PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Occasional and persistent frequent attenders and sickness absences in occupational health primary care – a longitudinal study in Finland
AUTHORS	Reho, Tiia; Atkins, Salla; Talola, Nina; Sumanen, Markku; Viljamaa, Mervi; Uitti, Jukka

VERSION 1 – REVIEW

REVIEWER	Reviewer name: Frans T Smits Institution and Country: University of Amsterdam, department of General Practice, Amsterdam, The Netherlands Competing interests: none declared
REVIEW RETURNED	18-Jul-2018

GENERAL COMMENTS	Review of BMJ Open (bmjopen-2018-024980) “Occasional and persistent frequent attenders and sickness absences – a longitudinal study” Tilia Reho et al study how occasional and persistent frequent attendance of occupational health service (OHS) is associated with sickness absences among the working population in Finland. I think these results are of limited interest only for practitioners and nurses working in occupational health services and therefore the results may be better published in a journal within this domain. Their results seem not very surprising. It is rather obvious that employees who visit an OHS have more and longer duration of sick leave than non-attenders of OHS, that attending OHS is associated with long sickness absence when compared with non-FA and that more and persistent sick leaves means more disability pensions. It would have been new and more interesting to know whether frequent attendance of the GP is related to sickness leave and which characteristics of FAs of the GP predict the length of sickness leave. Besides costs in secondary care, these societal consequences by high sick leave are important aspects of FAs of primary care. If presented in this way, the results would have certainly justified a publication in a general medical journal. Major remarks: 1. Setting and used terms. For a non-Finnish reader, the used definitions remain unclear. Normally, ‘primary care’ refers to General practitioners and supporting staff. But, different from other countries, as I understand, you include OHS in primary care. The first sentence of the abstract and the introduction suggest that you plan to study sickness leave of Frequent attenders (FAs) of the GP, but in the method section you seem to select frequent attenders of OHS.

	As said, studying FAs of the GP would have been much more interesting for general medical readers than sickness leave of FAs of OHS. Please be clear about your methods and about which domain you describe: primary medical care (GP) or OHS. I miss information about the exact structure of Occupational Health in Finland. Only employees? Which employees? You can help your readers by giving some more information about the Finnish (OHS)context e.g. in a separate box. 2.Definition of FAs: - Frequent Attenders is a term mostly used in General Practice and, sometimes, in the emergency department. Therefore, you better specify (e.g. in the title) in which domain your patients are visiting frequently: frequent attenders of OHS or GP. - As you probably know, different definitions of Frequent Attenders are used. Because women and the aged use all healthcare more frequently, most authors nowadays prefer a proportional definition per age/sex group.1 2 Please discuss why you didn't use this definition and discuss the consequences of this choice in the discussion section. - It is unclear to me whether workers who do not visit the Occupational Health Service are included in `non-FAs´. Which denominator do you use: all patients who visited the OHS? Or did you include all employees? - Wy didn't you define a FA in 2015 or 2016 (and in no other year) as an occasional attender? - In General Practice and the emergency department patients choose themselves freely to consult a physician and Frequent attendance is related to patients 'characteristics. Are patients in Finland obliged to visit the OHS in case of sick leave? If yes visiting frequently is biased by legal procedures and not only related to patients 'characteristics. - Why didn't you use length of sick leave as a continuous variable? 3. Also after (re) reading, your methods remain unclear to your readers, which makes it impossible to repeat your study. 3. I miss general medical data of the included patients. Wasn't it possible to link these data with GP data of these patients ((multi)morbidity; medication)? Because of these serious objections, I have not read the article in all details and I limit myself to the main detailed remarks. Main detailed remarks: - Please adjust the title: Occasional and persistent frequent attenders of occupational health service and sickness absences – a longitudinal study Abstract: - As argued before you have to adjust the 'objectives' section: As far as I understand, the first sentence does not describe FAs of the GP, but FAs of OHS. - Why didn't you define sickness leave as a continuous variable? Introduction: In your introduction it seems that you want to study sickness leave of GP's frequent attenders. On the other hand, in 'materials and methods' you define FA as frequent attenders of OHS. Please be more clear. Materials and methods: Definition of (non)FA: Already discussed in 'main remarks'. Statistics: Please consider to analyze sickness leave as a continuous variable.

	Ethics: I don't understand what ethics has to do with the 'size' of the study population. Please explain. Results: -The flow of the patients (fig.1; p 23) remains unclear to me: Why did you exclude FAs in 2015 or 2016? Please specify numbers after 'exclusions, n =18 831'. High number of loss to follow up due to employment status. Why? Wasn't it possible to retrieve these numbers elsewhere? This may have led to underestimation of pFA. -In comparison with international literature, the low number of sick leave caused by mental problems is striking. Is there an explanation? Discussion: -Please structure this section by providing subheadings (strengths and limitations, other literature, implications for healthcare, conclusion) - I prefer you describe strengths and limitations right after the short description of your results. Please elaborate more about possible biases.

REVIEWER	Reviewer name: Kustaa Piha Institution and Country: Department of Public Health,University of Helsinki, Finland Competing interests: None declared
REVIEW RETURNED	14-Aug-2018

GENERAL COMMENTS	I'm pleased to receive an opportunity review the original manuscript "Occasional and persistent frequent attenders and sickness absences – a longitudinal study". The manuscript aims to study how use of occupational healthcare resources in terms of frequent attending is associated with sickness absence. The study data is received from one single occupational healthcare service provider, namely private healthcare company Pihlajalinna client registers in 2014-2016. The outcomes is sickness absence periods certified by self, occupational nurse, or physician. The study misses both resources used in other healthcare service providers and also sickness absence periods certified elsewhere and this reduces the generalizability of the results. However, the N of the study is considerably large and the data is register based and can be regarded as accurate as compared to e.g. self-reported sickness absence (Burdorf, Post & Bruggeling 1996). This study is generally of interesting topic, as frequent attenders use considerable amount of healthcare resources but the association to working ability is less known. Also, it is new knowledge that the high use of services in one year is associated with elevated sickness absence risk also in subsequent years. In general, the manuscript is clearly written, the analyses are carefully conducted, the results are presented in a clear manner, and the relevant topics are addressed in the discussion section. However, there are some limitations in the study that also brings out questions, comments and suggestions for further writing of the study. I have divided them in different categories as follows: Major compulsory revisions or questions

	1. The authors have decided to exclude non-attenders from the study. Why the authors have made this kind of a decision? The non-attenders might have been a natural reference point to which other service users could be compared. 2. The data on health services use does not include other service producers (e.g. public sector health centres, outpatient visits to secondary care, private healthcare use). The authors should pay attention to this and state how this limits the conclusions. 3. The data on sickness absence seem to exclude sick leaves certified by other service providers (e.g. public sector health centres, outpatient visits to secondary care, private healthcare use). Therefore the data might include, for example, patients with high number of visits to outpatient care in secondary care and long sick leave, but who belong here to non-FA group with no or small number of sick leave. The authors should describe these limitations in more detail. 4. The setting in mixes three kind of population in 2014-2016. 1) One group is present all three years, 2) second group belong to the population at the beginning but exit before 2016 mostly due to employment ending, and 3) third group does not belong to the population at the beginning but enter the population due to new clientele or starts visits. However, the authors have selected persistent-FA group that can only belong to group 1) but compare them to groups 1)-3). Also groups 2) or 3) can in reality include also persistent-FA clients, but due to setting cannot be classified as such. The authors should consider limiting the analyses to group 1) only to allow justified comparisons. Minor essential revisions or questions 5. In Finland, the employers can freely select what additional occupational health services they provide to the employees. The authors should describe if the study population includes different level services that might affect frequency of attending. 6. In page 6 the authors indicate that individual patient consent is not needed because the size. However, I think it could be more precise to indicate that individual consent is not needed as the study is a register-based study where no single participant can be recognized. 7. In general, the authors should pay more attention to the limitations of the study setting in the discussion setting including the overall generalizability of the results.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Reviewer Name: Frans T Smits

Institution and Country: University of Amsterdam, department of General Practice, Amsterdam, The Netherlands

Please state any competing interests or state ‘None declared’: none declared

Please leave your comments for the authors below

Review of BMJ Open (bmjopen-2018-024980) “Occasional and persistent frequent attenders and sickness absences – a longitudinal study”

Tilia Reho et al study how occasional and persistent frequent attendance of occupational health service (OHS) is associated with sickness absences among the working population in Finland.

I think these results are of limited interest only for practitioners and nurses working in occupational health services and therefore the results may be better published in a journal within this domain. Their results seem not very surprising. It is rather obvious that employees who visit an OHS have more and longer duration of sick leave than non-attenders of OHS, that attending OHS is associated with long sickness absence when compared with non-FA and that more and persistent sick leaves means more disability pensions. It would have been new and more interesting to know whether frequent attendance of the GP is related to sickness leave and which characteristics of FAs of the GP predict the length of sickness leave. Besides costs in secondary care, these societal consequences by high sick leave are important aspects of FAs of primary care. If presented in this way, the results would have certainly justified a publication in a general medical journal.

• The previous version of the manuscript may have been unclear about the functions of OHS primary care in Finland and we have now clarified this on the manuscript on p. 6. The inserted text explains that OHS primary care is the main primary care provider for the working population in Finland. It covers up to 90% of the working population and it is often used as the sole primary care provider. The Finnish OHS is not only used in the case of work related problems or sickness absences but also for the same functions as general practice. It provides most of the primary care services for the working population. This allows generalisation of the results to some extent outside Finnish OHS primary care and justifies publication in a general medical journal.

Major remarks:

1. Setting and used terms.

For a non-Finnish reader, the used definitions remain unclear. Normally, ‘primary care’ refers to General practitioners and supporting staff. But, different from other countries, as I understand, you include OHS in primary care. The first sentence of the abstract and the introduction suggest that you plan to study sickness leave of Frequent attenders (FAs) of the GP, but in the method section you seem to select frequent attenders of OHS. As said, studying FAs of the GP would have been much more interesting for general medical readers than sickness leave of FAs of OHS. Please be clear about your methods and about which domain you describe: primary medical care (GP) or OHS.

• As described above, we have clarified the terminology throughout the manuscript and described the Finnish OHs in more detail on p. 6.

I miss information about the exact structure of Occupational Health in Finland. Only employees? Which employees? You can help your readers by giving some more information about the Finnish (OHS)context e.g. in a separate box.

• We have added more information on the organization of the Finnish OHS in the methods on p.6.

• Primary care services are provided in three parallel service sectors: municipal, occupational health (OH) and private services. Preventive occupational health services (OHS) are legislated and primary care OH services are voluntary for organizations, though widely used, and covers up to 90% of employees. The expense is directly covered by the employer, and subsidized by an insurance paid by employers and employees. Previous work has shown that most employees use their OH unit as their sole primary care provider in particular for issues affecting work ability. The primary care provided should support the OH service’s preventive functions, most importantly prevention of working disability but is also used to treat illnesses. The organization of the Finnish occupational health primary care allows for studying the working population in primary care setting separately from the rest of the population.

2.Definition of FAs:

- Frequent Attenders is a term mostly used in General Practice and, sometimes, in the emergency department. Therefore, you better specify (e.g. in the title) in which domain your patients are visiting frequently: frequent attenders of OHS or GP.

• We have added clarification of the context on the title, p. 1.

- As you probably know, different definitions of Frequent Attenders are used. Because women and the aged use all healthcare more frequently, most authors nowadays prefer a proportional definition per age/sex group.1 2 Please discuss why you didn't use this definition and discuss the consequences of this choice in the discussion section.

• We have added explanation and discussion to the discussion section p. 19.

- It is unclear to me whether workers who do not visit the Occupational Health Service are included in `non-FAs´. Which denominator do you use: all patients who visited the OHS? Or did you include all employees?

• This was clarified and is now more clearly stated on p. 7.

• non-FAs are those that had visited OHS during the study year but were not frequent attenders.

- Wy didn't you define a FA in 2015 or 2016 (and in no other year) as an occasional attender?

• We chose to use FAs in 2014 to represent occasional FA's because those that patients that were FA in 2015 and/or 2016 but not in 2014 might have entered the practice in 2015 or 2016 and we have no record of their previous use. Thus they might have been frequent attenders and should be categorized as pFA. To account for confounding, they were exclude. The clarification was added to p. 7.

- In General Practice and the emergency department patients choose themselves freely to consult a physician and Frequent attendance is related to patients 'characteristics. Are patients in Finland obliged to visit the OHS in case of sick leave? If yes visiting frequently is biased by legal procedures and not only related to patients 'characteristics.

• The patients in the Finnish OHS are obliged to visit to OHS once when they have had 90 days sickness absence for a medical certificate but otherwise the visits and use are not mandated.

- Why didn't you use length of sick leave as a continuous variable?

• There is evidence 1 that sickness absences of certain lengths are associated with risk of future disability and we wanted to examine how FAs differ from other users in relation to these limits.

3. Also after (re) reading, your methods remain unclear to your readers, which makes it impossible to repeat your study.

• We have reviewed and revised the methods to increase legibility, p. 6-7.

3. I miss general medical data of the included patients. Wasn't it possible to link these data with GP data of these patients ((multi)morbidity; medication)?

• General characteristics of frequent attenders in the OHS have been previously described 2. We have added information on this to page 7. We are unable to access medication data, which is why it is not included.

Because of these serious objections, I have not read the article in all details and I limit myself to the main detailed remarks.

Main detailed remarks:

- Please adjust the title: Occasional and persistent frequent attenders of occupational health service and sickness absences – a longitudinal study

• We have edited the title to ” Occasional and persistent frequent attenders and sickness absences in occupational health service primary care – a longitudinal study in Finland”, p. 1.

Abstract:

- As argued before you have to adjust the ‘objectives’ section: As far as I understand, the first sentence does not describe FAs of the GP, but FAs of OHS.

• We have added clarification to p. 2.

- Why didn’t you define sickness leave as a continuous variable?

• As stated above there is evidence 1 that sickness absences of certain lengths are associated with risk of future disability and we wanted to examine how FAs differ from other users in relation to these limits.

Introduction:

In your introduction it seems that you want to study sickness leave of GP’s frequent attenders. On the other hand, in ‘materials and methods’ you define FA as frequent attenders of OHS. Please be more clear.

• We have clarified the reasons why we discuss FAs in GP context in the introduction although we study FAs in OHS primary care to p. 4.

Materials and methods:

Definition of (non)FA: Already discussed in ‘main remarks’.

Statistics: Please consider to analyze sickness leave as a continuous variable.

Ethics: I don’t understand what ethics has to do with the ‘size’ of the study population. Please explain.

• We have edited the ethics section on p. 8.

Results:

-The flow of the patients (fig.1; p 23) remains unclear to me: Why did you exclude FAs in 2015 or 2016? Please specify numbers after ‘exclusions, n =18 831’. High number of loss to follow up due to employment status. Why? Wasn’t it possible to retrieve these numbers elsewhere? This may have led to underestimation of pFA.

• We excluded those patients that were categorized as FA in 2015 and/or 2016 that were not FA in all three study years (2014-2016). A patient that was categorized as FA in 2015 and/or 2016 might have entered the system in 2015 or 2016 and we would not have information on their previous service use.

Thus they might have been FAs in the previous year (2014) but we would falsely categorize them as occasional FA. To avoid this bias, we chose to exclude them and define FAs in 2014 as the occasional FAs. The clarification was added to p. 7.

• There were 18 831 patients excluded for several reasons: there was no primary care plan (only legislated OHS, no primary care visits allowed) as this would bias the results since legislated services are not based on patient need. Some were excluded due to age, and most exclusions were done because these patients had no contact with the unit during the study years and thus we had no data on them. For example only 47% of patients listed on the OHS service providers list, used services in 2015.

• Unknown employment status and ended employment might lead the patient to use other service providers to whose registers we have no access. The size of the pFA population might have diminished due to loss for follow up but those patients that are now included in the pFA group are those whose information we have throughout the study years and thus they represent the group rather well, although there might be individuals lost due to employment status changes.

-In comparison with international literature, the low number of sick leave caused by mental problems is striking. Is there an explanation?

• 15-17% of long (15 days or more days) sickness absences were caused by mental disorders in our study population.

• According to The Social Insurance Institution of Finland in 2016 in Finland, 18% of sickness absences longer than 11 days were due to mental disorders (the reference unfortunately in Finnish and Swedish3)

• Our results therefore match national statistics provided by The Social Insurance Institution of Finland.

Discussion:

-Please structure this section by providing subheadings (strengths and limitations, other literature, implications for healthcare, conclusion)

• We have edited the discussion section and added strengths and limitations subheading on p. 18, but since in the recent publications of this paper appear to be without them (at least in the most recent publications) we have not added other subheadings to the discussion section.

- I prefer you describe strengths and limitations right after the short description of your results. Please elaborate more about possible biases.

• We have discussed the possible biases in more detail on p. 18-19.

• Recently it seems that articles published in BMJ Open are structured in the discussion section on this order that we have used situating the strengths and limitations to the end. We have used this order to organize the discussion section.

1. Kivimäki M, Forma P, Wikström J, et al. Sickness absence as a risk marker of future disability pension: the 10-town study. J Epidemiol Community Heal 2004; 58: 710–711.

2. Reho T, Atkins S, Talola N, et al. Frequent attenders in occupational health primary care – a cross-sectional study. Scand J Public Health. Epub ahead of print 2018. DOI: https://doi.org/10.1177/1403494818777436.

3. Official Statistics of Finland: Kelan sairausvakuutustilasto 2016. 2016. https://helda.helsinki.fi/bitstream/handle/10138/224317/Kelan_sairausvakuutustilasto_2016.pdf?sequence=4

We thank the reviewer for their constructive comments and their time spent to analyze this manuscript. The point-to-point responses and explanations related to their comments are listed below:

Reviewer: 2

Reviewer Name: Kustaa Piha

Institution and Country: Department of Public Health, University of Helsinki, Finland

Please state any competing interests or state ‘None declared’: None declared

Please leave your comments for the authors below

I’m pleased to receive an opportunity review the original manuscript “Occasional and persistent frequent attenders and sickness absences – a longitudinal study”. The manuscript aims to study how use of occupational healthcare resources in terms of frequent attending is associated with sickness absence.

The study data is received from one single occupational healthcare service provider, namely private healthcare company Pihlajalinna client registers in 2014-2016. The outcomes is sickness absence periods certified by self, occupational nurse, or physician.

The study misses both resources used in other healthcare service providers and also sickness absence periods certified elsewhere and this reduces the generalizability of the results. However, the N of the study is considerably large and the data is register based and can be regarded as accurate as compared to e.g. self-reported sickness absence (Burdorf, Post & Bruggeling 1996).

This study is generally of interesting topic, as frequent attenders use considerable amount of healthcare resources but the association to working ability is less known. Also, it is new knowledge that the high use of services in one year is associated with elevated sickness absence risk also in subsequent years.

In general, the manuscript is clearly written, the analyses are carefully conducted, the results are presented in a clear manner, and the relevant topics are addressed in the discussion section. However, there are some limitations in the study that also brings out questions, comments and suggestions for further writing of the study. I have divided them in different categories as follows:

Major compulsory revisions or questions

1. The authors have decided to exclude non-attenders from the study. Why the authors have made this kind of a decision? The non-attenders might have been a natural reference point to which other service users could be compared.

• The non-attenders are those that have not visited any of the units in any of the study years. We have excluded them from the study as there no data available for them. Thus they cannot be used as a reference group either. For this reason we have chosen to use the normal attenders (non-frequent attenders) as often used in previous studies as well 4,5

2. The data on health services use does not include other service producers (e.g. public sector health centres, outpatient visits to secondary care, private healthcare use). The authors should pay attention to this and state how this limits the conclusions.

• We have added discussion on this matter to the discussion section on p. 18-19.

3. The data on sickness absence seem to exclude sick leaves certified by other service providers (e.g. public sector health centres, outpatient visits to secondary care, private healthcare use). Therefore the data might include, for example, patients with high number of visits to outpatient care in secondary care and long sick leave, but who belong here to non-FA group with no or small number of sick leave. The authors should describe these limitations in more detail.

• The sickness absence certificates written outside of the OHS unit are regularly entered through a portal to our data and thus our study includes also sick-leaves certified outside of the OHS unit. It is rather uncommon and rare that the sickness absence s would not be entered into our database, as the employees want all sickness absences to come to our attention and to be included in to reporting systems. Clarification about this was added to p. 6.

4. The setting in mixes three kind of population in 2014-2016. 1) One group is present all three years, 2) second group belong to the population at the beginning but exit before 2016 mostly due to employment ending, and 3) third group does not belong to the population at the beginning but enter the population due to new clientele or starts visits. However, the authors have selected persistent-FA group that can only belong to group 1) but compare them to groups 1)-3). Also groups 2) or 3) can in reality include also persistent-FA clients, but due to setting cannot be classified as such. The authors should consider limiting the analyses to group 1) only to allow justified comparisons.

• The group of pFA stays constant during the study years.

• The group of 1yFA's representing occasional FA's is defined according to service use in 2014 and the 1391 patients that are still listed in 2016 do not belong to pFA group as their service use is known. From this group we lost 1077 patients during follow-up (approx. 500 per year) and their service use in the following years is unknown. This is a limitation that we have discussed now in the discussion section p. 19.

• There is previous research indicating that approximately 15% of FAs continue as persistent FA6, and for the rest, their service use diminishes over time without interventions. The 592 pFAs represent 24% of the original FA population, which suggests that it is unlikely that there would be many pFAs "lost".

• The non-FA group does not include pFA (as they should be frequent attenders in all three years) but might include 1yFA. However, this will not underestimate the risks associated with non-FA and thus lead to overestimation of pFA's and 1yFA's risks when compared to non-FA.

• We have made confirmatory analysis of the OR including only the 1391 1yFAs whose service use is known also in2015-2016 (FAs in 2014, non-FAs in 2015-2016). The results are shown in a screen capture below (in red the new analysis including only the 1391 patients and the original in black). The results were essentially the same and there are no substantial differences. Thus, we did not change our defined populations or redo the analysis in the manuscript.

• We have also edited the discussion section to address this issue, p. 18-19.

Minor essential revisions or questions

5. In Finland, the employers can freely select what additional occupational health services they provide to the employees. The authors should describe if the study population includes different level services that might affect frequency of attending.

• This is true and we have added discussion on this to p.18. However, although there are often limitations to laboratory and imaging services in the primary care provided to employees, visits to nurses and physicians are not limited (at least in Pihlajalinna). We chose to define frequent attenders according to number of visits to any professional but we have previously conducted confirmatory analyses using only physician visits. There were no marked differences.

6. In page 6 the authors indicate that individual patient consent is not needed because the size. However, I think it could be more precise to indicate that individual consent is not needed as the study is a register-based study where no single participant can be recognized.

• We have edited the section on ethics on p. 8.

7. In general, the authors should pay more attention to the limitations of the study setting in the discussion setting including the overall generalizability of the results.

• We have edited the discussion section and have more clearly stated the limitations on generalizability, p. 18-19.

4. Gili M, Luciano J V., Serrano MJ, et al. Mental Disorders Among Frequent Attenders in Primary Care. J Nerv Ment Dis 2011; 199: 744–749.

5. Neal RD, Heywood PL, Morley S. Frequent attenders' consulting patterns with general practitioners. Br J Gen Pract 2000; 50: 972–976.

6. Smits FT, Brouwer HJ, ter Riet G, et al. Epidemiology of frequent attenders: a 3-year historic cohort study comparing attendance, morbidity and prescriptions of one-year and persistent frequent attenders. BMC Public Health; 9. Epub ahead of print 24 January 2009. DOI: 10.1186/1471-2458-9-36.

VERSION 2 – REVIEW

REVIEWER	Reviewer name: Frans T Smits Institution and Country: Department of general practice, University of Amsterdam, The Netherlands. Competing interests: none declared
REVIEW RETURNED	06-Nov-2018

GENERAL COMMENTS	Review after revision of BMJ Open (bmjopen-2018-024980.R1): Occasional and persistent frequent attenders and sickness absences in occupational health primary care – a longitudinal study in Finland. The authors have answered sufficiently and satisfactorily many questions raised by the reviewers, but unhappily some issues remain unsolved: 1. The definition of (persistent) frequent attenders in this article differs from internationally accepted agreements, which makes it difficult to compare internationally 1,2:

	- The numerator is different by including also consultations by nurses, physiotherapists et al. - The denominator is (much?) smaller by not including non-attenders of OHS resulting in less (p)FAs. In this respect 'non-FAs' is a perhaps a confusing term; 'normal-attender'? - The older a patient is, the more the attendance will be. This will also account within your age group (1- to 68). I can't understand why you not account for this and use age groups to calculate FAs.2 Also, if you had limited your selection to patients enlisted in all 3 years, it would have been possible to also define FAs in 2015 and 2016 as occasional FAs. Please discuss the consequences and the resulting limitations of these choices more in the discussion section. Please change this in your article or (if not possible) discuss this adequately. 2. Although you now elaborate more on the difference between OHS and GP care in Finland, it would be helpful for international readers if you explained some more the specific features and differences of OHS and GP care in Finland. 3. As I understand you have access to characteristics of OHS-visitors, it would be very interesting if you discussed which specific characteristics of FAs predict the length of sickness leave. 4. I don't understand your answer on why you not also used the length of sick leave as a continuous variable in the multivariate analysis. 5. Whether generalization of your results outside Finnish OHS is justified and publication in a general medical journal is recommendable, depends on the magnitude of primary care use elsewhere of OHS-users. Can you report more about the magnitude of service use elsewhere by OHS-patients (e.g. GP use)? Other remarks: - Page 6: On which moment you defined the age limits (18 and 68)? - Page 17 first paragraph: However? 1 Vedsted P, Christensen MB. Frequent attenders in general practice care: a literature review with special reference to methodological considerations. Public Health 2005; 119: 118–37. 2 Smits FTM, Mohrs JJ, Beem EE, Bindels PJE, Van Weert HCPM. Defining frequent attendance in general practice. BMC Fam Pract 2008; 9. DOI:10.1186/1471-2296-9-21.

REVIEWER	Reviewer name: Kustaa Piha Institution and Country: Department of Public Health, University of Helsinki, Finland Competing interests: None declared
REVIEW RETURNED	07-Nov-2018

GENERAL COMMENTS	I'm pleased to review the revised manuscript of "Occasional and persistent frequent attenders and sickness absences in occupational health primary care – a longitudinal study in Finland".

	The authors have replied to the all major compulsory revisions or questions in a justified and adequate way. Especially the question concerning the mixing of three kind of populations in 2014-2016 was answered in detail and also supplementary analyses using limited subgroups were made and the results of these were shown and indicating that the results did not differ. Also the minor essential revisions and questions were answered adequately.

VERSION 2 – AUTHOR RESPONSE

Reviewer: 1

Reviewer Name: Frans T Smits

Institution and Country: Department of general practice, University of Amsterdam, The Netherlands.

Please state any competing interests or state 'None declared': none declared

We thank the reviewer for their constructive criticism and time spend to analyse the manuscript. The point-to-point responses related to their comments are given below.

Please leave your comments for the authors below

Review after revision of BMJ Open (bmjopen-2018-024980.R1): Occasional and persistent frequent attenders and sickness absences in occupational health primary care – a longitudinal study in Finland.

The authors have answered sufficiently and satisfactorily many questions raised by the reviewers, but unhappily some issues remain unsolved:

1. The definition of (persistent) frequent attenders in this article differs from internationally accepted agreements, which makes it difficult to compare internationally 1,2:

- The numerator is different by including also consultations by nurses, physiotherapists et al.

We have previously published a cross-sectional study describing the frequent attenders of OHS [1]. For that, we made confirmatory analyses, where FAs were determined by only physician visits and the results did not differ substantially. Thus, the definition used here should not yield biased results.

As a whole, 70% of all visits are made to a physician's office. We have included this information onto page 7 and added discussion on this issue on page 21.

- The denominator is (much?) smaller by not including non-attenders of OHS resulting in less (p)FAs. In this respect 'non-FAs' is a perhaps a confusing term; 'normal-attender'?

We have used the term non-FA (non-frequent attender) to refer to patients that had visited the OHS unit at least once during the study years but that were not frequent attenders. Similar use of the term (non-FA referring to patients having visited the unit but were not FA) was used by for example, Jorgensen et al.[2] We have defined non-FA (on p. 7) and hope this may clarify any confusion to the reader. We have considered changing non-FA to a normal attender, but feel that its connotation implies that frequent attenders would then be "abnormal" which we do not wish to imply.

- The older a patient is, the more the attendance will be. This will also account within your age group (1- to 68). I can't understand why you not account for this and use age groups to calculate FAs.2

In our previous article [1] we described frequent attenders of the OHS. Below are listed the OR for being in FA10 in different age groups (adjusted for sex, age and field of industry when possible)

Age OR 95% CI

18–34 1.00 0.93 - 1.26

35–44 1.07 0.65 - 1.08

45–54 0.84 0.61 - 1.22

55–68 0.86 0.93 - 1.26

In our study population, age did not significantly increase the likelihood of being FA10. Thus, we have kept with our original categorization, but addressed this in the discussion on page 21.

Also, if you had limited your selection to patients enlisted in all 3 years, it would have been possible to also define FAs in 2015 and 2016 as occasional FAs. Please discuss the consequences and the resulting limitations of these choices more in the discussion section.

Please change this in your article or (if not possible) discuss this adequately.

Though limiting the selection of patients for 3 years would have been beneficial in defining occasional FAs in 2015 and 2016, it would not have allowed for similar analysis to the 2014 FAs because of the differing length of follow-up period. Therefore, we chose to use FA10 in 2014 as their follow-up time would equal that of pFAs (FA10 in 2014-2016) and would allow for examining their sickness absences after consultation rates have normalized. We have added discussion on this to p. 20-21.

2. Although you now elaborate more on the difference between OHS and GP care in Finland, it would be helpful for international readers if you explained some more the specific features and differences of OHS and GP care in Finland.

We have added more information on the features of the Finnish OHS to the Methods section, p. 6.

3. As I understand you have access to characteristics of OHS-visitors, it would be very interesting if you discussed which specific characteristics of FAs predict the length of sickness leave.

We have made additional analysis describing association of sex and morbidity with frequent attender status in sickness absences over 15 days. This has been added to the manuscript on p. 18.

4. I don't understand your answer on why you not also used the length of sick leave as a continuous variable in the multivariate analysis.

We have conducted additional analysis where we examined the association of sickness absences and frequent attenders status using sickness absences as a continuous variable. The results are added to the manuscript and shown on p. 17.

5. Whether generalization of your results outside Finnish OHS is justified and publication in a general medical journal is recommendable, depends on the magnitude of primary care use elsewhere of OHS-users. Can you report more about the magnitude of service use elsewhere by OHS-patients (e.g. GP use)?

As stated previously OHS primary care is voluntary for the employer to pay for, but it is widely used and 90% of the Finnish working population is covered by OHS primary care. OHS primary care is paid by the employer and it is free of charge for the employee, this is part of the reason why it is widely used by the working population instead of GP. Primary care services are available also municipally (GP) but there is a minor co-payment for using the services (the rest is covered by social security) and privately (by GP or specialist) which is paid by the individual (and only for a minor part subsidized by the state), thus there is also a financial incentive to use OHS primary care, when available.

The studies on parallel use of services in Finland are somewhat old but are referred to below.

• The use of occupational health services has increased heavily in the past years[3]:

o in 2006 there were on average 0,9 visits to OHS physicians and in 2009 1,7 visits to OHS physicians in the working population

o in 2006 there were 1,2 visits to GP and in 2009 1,0 visits (in the population)

o Per citizen there were in 2009 on average 1,7 visits to OHS physicians and 1,0 to GP

• Of the working age population (not necessarily working at the moment) 56% of men and 46% of women named an OHS physician as their first primary care provider[4]

o for the working aged 74% named their OHS nurse as their primary nurse[4]

o During the last 12 months 33% of men and 37% of women had visited an OHS physician at least once[4]

• Three out of four patients that had visited OHS unit named their OHS unit as their primary health care provider[5]

o Over 50% of these visits were due to acute health issues

o During the last 12 months 85% of the respondents had visited an OH physician and only 25% a GP.

o There were on average 3,0 visits to OHS and 0,5 to GP.

• Yet another study showed that during a 6 month period 57% of employees had visited either an OHS physician or OH nurse[6]

o Of employees having a long-standing illness 84% of women and 67% of men had visited an OH professional[6]

We have clarified this issue briefly on p. 6.

Other remarks:

- Page 6: On which moment you defined the age limits (18 and 68)?

The age limits were defined and exclusions made in the very beginning when forming the study population. We had received the pseudonymized material from Pihlajalinna after which the exclusions were made.

- Page 17 first paragraph: However?

However was used to point out that not only persistent FA but also occasional FA have more and longer sickness absences than average users of the OHS.

1. Reho T, Atkins S, Talola N, Sumanen M, Viljamaa M, Uitti J. Frequent attenders in occupational health primary care – a cross-sectional study. Scand J Public Health. 2018. DOI: 10.1177/1403494818777436

2. Jørgensen JT, Andersen JS, Tjønneland A, Andersen ZJ. Determinants of frequent attendance in Danish general practice: A cohort-based cross-sectional study. BMC Fam Pract. 2016;17.DOI: 10.1186/s12875-016-0412-4

3. Vaarama M, Moisio P, Karvonen S. Suomalaisten hyvinvointi 2010 [Finnish well-being 2010] (In Finnish). Helsinki; 2010.

4. Koskinen S, Lundqvist A, Ristiluoma N, eds. Terveys, toimintakyky ja hyvinvointi Suomessa 2011 [Health, functional capacity and welfare in Finland in 2011] (In Finnish with English summary). Helsinki; 2012.

5. Virtanen P, Mattila K. Työterveyslääkärin potilas käy myös terveyskeskuksessa, tosin harvoin [Patients of occupational health physicians also visit health centre GPs, albeit seldom] (In Finnish with English summary). Suom Lääkäril. 2011;47:3583–6.

6. Kimanen A, Rautio M, Manninen P, Räsänen K, Husman P, Husman K. Primary care visits to occupational health physicians and nurses in Finland. Scand J Public Health. 2011;39:525–32.

Reviewer: 2

Reviewer Name: Kustaa Piha

Institution and Country: Department of Public Health, University of Helsinki, Finland

Please state any competing interests or state ‘None declared’: None declared

Please leave your comments for the authors below

I'm pleased to review the revised manuscript of "Occasional and persistent frequent attenders and sickness absences in occupational health primary care – a longitudinal study in Finland". The authors have replied to the all major compulsory revisions or questions in a justified and adequate way. Especially the question concerning the mixing of three kind of populations in 2014-2016 was answered in detail and also supplementary analyses using limited subgroups were made and the results of these were shown and indicating that the results did not differ. Also the minor essential revisions and questions were answered adequately.

We thank the reviewer for their constructive comments.

VERSION 3 – REVIEW

REVIEWER	Reviewer name: Frans T Smits Institution and Country: Department of General Practice, Amsterdam University Medical Centre, University of Amsterdam, The Netherlands Competing interests: None declared
REVIEW RETURNED	07-Dec-2018

GENERAL COMMENTS	Review of BMJjopen-2018-024980.R2 entitled "Occasional and persistent frequent attenders and sickness absences in occupational health primary care – a longitudinal study in Finland" I thank the authors for their elaborate response and the changes made in the manuscript. Although I am not quite happy with some of the choices, made by the authors, I think the manuscript is now ready for publication. Minor remarks: 1. Unfortunately, some definitions in the manuscript still diverge from international standards in primary care FA-research (They include consultations by non-GPs; their definition of non-FAs doesn't include enlisted patients without consultations), but they now explain these deviant choices sufficiently. 2. The authors now include the number of sickness absences as a continuous variable, but in my previous comment I meant the number of sickness days additional to the 2 categorical variables (intermediate length (4-14 days) and long (15 or more days)) in table 4. 3. Not all abbreviations in the tables are explained in the legends (e.g. table 2).

VERSION 3 – AUTHOR RESPONSE

Reviewer: 1

Reviewer Name: Frans T Smits

Institution and Country: Department of general practice, University of Amsterdam, The Netherlands.

Please state any competing interests or state 'None declared': none declared

Review of BMJjopen-2018-024980.R2 entitled "Occasional and persistent frequent attenders and sickness absences in occupational health primary care – a longitudinal study in Finland"

I thank the authors for their elaborate response and the changes made in the manuscript. Although I am not quite happy with some of the choices, made by the authors, I think the manuscript is now ready for publication.

We thank the reviewer for their constructive comments and their time spend to analyse the manuscript. The point-to-point responses related to their comments are given below.

Minor remarks:

1. Unfortunately, some definitions in the manuscript still diverge from international standards in primary care FA-research (They include consultations by non-GPs; their definition of non-FAs doesn't include enlisted patients without consultations), but they now explain these deviant choices sufficiently.

- We thank the reviewer for their approval despite the differences.

2. The authors now include the number of sickness absences as a continuous variable, but in my previous comment I meant the number of sickness days additional to the 2 categorical variables (intermediate length (4-14 days) and long (15 or more days)) in table 4.

- We apologize for the misunderstanding. In table 4 the sickness absences are categorized into three categories (1-3 days, 4-14 days and all above 15 days). In the last category (15 days or more) are included all sickness absences longer than 15 days. Thus, no sickness absences are lost, and the last category includes also the long sickness absences.

- On the other hand, in table 2 are shown the median and mean lengths of sickness absences of different FA-groups allowing comparison of the lengths in different years and through the study years (including total length of sickness absences per year and average length of a single absence episode).

- In table 5 can be seen the association of a single sickness absence day with FA-status. When there are multiple days, the association grows stronger.

3. Not all abbreviations in the tables are explained in the legends (e.g. table 2).

- The explanations of the abbreviations in table 2 are shown on p. 12, line 43. We have relocated the abbreviations to enhance legibility in table 2.

- We have added missing abbreviations to tables 3-6.

- We did not find missing abbreviations in other tables.