Author's response to reviews

Title: Morbidity and doctor characteristics only partly explain the substantial healthcare expenditures of frequent attenders - A record linkage study between patient data and reimbursements data -

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Author's response to reviews: see over
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Editor of BMC Family Practice

Dear Ms. Nolasco and Professor Dowell,

Thank you for the opportunity to resubmit our manuscript. We thank the reviewers for their time and valuable comments and revised the manuscript based on their comments. In this letter you will find a point by point response to the comments of the reviewers. In the original manuscript all changes are marked in red. In the responses (in italics) we provide in this letter please find the page numbers on which the revised texts can be found. We hope that this revision is suitable for publication in BMC Family Practice.

Referee 1
1. This study is an extremely important one in the field and this is an interesting hypothesis to explore. The methods are broadly of high quality and the discussion covers most points.

Reply: Thank you for your compliments.

2. My main concern is that I cannot follow the analysis to determine how the main hypothesis was tested. The data is clustered by practice and GP who of course see multiple patients so this data cannot be handled in the same manner as individual patient characteristics. It is unclear how this clustering was statistically handled.

Reply: This hierarchical (or multilevel) structure of the data was accounted for by the use of multilevel regression analysis or mixed models (i.e. consisting of a random part (physician identifier) and a fixed part ((physician and patient characteristics), which was explained in the section on Statistical methods and the box with statistical considerations (page 7 and 8 in the revised version).

3. Some problems seem to be considered arbitrarily in the analysis as possible explanatory variables based on a rather limited view of the literature. Some other factors from a rather limited list of possible variables are considered as cofounders. I found the distinction arbitrary and contentious e.g. locomotor problems are also found often among FAs and FAs in some studies die more often from cancer. The list of variables considered is not exhaustive.

Reply: Although perhaps not explained sufficiently clear, the actual structure of the analysis is straightforward: We focus on the magnitude of the three (dummy) variables coding for zero-, one-, two-, and three-year frequent attendance, respectively, after controlling for all comorbidities (and age and sex) and physician characteristics that we were able to measure. So, to us, in this paper, the variables of main interest are those coding for frequent attendance. All other variables we consider as confounders. We may have caused some confusion by using two different sets of confounders (model 1 and model 2), where model 1 is a subset of model 2. With hindsight, model 1 seems superfluous and we removed it from the paper since model 2 adjusts for more potential confounders.
than model 1, which provides better insight into the independent role of the frequent attendance variables. Of course, some residual confounding may still exist (see below).

4. Even more concerning is the statement that each problem had to be likely to be present for 6 months - how can the authors make such judgments only from notes on such a scale and who made them? If it is not possible to assess the severity of the problem then how can its likely duration be assessed and won't the duration also depend on the management that is proposed? How was the validity and reliability of each judgment or a proportion of them tested? It is possible that all of these issues have been addressed in the research but the manuscript does not provide enough detail to assure the reader that the hypothesis was adequately explored.

Reply: These judgements are made by the PCPs. As soon as a patient’s problem is likely to last or has lasted for more than 6 months (e.g. diabetes mellitus, cerebrovascular accident), PCPs will add that problem to the patient’s problem list using the ICPC coding system. For this study, we extracted these problem list data from the Electronic Medical Records exactly as registered (coded) by the participating PCPs. There will be some variation in how meticulously different PCPs work. However, it is unlikely that such differences are associated with frequent attendance. The manuscript now reads as: “any medical problem which needs long-term medical attention or monitoring lasting or likely to last for more than 6 months was added to the PCPs’ electronic medical record and coded according to the ICPC system. These EMR data were extracted for the purpose of this study” (page 6).

The validity and reliability of coding of the problem list in our PCP network has been shown to be good in previous studies (page 6).4,5

5. Results do not seem to address the hypothesis that additional costs can be explained by patient and primary care physician’s characteristics.

Reply: In this paper, we wanted to focus on the magnitude of the three (dummy) variables coding for zero-, one-, two-, and three-year frequent attendance, respectively, after controlling for all comorbidities (and age and sex) and physician characteristics that we were able to measure. Therefore, to us, in this paper, the variables of main interest are those coding for frequent attendance. All other variables we consider as confounders. However additional files 3 and 4 provide details on the magnitude of the effects of the confounders, because we realize that some readers may have an interest in their independent effects on costs.

6. Problem of only using data from one insurer (so 55% data) need to be acknowledged. Possible selection bias and possible problems of generalisability

Reply: We emphasize (and provide a reference) that, in The Netherlands, health insurance is compulsory and that insurers are not permitted to make any selections. However, because insurers compete on the basis of their premium, the patient’s choice of the AGIS health insurer could cause a small degree of self-selection. We added this to the revised version on page 10.
7. More detail on how linkage was achieved and verified i.e. checks to ensure that the data on patients and GPs were correctly linked and results of those checks. The worry is that the reason no association is found is because the data has not been linked properly. What checks were employed by the independent organisation to ensure that the data sets were linked accurately?

Reply: The two databases were linked using a number that uniquely identifies single Dutch citizens, the so-called “burger [= citizen] service nummer [= number]” or BSN. Only 2% could not be linked. These 2% may have concerned persons who live in the Netherlands illegally. We changed the text accordingly (page 5): The two databases were linked using a number that uniquely identifies single Dutch citizens, the so-called “burger [citizen] service nummer [number]” or BSN in Dutch. Through a certified trusted third party that specializes in record linkage through irreversible pseudonymisation (ZorgTTP, Houten, The Netherlands), the PCP database (clinical data) and the insurer database (financial reimbursement data) were encrypted.

In addition, our results do show various associations. There is situation that no associations were found. Had this been the case, we would have shared the reviewer’s concern.

8. Was the same record system used throughout the three year period?

Reply: Yes.

9a. Were all secondary care and emergency care costs covered by the insurers? What costs would the insurance system cover and what would it not cover? Could coverage vary for different groups of patients e.g. residents without EU passports?

Reply: In the Netherlands, health insurance covers a broad range of healthcare costs including PCP care, prescription medication, specialist care in and outside hospitals and emergency care. Only over the counter medication such as simple painkillers and antihistamines are excluded. EU citizens who work and live in the Netherlands usually have Dutch healthcare insurance and were included in our study if they were AGIS insured. We changed the text accordingly (page 5 and 6).

9b. Were there some contacts e.g. emergency less reliably recorded than others?

Reply: In this study, frequent attendance was defined on the basis of face-to-face contacts with their PCP. Therefore, out of hours contacts (such as emergencies) are not recorded as face-to-face contacts with the PCP.

10. Pages 8 and 9. Why not use a systematic classification e.g. see Barnett and Guthrie Lancet 2012; 380:37-43 who identified over 40 different medical categories that could be established from primary care records?
Reply: We agree that systematic classification has great advantages and emphasize that we have used a systematic classification, namely, the International Classification of Primary Care (ICPC), as was explained on page 6. (see e.g. http://en.wikipedia.org/wiki/International_Classification_of_Primary_Care).

11. Pages 8 and 9. Having 2 models in the analysis does not in any way test residual confounding when the distinction between an explanatory variable and a confounding variable is so arbitrary and tenuous. Residual confounding is inevitably a problem with this type of study.

Reply: We may have caused some confusion by using two different sets of confounders (model 1 and model 2), where model 1 is a subset of model 2. With hindsight, model 1 seems superfluous and we removed it from the paper since model 2 adjusts for more potential confounders than model 1. The history of using two separate 2 models is that we controlled for the variables in model 1 first, but realized that we could do slightly better and extracted the additional variables and added that analysis a few weeks later. We now consider model 1 as a, not very informative, type of sensitivity analyses to show the stability of our result which does not add much to the paper.

12. How were depression, anxiety and medically unexplained symptoms defined and recorded? Primary care physicians tend to use an enormous and sometimes idiosyncratic set of terms for these problems. Judgments about medically unexplained symptoms are particularly contentious. Were other diagnostic information e.g. diabetes mellitus recorded in a systematic and/or standardised way?

Reply: Depression and anxiety had to comply with the rules of the ICPC classification (ICPC codes P76 and P74, respectively). For medically unexplained symptoms we used the list by Robbins [ref. 15]

13. I am unclear what the questionnaire sent to practices and GPs revealed but it seems to have elucidated little e.g. nothing about consultation style, stress perceived by GP, aim to provide personal continuity of care or greater emphasis on providing immediate access to care. The manuscript would be clearer if it outlined the information requested in the questionnaire sent to the GP.

Reply: We agree and included the questionnaire as additional file 2.

Referee 2
1. It might be helpful to highlight the known association between frequent attenders and psychological factors.

Reply: Although perhaps not explained sufficiently clear, the actual structure of the analysis is straightforward: We focus on the magnitude of the three (dummy) variables coding for zero-, one-, two-, and three-year frequent attendance, respectively, after controlling for all comorbidities (and age and sex) and physician characteristics that we were able to measure. So, to us, in this paper, the variables of main interest are those coding for frequent
attendance. All other variables, including those related to psychological factors, we consider as confounders. However additional files 3 and 4 provide details on the magnitude of the effects of the psychological factors for those readers with a special interest in the role of these factors.

2. Clarification is needed about the payment system in the Netherlands. Are all patients covered by insurance?

Reply: We included a sentence clarifying this issue (page 5 and 6): “All Dutch citizens are required by law to have a healthcare insurance, which covers a broad range of primary care costs, such as for PCP subscription-and fee for performance payments and all specialist care costs.”

3. Would mental health prescription costs be included in somatic or psychological costs? Specialist care is not defined – is it referral to private specialist rooms, or outpatient costs in hospital care etc.

Reply: Mental health prescriptions have a specific Anatomical Therapeutic Chemical (ATC) Classification System code and are included as mental health costs. All services provided by specialist are defined as specialist care costs. We clarified this more (page 6): “Costs of specialist care consist of all specialist remuneration (in and outside hospitals) and costs of hospital admissions. Mental health prescriptions have an Anatomical Therapeutic Chemical (ATC) Classification System code and are included as mental health costs, both in primary and specialist care. Costs of homecare, district nurses and nursing homes were not included.”

We hope that we were able to answer all questions of the reviewers satisfactorily and look forward to hearing from you.

Using this opportunity we would like to ask permission to publish a revised version of this article in the Dutch language after publication in BMC Family Practice.

With kind regards,

On behalf of all authors,

Frans Smits, GP
Gerben ter Riet, MD, PhD
Reference List


(6) Smeets HM, de Wit NJ, , Hoes AW. Routine health insurance data for scientific research: potential and limitations of the Agis Health Database. *Journal of Clinical Epidemiology* 2011; 64(4):424-430.