Life Expectancy at Birth: the Numbers Behind the Means

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Datasets spanning long periods of time, are crucial to our understanding of a range of phenomena, both within as outside social and economic history. For various processes, from social inequality to climate change, only change gradually, requiring long periods of time to observe and to explain change. Moreover, data spanning longer periods of time help us to unravel causality issues in the processes we study. Finally, time series data help us put contemporary phenomena in perspective.

Creating datasets that span long periods of time is, however, often far from straight forward. Even after the hard work of locating, preserving and digitising source materials is done, there are all kinds of decisions to make that can often not be shared in journal articles, because of word limitations, but is important for a proper understanding, and interpretation of the data at hand.

While this used to be an 'academic problem', i.e. limited to researchers, who anyway ought to be aware of the caveats of data assembly, the call for the openness of data in combination with social media now allows for rapid circulation of (visualizations of) data to an audience that is not trained to be aware of such caveats. For example, Figure 1 shows a tweet, by one of the directors of the Bill and Melinda Gates foundation, of a visualization of life expectancy over time, which today is retweeted over a thousand times and gained more than 2500 likes. In this data podium article, I would like to focus on a number of generic issues with long term datasets, illustrated via a dataset on life expectancy, in order to raise awareness of issues related to creating and interpreting long term data.

Before going into the issues of creating and interpreting long term datasets, I will first describe the dataset that I will use in this exercise. The

Figure 1. An example of long term reasearch data being shared via social media

dataset featured in the OECD's 'How was life?'- publication,[1] where it was used to describe and explain changes in health across the globe for nearly 200 years. More specifically, the dataset describes Period Life Expectancy at birth, the number of years one would live, if the circumstances at birth would continue to be the same.

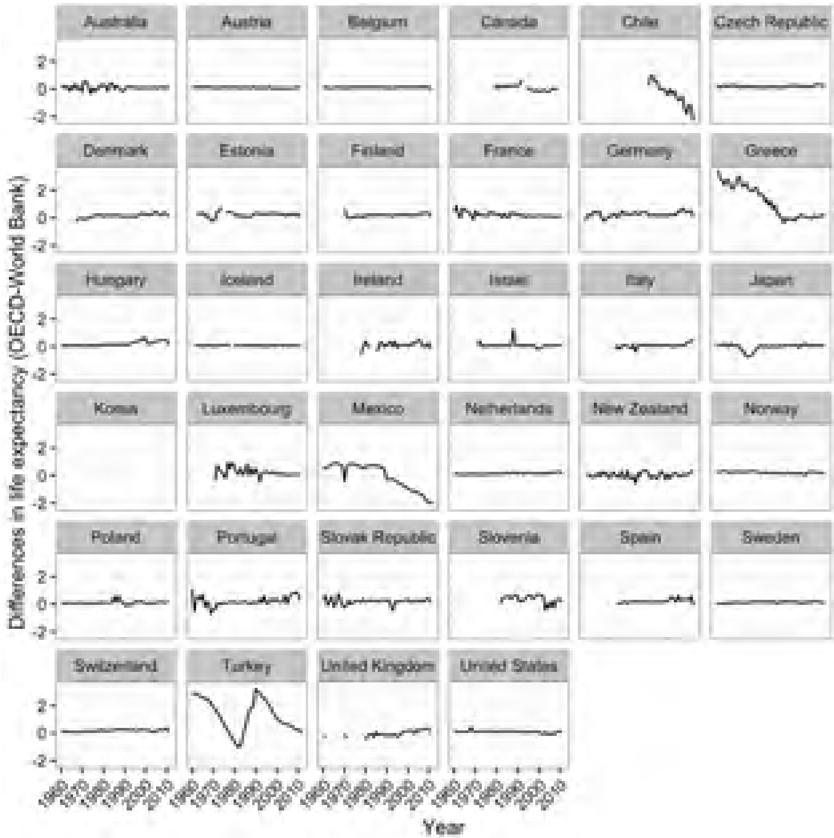
Being a Clio Infra dataset the ultimate goal for this dataset is to cover the globe for the period ca. 1500-2000. At the moment however, data range from 1543 (for the UK) to 2010 for nearly all countries in the world. The further back in time, the more limited the number of countries for which data is available. Moreover, for many countries life expectancy rates are only available after 1950. The data were gathered between September 2013 and April 2014. The dataset is stored at the Dataverse instance of the International Institute of Social History (http://datasets.socialhistory.org) and is available via a persistent identifier: http://hdl.handle.net/10622/LKYT53.

The OECD article by Zijdeman and Ribeiro da Silva (2014) provides quite detailed information on which sources were used in case of overlapping sources.[2] In total, data from seven different data providers were used:

1 J.L. van Zanden, c.s. (eds.), *How was life? Global well-being since 1820* (Paris 2014). doi: 10.1787/9789264214262-en.

2 R.L. Zijdeman and F. Ribeiro da Silva, 'Life Expectancy since 1820' in *How was life? Global well-being since 1820*, edited by Jan Luiten, c.s. (Paris 2014) 101-116.

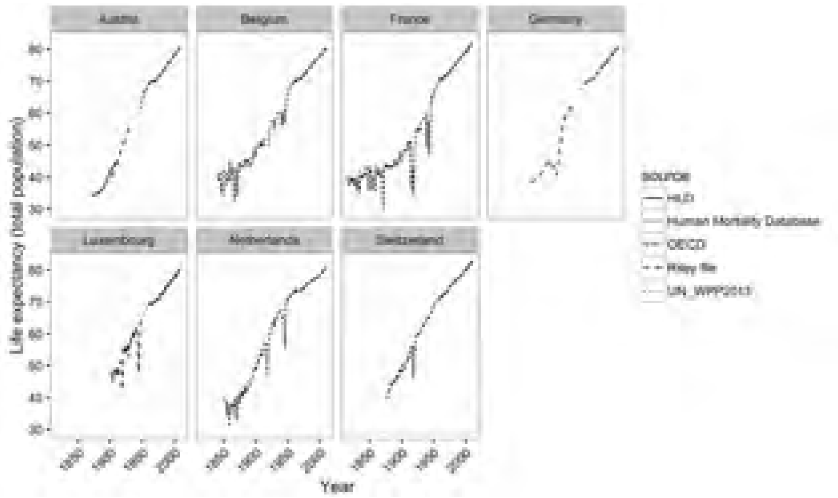
Figure 2. Absolute differences in total life expectancy at birth between two sources for a number of Western countries



- Australian Bureau of Statistics: www.abs.gov.au/ausstats/abs@.nsf/web+pages/statistics?opendocument#from-banner=LN
- GAPMINDER: www.gapminder.org
- Human Mortality Database: www.mortality.org
- Kannisto-Nieminen-Turpeinen database[3]
- Montevideo-Oxford Latin America Economic History Database: www.lac.ox.ac.uk/moxlad-database
- UN World Population Project: esa.un.org/wpp/
- OECD: stats.oecd.org
- ONS: www.ons.gov.uk/ons/datasets-and-tables/index.html

3 V. Kannisto, M. Nieminen, and O. Turpeinen, 'Finnish life tables since 1751', *Demographic Research* 1:1 (1999). DOI: 10.4054/DemRes.1999.1.1.

Figure 3. An illustration of various sources used to depict total life expectancy at birth in a number of European countries



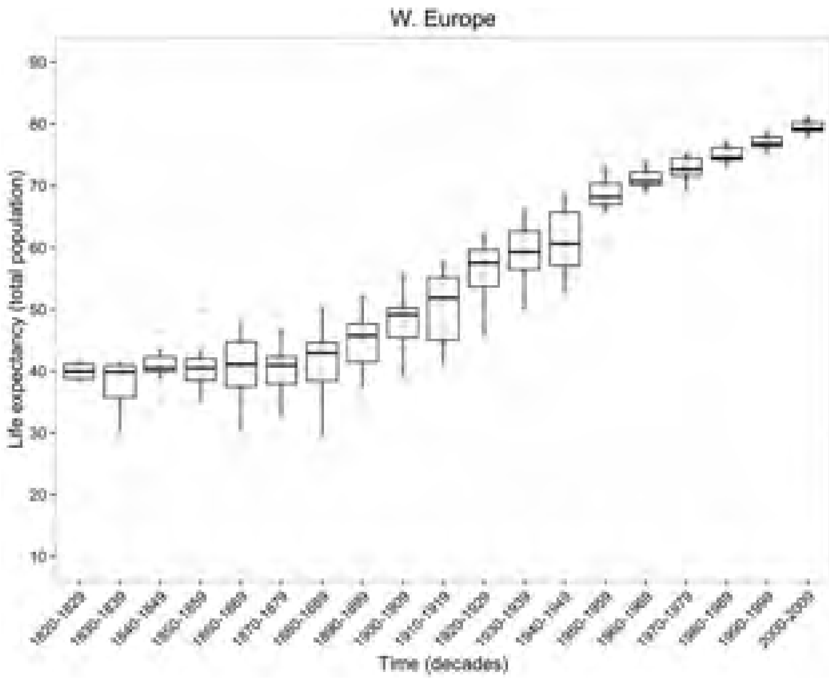
In case of overlapping data sources, the main principle was to favour datasets that spanned longer periods of time for reasons of consistency. The data is accompanied by a codebook providing an R script that shows exactly how the data were derived. In addition to the article and codebook, Table 1 in the Appendix provides an overview of the sources which were used for all countries and time periods in the dataset.

A first issue with long time series data is that the use of multiple sources, needed for such long time series, is obscured. Sources are seldom uniform in the way they acquired their data. Variation in source data can range from anything between data acquisition methods (from e.g. census takers registering data in 'their own way' up to different ways of measuring the concept at hand (different instructions)'. Obviously such differences could lead to biases over time as well as between different regional units (countries).

Users of datasets are seldom presented information on the use (and consequences) of different sources, directly inside the dataset. At best, there are some notes in a codebook, but this would require the researcher herself to create variables for robustness checks. A quite cumbersome task judging by the size of Table 1 in the Appendix. Research journals also seldom allow for more rigorous notes on data gathering due to space restrictions. As a result, users need to rely on a combination of the codebook and different patterns in the data such as the change around 1840 in the UK in Figure 1.

As an illustration of how different sources may relate to one another, Figure 2 presents data on life expectancy after World War II, from two of

Figure 4. A box- and scatterplot representation of total life expectancy at birth in countries in Western Europe

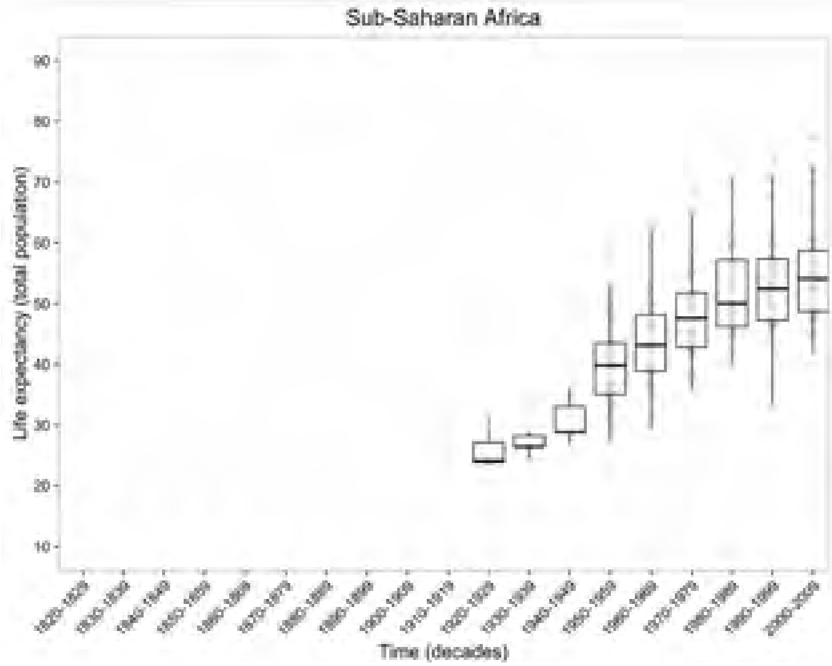


the biggest data agencies, the Organisation for Economic Co-operation and Development (OECD) and the World Bank. The zero-value on the y-axis indicates that there are no differences in life expectancy according to OECD and World Bank, while a positive value indicates that the OECD has a higher estimated life expectancy than the World Bank. Reassuringly, we see hardly any differences between countries, nor systematic changes over time. However, for a number of countries there are differences, most notably in Greece, Israel, Mexico and Turkey. Researchers interested with a particular focus on any of these countries might want to do robustness checks on the use of the OECD and World Bank data.

Another instance of multiple data sources causing irregularities in data patterns is the use of complementary datasets. In the life expectancy dataset, data sources complement each other mostly over time and may lead to sudden 'shifts' in levels of life expectancy, for example because of differences in registration methods.

Figure 3 shows how the OECD data are complemented by data from various sources. Each line graph represents a different data source. Overall, the patterns appear to be surprisingly homogeneous across datasets. More-

Figure 5. A box- and scatterplot representation of total life expectancy at birth in countries in Sub-Saharan Africa



over, historical datasets that expand beyond the 1950's again show remarkable similar levels of life expectancy to the one reported by the OECD. Thus while a potential risk, the life expectancy data does not appear to suffer too much from differences in temporally complementary sources.

Data sources that are regionally aggregated may also distort genuine patterns in life expectancy. This could be the result of how the data were constructed (e.g. multiple sources being combined into country level data), but also in the way the data are presented. Given the number of countries for which data are available, it is often tempting to aggregate data to some supra-national level in order to make the data more 'comprehensive'. Zijdeman and Ribeiro da Silva (2014) did so as well aggregating the data to 8 major world regions, and visualizing changes in life expectancy by a single line, each representing a single major world region.

There are two issues to remember when visualizing datasets such as the Clio Infra Life Expectancy dataset in an aggregated way. First, given the historical nature of the data, the mean is bound to be calculated from a different number of countries over time. The mean is thus more representative of later periods, but also, fluctuations in the mean, can be the result of the expanding number of countries to calculate the mean from.

Secondly, the mean does by definition not allow one to interpret the variation in scores of countries. Countries could thus be similar to each other with values close to the mean, but the mean could also be less representative if some countries perform considerably better or worse in comparison to other countries.

Figures 4 and 5 provide alternative visualizations to the ones used by Zijdeman and Ribeiro da Silva (2014) for life expectancy at birth for Western Europe and Sub-Saharan Africa respectively. Each figure consists of a jittered scatterplot overlaid by a boxplot. The scatterplot shows the average value of life expectancy by country. From the figures it is easy to see, how over time the number of countries representing a region increases. The jitter function adds some random error to the positioning of each point, in order to reduce overlay between data points (countries). The boxplots provide guidance on interpreting the variation across countries in life expectancy. The larger the size of the box and/or the 'whiskers' above and below the box, the more variation there is and the less the mean is a proper representation of the countries at hand.

The benefit of visualizing data using a combination of scatter- and boxplot over a single line representing the mean, becomes evident when thinking about the different conclusions one could draw from the alternative graphs. When figures 4 and 5 would just represent means, one would conclude that the world is becoming a better place, for both in Western Europe as in Sub-Saharan Africa mean life expectancy has been rising over the course of the twentieth century.

The scatter- and boxplots show a more nuanced picture though. First of all, it shows that for earlier time periods fewer countries are representing each global region and any claims on life expectancy at the aggregate level are thus more uncertain for earlier time periods. Moreover, we see that in Western Europe the variation in life expectancy is declining, while in Sub-Saharan Africa there is, at best, no evidence for convergence. A more appropriate conclusion then appears to be, that in both Western Europe and Sub-Saharan Africa life expectancy has increased, but that inequality in life expectancy within Western Europe has strongly decreased to a maximum of 5 years, while in Sub-Saharan Africa inequality did at best not lessen, showing a 45-year difference at the extremes, and even a 10-year difference between the middle 50 per cent of the countries. Zijdeman and Ribeiro da Silva (2014) reach a similar conclusion, but the reader has no way to corroborate their claims based on the visualization of the means as presented in their chapter.

To summarise, the Clio Infra dataset on life expectancy at birth is a dataset created from multiple data sources and in this 'data stage' article I have illustrated potential issues with this type of datasets. Data sources covering the same time periods and regions might be incongruent and complementary datasets may cause sudden changes in trends over time. The life expectancy dataset at hand proves to be remarkably resilient to both issues. A second issue raised was that datasets like the life expectancy dataset are often used to literally draw comparisons between world regions using line graphs of means over time. I have suggested that a combination of scatter- and boxplot is more appropriate as it helps the reader to assess changes in the richness of data over time, as well as to draw substantively more interesting (and more appropriate) conclusions.

To my knowledge, the construction of datasets has received much more attention in recent years. While debates on 'openness of data' often result in discussions on principles of ownership, the one principle that we share as researchers is that research should be replicable. That does not only apply to regression analysis on a specific dataset, but also to the construction of those datasets themselves. In journal articles, and even in codebooks there is little space to go into great detail on the particulars of the creation of a dataset, nor to highlight particular issues that the researcher had to deal with. It is my hope that the space provided in this journal to write data review articles or data stage articles like this one, will be used to raise awareness of peculiarities of datasets. Not only would that provide common ground for replication and robustness checks of datasets, it would also enhance our use of those data as we gain a better understanding of the datasets at hand.

About the author

Richard Zijdeman obtained his PhD in sociology and focuses on long term patterns of occupational stratification in Western countries over the past 200 years. Methodologically he is specialized in historical measures of occupational status and multilevel models accounting for complex variance structures. Currently his main roles are Chief Data Officer at the International Institute of Social History and project lead for the structured data component of the the Common Lab Research Infrastructure for the Arts and Humanities (CLARIAH). For the latter his team is building an infra-structure to transpose historical datasets (including GIS) to Linked Open Data, enhancing the connectivity of datasets as well as the reproducibility of research.
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Appendix

Table 1. Overview of life expectancy data by world region, country, first and last observed year and source

Region	Country	First Year	Last Year	Source
East Asia	China	1930	2009	Riley file-UN_WPP2013
East Asia	China, Hong Kong SAR	1950	2009	UN_WPP2013
East Asia	China, Macao SAR	1950	2009	UN_WPP2013
East Asia	Dem. People's Republic of Korea	1908	2009	Riley file-UN_WPP2013
East Asia	Japan	1865	2009	Human Mortality Database-Riley file
East Asia	Mongolia	1950	2009	UN_WPP2013
East Asia	Republic of Korea	1908	2009	OECD-Riley file-UN_WPP2013
East. Europe and form. SU	Albania	1950	2009	UN_WPP2013
East. Europe and form. SU	Armenia	1950	2009	UN_WPP2013
East. Europe and form. SU	Azerbaijan	1950	2009	UN_WPP2013
East. Europe and form. SU	Belarus	1900	2009	Human Mortality Database-Riley file-UN_WPP2013
East. Europe and form. SU	Bosnia and Herze-govina	1950	2009	UN_WPP2013
East. Europe and form. SU	Bulgaria	1900	2009	Human Mortality Database-Riley file
East. Europe and form. SU	Croatia	1950	2009	UN_WPP2013
East. Europe and form. SU	Czech Republic	1875	2009	Human Mortality Database-Riley file
East. Europe and form. SU	Estonia	1897	2009	Estonian Interuniversity Population Research Centre-Human Mortality Database-Riley file-UN_WPP2013
East. Europe and form. SU	Georgia	1950	2009	UN_WPP2013

Region	Country	First Year	Last Year	Source
East. Europe and form. SU	Hungary	1900	2009	Human Mortality Database-Riley file
East. Europe and form. SU	Kazakhstan	1868	2009	Riley file-UN_WPP2013
East. Europe and form. SU	Kyrgyzstan	1950	2009	UN_WPP2013
East. Europe and form. SU	Latvia	1896	2009	Human Mortality Database-Riley file-UN_WPP2013
East. Europe and form. SU	Lithuania	1900	2009	Human Mortality Database-Riley file-UN_WPP2013
East. Europe and form. SU	Montenegro	1950	2009	UN_WPP2013
East. Europe and form. SU	Poland	1931	2009	Human Mortality Database-Riley file-UN_WPP2013
East. Europe and form. SU	Republic of Moldova	1950	2009	UN_WPP2013
East. Europe and form. SU	Romania	1932	2009	Riley file-UN_WPP2013
East. Europe and form. SU	Russian Federation	1896	2009	Human Mortality Database-Riley file-UN_WPP2013
East. Europe and form. SU	Serbia	1950	2009	UN_WPP2013
East. Europe and form. SU	Slovakia	1921	2009	Human Mortality Database-Riley file
East. Europe and form. SU	Slovenia	1950	2009	Human Mortality Database-OECD-UN_WPP2013
East. Europe and form. SU	Tajikistan	1950	2009	UN_WPP2013
East. Europe and form. SU	TFYR Macedonia	1950	2009	UN_WPP2013
East. Europe and form. SU	Turkmenistan	1950	2009	UN_WPP2013
East. Europe and form. SU	Ukraine	1900	2009	Human Mortality Database-Riley file-UN_WPP2013

Region	Country	First Year	Last Year	Source
East. Europe and form. SU	Uzbekistan	1950	2009	UN_WPP2013
Latin America and Carib.	Antigua and Barbuda	1950	2009	UN_WPP2013
Latin America and Carib.	Argentina	1875	2009	MOxLAD-Riley file-UN_WPP2013
Latin America and Carib.	Aruba	1950	2009	UN_WPP2013
Latin America and Carib.	Bahamas	1950	2009	UN_WPP2013
Latin America and Carib.	Barbados	1950	2009	UN_WPP2013
Latin America and Carib.	Belize	1950	2009	UN_WPP2013
Latin America and Carib.	Bolivia (Plurinational State of)	1900	2009	MOxLAD-Riley file-UN_WPP2013
Latin America and Carib.	Brazil	1900	2009	MOxLAD-Riley file-UN_WPP2013
Latin America and Carib.	Chile	1900	2009	Human Mortality Database-MOxLAD-OECD-Riley file-UN_WPP2013
Latin America and Carib.	Colombia	1900	2009	MOxLAD-Riley file-UN_WPP2013
Latin America and Carib.	Costa Rica	1875	2009	MOxLAD-Riley file-UN_WPP2013
Latin America and Carib.	Cuba	1899	2009	MOxLAD-Riley file-UN_WPP2013
Latin America and Carib.	Curaçao	1950	2009	UN_WPP2013
Latin America and Carib.	Dominican Republic	1930	2009	MOxLAD-Riley file-UN_WPP2013
Latin America and Carib.	Ecuador	1950	2009	UN_WPP2013
Latin America and Carib.	El Salvador	1920	2009	MOxLAD-UN_WPP2013

Region	Country	First Year	Last Year	Source
Latin America and Carib.	French Guiana	1950	2009	UN_WPP2013
Latin America and Carib.	Grenada	1950	2009	UN_WPP2013
Latin America and Carib.	Guadeloupe	1950	2009	UN_WPP2013
Latin America and Carib.	Guatemala	1900	2009	MOxLAD-Riley file-UN_WPP2013
Latin America and Carib.	Guyana	1911	2009	Riley file-UN_WPP2013
Latin America and Carib.	Haiti	1950	2009	UN_WPP2013
Latin America and Carib.	Honduras	1920	2009	MOxLAD-UN_WPP2013
Latin America and Carib.	Jamaica	1881	2009	Riley file-UN_WPP2013
Latin America and Carib.	Martinique	1950	2009	UN_WPP2013
Latin America and Carib.	Mexico	1893	2009	MOxLAD-OECD-Riley file-UN_WPP2013
Latin America and Carib.	Nicaragua	1920	2009	MOxLAD-UN_WPP2013
Latin America and Carib.	Panama	1930	2009	MOxLAD-UN_WPP2013
Latin America and Carib.	Paraguay	1900	2009	MOxLAD-Riley file-UN_WPP2013
Latin America and Carib.	Peru	1940	2009	MOxLAD-UN_WPP2013
Latin America and Carib.	Puerto Rico	1894	2009	Riley file-UN_WPP2013
Latin America and Carib.	Saint Lucia	1950	2009	UN_WPP2013
Latin America and Carib.	Saint Vincent and the Grenadines	1950	2009	UN_WPP2013

Region	Country	First Year	Last Year	Source
Latin America and Carib.	Suriname	1950	2009	UN_WPP2013
Latin America and Carib.	Trinidad and Tobago	1921	2009	Riley file-UN_WPP2013
Latin America and Carib.	United States Virgin Islands	1950	2009	UN_WPP2013
Latin America and Carib.	Uruguay	1900	2009	MOxLAD-UN_WPP2013
Latin America and Carib.	Venezuela (Bolivarian Republic of)	1900	2009	MOxLAD-UN_WPP2013
MENA	Algeria	1923	2009	Riley file-UN_WPP2013
MENA	Bahrain	1950	2009	UN_WPP2013
MENA	Cyprus	1895	2009	Riley file-UN_WPP2013
MENA	Egypt	1927	2009	Riley file-UN_WPP2013
MENA	Iran (Islamic Repu-blic of)	1950	2009	UN_WPP2013
MENA	Iraq	1950	2009	UN_WPP2013
MENA	Israel	1950	2009	Human Mortality Database-OECD-UN_WPP2013
MENA	Jordan	1950	2009	UN_WPP2013
MENA	Kuwait	1908	2009	Riley file-UN_WPP2013
MENA	Lebanon	1950	2009	UN_WPP2013
MENA	Libya	1950	2009	UN_WPP2013
MENA	Morocco	1950	2009	UN_WPP2013
MENA	Oman	1950	2009	UN_WPP2013
MENA	Qatar	1950	2009	UN_WPP2013
MENA	Saudi Arabia	1950	2009	UN_WPP2013
MENA	State of Palestine	1950	2009	UN_WPP2013
MENA	Sudan	1950	2009	UN_WPP2013
MENA	Syrian Arab Republic	1950	2009	UN_WPP2013
MENA	Tunisia	1923	2009	Riley file-UN_WPP2013
MENA	Turkey	1937	2009	OECD-Riley file-UN_WPP2013
MENA	United Arab Emirates	1950	2009	UN_WPP2013
MENA	Western Sahara	1950	2009	UN_WPP2013

Region	Country	First Year	Last Year	Source
MENA	Yemen	1950	2009	UN_WPP2013
South and South-East Asia	Afghanistan	1950	2009	UN_WPP2013
South and South-East Asia	Bangladesh	1876	2009	Riley file-UN_WPP2013
South and South-East Asia	Bhutan	1950	2009	UN_WPP2013
South and South-East Asia	Brunei Darussalam	1950	2009	UN_WPP2013
South and South-East Asia	Cambodia	1945	2009	Riley file-UN_WPP2013
South and South-East Asia	Fiji	1950	2009	UN_WPP2013
South and South-East Asia	French Polynesia	1950	2009	UN_WPP2013
South and South-East Asia	Guam	1950	2009	UN_WPP2013
South and South-East Asia	India	1881	2009	HLD-Riley file-UN_WPP2013
South and South-East Asia	Indonesia	1927	2009	Riley file-UN_WPP2013
South and South-East Asia	Kiribati	1950	2009	UN_WPP2013
South and South-East Asia	Lao People's Democratic Republic	1950	2009	UN_WPP2013
South and South-East Asia	Malaysia	1950	2009	UN_WPP2013
South and South-East Asia	Maldives	1950	2009	UN_WPP2013
South and South-East Asia	Micronesia (Fed. States of)	1950	2009	UN_WPP2013
South and South-East Asia	Myanmar	1926	2009	Riley file-UN_WPP2013
South and South-East Asia	Nepal	1950	2009	UN_WPP2013

Region	Country	First Year	Last Year	Source
South and South-East Asia	New Caledonia	1950	2009	UN_WPP2013
South and South-East Asia	Pakistan	1921	2009	Riley file-UN_WPP2013
South and South-East Asia	Papua New Guinea	1946	2009	Riley file-UN_WPP2013
South and South-East Asia	Philippines	1938	2009	Riley file-UN_WPP2013
South and South-East Asia	Samoa	1950	2009	UN_WPP2013
South and South-East Asia	Singapore	1950	2009	UN_WPP2013
South and South-East Asia	Solomon Islands	1950	2009	UN_WPP2013
South and South-East Asia	Sri Lanka	1901	2009	Riley file-UN_WPP2013
South and South-East Asia	Thailand	1937	2009	Riley file-UN_WPP2013
South and South-East Asia	Timor-Leste	1950	2009	UN_WPP2013
South and South-East Asia	Tonga	1950	2009	UN_WPP2013
South and South-East Asia	Vanuatu	1950	2009	UN_WPP2013
South and South-East Asia	Viet Nam	1950	2009	UN_WPP2013
Sub-Saharan Africa	Angola	1940	2009	Riley file-UN_WPP2013
Sub-Saharan Africa	Benin	1950	2009	UN_WPP2013
Sub-Saharan Africa	Botswana	1950	2009	UN_WPP2013
Sub-Saharan Africa	Burkina Faso	1950	2009	UN_WPP2013
Sub-Saharan Africa	Burundi	1950	2009	UN_WPP2013
Sub-Saharan Africa	Cameroon	1931	2009	Riley file-UN_WPP2013
Sub-Saharan Africa	Cape Verde	1950	2009	UN_WPP2013
Sub-Saharan Africa	Central African Republic	1950	2009	UN_WPP2013

Region	Country	First Year	Last Year	Source
Sub-Saharan Africa	Chad	1950	2009	UN_WPP2013
Sub-Saharan Africa	Comoros	1950	2009	UN_WPP2013
Sub-Saharan Africa	Congo	1950	2009	UN_WPP2013
Sub-Saharan Africa	Côte d'Ivoire	1950	2009	UN_WPP2013
Sub-Saharan Africa	Democratic Republic of the Congo	1950	2009	UN_WPP2013
Sub-Saharan Africa	Djibouti	1950	2009	UN_WPP2013
Sub-Saharan Africa	Equatorial Guinea	1950	2009	UN_WPP2013
Sub-Saharan Africa	Eritrea	1950	2009	UN_WPP2013
Sub-Saharan Africa	Ethiopia	1950	2009	UN_WPP2013
Sub-Saharan Africa	Gabon	1950	2009	UN_WPP2013
Sub-Saharan Africa	Gambia	1950	2009	UN_WPP2013
Sub-Saharan Africa	Ghana	1921	2009	Riley file-UN_WPP2013
Sub-Saharan Africa	Guinea	1950	2009	UN_WPP2013
Sub-Saharan Africa	Guinea-Bissau	1950	2009	UN_WPP2013
Sub-Saharan Africa	Kenya	1927	2009	Riley file-UN_WPP2013
Sub-Saharan Africa	Lesotho	1950	2009	UN_WPP2013
Sub-Saharan Africa	Liberia	1950	2009	UN_WPP2013
Sub-Saharan Africa	Madagascar	1950	2009	UN_WPP2013
Sub-Saharan Africa	Malawi	1950	2009	UN_WPP2013
Sub-Saharan Africa	Mali	1950	2009	UN_WPP2013
Sub-Saharan Africa	Mauritania	1950	2009	UN_WPP2013
Sub-Saharan Africa	Mauritius	1924	2009	Riley file-UN_WPP2013
Sub-Saharan Africa	Mayotte	1950	2009	UN_WPP2013
Sub-Saharan Africa	Mozambique	1950	2009	UN_WPP2013
Sub-Saharan Africa	Namibia	1950	2009	UN_WPP2013
Sub-Saharan Africa	Niger	1921	2009	Riley file-UN_WPP2013
Sub-Saharan Africa	Nigeria	1950	2009	UN_WPP2013
Sub-Saharan Africa	Réunion	1950	2009	UN_WPP2013
Sub-Saharan Africa	Rwanda	1950	2009	UN_WPP2013
Sub-Saharan Africa	Sao Tome and Principe	1950	2009	UN_WPP2013
Sub-Saharan Africa	Senegal	1927	2009	Riley file-UN_WPP2013
Sub-Saharan Africa	Seychelles	1950	2009	UN_WPP2013

Region	Country	First Year	Last Year	Source
Sub-Saharan Africa	Sierra Leone	1931	2009	Riley file-UN_WPP2013
Sub-Saharan Africa	Somalia	1950	2009	UN_WPP2013
Sub-Saharan Africa	South Africa	1950	2009	UN_WPP2013
Sub-Saharan Africa	Swaziland	1950	2009	UN_WPP2013
Sub-Saharan Africa	Togo	1950	2009	UN_WPP2013
Sub-Saharan Africa	Uganda	1927	2009	Riley file-UN_WPP2013
Sub-Saharan Africa	United Republic of Tanzania	1950	2009	UN_WPP2013
Sub-Saharan Africa	Zambia	1950	2009	UN_WPP2013
Sub-Saharan Africa	Zimbabwe	1950	2009	UN_WPP2013
W. Europe	Austria	1870	2009	HLD-Human Mortality Database-Riley file
W. Europe	Belgium	1841	2009	Human Mortality Database
W. Europe	Channel Islands	1950	2009	UN_WPP2013
W. Europe	Denmark	1835	2009	Human Mortality Database
W. Europe	Finland	1825	2009	Human Mortality Database-Kannisto, Nieminen and Turpeinen (1999)-Riley file
W. Europe	France	1820	2009	Human Mortality Database
W. Europe	Germany	1875	2009	HLD-Human Mortality Database-OECD-Riley file-UN_WPP2013
W. Europe	Greece	1877	2009	OECD-Riley file-UN_WPP2013
W. Europe	Iceland	1838	2009	Human Mortality Database
W. Europe	Ireland	1901	2009	Human Mortality Database-Riley file
W. Europe	Italy	1872	2009	Human Mortality Database
W. Europe	Luxembourg	1901	2009	Human Mortality Database-Riley file-UN_WPP2013
W. Europe	Malta	1950	2009	UN_WPP2013
W. Europe	Netherlands	1850	2009	Human Mortality Database
W. Europe	Norway	1846	2009	Human Mortality Database
W. Europe	Portugal	1940	2009	Human Mortality Database
W. Europe	Spain	1882	2009	Human Mortality Database-Riley file
W. Europe	Sweden	1820	2009	Human Mortality Database
W. Europe	Switzerland	1876	2009	Human Mortality Database

Region	Country	First Year	Last Year	Source
W. Europe	United Kingdom	1823	2009	Human Mortality Database-ONS 2008-ONS 2008-Wrigley et al. 1997
W. Offshoots	Australia	1885	2009	Australian Bureau of Statistics 2008-Human Mortality Database
W. Offshoots	Canada	1831	2009	Human Mortality Database-Riley file
W. Offshoots	New Zealand	1948	2009	Human Mortality Database-OECD
W. Offshoots	United States of America	1880	2009	HLD-Human Mortality Database-Riley file