PEER REVIEW HISTORY

BMJ Paediatrics Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Paediatric Attendances of the Emergency Department in a Major Irish Tertiary Referral Centre Before and After Expansion of Free GP Care to Children Under 6: A Retrospective Observational Study
AUTHORS	Korotchikova, Irina Alkhalaf, Sukainah Sheridan, Ewa O'Brien, Rory Bradley, Colin Deasy, Conor

VERSION 1 – REVIEW

REVIEWER	Reviewer name: Dr. Peter Flom Institution and Country: Peter Flom Consulting, United States Competing interests: None
REVIEW RETURNED	02-Oct-2020

GENERAL COMMENTS	I confine my remarks to statistical aspects of this paper. I have some issues with the figures and a suggestion on the analysis. On the analysis - what the authors did is not wrong, but it's not best. A better method would be to use logistic regression, with time as a covariate and add a spline of time. This would also let the authors control for covariates. Another idea is to use the 6 to 12 year olds as a sort of control group - it's not really a perfect control but it's not unreasonable to suppose that any events in Ireland that affected how the youngest kids went to doctors also affected how older kids went to doctors - except for the change in payment for the little ones. On the figures: For figures, 1, 3 and 4, instead of showing both the earlier years and the later years, show the difference. The power of doing this was shown by William S. Cleveland in his books on statistical graphics. Also, the "age at attendance" is a little unclear because the ages overlap. If the first age group is for babies up to 1 year, the second for 1 year to 1 year 11 months and so on, then it would be clearer to label them 0, 1, 2..... And I think figure 2 can be dropped. It is the same information as in figure 3, but in a worse format. Peter Flom

REVIEWER	Reviewer name: Dr. Patricia Lucas

	Institution and Country: University of Bristol, United Kingdom of Great Britain and Northern Ireland Competing interests: None
REVIEW RETURNED	08-Nov-2020

GENERAL COMMENTS	I found that this paper lacked background context, and did not properly take account of confounding/covarying variables or context. For example, we do not know whether these children could have visited other servcies. Nor do we know whether the child population was stable over this period - a better measure have been not the total count of ED visits, but a ED visit rate. Moreover, I am not clear why this work is not superseded by Walsh et al (2019) who seem to have published a more complete and thorough analysis of the same issue.

REVIEWER	Reviewer name: Dr. Segn Nedd Institution and Country: St Mary's Hospital, United Kingdom of Great Britain and Northern Ireland Competing interests: None
REVIEW RETURNED	22-Oct-2020

GENERAL COMMENTS	This piece clearly provides some valuable insight into reciprocal effects in secondary care that arose following the expansion of free GP care to children under 6-year olds in Ireland. It may subsequently shed some light on possible challenges which may arise with further roll-out of free care for children under 15 years. Appropriate analyses methods were used with initial chi-squared testing followed but Bonferroni methods for multiple comparisons. This allowed for clear identification of results where changes had extremely minimal likelihoods of occurring due to chance. I was surprised to see the intervention (as explained in the abstract) stated that free GP care was expanded to all children aged 0-15 in July 2015. Throughout the article the implication was in fact that on 1st July 2015 this was available to those under 6 years only. This would be a crucial clarification as the analysis of the intervention underpins the purpose of this study. Although the study aimed to evaluate the effect of expansion of free GP care to children under 6 years this analysis was however not always clearly highlighted amongst other analyses. It was reported that ED attendances by single year of age (SYOA) was increased in children under 10 years of age. I would be curious to understand how significant this was in those aged 0-6 years compared to children aged 6-10 years of age. Additionally, although Hospital admission rates declined during phase 2 compared to phase 1 actual numbers of admissions increased. This was not commented on throughout the article. The larger number of overall admissions would still have a knock-on effect on resources required in secondary care. This could have been more clearly explored. This also in turn would then lay more weight to the discussed proposed interventions such as a need for a short stay paediatric unit in secondary care. Following from this It was clearly mentioned in the limitations section that the lack of diagnosis or reason for presentation that was missing. Unfortunately, this omission greatly affects some of the conclusions that can be made and thus has implication for the recommendations. It was suggested that some of the ED

	presentations were for minor conditions and that better incentives or resources in GP to manages these could be a potential solution. However, without evidence of the type of presentations this may include it would be difficult to make such conclusions and subsequent concrete proposals in-regards-to resource planning and potential new services delivery in the primary care setting. The overall conclusion however does remain true in line with the data presented that it is vitally important to ensure that both primary and secondary care facilities are supported for a potential increase in service utilisation once further proposed government plans are rolled out.

VERSION 1 – AUTHOR RESPONSE

10-Nov-2020

Dear Dr. Korotchikova,

Manuscript ID bmjpo-2020-000862 - "Characteristics of Paediatric Attendances of the Emergency Department in a Major Irish Tertiary Referral Centre Before and After Expansion of Free GP Care to Children Under 6"

Manuscript ID bmjpo-2020-000862 entitled "Characteristics of Paediatric Attendances of the Emergency Department in a Major Irish Tertiary Referral Centre Before and After Expansion of Free GP Care to Children Under 6" which you submitted to BMJ Paediatrics Open, has been reviewed. The comments of the reviewer(s) are included at the bottom of this letter.

The reviewer(s) have recommended revisions to your manuscript. Therefore, I invite you to respond to the reviewer(s)' comments and revise your manuscript. Please remember that the reviewers' comments and the previous drafts of your manuscript will be published as supplementary information alongside the final version.

To revise your manuscript, log into https://mc.manuscriptcentral.com/bmjpo and enter your Author Center, where you will find your manuscript title listed under "Manuscripts with Decisions." Under "Actions," click on "Create a Revision." Your manuscript number has been appended to denote a revision.

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You will be unable to make your revisions on the originally submitted version of the manuscript. Instead, revise your manuscript using a word processing program and save it on your computer. Please also highlight the changes to your manuscript within the document by using the track changes mode in MS Word or by using bold or colored text. Once the revised manuscript is prepared, you can upload it and submit it through your Author Center.

When submitting your revised manuscript, you will be able to respond to the comments made by the reviewer(s) in the space provided. You can use this space to document any changes you make to the original manuscript. In order to expedite the processing of the revised manuscript, please be as specific as possible in your response to the reviewer(s).

You will receive a proof if your article is accepted, but you will be unable to make substantial changes to your manuscript, please take this opportunity to check the revised submission carefully.

IMPORTANT: Your original files are available to you when you upload your revised manuscript. Please delete any redundant files before completing the submission.

Because we are trying to facilitate timely publication of manuscripts submitted to BMJ Paediatrics Open, your revised manuscript should be submitted within 28 days. If it is not possible for you to submit your revision by this date, we may have to consider your paper as a new submission.

Once again, thank you for submitting your manuscript to BMJ Paediatrics Open and I look forward to receiving your revision.

If you experience any difficulties please contact the Editorial office: info.bmjpo@bmj.com

Yours Sincerely,

Dr. Ian Maconochie
Associate Editor, BMJ Paediatrics Open

Prof. Imti Choonara
Editor in Chief, BMJ Paediatrics Open

FORMATTING AMENDMENTS (if any)
Requred amendments will be listed here; please include these changes in your revised version:

Reviewer: 1
Reviewer name: Peter Flom

Reviewer: 2
Reviewer name: Dr Segn Nedd

Reviewer: 3
Reviewer name: Patricia Lucas

Reviewer: 1
Institution and Country: Peter Flom Consulting USA

Reviewer: 2
Institution and Country: St Mary's Hospital, Imperial College Healthcare NHS Trust. United Kingdom

Reviewer: 3
Institution and Country: University of Bristol

Dear Editor and the Reviewers,

We would like to thank you for allowing us to revise and resubmit our manuscript. We are very appreciative of your valid and constructive comments and suggestions.

In this revised version of the manuscript, we have made the suggested changes in line with the reviewers' feedback and responded to each of the reviewers' comments (please, see the attached letter).

Following a substantial revision, we are resubmitting our manuscript for your further evaluation and looking forward to hearing from you.

Many thanks.

Kind regards,

Irina Korotchikova

Reviewer: 1

Comments to the Author
I confine my remarks to statistical aspects of this paper.

I have some issues with the figures and a suggestion on the analysis.

On the analysis - what the authors did is not wrong, but it's not best. A better method would be to use logistic regression, with time as a covariate and add a spline of time. This would also let the authors control for covariates.

Response: Thank you for your very constructive suggestions. We have performed the logistic regression analyses with time as a covariate and added a spline of time.

Another idea is to use the 6 to 12 year olds as a sort of control group - it's not really a perfect control but it's not unreasonable to suppose that any events in Ireland that affected how the youngest kids went to doctors also affected how older kids went to doctors - except for the change in payment for the little ones.

Response: We have used the 6-15 years group as a control as suggested.

On the figures: For figures, 1, 3 and 4, instead of showing both the earlier years and the later years, show the difference. The power of doing this was shown by William S. Cleveland in his books on statistical graphics.

Response: We have left Figure 1 as it was in the first submission as it shows all paediatric attendances regardless of the mode of referral. Figures 3 and 4 have been changed.

Also, the "age at attendance" is a little unclear because the ages overlap. If the first age group is for babies up to 1 year, the second for 1 year to 1 year 11 months and so on, then it would be clearer to label them 0, 1, 2.....

Response: The suggested change has been made.

And I think figure 2 can be dropped. It is the same information as in figure 3, but in a worse format.

Response: Figure 2 has been removed as recommended.
Peter Flom

Reviewer: 2

Comments to the Author
This piece clearly provides some valuable insight into reciprocal effects in secondary care that arose following the expansion of free GP care to children under 6-year olds in Ireland. It may subsequently shed some light on possible challenges which may arise with further roll-out of free care for children under 15 years. Appropriate analyses methods were used with initial chi-squared testing followed but Bonferroni methods for multiple comparisons. This allowed for clear identification of results where changes had extremely minimal likelihoods of occurring due to chance.

Response: Thank you for your positive feedback.

I was surprised to see the intervention (as explained in the abstract) stated that free GP care was expanded to all children aged 0-15 in July 2015. Throughout the article the implication was in fact that on 1st July 2015 this was available to those under 6 years only. This would be a crucial clarification as the analysis of the intervention underpins the purpose of this study.

Response: Free GP care was extended to children under 6 years of age in July 2015. This typo has been corrected in the abstract.

Although the study aimed to evaluate the effect of expansion of free GP care to children under 6 years this analysis was however not always clearly highlighted amongst other analyses. It was reported that ED attendances by single year of age (SYOA) was increased in children under 10 years of age. I would be curious to understand how significant this was in those aged 0-6 years compared to children aged 6-10 years of age.

Response: In this revision we have performed the logistical regression analysis with interaction term between the age and year of attendance which showed that a significant increase in CUH ED attendances was seen in all ages from 0 to 5 years with no significant increase observed in children from 6 to 15 years. This information has been added to the results (Table 2 and Figure 4).

Additionally, although Hospital admission rates declined during phase 2 compared to phase 1 actual numbers of admissions increased. This was not commented on throughout the article. The larger number of overall admissions would still have a knock-on effect on resources required in secondary care. This could have been more clearly explored. This also in turn would then lay more weight to the discussed proposed interventions such as a need for a short stay paediatric unit in secondary care.

Response: Thank you for your observation. We have now commented on the overall increase in the number of children admitted to hospital. The fact that there was a significant decrease in the percentages of children in the 0-5 years groups who attended CUH ED via a GP referral and were subsequently admitted to hospital remains an important finding.

Following from this It was clearly mentioned in the limitations section that the lack of diagnosis or reason for presentation that was missing. Unfortunately, this omission greatly affects some of the conclusions that can be made and thus has implication for the recommendations. It was suggested that some of the ED presentations were for minor conditions and that better incentives or

resources in GP to manages these could be a potential solution. However, without evidence of the type of presentations this may include it would be difficult to make such conclusions and subsequent concrete proposals in-regards-to resource planning and potential new services delivery in the primary care setting.

Response: We have removed "At the same time the hospital admission rates in the same category of patients significantly decreased suggesting that many of these CUH ED visits could have been potentially avoided should there have been sufficient support available for the primary care providers" from the conclusion.

The overall conclusion however does remain true in line with the data presented that it is vitally important to ensure that both primary and secondary care facilities are supported for a potential increase in service utilisation once further proposed government plans are rolled out.

Reviewer: 3

Comments to the Author
I found that this paper lacked background context, and did not properly take account of confounding/covarying variables or context. For example, we do not know whether these children could have visited other servcies. Nor do we know whether the child population was stable over this period - a better measure have been not the total count of ED visits, but a ED visit rate. Moreover, I am not clear why this work is not superseded by Walsh et al (2019) who seem to have published a more complete and thorough analysis of the same issue.

Response: The additional, more robust, analyses have been undertaken and the results have been presented in this revised submission. We felt it was important to look at a single large tertiary hospital as significant policy changes, such as the introduction of free GP care for under 6s, could affect hospitals (with different level of care) differently. Moreover, the study by Walsh et al. only looked at a single 6-months period before and immediately after the expansion of free GP care to under 6s. We felt that it was important to look at a longer periods of time to see whether the observed increase in ED attendances through a GP referral in 0 – 5 years group was sustained.

In relation to the paediatric population in the catchment area, the table below demonstrates the demographic changes in the 0-15 years population of Cork and Co. Cork, according to the 2012 and 2016 census:

	2012	*2016*
Total number of children (0-15 years)	115,879	120,417
0-5 years	47,484	45,941
6-15 years	68,395	74,476

As it can be seen from the above table, the number of children in the 0-5 years group did not increase during the study period.

Editor in Chief
Comments to the Author:
Title delete "Characteristics of" and add " a retrospective observational study"

Response: This change has been made

Consider actual numbers as well as proportions. The actual numbers of children (0-5y) admitted actually increased. This is important and Fig 4 would look very different using numbers. Your discussion & conclusions& abstract need to change to reflect this. THIS POINT IS IMPORTANT AND YOUR PAPER MUST ADDRESS THIS

Response: Thank you for pointing this out. We have included the actual numbers and changed the figures as suggested

Discussion page 16, line 44-45 delete "This is the first Irish study" See instructions to authors - we do not recommend describing studies as the first. This is upto others to decide.

Response: We have removed “This is the first Irish study” from the discussion.

Be more cautious in your discussion. You do not have clinical outcomes. The children may have received treatment that prevented the need for admission. Do not speculate too much. The actual number of sick children in Cork who need hospital treatment is unlikely to be different,so increased attendance should not neccessarily result in increased admission. Your discussion needs to be shortened.

Response: We have amended and shortened the discussion as suggested. The following sentence has been added “This might suggest that some of these ED presentations may have been for ambulatory care sensitive conditions or driven by a desire by parents and GPs to have a second opinion to resolve diagnostic uncertainty for conditions that ultimately transpired to be self-limiting” instead of the previous “This suggests that some of these ED presentations may have been for minor conditions and could have been potentially avoided. Some may have been driven by a desire by parents and GPs to have a second opinion to resolve diagnostic uncertainty for conditions that ultimately transpired to be self-limiting”.

Minor points

Table 1 is very busy. Consider moving data for days of the week to a supplementary table.

Response: This change has been made.

Introduction page 6 line 34 avoid use of "recently". If your paper is published, readers will not know when you are referring to, give precise dates (months and years)

Response: We have removed “recently” and added the exact date “January 5th, 2020”.

VERSION 2 – REVIEW

REVIEWER	Reviewer name: Dr. Peter Flom Institution and Country: Peter Flom Consulting, United States Competing interests: None
REVIEW RETURNED	11-Jan-2021

GENERAL COMMENTS	The authors have addressed my concerns and I now recommend publication

REVIEWER	Reviewer name: Dr. Segn Nedd Institution and Country: St Mary's Hospital, United Kingdom of Great Britain and Northern Ireland Competing interests: None
REVIEW RETURNED	26-Jan-2021

GENERAL COMMENTS	This piece clearly provides some valuable insight into the reciprocal effects that occurred in a tertiary Paediatric ED following the expansion of free GP care to children aged 0-5 years olds in Ireland.

	It may subsequently shed some light on possible challenges which may arise with further roll-out of free GP care for children aged 6-15 years. The utilisation of embedded electronic patient records facilitated good data collection outlining the numerical changes in GP referrals to CUH ED before and after the intervention. The use of logistic regression analyses also helped to clearly compare differences in referral methods between 0-5 year olds and those aged 6-15 years. The data is generally well presented in graphical form. Figure 6 is difficult to interpret due to the number of data points. However overall, there is a clear description of an increase in GP referrals to CUH ED in 0-5 year olds after the intervention. The results also shed light on other changes which occurred in relation to patient outcomes between time period A and time period B. The principal aim of this study was to ascertain the difference in GP referrals to CUH ED in children aged 0-5 years. Further analysis was undertaken surrounding presentation pathways by single year of age. It would have been useful to see the numerical breakdown of this analysis in the supplementary information. Through review of the graphical data it appears that there was a large increase in post intervention GP referrals to CUH ED in infants. This was not further explored. Analysis of other characteristics of this group would be important in order to ensure that appropriate intervention proposals could be made. This additionally highlights the main limitation in this study. There was an inability to analyse the diagnosis, reason for attendance or treatment given for each presentation. The discussion gave consideration to various hypothetical diagnoses. Mention was made of the need for extra support to be provided to not only secondary but also primary care services. However, as there was no accurate picture of the specific clinical needs and resources utilised during CUH ED presentations it is difficult clearly state what type of proposed interventions would be most suitable. Interventions that may be appropriate to support the needs of older children may not address the needs of infants who appear to have been referred in large numbers post intervention. Further study surrounding these factors would be most valuable in ensuring that proposals for service reconfigurations adequately address the specific health needs of this population. This would also be an important area of study in any future research relating to further expansion of free GP care for children between 6-15 years in Ireland.

VERSION 2 – AUTHOR RESPONSE