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 Emergency Department dog bite attendance during the COVID-19 pandemic: an audit at a tertiary children's hospital
AUTHORS	Tulloch, John S P Minford, Simon Pimblett, Vicky Rotheram, Matt Christley, Robert M Westgarth, Carri

VERSION 1 – REVIEW

REVIEWER	Reviewer name: Dr. Laura A. Reese Institution and Country: Michigan State Univ, United Kingdom of Great Britain and Northern Ireland Competing interests: None
REVIEW RETURNED	30-Jan-2021

GENERAL COMMENTS	This is a tightly focused, well-written paper which has immediate import to public health policy. The analyses are well-conducted and reported. There are a variety of potential explanations for the rise in emergency department attendance aside from or along with COVID that are not controlled for but identified and discussed by the authors. My only question is what the authors speculate about the higher rates of bites to females in the summer, but this is only out curiosity as opposed to being a flaw in the manuscript.

REVIEWER	Reviewer name: Chris Mannion Institution and Country: Leeds Teaching Hospitals NHS Trust, United Kingdom of Great Britain and Northern Ireland Competing interests: None
REVIEW RETURNED	15-Feb-2021

GENERAL COMMENTS	This is a helpful audit - the stats are complex but well constructed. It serves as a useful addition in dog bite research. I am happy to accept this.

REVIEWER	Reviewer name: Dr. Peter Flom Institution and Country: Peter Flom Consulting, 515 West End Ave, New York, 10024, United States Competing interests: None
REVIEW RETURNED	03-Feb-2021

GENERAL COMMENTS	I confine my remarks to statistical aspects of this paper. The general approach is fine, but I have some issues to resolve before I can recommend publication. One issue is about clarity: I found it difficult, at times, to figure out when the authors were talking about dog bites per population vs.

	dog bites per attendance. Perhaps these analyses could be presented in separate sections. But, another choice is to only look at per population data. The total number of attendances dropped sharply for a period during COVID. This is interesting, but is not the subject of this paper. The main question is "Were more kids getting bitten by dogs?" If anything, the total number of attendances might serve as a covariate - indicating a reluctance to take kids to emergency rooms during COVID. (There may be some relatively minor bites where the parents decide to treat the kid at home because of COVID fear). Unless there is some strong reason to present the "per attendance" analysis, I'd prefer that it be dropped. On page 6 line 22, the authors state that they used backward elimination to build models. This is not recommended. When backward (or forward, or stepwise) methods are used, the p values are too low, standard errors too small, parameter estimates are biased away from 0. (See Frank Harrell's book *Regression Modeling Strategies* for more about this, including a proof). It would be better to use substantive knowledge, but, if the authors insist on an automated method, LASSO is better. In Table 1 and associated text, the authors use chi square to examine the relationship between dog bites victims ages during COVID and outside of COVID. It would be better to use an ordinal method (e.g. a Jonckheere Terpstra test). Also, in table 1, it appears that dog bites per month went down a lot during COVID. 162/7 = 23 per month during COVID vs. 757/14 = 54 per month before COVID. This appears to contradict the blue line in figure 2 (p. 18) Peter Flom

VERSION 1 – AUTHOR RESPONSE

Ref: Manuscript ID bmjpo-2021-001040

Re: "Paediatric Emergency Department dog bite attendance during the COVID-19 pandemic: an audit"

Dear Editors and Reviewers,

Thank you for taking the time to read and review the paper and for your very useful comments. We think these amendments will make it a stronger paper upon publication. We have responded to all of your comments below and provided a tracked-changes version of the document, alongside a clean version so that you can see all the changes clearly.

Thank you again for you time and we hope that these revisions and responses meet with your approval.

Kind Regards

The Authors

Comments Reviewer 1

This is a tightly focused, well-written paper which has immediate import to public health policy. The analyses are well-conducted and reported. There are a variety of potential explanations for the rise in emergency department attendance aside from or along with COVID that are not controlled for but identified and discussed by the authors. My only question is what the authors speculate about the higher rates of bites to females in the summer, but this is only out curiosity as opposed to being a flaw in the manuscript.

Thank you very much for your kind words. We do not know why there would be higher rates of bites to females in the summer. We have not seen this reported or explored in any other literature and hence we decided to not speculate further about this in the paper. It is likely there is some difference in the activities and behaviours that girls do with dogs compared to boys in the summer months. What these would be are not abundantly clear, and some qualitative or mixed-methods research is needed to explore this.

Comments Reviewer 2

I confine my remarks to statistical aspects of this paper. The general approach is fine, but I have some issues to resolve before I can recommend publication.

One issue is about clarity: I found it difficult, at times, to figure out when the authors were talking about dog bites per population vs. dog bites per attendance. Perhaps these analyses could be presented in separate sections.

We have attempted to clarify the nomenclature throughout the paper. These terms are now used throughout 'dog bite numbers or attendances' and 'percentage of attendances due to dog bites'. At no point in the submission did we use a dog bite per population measure. This is due to two reasons. Firstly, the attending population of an emergency department does not have the same demographic as the wider community population, as we know that there are many socio-demographic issues that impact who attends hospitals. Secondly, the population that the hospital in question serves is unknown. Broadly speaking it is the city of Liverpool, but patients do arrive from most of North West England, North Wales and the Isle of Man. In the UK there is personal choice about which hospital a patient uses, therefore unless data is examined at a national scale, it is difficult to define an incidence of any condition per the wider population.

But, another choice is to only look at per population data. The total number of attendances dropped sharply for a period during COVID. This is interesting, but is not the subject of this paper. The main question is "Were more kids getting bitten by dogs?" If anything, the total number of attendances might serve as a covariate - indicating a reluctance to take kids to emergency rooms during COVID. (There may be some relatively minor bites where the parents decide to treat the kid at home because of COVID fear).

Unless there is some strong reason to present the "per attendance" analysis, I'd prefer that it be dropped.

We would counter that this is a key point in the findings. Parents took children to emergency departments for dog bites, despite there being an overwhelming decrease in attendances for all other reasons (as mentioned in the discussion and displayed in Fig 2). Without contextualising the count data within a denominator population, the count data is prone to misinterpretation especially as the background attending population was not numerically stable during the COVID-19 public helth measures.

By providing both raw count data and the percentage of attendances data we provide emergency department clinicians, public health clinicians, and policy makers the information required to understand that not only did dog bite numbers increase, but that they made up a higher proportion of the emergency departments work load during COVID-19 public health measures. This may additionally influence service provision within the hospital, such as the plastic surgery teams. This will have impact on how emergency departments prepare for their management within future lockdowns. To say that more than 1 in 100 attendances to an emergency department was due to dog bites is quite an astonishing figure!

Other emergency department-based studies describe both numbers and percentages as we do. For example, doi:10.1136/injuryprev-2013-040816, this paper describes injuries in children presenting to emergency departments and provides raw numbers and data. Likewise, this paper, doi: 10.1136/emj.2005.025411, describes reasons for childhood attendance to emergency department, and provides the same figures. By providing percentage figures alongside raw numbers we can ensure that the data presented in this work is comparable to previous and future research. We have increased the prominence and focus of dog bite numbers within the text but have maintained the percentages as the authors feel that they are equally as important.

On page 6 line 22, the authors state that they used backward elimination to build models. This is not recommended. When backward (or forward, or stepwise) methods are used, the p values are too low, standard errors too small, parameter estimates are biased away from 0. (See Frank Harrell's book *Regression Modeling Strategies* for more about this, including a proof). It would be better to use substantive knowledge, but, if the authors insist on an automated method, LASSO is better.

Thank you for providing that information. Thankfully creating a model based on substantive knowledge created the same models presented. We have changed the sentence in the methods to read, 'Substantive knowledge was used to select the models with the best fit (only these will be presented).'

In Table 1 and associated text, the authors use chi square to examine the relationship between dog bites victims ages during COVID and outside of COVID. It would be better to use an ordinal method (e.g. a Jonckheere Terpstra test).

Thank you for your suggestion. The JT test is appropriate for analysis of continuous or ordinal data among ordinal categories and is a rank-based trend test. In contrast, we were examining the frequency of dog bite attendances across age categories. Hence, we believe that use of a Chi2 test for proportions together with a Chi Square test for trend (also known as the Cochran-Armitage test for trend) is still the most appropriate statistical approach.

Also, in table 1, it appears that dog bites per month went down a lot during COVID. 162/7 = 23 per month during COVID vs. 757/14 = 54 per month before COVID. This appears to contradict the blue line in figure 2 (p. 18)

This was caused by an error in the heading. The first column should have read Jan 2016-Feb 2020, not 2019! This header has now been corrected. When you now calculate mean bites per month, you get 15. As the per the Editors suggestion we have added a new row to show mean number of bites per month.

Comments Reviewer 3

This is a helpful audit - the stats are complex but well constructed. It serves as a useful addition in dog bite research. I am happy to accept this.

Thank you very much for your kind words, and willingness to support the paper's acceptance.

Comments Editor in Chief

I am in agreement with the stats reviewer that you need to focus on the NUMBER of dog bites NOT the proportion of attendances that were dog bites. We are keen to publish your paper but this change is ESSENTIAL.

We have shifted the focus to number of dog bites throughout the paper. However, we would like the proportion of dog bites to remain in the paper. As discussed with reviewer 2, by focusing solely on number of dog bites, the reader misses the nuance that the clinicians were seeing a higher proportion of dog bites out of all their cases. The attending population was not constant over the study period and so without presenting these data, it is challenging for the reader to contextualise the findings. We have now included dog bite attendance numbers clearly in the abstract, results and discussion (alongside percentage of attendances that were dog bites). We have ensured that the dog bite numbers throughout each section of the paper take precedence over the percentage attending due to dog bites figures.

Fig 2 is important.

Agreed, we have added a new line on it to show when the COVID-19 public health measures started.

Table 1 has a typo in the heading for column 2, the years "2016" not "2019" according to the text.

This has been amended, thank you for spotting our error!

I suggest attending number of monthly dog bites to the table.

Thank you for the suggestion, we have added a new row for 'mean number of dog bites per month' on Table 1.

I also suggest adding a table with actual numbers of dog bite attendances each month during lockdown. From Fig 2 it appears to be low at the start of lockdown, suggesting parents were afraid to go to ED following a dog bite to a child, and then increases dramatically.

This is already presented in Figure 2 and described in the text, and we feel would be an unnecessary duplication of the results. We have amended Fig 2 for more clarity by placing a vertical line to represent the start of COVID-19 public health measures. As you can see the dog bite numbers are within the normal range at this point, whilst total attendances to the emergency department were very low. We stated in the discussion, 'However, children continued to attend Alder Hey for dog bites, with no clear decrease in attendance, despite overall attendance numbers dramatically decreasing'. The lag in time before the sudden increase in dog bite cases is discussed over two paragraphs starting, 'Dog bite numbers did not dramatically increase….'

Delete Figs 1 and 3.

We have deleted Figure 1 but kept Figure 3. On presentation of results to clinical colleagues this was the figure that was found to be the most useful. We have added a vertical line to represent the start of COVID-19 public health measures for more clarity. In addition to our discussion above, we feel it is important that the readers can see both the number of dog bite attendances, and the percentage of them in the presenting population.

Abstract, what this study adds and results will all change using actual number of dog bites rather than proportions

We have added number of dog bite attendances, alongside the percentage of dog bites in the attending population, to the abstract and what this adds. These figures were already present in

the results, but we have reordered them so that dog bite numbers take precedence over percentage attending.

Title add " at a tertiary childrens hospital"

This has been added and the title is now, 'Paediatric Emergency Department dog bite attendance during the COVID-19 pandemic: an audit at a tertiary children's hospital'

VERSION 2 – REVIEW

REVIEWER	Reviewer name: Dr. Peter Flom Institution and Country: Peter Flom Consulting, 515 West End Ave, New York, 10024, United States Competing interests: None
REVIEW RETURNED	09-Mar-2021

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