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)	Characteristics of child welfare investigations reported by healthcare professionals in Ontario: Secondary analysis of a regional database
AUTHORS	Livingston, Eliza Joh-Carnella, Nicolette Lindberg, Daniel M Vandermorris, Ashley Smith, Jennifer Kagan-Cassidy, Miya Giokas, Danielle Fallon, Barbara

VERSION 1 – REVIEW

REVIEWER	Reviewer name: Dr. Anne Smith Institution and Country: Competing interests: None
REVIEW RETURNED	05-Jun-2021

GENERAL COMMENTS	My apologies for initially agreeing to review this manuscript only to discover that I am ill-equipped to provide comment on the statistical analyses used in the study. Although I am familiar with Chi-square analyses and SPSS, I am not familiar with "Chi square automatic interaction detector analyses, CHAID" and I therefore suggest review by an individual who is familiar with this particular statistical analysis process. The statistical analyses are so fundamental to this manuscript that I am hesitant to offer a review based on the assumption that the findings are entirely valid and the conclusions drawn are therefore entirely reasonable – although this may be the case. I regret that do not understand Figure 1. and Figure 2. which I assume is because I am unfamiliar with CHAID. P11 paragraph 2 – I am curious as the reasons for the absence of data within the sentence "Primary caregivers involved in investigations with a hospital referral source were significantly more likely to have noted alcohol abuse, drug/solvent abuse, mental health issues, be a victim of IPV, or have a history of foster care or group homes". Reference table 3? P13. Table 3. I assume that data around "Service referral made" and "Case closed with No Service Referral" do not add up to 100% because some cases remained active at the time of data collection. Perhaps an explanation might be provided in the text. I recommend review by a reviewer who understands how CHAID might be used appropriately so that s/he can provide meaningful comments on the methodology and statistical analyses described in this manuscript and thus whether the conclusions drawn by the authors are valid.

REVIEWER	Reviewer name: Dr. Gabriel Otterman

	Institution and Country: Uppsala University Department of Womens and Childrens Health, Sweden Competing interests: None
REVIEW RETURNED	23-Jun-2021

GENERAL COMMENTS	Many thanks for the invitation to review the manuscript entitled Characteristics of child maltreatment investigations referred by healthcare professionals in Ontario: Opportunities for collaboration, prevention and intervention submitted to BMJ Paediatrics Open. There is much work that needs to be done in improving inter-sectoral responses to child maltreatment. Efforts to examine potential models of collaboration around the responses and prevention of child abuse and neglect are welcome; the issue of decision making within the child welfare system in response to reports or referrals from healthcare is therefore a salient one. Eliza Livingston and colleagues provide novel data in the current study from Ontario where they examine the characteristics and outcomes of child welfare investigations referred by healthcare professionals. Studying the universe of children/families that were provided child welfare services following a referral from healthcare, the investigators sought to identify predicting characteristics that potentially distinguished hospital-based from community-based healthcare referrals. The writing style is good, and the manuscript reads well. The abstract, introduction, methods, results and discussion are adequate in length, and the table is helpful. The figures, depicting the CHAID analyses, are lacking legends in the current printout. I list some comments for the authors to consider – not in any order of importance - aimed to improve the manuscript for publication. 1. The term in the title 'child maltreatment investigations' may mistakenly be taken for medical investigations, so please edit for clarity. The subtitle 'opportunities…' is not really fleshed out in the manuscript more than superficially. The opportunities and what they would look like, are not substantially described in the discussion, so the title promises something that is not delivered in the paper. 2. The authors systematically use the terms 'referral' and 'child welfare' throughout the paper. From a quick online search, the terminology in Ontario is of 'reporting' and 'mandatory reporting for professionals' of suspected child maltreatment, to Children's Aid Society. I understand the use of alternate, more neutral terms, but this may be a source of confusion. Is a referral of suspected child maltreatment in compliance with mandatory reporting laws a uniform procedure across the province? Is there, for example, a single form that is used? In my setting (Sweden) one can make a referral to child welfare services that is not via a report to CPS. In other countries, such as the UK and the Netherlands, where mandatory reporting to CPS is not as robust, the decision trees may be different. More background with clarity on the system in Ontario would be helpful, especially for the international reader. 3. I note that CAS in Ontario may include faith-based child welfare outlets. Is there uniformity or quality improvement of the decision process among local CAS providers? Would one expect similar behaviour amongst local CAS units responding to the same healthcare referral across the province? 4. The introduction should describe what is already known about the higher substantiation rate by CPS of reports/referrals from healthcare which has long been reported from many settings. 5. Likewise, the definitions of child welfare 'decision to provide a family with services,' and 'substantiation' are needed for clarity. Can a referral/report be substantiated by CAS investigators without a decision to provide services? Is the decision to provide services a binary outcome?

	6. I was surprised that one could distinguish with confidence a referral source between hospital and community. In my experience, these referrals may overlap, like when a child is referred from community healthcare to tertiary healthcare and when all professionals are mandated to report to CPS. A single event around a child might result in multiple referrals from multiple sources by mandatory reporters. 7. Are the distinctions between community and hospital referrals also along the lines of staffing by general practitioners and paediatric specialists? Are community settings largely staffed by GPs? I imagine that Ontario as a province has vast diversity from major urban centres to remote rural communities with indigenous populations. Given that the weighting appropriately controlled for this diversity, the researchers may be examining the difference between a paediatric referral versus a GP referral. Please clarify. 8. Did the OIS allow for any control of severity of cases? It would not be surprising, as pointed out by the authors, that tertiary care facilities would be caring for the youngest patients, and with the greatest severity of established 'physical harm.' Were the characteristics of paediatric facilities considered, such as the presence of multidisciplinary hospital-based teams? It is not surprising that the data presented demonstrates that the children cared for in hospital facilities were younger, more often had primary caregiver risk factors, as one would see in urban, inner-city settings were families may not access primary care despite the health system's universal access. 9. A discussion of the ethical dimensions of the study, ethical approval or IRB exemption is lacking. 10. The results provide valuable insight on the importance of referrals/reporting from healthcare, but also how this type of data can be used to bring about systems change and quality improvement across agencies. The authors can state in the discussion how they see this type of analysis can contribute to collaboration with articulated shared values and measures of outcomes of interest to improve referral patterns from healthcare as well as enhance informed responses within the child welfare system.

REVIEWER	Reviewer name: Dr. Peter Flom Institution and Country: Peter Flom Consulting, United States Competing interests: None
REVIEW RETURNED	09-Jun-2021

GENERAL COMMENTS	I confine my remarks to statistical aspects of this paper. I have one big question: The main advantage of CHAID over CART is that CHAID allows multiway splits. So, why use CHAID with binary splits rather than CART? Other questions: p. 7 line 22-23 This is kind of confusingly written. I would say that all the subjects start in the root node and then that node is split to maximize the difference in the DV. line 29 Why use this method of avoiding overfitting? The usual method, AFAIK, is to divide the data into train and test data sets (and possibly a confirm data set). Peter Flom

VERSION 1 – AUTHOR RESPONSE

Dr. Imti Choonara

Editor-In-Chief
BMJ Open Paediatrics

July 22, 2021

Dear Dr. Choonara,

On behalf of my co-authors, I would like to thank you for the opportunity to revise and resubmit our manuscript (bmjpo-2021-001167), entitled "Characteristics of child welfare investigations reported by healthcare professionals in Ontario: Secondary analysis of a regional database." The reviewers' comments were very helpful, and we have carefully considered and responded to each suggestion in our responses. We were successful in incorporating the majority of the reviewer's feedback into our revised manuscript, which we hope has improved its clarity and relevance to a wider audience.

We have included our response to reviewers in which we address each comment the reviewers made in full. In our response to reviewers below, we have numbered each comment with our responses underneath labeled "AR". We have also attached a file with our response to reviewers organized in a table with the reviewer's comments on the left side and our responses on the right. All of the corresponding changes were tracked in the marked copy of the manuscript.

Thank you again for your consideration of our revised manuscript.

Sincerely,

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Editor in Chief
1. Title replace "Opportunities for collaboration, prevention, and intervention" with description of the methodology, eg "secondary analysis of a regional database"
AR: Thank you for your suggestion. The title has been changed to "Secondary analysis of a regional database."

2. Results expand your description of the actual number of referrals before statistical analysis:ie,number of hospital referrals, number of community healthcare referrals, remaining number of referrals from others (state who these were)
AR: Thank you for your suggestion. The first paragraph in the results section has been expanded to include this information.
"In the OIS sample 441 and 162 investigations were reported by hospital and community-based healthcare providers between October and December 2018, respectively. The remaining 6,987 reports were made by other professional (e.g., schools, police, etc.) and non-professional sources (e.g., relatives, neighbours, etc.)."

3. I think your analyses are based on "7,590 child maltreatment-related investigations". This needs to be clearly stated
in both the abstract and the main paper.
AR: Thank you for your suggestion. This has now been clearly stated in the Abstract and Methods sections.
The statement "A sample of 7,590 child maltreatment-related investigations from the Ontario Incidence Study of Reported Child Abuse and Neglect – 2018, a cross sectional study, were analyzed," was included in the Abstract.
The statement "The final sample, which included 7,590 child maltreatment-related investigations, was

weighted to derive estimates of investigation rates for the province," was included in the Methods section.

Associate Editor
1. The reviewers have provided suggestions and edits which can be incorporated to improve the readability and relevance to a wider audience. This paper will provide valuable guidance to child health and welfare professionals across the western world and needs wide dissemination.
AR: Thank you for your comment. We have incorporated the reviewers' comments, and hopefully this has improved the readability and relevance of our paper for a wider audience.

Reviewer 1 - Dr. Anne Smith
1. P11 paragraph 2 – I am curious as the reasons for the absence of data within the sentence "Primary caregivers involved in investigations with a hospital referral source were significantly more likely to have noted alcohol abuse, drug/solvent abuse, mental health issues, be a victim of IPV, or have a history of foster care or group homes". Reference table 3?
AR: Thank you for your comment. We did not include data in that sentence because we thought it would be confusing, however you are correct that it appears odd. We have now changed the sentence to include data:
"Primary caregivers involved in investigations with a hospital referral source were significantly more likely to have noted alcohol abuse (11% vs. 7%), drug/solvent abuse (19% vs. 10%), mental health issues (41% vs. 38%), be a victim of IPV (29% vs. 22%) or have a history of foster care or group homes (9% vs. 5%)."
We state on p11 paragraph 1 that the results in the following paragraphs are all shown in Table 3.

2. P13. Table 3. I assume that data around "Service referral made" and "Case closed with No Service Referral" do not add up to 100% because some cases remained active at the time of data collection. Perhaps an explanation might be provided in the text.
AR: Thank you for your comment. "Case closed with no service referral" refers to cases that did not receive a service referral and/or were not transferred to ongoing services. Adding these three categories adds up to more than 100%, as an investigation can be both transferred and receive a service referral. To clarify this, we have changed the variable name to "Case closed without any additional services."

Reviewer 2 - Dr. Peter Flom
1. The main advantage of CHAID over CART is that CHAID allows multiway splits. So, why use CHAID with binary splits rather than CART?
AR: Thank you for your comment. We believed CHAID would be a better choice for our analysis than CART as it has been shown to be better suited for larger datasets, especially those with nominal variables, and it is more effective for exploratory purposes (Sullivan & van Zyl, 2008). Further, CHAID prevents data overfitting by splitting nodes only if a significance criterion is achieved (Lin & Fan, 2019).

2. p. 7 line 22-23 This is kind of confusingly written. I would say that all the subjects start in the root node and then that node is split to maximize the difference in the DV.
AR: Thank you for your suggestion. The sentence has been rewritten to make sure it is clear.
"All subjects start in the root node which is then split to maximize the difference in the dependent variable."

3. line 29 Why use this method of avoiding overfitting? The usual method, AFAIK, is to divide the data into train and test data sets (and possibly a confirm data set).
AR: Thank you for your comment. In order to avoid overfitting, the CHAID algorithm uses a statistical end process rule to halt tree growth. This allowed us to select our minimum sizes for parent and child nodes prior to analysis to curtail overfitting.
To clarify this method, we have rewritten the sentence regarding overfitting in the Methods. It is now "To avoid overfitting the data, the minimum sizes for parent (n=50) and child (n=20) nodes were chosen to halt tree growth [27]."

Reviewer 3 - Dr. Gabriel Otterman
1. The term in the title 'child maltreatment investigations' may mistakenly be taken for medical investigations, so please edit for clarity. The subtitle 'opportunities…' is not really fleshed out in the

manuscript more than superficially. The opportunities and what they would look like, are not substantially described in the discussion, so the title promises something that is not delivered in the paper.
AR: Thank you for your suggestion. The title has been changed to "Characteristics of child welfare investigations reported by healthcare professionals in Ontario: Secondary analysis of a regional database," for clarity and to ensure it accurately describes the paper.

2. The authors systematically use the terms 'referral' and 'child welfare' throughout the paper. From a quick online search, the terminology in Ontario is of 'reporting' and 'mandatory reporting for professionals' of suspected child maltreatment, to Children's Aid Society. I understand the use of alternate, more neutral terms, but this may be a source of confusion. Is a referral of suspected child maltreatment in compliance with mandatory reporting laws a uniform procedure across the province? Is there, for example, a single form that is used? In my setting (Sweden) one can make a referral to child welfare services that is not via a report to CPS. In other countries, such as the UK and the Netherlands, where mandatory reporting to CPS is not as robust, the decision trees may be different. More background with clarity on the system in Ontario would be helpful, especially for the international reader.
AR: Thank you for your comment. To ensure that there is no confusion, we have changed the word 'referrals' to 'reports' where applicable.
Any individual in Ontario who suspects a child is being maltreated is required to call their local Children's Aid Society to file a report. The agency will then determine whether the report has enough evidence to be opened for an investigation. While making a report is similar across the province, it is not a uniform procedure as Ontario uses a decentralized child welfare model. As such, child welfare agencies act independently of one another, although they all follow Ontario's child protection legislation, the Child, Youth and Family Services Act (Fallon et al., 2021).
We have added the paragraph below to the introduction to provide more background on the Ontario child welfare system for the international reader. The term 'child welfare' has also been more thoroughly explained here. "In Ontario, every citizen has a duty to report child maltreatment to child welfare; healthcare providers are particularly responsible as failure to do so may result in a fine [23]. Reports are screened by the child welfare agency to determine whether they meet the criteria to be opened for an investigation. Mandated child welfare agencies in Ontario operate under a decentralized model, but all are governed by provincial child protection legislation, the Child, Youth and Family Services Act [11]."

3. I note that CAS in Ontario may include faith-based child welfare outlets. Is there uniformity or quality improvement of the decision process among local CAS providers? Would one expect similar behaviour amongst local CAS units responding to the same healthcare referral across the province?
AR: Thank you for your comment. In Ontario, the child welfare system uses a decentralized model meaning that local CAS providers act independently of one another. However, all agencies follow the same government mandate resulting in similar, albeit not identical, decision processes and behaviours across province agencies. To clarify this aspect of the child welfare system in Ontario the following sentence has been included in the Introduction:
"Mandated child welfare agencies in Ontario operate under a decentralized model, but all are governed by provincial child protection legislation, the Child, Youth and Family Services Act [11]."

4. The introduction should describe what is already known about the higher substantiation rate by CPS of reports/referrals from healthcare which has long been reported from many settings.
AR: Thank you for your suggestion. A sentence has now been included in the introduction describing previous research on higher substantiation rates from healthcare sources.
"Further, investigations referred to child welfare by healthcare professionals are more likely to be substantiated than referrals from non-professional sources (i.e., child, relatives, community members, etc.) [10].

5. Likewise, the definitions of child welfare 'decision to provide a family with services,' and 'substantiation' are needed for clarity. Can a referral/report be substantiated by CAS investigators without a decision to provide services? Is the decision to provide services a binary outcome?
AR: Thank you for your comment. The definition for 'substantiation' is provided in Table 1, and 'decision to provide a family with services' is defined both in the introduction (see pg. 5 paragraph 4) and the methods (pg. 7 paragraph 2). Further, 'Service Referral Made,' and 'Transfer to Ongoing Services,' are

also described in Table 1.
A referral can be substantiated without receiving ongoing services or an external service referral. The decision to provide services is not a binary outcome, as a case can:
a) Be closed without transfer to ongoing services and receive a service referral.
b) Be closed without transfer to ongoing services and receive no service referral (that is no additional services are provided).
c) Remain open and be transferred to ongoing services and receive a service referral.
d) Remain open and be transferred to ongoing services and not receive a service referral.
To ensure this is clear, we have added the following sentence to the Methods. "The case dispositions captured in the OIS-2018 are not mutually exclusive."

6. I was surprised that one could distinguish with confidence a referral source between hospital and community. In my experience, these referrals may overlap, like when a child is referred from community healthcare to tertiary healthcare and when all professionals are mandated to report to CPS. A single event around a child might result in multiple referrals from multiple sources by mandatory reporters.
AR: Thank you for your comment. The methodology of the OIS study is such that information (including referral source) is provided by investigating child welfare workers. Therefore, we rely on their determination of referral source.
While it is possible that a case could have multiple referrals, we conducted additional analyses and confirmed that all the investigations used in this analysis only had one healthcare referral source.

7. Are the distinctions between community and hospital referrals also along the lines of staffing by general practitioners and paediatric specialists? Are community settings largely staffed by GPs? I imagine that Ontario as a province has vast diversity from major urban centres to remote rural communities with indigenous populations. Given that the weighting appropriately controlled for this diversity, the researchers may be examining the difference between a paediatric referral versus a GP referral. Please clarify.
AR: Thank you for your comment. Given that the objective of the OIS-2018 was to estimate the number of child welfare investigations in Ontario in 2018, our sampling strategy was to randomly select a higher proportion of agencies with high service volume counts, likely akin to urban centres. However, as it is a provincial sampling strategy, we are unable to comment on differences within geographic regions (i.e., major urban centres, rural communities, etc.). Therefore, while paediatric referrals may be more likely to come from urban centres and general practitioner referrals from rural community settings, we are not able to make the assumption that we are examining differences between paediatric and GP referrals.

8. Did the OIS allow for any control of severity of cases? It would not be surprising, as pointed out by the authors, that tertiary care facilities would be caring for the youngest patients, and with the greatest severity of established 'physical harm.' Were the characteristics of paediatric facilities considered, such as the presence of multidisciplinary hospital-based teams? It is not surprising that the data presented demonstrates that the children cared for in hospital facilities were younger, more often had primary caregiver risk factors, as one would see in urban, inner-city settings were families may not access primary care despite the health system's universal access. AR: Thank you for your comment. As this is a population-based study, the OIS does not control for severity. Although some variables captured within the study can be used to indicate severity (i.e., physical harm), while physical harm was included as a variable in the CHAID analyses, it did not emerge as a significant predictor of the decision to provide a family with additional services.
The characteristics of paediatric facilities were not considered as the OIS did not capture this information. As mentioned in the previous response, we are unable to comment on differences between geographic settings, as we used a provincial sampling strategy to represent what is occurring in Ontario.

9. A discussion of the ethical dimensions of the study, ethical approval or IRB exemption is lacking.
AR: Thank you for this comment. A statement regarding ethical approval has now been included in the Methods.
"The OIS received ethics approval by the University of Toronto (protocol #28580)."

10. The results provide valuable insight on the importance of referrals/reporting from healthcare, but also how this type of data can be used to bring about systems change and quality improvement across agencies. The authors can state in the discussion how they see this type of analysis can contribute to

collaboration with articulated shared values and measures of outcomes of interest to improve referral patterns from healthcare as well as enhance informed responses within the child welfare system.
AR: Thank you for your comment. We have edited the Discussion to incorporate your points. The following is now in our concluding paragraph:
"This information will help healthcare professionals support their patients including making a report to child welfare when they suspect maltreatment. Further, the findings can help child welfare workers develop informed responses to reports from this healthcare sources. This will facilitate improved collaboration between the Ontario healthcare and child welfare systems to support families."

References

Fallon B, Lefebvre R, Filippelli J, Joh-Carnella N, Trocmé N, Carradine J, Fluke J. Major findings from the Ontario Incidence Study of Reported Child Abuse and Neglect 2018. Child Abuse Negl. 2021;111:104778. DOI: 10.1016/j.chiabu.2020.104778.

Lin CL, Fan CL. Evaluation of CART, CHAID, and QUEST algorithms: a case study of construction defects in Taiwan. J Asian Archit. 2019;18(6):539-553. DOI: 10.1080/13467581.2019.1696203

Sullivan DJ, van Zyl MA. The well-being of children in foster care: Exploring physical and mental health needs. Child Youth Serv Rev. 2008;30(7): 774-786. DOI: 10.1016/j.childyouth.2007.12.005