Author’s response to reviews

Title: Evaluation of data availability on population health indicators at the regional level across the European Union

Authors:

Claudia Costa (claudiampcosta@gmail.com)
Ângela Freitas (angelafreitas30@gmail.com)
Iwa Stefanik (iwastefanik@gmail.com)
Thomas Krafft (thomas.krafft@maastrichtuniversity.nl)
Eva Pilot (eva.pilot@maastrichtuniversity.nl)
Joana Morrison (j.morrison@ucl.ac.uk)
Paula Santana (paulasantana.coimbra@gmail.com)

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Author’s response to reviews:

The authors want to thank the careful review and valuable comments provided, which we have considered as very constructive to improve the quality of the manuscript. Below is a point-by-point response letter to each reviewer, detailing the corrections made and corresponding amendments made in the manuscript text (resubmitted). All changes to the manuscript are indicated in the revised text using highlighted text (grey). Looking forward to a positive feedback, the authors will be happy to be contacted for any further information.

Reviewer 1:

Costa and colleagues provide a manuscript on the evaluation of data availability on population health indicators at regional level across the European Union. The need for such indicators beyond mortality is clearly described and the large EURO-HEALTHY certainly provides an ideal network for enabling a progress in this area. But the paper is a bit difficult to follow in its current form and the following comments may help to further improve the paper:

Answer: We thank the Reviewer for the comments. We have made significant changes to the paper to make it more easy to follow.
Major comments:

1. The main comments relates to the definition of population health, which is referred to, and health inequalities/disparities, which is also referred to. It is not clear from the title, abstract and intro whether the authors use these terms interchangeably or, as it is at least my understanding, whether these concepts are different. Health inequalities/disparities are often used in the context of unequal access to prevention or health care services or in terms of (the broad range of) determinants of health and disease, whereas (lowered) population health would be a consequence of such inequalities/disparities. The paper needs to be very clear about these terms (however the authors choose to define them) and stick to consistent use of those terms ultimately used.

Answer: We agree with the reviewer’s comment. We added text in the introduction section clarifying the terminology used in this study, regarding ‘population health’ and ‘population health inequalities’. When we refer to health inequalities, we consider a definition of ‘population health’ which considers both health outcomes and health determinants. So, ‘population health inequalities’ refer, in some cases, to an unequal distribution of health determinants (regions with low educational level – worse health; regions with high educational level – better health), and in other cases, to inequalities in health outcomes indicators (variations in mortality and patterns of disease). See page 4, line 12-19.

2. The aim of the paper is not clearly formulated, nor in the abstract nor at the end of the intro. Was the aim to develop the tool and/or to evaluate data availability? It is currently a mix of a methods and results paper. Fine, if these are two subsequent aims but this should be made clearer. As a consequence, the methods section is also a mix of score development and application of the score to evaluate data availability. It would be helpful to separate these two steps.

Answer: We agree with the reviewer’s comment. We clarified the aim in the abstract and at the end of the introduction. See page 3, line 7-10 and page 7, line 8-15. The aim of this research was to assess the data availability for the indicators in the EURO-HEALTHY Population Health Index. As a subsequent aim, an adequate protocol to overcome issues with missing data will be presented, as well as key messages to the national and European statistics authorities for the improvement of data collection on population health.

We have also reorganized the methods section in order to clarify that this is a results paper where we evaluated whether the data from PHI indicators are available considering a predefined set of criteria (responding to the requirements for constructing the Population Health Index) and we applied an assessment framework (the score) to assess whether the data completeness protocol was able to keep the quality of the indicator to be included in the PHI. As such, the method section was divided in three steps: data collection, data completeness and Evaluation criteria and development of a scoring system.
3. The discussion focuses much on the results (i.e., data availability). This is fine if this is turned more into a paper focusing more on the application of the score. But once it is clearer if this is a methods or an application paper or both, the discussion would also gain from a clearer structure.

Answer: We agree with the reviewer’s comment. To make it clearer that this is an application paper, we have reorganized our aim and structured the results section in three parts – 1. Data availability of Population Health Index indicators; 2. Data completeness of the Population Health indicators; and 3. Analysis of the indicator’s and regions’ availability scores - and organized the discussion into three key messages based on the conclusions from this study: 1. Data completeness protocol and availability scores are suitable tools to apply on any indicator’s data source mapping; 2. Overcoming missing data issues should be a priority; and 3. Data collection is driven by policy.

4. There is reference to reliability, accuracy and quality of data. These terms are of course related, but depending on the context in which these terms are used, they can still be quite different. It would be helpful if these terms were defined and then used consistently throughout the paper.

Answer: We agree with the reviewer’s comment. Data reliability and data availability are dimensions of data quality assessment. Accuracy is one element of reliability. Definitions are provided in the Introduction section. See page 5, line 7-18. Changes across the text were made in order to clarify and be consistent with terminology.

Minor:

1. Please explain how the weighting scheme of 0.7 and 0.3 was determined and alternatives would have been an option (and how such alternatives could affect the results and policy implications)

Answer: We agree with the reviewer’s comment. The weighting scheme was discussed and determined among the authors of this manuscript. We agree that the weights affect the results, so we clarified how and why the weights were determined in the text (see page 9, line 5-11) and also added a sentence about this to the limitations section (see page 23, line 14-16).

2. Figures are hard to read because of poor resolution.

Answer: We agree with the reviewer’s comment. We created three new figures to support this paper and we built the figures with higher resolution.

3. The implications of having more complete data on the policy making level is not entirely clear. There is always the question why indicators should be used, and as a consequence of different reasons, how many indicators should be used, what they cover and the extent of detail
they entail. Systematic, high quality ascertainment of indicators is very costly and there should be some framework (foreseeing policy implications) that guides the selection of indicators. Some conceptual considerations on this issue would be welcome for the discussion.

Answer: The starting point for this paper was the framework of the population health model so issues regarding the indicators selected, number of indicators and extent are out of the scope from this paper. Even though, we agree that it is relevant to discuss costs and implications of having more data, so we added this to the limitations section. See page 23, line 17-19.

4. It would be good if the paper (its revision) was proofread and edited by a scientist that is not as expert as the authors themselves to ensure readability for a bit wider audience who is interested in population health metrics.

Answer: We’ve rewritten extensive parts of the manuscript to ensure readability for a wider audience, by simplifying the language and terminology used, for example.

It was also re-sent to our native English reviewer and to a colleague from another research area.

Reviewer 2

The aim of this project is to assess data availability for indicators relevant to evaluate and monitor population health on the regional level within the European Union. The manuscripts presents in particular the methods of the EURO-HEALTHY PHI. The study concludes that, despite several constraints on compiling data the construction of a multidimensional database of population health is viable for the EU28 regions. 269 statistical regions (NUTS) were defined across 28 countries and indicators across 10 domains were assessed (i) Economic conditions, social protection and security; ii) Education; iii) Demographic change; iv) Lifestyle and health behaviours; v) Physical environment; vi) Built environment; vii) Road safety; viii) Healthcare resources and expenditure; ix) Healthcare performance and x) Health outcomes). Though certainly a relevant project, the manuscript has some weaknesses to be addressed.

Answer: We thank the Reviewer for these comments and hope we were able to address all the weaknesses the reviewer reported.

1. The Information provided in the article reads somewhat like a general methods report of the Horizon2020 project and some information is included in reports on the web site, e.g. http://www.euro-healthy.eu/euro-healthy-resources/Indicators_and_areas_of_concern_and_policies The added value of the manuscript itself (beyond the project deliverables) should be described.

Answer: We agree with the reviewer’s comment. We restructured and reformulated the entire manuscript to add value to the readers. We focused the discussion on the applicability of the data
completeness protocol to future monitoring activities and construction of indices on the pitfalls that must be taken into consideration for monitoring population health in the European Union and on the relevance of a policy to promote data collection.

2. The project has many dimensions which calls for a strong structure in the presentation and discussion of the data. I found it rather cumbersome to grasp and synthesize along the current version of the manuscript. It could e.g. provide some appealing visualizations of the main concepts and results and some stronger structure of the Discussion section.

Answer: We agree with the reviewer’s comment. We have produced three new figures (see page 9, 14 and 15) and included some of the tables and figures (that were in the text) as additional files (see page 38 to 43). Moreover, we have changed the structure of the discussion section and organized it into three key messages based on the conclusions from this study: 1. Data completeness protocol and availability scores are suitable tools to apply on any indicator’s data source mapping; 2. Overcoming missing data issues should be a priority; and 3. Data collection is driven by policy.

3. The Introduction provides a lot of background information. The ultimate purpose of the manuscript is though not explicitly stated at the end, thus, remains to be figured out by the reader (unless one reads the abstract). In fact, it is only in the Methods section that objectives get disclosed.

Answer: The introduction section was rewritten and oriented to provide a clearer background on the main focus of the manuscript: assessing data availability of a multidimensional set of population health indicators (integrating the EURO-HEALTHY Population Health Index) at EU regional level. Besides, the aim was rewritten (see page 7, line 8-15).

4. Though the methods are ultimately a key part of the manuscript, the underlying methods are not equally clear (e.g. the role and methods of the Delphi process).

Answer: This manuscript was focused on describing and assessing the data availability of the PHI indicators rather than describing the process of selecting the indicators. The Delphi process and respective methodology is described and detailed in another article published under the EURO-HEALTHY project (reference provided in the text). Also, the PHI model structure is the subject of another paper. See page 7, line 15-18.

5. Table 2 lists 14 indicators with Reliability issues. In the text, 15 were mentioned to be excluded due to reliability issues.

Answer: The comments from both reviewers made us realize that this part of the analysis was not important for the aim of the present manuscript, so we decided to exclude this section from the text.
6. Lack of analytical soundness was mentioned as exclusion criterion. However, the meaning of it was not explained at all. It is, e.g. listed that Long-term care beds in nursing and residential care facilities, per 100,000 inhabitants and Curative care beds, per 100,000 inhabitants lacked soundness as did the Sex ratio of life expectancy at birth. The definition of "soundness" needs some specification in the Methods.

Answer: The comments from both reviewers made us realize that this part of the analysis was not important for the aim of the present manuscript, so we decided to exclude this section from the text.

7. Results 3.4. section repeats again the Methods of the availability score. This is redundant

Answer: The Results section was restructured and rewritten. Accordingly, redundancies were removed and the text made clearer.

8. The structure of Tables 3, 4, 5 should be describe in a more comprehensive self-explanatory legend. E.g. HEALTH DETERMINANTS COMPONENT is listed vertically, though additional sub-sections are provided.

Answer: We agree with the reviewer’s comment. We added a legend to the tables to make them easier to read.

9. The Discussion, though rich of useful information, is not well structured, thus, hard to follow and read.

Answer: We agree with the reviewer’s comment. We changed the structure of the discussion section and organized it into three key messages based on the conclusions from this study: 1. Data completeness protocol and availability scores are suitable tools to apply on any indicator’s data source mapping; 2. Overcoming missing data issues should be a priority; and 3. Data collection is driven by policy.

10. Though the conclusions make clear what is needed in the EU, it remains unclear whether and how EURO-HEALTHY PHI will contribute to this given that this is a H2020 project, thus updating the data will not happen unless the authorities take up the lead to improve the data. Will the EURO-HEALTHY PHI data base be made available or where does this lead to?

Answer: The EURO-HEALTHY project was designed to contribute with evidence, data and methods relevant to inform policies with potential to reduce inequalities in health determinants and health outcomes across EU regions. Two important open access platforms were developed to give access to the Population Health Index and to the indicators collected:
1) Healthyregionseurope: a WebGIS (web platform based in geographical information systems) where it is possible to navigate through the PHI results across EU regions and analyze the regional distribution of the 39 indicators (data between 2001 and 2015) (link: https://healthyregionseurope.uc.pt);

2) EUROHEALTHY data portal: a database where the data collected for more than 60 indicators is stored and where it is possible to download all alphanumeric and geographical data. Access is available for interested users, by sending an email. (link: http://eurohealthydata.uc.pt/)

As the EURO-HEALTHY project received funding for only 3 years (2015-2017), the maintenance of these two online platforms is dependent on the interest expressed by EU official bodies or other institutions who will be willing to take the lead. By producing this paper we aim to support and raise awareness to the pitfalls the authorities will need to consider if they decide to monitor population health in Europe.

11. The map shows also the various countries in Europe that are not included in the EU28. What is the state of collaborations with those countries to achieve a complete view on all indicators for the entire region of Europe? This is of particular interest in all sub-regions shared across borders within and outside EU28 where health is co-determined by factors relevant across the borders.

Answer: Although we agree with the reviewer’s comments, it was not possible to extend the study to all the countries in Europe because of data collection issues. Besides, the EURO-HEALTHY project (EU funded) was centered on the EU28, so the manuscript gives information on data availability of indicators at the regional level only within European Union (EU 28 countries). Still, we added this as a future research topic. See page 24, line 2-5.