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

Compiled by James C. Riley
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Introduction


Scholars may find this list useful as a starting point for research into the history of survivorship in individual countries. On that matter there is still much to be learned, especially for countries outside Western Europe. But my particular hope is that these sources, and others that may be added to this list, will stimulate work on the comparative history of survivorship and factors that advanced or retarded gains in life expectancy in groups of countries or among all countries. There is much yet to be learned about why so many countries still lag in life expectancy, and about why some subpopulations within high survival countries do not enjoy the same advantages in survival as more favored groups.

My initial goal in consulting these sources was to identify all the countries that could be considered to combine high life expectancy with low income levels, and to build a picture of life expectancy change over time in those countries. That work led me to study life expectancy gains in Jamaica, a country not previously considered to have combined good health and low income, and to write a book-length study of a dozen countries that share the experience of making rapid and impressive gains in life expectancy before becoming either middle or high-income lands.1

The research was eased and simplified by two things. First, the late George Stolnitz, in cooperation with Indiana University librarians, had assembled a rich collection of material on mortality that was readily available to me. Second, electronic bibliographic tools simplify the search for books and essays. I am grateful for the cooperation of IU librarians in obtaining additional material not already in our collections.

Yet I have no doubt that this bibliography is incomplete. The directors of the Human Life-Table Database, who agreed to provide a home for this list, have consented also to let me make additions as readers alert me to sources that should be included. Please send suggestions to me at rileyj@indiana.edu, or to me at this address: History Department, Indiana University, Bloomington, IN 47405, USA.

The table of contents reveals the organization of this list. A brief summary of each country's history of survivorship precedes the list of sources used to build that

1 James C. Riley, Poverty and Life Expectancy: The Jamaica Paradox (Cambodge, 2005). A manuscript dealing with twelve countries is now under review.
picture and to assemble the quantitative evidence behind the two essays mentioned above. These summary histories focus on identifying the period during which a country began its health transition, a term used here to describe persistent and sustained but not uninterrupted gains in life expectancy. Those beginning periods and the levels of life expectancy in them are summarized in Appendix 1 of "The Timing and Pace of Health Transitions around the World." The countries themselves have been grouped in five regions: Africa, the Americas, Asia, Europe, and Oceania.

Reconstructions of life expectancy often disagree with one another. The different methods that demographers have used sometimes produce conflicting results, the quality and quantity of statistical data available for examination varies, and expectations differ. Researchers working in roughly the period 1950-1975 apparently expected to find lower levels of life expectancy in the past and present than researchers working in more recent years. In deciding which life expectancy estimates to use, I have often taken more recent work to supersede earlier work. That approach biases estimates upward, especially for the years since about 1950. Since so many agencies provide estimates of life expectancy for the period since 1950, I concentrated my search for sources on the earlier period, and especially on the periods during which each country's health transition might have begun. I accepted and have used World Bank and UN estimates of life expectancy since 1950 for countries for which there is little reliable evidence, but I suspect that those estimates are often too high.

Sometimes it proved impossible to choose between two or more versions of the life expectancy history of a country. Those cases are mentioned in the brief summary histories of each country.

For countries for which quantitative evidence is limited, it is often difficult to make firm estimates of life expectancy or to specify the period when the health transition began. Readers will notice that I have often used an estimate above 30 years to suggest that gains in survival may have begun in an earlier period. That is, of course, a rough estimate; when made it assumes that a country belongs to the large group of pre health transition countries with comparatively low life expectancy, between 20 and 30 years, rather than to the small group of countries known to have had expectancies above 30 years for much of the pre transition era.

This list includes sources for the estimates that I did not adopt. Thus any researcher can test my conclusions and choices by going back over the same material I examined. I hope this bibliography will prove useful for that purpose, as a convenient place to begin research on the history of life expectancy, and as a stimulus to the comparative study of controlling hazards to survival.
abstracts:

"Estimates of Regional and Global Life Expectancy, 1800-2000"

Historians and demographers have gone to considerable trouble to reconstruct life expectancy in the past in individual countries. This essay collects information from a large body of that work and links estimates for historical populations to those provided by the United Nations, the World Bank, and other sources for 1950-2001 to produce a picture of regional and global life expectancy at birth for certain years from 1800 to 2001.

"The Timing and Pace of Health Transitions around the World"

This essay assembles estimates from some 700 mostly national studies of survival in the past to create a broad picture of regional and global life expectancy gains across space and time, and to examine some implications of that picture. At the initiation of their health transitions most countries had a life expectancy between 25 and 35 years. Counties that began later made gains at a faster pace, which is well known. Those faster gains are usually associated with the dissemination of western medicine. But rapid gains occurred in the period 1920-1950, largely before the availability of antibiotics or the modern vaccines. Especially rapid gains came in the years immediately after World War II in countries where the leading causes of death were communicable diseases that could be managed with antibiotics as well as in countries where the leading causes of death were degenerative organ diseases. Both periods of rapid gain await satisfactory explanation.

Acknowledgments: This work was a byproduct of research supported by the National Endowment for the Humanities, the Agency for Healthcare Research and Quality, the Council for International Exchange of Scholars under its New Century Scholars program, and Indiana University. I am grateful for that support and for the assistance with translations given by a number of scholars and graduate students. I am grateful also to the editors at Population and Development Review for finding a home for this list of sources, and to Vladimir Shkolnikov and John Wilmoth, directors of the Human Life-Table Database, for providing that home.
Sources used repeatedly, with abbreviations:


HMD  The Human Mortality Database at www.mortality.org


AFRICA

Algeria

Kateb (1998) reports survival improving among Europeans in Algeria from the 1890s. Enquête (1980) finds mortality in decline from the beginning of the 20th century. Negadi, Tabutin, and Vallin (1974) and Condé (1973) suggest decline as early as the 1920s. But Vaidyanathan and Al-Baradie (1982) and Fargues (1986) trace mortality decline to the period after World War II. Estimates of crude death rates provided by Negadi, Tabutin, and Vallin indicate that the health transition probably began in the 1930s, when life expectancy was about 31.2 years, but was interrupted by European armies fighting in Algeria during World War II and again in 1956-60 by the Algerian war. In each case the mortality decline seems to have resumed at or toward the level achieved before the interruption, which is an important clue that gains began earlier.

UNDYHS; WDI 2002; UN#55; Condé 1973; B'Chir and Tabutin 1980


Angola

Carvalho (1979) estimates life expectancy for Africans (98% of the populace) in 1940 at 27 years. That and UN estimates suggest that sustained improvements in life expectancy began in the 1940s or 1950s, probably in the late 1940s. Life expectancy peaked in the early 1990s, and then declined.

UNL&T1982; WDI 2002; UNDYHS


**Benin**
Available estimates (UNDYHS; UN#55) are consistent enough to locate the starting point for gains in survival in the late 1940s or 1950s, and to give a beginning level of about 31 years. Life expectancy peaked around 1997 at some 53.4 years and has since retreated.

UN#55; WDI 2002; UNDYHS

**Botswana**
The earliest estimates of life expectancy are for the 1950s from the UN, and they differ markedly, ranging for the early 1950s from 33.4 to 42.5 years, with more recent publications favoring the higher value. Whichever one may be preferred, the starting point for the health transition and for improvements in infant mortality will be the 1940s or 1950s. Later estimates of both remain problematic. Life expectancy peaked in the early 1980s at 60 to 61 years and has since declined disastrously.

UN#55; WDI 2002; UNDYHS

**Burkina Faso**
UN estimates of life expectancy in the early 1950s, at 31 to 33.2 years, suggest that survival gains for the overall population began in the late 1940s or 1950s.

Brass et al. 1968; UN#55; UNDYHS; WDI 2002

**Burundi**
UN estimates of life expectancy in the early 1950s, at 31.3 to 37.5 years, differ sharply but nevertheless suggest that survival gains began in the late 1940s or 1950s.

UN#55; UNDYHS; UNL&T1982; WDI 2002

**Cameroon**
UN estimates of life expectancy in the early 1950s, at 33.5 to 36 years, suggest that survival gains began in the late 1940s or 1950s. The estimates for 1930-32 from Ayeni (1976) are for South Cameroon only.

UN#55; UNDYHS; WDI 2002

Lantum, Dan N. 1983. *Demographic Transition of Cameroon between 1900 and 1982 with Special Reference to Natality and Mortality.* Yaounde.

**Cape Verde**

The UN estimate of life expectancy for the early 1950s (48.5 years) is high enough to suggest that gains started as early as the 1930s.

UNDYHS; UNSDiv


**Central African Republic**

UN estimates of life expectancy in the early 1950s, at 33 to 35.4 years, suggest that survival gains began in the late 1940s or 1950s. Life expectancy peaked at about 47.6 years in the period 1987-1992, then declined.

UN#55; UNDYHS; WDI 2002

**Chad**

UN estimates of life expectancy in the early 1950s, at 31.3 to 32.5 years, suggest that survival gains began in the late 1940s or 1950s. Life expectancy peaked at about 48.5 years in the 1990s, then declined.

UN#55; UNDYHS; WDI 2002

**Comoros**

The UN estimate of life expectancy for the early 1950s (40 years) is high enough to suggest that gains started in the 1940s or 1950s.

UN#55; UNDYHS; UNSDiv; WDI


**Congo Democratic Republic**

Estimates of life expectancy (38.5 to 39 years) for the early 1950s suggest that mortality decline began in the 1930s or 1940s. But there is little reliable information. Life expectancy peaked around 1992 at 51.7 to 52 years and then declined.
Congo Republic

UN estimates of life expectancy (33.5 to 38.6 years) in the early 1950s suggest that mortality decline began in the 1940s or 1950s, but there is little reliable information. Life expectancy peaked around 1987 at 51 to 52 years and then declined.

Cote d’ivoire

UN estimates of life expectancy (33.5 to 36 years) in the early 1950s suggest that mortality decline began in the 1940s or 1950s, but there is little reliable information. Life expectancy peaked around 1987 at 51 to 52.2 years and then declined.

Djibouti

A UN estimate of life expectancy (33 years) in the early 1950s suggests that mortality decline began in the 1940s or 1950s, but there is little reliable information. Life expectancy peaked around 1997 at 50.3 years and then declined.

Egypt

Some authorities have located the beginning of the health transition in the late 1940s, or specifically in 1946, or in the 1950s (Omran, 1966; Askar, 1982; El-Badry, 1965; Grais et al., 1956), often using official estimates that understate mortality. Recast estimates of infant mortality, crude death rates, and life expectancy indicate that gains began earlier, in the 1930s when life expectancy at birth was 30 to 33 years, but were then interrupted by World War II (Fargues, 1986; Bucht and El-Badry, 1986). It may be that those gains should be associated with public health improvements in the 1930s (Francis, 1949).


**Equatorial Guinea**

A UN estimate of life expectancy (34 years) in the early 1950s suggests that mortality decline began in the 1940s or 1950s, but there is little reliable information.

UNDYHS; WDI 2002

**Eritrea**

A UN estimate of life expectancy (35.9 years) in the early 1950s suggests that mortality decline began in the 1940s or 1950s, but there is little reliable information.

UNDYHS; WDI 2002

**Ethiopia**

UN estimates of life expectancy in the early 1950s (31 to 32.9 years) suggest that mortality decline began in the 1940s or 1950s, but there is little reliable information before the 1984 census (Adugna, 1987). Life expectancy peaked around 1992 at 45.3 to 47.5 years.

UN#55; UNDYHS; WDI 2002

**Gabon**

François (1975) dates mortality control efforts from the 1950s, but UN estimates suggest the possibility that gains in life expectancy began in the 1940s. Life expectancy, some 31.3 years around 1950, has continued to rise and infant mortality to decline into the 21st century.

UN#55; UNDYHS; WDI 2002; WDI 2004

**Gambia**

UN estimates of life expectancy in the early 1950s (30 to 33.5 years) suggest that mortality decline began in the 1940s or 1950s, but there is little reliable information. Using census estimates, Williams et al. (1980) report higher infant mortality and lower life expectancy for 1973 than either the UN or the World Bank. Life expectancy has continued to rise into the 21st century.

UN#55; UNDYHS; WDI 2002; WDI 2004

**Ghana**

Engman (1986) and Caldwell (1967b) trace the beginning of the health transition to the early 20th century, probably the 1920s, and Caldwell gives an estimate of life expectancy in 1921, at 28 years, that is high enough to allow the possibility of an even earlier beginning. By 1948-1960 Ghana had nearly the highest life expectancy in sub-Saharan Africa, and also higher incomes and more effective government activity, although most of the high survival and prosperity was to be found in the south.

UNDYHS; WDI 2002
Guinea

UN estimates of life expectancy in the early 1950s (31 to 31.3 years) indicate that improvements began in the late 1940s or 1950s. However, a French survey done in 1954-55 reported significantly lower life expectancy, at about 27 years, and a crude death rate of about 40 per 1000 (France, 1959). According to the UN, life expectancy continued to rise into the 21st century.

Condé 1973; UN#55; UNDYHS; UNL&T 1982; WDI 2002; WDI 2004

Guinea Bissau

UN estimates of life expectancy in the early 1950s (28 to 32.5 years) indicate that improvements began in the late 1940s or 1950s. According to the UN, life expectancy continued to rise into the 21st century.

Brass et al. 1968; UN#55; UNDYHS; WDI 2002; WDI 2004

Kenya

Condé (1973) speculates about survival in the 1920s and 1930s in a way that suggests life expectancy began to rise in the 1930s, which is plausible in light of the development of medicine and public health in this British colony (Beck, 1970; Ndege, 2001). Life expectancy was about 23.9 years in the 1930s.

Condé 1973; UN#55; UNDYHS; WDI 2002
Lesotho

UN estimates of life expectancy in the early 1950s (35.9 to 39.5 years) are high enough to suggest that improvements began in the 1940s, or perhaps earlier. Life expectancy peaked around 1992 and by 2000-2005 had dropped to only 34.9 years (UNSDiv).

UN; UNDYHS; UNSDiv; WDI 2002

Liberia

UN estimates of life expectancy in the early 1950s (34.5 to 37.4 years) are high enough to suggest that improvements began in the 1940s or 1950s. But Campbell (1981) prefers lower estimates for the 1960s. According to the World Bank, life expectancy peaked around 1987 at 53.5 years but then persistently dropped for the remainder of the century.

UN; UNDYHS; WDI 2002

Libya

Life expectancy may have begun to improve as early as the 1930s, but the censuses of 1931 and 1936 are too poor in quality to establish mortality levels. The UN estimate of life expectancy in the early 1950s, at 42.9 years, is high enough to suggest that gains began in the 1930s or 1940s.

B’Chir and Tabutin 1980; UN; UNDYHS; WDI 2002

Malawi

UN estimates of life expectancy in the early 1950s (33.5 to 36.2 years) are high enough to suggest that improvements began in the 1940s or 1950s. Life expectancy peaked in the late 1980s at 45.8 years, but has since declined.
Mali

UN estimates of life expectancy in the early 1950s (32.5 to 33.5 years) are high enough to suggest that improvements began in the 1940s or 1950s. Life expectancy peaked in the late 1980s at 46.5 years, but has since declined.

Mauritania

UN estimates of life expectancy in the early 1950s (33.5 to 35.5 years) are high enough to suggest that improvements began in the 1940s or 1950s.

Morocco

Little reliable information is available for any period before 1960, when there was a good quality census and by which time life expectancy at birth was about 47 years (Morocco, 1997). Ibrahim (1980) dates the decline of mortality from about 1910 beginning in urban areas with better medical services; Vaidyanathan and Nawar (1982) date it from 1940; and Johnson (1980) traces the decline to 1945-46. Life expectancy probably began to rise and infant mortality to decline either in the 1930s or in the postwar 1940s.

Mozambique

UN and World Bank estimates suggest that survival began to improve in the 1940s or 1950s (life expectancy in the early 1950s was about 33.5 years). But Kjolhede and Oliver (1992) maintain that there was little change in 0-5 mortality until the 1970s.
expectancy reached 44.4 years around 1982 but then fluctuated and, in the late 1990s, declined.

UN#55; UNDYHS; WDI 2002

Namibia

Notkola and Siiskonen (2000) suggest a decline in mortality among Evangelical Lutherans in Ovamboland from the 1930s or 1940s. UN estimates of life expectancy in the early 1950s range from 31.3 to 38.7 years, which is wide enough to accommodate the idea that gains began in the 1930s or 1940s. Life expectancy peaked around 1992 at 58.5 years.

UN#55; UNDYHS; WDI 2002

Niger

UN estimates of life expectancy in the early 1950s (33 to 33.5 years) are high enough to suggest that improvements began in the 1940s or 1950s.

UN#55; UNDYHS; WDI 2002

Nigeria

UN estimates of life expectancy in the early 1950s (31.3 to 36.5 years) are high enough to suggest that improvements began in the 1940s or 1950s. Life expectancy peaked around 1997 at just over 50 years and then declined.

UN#55; UNDYHS; WDI 2002
**Rwanda**

Niyibizi (1982) reports that survival began to improve in the 1930s as Belgian colonial authorities built a public health infrastructure, the crude death rates dropping to about 30 per 1000 by 1952. Meheus and Bizimungu (1982) find little improvement between 1952 and the 1970 demographic survey, which reported a CDR of 22 in a much younger population; even the 22 per 1000 estimate may be too low. UN estimates of life expectancy in the early 1950s range from 33.5 to 40.0 years. While WDI 2002 estimates life expectancy in 1970 at 44.5 years, Meheus and Bizimungu prefer 39. Life expectancy rose sharply during the 1970s and early 1980s, reaching a peak around 1987 (at 48.3 years) but then fell abruptly during the massacres of 1994.

UN#55; UNDYHS; UNL&T1982; WDI 2002


**Senegal**

Pison et al. (1995) report from official statistics that mortality began to decline in the 1910s in Dakar and Saint-Louis. Sankalé and Pène (1960) find mortality decline in the same two cities from the period 1925-35. Condé (1973) suggests gains in life expectancy from the 1930s, but without identifying sources. UN estimates of life expectancy in the early 1950s, at 33.5 to 36.5 years, likewise suggest an earlier beginning. Garenne, Cantrelle, and Diop (1985) report that improvements in infant mortality and life expectancy at the national level began in the 1940s.

Condé 1973; UN#55; UNDY1967; UNDYHS; WDI 2002


**Sierra Leone**

Tekse (1975) considers the possibility of mortality decline beginning in the 1930s but settles on the late 1940s as the likelier beginning point. This is consistent with UN estimates of life expectancy in the early 1950s, at 30 to 33.5 years. Gains in life
expectancy have been uneven, leaving the country at 39.2 years in 2000, that dropping to a UN estimate of 34.3 years in 2000-2005.


**Somalia**

UN estimates of life expectancy in the early 1950s (33 to 33.5.5 years) are high enough to suggest that improvements began in the 1940s or 1950s.

**South Africa**

According to official figures, life expectancy began to rise for whites before the 1920s and for coloreds and Asians by the 1920s or 1930s (Van Tonder and van Eeden, 1975). Less information is available for the majority black population, but separate estimates for the African population in 1935-40, at 38.1 to 40 years, are high enough to suggest that life expectancy began to rise in the 1920s or 1930s (Van Tonder and van Eeden, 1975; Sadie, [1972]). Thus gains for the country as a whole began in the 1920s or 1930s. Life expectancy peaked around 1992 at about 62.9 years and then declined.

**Sudan**

Bell (1996) suggests that smallpox vaccination and sulfa drugs may have initiated a mortality decline in the 1930s, but very little information is available about actual levels of mortality. UN estimates of life expectancy in the early 1950s suggest an early beginning to decline because they are surprisingly high at 37.7 to 38.6 years. Zachariah and Soliman’s (1970) estimate for 1955-56, at 42.9 years, is higher still. Sustained improvements in life expectancy and infant mortality probably began in the 1930s or 1940s.

**Swaziland**

UN estimates of life expectancy in the early 1950s (33.4 to 35.6 years) are high enough to suggest that improvements began in the 1940s or 1950s. Life expectancy peaked in the mid 1990s and then began a rapid decline to a UN estimate of 34.3 years in 2000-2005.

UN#55; UNDY1967; UNDYHS; WDI 2002

**Tanzania**

Incomplete data suggest that life expectancy began to rise in the 1940s or 1950s. The UN estimate of life expectancy in 1950 at 34.2 years is consistent with successive estimates provided by Egerö and Henin (1973), Henin (1979), and Kamuzora and Komba (1991) for 1957, 1967, and 1973. Life expectancy peaked around 1987 at 51.0 years.

UN#55; UNDY1967; UNDYHS; WDI 2002


**Togo**

UN estimates of life expectancy for the early 1950s (31.3 to 36 years) are high enough to suggest that improvements began in the 1940s or 1950s. Life expectancy peaked around 1987 at 51.4 years.

UN#55; UNDYHS; UNL&T1982; WDI 2002


**Tunisia**

According to estimates of life expectancy provided by Condé (1973), overall mortality began to decline in the 1920s from a beginning level of some 28.8 years. B’Chir (1981) and B’Chir and Tabutin (1980) detect decline before World War II, as does Seklanie (1967-68), but all are indefinite about a beginning period. Correcting for underregistration of deaths, Waltisperger et al. (2001) adjust Seklanie’s estimates of life expectancy and infant mortality downward, but not so far down as to exclude the possibility of gains in survival before World War II. Tunisia’s health transition is estimated to have begun in the 1920s.

Condé 1973; B’Chir and Tabutin 1980; UN#55; UNDYHS; WDI 2002


Seklani, Mahmoud. 1967-68. La mortalité et le coût de la santé publique en Tunisie depuis l’après-guerre. 2 vols.; Tunis.


**Uganda**

Following Condé’s (1973) estimates, life expectancy began to rise in the 1930s from a beginning level of some 23.9 years. It peaked between 1977 and 1982, declined to 42.1 years in 2000, and then began to rise again.

Condé 1973; UN#55; UNDYHS; WDI 2002

Langlands, B.W. 1970. The Demographic Condition of Uganda as a Developing Country. Kampala.

Miller, Norman N. 1971. The Dynamics of Population in Uganda. Hanover, NH.

Zambia

Estimates made by Hill (1985) and the UN (the latter at 36 to 37.8 years in the early 1950s) suggest that life expectancy began to rise in the 1940s or 1950s, peaked around 1982, and then faltered, falling from a high of 51.2 years in 1982 to no more than 38.0 years in 2000 and to 32.4 years in 2000-2005.


Zimbabwe

Condé’s (1973) estimates suggest that life expectancy began to rise in the 1930s or 1940s from a level in the mid 1930s of 26.4 years. UN and WDI 2002 estimates show that it peaked around 1987 and then fell from a high of 56.9 years in 1987 to 39.9 years in 2000 and then to 33.2 years in 2000-2005.

Condé 1973; UN#55; UNDYHS; UNSDiv; WDI 2002
AMERICAS

Argentina

Somoza (1971a, 1971b, and 1973) and Pérez Brignoli (1989) provide estimates that suggest that life expectancy began to rise in the period 1895-1905 from a level of some 33.3 years. Estimates for later years, from UNDYHS and WDI 2002, appear to confirm this picture by closely matching the development of life expectancy over time estimated by Somoza and Pérez Brignoli.

Pérez Brignoli 1989; UNDY1967; WDI 2002

Bolivia

Estimates of life expectancy for the 1950s from Bartlema et al. (1985) and various UN sources, which range from about 38 to 49.7 years, are high enough to suggest that improvements began in the 1930s or perhaps the 1940s.

UN#55; UNDYHS; WDI 2002

Brazil

Estimates of infant mortality and life expectancy for Brazil in the period before 1950 fall into two groups. One suggests comparatively favorable survival in the late 19th and early 20th century and slight but noticeable gains from the late 19th century forward. Thus Smith (1946) and Martin and Camargo (1984) provide estimates of crude death rates that show mortality in decline from the latter part of the nineteenth century. Mortara’s (1941, 1954-55) estimates for 1870-1890 and later periods are in agreement with this picture.
Arriaga (1968 and 1970) also suggests life expectancy gains from the 1890s and from lower levels. In the other approach Carvalho (1973) suggests lower survival in the earlier period and a deferral of gains until the 1920s or 1930s, with faster gains once the transition was underway. Because the estimates of infant mortality from Smith and Martin and Camargo appear to be unrealistically low, due to defects in official population estimates and vital statistics underregistration, and because there are no strong explanations for why survival should have improved in the late 19th or early 20th century, I have adopted the second group’s position.

Castro-Santos (1987) reports crude death rate series for some cities that begin in the late nineteenth century, describing the rates for Rio de Janeiro as the most reliable. Those suggest decline from as early as the 1890s even though Castro-Santos finds that mortality did not begin a persistent decline in Rio and São Paulo until the 1920s and in Brazil as a whole until the 1930s. Thus it may be that the early decline school has been influenced by conditions in the major cities.
da Dinâmica da População do Brasil nos Últimos Cem Anos,” Revista Brasileira de Estatística 2: 267-76.


Canada

Bourbeau and Légaré (1982) find that mortality decline was underway in Canada in the 1830s, the earliest decade for which they supply an estimate, from a beginning level of some 39 years. They report also that survival in Quebec very slightly surpassed that in Canada as a whole. Gains were slow until the 1890s

HMD


Chile

Although some authorities (e.g., Gutiérrez Roldán, 1975) have suggested an earlier beginning, most locate the initial rise in life expectancy in the 1920s (Cabello, 1955-56; McCaa, 1978; Pérez Brignoli, 1989; Tacla Chamy, 1975; Mamalakis, 1980; and United States, 1943). The beginning level was some 31.6 years.

Arriaga 1968; Pérez Brignoli 1989; UNDYHS; UNSDiv; WDI 2002


Gutiérrez Roldán, Hector. 1975. La Población de Chile. [Paris].


**Colombia**

Colombia lacks reliable data until about 1960, and authorities have differed in estimating mortality levels and the timing of transitions. Flórez and Méndez (2000) indicate that life expectancy began to rise in the 1930s, or possibly the late 1920s. This is plausible for timing, but their early estimates of life expectancy (40.0 years centered on 1928) may be too high and of infant mortality (183.3 per 1000 centered on 1928) too low. Lopez Toro (1968) estimates life expectancy at 43.8 for females and 40.0 for males across the period 1938-51. Zlotnik (1982) following Arriaga (1968) prefers estimates that suggest that life expectancy began to rise in the first decade of the 20th century. The estimate adopted is that survival began to improve in the 1930s from a beginning level within the range 32 to 40 years.

Arriaga 1968; UNDYHS; UNSDiv; WDI 2002


**Costa Rica**

Costa Rica’s health transition began between the latter decades of the nineteenth century and the 1920s. The two leading experts, Luis Rosero Bixby and Héctor Pérez Brigncoli, offer incompatible estimates of infant mortality and life expectancy for the period from the 1860s to about 1900. According to Rosero and Caamaño (1984) and Rosero (1985) mortality may have declined as early as the 1870s but certainly decreased in the 1890s, then changed little, rising slightly, until the 1920s when the decline resumed. According to Pérez Brigncoli (1989), life expectancy was unusually high in the 1860s and 1870s and then declined to around 32 years until the 1920s, when sustained gains began.

Arriaga 1968; Pérez Brignoli 1989; UNDYHS; UNSDiv; WDI 2002


Cuba

For Cuba there is a possibility that life expectancy gains began in the 1880s but were interrupted in a devastating way during the Spanish-American War. Garcia Quiñones (1996) reports Gonzalez Quiñones’ unpublished 1994 inverse projection estimates for 1799-1959, which suggest this pattern. Authorities agree that life expectancy rose from around 1900 and a beginning level within the range 33.1 to 38.4 years. At first gains came slowly but then at a rapid pace from about 1925 to 1975.

Pérez Brignoli 1989; UN#55; UNDYHS; UNSDiv; WDI 2002

Dominican Republic

Life expectancy began to rise and infant mortality to decline in the 1930s or 1940s, more probably in the 1930s, and rose quite rapidly in the 1950s and 1960s (Arriaga, 1968; Ramírez, Duarte, and Gómez, 1986; and Ramírez et al., 1988). The beginning level was about 29.9 years.

Arriaga 1968; UN#55; UNDYHS; WDI 2002
**Ecuador**

Delaunay (in Delaunay, León, and Portais, 1990) dates the beginning of a decline in crude death rates from the 1920s. Uquillas (1976), reporting corrected estimates, finds that the crude death rate was significantly lower in 1950 than it had been in 1920 or 1925. Ecuador’s health transition began in the 1930s or 1940s. No estimates were found for the beginning level. In the 1950s survival remained one of the lowest in Latin America.

UN#55; UNDYHS; WDI 2002
_Ua Mortalidad y las políticas de salud en el Ecuador_. 1985. Quito.

**El Salvador**

Barón Castro (1978) reports that crude death rates began to decline in the 1920s. But the earliest estimate for life expectancy, at 28.7 years in 1930, is still low (Arriaga, 1968). The UN estimate of life expectancy in 1949-51, at 51.1 years, indicates substantial interim gains for infants and the overall population beginning in the 1930s or 1940s.

Arriaga 1968; UN#55; UNDYHS; WDI 2002

**Guatemala**

Early’s (1982) adjusted CDR estimates indicate that mortality began to decline in the 1930s from a beginning level of some 25.8 years. This agrees with Arriaga’s (1968) estimates of life expectancy and infant mortality. (Arias de Blois (1976) provides official estimates of CDR from 1920-24 and infant mortality from 1915-19, in both of which deaths are underregistered.) Gains were especially rapid in the 1940s and 1950s (UNDYHS; Chackiel, Hill, and Isaacs, 1985).

Arriaga 1968; UN#55; UNDYHS; WDI 2002
Washington.

**Guyana**

Life expectancy began to rise in the early 1920s (Mandle, 1970; Smith, 1962; Taeuber, 1952) from a 1911 level of some 31.1 years. Gains in the period since independence have been meager, and may have been interrupted by an early reversal of trend. According to the World Bank, life expectancy peaked around 1992 and then declined.

UN#55; UNDYHS; WDI 2002
*Demography* 7: 301-15.

**Haiti**

Life expectancy probably began to rise and infant mortality to decline in the late 1940s or 1950s, but the various authorities (Arriaga 1968; UN#55; UNDYHS; and WDI 2002) offer conflicting estimates of its level around 1950. Hobcraft (1978) points out the paucity of reliable information for any period before the 1971 census. Life expectancy peaked around 1997 and then began to decline.

Arriaga 1968; UN#55; UNDYHS; WDI 2002

**Honduras**

Although there are few reliable estimates of age-specific mortality as late as the 1970s, Honduran gains in survival appear to have begun in the 1930s or 1940s from a 1930 level of some 33.9 years. Hill (1980) notices rapid progress in the period 1950-1961, while estimates of life expectancy in the early 1950s, such as Camisa and Rincón's (1981) at 42.2 years, give a level that suggests earlier progress.
Jamaica

Life expectancy began a sustained rise in the 1920s from a 1921 level of 37 years (Riley, 2005). From the mid 1920s into the 1950s Jamaica had a particularly rapid pace of gain.

Mexico

McCaa (2000) reports a gain in life expectancy of “as much as 5 or 10 years” during the nineteenth century, rising to perhaps 30 years around 1900 from a level at or below 20 years in 1800. Alba (1982) argues that “health conditions began to improve after 1860,” which is also the decade cited by Cook and Borah (1974-79). Arriaga (1968) suggests gains from the latter 1890s. Estimates from Mier y Terán and Collver, reported by Pérez Brignoli (1989) and Camposortega (1992), are consistent with this interpretation, although these series do not begin until 1895-1900. But the series estimated by Bravo Becherelle, Jimenez Reyes, and Jimenez Reyes (1958), which opens in 1893, shows life expectancy at birth between 23.3 and 29.5 years in the period 1893-1900, which may be too low to accommodate sustained gains from an earlier period. These estimates suggest that gains began instead in the 1900s. It is difficult to narrow these estimates down further than to say that life expectancy began to rise between the 1860s and the 1900s. Improvements in survival were interrupted during 1910-20 by civil war and the influenza epidemic, but resumed in the 1920s and came at a fast pace between 1925 and 1960.

[References]

Arriaga 1968; Pérez Brignoli 1989; UN#55; UNDY1967; WDI 2002


Nicaragua

Life expectancy began to rise in the 1930s or 1940s, more probably the 1930s. The 1921 level has been estimated at 24.4 years.

Arriaga 1968; UN#55; UNDYHS; WDI 2002

Donahue, John M. 1986. The Nicaraguan Revolution in Health: From Somoza to the Sandinistas. South Hadley, MA.


Panama

Chamberlain (1929) shows that the crude death rate in Panama City and Colon fell sharply from 1909 to the 1920s, as it did also in the Canal Zone, inhabited mostly by workers from the US and the West Indies. National estimates, available from 1930, show life expectancy at 35.9 years and rising, and infant mortality in decline from the 1920s. Even though only about 20 percent of the population lived in the two leading cities, it is plausible to infer that a sustained rise in life expectancy began in the 1910s.

Arriaga 1968; UNDYHS; WDI 2002

Paraguay

Life expectancy in 1899 is estimated at 26.1 years. Survival began to improve in the 1920s or 1930s (Arriaga, 1968), but life expectancy probably did not reach the level estimated by the UN for the early 1950s of 62.7 years.

Arriaga 1968; UN#55; UNDYHS; WDI 2002

Peru

Arriaga (1966) estimates life expectancy and infant mortality in 1940 at 36.4 years and 196.1 per 1000, respectively. Both suggest the possibility of prior gains, so that survival is estimated to have improved from the 1930s or 1940s.

UN#55; UNDYHS; WDI 2002

Puerto Rico

After a long period of quite modest gains, life expectancy rose sharply in the 1900s from a beginning level of 30.4 to 32.1 years, changed little in the 1910s and 1920s, and then again rose sharply from the 1930s (Vázquez, 1961, 1963, 1964, and 1988; Rivera de Morales, 1970; Morales del Valle and Carnivali, 1984).


Vázquez Calzada, José L. 1988. La Población de Puerto Rico y su trayectoria histórica. n.p.


**Suriname**

Using crude death rates, Lamur (1973) and Boldewijn, Lamur, and Lamur (1977) locate the beginning of gains in life expectancy in the 1920s, albeit apparently using official mortality statistics, which are probably incomplete and understated (Oostburg, 1992). Official sources suggest an uneven picture since 1960 with successive years without improvement.

UN#55; UNDYHS; WDI 2002


**Trinidad and Tobago**

Life expectancy apparently jumped upward after slavery was abolished, in the 1830s, but the health transition and its sustained gains did not begin until later. Harewood (1975) and Abdullah (1985) trace the beginning decline in mortality to the 1920s when life
expectancy was some 39.4 years, although Harewood also finds some modest decline in crude death rates between 1900 and 1920.

UNDYHS; WDI 2002

Uruguay

Official estimates of the crude death rate (Narancio, Capurro Calamet, and Ruano Fournier, 1939; Rial, 1980) suggest an already low level in the 1870s and a significant decline during the 1890s, but then little change thereafter until the 1930s. But Migliónico’s (2001a) reconstructed life tables, which are based on official statistics for mortality by age and estimates of the population at risk between census years, indicate that persistent gains began in the early 1920s from an unusually high beginning level of some 50 years.

UNDYHS; WDI 2002
Washington.


**United States**

It is difficult to find a trend in white or non white mortality in the period 1800-1860 (McClelland and Zeckhauser, 1982), chiefly because data are sparse and difficult to interpret. Haines (1999) finds no consistent decline in US mortality until after 1870 or around 1880 (Haines, 1994). His estimates show gains onward from 1850, when life expectancy was 38.3 years, with a dip from 1870 to 1880 (Haines, 1998). Like England and Wales, the US was undergoing urbanization in this period and death rates in cities were higher than in rural areas. Thus it is possible that sustained gains began earlier. Until more is known, however, it will be wise to accept Haines’ judgment and locate the beginning of the health transition in the 1880s. Among non whites life expectancy apparently declined in the 1890s and early 1900s (Ewbank, 1987; and United States, [www.cdc.gov/nchs](http://www.cdc.gov/nchs)).

HMD


Arriaga’s (1968) estimates indicate that gains in life expectancy and reductions in infant mortality began in the 1920s or 1930s, and this agrees with the estimates of crude death rates provided by Chen and Picouet (1979). The 1926 life expectancy level was about 32.2 years. Gains were particularly fast in the 1940s and 1950s.

Venezuela


ASIA

Afghanistan

There is little solid information for any period. Berke (1946) reports new activity in public health and medical training in the late 1920s and 1930s, but does not link that to survival. The UN (UN#55) estimated life expectancy in 1950 at 30 years (which leaves some possible room for earlier improvement) and rising. Survival presumably began to improve in the late 1940s or 1950s. Both UN and WDI 2002 estimates suggest continued gains to 2000, with the UN being more optimistic. It is difficult to reconcile these estimates with events in Afghanistan, especially war and migration. More realistically, Khalidi (1989) reports uneven change.

UN#55; UNDYHS; WDI 2002

Bahrain

Little direct evidence is available even into the 1970s. Oil exports, begun in 1933, and other indications of economic development suggest that both overall and infant mortality may have declined from about 1940. This is in agreement with UN estimates of life expectancy, which start in 1950-55 at 51.0 years, suggesting earlier gains.

UNDYHS; UNSDiv; WDI 2002

Bangladesh

See also India and Pakistan.

Ahmed (1963) gives life expectancy estimates for Bengal and East Pakistan from 1871-81, which suggest that most of the area of present-day Bangladesh participated, albeit marginally, in the reductions in mortality reported for the British colony of India as a whole from the 1920s. Life expectancy in the period 1921-31 is estimated at 24.9 years. There is little direct information on mortality between the 1950s and the 1970s.

UN#55; UNDYHS; WDI 2002
Cambodia

According to Siampos (1970), Cambodia’s health transition began in the second half of the 1940s, though there may have been some earlier gains. Siampos estimates life expectancy in the 1940s at 35 years, which is apparently an informed guess. By 1967 life expectancy had risen to about 45.4 years, but by 1977, amidst war and mass killings by the regime, it had dropped to about 31.2. In the later 1970s and early 1980s there was a quick recovery to the life expectancy level of the 1960s, but since then only a few years have been added.

UN#55; UNDYHS; WDI 2002

China

For two reasons it seems necessary to conclude that China’s health transition began in the 1920s, was interrupted by war and civil war in the late 1930s and 1940s, and resumed when the Maoists came to power in 1949. First, although estimates of life expectancy for the period 1925-1936 vary from 24.2 to 35 years (Brass, 1986; Caldwell et al., 1986; Jiang, 1986; Chen, 1946; Notestein and Chiao, 1937; Wang, 1986; and Zheng, 1986), all show an increase between then and the early 1950s. Second, several authorities (Chen, 1989; Hillier and Jewell, 1983; Campbell, 1997; and Yip, 1995) adduce concrete reasons why survivorship improved in the 1920s and 1930s in the spread of public health ideas and practice, and the development of urban health facilities (on which see also Hayford, 1990). (However, Banister (1987) describes the decades before 1949 as marred by war, poor sanitation, polluted water, minimal control of epidemic disease, and ineffective smallpox immunization, and Chen (1946), assessing the period 1917-1944, expects gains in infant mortality and life expectancy in the future.)

UN#55; WDI 2002
Chen, Ta. 1946 *Population in Modern China*. Chicago.
Rogaski, Ruth. 1996. From Protecting Life to Defending the Nation: The Emergence of Public Health in Tianjin, 1859-1953. PhD dissertation, Yale University (supplying more detail than the published version of this dissertation).
Cyprus

St John-Jones’ (1983) estimates indicate that life expectancy began to rise in the 1890s or 1900s from an 1890s level of some 38.5 years. Progress came rapidly in the decade after World War II.

UNDYHS; WDI 2002

India

See also Bangladesh and Pakistan.

Up to 1947 the Indian data include present-day Bangladesh and Pakistan. Work by a number of scholars, beginning with Das Gupta (1971), Visaria and Visaria (1982), and Bhat (1987), has corrected official estimates of life expectancy. According to Das Gupta, Bhat, and the official estimates, life expectancy began to rise in the 1920s. Das Gupta’s estimates show a continuing increase in the 1930s and 1940s, but both Bhat and the official series suggest instead that life expectancy stabilized in the 1930s and 1940s and then resumed rising. In any case life expectancy began to rise in the 1920s from an initial level of some 24.9 years.

UN#55; UNDYHS; WDI 2002
Indonesia

Boomgaard (1989) suggests that the crude death rate in Java declined between 1820-1850 and 1850-1880 amidst waning smallpox mortality, and that mortality around 1800 may have been higher still. But this trend does not seem to have continued. Likewise estimating crude death rates, most authorities suggest that mortality began to decline in Java and Indonesia in the 1920s, although weakly and more noticeably in cities and some regions than in either Java or Indonesia as a whole (Gooszen, 1999; Boomgaard and Goozen, 1991; Gardiner and Oey, 1987; Cho, 1980; Breman, 1963). This interpretation is accepted. However, Utomo and Iskandar (1986) and Soeradji and Ismail (1986) reject this view, dating gains from the early 1950s. There is general agreement that mortality rose during the Japanese occupation (1942-1945) and the Indonesian war for independence (1945-1949).

Iran

The UN estimate of life expectancy (42.4 years) in the early 1950s is high enough to suggest that improvements began in the 1930s or 1940s. But there is little information upon which to build estimates before the 1966 census, the first of good quality. Propaganda from promoters of the Pahlavi dynasty (“Health,” 2004) reports without
elaboration or citation that life expectancy was 25 years in 1926, when the Pahlavis took power. That is a suspect source, but the level is plausible. Afkhami (2003) reports that attempts at public health improvements were ineffective until the 1920s, following the establishment of a Pasteur Institute in 1921. Aghajanian (1988) argues that there was little decline in mortality after the 1979 revolution, and fears that mortality may have increased.

UN#55; UNDYHS; WDI 2002


Iraq

The UN estimate of life expectancy (42.7 years) for the early 1950s is high enough to suggest that improvements began in the 1930s or 1940s. Survival deteriorated sharply during and after the Persian Gulf War, and had not, by 2000, recovered the prewar levels.

UN#55; UNDYHS; WDI 2002

Japan

Some authorities (including Janretta and Preston, 1991; and Macfarlane, 1997) report that Japanese life expectancy was atypically high across the preindustrial era. Hayami (2001), exploring CDRs in a group of towns, finds a trend decline across the period 1670-1860. Thus it is uncertain whether the comparatively high life expectancy reported for the 1860s was a longstanding or a newer feature of experience. On the assumption that it was longstanding, life expectancy began to rise at some point between the 1870s and the 1890s, more probably in the 1890s. The pace of gains remained quite slow until 1925-1935. World War II led to severely high mortality, but the Japanese recovered quickly in the immediate postwar years, passed Sweden around 1978 as the world leader in life expectancy, and kept that lead to the end of the century.

HMD

Jordan

Winckler (1997) suggests that mortality in the Middle East in general declined from the second half of nineteenth century as famine and epidemics were brought under control. Because the first reliable information derives from the 1961 census, there is no evidence to confirm the suggestion of early decline. Nevertheless the levels of life expectancy (48.2 years) derived from that census and of infant mortality drawn from fertility and demographic and health surveys, especially Blacker, Hill, and Moser (1983), suggest that survival improvements began in the 1930s.

UN#55; UNDYHS; WDI 2002
Sivamurthy, M. and Abdul Rahim A. Ma’Ayta. 1982. “A Study of Mortality in Jordan with Special Reference to Infant Mortality,” in Cairo Demographic Centre
Korea

Kim and Kim (2004) and Kim (1990) trace the decline in mortality to around 1900; Kwon (1977) dates it from the 1910s and associates it with declines in Japan and Taiwan; Lee (1980) traces it to the period 1910-1915; Lee (1985) and Chang (1967) prefer the 1920s as the beginning point, and Ishi (1972) the 1930s. Kwon’s estimates have been used; they show that the pace of gain was initially slow from a beginning level of 23.5 years. The health transition was interrupted in 1943-1945 and 1950-1952 and then, at the conclusion of the Korean War, bifurcated into separate paths for the north and south. Health Statistics (1987) provides official estimates for North Korea. Early postwar estimates do not always differentiate between the two countries.

Kuwait

Hill (1975) implies that life expectancy was about 26 years in Kuwait at Lorimer’s 1908 survey and in general in the period before sustained gains in survival began. The UN life expectancy estimate for the early 1950s, at 55.8 years, is high enough to indicate that gains may have begun in the 1930s, but Hill seems to locate the beginning of gains in the period since 1945.
Laos

Robinson (1989) reports an estimate of the crude death rate in 1911 of 35 per 1000. By 1949 life expectancy was about 38 years, or perhaps only about 34 years by 1955 (Halpern, 1961), either estimate indicating interim improvement. The UN estimate of life expectancy in the early 1950s (37.8 years) also suggests earlier gains, beginning perhaps in the 1930s or 1940s. Laos improved these levels little until the late 1970s.

UN#55; UNDYHS; WDI 2002

Lebanon

The UN estimate for life expectancy in the early 1950s, at 54 years, is high enough to indicate that improvements began in the 1930s or 1940s.

UN#55; UNDYHS; WDI 2002

Malaysia

Saw (1988) and Fernandez, Hawley, and Pridaza (1976) find the mortality decline in progress by the 1930s. Manderson shows that crude death rates declined after about 1911 in the Straits Settlement. (British Malaya included the Straits Settlement of Penang, Province Wellesley, Singapore and Malacca, the Federated Malay States, the Unfederated Malay States, and Brunei. As of 1911 the Straits Settlement accounted for 24.9 percent of the total population in the Malay states.) In Peninsula Malaysia (the Federated Malay States) the crude death rate declined after 1911.
Mongolia

UN estimates of life expectancy in the early 1950s are high enough, at 42.2 to 45 years, to suggest that gains began in the 1940s or 1950s.

UN#55; UNDYHS; WDI 2002

Myanmar

UN estimates imply that life expectancy began to rise in the 1930s or 1940s. But Horwood's (1956) estimates for the early 1950s (life expectancy of 31 to 32 years), his description of health conditions, and Richell's (1992) appraisal of infant mortality suggest that gains may not have begun before the 1950s.

UN#55; UNDY1967; UNDYHS; WDI 2002


Nepal

Although population growth at an average annual rate of 1.2 percent in the 1930s suggests the possibility of gains in survival before World War II, it is likelier that life expectancy began to improve in the late 1940s or 1950s. UN estimates place life expectancy in the early 1950s within the range of 33.1 to 36.3 years.

UN#55; UNDYHS; WDI 2002


Oman

Descriptions of conditions in the 1920s, 1930s, and 1940s (Harrison, 1940; O’Shea, 1947; Phillips, 1966) suggest poor hygiene, few medical resources, and economic wretchedness. A UN investigation (1978) reported the crude death rate in the mid 1950s to have been about 60 per 1000, an exceptionally high level and at odds with the UN estimate of life expectancy in the early 1950s at 36.4 years. Oil exploration began in the mid 1950s and the first strike came in 1963. British aid from 1959 contributed to development in health and education. There is an apparent conflict between descriptions of circumstances in the 1920s, 1930s and 1940s, and estimates of infant and child mortality and life expectancy in the 1950s and 1960s, in that the descriptions suggest conditions ill calculated to have allowed infant mortality as low as 231 per 1000 in the early 1950s, or a life expectancy as high as 40.3 years in 1960 (WDI 2002). Hill and Chen (1996) report exceptionally rapid improvement in life expectancy and infant mortality after 1970. Gains in life expectancy and infant mortality began between the 1940s and 1970s.

UNDYHS; WDI 2002

Pakistan

See also India and Bangladesh.
Robinson (1967) reports that mortality began to decline around 1900, with an interruption in the 1940s, and Afzal (1974) accepts this chronology. Ahmed (1963) estimates life expectancy in Pakistan in the decade 1941-1951, a period of recurrent crises, at only 22.8 years, but finds that mortality declined from 1921. Irfan (1986) and Rukanuddin and Farooqui (1988) agree. Ahmed’s estimates of life expectancy in Punjab for the period 1871-1931 usually surpass those for British India while his estimates for Bengal usually fall short, but estimates for just the territory of Pakistan as of 2000 have not yet been produced. (In 1947 Punjab was divided with West Punjab going to Pakistan.)

In the absence of contrary information, it seems best to associate Pakistan with British India, and to conclude that life expectancy began to rise and infant mortality to fall in the 1920s.

UN#55; UNDYHS; WDI 2002

**Philippines**

Several authorities describe the period 1875-1905 as one of recurrent crises caused by epidemics and war, and this picture is affirmed by CDR estimates in Smith (1975). Population growth resumed around 1905. There is also some consensus that mortality declined from the 1930s, albeit slowly for some years (Aromin, 1961; Concepcion, 1978; Madigan, 1965; Zablan, 1994). But the levels of life expectancy suggested for the 1930s, at 40 to 46 years, are high enough to leave room for earlier decline. Flieger (1982) suggests decline from early in the twentieth century, by implication around 1910, which agrees with estimates assembled by Concepcion and Kintanar (1974). Zablan’s series of crude death rates shows decline after the late 1910s except for the period 1942-45. Hence the beginning of rising life expectancy cannot be dated more precisely than the 1910s to the 1930s.

UNDY1967; UNDYHS; WDI 2002


Qatar

The UN estimate for the early 1950s, at 48 years, suggests that survival gains for the overall population and for infants began in the 1930s or 1940s. But there is very little in descriptions of the region to suggest how this may have happened.
Saudi Arabia

UN estimates of life expectancy in the early 1950s, 34.7 to 39.9 years, suggest that gains in general and infant survival began in the 1940s or 1950s. Chu, Djazar, and Adham (1963) report some public health improvements as early as the 1930s.


Singapore

Crude death rates are available for the Straits Settlement from 1878. Those show a high and variable level of mortality peaking in 1901-1905 at 47.1 deaths per 1000, above the average for 1878-1900 of 34.6 (Cheng, 1979; Saw, 1999; Manderson, 1987). Thus there was sustained decline in mortality from 1906-1910, but the crude death rate did not drop below the 1878-1900 average until the early 1920s. Sustained gains in life expectancy may be said to have begun in the 1900s (Cheng, 1979) or the 1920s (Ho, 1979), but the beginning level of life expectancy is unknown.


Sri Lanka

Meegama (1979 and 1981) traces the beginning of gains in life expectancy to the late nineteenth century, Sarkar (1957) and Roche (1976) to the early 1900s, Ramachandran (1959) to 1923, and Gunatilleke (1985) to the 1930s. United Nations (1976) and Langford and Storey (1993) locate the beginning “after 1921” but in the 1920s, which is the interpretation accepted. Especially rapid progress came in the late 1940s and 1950s.


**Syria**

Winckler (1999) associates the beginning of survival gains with the French mandate after World War I. Although there is little information for the period before 1950, UN estimates of life expectancy (43.8 to 46 years) and infant mortality (160 per 1000) for the early 1950s and descriptive accounts of the development of hospital and public health facilities in the earlier period (Blecher, 2002) both suggest that gains in survival for the general population began in the 1930s.

UN#55; UNDYHS; WDI 2002


**Taiwan**

Mizraee (1979) locates the beginning of “steady and continuous” decline in infant and overall mortality in 1920, and Liu (2000) accepts Mizraee’s estimates. Taiwan was a Japanese colony when its mortality decline began, and Japanese public health programs appear to have stimulated the decline. The life expectancy level in 1911-1920 was about 30.8 years.

Thailand

Chamratrithirong (1981), Arnold, Retherford, and Wanglee (1977), Bourgeois-Pichat (1974), Rungpitarangsi (1974), and Thomlinson (1971) agree that mortality decline began in the late 1940s when DDT was used to combat malaria. However, the life expectancy estimated for the period immediately before these gains began, 38.3 to 40.3 years, is surprisingly high for a country at the beginning of a health transition. Gains in overall and infant survival more probably began in the 1930s but were temporarily reversed in the early 1940s. That would still be consistent with Bourgeois-Pichat’s estimates of the crude death rate (an average of 29.2 in the 1930s) because, as he argues, fertility was significantly higher than mortality and the population was growing, so that the average age of the population was declining. And it would be consistent with Manarungsan’s (1989) CDR series as well, in which the average in the 1930s was 24.4 deaths per 1000..

UN#55; UNDY1967; UNDYHS; WDI 2002

Turkey

*Population of Turkey* (1995) locates the beginning of gains in life expectancy in the 1920s; Shorter and Macura (1982) prefer before 1935 as the point of initiation. The health transition is estimated to have begun in the 1920s or 1930s, but the beginning level is unknown.
United Arab Emirates

The UN estimate of life expectancy in the early 1950s, at 48 years, suggests that gains in survival began in the 1940s, or perhaps earlier.

Vietnam

Feeney and Xenos (1993) argue that information is too poor to decide how much mortality has declined or when. But other authorities make suggestions: Banister (1985) finds the major transformation in health in Vietnam in the period from the 1950s to the 1980s, wars with France and the United States notwithstanding. Barbieri et al. (1995) observe rapid but irregular declines in mortality between the colonial period and the late 1970s. Bryant (1998) reports few positive steps in public health during the French colonial period, but Gendreau’s (1997) estimates of life expectancy for 1900 and 1930 indicate an interim gain of about 10 years. Vietnam’s health transition began in the 1920s or 1930s but has been interrupted by Japanese occupation during World War II, a serious famine at the end of that war, during certain parts of the wars with France and the United States, and during the late 1950s famine.


### Yemen

UN estimates of life expectancy in the early 1950s, in the low 30s, suggest that gains in survival began in the 1940s or 1950s.

UN#55; UNDYHS; WDI 2002

EUROPE

Albania

Gjonça (2001) suggests that survival gains began before 1930, and that the widely used estimate of life expectancy in 1938 of 38.3 years is too high because deaths were underreported. Estryn-Behar and Behar (1976) locate improvements in the public health infrastructure in the 1940s. Different sources differ slightly about levels in 1950 and thereafter; Meksi and Della Zuanna (1994) judge that official estimates for 1950 are too high by as much as 4 to 6 years. Survival began to improve in the 1920s or 1930s.

UNDYHS; UNSDiv; WDI 2002


Austria

Andorka, Horska, and Head-König (1997-98) trace mortality decline in the Austrian portion of the Austro-Hungarian Empire from the 1820s, when “le recul de la mortalité s’accélère”. But crude death rates (Mitchell EHS 1981) do not show a decline until the 1880s or 1890s. Estimates of life expectancy for 1865-1875 and 1901-1905 (Helczmanovszki, 1973 and UNDYHS), 31.7 and 40.1 years respectively, also show that improvement began between those dates. For the Austrian part of the Empire and perhaps also for German-speaking parts of the Empire, the health transition began in the 1880s or 1890s.

HMD; Mitchell EHS 1981; UNDYHS; WDI 2002


Belgium

Devos’ (2003) crude death rate series suggests gains from 1818 that were, however, reversed in the 1830s. The age-specific death rate series, which begins in 1843, suggests a very slow pace of gain up to about 1880 of one year per decade (Devos, 2003). Masuy-Stroobant (1983) reports that gains were underway by 1847-56, the period for which Quetelet offered an estimate of 38.1 years. Although Devos prefers to date the health transition in Belgium from the late eighteenth century, the picture is confused enough that I prefer the 1840s. It will be important to discover whether urbanization affected these national estimates, and whether Belgium, like England and Wales, enjoyed gains that are concealed by rising urbanization and higher death rates in cities.

Mitchell EHS 1981; WDI 2002
André, Robert, and José Pereira-Roque. 1974. La démographie de la Belgique au XIXe siècle. Brussels.
Veys, D. 1983. Cohort Survival in Belgium in the Past 150 Years: Data and Life Table Results, Shortly Commented. Leuven.
Bulgaria

Official estimates of life expectancy suggest an already high level in 1899-1902 of 40.2 years, but no sustained rise until the 1920s (Totev, 1985, UNDYHS, and Cockerham, 1999). Life expectancy reached some 71 years in the mid 1960s, and changed little thereafter with females tending to gain one or two years and males to lose one or two years. The official estimates deserve scrutiny because they suggest a baseline population with unexpectedly good survival without corresponding advantages, which may be due to the underregistration of deaths.


Czech Republic

Estimates of life expectancy reported by Srb (1962-63) and UNDY1967 plus crude death rates from Chesnais (1992) indicate that sustained gains began in the Czech and Slovak lands in the 1890s from a beginning level in Czech lands of 35 years.

Chesnais 1992; Mitchell, EHS 1981; UNDY1967; UNSDiv

Denmark

On the basis of crude death rates (Andersen, 1979a, 1979b, and 1984; Johansen, 2002; Andreev, 2002), Denmark’s health transition began in the 1770s when, judging from the CDR, life expectancy was about 33 years. Gains were more rapid from the 1770s to the 1820s, then slower from the 1820s to the 1890s, then more rapid again. In recent decades Denmark has had one of the slower paces of gain among countries in Western Europe.

HMD
Estonia

Mazur (1969) reports an estimate of life expectancy c. 1900 of 43.1 years, and Krumins (1994) gives one for the early 1920s of 51.7 years. Life expectancy evidently began to improve at some point between the 1890s and 1920s.

UNDYHS; UNSDiv; WDI 2002

Finland

Persistent gains in life expectancy began in the 1870s, just after the 1868 crisis, and were particularly rapid between the 1910s and the early 1950s (Kannisto, Nieminen, and Turpeinen, 1999). The beginning level was some 32.1 years. Jutikkala (1945) and Turpeinen (1975a) provide crude death rates from 1722; Turpeinen and Kannisto (1997) report the main mortality crises and show life expectancy from 1751-60 by sex.

HMD

**France**

Crude death rate and life expectancy estimates for the eighteenth century, constructed from parish records, show that life expectancy began to rise in the 1790s (Blayo, 1975) from a beginning level of 28.1 years. From the 1820s to the 1870s there was little change in national levels owing to urbanization, but it seems likely that death rates continued to decline, at least in rural areas (Meslé and Vallin, 1989; Trausch, 1997; HMD).

HMD

**Germany**

Life expectancy began to rise in the 1870s from a beginning level in the range 36.7 to 38.4 years and amidst unusually marked regional differences in survival (Imhof, 1994).

HMD: UNDY1967
Greece

Valaoras (1960) and Siampos (1989) offer estimates of life expectancy and infant mortality that suggest improvement from the 1870s along a smooth curvilinear path. But Chenais’ (1992) series of crude death rates for 1860-1890 does not indicate improvement. Various other sources (Greece, Life-Tables for Greece, 1964; UNDY1967; France, Annuaire statistique, 1966) report estimates for the 1920s at 44.6 to 50.0 years, high enough to suggest that life expectancy may have begun to rise during the 1900s or 1910s.

Chenais 1992; Mitchell EHS 1981; UNDY1967; UNDYHS; UNSDiv; WDI 2002

Hungary

The crude death rates series reported by Andorka, Horska, and Head-König (1997-98) and Hungary (1992) indicate that gains may have begun in the 1880s, but were certainly underway in the 1890s in the area of present-day Hungary and the Hungarian portion of the Hapsburg Empire. Life expectancy estimates are available from 1900-1901 (Pallós, 1971; Hungary, 1992), and those indicate continued gains, which were most rapid in the period from the early 1920s into the 1950s.

UNDY1967; WDI 2002

Iceland

Both crude death rates and life expectancy estimates indicate that overall survival began a sustained increase in the 1870s from a beginning level of 32.3 years. The most rapid gains occurred between 1885 and 1950 (Gardarsdóttir, 2002; Gardarsdóttir, n.d.; Jónsson and Magnússon, 1997; and Hansen, [1980]).
Ireland

Official sources indicate that Ireland had unusually low infant mortality, around 100 per 1000 live births, and low crude death rates, 17-20 per 1000, from the 1860s to the end of the century. But those sources appear to understate deaths owing to underregistration. According to the official statistics, Ireland’s health transition began in the 1900s. In a literature review Kennedy and Clarkson (1993) suggest that mortality was higher in the pre-famine period (1820s into 1840s) than in the eighteenth century, that life expectancy rose sluggishly beginning in the latter three decades of the nineteenth century, and that infant mortality did not decline until the early twentieth century. But Boyle and Ó Gráda (1986) offer estimates for the period 1821-1841 and for the famine that suggest that survival in Ireland nearly matched that in England and that mortality declined between 1821-1841 and late century. Thus Ireland’s life expectancy gains may have begun as early as the 1820s or as late as the 1890s.

Chenaïs 1992; Mitchell EHS 1981; UNDY1967; WDI 2002

Italy

Crude death rate estimates for individual provinces (Del Panta et al., 1996; Del Panta, 1997) show earlier turning points in some northern provinces, but these do not characterize the country as a whole. In northern Italy, according to Galloway (1994), and in the country as a whole, life expectancy began to rise in the 1870s or 1880s (HMD; Del Panta, 1979), and maintained a rapid pace of gains for many decades. In 1881-1882 life expectancy was some 35.4 years.
HMD; UNDY1967; WDI 2002

**Latvia**

Krumins (1994) estimates life expectancy as high as 45 years already in the 1890s, but this may be flawed by the underestimation of mortality. Life expectancy probably began to improve between the 1890s and the 1920s.

UNDYHS; WDI 2002

**Lithuania**

Mazur reports life expectancy around 1900 at 41.7 years and Krumins (1994) reports a figure for the mid 1920s of 50.5 years; both estimates suggest improvement beginning in the period from the 1890s to the 1920s. *General Demography of Poland* (1921), reporting crude death rates for parts of pre-partition Poland, indicates that mortality declined from the 1890s or 1900s.
Luxembourg

Life expectancy began to rise before the beginning of the official data series given by Trausch (1997), probably in the 1870s or 1880s.


Netherlands

Philips (1980) reports that mortality declined from 1871-75; Van Poppel and Mandemakers (1997) find that mortality began to decline for ages 1-4 years around 1860 and for infants after 1875, although there was another peak in 1880; Van Poppel, Tabeau, and Willekens (1996) identify the mid 1870s as the beginning point for gains in survival; Tabeau, van Poppel, and Willekens (1994) show that changes in life expectancy and infant mortality were quite small until the 1880s. Sustained gains in life expectancy began, albeit hesitantly, in the 1860s or 1870s.


Frans van Poppel also supplied me with a copy of their dataset of population estimates for 1850-1996.

**Norway**

Pitkänen (2002) locates the beginning of persistent gains in life expectancy in the period just after the Napoleonic wars, which would mean the late 1810s, and attributes the early gains to lower mortality chiefly among infants and children aged 1-4 years. Initially sharp gains in survival, according to Brunborg (1976, series M) from about 40 years in 1800 to about 48 in the 1820s, were followed by a lengthy period with little in the way of further gains until the 1890s, then rapid improvement from the 1890s to the 1950s. Norway’s population was not heavily urbanized, but urbanization and higher mortality in the towns (Hubbard, 2002) may account for the lengthy period with little gain. (HMD and Mamelund and Borgan, 1996, also provide life expectancy series for, respectively, 1846-2000 and 1846-1994.)

**HMD**


Poland
Dealing with areas of pre-partition Poland, *General Demography of Poland* (1921) reports crude death rates declining from the 1860s to the 1870s but does not examine the reliability of these estimates. The crude death rates reported by Wladimir, Dupâquier, and Gieysztor (1997-98) suggest that mortality declined sharply from the 1880s, which is potentially consistent with estimates of life expectancy for 1931 (49.8 years) and 1948 (59.1 years), and that has been accepted as the initial decade of gains.

Mitchell EHS 1981; UNDY1967; UNSDiv; WDI 2002

Portugal
Morgado (1979) dates mortality decline from the late nineteenth century. Official crude death rates for the period 1886-1909 from Morgado (1979) and Mitchell (EHS 1981) indicate some improvement in survival in the 1890s, but do not show an ongoing trend. Gains in life expectancy that are more evident began in the 1920s and speeded up in the 1930s, according to official estimates of life expectancy. No estimate could be found for the beginning level of life expectancy.

Mitchell EHS 1981; UNDY1967; UNDYHS; UNSDiv; WDI 2002

Romania
Based on crude death rates (Chesnais, 1992; Manuila, 1992), life expectancy began to rise in the 1910s or 1920s, by the early 1930s reaching 42.0 years (UNDY1967).
Chesnais, 1992; Mitchell EHS 1981; UNDY1967; UNSDiv; WDI 2002

**Russia/USSR**

Blum (1994) traces the beginning of gains in life expectancy to the early twentieth century, but Patterson (1995) finds evidence of a “modest decline” in crude death rates and in infant mortality in the 1890s, after the 1892 famine. Patterson’s view agrees with the scheme of life expectancy reported by Adamets (2002), with official crude death rates for European Russia (Heer, 1968), and with Biraben’s (1958) estimates of crude death rates for the territory of the USSR. Life expectancy in European Russia was about 31 years in 1897, and in the Soviet Union, including the Asian Republics, about 34 years in 1923. Infant mortality was 300 to 330 in 1897. Russia/the Soviet Union experienced an unusually large number of setbacks (during World War I, the influenza epidemic of 1918-1919 aggravated by war, the 1933 famine, and World War II) and therefore slow and more irregular gains. Adamets reports only a small differential between male and female life expectancy in the period up to 1905, but a widening differential by the 1920s. By about 1960 that differential had reached 10 years, and life expectancy had leveled out at about 68 years (HMD).

**References**


Slovak Republic

Separate estimates for the Slovak lands are unavailable until the 1920s, but Srb’s (1962-63) estimates for the combined Czech and Slovak lands indicate that life expectancy began to rise in the 1890s, and that picture is consistent with life expectancy levels reported for the 1920s and thereafter.

Chesnais 1992; Mitchell EHS 1981; UNDY1967; UNSDiv; WDI 2002


Spain

Although some authorities have suggested later beginning points (e.g., Puyol Antolin, 1988; and Cohen Anselem, 1996), both Nadal’s crude death rates series and Dopico’s reconstructions (Dopico and Rowland, 1990; Dopico, 1987 and 1995) of life expectancy show that overall survival began to rise in Spain in the 1890s.

UNDY1967; UNDYHS; WDI 2002

Sweden

Hofsten and Lundström (1976) trace the beginning of gains in life expectancy to the 1780s. Since they published, additional estimates of life expectancy have become available, to replace crude death rates. Those estimates are variable so that it is difficult to fix a starting point, but the 1790s seem to be a better decade in which to locate the beginning of Sweden's health transition.

HMD; WDI 2002


**Switzerland**

Life expectancy began to rise in the 1870s almost simultaneously with the initiation of sustained decline in infant mortality, which Viazzo (1997) dates from 1873. Calot (1998) shows that the risk of dying dropped initially for ages 0 to 40 years, and slightly for 40 to 50, but not at higher ages.

HMD; UNDY1967; WDI 2002


**Ukraine**

Mazur (1969) reports life expectancy around 1900 at 36.6 years. That plus the estimates from Meslé and Vallin (2003) suggest that life expectancy began to improve in the period from the 1890s to the 1920s.

UNDY1967; WDI 2002


**United Kingdom**

Scholarly attention has been lavished on the reconstruction of mortality in Great Britain, and especially in England, into the medieval past, but it cannot yet be said that a final version of mortality history has been reached. The Cambridge Group --Wrigley and Schofield (1989), Wrigley et al. (1997), Schofield (2000)-- present reconstructions for England in the period 1541-1871, which are widely accepted and used. But questions about them, including the ones posed by Razzell (1993) about undercounting of infant deaths, remain difficult to answer in a definitive way.

Hinde (2003) offers three possible dates for the beginning of life expectancy gains in England: the late 17th century, the mid 18th century, and (based on crude death rates) the last two decades of the 18th century. The Wrigley and Schofield series shows life expectancy gains from the first decade of the nineteenth century, and that periodization is used for England and, because of England’s size, the UK. Those gains appear to have been interrupted between the 1820s and the 1870s in England, and then England and
Wales, by a period of stable survival. But as Woods (1985) showed, survival continued to improve separately in rural and urban areas, and it was the higher death rates of cities and urbanization that created the appearance of stable survival. In Scotland life expectancy gains may already have been underway in the 1860s, when serial estimates of life expectancy begin, in that Flinn (1976) gives an estimate for 1793 of 35.5 years or, excluding the far north where the sources are most unreliable, 39.4 years. By 1861-1870 life expectancy, at 42.1 years, was higher than in England and Wales. Until more has been learned about survival in Scotland before the 1860s, however, it will be more prudent to locate the beginning of its persistent gains in life expectancy in the 1870s.

HMD; Mitchell EHS 1981; UNDY1967; UNDYHS
**Yugoslavia**

Chesnais’ (1992) crude death rate series suggests that overall mortality began to decline in Yugoslavia between the 1900s and the 1920s.

Chesnais 1992; UNDY1967; UNDYHS

**OCEANIA**

**Australia**

The earliest national estimates, for 1875 and 1885, exclude the indigenous population. They show life expectancy rising from an already high level (Caldwell, 1987; McDonald, Ruzicka, and Pyne, 1987; Young and Ruzicka, 1982). Earlier estimates for New South Wales alone for 1860 and 1868 suggest that life expectancy may have begun rising earlier. But crude death rates available for New South Wales for 1825-1859 and for the country as a whole from 1860 (Young, 1980) suggest decline from the 1870s. The Australian population was made up chiefly of young adult immigrants in the early decades of European settlement. Since the population was aging by the 1860s, it remains possible that life expectancy gains began in the 1860s. Given this uncertainty Australia's health transition began in the 1860s or 1870s. In the indigenous population life expectancy levels remain much lower (Kinfu and Taylor, 2002).

Mitchell HIS 1995; UNDY1967; UNDYHS; WDI 2002

**Fiji**

For the Fijian and Indo-Fijian populations together, life expectancy began to rise in the 1920s (Balkaran, Taylor, and Naroba, 1990; Biumaiwai, Bavadora, and Olokowski, 1982). The decline had begun earlier among Indians alone (Lal, 2000; Lukere, 1997).

Biemaiwai, M., T. Bavada, and T. Olokowski. 1982 Population, Morbidity and Mortality in Fiji during the Last 100 Years. Suva.


Madagascar

Life expectancy began to rise in the 1940s or 1950s.

Mauritius

Life expectancy began to rise slowly in the 1920s and then jumped up sharply from the late 1940s amidst use of DDT for malaria eradication. Its level in the 1920s was about 31.2 years.


Sombo, N’cho, and Dominique Tabutin. 1983. Tendances et causes de la mortalité à Maurice depuis 1940. Louvain-la-Neuve.


New Zealand

For Europeans New Zealand’s health transition appears to have been in progress in the 1870s, when life expectancy was 51.8 to 53.1 years. For that reason the transition is estimated to have begun in the 1860s or 1870s, the European population having surpassed the indigenous Maori population around 1858.

UNDY1967; WDI 2002


Papua New Guinea

Van de Kaa (1971) estimates life expectancy in 1946 at 31.5 years, a level high enough to allow for earlier gains. But most authorities suggest that survival for infants and in the general population began to improve only in the period after World War II.

UNDYHS; WDI 2002
Solomon Islands

The UN estimate of life expectancy in the early 1950s, 44.0 years, is high enough to suggest that gains in life expectancy and infant mortality began as least as early as the 1940s.

UNDYHS; WDI 2002