Estimates of Regional and Global Life Expectancy, 1800–2001

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SCHOLARS SOMETIMES VENTURE estimates of global average life expectancy in the more distant past, before 1950 and the period covered by estimates from the United Nations, the World Bank, and other agencies (e.g., Preston 1995; Coale 1986).[1] Because historians and demographers have so assiduously collected information about human survival, it is now possible to find a solid enough basis for making quantitative estimates back to 1800. This impressive body of scholarship, which has concentrated chiefly on national populations, provides the basic material for a picture of global change and variations across six regions: Africa, the Americas, Asia, Europe, the former Soviet Union, and Oceania.[2]

Table 1 shows results using two widely consulted sets of population estimates to weight regional and national values by population size. One set of population estimates has been taken from Biraben (1979) updated by Livi-Bacci (1992), and the other from Maddison (2003).[3] Life expectancy estimates have been drawn from some 700 sources, which are listed by country in a bibliography provided separately.[4]

Global life expectancy at birth was about 28.5 years in 1800. Only modest gains occurred into the early twentieth century; those can be attributed in part to more countries beginning health transitions and in part to continuing gains in life expectancy in the countries (principally in Europe) that had begun health transitions earlier.[5] Much more rapid progress occurred after 1913, especially after World War I and the global influenza pandemic— thus from about 1920 to about 1973. In that period global life expectancy advanced at an annual increment of about a half-year gain for each year of calendar time. But the pace of change slowed quickly in the late 1980s and 1990s to an annual increment in life expectancy of only 0.1 year per year

TABLE 1 Estimates of life expectancy before the beginning of the health transition, by region, and of regional and global life expectancy, 1800–2001

Time	Africa	Americas	Asia	Europe	Former Soviet Union	Oceania	Weighted average for globe using Biraben/Livi-Bacci population estimates	Weighted average for globe using Maddison population estimates
Period when earliest health transition in region began	1920s	1820s or 1830s	1870s–1890s	1770s	1890s or 1900s	1860s or 1870s		
Life expectancy before health transition	26.4	34.8	27.5	34.3	29.0	22.5 for the indigenous population; 45.6 for Europeans		
1800				33.3		Excluded[a]	28.5	
1820				35.6		Excluded[a]		29.0
1850		35.1		36.3			29.3	
1870		35.1		36.2		34.7		29.7
1900		41.0	28.0	42.7		47.6	32.0	
1913		45.1	28.1	46.8	34.2–38.6	51.0		34.1
1950	35.6	58.4	41.6	64.7	56.1	63.4		48.0
1973	46.9	66.0	57.5	70.9	68.9	68.2		60.0
1990	52.9	70.8	64.5	74.2	69.1	72.8	65.2	
2001	50.5	73.2	67.1	76.8	66.6	74.6		66.6

[a]Too little information is available to estimate Oceania's population in 1800 or 1820.
SOURCES: Separate bibliography (see endnotes 3 and 4).

of calendar time between 1990 and 2001, roughly equal to the pace that obtained between 1870 and 1900.

For the pre–health transition period for each region, the life expectancy values employed are averages of estimates for the period before the beginning of the transitions for countries within that region. As countries in a region began health transitions, the values used for them switch to life expectancy estimates specific to those countries. Thus for the pretransition period the assumption is made here that the average of all life expectancy estimates of acceptable quality for countries in a region provides the best available gauge of the pretransition average for the entire region. Table 2 shows the number of data points available for each region for estimating life expectancy in the pretransition period, limiting consideration to estimates that refer to an entire country or a large subnational region. For the pretransition period those data points have been aggregated for each region without any weighting within regions. This period has presumably the weakest basis, the largest margin of error, and the simplest method of deriving an estimate.

Many more estimates are available for the pretransition period but go unused here because most of the work scholars have done on that era deals with small geographic areas: parishes, villages, or towns and sometimes also their hinterlands, often producing crude death rates. The values used here are limited to estimates expressed as life expectancies and meant to capture national experience or large regions within a country, such as England, North Italy, and European Russia. Hence, the period during which life expectancy is estimated matters less than the fact that the period precedes the beginning

TABLE 2   Availability of pre–health transition estimates of regional life expectancy

Region	Number of pre-transition estimates	Number of countries represented	Range	Mean	Standard error	Standard deviation	Median	Mode
Africa	12	10	22.5–31.0	26.4	0.86	2.99	25.4	23.9
Americas	165	15	17.3–51.9	34.8	0.49	6.18	34.8	30.2
Asia	31	6	20.2–37.5	27.5	1.04	5.77	25.1	24.6
Europe	391	15	18.0–42.9	34.3	0.21	4.13	34.8	35.4
Former Soviet Union	4	1	26.0–31.5	29.0	1.46	2.91	29.2	—
Oceania[a]	2	2	22.5–45.6					

[a]Estimate of 22.5 is for the indigenous population; 45.6 is for Europeans.
SOURCES: Separate bibliography (see endnotes 3 and 4).

of a country's health transition. For example, Wrigley and Schofield (1989) and Wrigley et al. (1997) provide 80 estimates of life expectancy in England from 1600 through the 1790s, preceding the health transition of England and Wales, which began in the 1800s. Spain's health transition began in the 1890s. Six estimates of life expectancy in that country are available for the period from the 1770s through the 1880s, and because all of those estimates precede the beginning of Spain's health transition, all of them may be deployed in arriving at an estimate of life expectancy for Europe in the pretransition era.

All pretransition estimates available for Africa refer to the period of European control and to lands that were European colonies. Some authorities suggest that survival was higher in the precolonization era, which sometimes means the period before European missionaries began to arrive, in the 1830s and 1840s, and sometimes the period before Arabic-speaking merchants and Muslim agents arrived, which was much earlier. But I found no estimates of life expectancy for large regions for either of those earlier periods.

Health transitions began in different countries in different periods, as early as the 1770s in Denmark and as late as the 1970s in some countries of sub-Saharan Africa. For the era of health transitions, where estimates of life expectancy are much more numerous, my main aim has been to find the most satisfactory estimates available for each country. For regional values from 1800 through 1950, pretransition and transition estimates are mixed, depending on whether a particular country had begun a health transition, and regional and therefore global estimates are weighted by population. National population weights are added as each country began its health transition. For 1950–2001, I have drawn life expectancy estimates chiefly from various sources provided by the United Nations, the World Bank's World Development Indicators, and the Human Mortality Database.

Figure 1 compares world life expectancy estimates from several sources. Estimates ventured earlier in time have usually been lower, whereas recent scholarship has tended to give higher estimates. The curvilinear form of life expectancy change shown in this figure adds support to the argument by Oeppen and Vaupel (2002) that further gains in survival may be anticipated, notwithstanding the effects of HIV/AIDS and tobacco use. But the form of regional and global change in life expectancy, as given by the estimates presented here, indicates that the pace of change has been uneven, with the period of most rapid gains lying in the past. In Europe, for example, annual increments to life expectancy peaked in the period 1913–50. The global results are of course strongly affected by the populations of Asia. Countries with low survival as of 2001 (life expectancy below 60 years) comprise too small a segment of world population to offer the promise of producing gains that match those of 1913–50 or 1913–60, even should HIV/AIDS and other causes of death be quickly subdued.

Table 3 recasts the estimates in Table 1 to show the difference between the highest and lowest regional levels of life expectancy. There was com-

FIGURE 1   World life expectancy estimates compared, 1800–2001
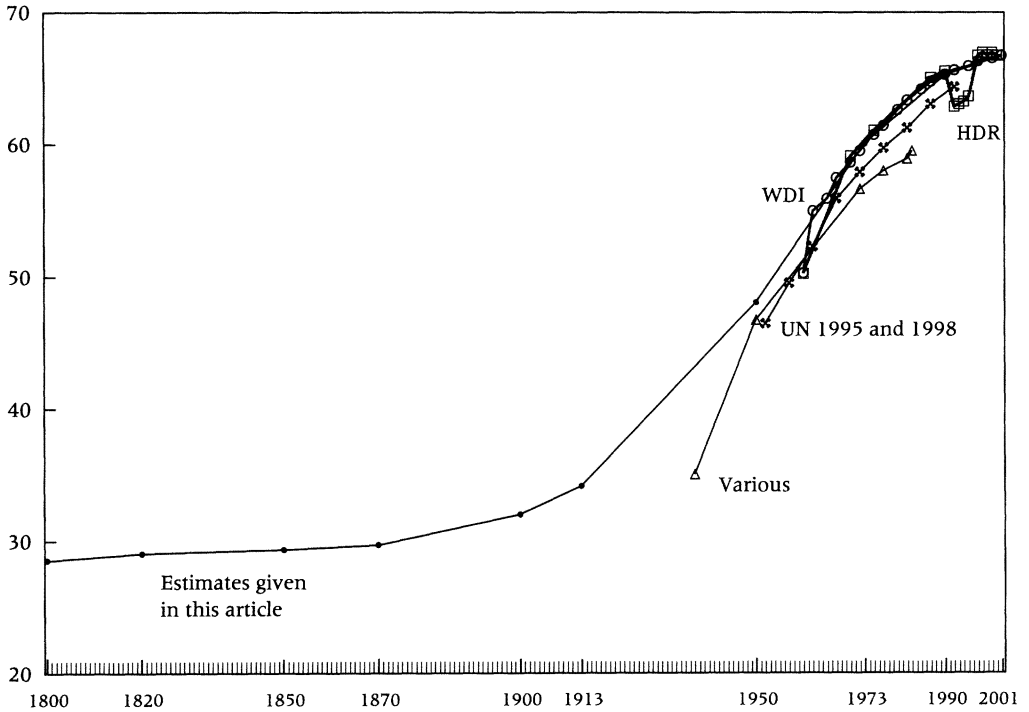
NOTE: HDR = UNDP, *Human Development Report*, various years; WDI = World Bank, *World Development Indicators 2004*.
SOURCES: World Bank 2004; United Nations Development Programme (various years); United Nations 1995, 1998; Siampos 1989, who on p. 424 reproduces without attribution what may be a League of Nations or UN estimate for 1930; United Nations 1975a: 1; 1975b, I: 175; and 1988: 117.

paratively little difference among regions in life expectancy in the period 1800–1820, even though estimates for individual countries suggest quite substantial differentiation in the pretransition era. The gap widened by 1900–1913 and peaked around 1950 before declining. Since the 1970s or 1980s, the gap has again widened.

TABLE 3   Highest and lowest regional life expectancies and the difference, 1800–2001

Period	Highest	Lowest	Difference
1800–1820	35.6	26.4	9.2
1850–70	36.3	26.4	9.9
1900–1913	51.0	26.4	24.6
1950	64.7	35.6	29.1
1973	70.9	46.9	24.0
1990–2001	76.8	50.5	26.3

SOURCES: Separate bibliography (see endnotes 3 and 4).

Conclusion

According to the estimates provided here, global life expectancy at birth rose along a curvilinear path from about 28.5 years in 1800 to about 66.6 years in 2001. Some 30 countries initiated sustained gains in survival before the 1920s, and global life expectancy rose only slowly up to 1913 while the gap between the highest and lowest regional life expectancies rose sharply, peaking around 1950. Gains were rapid and widely shared during most of the twentieth century, up to about 1990 when especially the effects of HIV/AIDS led to a widening gap between countries and regions with lowest and highest life expectancy.

Notes

This article and the associated bibliography are dedicated to the memory of George Stolnitz (1920–2001), a former colleague at Indiana University who published a formative article on global mortality patterns and who saw to it that the IU library collected most of the material on which this article is based.

1 Preston (1995: 30) estimates global life expectancy at birth before 1600 at 20 to 30 years in all regions. Coale (1986: 23) estimates life expectancy in Europe before the demographic transition at 20 to 30 or 35 years.

2 The individual countries included are those that had populations in 2000 of at least 400,000, plus Iceland. Smaller countries have been excluded chiefly because of the difficulty of finding estimates for life expectancy before the 1940s. For 2001 the population included in the estimates is 99.6 percent of the total midyear world population.

3 I have used Maddison's national population estimates for each year from 1820. In cases where he does not supply estimates, I have taken those from other sources listed in the Bibliography of works providing estimates of life

expectancy at birth and estimates of the beginning period of health transitions in countries with a population in 2000 of at least 400,000 (see endnote 4). The former Soviet Union is included as a distinctive region because both Biraben and Maddison estimate population separately for that region. Too little information is available to venture estimates for Oceania's population in 1800 or 1820.

4 Because of its length, this bibliography is furnished separately and on the web. Go to «www.lifetable.de/RileyBib.htm». Readers are invited to identify additional sources that may also supply information about the initiation of a country's health transition and life expectancy before and after the beginning of that transition. Please contact the author of this article «rileyj@indiana.edu».

5 The term health transition describes the persistent welfare gains in lower mortality and higher survival that have occurred in all countries and distinguishes those gains from a pretransition period in which survival varied but did not show a long-run trend.

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