Reviewer’s report

Title: How do World and European Standard Populations impact Burden of Disease studies? A case study of Disability-Adjusted Life Years in Scotland

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Reviewer: Lorenzo Monasta

Reviewer's report:

Thank you for the possibility of reviewing this interesting manuscript.

The results of which are however quite obvious: if you adjust rates to a standardised population, rates will change according to the population adopted. If you adopt a younger population, you will see the rates of diseases and injuries typical of the younger population acquiring more weight, and those of the elderlies decreasing their weight.

Of course, if you choose the ESP2013, which is almost identical to the Scottish population, rates will not change much if compared to the crude rates.

Now, the problem behind this analysis is that ASRs are useful if you compare trends or if you compare different geographies. If you need to compare diseases or injuries by ranking, you better adopt crude rates, if ranking is a way of understanding how prevalent or how important in terms of frequency or burden is a disease or injury.

ASRs should never be used to discuss absolute instances.

Specific comments

Line 41: "As expected…". As expected by whom? It is not clear at this stage why it should be expected. Of course, you later explain that GBD WSP is a younger population and this reduces the DALY rates because in Scotland DALYs are mainly concentrated on the elderly. But this is not clear in the abstract.

Line 84: "calculations" is repeated twice.

Line 87: I do not agree that international comparability becomes a secondary aim. I agree that subnational estimates are crucial to policymakers. However, comparing our country with neighbouring countries, or to countries with similar socio-economic conditions, or with similar health systems, is also vital to policymakers.

Line 114-116: Better specify that the aim of the study is to compare crude vs. adjusted, AND adjusted with ESP2013 vs. GBDWSP.
Line 168. As previously mentioned, if the Scottish burden weights more on the elderly, it is evident that if you standardise the rates to a younger population, the burden will reduce. While ESP2013 practically does not standardised, given that it almost coincides with the Scottish population. I suggest changing throughout the manuscript the tone of the results, which appear to be less surprising than described.

Line 179-181: As previously mentioned, the point is not to compare crude rates vs. ASR, but to compare ASR for different years of geographies.

Line 204: This is obvious once you establish that GBD WSP is a younger population than the Scottish or the ESP2013.

Line 230: This is because the two populations (Scottish and ESP2013) are almost the same.

Line 232: This is because these populations are different.

Line 249-250: When you adopt a standard population, you should then compare results considering these are ASRs, and comparisons make sense if you compare years or locations. In relative terms, not is absolute terms.

Line 297: Of course you need to supplement with crude rates or numbers! There are comparisons which require crude rates or numbers, and others that are facilitated by the use of standardised rates. Each comparison has its own reason. Of course is you want to use ASRs for absolute reasons, it will work only if your standard population is almost identical to your population. But this makes standardisation pointless.

Line 307: This does not enable harmonisation. This simply makes ASR closer to crude rates. Again, crude rates are useful for understanding the absolute weight of a disease burden, while ASRs allow us to understand if, not considering population changes, the burden of a disease or injury or risk factor has changed in time or is different between geographies. Let us take breast cancer. In twenty years the incidence of breast cancer might change. This change might be due to a reduction in risk factors, or to changes in the population structure. If you want to exclude the latter, you standardise. Of course, once you standardise, you will not be able to talk about absolute burden. If your aim is to always compare with proximity situations, of course you would better choose a standard population that is the closest possible to your actual population.

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