Improvements in water supply and sewage handling, as well as in nutrition and housing, accounted for most of the improvement before the 1940s, when antibiotics and vaccines and increasing education of mothers began to make a major impact. Since the middle of the twentieth century, the "Child Survival Revolution" has spread to all parts of the world. Children almost everywhere in the world are much more likely to reach late middle age now than in previous generations.

Especially since around 1960, mortality at older ages has improved steadily. This improvement has been primarily due to advances in care of heart disease and stroke and in control of conditions like hypertension and hypercholesterolemia that lead to circulatory diseases. In some parts of the world, smoking rates have declined, and these declines have led to lower incidence of many cancers, heart disease, and stroke.

The initial decline in fertility resulted in older age groups becoming a larger fraction of the total population. Declines in adult and old age mortality contributed to population aging in the later stages of the process. Life expectancy at birth—the average age to which someone is expected to live, under prevailing mortality conditions—has been calculated at around 28 years in ancient Greece, perhaps 30 years in medieval Britain, and less than 25 years in the colony of Virginia in North America. In the United States, life expectancy climbed slowly during the nineteenth century, reaching 49 years for white women by 1900. White men had a life expectancy 2 years lower than that for white women, and black Americans had a life expectancy 14 years lower than did white Americans in 1900. By the early twenty-first century, life expectancy in the United States had improved dramatically for all, with the sex gap wider and the racial gaps narrower than at the beginning of the century: 76 years for white men in 2006; 81 years for white women; and 70 and 76 years for black men and women, respectively. However, although the United States had a relatively high life expectancy compared to other high-income countries around 1980, almost all such countries have in the interim exceeded the United States in life expectancy. Female life expectancy, especially for whites in the United States, has done particularly poorly, and this has been attributed to relatively high rates of lifetime smoking.

At later stages of the demographic transition, mortality declines at the oldest ages, leading to increases in the 65 and older population, and the oldest old, those older than age 85 years. Migration can also affect population aging. An influx of young migrants with high birth rates can slow (though not stop) the process, as it has in the United States and Canada; or the out-migration of the young leaving older people behind can accelerate aging at the population level, as it has in many rural areas of the world.

REGIONAL AGING—NUMBERS AND PERCENTAGES OLDER THAN AGE 60 YEARS

Regions of the world are at very different stages of the demographic transition (Fig. 93e-1). Of a world population of 6.8 billion in 2012, approximately 11% were older than age 60 years, with Japan (32%) and Europe (22%) being the oldest regions (Germany and Italy 27% each) and the United States having 19%. The percentage of the population older than age 60 years in the United States has remained lower than in Europe, due both to modestly higher fertility rates and to higher rates of immigration. Asia has about 10% older than age 60 years, with the population giants close to the average—China (12%), Indonesia (9%), and India (7%). Middle Eastern and African countries have the lowest proportions of older people (5% or lower).

Based on estimates from the United Nations Population Division, 809 million people were age 60 years or older in 2012, of whom 279 million lived in more developed countries and 530 million in less developed countries (as classified by the United Nations). The countries with the largest populations of those age 60 and older were China (181 million), India (100 million), and the United States (60 million).

NUMBERS—POPULATION SIZE PROJECTIONS

Population projections make use of expected fertility, mortality, and migration rates and should be regarded as uncertain when applied 40 or more years in the future. However, the population that will be age 60 and older in 2050 have all been born and survived childhood in 2014, so uncertainty about their numbers (as distinct from their proportion of the total population) is not great. Comparing the maps of the world in 2010 (Fig. 93e-1) and 2050 (Fig. 93e-2), it is apparent that the middle- and low-income countries in Latin America, Asia, and much of Africa will soon be joining the "oldest" category. In less than four decades between 2012 and 2050, the United Nations Population Division projects that the world population age 60 and older will more than double to 2.03 billion, with the least developed regions more than quadrupling. China's 60+ population is projected to reach 439 million, India's 323 million, and the United States's 107 million. Over the same period, the median age of the world's population is expected to increase by 10 years.

Current global life expectancy at birth is estimated to be 65.4 for men and 69.8 for women, with the comparable figures for the more developed region being 73.6 and 80.5 years. Life expectancy in the least developed countries averaged only 57.2 for women and 54.7 for men. Life expectancy at birth is heavily influenced by infant and child mortality, which is considerably higher in poor countries. At older ages, the gap between rich and poor nations is narrower; so while women who have reached age 60 in wealthy countries can expect 23.7 more years of life on average, women at age 60 in poor countries live 16.8 years on average—a significant difference but not so stark as the difference in life expectancy at birth. At the lowest levels of per capita gross national product (GNP), life expectancy shows a powerful positive association with this measure of economic development, but then the slope of the relationship flattens out; for countries with average incomes above about $20,000 per year, life expectancy is not closely related to income. At each level of economic development, there is significant variation in life expectancy, indicating that many other factors influence life expectancy.

Japan, France, Italy, and Australia currently have some of the highest life expectancies in the world, while the United States has lagged behind other high-income countries since about 1980, especially in the case of white women. The causes of this lag are being explored, but the cumulative number of years that people have smoked tobacco by the time they reach older ages and the prevalence of obesity appear to play important roles.

GROWTH OF THE OLDEST OLD POPULATION—THOSE OVER AGE 85

A modern feature of population aging has been the almost explosive growth of the age group known as the oldest old, variously defined as those over age 80 or age 85. This is the age group with the highest burden of noncommunicable degenerative disease and related disability. Thirty years ago, this group attracted little attention because they were hidden within the overall older population in most statistical reports; for example, the U.S. Census Bureau merged them into a 65+ category. The reduction of mortality at older ages coupled with larger birth

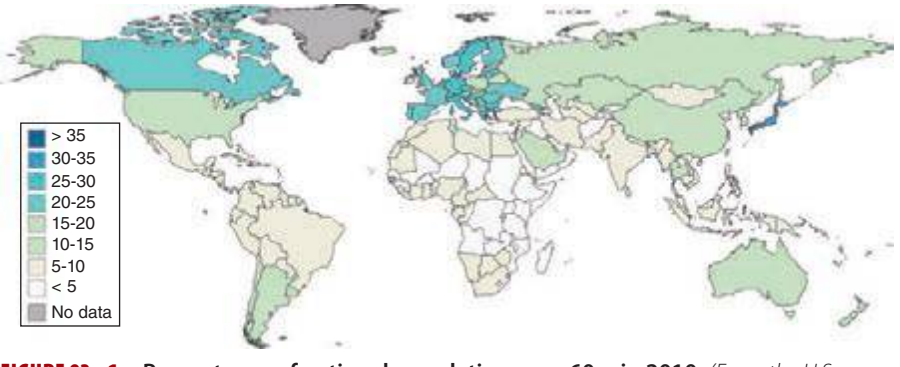

FIGURE 93e-1 Percentages of national populations age 60+, in 2010. *(From the U.S. Census Bureau, International Database. StatPlanet Mapping Software.)*