outcomes so we have made some modifications in the paper.

We have modified the following sentence in the Background section:

From: The triage approach results in less involvement of physicians and nurses in routine assessments.

To: "The triage approach could reduce the involvement of physicians and nurses in routine assessments, and therefore release resources that can be used for PCH assessments for children at risk."

And we have replaced the following sentence from the Future research section to the Background section.

"Our study of the costs of the routine assessments in the two approaches showed that the triage approach resulted in a cost reduction of about one-third for the age group of 5 to 6 years and a minimal cost reduction for the age group of 10 to 11 years [21]."

We have changed the following sentences in the Discussion section.

From: We examined the results of the PCH assessments on request (made with the aim of devoting more attention to children at risk).

To: "We examined the results of the PCH assessments on request. The triage approach was developed to reduce the cost of routine assessments and release resources to conduct PCH assessments on request for children with specific health-care needs."

And we have added the following sentences in the Discussion section.

"A possible reason for the introduction of the triage approach could be to improve the cost-benefit ratio for PCH. An earlier study of the costs of the routine assessments showed that the triage approach resulted in a cost reduction. However, we did not study the costs of onward referrals and of the PCH assessments on request."

We have modified the following sentence in the Implications for practice section.

From: It ensures a basic package of care for all children while preserving the strengths of the preventive health service: a low threshold and the wide reach necessary for the early identification of health problems.

To: "The triage approach has the potential to deliver a basic package of care for all children while preserving the strengths of the preventive health service: a low threshold and the wide reach necessary for the early identification of health problems."

And we have added the following sentence in this section.

"In earlier studies we found that access to PCH and the detection of health problems were comparable with the usual approach."

And we have modified the text in the Future research section as followed.

From: Further research is needed to study the costs of onward referrals and subsequent assessments to determine whether the triage approach is actually cost-effective.

To: "Further research is needed into the outcomes of referral to extra care. Moreover, we studied only the costs of the routine assessments, but research will also be needed into the costs of onward referrals to extra care and the costs of PCH assessments on request. So further research is needed to determine whether the triage approach is actually cost-effective."

4. P. 21: Conclusions: I do not think from your findings that the sentence "The triage approach reduces the referral rate to external services" is justified. This is only true if you discount the higher direct external referrals, which is 23 in the triage method and 2 in the usual method – and I do not think analysis of the new model can be done by excluding the direct referrals, which include children who have been displaced and are subject to the same outcome and costs as, whether they were referred from schools or from doctors as previously. This combined total is not statistically explored in your results section so cannot be justified.

[RESPONSE]: We have explained in our answer to comment 1 that the subgroup of children who are selected for a PCH assessment on request are from age groups other than those targeted by the routine assessments. All children aged 5 to 6 and 10 to 11 years are invited for the routine assessments, but only children with potential risk factors suspected by other parties are invited for an PCH assessment on request. This may be a possible explanation for the higher referral rate to extra care (additional PCH assessments and external services) resulting from the PCH assessments on request. As the routes of referred children between the two approaches differ we think it is not justify to simply add or subtract external or internal referrals, onward referrals etcetera and compare both approaches. We therefore cannot make no clear conclusions on the total burden of care use and related costs. Further research on cost benefits of external referral is needed. However, the differences in the number of PCH assessments on request between the two approaches could indeed have an impact on outcomes and on the cost-benefit ratio of the triage approach. We have modified the text in the conclusion in the Abstract and in the Discussion and Conclusion section to emphasise the differences between the outcomes of the routine assessments and the PCH assessments on request and the need for further research of the triage approach. We also refer to our answer to comment 1.

We have modified the following sentence in the conclusion of the Abstract section.

From: The triage approach provides extra opportunities to deliver PCH assessments and PCH assessments on request for children at risk, and it also results in fewer referrals to external services.

To: "The triage approach provides extra opportunities to deliver PCH assessments and PCH assessments on request for children at risk. Further research is needed into the cost benefits of the triage approach."

We have modified the following sentences in the Conclusion section.

From: The triage approach reduces the referral rate to external services. More research is needed into the outcomes of referral to extra care.

To: "In the triage approach, fewer children are referred to external services than in the usual approach in the case of the routine assessments. More research is needed into the outcomes of referral to extra care and into the cost benefits of the triage approach."

We have modified the following sentence in the Discussion section.

From: The referral rates to external services were lower for both age groups when triage was used rather than the usual approach.

To: Overall, the referral rates to external services resulting from the routine assessments were lower when triage was used rather than the usual approach.

5. P. 57 : This new figure is very welcome and helps to explain the model better. However the numbers are rather confusing and do not seem to add up?

[RESPONSE]: We agree that the numbers presented in the bottom row of Figure 2 "children to additional assessment by PCH physicians and nurses and children to external services" are confusing when compared with the total number of children referred because they do not add up. However, some children were referred to both additional PCH assessment and to external services.

We have added the following footnote to Figure 2.

*Some children were referred to both additional PCH assessment and external services

Reviewer: 4

Katherine Donegan

Medicines and Healthcare products Regulatory Agency, UK

In general, I am happy with the responses provided by the authors regarding my previous review. There are just a couple of very minor points that I would like to pick up on.

Comments:

1. Firstly, in relation to point 7 I made (Absolute numbers should always be presented alongside the reported percentage), I agree with reviewer 2 that consistency is important and that the rate is the more useful figure to quote given changes in the denominator. However, I would also argue that where an exact percentage is quoted inclusion of the absolute numerator and denominator figures that have been used to calculate the rate can be useful to the reader in helping them to see exactly what rate is being referred to by enabling them to link the rates to the absolute numbers presented in the tables.

[RESPONSE]: We have now also reported the absolute numbers of the numerator and denominator alongside the percentages throughout the manuscript.

2. Secondly, in relation to point 12 (It is stated that "Fewer children from both age groups were referred to external services when triage was used rather than the usual approach". However, I cannot find where the results are to fully justify this conclusion.) I note the author's response but still think some clarity would be useful here. As it is currently worded it sounds as though separate analyses have been calculated for each of the two age groups both of which show that fewer children were referred when triage was used. However, the authors point towards analyses that suggest that this comparison has been made only in the combined group including all ages rather than separately. It is not clear if this is being driven by a larger difference in one age group or smaller differences in both age groups. Therefore, I would suggest either changing the wording of the sentence the authors refer to from "Fewer children from both age groups were referred" to "Overall, fewer children were referred". Alternatively, separate analyses for each of the two age groups could be presented.

[RESPONSE]: We have adopted your suggestion to change the following sentence in the Discussion section.

From: The referral rates to external services were lower for both age groups when triage was used rather than the usual approach.

To: "Overall, the referral rates to external services resulting from the routine assessments were lower when triage was used rather than the usual approach."

We also conducted a separate analysis of the interaction effects for each of the two age groups when analysing the referral rates to external services. We found the effect was maintained in each age group separately, as reported in the Results section.

References

1. Bezem J, Theunissen M, Kamphuis M, Numans ME, Buitendijk SE, Kocken P. Novel Triage Approach to Identifying Health Concerns. *Pediatrics* 2016;137(3):e2015081420.
2. Bezem J, van der Ploeg C, Numans ME, Buitendijk S, Kocken P, van den Akker-van Marle E. Preventive Child Health Care at Elementary School Age: The Costs of Routine Assessments with a Triage Approach. *PLoS One* 2017 Apr 26;12(4):e0176569

VERSION 3 – REVIEW

REVIEWER	Katherine Donegan Medicines and Healthcare products Regulatory Agency, UK
REVIEW RETURNED	13-Sep-2017
GENERAL COMMENTS	Thank you, all my comments have now been addressed.