

# Global ageing

## Introduction

The Western world turned grey in the 20th century, and the rest of the world is following this century at a more rapid pace.

In response to population ageing, the United Nations General Assembly declared 2021–2030 the Decade of Healthy Ageing and asked the WHO to lead on implementation, but the Coronavirus disease 2019 (COVID-19) pandemic has diverted attention.

The common afflictions of old age are now accepted, not as a cause for shame but as serious diseases. Films and novels portray various aspects of ageing. There is increasing discussion in mainstream media about dementia and its effects on individuals from all levels of society, including former heads of state, sporting, and literary figures. However, ageism is still an issue. In the developed world, experience of death is often limited to the deaths of very elderly parents, and there is a loss of familiarity with death as a natural process.

## Changes in the global population

The world is affected by the four global demographic ‘megatrends’, all of which have implications for older people:

- 1 **Population growth**
- 2 **Population ageing**
- 3 **International migration**
- 4 **Urbanisation** (local migration)

## Population growth

From antiquity, the world population increased gradually, with fluctuations due to factors including famine and pandemics, reaching one billion around 1800. Since then, the growth rate has been remarkable (see Figure 1.1).

Population growth is determined by the balance of birth and death rates.

In outline:

- Once childhood death rates start to fall, life expectancy (LE) increases.
- More people reach reproductive age, high birth rates continue, the median age of the population stays low, and the population grows rapidly.

- Birth rates then start to fall; the population continues to increase, but ages.
- Eventually, older people outnumber the young, and the population begins to fall.

This process is called demographic transition (see Figure 1.2).

Major drivers of the transition include improvements in food security, nutrition, housing, clean water and sanitation, income, education (especially for women), and public health measures such as immunisation and contraception. Medical interventions such as the management of cardiovascular risk factors and earlier detection and management of cancer have extended LE in later life.

### World stages of transition in 2019 (Wang, Lancet 2020)

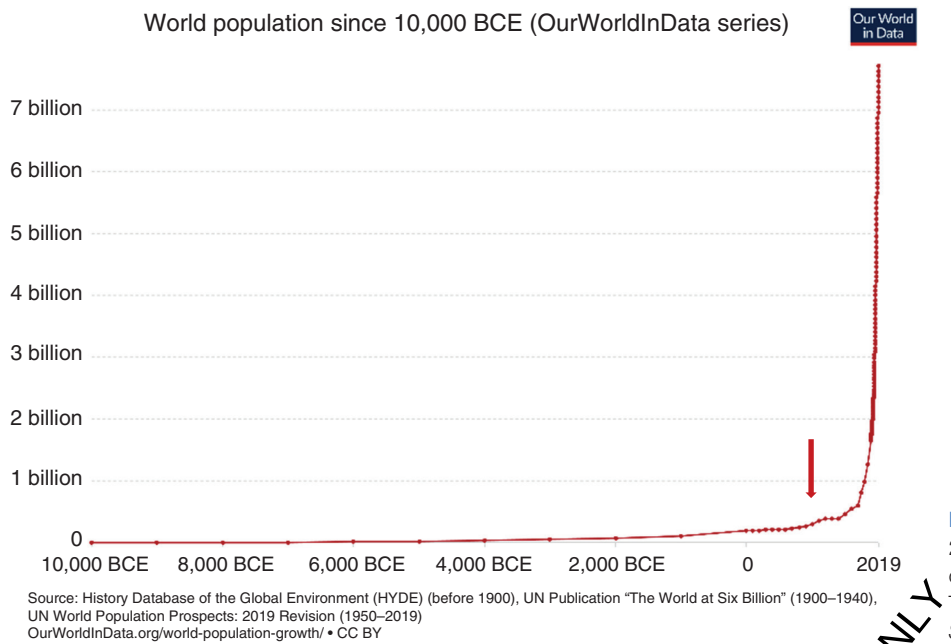
- 1 **Pre-transition:** no countries
- 2 **Early transition:** no countries (1970, 17 countries)
- 3 **Intermediate:** 35 countries
- 4 **Late transition:** 131 countries
- 5 **Post-demographic:** 38 countries, 18 with net emigration, and 20 with net immigration.

Population pyramids usually show the population divided into males and females in 5-year age bands. The shape shows the stage of transition, moving from expansive, a wide-based triangle where young children predominate, to a more rectangular shape as the population ages, constrictive as the base shrinks, and finally a rocket shape as there is little death until old age. The changing shape can be seen in the world population pyramids 70 years apart (see Figure 1.3).

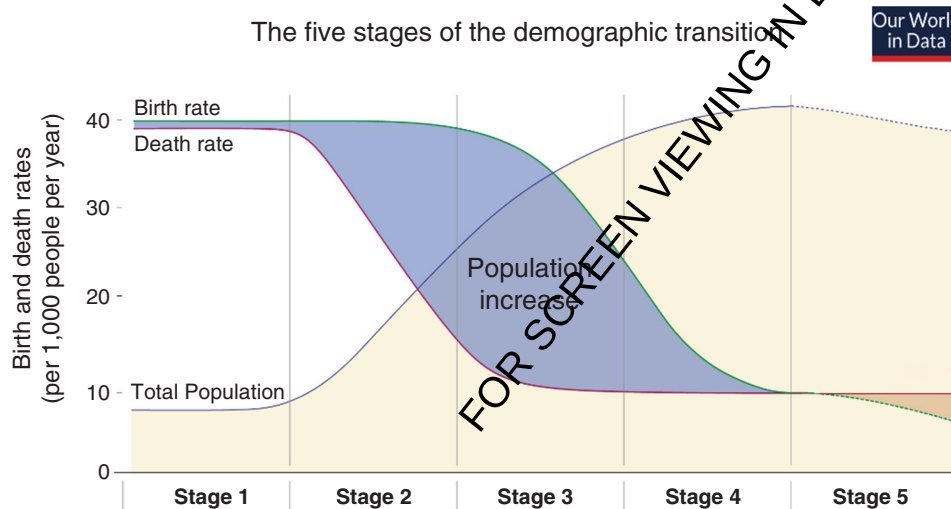
The world population reached eight billion in 2022. The rate of world population growth has been slowing since the 1960s. Until recently, the UN estimated that the world population would peak at 11 billion in 2100, but the rapidity of the decline in fertility has exceeded predictions.

- Many women wish or need to work.
- Widespread television, mobile phones, and internet access have brought a quantum leap in access to information, education, and awareness of how others live.
- Aspirations for a higher standard of living and better opportunities for children may be factors driving the rapidity of change.

The latest modelling suggests that peak world population will occur sooner and will be falling by 2100 to 10.4 billion (UN 2022), a peak of 9.7 billion in 2065 with a fall to 8.8 billion by 2100 (Lancet 2020), or more optimistically, a peak of 8.6 billion in 2050 with a fall to 7 billion by 2100 (New Scientist 2023). See Figure 1.4.



**Figure 1.1** World population from 10,000 BCE to 2019 (BCE is before the common era, CE is the common era, previously AD or anno domini). The arrow shows the impact of the Black Death. Source: Adapted from Our World in Data.



**Figure 1.2** Demographic transition. Source: Our World in Data / CC BY - 4.0.

## Population ageing

As discussed earlier, populations tend to age as they grow.

Population ageing has four key characteristics (UN 2009). It is:

- 1 Unprecedented**, without parallel in the history of humanity.
- 2 Pervasive**, affecting nearly all the countries in the world. Better treatment for HIV has enabled LE in sub-Saharan Africa to increase following a dip. Civil wars still have an impact on affected areas. It is too early to assess the overall effect of the COVID pandemic, but LE dipped for the first time in decades in many countries.
- 3 Profound**, with major consequences and implications for all aspects of life.
- 4 Enduring**, as short of a worldwide disaster, the trend will not be reversed.

## Ways of expressing the age of a population

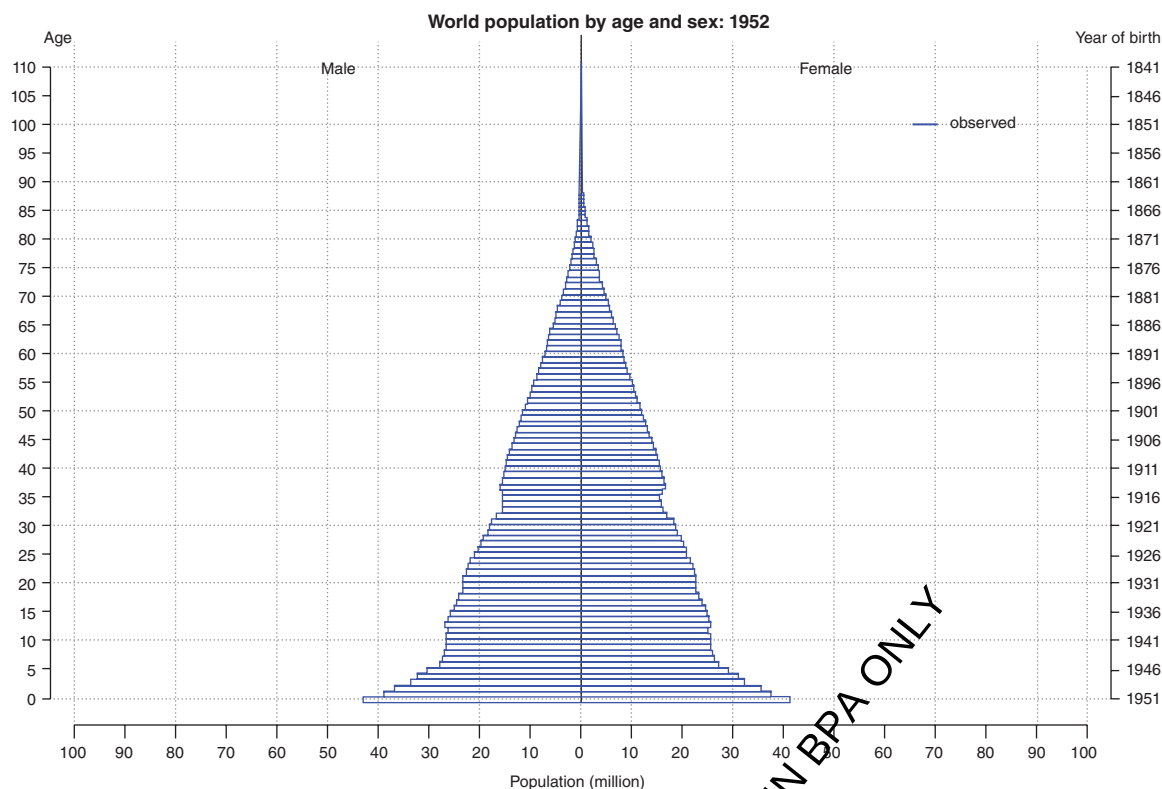
### Median age

- Age at which half of the population is older and half is younger.
- It enables a single figure to compare countries and measure change.

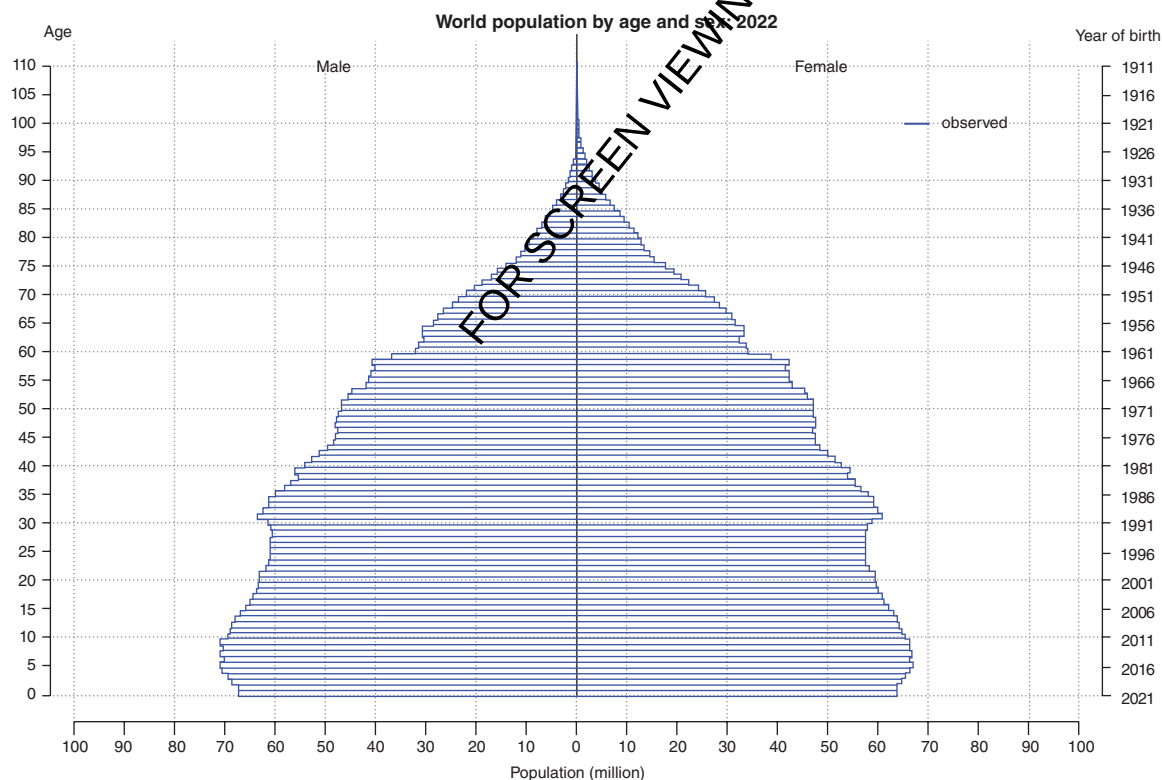
World median age: 22.6 years in 1960, 30.9 in 2020, projected 36.2 in 2050.

### Population over a specified age

- The age at which populations are considered 'elderly' is over 65 years in many statistics.
- Some data sets categorise people of 60+ as older and people of 80+ as the 'oldest old'.



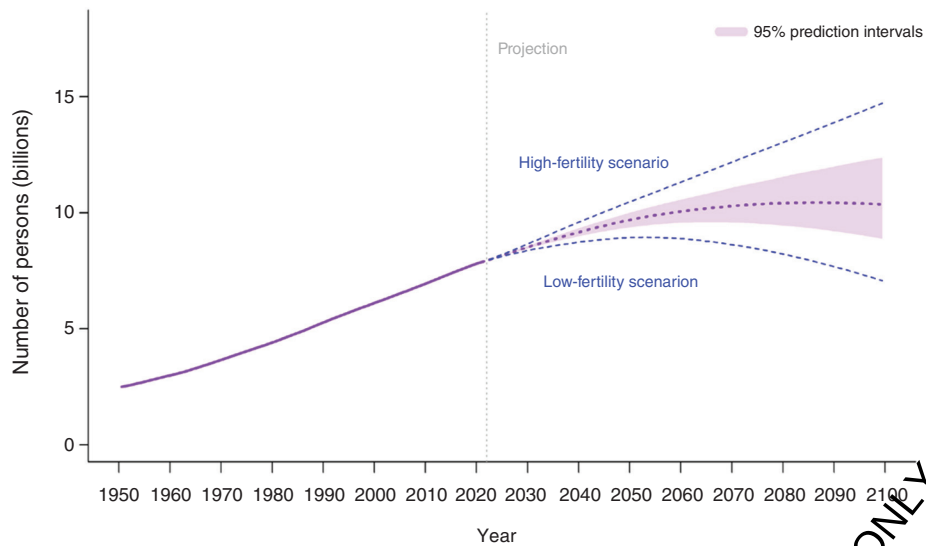
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United Nations, DESA, Population Division, *World Population Prospects 2022*, <http://population.un.org/wpp/>



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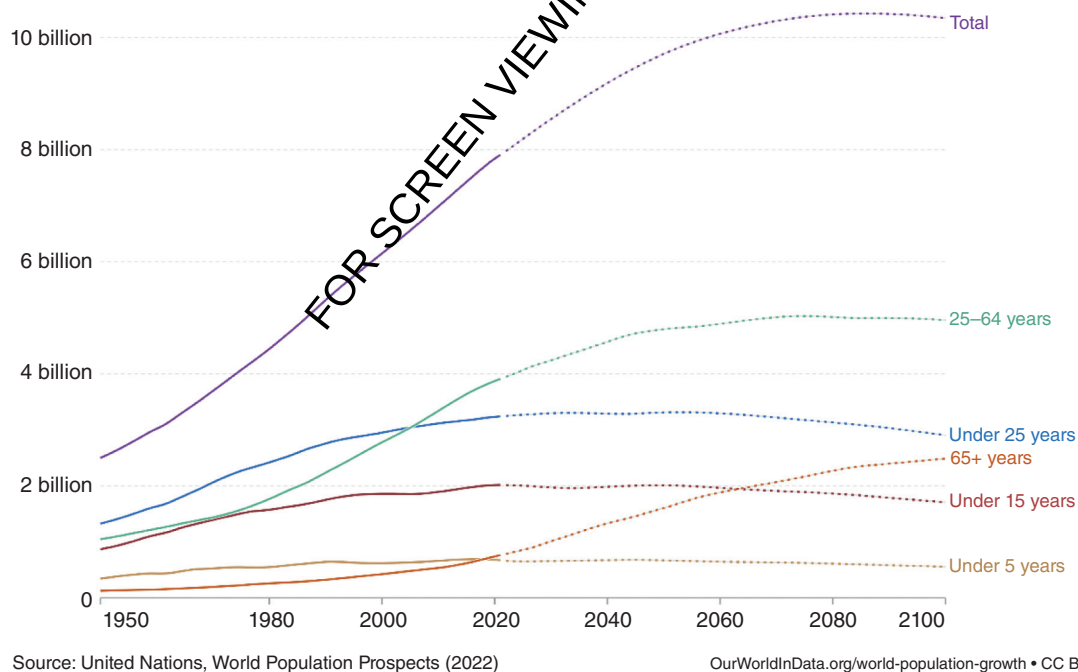
**Figure 1.3** World population pyramids for 1952 and 2022. Source: United Nations (UN) World population prospects 2024 / CC BY 3.0.

Global population size: estimates, 1950–2022, and medium scenario with 95 per cent prediction intervals and high- and low-fertility scenarios, 2022–2100



**Figure 1.4** Global population and projections  
Source: UN World population prospects summary, 2022 / CC BY 3.0.

Population by age group, including UN projections, World  
Historic estimates from 1950 to 2021, and projected to 2100 based on the UN medium-fertility scenario.  
this is shown for various age brackets and the total population



Source: United Nations, World Population Prospects (2022)

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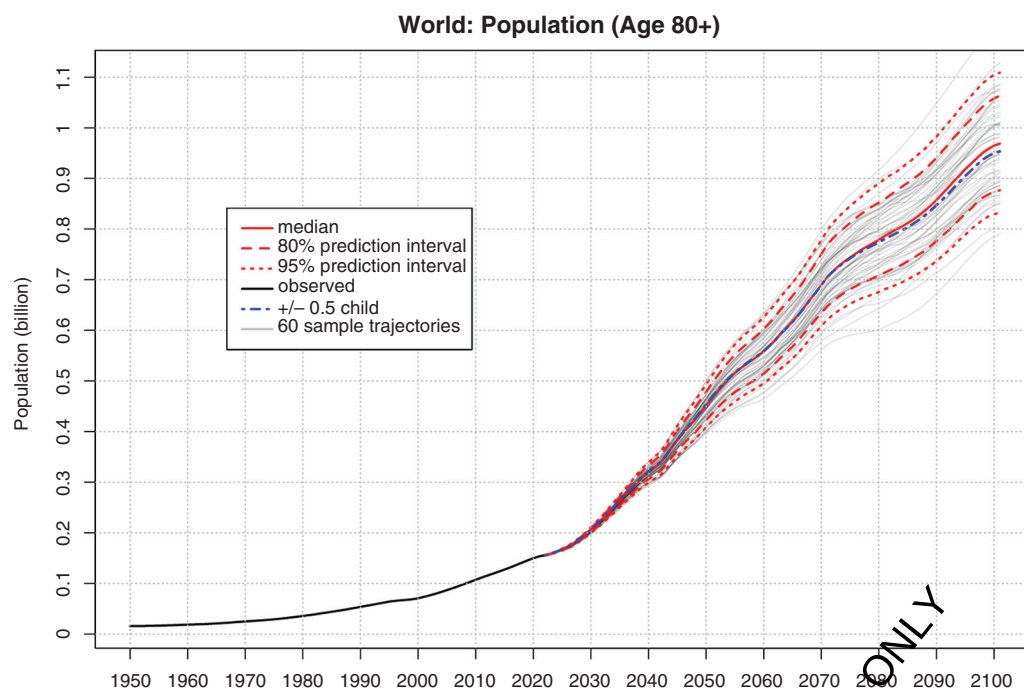
**Figure 1.5** The changing proportions of different age bands within the global population. Source: Modified from Our World in Data / CC BY 4.0.

The proportion of the world population aged 65+ was 5% in 1960, 10% in 2022, and predicted to rise to 16% in 2050. For the first time in world history, in 2018, people aged 65+ outnumbered children under 5 (see Figure 1.5).

Within the older population, the number of people aged 80+ will increase markedly (see Figure 1.6). This has implications for health and social services, as this age group has more needs. This will occur in middle-income countries as well as high-income countries.

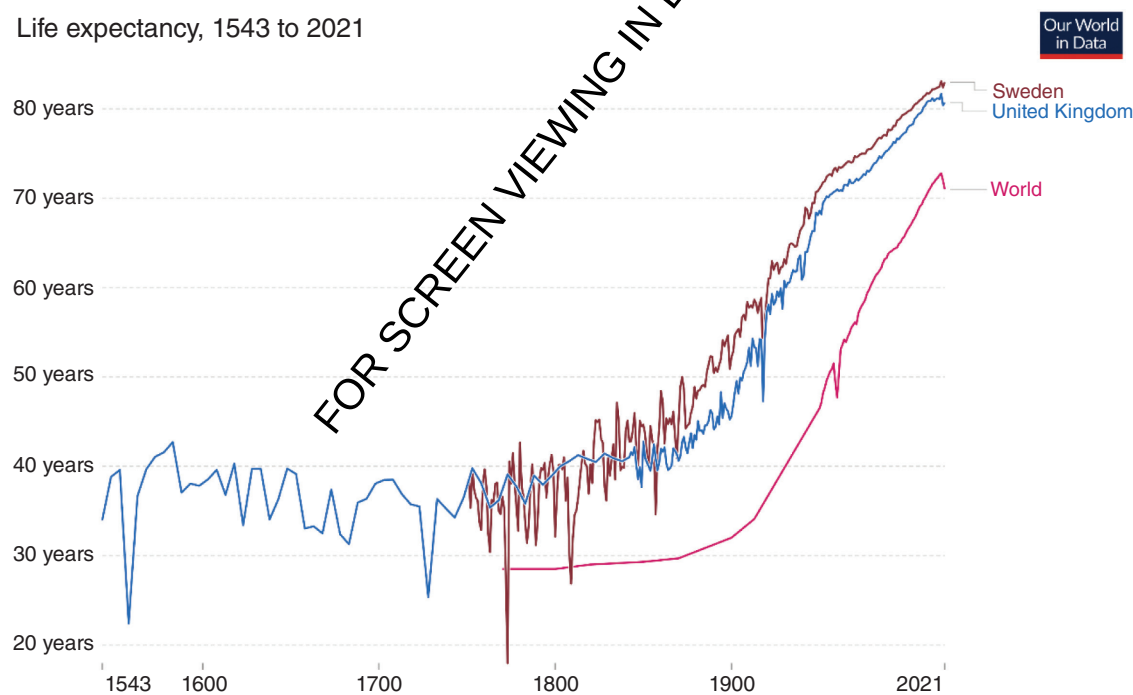
### Life expectancy at birth

Prior to 1800, global LE at birth is estimated to have been between 20 and 30. Extremely high infant and child mortality was the major factor, but people have always lived into middle and older age, just a much smaller proportion than today. In the absence of data, inferences about ageing can be made from artistic artefacts, e.g. figurines, drawings, and contemporary texts. In the 7th century BCE, the Greek poet Hesiod wrote



**Figure 1.6** Projected world population aged 80 and over. Source: UN World population prospects 2024 / CC BY 3.0.

### Life expectancy, 1543 to 2021



Source: UN WPP (2022); Zijdemann et al. (2015); Riley (2005)

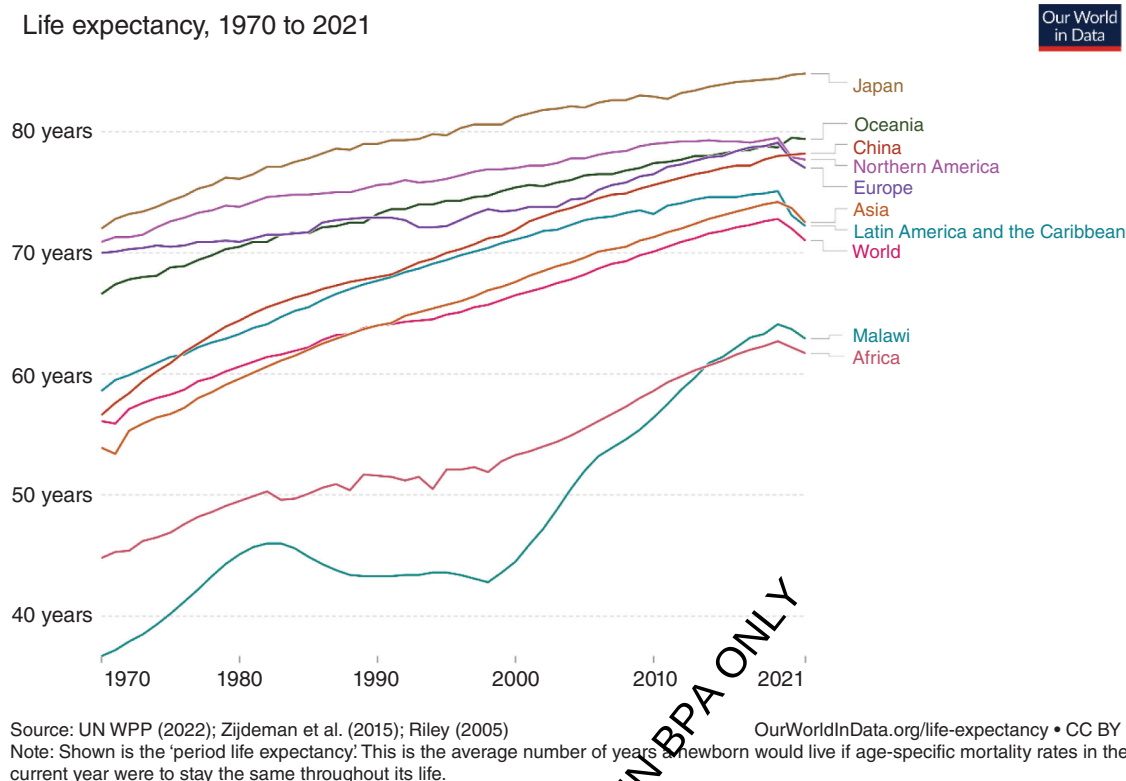
Note: Shown is the 'period life expectancy'. This is the average number of years a newborn would live if age-specific mortality rates in the current year were to stay the same throughout its life.

OurWorldInData.org/life-expectancy • CC BY

**Figure 1.7** The changing life expectancy at birth in the UK and Sweden over several centuries. Source: Modified from Our World in Data / CC BY 4.0.

that a man should marry at 'not much less than 30, and not much more'. To be a consul in ancient Rome, you had to be 43 – 8 years older than the minimum age of 35 to hold the presidency of the US. In the 1st century, Pliny records a few individuals with well-documented life spans of over 100 years, including Cicero's wife Terentia (103 years).

- Data about LE in populations is available for the UK from 1543 and Sweden from 1750.
- In 1800, more countries began collecting data, but global data, compiled by the UN, has only been available since 1948 (see Figure 1.7).
- Before 1800, no country had a sustained LE at birth over 40 years.
- Global inequality increased after 1850 as LE began to increase in parts of Europe and widened in 1900 as LE also increased in Australia and the US. By 1950, Norway had a LE of 72 years; the mean across Africa was 36 years, and in Mali, only 26 years.



**Figure 1.8** Life expectancy in a wider range of countries showing convergence. Source: Modified from Our World in Data / CC BY 4.0.

- From the 1950s, LE in most regions increased at a comparable rate until the HIV epidemic, which peaked in sub-Saharan Africa in the 1980s–1990s, caused a marked fall there.
- Since 2000, LE has again increased in all regions, with a faster trajectory in Africa, so the global gap is narrowing (see Figure 1.8).
- The average world citizen born in 1950 could expect to live to 46 years, to 66 by 2000, and to 73 in 2019, with a projection of 76 years by 2050.
- Since 2020, COVID has caused LE to fall. Data on the extent is incomplete, but there has been a fall of almost 3 years in the US, and the dip is now visible in world data.

To visualise the increase in LE since records became available, look at the interactive site in Our World in Data: life expectancy-increased-in-all-countries-of-the-world.

### Life expectancy at age 65

Life expectancy at age 65 is the average number of additional years of life a 65-year-old person would live if subjected to the age-specific mortality risks of a given period for the rest of their life.

- Worldwide, a person reaching 65 years old in 2020 can expect to live an additional 17 years, increasing to 19 years by 2050.
- Australia and New Zealand currently have the highest LE at age 65 (21 years), followed by Europe and Northern America (19 years).
- Life expectancy at age 65 is projected to increase in all regions, but with the smallest gain in sub-Saharan Africa.

### Estimating years spent in health

There is now more focus on whether the extra years of life are spent in health. There are several similar metrics with different definitions, so to compare data, e.g. across countries, use the same metric.

Health-adjusted life expectancy (HALE), used by the WHO, is the expected number of remaining years of life spent in good health, i.e. without irreversible limitations in activities of daily living, from birth

or age 65, assuming current rates of mortality and morbidity. Health status is derived from health statistics. In the EU, the Healthy Life Years indicator (HLY) is also known as disability-free life expectancy (DFLE) and uses self-reported data on disability. The UK metric of Healthy Life Expectancy (HLE) is not synonymous with DFLE, as it asks about the perception of health rather than disability.

Across the world, people live longer and live more years in good health. Between 2000 and 2019:

- LE at birth increased from 66.8 to 73.3 years.
- HALE increased from 58.3 to 63.7 years.
- LE and HALE are consistently higher for females.

Within individual countries, there are socio-economic gradients for LE and HALE.

### Old-age dependency ratio

The old-age dependency ratio (OADR), the number of old-age dependents (people aged 65+) per 100 persons of working age (aged 20 to 64 years), is used to compare the economic prospects of countries related to their ageing population (see Figure 1.9).

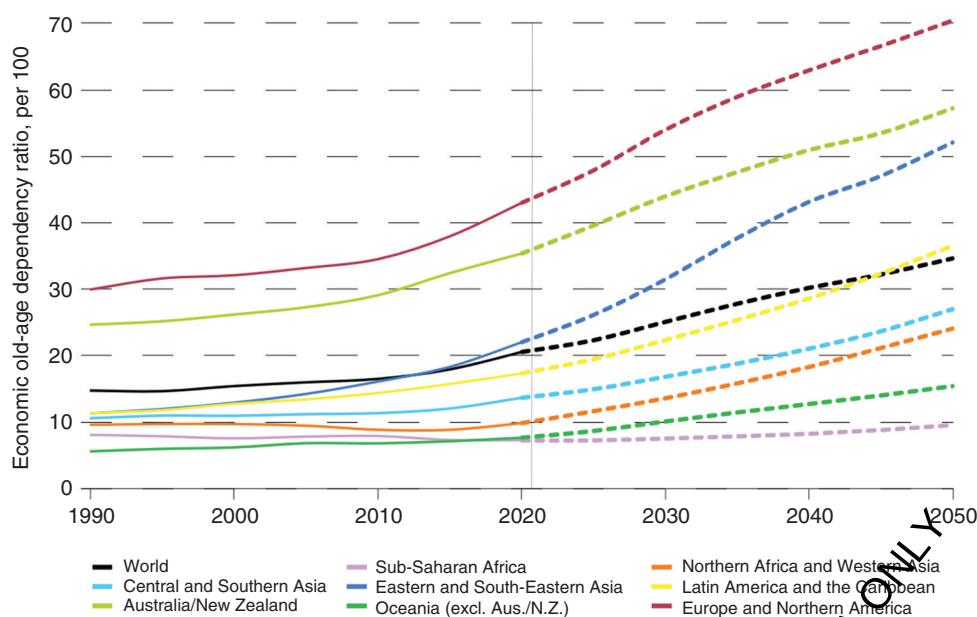
In 2020:

- Japan tops the list and will continue to do so in 2050.
- Most countries with high OADRs are European; more Asian countries will be among this group by 2050.

Some data still uses 15–64 as 'working age', but the age of 20 reflects longer education and later entry into the work force. The use of 'age 64' will also become outdated as older people choose or need to defer retirement.

Whatever age bands are used, a more intuitive way of expressing the number of working people available to support older people is the Potential Support Ratio (PSR), i.e. the inverse of OADR. Using data for people aged 25–64 per person aged 65+; in 2019, Japan had a ratio of 1.8,

**Economic old-age dependency ratios, world and regions, estimates for 1990–2021 and projections for 2022–2050**



**Figure 1.9** OADR calculated from numbers of people aged 65+ per 100 persons aged 20–64. Source: UN World social report 2023 / CC BY 3.0.

the lowest in the world. A further 29 countries, mostly in Europe and the Caribbean, already have PSRs below 3.

### Prospective old-age dependency ratio

As LE increases and older people stay economically active, rather than defining people as 'old' at an arbitrary age, newer metrics are being used. The prospective old-age dependency ratio (POADR) is calculated as the number of persons above the age closest to a remaining LE of 65 years compared to the number of persons between age 20 and that age.

### Sex ratios and the age-sex gap

Unless there is intervention, more male infants are born than females in all populations (105:100). However, boy babies have higher perinatal and infant mortality. For data and discussion on sex ratios in different countries, see Our World in Data.

In antiquity, men were said to outlive women. This may have been true, but it may be a reporting phenomenon as most cultures recorded more information about men. Once comprehensive data became available, it was clear that, on average, women outlived men. The difference results from a complex interaction between biological, behavioural, and socio-economic factors that is uneven throughout the lifespan (e.g. due to the risks of childbirth, attitude to risk, military service and dangerous jobs, and cardiovascular disease). The size of the difference has varied historically.

- By 2020, it was universal that women live longer than men, although the difference ranges from less than a year in Nigeria to over 10 years in Russia (the global average is 4.8 years).
- 90% of supercentenarians (people reaching 110 years of age or older) are women.
- Thus, in many countries, particularly those with older populations, women outnumber men.

### Countries where most older people live

India overtook China as the world's most populous country in April 2023. It is likely that between 2060 and 2070, sub-Saharan Africa will become the most populous region in the world.

The proportion of older people varies greatly from country to country, but as countries undergo demographic transition, the differences are diminishing. Globally, there were 703 million people aged 65+ in 2019. The region of Eastern and South-Eastern Asia was home to the largest number of older people (261 million), followed by Europe and Northern America (over 200 million).

Data from a range of countries are shown in Table 1.1.

Japan's population is the oldest in the world; most European countries have median ages around 43 years, but population ageing is not restricted to the developed world. In 2019:

- Nearly one in four people aged 65+ lived in China.
- Five countries (China, India, the US, Japan, and the Russian Federation) accounted for half of the world's population aged 65+.
- Five countries (China, the US, India, Japan, and Germany) were home to half of people aged 80+.

**Table 1.1** Percentage of people aged 65+ and median age in 2019 (Our World in Data).

|             | % aged 65+ | Median age years | World population ranking | Number of people aged 65+ (million) |
|-------------|------------|------------------|--------------------------|-------------------------------------|
| Japan       | 28         | 46.7             | 11                       | 35.6                                |
| Italy       | 23         | 45.7             | 23                       | 14.0                                |
| UK          | 19         | 40.1             | 21                       | 12.5                                |
| US          | 16         | 37.7             | 3                        | 53.3                                |
| Russian Fed | 15         | 39.4             | 9                        | 22.0                                |
| China       | 12         | 37.0             | 1 (2 from 2023)          | 164.5                               |
| Brazil      | 9          | 33.5             | 6                        | 19.3                                |
| Mexico      | 7          | 29.2             | 10                       | 9.5                                 |
| India       | 6          | 28.4             | 2 (1 from 2023)          | 87.1                                |
| Indonesia   | 6          | 29.7             | 4                        | 16.3                                |
| Nigeria     | 3          | 18.1             | 7                        | 5.5                                 |
| WORLD       | 9          | 30.7             | 7.7 billion              | 702.9                               |

Over the next three decades, the number of people aged 65+ is projected to more than double, reaching more than 1.6 billion people in 2050.

All regions will see an increase in the 65+ population between 2019 and 2050.

- The largest increase (312 million) is projected to occur in Eastern and South-Eastern Asia.
- The fastest increase (226%) is expected in Northern Africa and Western Asia.
- The second fastest increase (218%) is projected for sub-Saharan Africa.
- The increase is expected to be relatively small in Australia and New Zealand (84%) and in Europe and Northern America (48%), where the population is already older.

An excellent resource to look at demographic changes in individual countries is Our World in Data – the trends with time, effects of war (e.g. France 1918, 1944; Japan 1945), earlier flu pandemics, and HIV (e.g. Eswatini) are readily seen.

## The pace of population ageing

The pace of population ageing is accelerating. It took 115 years (1865–1980) for the proportion of older people to double in France (from 7 to 14%), whilst in China the proportion will have doubled between 2000 and 2026. This gives countries very little time to adjust.

## International migration

International migration is increasingly important.

- The number of people living outside their country of birth or citizenship reached 281 million in 2020, up from 173 million in 2000.
- The rate is continuing to increase due to economic migration and people fleeing war and persecution.

Most economic migrants are of working age and move to developed countries with older populations, so the countries they leave ‘age’ and the age in the destination country falls (e.g. Sweden). Immigration has an immediate impact on population age and growth in countries where natural population growth has fallen; in half of these 38 countries, immigration has ensured stable or rising populations.

However, emigration may worsen natural population decline, such as in Romania, where waves of immigration and emigration have caused marked fluctuations (see Figure 1.10).

The effect on populations of rapid, massive migration due to war depends on the situation, but typically more women and children are displaced. It is too early to evaluate the effect of the Russian invasion of Ukraine in 2022, but over 2 million refugees fled the fighting in the first 2 weeks. For context, United Nations High Commissioner for Refugees (UNHCR) estimates that there were 43.4 million refugees globally in 2023.

## Urbanisation

The other major change affecting populations is urbanisation. The UN estimates that in 2007, for the first time in human history, the number of people in urban areas overtook the number in rural settings (see Figure 1.11). As with international migration, it is mainly younger people who leave the countryside, fragmenting families and altering the age distribution of areas within a country. Conflicts also cause massive internal displacements in countries.

## Typical patterns of health and social care

### More developed countries

#### Demographic changes

- Death, which was common in infancy and usual before 65 years, is now rare in infancy and unusual before 65 years.
- Life expectancy has generally continued to rise, but the rate of increase has flattened since 2010 in the US, Canada, Australia, the UK, and several European countries. By contrast, in Japan, a period of low gains in LE was followed by a return to faster improvement.
- Life expectancies have dipped because of the direct and indirect effects of COVID, but it is still too soon to be sure of the size and duration of this effect.
- The dramatic rise in the older population over the past 100 years is now slowing.
- The number of ‘very old’, i.e. those  $\geq 80$  years of age, is still increasing rapidly.
- Ageing populations are associated with slower economic growth due to lower productivity, less innovation and a risk of ‘ageing recessions’ due to labour shortages plus increased demands for care. In 2010, China overtook Japan as the world’s second-largest economy, due in part to the ageing and shrinking population of Japan.

#### Medical services

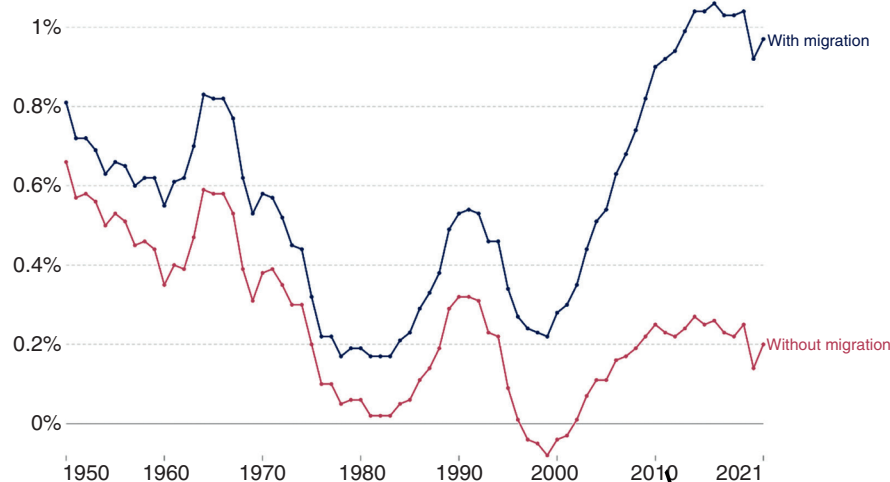
- Sophisticated health systems are set up with specialised services for elderly people.
- An older person costs health services nine times as much as a young person.
- Population ageing requires increased health funding, estimated in the EU at 0.6% per year between 2015 and 2050, so price growth and technological advancements will be the main contributors to future growth in health care expenditure.
- Most deaths are due to cardiovascular disease, dementia, and cancer (see Figure 1.12).
- Time-to-death, particularly the final year of life, rather than age, is a stronger driver of healthcare expenditure, and there is an inverse relationship between age and the cost of end-of-life care.
- Rising expectations of older people and their carers also fuel rising health costs.
- Ethical dilemmas will become more pressing, e.g. the prolongation of death by technological intervention and the debate about access to euthanasia.
- Medical training continues to value increasing specialisation, so practitioners struggle to deal with complex aetiologies (sociological, psychological, and medical), multiple pathology and the frailty and atypical presentations common in older patients. This can result in a mismatch between the aspirations of young medics and the needs of their older patients.

### Community services

- The provision of community care is more varied than for acute care. Inter-country comparisons are complex because of political, socio-economic, and demographic differences. The most straightforward comparison is the proportion of people in care homes; there used to be marked variation, but figures are converging to 4–7% of those aged 65+.

### Population growth rate with and without migration, Sweden

The annual change in population with migration included, versus the change if there was zero migration (neither emigration or immigration). The latter therefore represents the change in population based solely on domestic births and deaths.

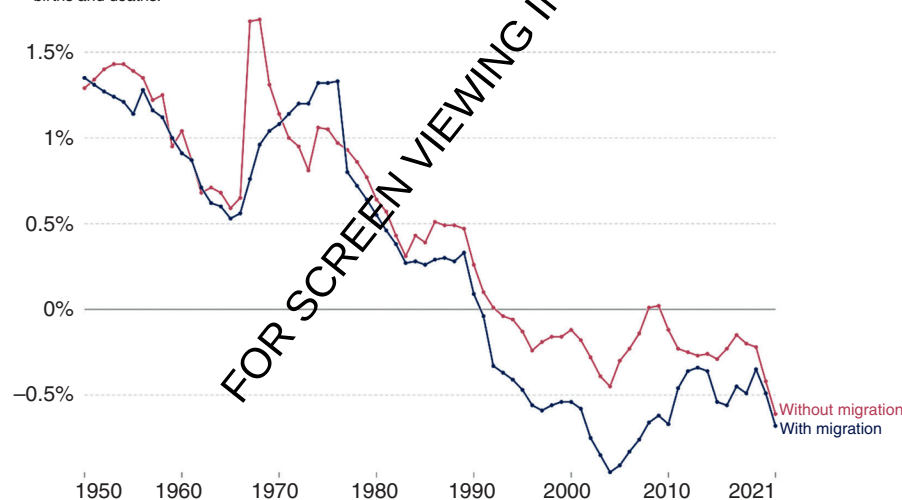


Source: United Nations, World Population Prospects (2022)

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### Population growth rate with and without migration, Romania

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Source: United Nations, World Population Prospects (2022)

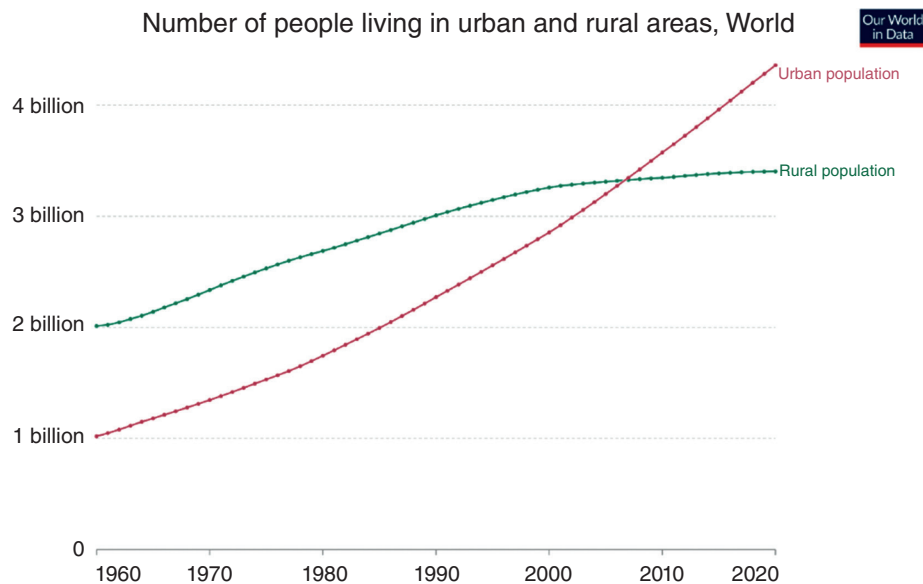
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**Figure 1.10** Population growth with and without migration: in Sweden, where migration is increasing the population, and in Romania, where it has decreased the population. Source: Our World in Data / CC BY 4.0.

- The development of patterns of care is similar. Historically, there was a heavy reliance on self-sufficiency and family care. The healthy and wealthy elderly have always fared the best. The more disadvantaged have always needed support from others.
- In the 'Old World,' non-family support was provided by the church or by occupationally related charities or guilds. In England, the state began to take a more active role after the dissolution of the monasteries with the first Poor Law Act of 1601, which provided workhouse care and 'outdoor relief.' This continued until the end of the 19th century. The 20th century saw the beginning of the welfare state – gradually growing in the first half of the century, reaching a peak mid-century, and then declining towards the end of the 1980s. State provision of

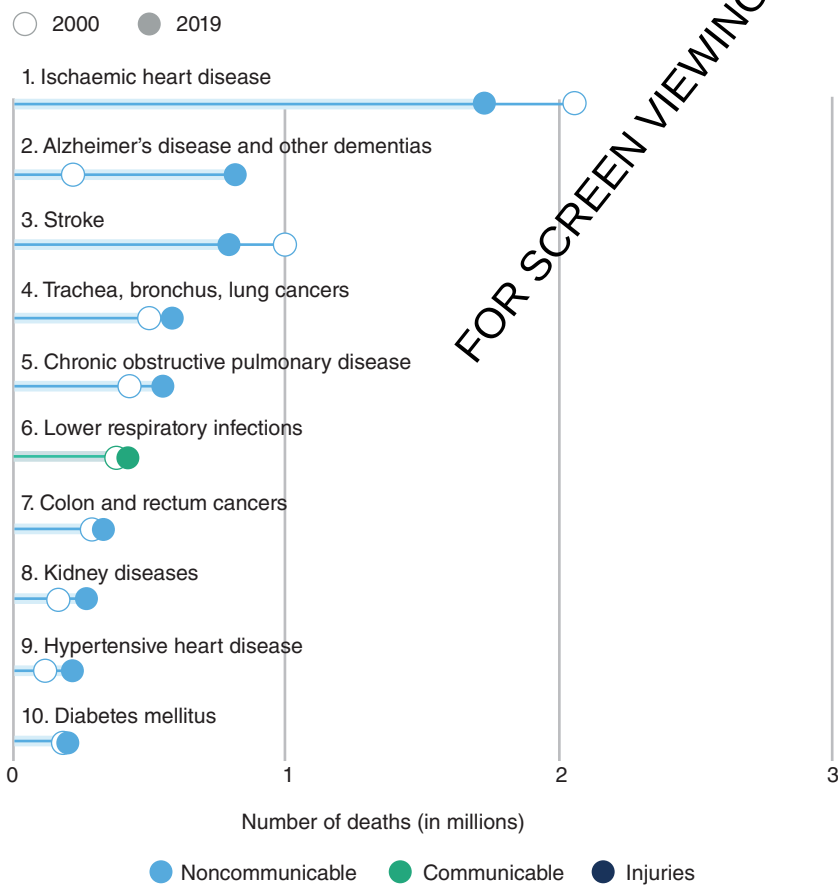
services was replaced by state regulation of services provided by other organisations. This regulation was gradually devolved and often weakened.

- From the 1980s on, nursing homes in the US, Europe, and Australia were increasingly run for profit, now mainly by multinational companies.
- Detailed case studies (2021) describe the provision and financing of long-term care (facility-based health care, home-based care, residential care, and personal care) in Australia, several European countries, Japan, the Republic of Korea, and the US. Common themes are issues with eligibility, equity, quality, affordability, and funding streams.
- Care for people with dementia is a major issue.



**Figure 1.11** Most people now live in urban areas.  
 Source: Our World in Data / CC BY 4.0.

## Leading causes of death in high-income countries



Source: WHO Global Health Estimates. Note: World Bank 2020 income classification.

**Figure 1.12** Top ten causes of death in high-income countries. Source: WHO Global Health Estimates.

## Less developed countries

### Demographic changes

- Once people reach old age in developing countries, their LE is not much lower than in the developed world (Table 1.2).
- Until recently, the proportion of older people was low, but as countries such as China and India are so populous, over 60% of the world's elderly population already lives in these countries.
- These countries' population structures are changing rapidly with falling birth rates as contraceptive policies become effective (or are imposed), infant mortality is reduced, and survival in adult life improves.
- European studies show that babies with low birth weight and reduced growth in the first year have poor adult health, e.g. with hypertension

and hyperglycaemia. This is likely to have significant consequences in India and Southeast Asia.

- Potentially preventable congenital and childhood disabilities will complicate old age.
- Poor people will be unable to get sufficient wealth to provide for themselves in old age, so the total burden will either fall on the state or older people will be neglected.
- Governments have many competing financial demands, e.g. education, housing, and the development of infrastructure.
- Many countries struggle with debt, and political instability is common.
- Population patterns are at risk of distortion by epidemics, e.g. HIV/AIDS, civil war, and migration, e.g. sub-Saharan Africa.

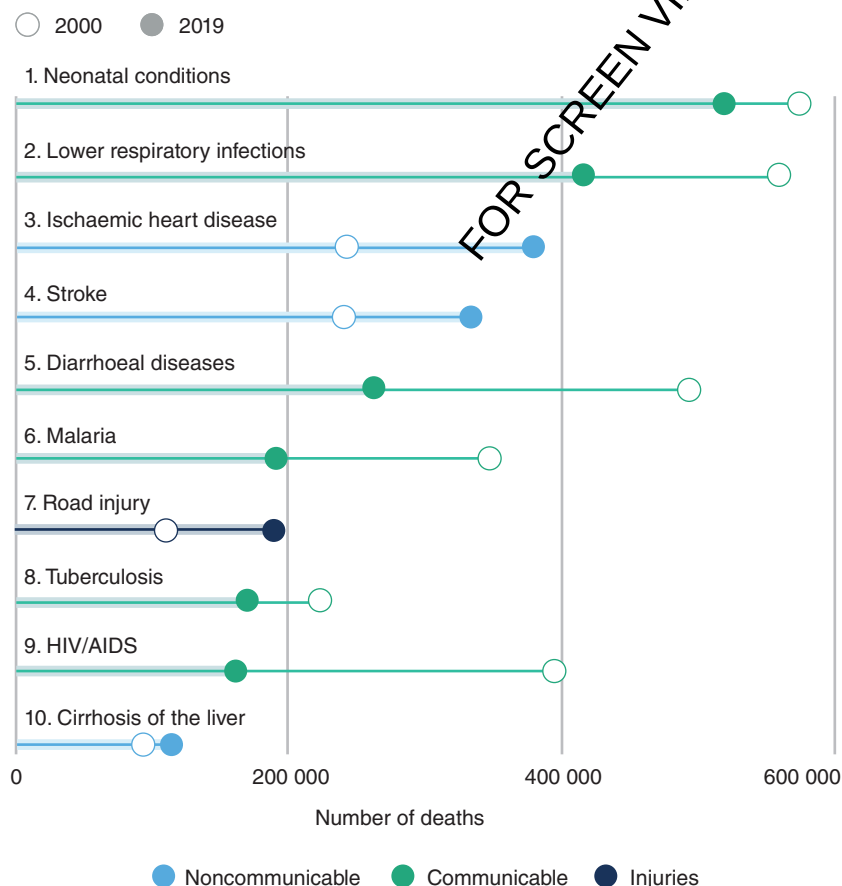
**Table 1.2** Mean life expectancy at different ages (UN 2019).

| Country              | At birth | At 60 years | At 80 years |
|----------------------|----------|-------------|-------------|
| World                | 73.3     | 21.1        | 8.2         |
| Low-income           | 65.1     | 17.4        | 5.9         |
| Lower-middle income  | 69.4     | 18.6        | 6.8         |
| Higher-middle income | 76.3     | 21.2        | 7.7         |
| High income          | 80.9     | 24.3        | 9.8         |

### Medical services

- Communicable diseases still claim most lives, but cardiovascular disease is increasing (see Figure 1.13).
- Health services are often primitive, patchy, and inappropriate for needs with huge urban/rural divides.
- There may be conflict between traditional healers and scientific approaches.
- The state may pursue 'high-tech' for the few over public health measures that would help many.
- Private health care clinics grow rapidly in cities, regulation may be limited, and people may shop around until they get an opinion that they like.

### Leading causes of death in low-income countries



Source: WHO Global Health Estimates. Note: World Bank 2020 income classification.

**Figure 1.13** Top ten causes of death in low-income countries. Source: WHO Global Health Estimates.

- There is often limited access to therapies and equipment for rehabilitation.
- Doctors and nurses need training in geriatrics because of worldwide demographic change.
- Development may be restricted by the tight macro-economic practices enforced by the International Monetary Fund, which encourage privatisation and limit a government's ability to invest in public health.
- Globalisation via the World Trade Organisation has resulted in conflict over the cost of drugs. Unaffordable prices for patented drugs ensure financial profits for Pharma, enabling the development of new drugs, but developing countries need access to cheap generic drugs, e.g. for hypertension, diabetes, and HIV. Efforts to distribute COVID vaccines worldwide and limited countries of manufacture highlighted the difficulties.
- World trade tends to promote bad health habits, e.g. smoking, high sugar intake, excess alcohol, and recreational drug abuse.

### Community services

- Most of the population continues to work for as long as they are able, and when they cannot, they must rely on family support; retirement, at least for most people, is a concept of the developed world.

## Ageing in India in 2023

### Demographic changes

India is in a rapid phase of transition. Life expectancy at birth has been increasing since the 1950s, with a recent dip due to COVID (see Figure 1.14). Of note, male LE was longer than that of females until 1980. As the birth rate is higher in India than in China, India became the most populous country in 2023.

- The population of India is around 1.5 billion people (UN data).
- India has 17.8% of the world's population.
- The median age in India is 28.7 years.
- Fertility has fallen from 5.9 children per woman in 1965 to 2.1 in 2020.
- The number of children under the age of five peaked in 2007.
- The population growth rate has been falling since 1983.
- Urbanisation has increased from 20% in 1970 to 35% in 2020.
- About half a million people emigrate every year.

The fall in the numbers of children means that the base of the population pyramid is becoming progressively constricted (see Figure 1.15) and young adults are the largest group.

Life expectancy at the age of 65 and older in India has also increased for both men and women since 1955, and as a result, India's elderly population is growing rapidly (Table 1.3).

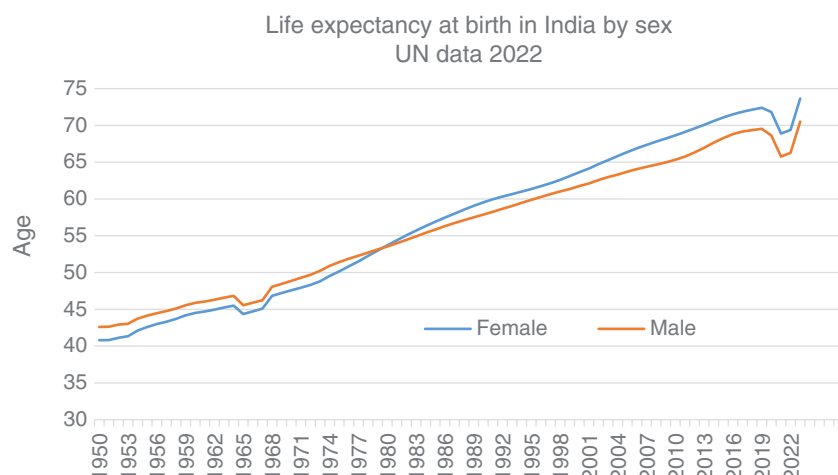
Between 1970 and 2020, the number of children aged 0–14 increased, plateaued and has been falling since 2010. The population age 15–64 has increased steadily by threefold; the over-65s have gone up over fourfold; and the over-80s, sevenfold, although they still make up only 7% and 1% of the population, respectively (see Figure 1.16).

### Causes of death and disability

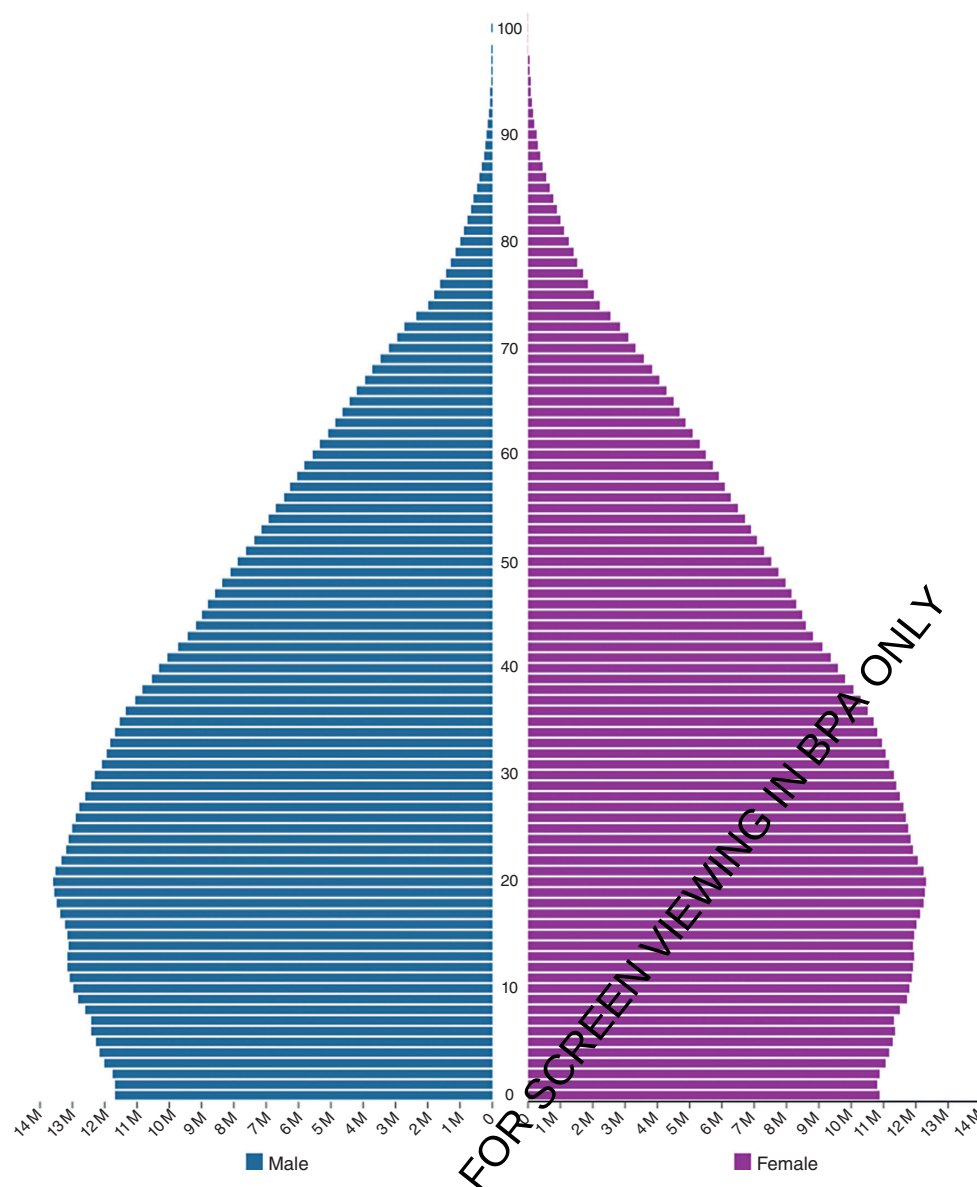
Indian states are in different phases of epidemiological transition, and there are large variations in disease burden across the states. People are living longer, but in 2019, only a fifth of registered deaths in India had a medically certified cause of death, so causes of death are based on extrapolation.

India generates considerable data on health aspects, but the data are fragmented and non-standardised, and there is little quality control. The Ayushman Bharat Digital Mission developed a system to generate a unique health identification number for every individual for use across a range of healthcare providers (to document cases of COVID and vaccinations), but the use of this number is still optional.

- Communicable diseases have fallen.
  - Polio has been eliminated, but malaria, tuberculosis, leprosy, AIDS, and a swathe of 'neglected tropical diseases' are still significant (see Figure 1.17).
  - Mortality from TB has halved since 1990 to 23 per 100,000, but India still has a quarter of the world's cases, an estimated 28 million new cases in 2018.
  - 1.47 million of these are drug-resistant TB, a situation local sources believe has arisen because of 'unregulated treatment by private providers'.
- The prevalence of noncommunicable diseases is rising steadily as the population ages.
  - Tobacco and alcohol use, a lack of exercise, and a poor diet have resulted in a high prevalence of metabolic syndrome and hypertension. Death rates from ischaemic heart disease (IHD), stroke, diabetes, and cancer are increasing.
  - Although domestic air pollution has fallen with cleaner cooking, poor air quality contributes to chronic obstructive pulmonary disease (COPD).
  - Malnutrition is still widespread. The 2019 Global Hunger Index ranks India at 102 out of 117 countries assessed and accounts for over two-thirds of deaths under 5 years old. The sequelae in the survivors will include poor health in middle and older age.
  - Injuries are another significant cause of mortality and morbidity.



**Figure 1.14** Life expectancy in India is now higher in women than men. The dip after 2019 was due to COVID. Source: UN World population prospects 2024 / CC BY 3.0.



**Figure 1.15** India population pyramid 2023.  
Source: UN World population prospects  
2024 / CC BY 3.0. M, a million.

**Table 1.3** Life expectancy for older people in India (UN 2019).

| Age | 1950–1955 |         | 1980–1985 |         | 2010–2015 |         | 2045–2050 projected |         |
|-----|-----------|---------|-----------|---------|-----------|---------|---------------------|---------|
|     | Males     | Females | Males     | Females | Males     | Females | Males               | Females |
| 65  | 9.4       | 10.2    | 11.4      | 12.4    | 13.8      | 14.8    | 15.5                | 17.2    |
| 80  | 4.1       | 5.1     | 5.1       | 6.0     | 6.5       | 6.9     | 7.2                 | 7.9     |

More detail about the diseases within these broad classifications is given in Figure 1.18 and IHD, COPD and stroke are now the three top causes of death.

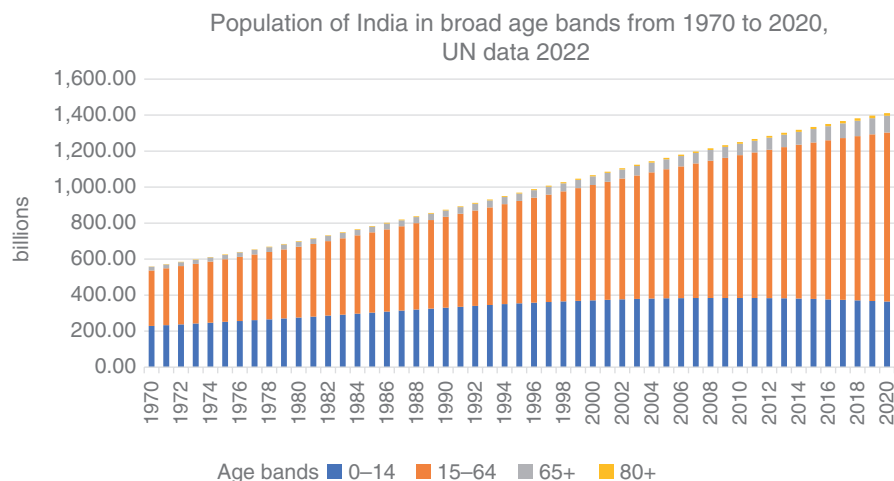
Reliable data on the prevalence of disabilities is limited, with estimates ranging from 2.2% (2011 census) to much higher figures. In the census, the main types of disability were impaired mobility, hearing, and vision. Long-term disability from congenital disorders, perinatal problems, poor nutrition, polio, injury from road traffic and industrial accidents, breathlessness from cardiorespiratory problems, and problems of older age, including stroke, arthritis, cataracts, macular degeneration and presbycusis, are all common.

Better data are now available from the Longitudinal Ageing Study in India (LASI), a nationally representative survey of 72,250 adults aged 45 and older across all states of India. Data collection for wave 1 was carried out from 2017 to 2018.

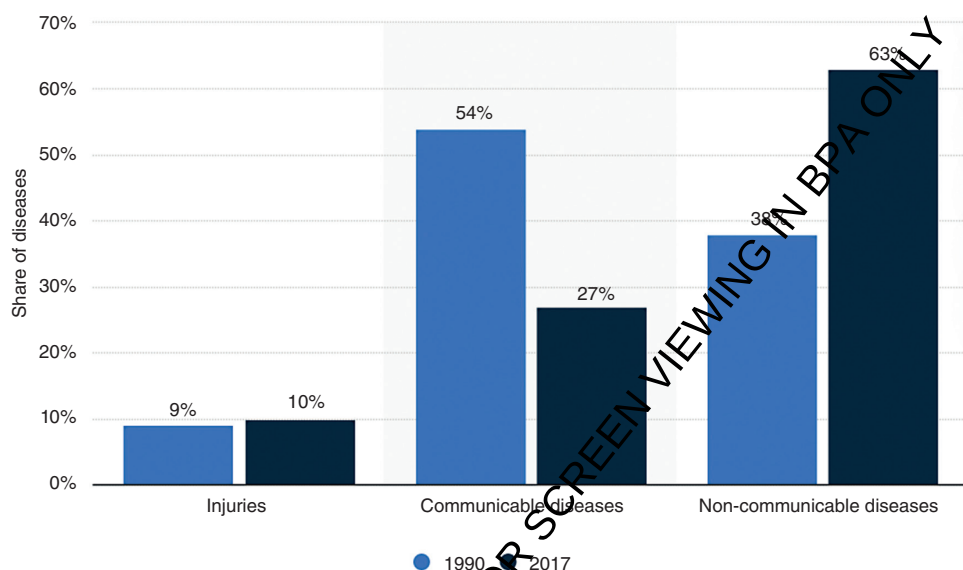
Some of the social data emphasises the challenges India faces in modernising:

All ages in rural areas:

- Households practicing open defecation: 38%
- Households without electricity: 11%.



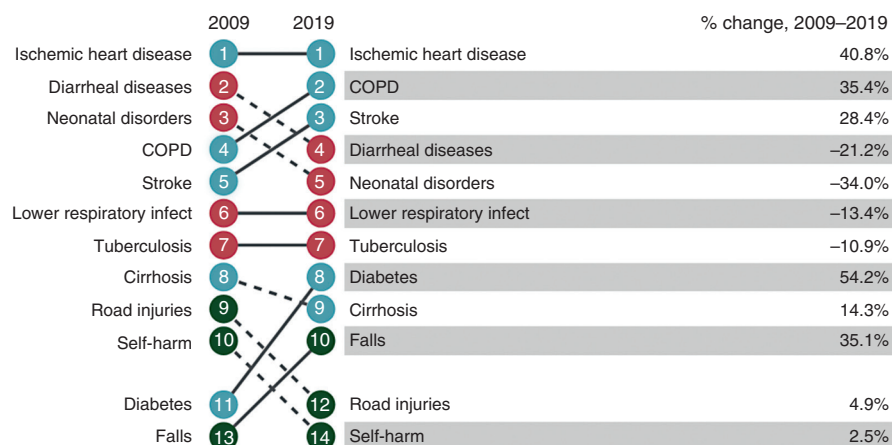
**Figure 1.16** The increasing proportion of older and very old people in India. Source: UN data 2022.



**Figure 1.17** Distribution of disease burden across India in 1990 and 2017, by type. Source: Statista <https://www.statista.com/statistics/1180661/india-distribution-of-disease-burden-by-type>.

### What causes the most deaths?

- Communicable, maternal, neonatal, and nutritional diseases
- Non-communicable diseases
- Injuries



**Figure 1.18** Top 10 causes of death in India. COPD, chronic obstructive pulmonary disease. Source: The Institute for Health Metrics and Evaluation.

Top 10 causes of total number of deaths in 2019 and percent change 2009–2019, all ages combined

People aged 60+ in all areas:

- No schooling: 57%;
- Currently receiving a retirement pension: 6%;
- Living alone: 6%;
- Poor or very poor self-rated health: 24%;
- Any activities of daily living (ADL) limitation: 24%;
- Any instrumental activities of daily living (IADL) limitation: 48%;
- Persons who need help with ADL/IADL limitations: 25%;
- Low vision: 37% (measured, better eye, with own glasses).

There is a lot of data on self-reported medical conditions, and some conditions were measured directly. Eye problems and hypertension reported by participants were similar to the levels found on examination. However, self-reported neurological and psychiatric problems were extremely low, at 2% at all ages and 3% in people aged 60 and over. This probably reflects a marked underdiagnosis and reluctance to disclose mental health problems because of the associated stigma.

- In LASI, a depression screening questionnaire gave a rate of 8% for all ages.
- Pilonia found that depression may affect 34% of the older population.
- Dementia will be underdiagnosed (lack of recognition and lack of schooling make standard tests difficult), but an add-on study to LASI estimates the prevalence of dementia in the over-60s at 7%.
- In childhood, neurodevelopmental disorders are common (14% of children aged 6–9 years in one study), and these disorders will persist into adulthood.

## Provision of health care

Within India, there is huge variation in health care. There are high standards in large centres, but much of the country still lacks health provision. India has one of the lowest public healthcare budgets in the world, at 1.26% of Gross Domestic Product (GDP) in 2020. The private sector accounts for over 70% of healthcare spending. The extremes are exemplified by cardiac centres, which offer coronary surgery to health tourists and are feted by Western politicians, contrasting with 10% of Primary Health Centres (PHCs), which have no MBBS doctor (2019).

Health care is decentralised, and each state organises its own health services. In principle, all Indian citizens can get free outpatient and inpatient care at government facilities. However, due to limited availability and shortages of staff and supplies, many households pay for private care, even though they incur debt to do so.

In 2018, the Indian Government announced the Ayushman Bharat Programme with two components:

- Health and Wellness Centres, to deliver comprehensive primary health care to the entire population. This was aimed at upgrading 150,000 government PHCs by the end of 2022.
- Pradhan Mantri Jan Arogya Yojana for improving access to secondary and tertiary hospital services for the bottom 40% of the population.

## Training in medicine

Medicine is a sought-after, competitive career in India, and there are many medical graduates every year. Others travel abroad to study, particularly to Eastern Europe. Many qualify with high debts and specialist aspirations, so a career in rural India is not attractive. State schemes to mandate a period of rural medicine are very unpopular.

In 1999, the Government of India Ministry of Social Justice and Empowerment developed the 'National Policy on Older Persons.' This stressed the importance of setting up geriatric services and proper training, but implementation has been limited. Professional organisations include the Indian Academy of Geriatrics, which publishes a quarterly journal, the Geriatric Society of India, and the charity HelpAge India.

Higher degrees in geriatrics are available at an increasing number of universities, including the top state and private institutions, the All India Institute of Medical Sciences, and the Christian Medical College.

## Provision of social care

Most older Indians live with family members, but as younger people move into cities or emigrate and women work, the proportion of older people living just with a spouse is increasing. Since the Maintenance and Welfare of Parents and Senior Citizens Act (2008), it has been a legal obligation for children to support their parents with a monthly allowance, but most older people are not aware of this. HelpAge India (2019) has documented that many careers of older relatives (usually a daughter-in-law) find care burdensome, and elder abuse occurs here as elsewhere. Wealthy families can fund private care at home or access luxury old-age communities and nursing homes. At the other end of the market, the Ministry of Social Justice and Empowerment supports 551 NGO-run old-age homes for 16,290 'destitute elderly' (2021). Data for private old-age homes is not kept by the government.

Small numbers of people have private or occupational pensions, as 90% of employment in India is in the informal sector. The benefits system is complicated. There are non-contributory pensions, the Indira Gandhi National Old-Age Pension Scheme, and a scheme for widows who live below the poverty line (BPL households) and have a BPL card to prove this. Pensions are claimed by about a third of rural older people from BPL households and a quarter of elderly widows. Many people are unaware of the scheme or find enrolment too cumbersome, and others make fraudulent claims. About a quarter of older people are aware of government concessions, e.g. for bus and train travel, telephone connections, special interest rates for bank accounts and loans, and income tax benefits; this proportion is lower amongst older rural inhabitants than their urban counterparts.

## Ageing in Africa

Africa is the second-largest continent with the second-largest population, estimated at 1.4 billion people in 2020, and the youngest median age at 19.7. Demography in Africa has shown more perturbation than in the rest of the world due to HIV/AIDS, with a plateauing of the trend to improvement (marked falls in some countries) in both LE and childhood mortality between 1980 and 1995. The combination of HIV and conflicts resulted in skip generations where grandparents brought up children, but most of that older generation has died, and the 'missing' parents are now 'missing' grandparents.

Life expectancy has been increasing steadily again, since the management of HIV/AIDS improved, but the impact of the COVID pandemic is still to be determined. Overall, as age is the biggest risk factor for death from COVID, Africa, with its young population, had less early mortality than 'older' countries. However, sub-Saharan Africa is home to two-thirds of people living with HIV, which may increase the risk of death from COVID. Some governments denied the reality of COVID; there was little testing; ICU care is limited; and ascertainment of the cause of death is poor. COVID vaccination was slow. By July 2021, less than 3% of people in Africa had received a single dose of the vaccine. In developed countries, the pandemic disrupted cancer screening. In Africa, diagnostic and treatment programmes for HIV and TB were disrupted, and the effects of this may be delayed.

In 2021, Africa was still the continent with the highest number of ongoing wars (Uppsala definition), with 14–18 conflicts causing 1,000–10,000 direct, violent deaths in the year, but only 1–5 major wars (with 10,000 or more combat-related deaths in a year), including the conflict in Tigray. Most deaths due to direct violence are among those aged 15–45. Indirect factors, including the movement of refugees, rape, famine, poverty, and

failure of infection control programmes, kill thousands more and limit sustainable economic development. A recent study across the entire continent found that the number of infant deaths related to armed conflicts from 1995 to 2015 was more than three times the number of direct deaths from these conflicts.

## Ageing in Brazil

Brazilians' LE has shot up to near Western European levels from just 37 years in 1940, whilst the number of births per woman has fallen to 1.8 from nearly 6 in 1970. In 1990, it was predicted that AIDS would have a major impact, but strategies including widespread promotion of condom use, educating prostitutes, needle exchange programmes, and most controversially, the manufacture and provision of cheap generic antiretroviral drugs, were remarkably successful in limiting the threatened epidemic.

Income distribution is very unequal in Brazil, with concomitant inequalities in health status and quality of life. Disability rises with increasing age. Those with less education and wealth were almost twice as likely to suffer from disability compared with their peers. Urban dwellers were also more disabled than those in rural areas.

## The climate emergency

According to the World Meteorological Organisation, 2022 continued the run of the world's hottest years with a temperature of 1.15°C above the average for the pre-industrial period (1850–1900). 2022 was the hottest summer on record in Europe, with the temperature topping 40°C in Britain for the first time, the worst drought in 500 years, and record wildfires and air pollution.

Climate change is a major threat to the world. It is already having a significant impact on human health by:

- **Direct effects:** changes in the normal temperature range with heat-waves and intense cold. Extreme weather events (floods, hurricanes, droughts, wildfires) and exposure to UV radiation.
- **Indirect effects:** changes in air quality (air pollution, pollen, and allergens), famine, unsafe food and water, and increased risk of transmission of vector-borne diseases.

Older people are more vulnerable to all these hazards and the chaos that follows disasters because of their physiology, medical problems, medication, and socio-economic factors. HelpAge International notes that humanitarian efforts often fail to provide adequate help for older people. An early example was the French experience in the 2-week summer heatwave of 2003, when most of the excess deaths occurred in people over 70, mainly due to the added stress on the cardiac and respiratory systems. After disasters like cyclones and floods, people with poor mobility and dementia are more challenging to rescue, and food- and water-borne diseases are more likely to be fatal.

Oxfam (2022) reports that:

- The number of climate-related disasters has tripled in the last 30 years.
- Between 2006 and 2016, the rate of global sea-level rise was two and half times faster than for almost all of the 20th century.
- More than 20 million people a year are forced from their homes by climate change.

Recent major events include cyclones Daniel in the eastern Mediterranean and Freddy in East Africa in 2023, the 2020 bushfires in Australia, ongoing droughts in the Horn of Africa, Southern Africa and Central America, and floods and landslides in India, Nepal, Bangladesh,

and Pakistan. The true toll of the floods in Pakistan in 2022 will not be known for years as the poverty resulting from destroyed livelihoods continues to claim lives.

Air pollution is the world's leading environmental cause of illness and premature death. Air pollutants and greenhouse gases often come from the same sources, and there is a complex interaction between pollutants and climate. Climate change is already increasing ozone levels, and the length of the wildfire season and number of large fires are contributing to increased particulate matter. PM<sub>2.5</sub> is the most hazardous particle and is cleared by rainfall, so the changes will vary in different localities.

Longer, hotter summers and rising CO<sub>2</sub> are increasing the length of pollen seasons and the quantity of pollen and fungal spores produced. Between 1995 and 2015, the season for ragweed pollen, a common allergen leading to asthma attacks, lengthened by around 3 weeks in the northern latitudes of North America, with later frosts in the autumn.

Mosquito-borne diseases are spreading. Mosquitoes that can carry the dengue fever virus were previously limited to elevations below 3,300 ft but are now found at over 7,000 ft in the Andes of Colombia. Malaria has been detected in new higher-elevation areas in Indonesia and Africa. Aedes mosquitoes, which transmit chikungunya, dengue fever, West Nile and Zika viruses, are now found in much of Southern Europe. Lyme disease is becoming more widespread as the range of ticks increases.

## Global poverty

Whilst the developed world confronts diseases of affluence, much of the world still struggles with poverty.

In 2019, half of the world's population (47%) lived in poverty defined, as living on less than US\$ 6.85 a day.

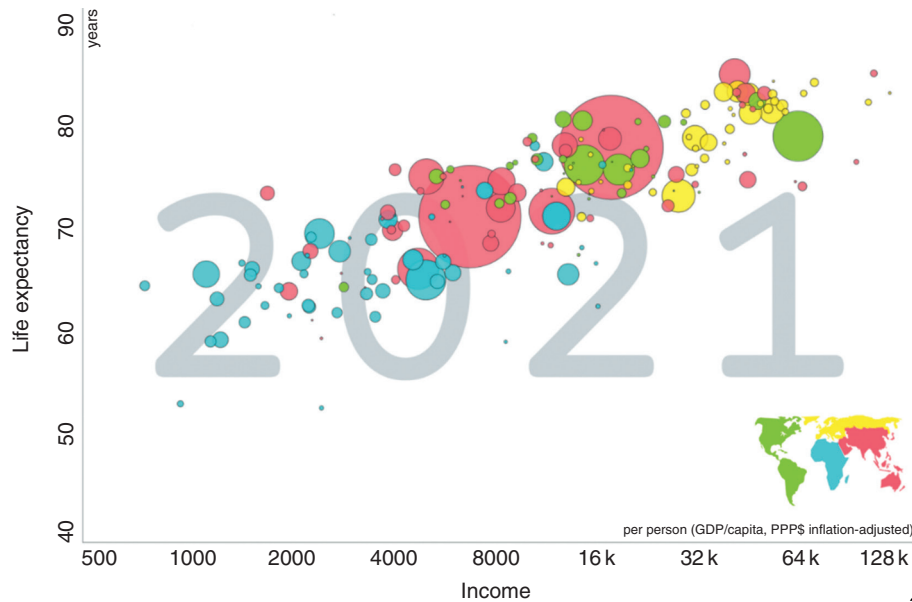
The number of people living in extreme poverty, living on less than \$2.15 a day, had been falling for three decades. The rate of decline slowed after 2015, partly because of conflict and climate change, but the trend was reversed in 2020, when poverty rose because of the disruption caused by the COVID pandemic. The effects of lockdowns and job losses were particularly hard on poor households everywhere, but in less economically developed regions there is less economic resilience, and older people who depended on family support fared badly. Global poverty resumed its pre-pandemic downward trajectory, but the ongoing effects of the pandemic and the war in Ukraine (from March 2022), with their inflationary effects on energy and food supply, are likely to have harmful effects for the next decade.

There is a clear positive correlation between the per capita income in a country and LE (see Figure 1.19), but there is a range of life expectancies across countries at all levels of income. Individual countries can be looked at dynamically on Gapminder. In many parts of the world, there is also marked variation within countries (see the discussion on the effect of social class in the UK in Chapter 2).

## Inter-generational strife

This is a potential problem in both more and less economically developed countries. Strains and conflict could arise from:

- Decreasing numbers of working-age adults are trying to support and fund increasing numbers of retirees.
- Younger people in the economically developed world are not experiencing the ongoing increases in affluence that their parents and grandparents took for granted.



**Figure 1.19** The relationship between gross domestic product and life expectancy. *Source:* Adapted from Gapminder.

- Increasing climate-change activism as those generations and parts of the world that gained from the consumption of resources are leaving a major challenge for the next generation and developing countries (several of which are at particular risk from rising sea levels).
- The prospect of relative poverty in old age for the current young due to increased LE but declining provision for pensions (compared with current retirees).
- High expectations of those growing old in the next two decades, aspiring to retire early with decreased disability but still expecting enhanced care services.
- In less economically developed countries, demographic change poses challenges for older people, services, and pensions.

- Poverty.
- Dependence and abuse.
- Malnutrition (see Chapter 14).
- Hypothermia or risk of heat stroke (see Chapter 16).

## Retirement

Retirement is an ancient concept dating back to 13 BCE when the Roman Emperor Augustus began paying pensions to legionnaires who had served 20 years. Pensions have always been contentious – in CE 14, an increase in the retirement age and a reduction in the pension resulted in a mutiny! From the 16th century, several European countries offered pensions to their troops, and after the American Civil War, disabled veterans received pensions. However, throughout the world, most people worked until they were no longer physically able. In 1880, the Baltimore and Ohio Railroad introduced the first retirement plan financed jointly by contributions from an employer and its workers. In 1889, the German chancellor, Bismarck, established government financial support for those aged 70+ who were ‘disabled from work by age and invalidity’. State-funded pensions were gradually put in place by economically developed countries in the late 19th and early 20th centuries, usually with 65 as the retirement age. This was considered affordable, as the proportion of the population reaching this age was low.

In the 21st century, wealthy countries are increasing pension ages to try to maintain financial viability. However, even among the members of the Organisation for Economic Co-operation and Development (OECD), there is wide variation in pension structure, retirement age, and gender differences. In the least economically developed countries, retirement is for the privileged few, and most people still must work until they die or become unable to work and must rely on family support.

According to the International Labour Organisation (2019), at the global level, 68% of older people receive a pension, but only 20% in most low-income countries. Women are less likely than men to receive a pension, and if they do, benefits are often much lower.

Retirement is a major life transition. Even for those lucky enough to have the possibility of retirement, it is viewed as a mixed blessing. It may occupy one-third of life. In a 2018 survey in the UK, 38% looked forward to retiring, 11% did not, and 25% of retirees experienced difficulties with adverse psychosocial outcomes. Retirement is a potential period of loss of – income, companionship, status, and self-confidence.

## Social aspects of ageing

Old age is a time of loss. The potential losses are varied but often inter-related. Some are inevitable; others depend on the socio-economic and cultural environment.

## Losses in old age

- Health, due to declining homeostasis and increasing frailty and pathology.
- Independence, due to acquired disabilities.
- Wealth, as income falls on stopping work, and disabilities may result in added costs, e.g. for personal care, the need for a warmer environment, aids, and adaptations.
- Companionship after bereavement (spouse, siblings, and friends).
- Status following retirement, loss of independence, and ageism.
- Life.

The above changes and losses may expose people to the following consequences:

- Unhappiness, grief, depression, and suicide (see Chapter 8).
- Increased incidence of illness.
- Increased risk of accidents.

To counteract the disadvantages, there are positive aspects of retirement:

- Many stay fit and healthy for most of this time.
- It is an opportunity to redesign one's lifestyle and promote good health.
- Time is available for new or renewed interests, activities, and relationships.

But retirement may bring social problems, and it is a time when some complex decisions will have to be made. Dilemmas encountered may include:

- Becoming a carer, e.g. of parents or grandchildren early in retirement or of a spouse or siblings later.
- Where to live – it is probably best to stay somewhere comfortable and well known. If a move is contemplated, earlier is better than later, as the retiree is likely to be fitter and one of a pair.
- What sort of accommodation? Somewhere enabling independence, despite acquired disabilities.
- Driving – may need to be given up at some stage, so beware of geographical isolation (see Chapter 21).
- Boredom affects 10% of the retired – another 20% (although not bored) would prefer to still be working. People who are poor, disabled, poorly educated and isolated are most likely to be dissatisfied with retirement.
- The economic consequences of an expanding number of retirees are causing widespread concern in the developed world. The retirement age has increased in many countries and may reach 70+ years. There will be a need to review the nature of paid employment in later years with consideration for manual workers and ways to enable partial or gradual retirement.
- Preparation for retirement is vital.
- The increasing vulnerability and unpredictability of the global financial markets also pose threats to pension provision. The pension aspirations of many current workers may not be met and may be considered a potential threat to world finance.

## Some myths of ageing

- **It is a new problem.** No – there have always been elderly people; there are now more. In the past, most people were denied the opportunity of old age by dying young. Now, most babies born worldwide can expect to live into their 70s, and in developed countries, their 80s.
- **All older people are decrepit and confused.** No – most live independent lives in their own homes.
- **The chronic conditions of old age are untreatable.** No – medical treatment at all ages is primarily the management of chronic conditions. The course of disease can be slowed or modified, e.g. Parkinson's disease; symptoms can be alleviated, e.g. pain and breathlessness; and in deficiency diseases (pernicious anaemia, osteomalacia, and myxoedema), normal function can be restored.
- **Natural decline cannot be prevented.** No – regular physical activity can rejuvenate, and physical capacity can be improved by 10–15 years. Adopting a 'healthy lifestyle' in middle age (no smoking, minimal alcohol, avoidance of obesity, regular exercise and keeping social activity) can delay the onset and decrease the eventual severity and duration of disability towards the end of life.
- **Treating older patients is a waste of money.** No – not to treat is not only inhumane (see Human Rights Act 1998) but also often expensive, and neglected problems may lead to more expenditure in the long term (i.e. 'care' can be more expensive than 'cure').
- **All older people are depressed and lonely.** No – most elderly people are not depressed. Well-being and contentment may feature more in

later life than during the ambitious and frustrated productive years. Although the general population thinks that 90% of elderly people are lonely, only 10% of the elderly consider themselves to be so.

- **Older people are just a burden.** No – they are a valuable resource with experience and, sometimes, wisdom. Most carers are older people, and these include grandparents caring for grandchildren because of absent or working parents. The old are the backbone of voluntary services.
- **Old patients have a limited future and a poor prognosis.** No – LE at 65 years is more than 17 years for a man and 20 years for a woman. To put this into context, survival for 5 years after many surgical and oncological treatments is recorded as a success.



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