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Featured graphic. If Europe were a country …

If Europe were a country, what would its vital statistics show? The figure shows how crude mortality rates—the probability of being dead within the next twelve months—have varied with age and with time, for both males and females, within European nations from 1751 to 2011. The data are arranged to form a Lexis surface, a statistical canvas where one of the axes represents year and the other represents age (Lexis, 1875) At each combination of age and year is a value: mortality rate. Conceptually, the mortality rate is the 'height' of the Lexis surface at each of many tens of thousands of combinations of age and year, meaning the shaded contour plots here allow the visualisation of tens of thousands of values 'at a glance' (Vaupel et al, 1987; 1997) By investing a little more than a glance-worth of time to these visualisations it becomes possible to use them to identify a large number of complex features and patterns in the data (Minton, 2013; 2014; Minton et al, 2013).

All available data of European countries from the Human Mortality Database (HMD) were used. (Human Mortality Database, 2014) For almost three quarters of a century, from 1751 to 1815, this was just Sweden. From 1816 to 1850 six more countries' records became available, then another three during the second half of the 19th century. Data for the latter half of the 20th century were drawn from over twenty nations, a combined population size of almost half a billion citizens.

The contour plots involved bolting together data from many different countries, and required relying on a few countries to tell the start of the story of modern Europe. Despite this, and despite being the main arena of two world wars and like the rest of the globe experiencing the deadliest infectious disease outbreak ever recorded, the contour plots seem to tell a single, cohesive, positive story, of vastly reduced infant mortality and the emergence of a childhood ever safer from harm, reduced risk of death during adulthood, and the pushing back of biological ageing to ever greater chronological ages. Not quite 'forever young', but 'younger, longer'.

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Software: These visualisations were produced using the graphics packages lattice and ggplot2 within the R statistical programming language. The code available to reproduce these figures is available from the following url: https://github.com/JonMinton/Europe_Contours

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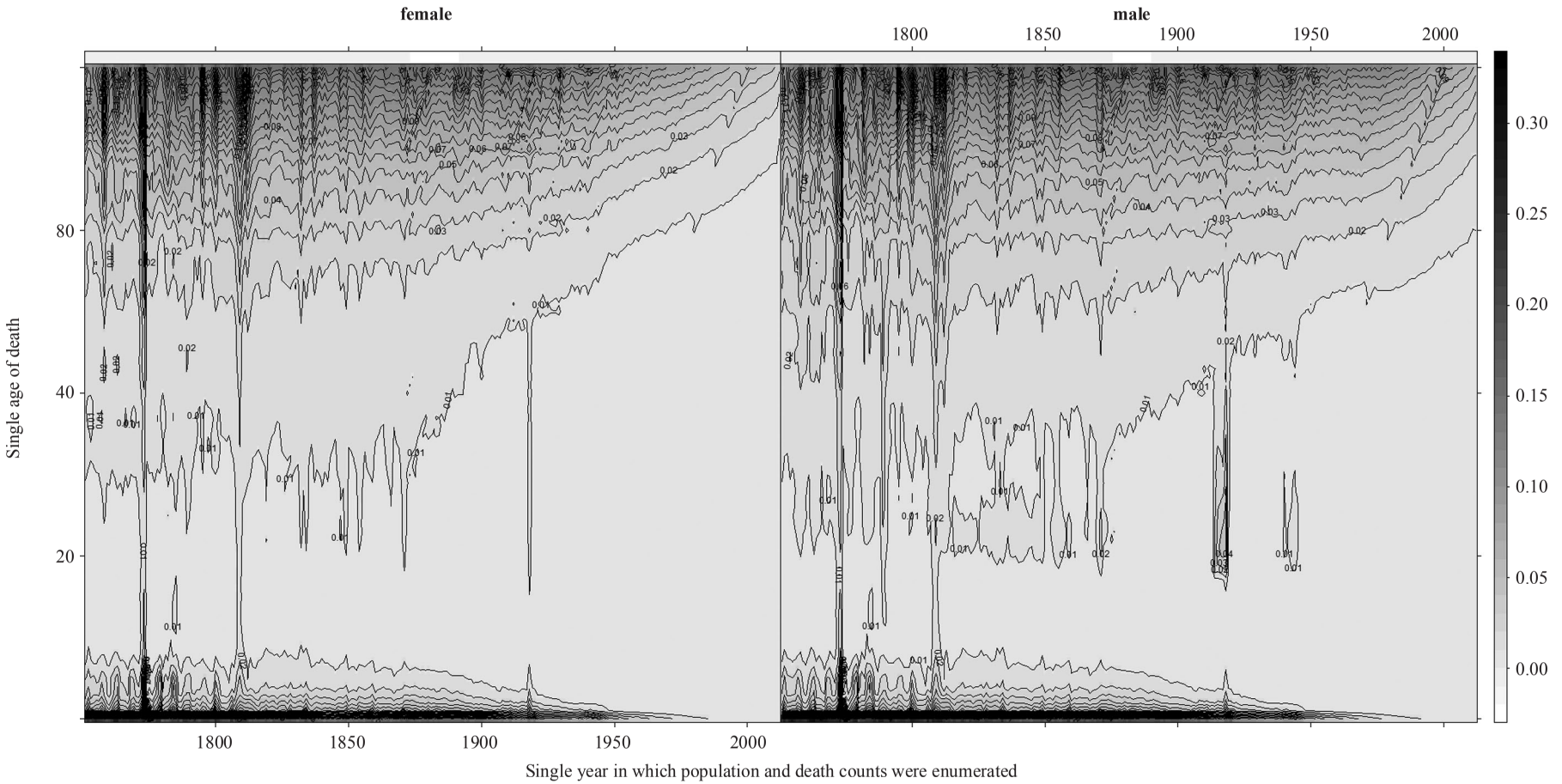

Figure. Probability of mortality in any given year by sex, and single year of age, enumerated Europe, 1751–2011. Darker shades indicate higher mortality rates; the legend on the right shows the correspondence between shade and mortality probability, with 1 corresponding to 100% and 0 to 0%. Contours connect points within the Lexis surfaces where the mortality rates are equal; each contour line is labelled with its corresponding mortality rate. The definition of Europe expands throughout this period as in later years more individual countries' records are available.