**Appendix S1A**

The decomposition formula by Arriaga [14] is

where gives the contribution of the all-cause mortality difference in age group x to x+n to differences in life expectancy at birth between two populations in years. The method is based on conventional life table functions , , and .

**Appendix S1B**

The formula for the extension is

Where gives the number of years that a cause of death is contributing to differences in life expectancy between two populations. Here is the mortality rate between ages and and is the proportion of deaths from cause in age group x to x+n in population . As shown in equation 1, is the all-cause mortality difference in age group x to x+n.