

24.1 24.1 Human Population Growth

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LEARNING OUTCOMES

Upon completion of this section, you should be able to

- 1. **1.** Define the terms *exponential growth* and *carrying capacity* and explain how each relates to human population growth.
- 2. **2.** Explain the relationship between birthrate, death rate, and the annual growth rate of a population.
- 3. **3.** Compare and contrast the difference between more-developed countries (MDCs) and less-developed countries (LDCs) with regard to population growth.

The world's population has risen steadily to a present size of slightly over 7 billion people (Fig. 24.1). Prior to 1750, the growth of the human population was relatively slow. As more reproducing individuals were added, population growth began to rapidly increase indicating that the population was undergoing **exponential growth**. The number of people added annually to the world population peaked at about 87 million around 1990. Currently it is a little over 83 million per year.

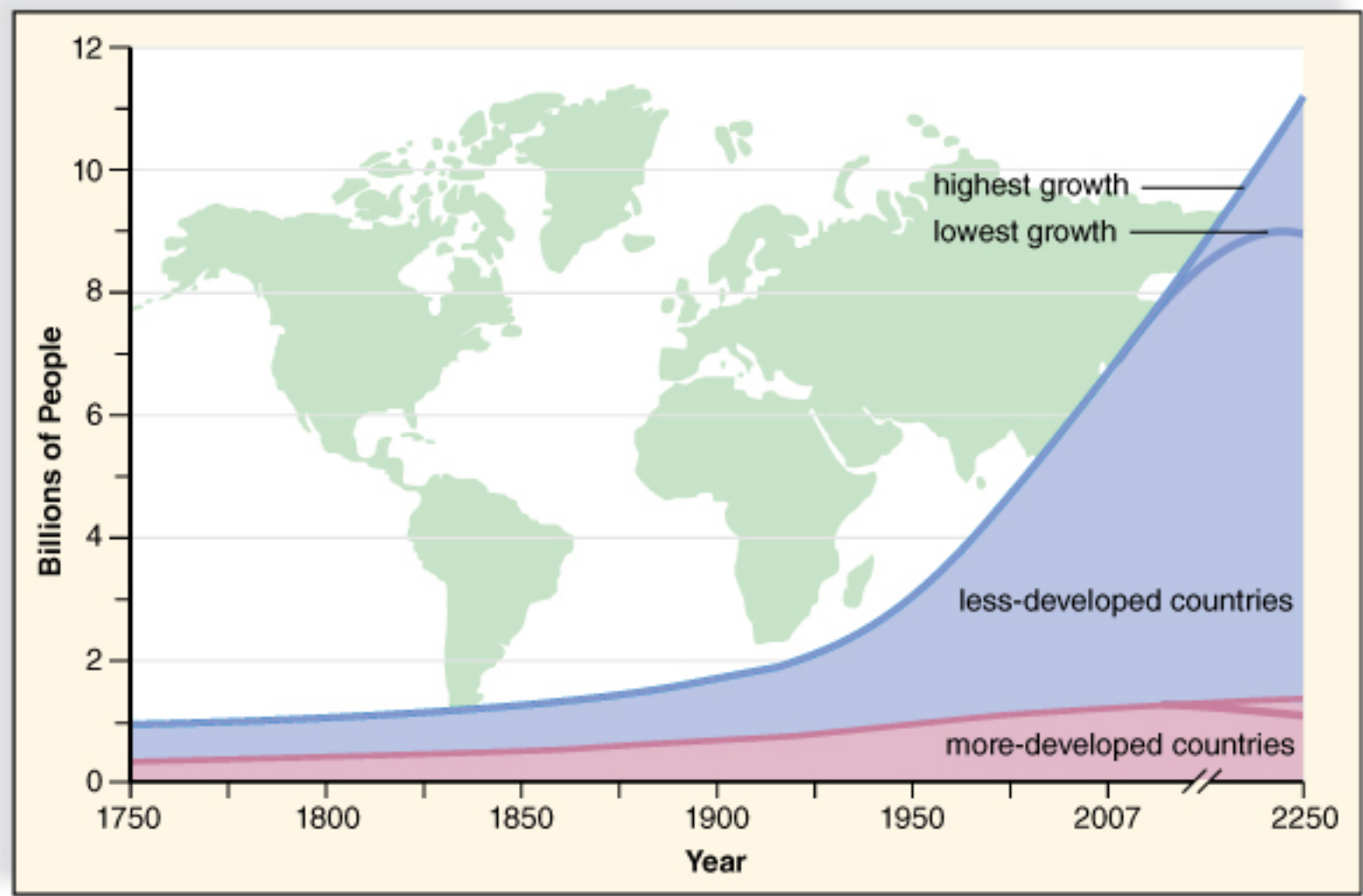


Figure 24.1
Projections for human population growth.

The world's population of humans is slightly over 7 billion. It is predicted that the world's population size may reach between 9 and 12 billion by 2250. Much will depend on how quickly the growth rate declines.

The **growth rate** of the human population is determined by considering the difference between the number of persons born per year (birthrate, or natality) and the number who die per year (death rate, or mortality). It is customary to record these rates per 1,000 persons. For example, the world at the present time (2012) has a birthrate of 19.1 per 1,000 per year, but it has a death rate of 8.0 per 1,000 per year. This means that the world's population growth, or its growth rate, is

$$\frac{19.1 - 8.0}{1,000} = \frac{11.1}{1,000} = 0.0111 \times 100 = 1.11\%.$$

Note that whereas the birthrate and death rate are expressed in terms of 1,000 persons, the growth rate is expressed per 100 persons, or as a percentage.

After 1750, the world population growth rate steadily increased, until it peaked at 2% in 1965. It has since fallen to its present level of between 1.1 and 1.2%. Yet, the world population is still steadily growing because of its past exponential growth.

In the wild, exponential growth indicates that a population is enjoying its **biotic potential**. This is the maximum growth rate under ideal conditions. Growth begins to decline because of limiting factors such as food and space. Finally, the population levels off at the carrying capacity. The **carrying capacity** is the maximum population that the environment can support for an indefinite period. The carrying capacity of the Earth for humans has not been determined. Some authorities think the Earth may be able to sustain 50 to 100 billion people. Others think we already have more humans than the Earth can adequately support.

The MDCs Versus the LDCs

The countries of the world can be broadly divided into two groups. The more-developed countries (MDCs), typified by countries in North America and Europe, are those in which population growth is modest. The people in these countries enjoy a good standard of living. The less-developed countries (LDCs), typified by some countries in Asia, Africa, and Latin America, are those in which population growth is dramatic. The majority of people in these countries live in poverty. Many countries are in a transitional stage between being a LDC and an MDC. Population growth is decreasing and standard of living is on the rise.

The MDCs

The MDCs The MDCs did not always have low population increases. Between 1850 and 1950, they doubled their populations. This was largely because of a decline in the death rate due to development of modern medicine and improvements in public health and socioeconomic conditions. The decline in the death rate was followed shortly thereafter by a decline in the birthrate. As a result, the MDCs have experienced only modest growth since 1950 (Fig. 24.1).

APPLICATIONS AND MISCONCEPTIONS

How do fertility rates vary between countries?

In 2012, the country with the highest projected fertility rate is Niger (7.52 children born per woman), followed by Uganda (6.65 children born per woman), and Mali (6.35 children born per woman), whereas Singapore was the country with lowest fertility rate (0.78 children born per woman). For death rates, South Africa had the highest rate (17.23 deaths per 1,000 people) and Qatar had one of the lowest (1.55 deaths per 1,000). For overall annual growth rates, the fastest-growing country in 2012 is projected to be Uganda (3.582%). Several countries are expected to experience declines, including Syria (−0.797%) and Jordan (−0.965%). In comparison, in the United States, the 2012 projected fertility rate is 2.06 births per woman, the

death rate is 8.39 per 1,000 people, and the annual growth rate is 0.899%. *Source:* www.cia.gov

The growth rate for the MDCs as a whole is about 0.1%. In some countries the population is not increasing but instead it is decreasing in size. The MDCs are expected to increase by 52 million between 2002 and 2050, but this amount will still keep their total population at just about 1.2 billion. In contrast to the other MDCs, growth in the United States has not leveled off. The population of the United States is now greater than 300 million and continues to increase. Though the birthrate in the United States has increased slightly, much of the continued population growth is due to immigration.

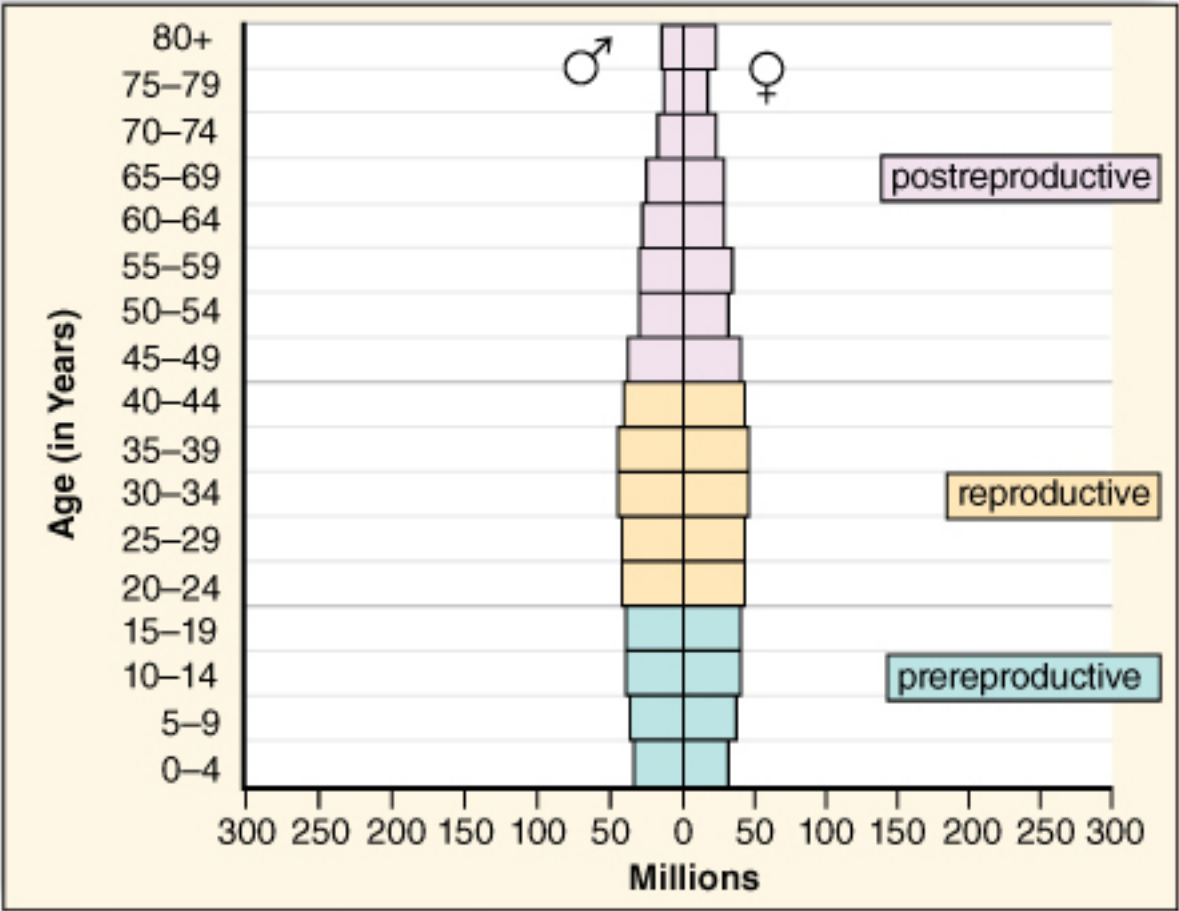
The LDCs

The LDCs The death rate began to decline steeply in the LDCs following World War II due to the introduction of modern medicine. However, the birthrate remained high. The growth rate of the LDCs peaked at 2.5% between 1960 and 1965. Since that time, the collective growth rate for the LDCs has declined. However, the growth rate has not declined in all LDCs. In many countries in Sub-Saharan Africa, women give birth to more than five children each.

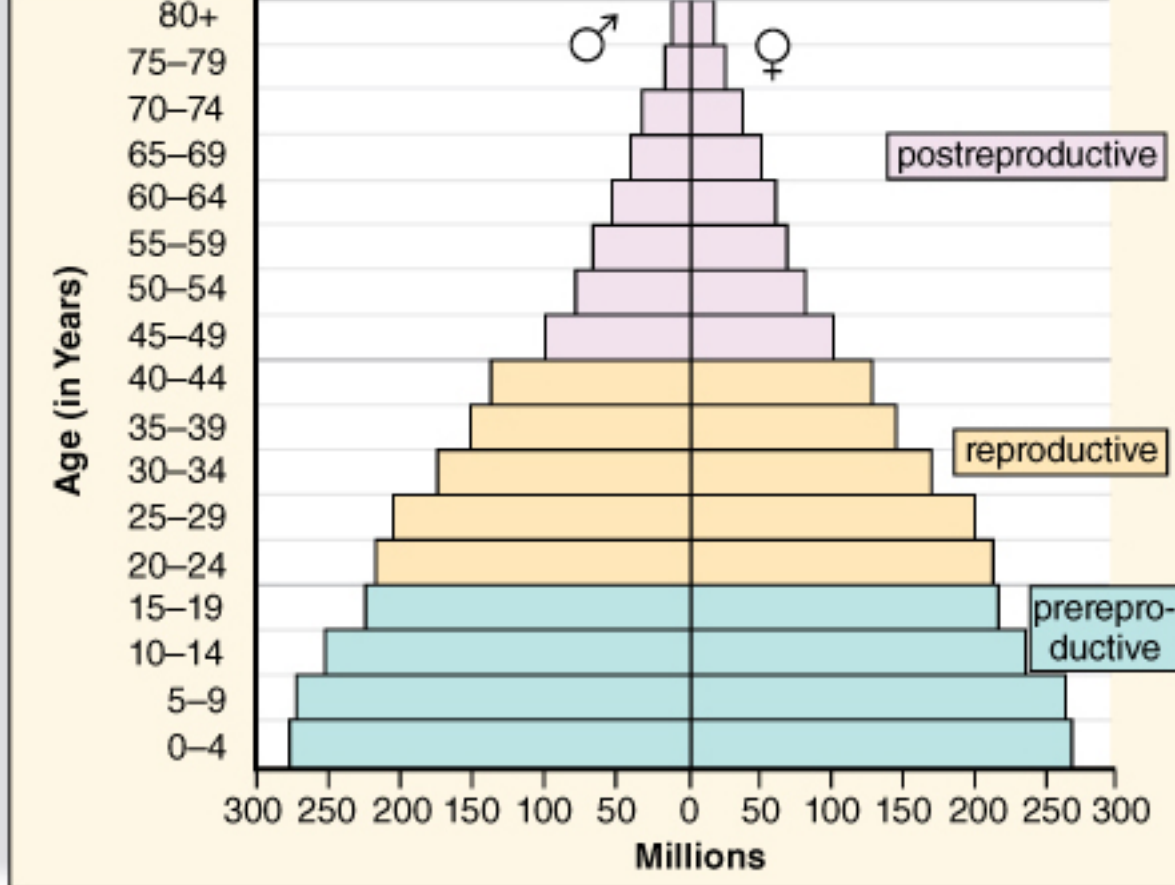
Between 2002 and 2050, the population of the LDCs may jump from 5 billion to at least 8 billion. Some of this increase will occur in Africa, but most will occur in Asia. Many deaths from AIDS are slowing the growth of the African population. Continued growth in Asia is expected to cause acute water scarcity, a significant loss of biodiversity, and more urban pollution. Twelve of the world's 15 most polluted cities are in Asia.

Comparing Age Structure

Comparing Age Structure The LDCs are experiencing a population increase because they have more women entering the reproductive years than older women leaving them. Populations have three age groups: prereproductive, reproductive, and postreproductive. This is best visualized by plotting the proportion of individuals in each group on a bar graph. This produces an age-structure diagram (Fig. 24.2).



a. More-developed countries (MDCs)



b. Less-developed countries (LDCs)



c.
Figure 24.2
Age-structure diagrams of MDCs and LDCs.

The shape of these age-structure diagrams allows us to predict that (a) the populations of MDCs are approaching stabilization, and (b) the populations of LDCs will continue to increase for some time. (c) Improved women's rights and increasing contraceptive use could change this scenario. Here, a community health worker is instructing women in Bangladesh about the use of contraceptives.

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Laypeople are sometimes under the impression that if each couple has two children, zero population growth will take place immediately. However, **replacement reproduction**, as this practice is called, will still cause populations to increase in size because of our life expectancy.

Most people will live long enough to become grandparents or even great-grandparents, thus resulting in an increase in the population.

CHECK YOUR PROGRESS 24.1

- 1 1 Calculate the annual growth rate of a population that is experiencing a birthrate of 20.5 per year and a death rate of 9.8 per year.

Answer

- 2 2 Compare the characteristics of an MDC with an LDC and give an example of each.

Answer

- 3 3 Evaluate an age-structure diagram to determine if the population will experience a population growth or decline in the future.

Answer