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)	Diversity in the Emergency care for febrile children in Europe: a questionnaire study.
AUTHORS	Borensztajn, Dorine; Yeung, Shunmay; Hagedoorn, Nienke; Balode, Anda; von Both, Ulrich; Carrol, Enitan; Dewez, Juan; Eleftheriou, Irini; Emonts, Marieke; van der Flier, Michiel; de Groot, Ronald; Herberg, Jethro; Kohlmaier, Benno; Lim, Emma; Maconochie, Ian; Martinón-Torres, Federico; Nijman, ruud; Pokorn, Marko; Strle, Franc; Tsolia, Maria; Wendelin, Gerald; Zavadska, Dace; Zenz, Werner; Levin, Michael; Moll, Henriette

VERSION 1 – REVIEW

REVIEWER	Reviewer name: Patrick Van de Voorde Institution and Country: Ghent University Hospital Belgium Competing interests: none
REVIEW RETURNED	15-Feb-2019

GENERAL COMMENTS	This survey tries to provide a snapshot of the current delivery of care for febrile children across certain European ED. Despite the clear limitation of the methodology, it provides sufficiently interesting data and conclusions. I would have like however a little bit more reflection on certain findings in the discussion, as well as some more elaboration on the limitations of the methods used. The focus in the discussion lies on 'resource use' while quality of care in itself goes beyond that. Despite being fragmentary, it might be interested to see whether certain differences could be linked (trend, probably not statistic) with certain hospitals (country, hospital type, mixed or not, number of beds or admissions..). When then looking at the survey used, I further wondered how you went from the 5 point Likert scale to more yes/no statements…Taking into account that this concerns fever in children at the ED I would have liked to know about use of procalcitonin, when and how urinalysis was done, when are bloodsamples taken, when bloodcultures, how many LP… but I presume that is part of the larger research project and goes beyond this first article? As for limitations, I presume it is not only the small number of centers per country but likely also an over-representation of larger hospitals which might not reflect the true nature of care provided. Also the fact you are asking the PI might influence results (response bias etc.). Minor comments: - First paragraph p6: I can not find any data about Belgium in the reference given, are the authors sure this is correct? - P9: please define 'office hours'?

REVIEWER	Reviewer name: Dr Jonathan Kaufman Institution and Country: University of Melbourne. Murdoch Childrens Research Institute, Sunshine Hospital, Western Health<. Australia

	Competing interests: None to declare
REVIEW RETURNED	14-Mar-2019

GENERAL COMMENTS	This is an informative study regarding the diversity of care received by febrile children in Emergency Departments in 11 hospitals in Europe. A strength of this study is the consideration of a broad range of domains and indicators of quality of care. A limitation is the small sample size – one investigator was surveyed from 11 hospitals (of ? hundreds) in 8 (of ? 28) countries in the EU. Some further comments in the discussion regarding this limitation of the study should be provided. A further limitation is that responses are from a single respondent at each centre, and therefore responses are based on that clinicians reflection on their local practice rather than validated demographic or hospital data. Some further comments in the discussion regarding this potential limitation of the study should be provided. ABSTRACT Results: “55% of supervising ED physicians were general paediatricians and the rest were general or paediatric emergency physicians” In the main paper p10 line 5 it is stated “In the other settings care could also be delivered by a paediatric emergency physician or an emergency physician.” It would be useful to clarify in both the abstract and results which settings where supervised exclusively by general paediatricians, which supervised exclusively by paediatric emergency physicians, which were supervised exclusively by general emergency physicians, and which supervised by a combination of these. INTRODUCTION P6 Line 26 – It may be helpful for readers to specifiy, given this is a European study, that this citation refers to a study of the US healthcare system METHODS RESULTS P9 line 37 “Nine settings served mixed inner-city/rural populations and in 10 settings the population was from a mixed socio-economic status.”. It may be indicated to note that this was based on the survey response from a single respondent rather than specific demographic data from an ED census. P10 Line 16: “In four settings all febrile children were discussed with a supervisor; this number was lower during out-of-office-hours (figure 1).” The figure is not available in the manuscript provided to me for review. The survey question (p34 line 48 and p35 line 42) was “During office hours/out-of-office hours a febrile child is reviewed by or discussed with a senior doctor”

	It would be helpful to specify that this is what was reported by the study respondent, which could be different to knowing whether there is a mandatory hospital policy for junior medical staff to discuss every single febrile patient during office hours (e.g a relatively well toddler with a likely URTI) with a supervisor even after hours at 3am. I would be interested to know if "senior doctor" refers specifically to a consultant level paediatrician or emergency physician, or could refer to a 'relatively more senior' trainee doctor working in the emergency department out of office hours. P12 line 54 – Does this admission rate refer to admissions from all presentations, or just admissions for febrile children? Does this include admissions to an ED short-stay unit or only admissions to a hospital ward (which is mentioned later in the discussion but not specifically in the results). DISCUSSION P15 line 31: "We found marked variation in ICU admission criteria". I was surprised to note in particular that on P11 line35 and in Appendix 3 that inotrope use was a criteria for ICU admission in only 10/11 centers. Perhaps the authors could comment specifically further on this, as I would assume that requiring inotropic support would reflect a very unwell patient who should be in the ICU. P16 line 50 – I think some further comments regarding the generelisablity of the study findings are warranted, regarding both the type/nature of the hospitals included as well as the number of hospitals included in the study. Given the article title is "Diversity in the Emergency Care for febrile children in Europe", some further comments about this are warranted. For example, of the 11 hospitals surveyed, "All hospitals had an on-site paediatric intensive care unit (PICU)". Do most hospitals in Europe have an on-site PICU? If not, this should be mentioned. Also how many EDs are there in total in Europe? This study surveyed principal investigators from an existing study network from 11 centres in 8 countries. How this likely reflects the broader ED setting in the whole of Europe should be mentioned in the discussion. For example, I would be interested to know how many EU nations were represented in the survey (8 of how many counties), and how many hospital ED's that see paediatric patients are present in the EU (11 centres of how many). TABLE 1 It would be useful to add as well as whether the hospital had a paediatric or mixed ED, which hospitals were specific tertiary paediatric centres and which were general hospital that also admit adult patients. For example, from reading the table the University Medical Centre Ljubliana has a paediatric ED, but I understand it to be a mixed adult and paediatric general hospital. In comparison the Alder Hey Children's NHS Foundation Trust has a paediatric ED, but I understand it to be a tertiary paediatric centre. Admission rate – does this include short-stay ED admissions, or only admissions to the main hospital wards?

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

This survey tries to provide a snapshot of the current delivery of care for febrile children across certain European ED. Despite the clear limitation of the methodology, it provides sufficiently interesting data and conclusions.

I would have like however a little bit more reflection on certain findings in the discussion, as well as some more elaboration on the limitations of the methods used. The focus in the discussion lies on 'resource use' while quality of care in itself goes beyond that.

Despite being fragmentary, it might be interesting to see whether certain differences could be linked (trend, probably not statistic) with certain hospitals (country, hospital type, mixed or not, number of beds or admissions.).

Response: We have added the following lines to the manuscript:

We analysed the correlation between the different setting characteristics using Pearson correlation coefficient.

We found strong correlations between self-referral rates and admission rates ($r = -0.89$, $P < 0.000$) and between annual visits and how often febrile children were discussed with a senior doctor during office hours ($r = -0.70$, $p < 0.05$) or during out of office hours ($r = -0.82$, $p < 0.05$).

We found moderate correlations between ED type and how often febrile children were discussed with a senior doctor during out of office hours ($r = 0.63$, $p < 0.05$).

We found no correlations between hospital type and admission rates or hospital type and how often febrile children were discussed with a senior doctor.

Given the limited number of participating settings, the generalizability of correlations found between the setting characteristics might be limited and these results should be interpreted with caution.

When then looking at the survey used, I further wondered how you went from the 5-point Likert scale to more yes/no statements…

We used different type of questions for different topics.

For example, we used yes/no questions: e.g. "does your hospital have an onsite PICU", multiple choice questions, e.g. "what kind of Triage system is used at the ED" or a 5-point Likert scale, e.g. "during out-of-office hours a febrile child is reviewed by or discussed with a senior doctor". We have described this in the methods section.

The answers to this last question are displayed in figure 1. The frequency of each answer option is displayed in this figure. Answers were not converted to a yes/no question. Please let us know if our answer is not clear or we have misunderstood your comment.

Comment: Taking into account that this concerns fever in children at the ED I would have liked to know about use of procalcitonin, when and how urinalysis was done, when are blood samples taken, when blood cultures, how many LP… but I presume that is part of the larger research project and goes beyond this first article?

Response: These questions will be addressed in the related MOFICHE (Management and Outcome of Fever in children in Europe) study, which collects information regarding actual resource use.

In this study, we have gathered data regarding urinalysis, blood samples, blood cultures, lumbar puncture and procalcitonin.

Comment: As for limitations, I presume it is not only the small number of centres per country but likely also an over-representation of larger hospitals which might not reflect the true nature of care provided. Also, the fact you are asking the PI might influence results (response bias etc.).

Response: We completely agree on that and have now added these limitations to the limitations section.

We have added the following lines to the manuscript:

The main limitation is the proportional representation as this was a small convenience study and the survey was filled in by a single respondent (the principal investigator).

Some of the results are based on clinician's reflection on their local practice and few on validated demographic or hospital data. For example, the data regarding socio-economic status was based on data provided by the survey respondent, while data regarding immunisation grades was based on WHO data.

In most countries only one or two hospitals from several hundred in most countries, contributed to this study and not all 28 European Union countries participated. Therefore, results can reflect differences between hospitals as well as between countries and are not representative of all hospitals in the participating countries. For example, not all European hospitals have an onsite PICU.

Furthermore, all participating hospitals were either a university or a large district general hospital, and results might not be generalizable to smaller hospitals.

Minor comments:

- First paragraph p6: I cannot find any data about Belgium in the reference given, are the authors sure this is correct?

Response: Thank you for noticing this. In our original manuscript, we used the reference by Wolfe and the original data that Wolfe references (the WHO mortality database) to compare mortality rates between countries. However, the original WHO mortality database is not available online anymore (it now only contains simplified data).

Therefore, we suggest to only reference the statements made by dr. Wolfe in her publication. We have replaced the previous statement by the following statement:

For example, death rates from illnesses that rely on first access services such as primary care—e.g. pneumonia, are higher in the UK than in Germany and the Netherlands. {wolfe 2011}

- P9: please define 'office hours'?

Response: Office hours were defined as daytime from Monday to Friday.

Out-of-office hours were defined as evenings, nights, weekends and public holidays.

Exact times (e.g. evening shift starting by 5 pm to 6 pm,) were different for each setting as this depended on local ED policies. Therefore, we choose just ask about out-of-office hours and not exact times.

Reviewer: 2

Comments to the Author

GENERAL COMMENTS

This is an informative study regarding the diversity of care received by febrile children in Emergency Departments in 11 hospitals in Europe.

A strength of this study is the consideration of a broad range of domains and indicators of quality of care.

A limitation is the small sample size – one investigator was surveyed from 11 hospitals (of ? hundreds) in 8 (of ? 28) countries in the EU. Some further comments in the discussion regarding this limitation of the study should be provided.

Response: We completely agree on that and have now addressed these limitations to the limitations section.

We have added the following lines to the manuscript:

In most countries only one or two hospitals from several hundred in most countries, contributed to this study and not all 28 European Union countries participated. Therefore, results can reflect differences between hospitals as well as between countries and are not representative of all hospitals in the participating countries.

Furthermore, all participating hospitals were either a university or a large district general hospital, and results might therefore not be generalizable to smaller hospitals.

However, as all participating hospitals were larger hospitals, the standard of care in these hospitals is expected to be high and therefore diversity might represent practice variability between countries.

Comment: A further limitation is that responses are from a single respondent at each centre, and therefore responses are based on that clinician's reflection on their local practice rather than validated demographic or hospital data. Some further comments in the discussion regarding this potential limitation of the study should be provided.

Response: We have added the following lines to the manuscript:

The main limitation is the proportional representation as this was a small convenience study and the survey was filled in by a single respondent (the principal investigator).

Some of the results are based on clinician's reflection on their local practice and few on validated demographic or hospital data. For example, the data regarding socio-economic status was based on data provided by the survey respondent, while data regarding immunisation grades was based on WHO data.

ABSTRACT

Results: "55% of supervising ED physicians were general paediatricians and the rest were general or paediatric emergency physicians"

In the main paper p10 line 5 it is stated "In the other settings care could also be delivered by a paediatric emergency physician or an emergency physician."

It would be useful to clarify in both the abstract and results which settings where supervised exclusively by general paediatricians, which supervised exclusively by paediatric emergency physicians, which were supervised exclusively by general emergency physicians, and which supervised by a combination of these.

Response: We have added to the abstract, results section and table 1 which settings were supervised by a specific type of specialist exclusively, and which settings were supervised by a combination of specialists.

INTRODUCTION

P6 Line 26 – It may be helpful for readers to specify, given this is a European study, that this citation refers to a study of the US healthcare system.

Response: We have added the following lines to the manuscript:

Although the discussed domains are based on a study looking into the United States healthcare systems, we believe these domains are similarly relevant for European health care systems. {Mintegi 2008} {Wolfe 2011}

RESULTS

P9 line 37 “Nine settings served mixed inner-city/rural populations and in 10 settings the population was from a mixed socio-economic status.”. It may be indicated to note that this was based on the survey response from a single respondent rather than specific demographic data from an ED census.

Response:Thank you for commenting on this.

We have added the following items to the limitations section.

The main limitation is the proportional representation as this was a small convenience study and the survey was filled in by a single respondent (the principal investigator).

Some of the results are based on clinician’s reflection on their local practice and few on validated demographic or hospital data. For example, the data regarding socio-economic status was based on data provided by the survey respondent, while data regarding immunisation grades was based on WHO data.

Furthermore, we have added the following lines to the methods section:

The questionnaire was filled in by the principal investigator in collaboration with the head of the (paediatric) ED or one of the main consultants responsible for the care of febrile children at the ED.

P10 Line 16:

“In four settings all febrile children were discussed with a supervisor; this number was lower during out-of-office-hours (figure 1).” The figure is not available in the manuscript provided to me for review.

This figure was uploaded to manuscript central. Please let us know if this figure, the legend or its description should be adjusted.

Comment: The survey question (p34 line 48 and p35 line 42) was “During office hours/out-of-office hours a febrile child is reviewed by or discussed with a senior doctor”

It would be helpful to specify that this is what was reported by the study respondent, which could be different to knowing whether there is a mandatory hospital policy for junior medical staff to discuss every single febrile patient during office hours (e.g a relatively well toddler with a likely URTI) with a supervisor even after hours at 3am.

Our aim was to study actual practice patterns, therefore we focused on practice patterns and not official regulations.

Comment: I would be interested to know if “senior doctor” refers specifically to a consultant level paediatrician or emergency physician, or could refer to a ‘relatively more senior’ trainee doctor working in the emergency department out of office hours.

Response: Thank you for your remark regarding the definition of senior doctor. This refers to a consultant level paediatrician or emergency physician.

P12 line 54 – Does this admission rate refer to admissions from all presentations, or just admissions for febrile children?

Response: This refers to admissions for all children, not only febrile children.

Comment: Does this include admissions to an ED short-stay unit or only admissions to a hospital ward (which is mentioned later in the discussion but not specifically in the results).

Response: This includes only admissions to a hospital ward. Information regarding admission to a short stay unit was not available and therefore not included.

DISCUSSION

P15 line 31: “We found marked variation in ICU admission criteria”. I was surprised to note in particular that on P11 line35 and in Appendix 3 that inotrope use was a criteria for ICU admission in only 10/11 centres. Perhaps the authors could comment specifically further on this, as I would assume that requiring inotropic support would reflect a very unwell patient who should be in the ICU.

Response: Thank you for noticing this.

We made a mistake that inotrope use was not a reason for ICU admission in all settings. We have corrected this in the manuscript.

P16 line 50 – I think some further comments regarding the generalisability of the study findings are warranted, regarding both the type/nature of the hospitals included as well as the number of hospitals included in the study. Given the article title is “Diversity in the Emergency Care for febrile children in Europe”, some further comments about this are warranted.

For example, of the 11 hospitals surveyed, “All hospitals had an on-site paediatric intensive care unit (PICU)”. Do most hospitals in Europe have an on-site PICU? If not, this should be mentioned.

Also how many EDs are there in total in Europe? This study surveyed principal investigators from an existing study network from 11 centres in 8 countries. How this likely reflects the broader ED setting in the whole of Europe should be mentioned in the discussion. For example, I would be interested to know how many EU nations were represented in the survey (8 of how many counties), and how many hospital ED’s that see paediatric patients are present in the EU (11 centres of how many).

Response: We have added the following lines to the manuscript:

In most countries only one or two hospitals from several hundred in most countries, contributed to this study and not all 28 European Union countries participated. Therefore, results can reflect differences between hospitals as well as between countries and are not representative of all hospitals in the participating countries. For example, not all European hospitals have an onsite PICU.

Furthermore, all participating hospitals were either a university or a large district general hospital, and results might not be generalizable to smaller hospitals.

However, as participating hospitals were larger hospitals, the standard of care in these hospitals is expected to be high and therefore diversity might represent practice variability between countries.

TABLE 1

It would be useful to add as well as whether the hospital had a paediatric or mixed ED, which hospitals were specific tertiary paediatric centres and which were general hospital that also admit adult patients. For example, from reading the table the University Medical Centre Ljubliana has a paediatric ED, but I understand it to be a mixed adult and paediatric general hospital. In comparison the Alder Hey Children's NHS Foundation Trust has a paediatric ED, but I understand it to be a tertiary paediatric centre.

Response: We have added the following information to table 1:

For each setting we have now included information on whether it is a tertiary or general hospital and whether it is a mixed or paediatric hospital.

Comment; Admission rate – does this include short-stay ED admissions, or only admissions to the main hospital wards?

Response: The admission rates include only admissions to the hospital wards.

Information regarding admission to a short stay unit was not available and therefore not included.