PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Characteristics and healthcare utilization patterns of high-cost beneficiaries in the Netherlands; a cross-sectional claim database study
AUTHORS	Wammes, Joost; Tanke, Marit; Jonkers, Wilma; Westert, Gert; Van der Wees, Philip; Jeurissen, Patrick

VERSION 1 – REVIEW

REVIEWER	Bern C. Dealy U.S. Food and Drug Administration U.S.
REVIEW RETURNED	14-Jul-2017

GENERAL COMMENTS	1. I do not believe that the methods are described sufficiently to allow for replication. I think it would help the manuscript considerably if it included additional description of variables and additional explanation of the Dutch healthcare system. 2. The findings are not presented clearly. The organization of the findings, coupled with awkward and cumbersome naming conventions make it very difficult to follow the results. Given the somewhat awkward variable names, I would suggest that the authors take greater care when organizing their findings. For example, the discussion of the 'Most cost incurring and secondary conditions' on page 12 also includes discussion in regards to specific conditions' portion of total costs. While contribution of a specific condition to total costs within a subpopulation is a worthwhile measure to investigate and discuss, it is distinct from the measure of 'Most cost incurring'. 3. I do not believe that all of the discussions and conclusions are justified by the results. The policy implications discussed in the article seem somewhat parallel to the research. The results neither support, nor refute the discussion and conclusions. 4. The standard of English is not acceptable for publication. While most of the writing is technically correct, there are a number of examples of inappropriate/uncommon use of words/phrases. Specific examples: a) Unintelligible sentence on page 12, lines 16-20 beginning "In contrast, less than.." b) Inappropriate use of the phrase "vice versa" on page 16. c) The authors use the word "comprehensive" inappropriately a number of times. For example, when they describe the health insurance plans as "comprehensive," it suggests that everything is covered, which would make supplemental insurance redundant.

	Additionally, on page 17, line 25, the authors write “Our research provides a precise and comprehensive picture of high-cost beneficiaries, but further research is necessary to specify characteristics and utilization of high-cost beneficiaries at a local level.” The use of the word “comprehensive” here is also confusing. It may be “relatively comprehensive,” but describing this research as “comprehensive” with no qualifications suggests that no further information or research would be useful. d) The use of terms like, “most cost incurring condition,” and “expensive treatments,” early in the manuscript (abstract and introduction) adversely affects readability. When the authors use these terms, they are speaking about specific constructs. Without skipping ahead to see how the authors define these measures (or without knowing that these terms should be read as specific measures), the reader may interpret discussion of these measures differently than intended. Additional Questions/Comments: 1. What do the authors mean when they refer to “complementary medicine”? 2. What do the authors mean when they refer to “allied healthcare”? 3. On page 16, line 46: “A major finding is that successful programs were tailored to the local needs of populations. In other words, the effectiveness and efficiency increase when interventions are targeted to the people that most likely benefit [26].” The citation given here (Blumenthal, et al., 2016) is an example of another article which makes this claim, but does not provide evidence supporting the claim. Given the wording, “A major finding…” I would expect that the citation provided would include a “major finding”. 4. Were the plans offered by the insurer available everywhere in the Netherlands? Were they primarily offered in specific geographical areas? This could be important given that socioeconomic status was based on geographical area. 5. On line 43 of page 9 the sentence begins using the ordinal “Third,” as if it were a continuation of a discussion introduced in earlier sentences (beginning with “First,” and “Second”). Furthermore, the following page includes ordinals, “first” “second” “fourth” and “fifth” (but not “third”). 6. I assume that Private spending in Table 1 represents some measure of out of pocket expenses. What exactly does that include? Does that include out of pocket expenses for services not included in their plan? Does it include co-payments, deductibles, premiums, or any other expenditures?

REVIEWER	Marion Haas Centre for Health Economics Research and Evaluation, University of Technology Sydney, Australia
REVIEW RETURNED	01-Aug-2017

GENERAL COMMENTS	This is a well-written and interesting paper. I have no revisions to suggest. Although the results will be of most interest to policy makers in The Netherlands, there are some important ideas and results which will be of interest to those in other countries eg the use of 1% and 2-5% highest cost users as the study groups and the findings that mental health issues, particularly among younger people and cardiac-related secondary conditions, are significant cost drivers. Many of the other findings will resonate with researchers and policy makers, particularly the high costs associated with cancer, dialysis and transplants, the impact of multi-morbidity and that costs tend to reduce older people (ie those aged 65 and over) compared to their younger counterparts. All these suggest policy responses, which the authors have mentioned. However, the major limitation of this analysis (also mentioned by the authors) is a very important one in terms of policy. Unless more than one of data can be used, it is not possible to distinguish persistent high cost users from those with one or more high cost events in 2013.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Comments to the Author

Comemnt 1. I do not believe that the methods are described sufficiently to allow for replication. I think it would help the manuscript considerably if it included additional description of variables and additional explanation of the Dutch healthcare system.

Response: Thank you for your feedback. We have included additional details in the revised manuscript. We referred to one paper that specifies the original database (Smeets 2011). In addition, we included additional information concerning specific variables and data preparation in our methods section. However, full specification of each variable would require much more context-specific information that may not be of interest to most of the readers. We therefore added that readers might contact the corresponding author for full details of the computation of the variables.

Revised text:
More information about (a predecessor of) the database is provided in Smeets et al. (Methods, page 7)

A detailed description of the Dutch risk-adjustment scheme is provided in van Veen et al. (Methods, page 9)

The list of drugs and indications that qualify for add-on reimbursement can be found at at www.farmatec.nl. (Methods, page 9)

For full details concerning the variable computation, please contact the corresponding author. (Methods, page 10)

>> We added the following phrases to further explain the Dutch healthcare system (Methods, page 6):

.. who were primarily living in central, eastern and western parts of the Netherlands.

The basic principle of the Dutch curative health system is that insurers compete for beneficiaries, and that they act as prudent buyers of services for their beneficiaries. Health insurers operate nationwide, are obliged to accept all applicants for basic health plans and are not permitted to risk-rate premiums for these basic plans. Every insured person, aged 18 years or older, is required to pay an annual deductible (350 euro in 2013), from which some services, such as general practice visits, are excluded. In addition to the basic health plan, more than 80% of the population buys voluntary insurance. Premiums for voluntary insurance are not regulated, and insurers are allowed to screen applicants.

Comment 2. The findings are not presented clearly.
The organization of the findings, coupled with awkward and cumbersome naming conventions make it very difficult to follow the results. Given the somewhat awkward variable names, I would suggest that the authors take greater care when organizing their findings. For example, the discussion of the 'Most cost incurring and secondary conditions' on page 12 also includes discussion in regards to specific conditions' portion of total costs. While contribution of a specific condition to total costs within a subpopulation is a worthwhile measure to investigate and discuss, it is distinct from the measure of 'Most cost incurring'.

Response: We agree with the reviewer that we used non-conventional terminology and variables to examine characteristics and healthcare utilization, and that our discussion of most cost incurring and secondary conditions are distinct measures in healthcare utilization than specific conditions' portion of total costs and proportion of total spending. In our initial manuscript, we specified the variables and illustrated the interpretation of each variable through examples in footnotes under table 2. We reorganized the paragraph (results page 12/13) and table 2, such that familiar measures (prevalence, total spending per ICD10-subchapter) are presented first, and successively present the measures that relate to most cost incurring and secondary conditions. In addition, we rephrased the quoted sentence:

'The most cost incurring condition accounted for 40-70% of total costs per beneficiary, depending on the ICD10-subchapter.'

>> Furthermore, we rephrased the heading of the paragraph:

'Utilization according to ICD10-subchapters, and most cost-incurring and secondary conditions'

>> Moreover, we added the following phrase to the manuscript to increase readability:

'Finally, we determined the contribution of ICD10-subchapters towards total costs per beneficiary.'

Comment 3. I do not believe that all of the discussions and conclusions are justified by the results. The policy implications discussed in the article seem somewhat parallel to the research. The results neither support, nor refute the discussion and conclusions.

Response: Thank you for this comment. We revised the discussion and removed several phrases that were not related to the results.

Comment 4. The standard of English is not acceptable for publication. While most of the writing is technically correct, there are a number of examples of inappropriate/uncommon use of words/phrases.

Response: A colleague reviewed the manuscript and we amended the manuscript accordingly.

Specific examples:
a) Unintelligible sentence on page 12, lines 16-20 beginning “In contrast, less than..”

>> We rephrased the sentence:

In contrast, circulatory disorders were mainly found as secondary condition: for example, in less than 30% of patients with ischemic heart disease or heart failure this was their most cost-incurring condition.

b) Inappropriate use of the phrase “vice versa” on page 17.

>> We replaced ‘Vice versa’ by ‘In addition’.

c) The authors use the word “comprehensive” inappropriately a number of times. For example, when they describe the health insurance plans as “comprehensive,” it suggests that everything is covered, which would make supplemental insurance redundant.

>> We removed the word ‘comprehensive’ from the abstract, page 6 and page 16.

Additionally, on page 17, line 25, the authors write “Our research provides a precise and comprehensive picture of high-cost beneficiaries, but further research is necessary to specify characteristics and utilization of high-cost beneficiaries at a local level.” The use of the word “comprehensive” here is also confusing. It may be “relatively comprehensive,” but describing this research as “comprehensive” with no qualifications suggests that no further information or research would be useful.

>> We removed the phrase ‘and comprehensive’.

d) The use of terms like, “most cost incurring condition,” and “expensive treatments,” early in the manuscript (abstract and introduction) adversely affects readability. When the authors use these terms, they are speaking about specific constructs. Without skipping ahead to see how the authors define these measures (or without knowing that these terms should be read as specific measures), the reader may interpret discussion of these measures differently than intended.

>> We agree with the reviewer that there is a chance that readers may interpret the measures differently than intended. We rephrased the abstract and replaced and more explicitly described our indicator for expensive treatments:

, the most cost incurring condition per beneficiary,

; and expensive treatment use (including dialysis, transplant surgery, expensive drugs, intensive care unit and DRGs >€30,000).

Additional Questions/Comments:
Comment 1. What do the authors mean when they refer to “complementary medicine”?

Response: By complementary medicine we referred to alternative medicine. In the Netherlands, there is a wide choice of alternative treatments available, including homoeopathy, acupuncture, natural medicine, magnetizing and osteopathy. Some supplementary insurance packages (partially) cover alternative medicine. We amended and added the following phrase to the methods section (page 7):

and alternative medicine (typically homoeopathy, acupuncture, natural medicine, magnetizing and osteopathy).

Comment 2. What do the authors mean when they refer to “allied healthcare”?

Response: By allied healthcare we referred to healthcare professions distinct from medicine. We added the following phrase to specify ‘allied healthcare’ (page 7):

(including physiotherapy, occupational therapy, dietary advice, speech therapy)

Comment 3. On page 16, line 46: “A major finding is that successful programs were tailored to the local needs of populations. In other words, the effectiveness and efficiency increase when interventions are targeted to the people that most likely benefit [26].”
The citation given here (Blumenthal, et al., 2016) is an example of another article which makes this claim, but does not provide evidence supporting the claim. Given the wording, “A major finding…” I would expect that the citation provided would include a “major finding”.

Response: Thank you for this comment. We removed this section of the policy implications because the content was not directly related to the results of our study (see above).

Comment 4. Were the plans offered by the insurer available everywhere in the Netherlands? Were they primarily offered in specific geographical areas? This could be important given that socioeconomic status was based on geographical area.

Response: Traditionally, most health insurance companies had a regional focus. During the years and after several mergers of insurers this focus has decreased. Nowadays, all health insurers operate nationwide, while they may retain some regional focus. In addition, health insurers are obliged to accept all applicants for a basic health plan and are not permitted to vary premiums by region. Most of the beneficiaries of the health insurer in this paper live in central, eastern or western parts of the Netherlands. We added the following phrases to the methods section (page 6, see above on description of the health system):

Health insurers operate nationwide, are obliged to accept all applicants for a basic health plan and are not permitted to risk-rate premiums for these basic plans.

.. who were primarily living in the central, eastern and western parts of the Netherlands.

Comment 5. On line 43 of page 9 the sentence begins using the ordinal “Third,” as if it were a continuation of a discussion introduced in earlier sentences (beginning with “First,” and “Second”). Furthermore, the following page includes ordinals, “first” “second” “fourth” and “fifth” (but not “third”).

Response: On page 9 and 10, we replaced ‘Third’, ‘Fourth’ with ‘In addition,’ and ‘Furthermore’, and removed ‘Fifth’.

>> We rephrased the paragraph at page 10, and inserted ‘Third,’.

Comment 6. I assume that Private spending in Table 1 represents some measure of out of pocket expenses. What exactly does that include? Does that include out of pocket expenses for services not included in their plan? Does it include co-payments, deductibles, premiums, or any other expenditures?

Response: This measure includes the compulsory deductible of €350 (see above description health system). We added the following to the table:

Consisting of the compulsory deductible of €350.

VERSION 2 – REVIEW

REVIEWER	Bern Dealy US Food and Drug Administration USA
REVIEW RETURNED	07-Sep-2017

GENERAL COMMENTS	The authors have adequately addressed all of my previously identified concerns.