

## 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

<b>TITLE (PROVISIONAL)</b>	Associating school doctor interventions with the benefit of the health check: an observational study
<b>AUTHORS</b>	Nikander, Kirsi Kosola, Silja Vahlberg, Tero Kaila, Minna Hermanson, Elina

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Reviewer name: Dr. Anna Gutniak Institution and Country: Karolinska Institute, CLINTEC Competing interests: None
<b>REVIEW RETURNED</b>	03-Jan-2022

<b>GENERAL COMMENTS</b>	<p>Overall a very interesting and important study! A couple of minor text revisions perhaps; On page 4, 24; is "well child clinics" a typo? If not, please explain what they are. On page p 14, 49; "on" - do you mean "no"? or "an"?</p> <p>If there is some editorial room: To appreciate the article even more I would welcome some additional background information. Some of it could probably be added as a separate figure or table. Questions that emerged for me when reading the article were: What are the guidelines and purposes for school doctors' routine check-ups in Finland for the different grades? What do parents generally expect from a school doctor's visit in Finland and what did they expect from this one (or; what information was given to them regarding the content/purpose of the visit)? How do the health checks in the study relate to the ordinary routine health checks? Were these families given special appointment times, rather than being given appointments in the same way as the children's non-participating classmates? In the last paragraph on page 3 it is mentioned that doctors do health checks in "certain grades". Which ones? How integrated is the school health system to the regular health system (can the doctor read the student's health records from the family physician?) in Finland? Was the reported extent and content of the interventions expected, ie did the health checks in the study visits differ from the health checks that are usually performed?</p> <p>These are all just minor comments and questions but it would be interesting to see them answered! Looking forward to seeing the article in print!</p>
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<b>REVIEWER</b>	Reviewer name: Dr. Peter Flom Institution and Country: Peter Flom Consulting, United States Competing interests: none
<b>REVIEW RETURNED</b>	27-Dec-2021

<b>GENERAL COMMENTS</b>	I confine my remarks to statistical aspects of this article. These were straightforward and well done, and I recommend publication.  Peter Flom
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<b>REVIEWER</b>	Reviewer name: Dr. Simon Lenton Institution and Country: 29, Maple Grove, Bath, BA2 3AF, United Kingdom of Great Britain and Northern Ireland Competing interests: None
<b>REVIEW RETURNED</b>	11-Jan-2022

<b>GENERAL COMMENTS</b>	<p>This study provides an insight into how well the Finish health care system is working for children, however it was not entirely clear from the text why this study was undertaken and how the results would influence school health policy. At one level it is surprising that 52% of doctors and 87% of parents found routine health examination in schools beneficial, considering the existence of an extensive preschool health system, in addition to primary care, coupled with annual school nurse health checks. The study excluded children with special needs, those requiring an interpreter, and no attempt was made to include the 25% who did not attend - all of these groups are likely to have even higher "needs" for health service involvement.</p> <p>Unfortunately, the study was not designed to determine whether overall outcome/impact was beneficial or harmful, merely whether either doctor or parent perception by experience (PREM) at the time of the check was useful.</p> <p>The study has many flaws, but the majority of these are picked up in the discussion. I cannot comment on the validity of statistical analysis. The most significant flaw not discussed, is the apparent absence of any formal structure to the health examination (which was described as "as usual" in line 24, page 6) - was each doctor working to the same protocol? Were the suggested investigations or interventions based on best available evidence?</p> <p>I was surprised to read in the results that "doctors in this study rarely made referrals for mental health or neurological problems when the data suggest that 16.1% of significant discussions were for psychological problems (line 17 page 9) and 8.1% of referrals to other professionals (line 57 page 8) psychosocial problems. It would be interesting to know what proportion of laboratory tests or medical imaging were significant.</p> <p>The conclusions from this study have very limited application outside Finland, the most significant conclusion is that doctors should provide evidence-based interventions rather than routine health checks which is very much in line with World Health Organisation guidelines requiring clarification on what needs to be done, by whom and when. It would be interesting to know what changes were made to the Finish school health system as a result of this study. Is the intention to develop school doctor medical roles within a multidisciplinary team to more effectively manage obesity, mental health problems and conduct disorders, neurodevelopmental disorders including ADHD and ASD in school aged children?</p>
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### VERSION 1 – AUTHOR RESPONSE

Dear editors,

Re: Associating school doctor interventions with the benefit of the health check: an observational study (bmjpo-2021-001394)

We are pleased that you are considering the above manuscript for publication in BMJ Paediatrics Open. We thank all reviewers for taking the time and effort to assess our manuscript. We are grateful for the insightful and valuable comments made.

All changes to the manuscript are indicated in the text by using track changes.

Please see our point-by-point responses to the reviewer comments below.

The word count has increased from 2491 to 2553 based on the reviewer comments.

Formatting Amendments (where applicable):

1. Supplementary file / Appendix

Please be informed that this should be in PDF Format.

Thank you for your comment. We changed the format of the Supplementary file to PDF.

Editor(s)' Comments to Author:

See comments of reviewer 3.

Also, expand upon these findings and how they complement your previous study (ref 14)

Thank you for your comment. In our previous study, we assessed the children's need for a health check (based on the concerns of parents, school nurses, and teachers) and compared it with the benefit of the health check, as evaluated by parents and doctors. In the current study, we describe the interventions that school doctors (blinded to the need for a health check) undertook during the health checks and compare them with the benefit of the health check. These findings complement our previous study by describing the interventions conducted by school doctors, and by showing that parents appreciated immediate help from the doctor.

These findings have been concluded in "What this study adds": "Doctors especially valued the appointments where interventions required their medical expertise. Parents appreciated immediate instructions, medical prescriptions and testing from the doctor compared with scheduled follow-up or referrals to other professionals."

Reviewer: 1

Dr. Peter Flom, Peter Flom Consulting

I confine my remarks to statistical aspects of this article. These were straightforward and well done, and I recommend publication.

Thank you for affirming our use of statistics.

Reviewer: 2

Dr. Anna Gutniak, Karolinska Institute

Overall a very interesting and important study!

A couple of minor text revisions perhaps;

On page 4, 24; is "well child clinics" a typo? If not, please explain what they are.

Well child clinics, also known as child health clinics, assess the physical, mental and social condition of children under school age. Since this terminology differs between countries, we omitted the term "well child clinics" and described it briefly instead "... some doctors worked part-time in schools and also provided health checks before school-age and medical services at health centers (page 4, first paragraph)." Information on well child clinics can be found in the study protocol, reference 11.

On page p 14, 49; "on" - do you mean "no"? or "an"?

We corrected the typo "on" to "an": "The small number of referrals to specialized care may have had an effect on the results." (page 13, first paragraph).

If there is some editorial room: To appreciate the article even more I would welcome some additional

background information. Some of it could probably be added as a separate figure or table. Questions that emerged for me when reading the article were:

What are the guidelines and purposes for school doctors' routine check-ups in Finland for the different grades?

Thank you for the question. We changed the order of two paragraphs in the introduction and added one sentence and reference: "The system is based on the Finnish law and instructions provided by The National Institute for Health and Welfare 12." (page 3, second paragraph). The main purposes of the health checks are to strengthen the well-being and health of the family, recognize special needs, ensure timely support, and reduce health inequalities. Unfortunately the word count didn't allow us to include this in the manuscript.

What do parents generally expect from a school doctor's visit in Finland and what did they expect from this one (or; what information was given to them regarding the content/purpose of the visit)?

Thank you for your interest. The expectations of parents regarding school doctor health checks have received little attention. Because Finnish municipalities are responsible for organizing primary health care, the information given to parents regarding doctor health checks in schools differ. In general, parents are informed that they are welcome to accompany their child to the health check.

How do the health checks in the study relate to the ordinary routine health checks?

All school doctors performed children's health checks as usual and had access to routine background information and patient records. (Please see page 5, second paragraph, Procedures). We added a sentence: "The extensive health check in Finnish school health services is described in Figure 1 and Table 1 of the study protocol 11." (page 5, second paragraph).

Were these families given special appointment times, rather than being given appointments in the same way as the children's non-participating classmates?

Participating families were given appointments in the same way as non-participating families. We have clarified the explanation of this process. Typically, a routine health check takes 30 minutes. After each health check in this study, the doctors had 5 minutes extra time to fill in an electronic study report including details on all interventions that they undertook during the health check (page 5, second paragraph, Procedures).

In the last paragraph on page 3 it is mentioned that doctors do health checks in "certain grades". Which ones?

Thank you for the comment. We added the grades and ages to the sentence: "School doctors perform routine general health checks in grades 1, 5 and 8 (at ages 7, 11 and 14 years, respectively) in addition to annual health checks by school nurses (page 3, second paragraph).

How integrated is the school health system to the regular health system (can the doctor read the student's health records from the family physician?) in Finland?

Although school health services are provided on school premises, the Finnish school health care system is fully integrated with general primary health care. In many communities, even the doctors are the same, as was also the case for some of the doctors participating in this study. We have revised the sentence on access to patient records as follows: "All school doctors performed children's health checks as usual and had access to routine background information and patient records from the health center and specialist care" (page 5, second paragraph, Procedures).

Was the reported extent and content of the interventions expected, ie did the health checks in the study visits differ from the health checks that are usually performed?

Thank you for the question. We had no previous studies or data to compare these reported interventions

to, but based on our clinical experience, the content was to be expected.

These are just minor comments and questions but it would be interesting to see them answered!  
Looking forward to seeing the article in print!

Thank you for your encouragement!

Reviewer: 3  
Dr. Simon Lenton

This study provides an insight into how well the Finish health care system is working for children, however it was not entirely clear from the text why this study was undertaken and how the results would influence school health policy.

Thank you. This study was undertaken because the benefits of school doctor interventions conducted in the setting of routine general health checks remain largely unknown. We revised the Introduction to clarify the purpose of the study. As highlighted by the WHO and Unesco guideline (reference 15), also school health care should be critically assessed for effectiveness. We hope that the results of this study add to the international discussion of the interventions and services provided via school health care.

At one level it is surprising that 52% of doctors and 87% of parents found routine health examination in schools beneficial, considering the existence of an extensive preschool health system, in addition to primary care, coupled with annual school nurse health checks.

Thank you for your insight. The doctors reported 52% and parents 87% of the appointments with any intervention beneficial. We fully agree that these percentages are surprisingly high. However, it may be seen as psychologically understandable that doctors valued their own work. Parents may have been grateful for time spent with a doctor since doctors are still one of the most respected professions in Finland. Also, access to primary care doctors has been unsatisfactory in many municipalities in Finland and this may be reflected in parents' assessment of benefit. We have added this last point to the discussion (page 11, last paragraph).

The study excluded children with special needs, those requiring an interpreter, and no attempt was made to include the 25% who did not attend - all of these groups are likely to have even higher "needs" for health service involvement.

Excluding children with special needs was a conscious decision, since our aim was to study the benefits of routine general health checks. Children with special needs often have contacts with various professionals and the role of school health care is to ascertain adequate services. Families requiring an interpreter may have more challenges accessing suitable services and ideally school health care should be more involved in supporting these families. We have revised the discussion of this (page 13, first paragraph). An attempt to include the 25% who did not attend was in fact made. In the study protocol, we explained that if the family had forgotten or lost their forms and parent's questionnaires, they were offered a chance to respond to the questionnaires just before the doctor's appointment (reference 11, data collection procedure).

Unfortunately, the study was not designed to determine whether overall outcome/impact was beneficial or harmful, merely whether either doctor or parent perception by experience (PREM) at the time of the check was useful.

Thank you for your comment. We have discussed these limitations in the first and second paragraphs of page 13: "Although the doctors followed predetermined criteria when assessing benefit, information bias may have emerged. This was a self-assessment with unavoidable subjectivity. We considered this in the statistical analyses by using multilevel logistic regression and comprised different doctors as one of the four covariates. The surrogate outcomes of doctor- and parent-evaluated benefit regarding any intervention should be appraised critically. Surrogate outcomes can fail to predict a true clinical outcome."

The most significant flaw not discussed, is the apparent absence of any formal structure to the health examination (which was described as "as usual" in line 24, page 6) - was each doctor working to the same protocol?

We have added to the Introduction that the health checks are based on a legal framework (one additional reference) and guidelines provided by The National Institute for Health and Welfare (page 3, second paragraph). Unfortunately, the detailed guidelines are only available in Finnish. They are available to all professionals via a national digital health portal ([www.terveysportti.fi](http://www.terveysportti.fi)). Thus, the basic principles are the same for all doctors. In Finland, municipalities are responsible for organizing primary health care, and consequently some differences in daily practice are possible. The participating doctors were recruited from four cities/municipalities, and this was accounted for in the multilevel analyses. We have also added this sentence to the Procedures: "The extensive health check in Finnish school health services is described in Figure 1 and Table 1 of the study protocol 13." (page 5, second paragraph).

Were the suggested investigations or interventions based on best available evidence?

We have no way of assessing the evidence-base of all different interventions. However, considering the proportion of e.g. laboratory tests or medical imaging (8.7%), these seem to reflect a fairly realistic need for investigations. Evidence-based guidelines on the assessment and treatment of various health problems are available to all professionals via a national on-line health portal ([www.terveysportti.fi](http://www.terveysportti.fi)).

I was surprised to read in the results that "doctors in this study rarely made referrals for mental health or neurological problems when the data suggest that 16.1% of significant discussions were for psychological problems (line 17 page 9) and 8.1% of referrals to other professionals (line 57 page 8) psychosocial problems.

Thank you for your comment. We have revised the sentence in question which now reads: "Doctors in this study rarely made referrals to specialist care for neurologic or mental health problems (0.9%) and rarely contacted child protection services." Please see page 10, second paragraph.

It would be interesting to know what proportion of laboratory tests or medical imaging were significant.

We fully agree, it would indeed be interesting to know these proportions. Unfortunately, it was out of the scope of this study to review the results of laboratory tests and medical imaging.

The conclusions from this study have very limited application outside Finland, the most significant conclusion is that doctors should provide evidence-based interventions rather than routine health checks which is very much in line with World Health Organisation guidelines requiring clarification on what needs to be done, by whom and when.

We believe that our results and conclusions are strengthened by the fact that they are in line with the WHO guidelines. The provision of targeted, need-based health care services to school-aged children is a delicate subject because if the services are associated with any stigma, they will be underused. For this reason, many countries may consider routine health checks an easy way to avoid stigmatization and we hope that our conclusions urge health policy makers to strive for more ambitious organizational models of school health care.

It would be interesting to know what changes were made to the Finish school health system as a result of this study. Is the intention to develop school doctor medical roles within a multidisciplinary team to more effectively manage obesity, mental health problems and conduct disorders, neurodevelopmental disorders including ADHD and ASD in school aged children?

Thank you. Due to the legal framework regarding school health care in Finland, actual changes to the school health care system are slow but the discussion has already become more heated. You realized well our thoughts about developing the school doctor medical role. We made an addition to the sentence: "Future studies should investigate the long-term effectiveness of school doctor interventions and school doctor participation in school multidisciplinary teams." (page 14, first paragraph, Conclusions).

We look forward to hearing from you in due course.

Yours sincerely,  
Kirsi Nikander, MD  
Doctoral School in Health Sciences,  
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