PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Improving life expectancy: how many years behind has the US fallen? A cross-national comparison among high-income countries, 1958-2007
AUTHORS	Verguet, Stephane; Jamison, Dean

VERSION 1 - REVIEW

REVIEWER	Anna Peeters Head, Obesity and Population Health Baker IDI Heart and Diabetes Institute Australia Competing interests- NIL
REVIEW RETURNED	20-Mar-2013

THE STUDY	There are some inconsistencies between the results, the abstract and the key messages
RESULTS & CONCLUSIONS	The choice of analysis could be improved to better align with the research question, and to provide a deeper exploration of the research question with more meaningful results
REPORTING & ETHICS	There is no statement regarding ethics or checklists
GENERAL COMMENTS	This is an interesting article, analysing the trends in mortality rate in the US relative to a series of other similar countries. The article indicates that US mortality rates were not always worse than comparator countries but that this separation occurred around the 1970s. Such data are useful to advance hypotheses regarding causes of the differential. Overall the data is strong however I feel a few different analyses could increase the relevance of the paper. 1. I do not see the “leader” comparisons as very relevant. It is not clear what differences over time from the single changing, leader tell us. I would make the primary comparison always with the “comparators” group. 2. It would be interesting to see if the more advantaged groups in the US had an experience more similar to the comparator group- a subdivision of the US mortality rates by ethnic and social group would be useful. 3. One possible reason a divergence might be seen from the 1970s that is related to lack of universal coverage is that many treatments for cardiovascular disease emerged from the 1970s (good anti-hypertensives, statins, effective treatment etc) and consequently the great mortality declines are mainly due to improvement in CVD mortality. This may expose an underlying issue of unequal treatment access and coverage. This should be discussed in the discussion. It would also be interesting to look at CVD and other cause mortality separately if possible to test the hypothesis that the big divergence is in CVD mortality.

	Minor suggestions: *In the abstract it says that LE began to diverge in the 1970s, but this does not appear to be the case from Figure 1. It appears that only mortality rates appeared to diverge from the 1970s. For men there does not seem to be a divergence over time. (See also discrepancies in "Key messages") *The last section of the key messages needs a conclusion regarding how the findings do add to the US NA assessments. *It might be worth putting the mortality results first and follow with the LE results as these reflect the combination of the mortality results. This point should also be discussed in the discussion *I do not think the detailed discussion on changing leader countries is relevant to this paper The discussion section needs expanding to include discussion of comparison with the literature, strengths, weaknesses, implications and future work.

REVIEWER	Goodarz Danaei Assistant Professor of Global Health Department of Global Health and Population Department of Epidemiology Harvard School of Public Health I have no conflicts of interest to declare.
REVIEW RETURNED	28-Mar-2013

GENERAL COMMENTS	Verguet and Jamison have calculated trends in child and adult mortality and life expectancy at birth in the US in the past 50 years and have compared these trends with 16 other high-income countries. The authors have used an intuitive measure of 'years behind' comparing the US to both the country with the best outcome measure (i.e. highest life expectancy or lowest mortality rates) as well as the average outcome across the other 16 countries. Their results indicate that in the last 1970s the mortality decline in the US population fell behind those of the other high-income nations such that life expectancy in men and women in the US in 2007 is similar to that of the lead country about 40 years back. This paper adds to the previous evidence regarding mortality disparities across high-income countries and provides an intuitive quantification of how far US has fallen behind. The data and methods are well-suited for the question of interest and the paper is concise and clear. I think the Results section can be improved by reporting the magnitude of the gap in the outcome measures because the same degree of 'years behind' may correspond to different absolute differences in mortality or life expectancy depending on the trends in the comparator countries. I would also suggest that the authors consider and discuss the possibility of some of the results being affected by the change in the 'leading' country. It is quite clear that the results for the 'years behind' estimator are more unstable when the comparator is the leading country as opposed to the average of all the other countries.

	The Discussion section makes a strong argument for the results being relevant to distinguish a particular period in time when the US fell behind other OECD countries. However, one should consider the potential lag time between any change in an environmental factor and its effect on mortality being manifested at the population level. It should also be noted that the selected estimator of 'years behind' may be misleading because the determinants of decline in mortality change over time. It may take much less than 40 years to reduce mortality gap if appropriate interventions that may not have been available 40 years ago are implemented in the US, especially because about half of the difference in adult mortality between US and other high-income countries is due to heart disease (Crimmins 2011) which is amenable to both therapeutic and preventive interventions (e.g. smoking cessation, reducing blood pressure and serum cholesterol, etc.).

VERSION 1 – AUTHOR RESPONSE

Response to Reviewer Anna Peeters

Competing interests- NIL

There are some inconsistencies between the results, the abstract and the key messages

Response: We thank the reviewer for this important detail. This has been updated. Please see Abstract (p.2), Article Summary (p.3) and the Results section (pp.7-12).

The choice of analysis could be improved to better align with the research question, and to provide a deeper exploration of the research question with more meaningful results
Thre is no statement regarding ethics or checklists

Response: We don't understand what the reviewer precisely means. The study is a secondary data analysis. Statements regarding ethics or checklists would not apply.

This is an interesting article, analysing the trends in mortality rate in the US relative to a series of other similar countries. The article indicates that US mortality rates were not always worse than comparator countries but that this separation occurred around the 1970s. Such data are useful to advance hypotheses regarding causes of the differential.
Overall the data is strong however I feel a few different analyses could increase the relevance of the paper.

Response: We thank the reviewer for her positive comments on our manuscript.

1. I do not see the "leader" comparisons as very relevant. It is not clear what differences over time from the single changing, leader tell us. I would make the primary comparison always with the

“comparators” group.

Response: We thank the reviewer for this useful suggestion. We have now added a direct comparison with the “comparators” group. Hence, we have provided additional figures (figures A.1, A.2, A.3, A.4 in the Supplementary Appendix) and also adjusted the Results section (pp.7-12).

2. It would be interesting to see if the more advantaged groups in the US had an experience more similar to the comparator group- a subdivision of the US mortality rates by ethnic and social group would be useful.

Response: We have now explored such comparisons (please see Discussion section, pp.15-16; Supplementary Appendix, figure A.8).

3. One possible reason a divergence might be seen from the 1970s that is related to lack of universal coverage is that many treatments for cardiovascular disease emerged from the 1970s (good anti-hypertensives, statins, effective treatment etc) and consequently the great mortality declines are mainly due to improvement in CVD mortality. This may expose an underlying issue of unequal treatment access and coverage. This should be discussed in the discussion. It would also be interesting to look at CVD and other cause mortality separately if possible to test the hypothesis that the big divergence is in CVD mortality.

Response: We have now discussed such hypothesis and examined in some detail CVD mortality (please see Discussion section, p.16; Supplementary Appendix, figure A.9). The examination of diverse disease- and condition-related outcomes is largely left for future work (Discussion section, p.16).

Minor suggestions:
*In the abstract it says that LE began to diverge in the 1970s, but this does not appear to be the case from Figure 1. It appears that only mortality rates appeared to diverge from the 1970s. For men there does not seem to be a divergence over time. (See also discrepancies in “Key messages”)

Response: We thank the reviewer for this important detail. This has been updated. Please see Abstract (p.2), Article Summary (p.3) and the Results section (pp.7-12).

*The last section of the key messages needs a conclusion regarding how the findings do add to the US NA assessments.

Response: We have now included a sentence in the Article Summary (p.4).

*It might be worth putting the mortality results first and follow with the LE results as these reflect the combination of the mortality results. This point should also be discussed in the discussion

Response: We have now mentioned this point in the Discussion section (pp.12-13). We maintained the order of results as life expectancy is a focus of the article.

*I do not think the detailed discussion on changing leader countries is relevant to this paper.

Response: We have now updated the Results section accordingly (please see Results section, pp.7-12).

The discussion section needs expanding to include discussion of comparison with the literature, strengths, weaknesses, implications and future work.

Response: We agree with the reviewer. We have now mentioned strengths and weaknesses (Discussion section, pp.13-14), included references to the literature (Discussion section, pp.14-15), implications and future work (Discussion section, p.16).

Response to Reviewer Goodarz Danaei

Verguet and Jamison have calculated trends in child and adult mortality and life expectancy at birth in the US in the past 50 years and have compared these trends with 16 other high-income countries. The authors have used an intuitive measure of 'years behind' comparing the US to both the country with the best outcome measure (i.e. highest life expectancy or lowest mortality rates) as well as the average outcome across the other 16 countries. Their results indicate that in the last 1970s the mortality decline in the US population fell behind those of the other high-income nations such that life expectancy in men and women in the US in 2007 is similar to that of the lead country about 40 years back.
This paper adds to the previous evidence regarding mortality disparities across high-income countries and provides an intuitive quantification of how far US has fallen behind. The data and methods are well-suited for the question of interest and the paper is concise and clear. I think the Results section can be improved by reporting the magnitude of the gap in the outcome measures because the same degree of 'years behind' may correspond to different absolute differences in mortality or life expectancy depending on the trends in the comparator countries.

Response: We thank the reviewer for his positive comments on our work. We have now reported the magnitude of the gap in the outcome measures. Please see the Supplementary Appendix (figures A.5, A.6, A.7). This was not directly reported in the Results section as the section was already quite long.

I would also suggest that the authors consider and discuss the possibility of some of the results being affected by the change in the 'leading' country. It is quite clear that the results for the 'years behind' estimator are more unstable when the comparator is the leading country as opposed to the average of all the other countries.

Response: We now mention this point in the Discussion section (p.14).

The Discussion section makes a strong argument for the results being relevant to distinguish a particular period in time when the US fell behind other OECD countries. However, one should consider the potential lag time between any change in an environmental factor and its effect on mortality being manifested at the population level.

Response: We agree with the reviewer and have now included comments in the Discussion section (p.14).

It should also be noted that the selected estimator of 'years behind' may be misleading because the determinants of decline in mortality change over time. It may take much less than 40 years to reduce mortality gap if appropriate interventions that may not have been available 40 years ago are implemented in the US, especially because about half of the difference in adult mortality between US and other high-income countries is due to heart disease (Crimmins 2011) which is amenable to both therapeutic and preventive interventions (e.g. smoking cessation, reducing blood pressure and serum cholesterol, etc.).

Response: We have now included comments in the Discussion section (p.14).

VERSION 2 – REVIEW

REVIEWER	Anna Peeters Head, Obesity and Population Health Baker IDI Heart and Diabetes Institute Australia I have no relevant conflicts of interest
REVIEW RETURNED	27-May-2013

REPORTING & ETHICS	I could find no reference to ethics The checkllists are not relevant to secondary data analysis