

FIGURE 93e-2 Percentages of national populations age 60+, in 2050 (projections).

(From the U.S. Census Bureau, International Database. StatPlanet Mapping Software.)

cohorts surviving into old age led to the rapid growth of the oldest old. This age group is predicted to grow at a significantly higher rate than the 60+ population, and one estimate has the current 102 million age 80+ increasing to almost 400 million by 2050 (Table 93e-2). Projected increases are astounding: China's 80+ population might increase from 20 to 96 million, India from 8 to 43 million, the United States from 12 to 32 million, and Japan from 9 to 16 million. The numbers of centenarians are increasing at an even faster rate.

THE FUTURE OF LIFE EXPECTANCY

The members of the population who could potentially become age 80 and older in 2050 are already alive today. The actual numbers of people who will be age 80 and older in 2050 will therefore depend almost solely on adult and old age mortality rates over the next 35 years. The history of the decline of mortality suggests that improvements in the standard of living, including increased and improved education and improved nutrition, coupled with improvements in public health stemming from an understanding of the germ theory of disease initially led to the decline in mortality, with medical achievements such as antibiotics and improved understanding of risk factors for cardiovascular and circulatory diseases becoming factors only in the post-World War II period; the largest strides in cardiovascular disease came only in more recent decades. The improvements in educational attainment of succeeding generations have been credited in large part for improvements in child mortality during the past century, because educated mothers

TABLE 93e-2 ESTIMATES (2012) AND PROJECTIONS (2050) FOR THE POPULATION AGED 80 YEARS AND OLDER: SELECTED REGIONS AND COUNTRIES

	Population Age 80 and Over (in millions)	
	2012	2050
World	113	4,062
More developed regions	56	121
Less developed regions	58	274
Africa	5	22
Asia	54	238
China	20	97
Japan	9	16
India	9	45
Europe	33	68
Russian Federation	4	7
Italy	4	8
Germany	4	10
Americas		
United States	12	32
Canada	14	
Mexico	2	8

Source: United Nations Population Division, *World Population Ageing* 2012.

are especially likely to understand and take advantage of measures to reduce infection. The effects of continuing progress will likely be seen in coming decades as well, because educational attainment is associated with improved health and survival at older ages. Countries vary in the extent to which the "future elderly" cohorts will be more educated. China in particular will have a much more educated elderly population in 2050 (with more than two-thirds of the 65+ population having completed secondary school) than it did in 2000 (when only 10% of older people had a secondary education). In the United States and other rich nations, this change has largely taken place already; future changes in educational attainment of the elderly population will be less dramatic.

Holding aside the possibility of new infectious diseases ravaging populations as AIDS did in some African countries, debates about future life expectancy revolve around the balance and influence of risk factors such as obesity; the possibility of reducing the deaths from current killers such as cancer, heart disease, and diabetes; whether there is some natural limit to life expectancy; and the distant though nonzero possibility that science will find a way to slow the basic processes of aging.

While some have posited natural limits to human life expectancy, the limits have been surpassed with some regularity, and at the very oldest ages in the leading countries with the highest life expectancy, there appears to be little evidence of any approaching asymptote. Indeed a surprising discovery was that life expectancy in the leading country over the last century and a half, with different countries taking the lead in different epochs, could be represented almost perfectly by a straight line, with the increase for females showing a steady and astonishing increase of three months per year or 2.5 years per decade (Fig. 93e-3). No single country kept that pace of improvement the entire time, but this trend calls into question the notion that improvement must slow down, at least in the near future.

There remains a great deal of diversity in health conditions both among and within national populations. There is nothing inevitable

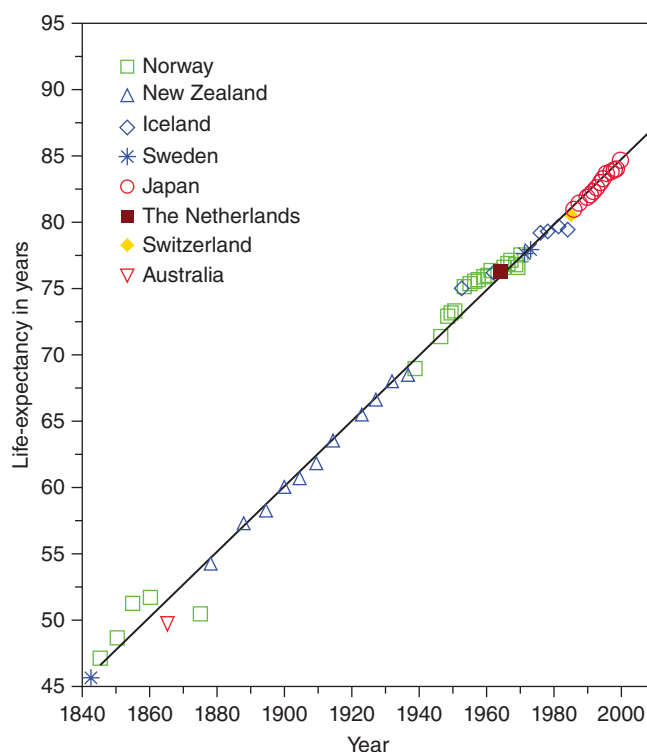


FIGURE 93e-3 Life expectancy in most advanced nations, 1800–2000, females. (From J Oeppen, JW Vaupel: *Science* 296:1029, 2002.)