Reviewer’s report

Title: The Cross-Sectional Average Length of Healthy Life (HCAL): A measure that summarizes the history of cohort health and mortality

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Reviewer: Hendrike Cornelie Boshuizen

Reviewer's report:

This is a well written paper, arguing that HCAL/CAL is a more consistent estimate of the part of life that is lived in poor health than the usually used metric of HE/LE. I completely agree with that. My only comment is that, despite being consistent, it is conceptually difficult to grasp. However, the authors do a great job of explaining this as clearly as possible.

My comments on the paper are mostly on the lack of information on the uncertainty of the estimates they present in their application. I could not find any information on the number of persons in the EU-SILC per year and country, which are the basis of these calculations. I am missing confidence intervals. Such interval could easily be calculated based only on the uncertainty stemming from the EU-SILC data, as the uncertainty from the mortality data is most likely negligible compared to this uncertainty. I realize that such intervals do not help interpreting the differences between HE and HCAL, as both use the same data, so their errors will be correlated. However, it helps interpreting differences between periods, genders and countries. A connected question concerns table 2: Here it is not clear to me how the trend is calculated. Is this the difference of the estimates for 2014 and 2008, or was the change calculated from a regression slope? This should be clear from the manuscript. I assume the first. For the countries where smoothing was applied over both age and period this seems fine to me, but for the other countries the results might be unreliable, both because of random fluctuations due to small numbers in the individual years, and due to changes in the working of the questions, which was given as the reason for not smoothing these data over time. Also in this table I miss confidence intervals.

A minor comment is that the mathematical notation could be somewhat sharper. In formula 1 omega is defined as an interval, while it should be a point in time. Why not simply make this infinity instead of omega?

Equation 4 says under the summation sign: x=0,n which is notation I fail to understand. I assume that it means that x is the interval (0,n] or [0,n) but in my opinion one should write only x=0, where x is the lower boundary of the interval, and add n(x) where needed in the equation as a symbol representing the width of the interval starting at x (or simple n if all intervals are equally wide; however I assume the last interval is wider that the others).

Lastly, in the appendix I noted that 0.5 is added to the calculated HCAL and HE. Does this mean there is an age category that is assumed to be 100% healthy?
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