Author's response to reviews

Title: Ethnic and Gender Specific Life Expectancies of the Singapore population, 1965 to 2009 - Converging, or Diverging?

Authors:

Raymond Boon Tar Lim (raymondlim1302@gmail.com)
Huili Zheng (huili_zheng@nuhs.edu.sg)
Qian Yang (yang_qian@nuhs.edu.sg)
Alex R Cook (alex.richard.cook@gmail.com)
Kee Seng Chia (kee_seng_chia@nuhs.edu.sg)
Wei Yen Lim (ephlwy@nus.edu.sg)

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Author's response to reviews: see over
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Dear Mr Proel Vargas,

RE: MS: 3444500651015965 Ethnic and Gender Specific Life Expectancies of the Singapore population, 1965 to 2009 - Converging, or Diverging?

Thank you for giving us an opportunity to address concerns raised by the reviewers.

We have amended the manuscript based on comments raised by the reviewers (changes highlighted in yellow). We also enclose a point-by point response to the reviewers’ comments (see Annex).

We are very grateful to the reviewers for their positive and helpful suggestions and we believe that the quality of the manuscript has been significantly improved as a result.

Yours sincerely,
Dr Raymond Boon Tar Lim
Responses to Reviewer 1: Naoki Kondo

Major compulsory revisions

Comment:
#1 Methods section did not include necessary information to be reported. For example, information with which readers can evaluate the accuracy of the data used should be reported: eg, definitions of ethnicities, % of population and death counts dropped from these registries. To secure the inclusion of necessary information, I think the use of a checklist such as STROBE should be helpful.

Response and action by author:
We thank the reviewer for this suggestion and have included this information in the amended manuscript. We have now provided the definitions of ethnicities, indicated that more than 96% of all deaths were included, and mentioned that less than 4% of the resident population were dropped in the calculation of mortalities and mid-year population as they were of ethnicities other than Chinese, Malays and Indians.

These amendments are located at:
i) pg 5, 1st paragraph, lines 2 to 4
ii) pg 5, 1st paragraph, lines 7 to 8
iii) pg 6, 2nd & 3rd paragraphs

Comment:
#2 Methods. Explain the reasons why and for what the authors additionally used the National Health Survey data. The detailed of that survey should also be needed.

Response and action by author:
The National Health Survey (NHS) is a serial cross-sectional survey implemented by the Ministry of Health Singapore. We did not obtain any raw data from the NHS or carry out any statistical analysis on the NHS dataset. In this paper, we cited findings from the NHS that indicate that there are disparities in the prevalence of chronic diseases and lifestyle risk factors among different ethnicities and genders. We have clarified this in the paper and apologise for any confusion inadvertently caused.

The amendment is located on pg 11, last paragraph, line 6.
Comment:

#3 Results: The authors reported that there were persistent gaps between ethnicities on life expectancy. But no data on the magnitude of the gaps have been reported.

Response and action by author:

We have added the magnitude of the gaps in life expectancy by gender and ethnicity in the tables accompanying each figure. In addition, we have added that the average magnitude of the gap in life expectancy at birth for the Chinese males and females was 5 to 7 years and 2 to 4 years for Malay males and females throughout the period of observation from 1965 to 2009. There is a persistent 8–11 years gap between Malay males and Chinese females throughout the period of observation from 1965 to 2009. In contrast, although Indian males and females had the lowest life expectancy of the 3 major ethnicities in 1970s, Indian males and females have both experienced the highest rates of increases in life expectancy at birth, especially from 1990s onwards, such that the life expectancy gap has closed from 6.9 years between Chinese and Indian females and 1.7 years between Chinese and Indian males in 1965, to 1.9 years in females and 0.2 years in males.

These amendments are located at:

i) Tables 2 and 3

ii) pg 7, last paragraph extending to pg 8, first paragraph

iii) pg 8 to 10, the whole sub-section on comparison of life expectancy stratified by ethnicity in both genders

Comment:

#4 I did not see any descriptions on ethical consideration.

Response and action by author:

We used publicly available aggregate population data published by the National Registry of Births and Deaths and the Department of Statistics. As we did not obtain any individual-level data, nor had any contact with study subjects, review from the local Institutional Review Board was deemed unnecessary.

The amendment is located at page 7, 1st paragraph just before Results.
Minor Essential Revisions

Comment:

#5 Background section fails to explain the importance of this paper. For example, why the description of life expectancy gaps across ethnic and gender groups are important? What are potential implications in international perspectives?

Response and action by author:

We thank the reviewer for highlighting this. Differences and gaps in life expectancy among ethnic groups and between genders within a country often imply the presence of health inequalities. Studies have found important determinants to explain these health inequalities, such as differences in the prevalence of chronic disease risk factors, preventive health behaviour, access to and utilisation of healthcare service, as well as socio-economic status.

International comparison of life expectancy typically involves the average value for a country, and does not consider any possible differences between subgroups within a country. Through long-term monitoring of life expectancy by sub-groups within a country, policy makers and other stakeholders would be better informed when it comes to allocating healthcare resources and planning health promotion programmes.

Our results add to the literature on ethnicity-related health inequalities within countries, and specifically contribute to data about societies in Asia, for which there is a relative paucity of data.

The amendments are located at:

i) pg 4, 1st paragraph, lines 4-6
ii) pg 4, 2nd paragraph, lines 1-2
iii) pg 4, 3rd paragraph

Comment:

#6 Please explain the rationales of the use of WHO definition of the groups I-III on death causes. For example, in the discussion section, the authors mainly discuss about the ethnicity gaps in life expectancy in terms of the share of deaths that were amenable/modifiable and not amenable/modifiable. This is not directly linked with the WHO categorization.

Response and action by author:

The WHO definition of Groups I-III on death causes was used to delineate the epidemiological transition of Singapore, which has been well-documented in Western countries and Japan, but less well-described in other Asian countries.
We notice that after the completion of this transition, ethnicity gaps still persist. Disparities in mortality and life expectancy in countries that have completed the epidemiologic transition such as Singapore are mainly due to differences in the distribution of chronic diseases and lifestyle risk factors, many of which are amenable or modifiable. We make the point in the discussion section that data from other sources (including the NHS) indicate that ethnic disparities in the prevalence of chronic diseases and lifestyle risk factors persist, and speculate that these differences contribute to the life expectancy gap. This suggests that there are potential interventions that could close the ethnic gap in life expectancy, by focusing on such modifiable or amenable factors.

These amendments are located at:

i) pg 10, last paragraph, last three sentences
ii) pg 11, last paragraph, lines 1 to 4

Comment:

#7 Results: I think the results for gender-combined data are not necessary. All results should be gender stratified.

Response and action by author:

We thank the reviewer for this feedback and have removed gender-combined data

These amendments are located at:

i) pg 8 to 10, the whole sub-section on comparison of life expectancy stratified by ethnicity in both genders

ii) Figure 3 and 4

iii) Tables 2 and 3

Comment:

#8 Discussions: The first half of discussion section is like results section, with unnecessarily long summary of results and additional descriptions of more results. Please reorganize the manuscript.

Response and action by author:

We thank the reviewer for this feedback and have reorganised the manuscript.

The amendment is located at pg 10, 1st paragraph of discussion section, lines 7 to 12.
Comment:

#9 Discussions and Conclusion: related to my comment for Background section, what is the implication of this study for public health and for the readers from the world?

Response and action by author:

Please see our response to #5 under minor essential revisions.

The amendments are located at:

i) pg 4, 1st paragraph, lines 4-6
ii) pg 4, 2nd paragraph, lines 1-2
iii) pg 4, 3rd paragraph

Discretionary Revisions

Comment:

#10 Page 12, second paragraph: to understand the impact of the misclassification due to immigrations and registration missing, the data on secular trends in immigrants from China, India and surrounding countries should be reported. Discuss about the magnitude of the bias based on those data.

Response and action by author:

We do not anticipate any missing data because the Registry of Births and Deaths is a National Registry, and under the Registration of Births and Deaths Act, it has been compulsory to register all births and deaths in Singapore since 1937. Singapore is a small city-state with a land area of about 700 sq km, and essentially 100% urban, so there should be almost no deaths that are missing.

We obtain the estimated mid-year resident population from the Department of Statistics, and again this is based on Census data together with data from births and deaths and naturalization.

Singapore is an immigrant population, and 20% of our resident population were born outside Singapore. The life expectancy trends described in this paper therefore includes the mortality experience of naturalised Singaporeans who were born in China, India, Malaysia or Indonesia, or other parts of the world. We are unable to exclude these naturalised Singaporeans, since the data we have do not distinguish between naturalised Singaporeans and those who were born in Singapore. However, we do not see this as a bias to our study, since our research objective was to evaluate the change in life expectancy of Singaporeans and Permanent Residents over time, regardless of their status as naturalised Singaporeans or not. We have added this point into the text. The amendment is located at pg 15, 2nd paragraph, lines 11 to 15.
Responses to Reviewer 2: Amal Harrati

Major compulsory revisions: None

Minor Essential Revisions

Comment:

1. There is an important and necessary distinction between the increases in life expectancy as an overall trend and the related gap that remains in the trends of life expectancy as opposed to the temporal gains in life expectancy across ethnic groups and gender. The authors need to do a better job of distinguishing between the existing gap in life expectancy that has persists over time versus the differential rate of change in the gains in life expectancy. The first table from the appendix (which incidentally, needs to be labeled) illustrates this well. There are a number of time periods in which the gains of life expectancy of the Malay or of men are much higher than the more so-called favorable group. This is the case, for example, for gains in life expectancy at birth Malays from 1975-79 relative to the five years prior. This is also the case in the earlier part of the same decade, and less significantly, in the first part of the 1980s. While this evidence does not directly contradict the main argument of the paper—the overall life expectancy of Malays and of males remains consistently lower than their counterparts across all time periods—it does highlight a different and important point. If the article’s purpose is, as the title suggests, explaining the divergence or convergence in life expectancy across the last 5 decades, this distinction needs to be better emphasized.

Response and action by author:

We appreciate the reviewer's valuable comment. While there are time periods where the life expectancy gains of Malays and the male gender are higher than other ethnicities and females, overall, their life expectancies have remained consistently lower across all time periods, and a gap in life expectancy is clearly seen throughout the time periods under investigation. This differs for the Indians where the rate of gain exceeds the other two ethnicities across all time periods, resulting in a closing of the gap in life expectancy. We have re-written parts of the Results and Discussion sections to better distinguish gender and ethnicity differences between the gap in the rate of change in life expectancy, and the absolute gap in the magnitude of life expectancy.

The amendments are located at:

i) pg 7, whole of sub-section on gender-differences in life expectancy

ii) pg 8 to 10, the whole sub-section on comparison of life expectancy stratified by ethnicity in both genders

iii) pg 10, 1st paragraph of discussion section, lines 7 to 12
Comment:

2a. Firstly, the language with regards to these explanations is generally too weak. The authors seem to hesitantly suggest possible explanations but at least in some cases, there is enough evidence in both the demographic and public health literature to make stronger statements about the possible contributions of various risk factors to life expectancy, particularly if the paper concludes with a call for greater intervention for particular groups.

Response and action by author:

We thank the reviewer for the comment. We have revised the language and included a line with citation to indicate that modifiable risk factors are known to contribute to mortality and life expectancy, and differences in these factors may explain persistent differences in life expectancy in Singapore.

The amendment is located at pg 11, last paragraph, lines 1 to 4.

Comment:

2b. Secondly, as related to my earlier comment, there are substantial differences across time in which groups had the greatest gains in life expectancy. However, the narrative of the paper with regards to risk factors for lower life expectancy speaks to general trends and to the persistent gap across time within these groups. Again, the two are not in direct contradiction, but need to be more carefully distinguished. Likewise, the discussion on the risk factors related to the gender differences speaks to a long time trend. However, given the rapid industrialization of Singapore over this time period, it is surely the case that gender-specific behaviours such as smoking have changed over time. This would imply differential gains in life expectancy across different time periods. The paper would benefit from a discussion of this phenomenon (or lack thereof).

Response and action by author:

We thank the reviewer for this comment.

Given the lack of data prior to 1992 for lifestyle risk factors (except smoking), we are unable to pinpoint if gender-specific lifestyle behaviours and risk factors have changed over a long time period. We are only able to describe gender and ethnic differences in lifestyle behaviours and risk factors from 1992 onwards.

Nonetheless for smoking we are able to do so. Smoking prevalence among males almost halved from 1970s to the present, of which lung cancer rates in males have also declined as a consequence, from 63.0 per 100,000 in the period 1978 to 1982 (age-standardised) to 40.8 per 100,000 in 2003 to 2007. Females have also experienced similar gains in life expectancy during this time period possibly due to factors that directly or indirectly improve health such as
increased literacy rates from 60% in 1970 to about 96% in 2010, doubling of the labour participation rate from 25% in 1970 to more than 50% in 2010, as well as improvements in maternal health etc.

The amendment is located at pg 13, last paragraph extending to pg 14, first paragraph.

Comment

2c. Related, the evidence brought to bear with regards to risk factors from the National Health Surveys only span the years from 1992-2010. However, some of the largest gains—and differences in gains—in life expectancy in Singapore occur in the 1970s and 1980s. The paper would benefit greatly from the addition of an extension of the National Health Surveys to include prior decades or, if these data are not available, additional data from another source.

Response and action by author:

Unfortunately, we do not have data prior to 1992 for most of the other risk factors, so it is difficult to evaluate how these factors have changed over time, and whether changes in these factors can explain relative gains in life expectancy among ethnicities and genders.

The data available is only for smoking, which we have already described earlier in the previous comment.

The amendment is located at pg 13, last paragraph extending to pg 14, first paragraph.

A few additional comments

Comment

The detailed tables on life expectancy always present either ethnic group or gender, but never both. However, it is conceivable that part of the reason for the persistent gap in life expectancy in men relative to women in Singapore is the result of disproportionate shares of males that are Malay. Given the magnitude of the gaps across gender, this seems unlikely; still, without knowing anything about the population composition of Singapore, it remains possible. I suggest the authors either present the data separated by gender and ethnic group together (ie. Indian males/females, Malay males/females, etc.) or at the very least give the shares of men and women across the three ethnic groups.
Response and action by author:

We have stratified the life expectancy data by ethnicity in both genders and presented this in the Results Section, with accompanying figures and tables.

The amendments are located at:

i) pg 8 to 10, the whole sub-section on comparison of life expectancy stratified by ethnicity in both genders

ii) Figure 3 and 4

iii) Tables 2 and 3

Comment:

With regards to the discussion on the leading cause of death, it is unclear from the text whether the three leading causes of death remain the same across the three ethnic groups and across the two gender groups for all time periods. If this is the case, it should be stated clearly. If it is not, there needs be greater emphasis in detailing the different leading causes of death for the different groups.

Response and action by author:

Cancer, coronary heart diseases and stroke are the three leading causes of mortality across the three ethnic groups and gender from 1970 (after Singapore has completed its epidemiological transition) to the present.

The amendment is located at pg 10, last paragraph, last three sentences.

Comment:

The results section would benefit from subheads to highlight different main points being made. Likewise, there should be a separate Limitations section on page 11.

Response and action by author:

We have included subheadings in both the Result and Discussion Section.

These subheadings are in bold and highlighted in yellow.
Discretionary Revisions

Comment:

While there is a relatively full discussion of the context of Singaporean industrialization in the discussion section, it is missing in the introductory pages. An abridged version of this discussion in the early part of the paper might help set up the context better for readers who are unfamiliar with the recent history of Singapore.

Response and action by author:

We have added a brief description of the social and economic changes in Singapore during the time period under discussion in the introduction section.

The amendment is located at pg 4, last paragraph, lines 1 to 4.

Comment:

In reading this article, I am left wondering if there is any other ethnic group in Singapore. If there is, however, small it may be, it would be nice to quickly note that this is the case and why attention is not be placed on this/these groups (data limitations, etc.).

Response and action by author:

There are other ethnic groups in Singapore. The most common are “Eurasians”, which are people of mixed Asian and European ancestry, but also other ethnic groups such as Thai, Japanese, and various Caucasian populations, but collectively they form a small proportion of the Singapore resident population, of less than 4%. Because the numbers are small, it is not possible to evaluate life expectancy changes in this broad group of “Others”.

The amendment is located at page 6, last paragraph, lines 3 to 4.

Comment:

The formulae detailed in Appendix 1 appear to be correct but might benefit from a citation.

Response and action by author:

We had already cited the sources of the formulae (reference numbers 22 to 24).