Population Concentrations

Learning Outcome 2.1.1

Describe regions where population is clustered and where it is sparse.

Two-thirds of the world's inhabitants are clustered in four regions (Figure 2-3). The four population clusters occupy generally low-lying areas, with fertile soil and temperate climate. Most live near the ocean or near a river with easy access to an ocean, rather than in the interior of major landmasses.

CLUSTERS

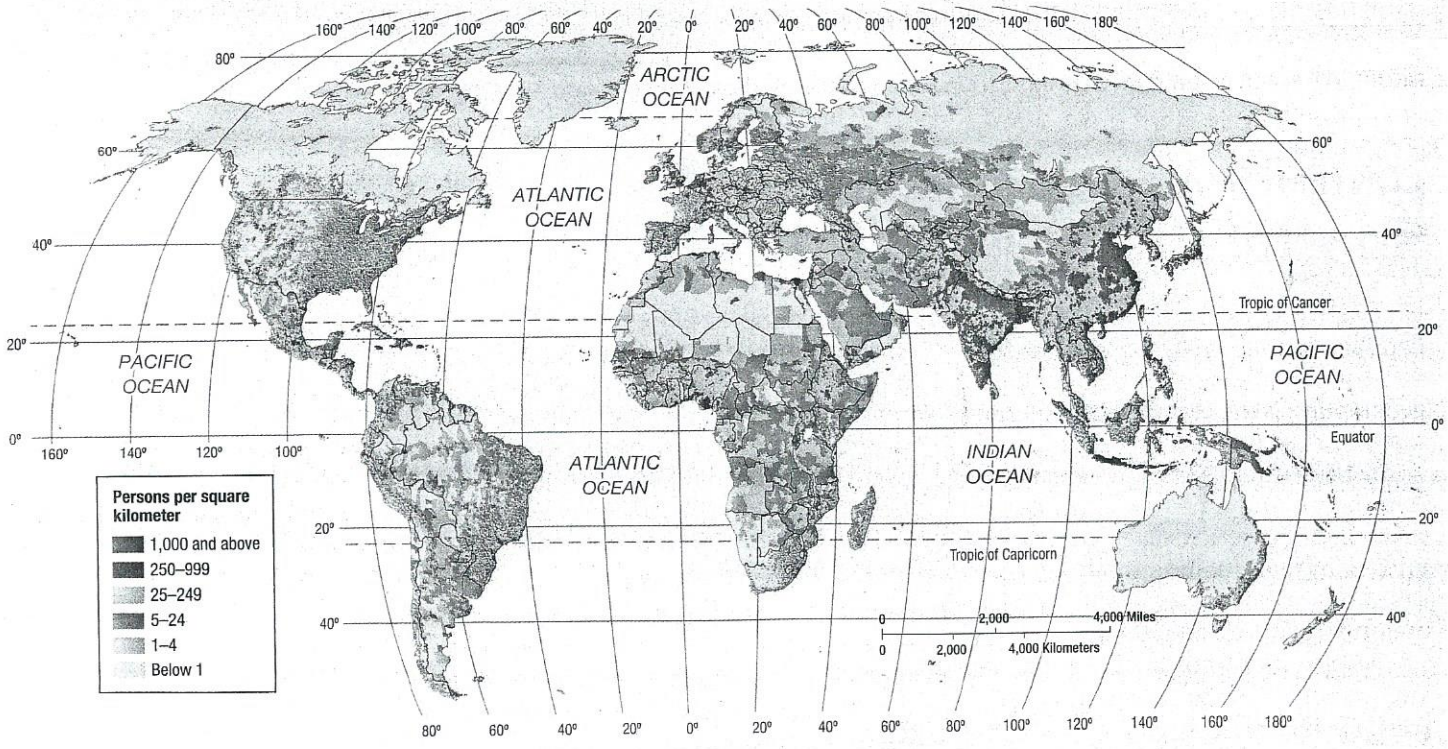
The four major population clusters—East Asia, South Asia, Europe, and Southeast Asia—display differences in the pattern of occupancy of the land.

EAST ASIA. Nearly one-fourth of the world's people live in East Asia. The region, bordering the Pacific Ocean, includes eastern China, the islands of Japan, the Korean peninsula, and the island of Taiwan. The People's Republic of China is the world's most populous country and the fourth-largest country in land area. The Chinese population is clustered near the Pacific Coast and in several fertile river valleys that extend inland, though much of China's interior is sparsely inhabited mountains and deserts. More than one-half of the people live in rural areas where they work as farmers. In sharp contrast to China, more than three-fourths of all Japanese and Koreans are clustered in urban areas and work at industrial or service jobs.

SOUTH ASIA. Nearly one-fourth of the world's people live in South Asia, which includes India, Pakistan, Bangladesh, and the island of Sri Lanka. The largest concentration of people within South Asia lives along a 1,500-kilometer (900-mile) corridor from Lahore, Pakistan, through India and Bangladesh to the Bay of Bengal. Much of this area's population is concentrated along the plains of the Indus and Ganges rivers. Population is also heavily concentrated near India's two long coastlines—the Arabian Sea to the west and the Bay of Bengal to the east. Like the Chinese, most people in South Asia are farmers living in rural areas.

EUROPE. Europe includes four dozen countries, ranging from Monaco, with 1 square kilometer (0.7 square miles) and a population of 33,000, to Russia, the world's largest country in land area when its Asian part is included. In contrast to the three Asian concentrations, three-fourths of Europe's inhabitants live in cities, and fewer than 10 percent are farmers. The highest population concentrations in Europe are near the major rivers and coalfields of Germany and Belgium, as well as historic capital cities such as London and Paris.

SOUTHEAST ASIA. Around 600 million people live in Southeast Asia, mostly on a series of islands that lie between the Indian and Pacific oceans. Indonesia, which consists of 13,677 islands, is the world's fourth-most-populous country. The largest population concentration is on the island of Java, inhabited by more than 100 million people.



▲ **FIGURE 2-3 POPULATION DISTRIBUTION** People are not distributed uniformly across Earth's surface.

Several islands that belong to the Philippines contain high population concentrations, and population is also clustered along several river valleys and deltas at the southeastern tip of the Asian mainland, known as Indochina. Like China and South Asia, the Southeast Asia concentration is characterized by a high percentage of people working as farmers in rural areas.

OTHER CLUSTERS. The largest population concentration in the Western Hemisphere is in the northeastern United States and southeastern Canada. This cluster extends along the Atlantic Coast from Boston to Newport News, Virginia, and westward along the Great Lakes to Chicago. The largest cluster in Africa is along the Atlantic coast, especially the portion facing south. Nigeria is the most populous country in Africa. As in the three Asian concentrations, most West Africans work in agriculture.

Pause and Reflect 2.1.1
Why isn't North America one of the four major population clusters?

SPARSELY POPULATED REGIONS

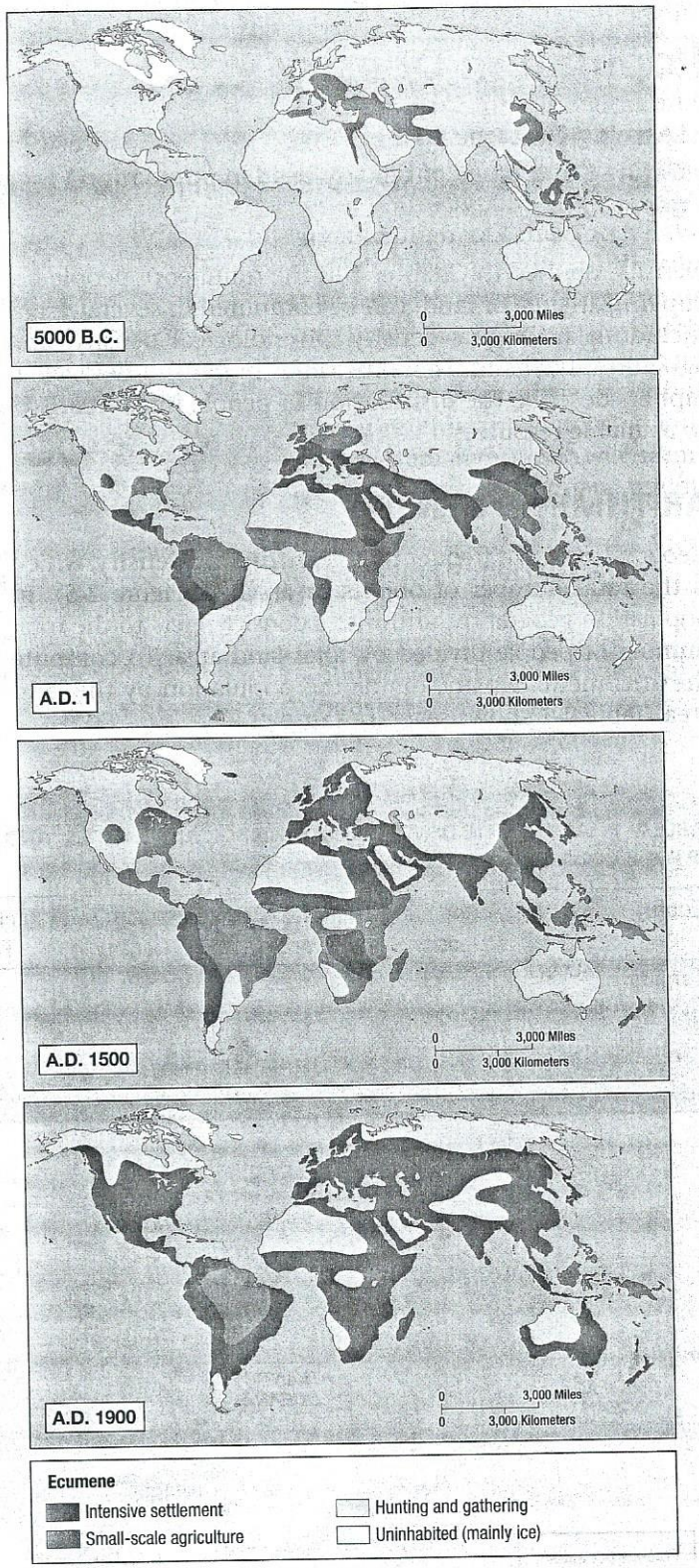
Human beings avoid clustering in certain physical environments. Relatively few people live in regions that are too dry, too wet, too cold, or too mountainous for activities such as agriculture. The areas of Earth that humans consider too harsh for occupancy have diminished over time, whereas the portion of Earth's surface occupied by permanent human settlement—called the **ecumene**—has increased (Figure 2-4).

DRY LANDS. Areas too dry for farming cover approximately 20 percent of Earth's land surface. Deserts generally lack sufficient water to grow crops that could feed a large population, although some people survive there by raising animals, such as camels, that are adapted to the climate. Dry lands contain natural resources useful to people—notably, much of the world's oil reserves.

WET LANDS. Lands that receive very high levels of precipitation, located primarily near the equator, may also be inhospitable for human occupation. The combination of rain and heat rapidly depletes nutrients from the soil and thus hinders agriculture.

COLD LANDS. Much of the land near the North and South poles is perpetually covered with ice or the ground is permanently frozen (permafrost). The polar regions are unsuitable for planting crops, few animals can survive the extreme cold, and few humans live there.

HIGH LANDS. The highest mountains in the world are steep, snow covered, and sparsely settled. However, some high-altitude plateaus and mountain regions are more densely populated, especially at low latitudes (near the equator) where agriculture is possible at high elevations.



▲ **FIGURE 2-4 ECUMENE** Seven thousand years ago humans occupied only a small percentage of Earth's land area, primarily in Southwest Asia, Eastern Europe, and East Asia. Even 500 years ago much of North America and Asia lay outside the ecumene. Still, approximately three-fourths of the world's population live on only 5 percent of Earth's surface. The balance of Earth's surface consists of oceans (about 71 percent) and less intensively inhabited land.

Population Density

Learning Outcome 2.1.2
Define three types of density used in population geography.

Density, defined in Chapter 1 as the number of people occupying an area of land, can be computed in several ways, including arithmetic density, physiological density, and agricultural density. These measures of density help geographers describe the distribution of people in comparison to available resources.

ARITHMETIC DENSITY

Geographers most frequently use **arithmetic density**, which is the total number of objects in an area (Figure 2-5). In population geography, arithmetic density refers to the total number of people divided by total land area. To compute the arithmetic density, divide the population by the land area. Table 2-1 shows several examples.

Arithmetic density enables geographers to compare th number of people trying to live on a given piece of lan in different regions of the world. Thus, arithmetic densit answers the "where" question. However, to explain wh people are not uniformly distributed across Earth's surfac other density measures are more useful.

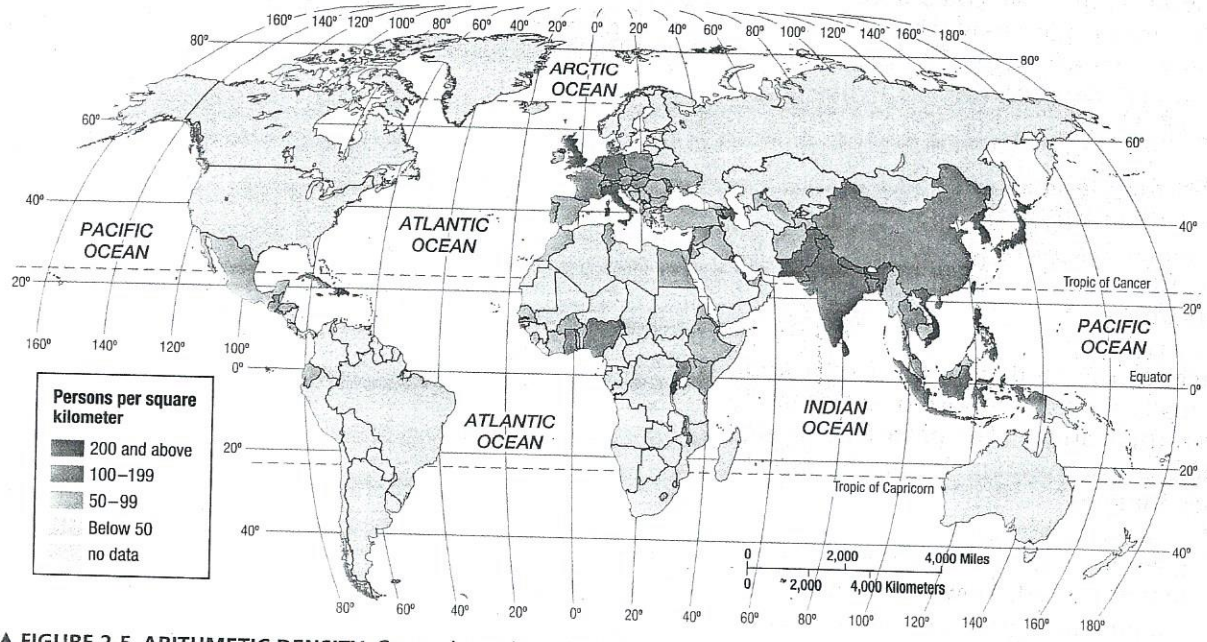
PHYSIOLOGICAL DENSITY

Looking at the number of people per area of a certain typ of land in a region provides a more meaningful populatio measure than arithmetic density. Land suited for agricul ture is called arable land. In a region, the number of peopl supported by a unit area of arable land is called the **physi ological density** (Figure 2-6).

Comparing physiological and arithmetic densitie helps geographers understand the capacity of the land t yield enough food for the needs of the people. In Egypt for example, the large difference between the physiologi cal density and arithmetic density indicates that most o the country's land is unsuitable for intensive agriculture In fact, all but 5 percent of Egyptians live in the Nile Rive valley and delta because it is the only area in the coun try that receives enough moisture (by irrigation from the river) to allow intensive cultivation of crops.

TABLE 2–1 ARITHMETIC DENSITIES, PHYSIOLOGICAL DENSITIES, AND AGRICULTURAL DENSITIES OF FOUR COUNTRIES

Country	Arithmetic Density	Physiological Density	Agricultural Density	Percentage Farmers	Percent Arable Land
Canada	3	65	1	2	0.5
United States	32	175	2	2	1.7
The Netherlands	400	1,748	23	3	0.01
Egypt	80	2,296	251	31	0.03



▲ **FIGURE 2-5 ARITHMETIC DENSITY** Geographers rely on the arithmetic density to compare conditions in different countries because the two pieces of information–total population and total land area–are easy to obtain. The highest arithmetic densities are found in Asia, Europe, and Central America. The lowest are in North and South America and South Pacific.

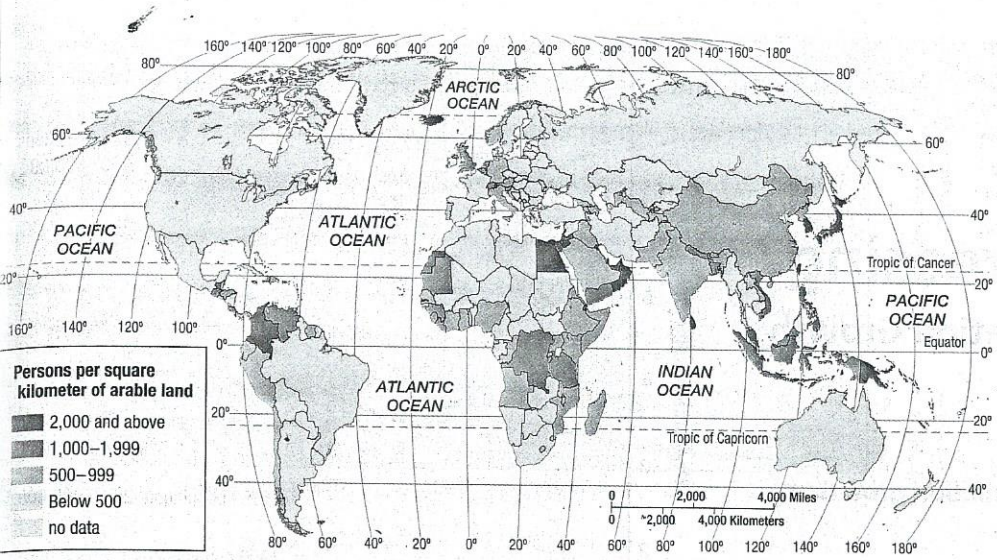


FIGURE 2-6 PHYSIOLOGICAL DENSITY Physiological density provides insights into the relationship between the size of a population and the availability of resources in a region. The relatively large physiological densities of Egypt and the Netherlands demonstrates that crops grown on a hectare of land in these two countries must feed far more people than in the United States or Canada, which have much lower physiological densities. The highest physiological densities are found in Asia, sub-Saharan Africa, and South America. The lowest are in North America, Europe, and South Pacific.

To understand relationships between population and resources in a country, geographers examine a country's physiological and agricultural densities together. For example, the physiological densities of both Egypt and the Netherlands are high, but the Dutch have a much lower agricultural density than the Egyptians. Geographers conclude that both the Dutch and Egyptians put heavy pressure on the land to produce food, but the more efficient Dutch agricultural system requires fewer farmers than does the Egyptian system.

Pause and Reflect 2.1.2

Name a country other than Egypt that has high physiological and agricultural densities.

AGRICULTURAL DENSITY

Two countries can have similar physiological densities but produce significantly different amounts of food because of different economic conditions. **Agricultural density** is the ratio of the number of farmers to the amount of arable land (Figure 2-7). Table 2-1 shows several examples.

Measuring agricultural density helps account for economic differences. Developed countries have lower agricultural densities because technology and finance allow a few people to farm extensive land areas and feed many people.

CHECK-IN: KEY ISSUE 1

Where Is The World's Population Distributed?

- ✓ **Most of the world's population is highly clustered in four regions.**
- ✓ **Arithmetic, physiological, and agricultural densities are different approaches to describing the distribution of people.**

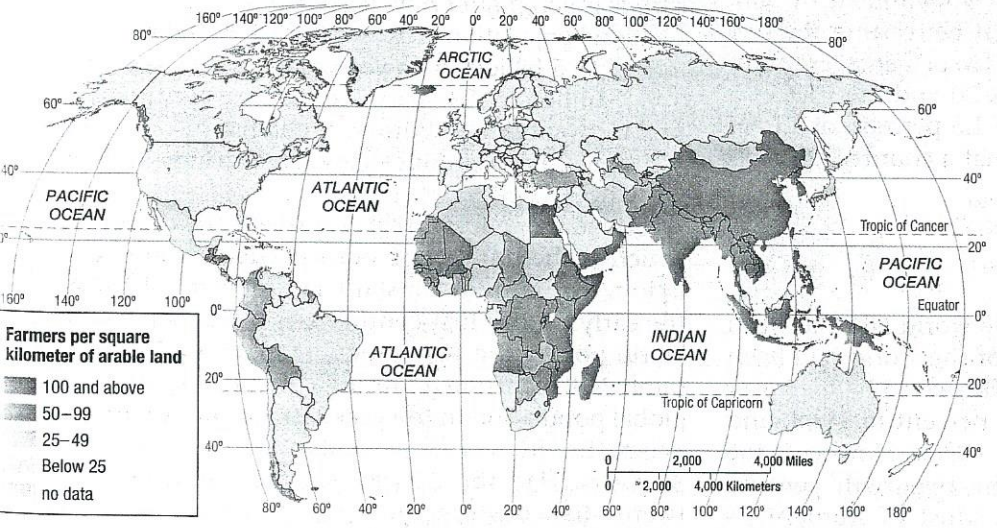


FIGURE 2-7 AGRICULTURAL DENSITY The highest agricultural densities are found in Asia and sub-Saharan Africa. The lowest are in North America, Europe, and South Pacific.

KEY ISSUE 2

Why Is Global Population Increasing?

- Components of Population Growth
- Population Structure

Learning Outcome 2.2.1
Understand how to measure population growth through the natural increase rate.

Population increases rapidly in places where many more people are born than die, and it declines in places where deaths outnumber births. The population of a place also increases when people move in and decreases when people move out. This element of population change—migration—is discussed in Chapter 3.

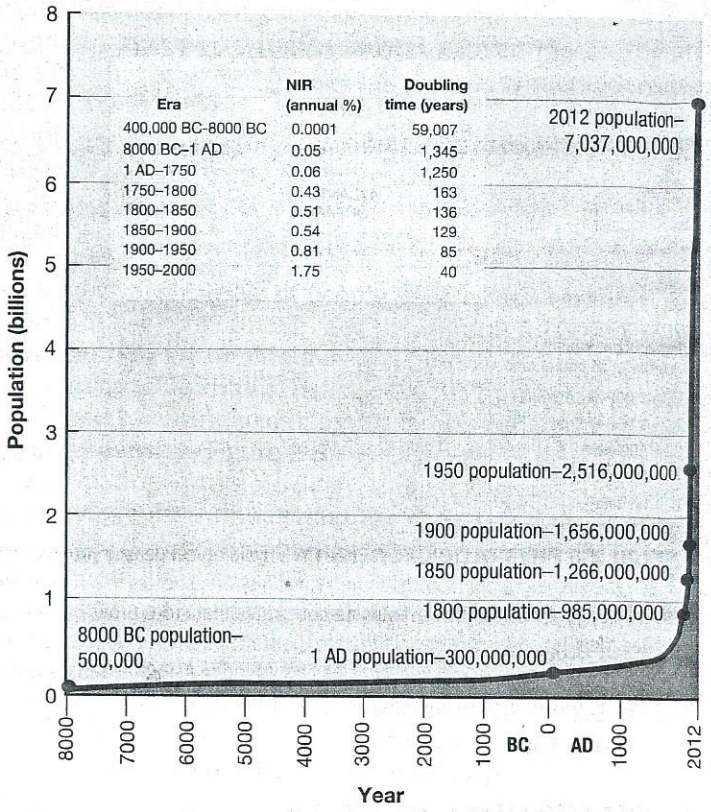
COMPONENTS OF POPULATION GROWTH

Geographers most frequently measure population change in a country or the world as a whole by using three measures:

- **Crude birth rate (CBR)** is the total number of live births in a year for every 1,000 people alive in the society. A CBR of 20 means that for every 1,000 people in a country, 20 babies are born over a one-year period.
- **Crude death rate (CDR)** is the total number of deaths in a year for every 1,000 people alive in the society. Comparable to the CBR, the CDR is expressed as the annual number of deaths per 1,000 population.
- **Natural increase rate (NIR)** is the percentage by which a population grows in a year. It is computed by subtracting CDR from CBR, after first converting the two measures from numbers per 1,000 to percentages (numbers per 100). Thus if the CBR is 20 and the CDR is 5 (both per 1,000), then the NIR is 1.5 percent, or 15 per 1,000. The term *natural* means that a country's growth rate excludes migration.

NATURAL INCREASE

During the twenty-first century, the world NIR has been 1.2, meaning that the population of the world had been growing each year by 1.2 percent. The world NIR is lower today than its all-time peak of 2.2 percent in 1963, and it has declined sharply since the 1990s. However, the NIR during the second half of the twentieth century was high by historical standards. Most of humanity's



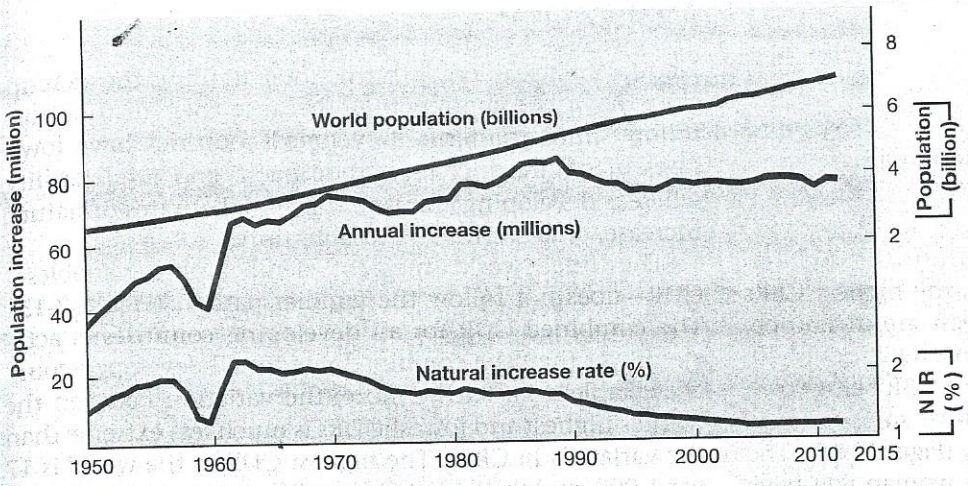
▲ **FIGURE 2-8 WORLD POPULATION THROUGH HISTORY** Through most of human history population growth was virtually nil. Population increased rapidly beginning in the eighteenth century.

several-hundred-thousand-year occupancy of Earth was characterized by an NIR of essentially zero, and Earth's population was unchanged, at perhaps a half-million (Figure 2-8).

About 82 million people are being added to the population of the world annually (Figure 2-9). This number represents a decline from the historic high of 87 million in 1990. The number of people added each year has dropped much more slowly than the NIR because the population base is much higher now than in the past.

World population increased from 3 to 4 billion in 14 years, from 4 to 5 billion in 13 years, and from 5 to 6 billion and 6 to 7 billion in 12 years. As the base continues to grow in the twenty-first century, a change of only one-tenth of 1 percent can produce very large swings in population growth.

The rate of natural increase affects the **doubling time**, which is the number of years needed to double a population, assuming a constant rate of natural increase. At the early twenty-first-century rate of 1.2 percent per year, world population would double in about 54 years. If the same NIR continued through the twenty-first century, global population in the year 2100 would reach 24 billion. When the NIR was 2.2 percent in 1963, doubling time was 35 years. Had the 2.2 percent rate continued into the twenty-first century, Earth's population in 2010 would



◀ **FIGURE 2-9 WORLD POPULATION GROWTH, 1950–2011** The NIR declined from its historic peak in the 1960s, but the number of people added each year has not declined very much because with world population increasing from 2.5 billion to more than 7 billion people during the period, the percentage has been applied to an ever larger base.

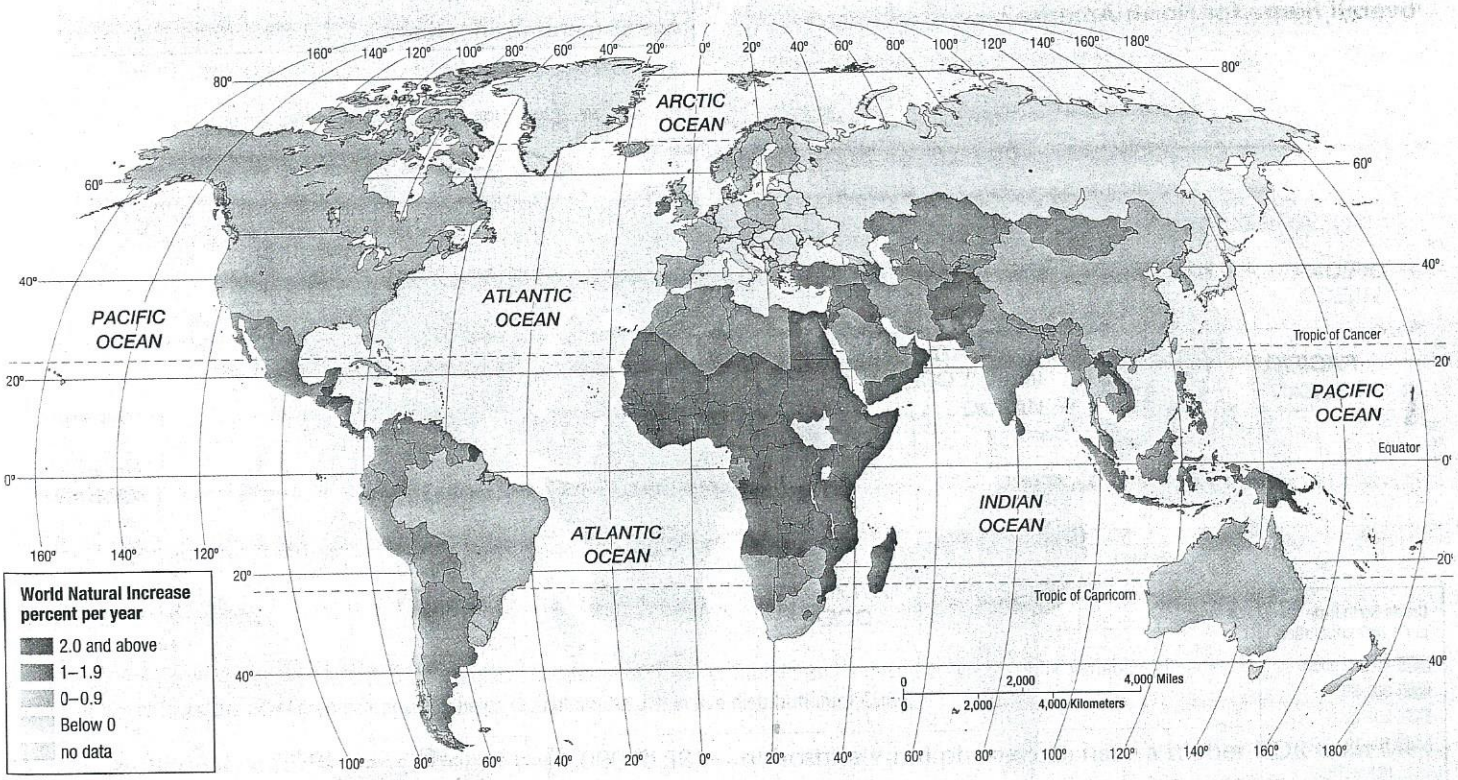
have been nearly 10 billion instead of nearly 7 billion. A 2.2 percent NIR through the twenty-first century would produce a total population of more than 50 billion in 2100.

More than 95 percent of the natural increase is clustered in developing countries (Figure 2-10). The NIR exceeds 2.0 percent in most countries of sub-Saharan Africa, whereas it is negative in Europe, meaning that in the absence of immigrants, population actually is declining. About one-third of the world's population growth during the past decade has been in South Asia, one-fourth in sub-Saharan Africa, and the remainder divided about equally among East Asia, Southeast Asia, Latin America, and Southwest Asia & North Africa.

Regional differences in NIRs mean that most of the world's additional people live in the countries that are least able to maintain them. To explain these variations in growth rates, geographers point to regional differences in fertility and mortality rates.

Pause and Reflect 2.2.1

The United States has an NIR of 0.6. Does that mean the doubling time is more than 54 years or less?



▲ **FIGURE 2-10 NATURAL INCREASE RATE** The world average is currently about 1.2 percent. The countries with the highest NIRs are concentrated in Africa and Southwest Asia.

FERTILITY

Learning Outcome 2.2.2

Understand how to measure births and deaths through CBR and CDR.

The world map of CBR (Figure 2-11) mirrors the distribution of NIR. As was the case with NIRs, the highest CBRs are in sub-Saharan Africa, and the lowest are in Europe. Many sub-Saharan African countries have a CBR over 40, whereas many European countries have a CBR below 10.

Geographers also use the **total fertility rate (TFR)** to measure the number of births in a society (Figure 2-12). The TFR is the average number of children a woman will have throughout her childbearing years (roughly ages 15 through 49). To compute the TFR, demographers assume that a woman reaching a particular age in the future will be just as likely to have a child as are women of that age today. Thus, the CBR provides a picture of a society as a whole in a given year, whereas the TFR attempts to predict the future behavior of individual women in a world of rapid cultural change.

The TFR for the world as a whole is 2.5, and, again, the figures vary between developed and developing countries. The TFR exceeds 5.0 in sub-Saharan Africa, compared to 2 or less in nearly all European countries.

Pause and Reflect 2.2.2

How does the TFR in your family compare to the overall figure for North America?

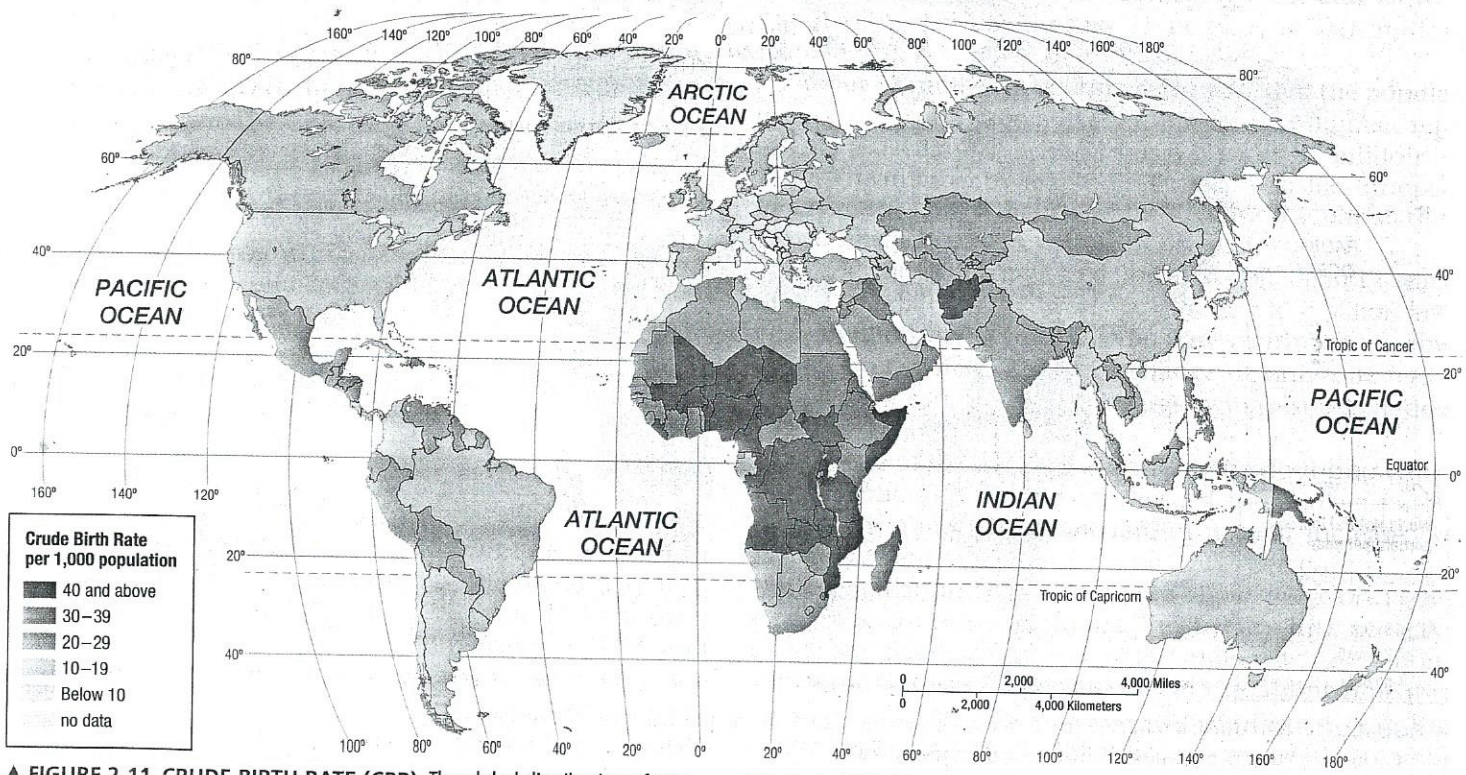
MORTALITY

Natural increase, crude birth, total fertility, the descriptions have become repetitive because their distributions follow similar patterns. Developed countries have lower rates of natural increase, crude birth, and total fertility, whereas developing countries have higher rates of natural increase, crude birth, and total fertility.

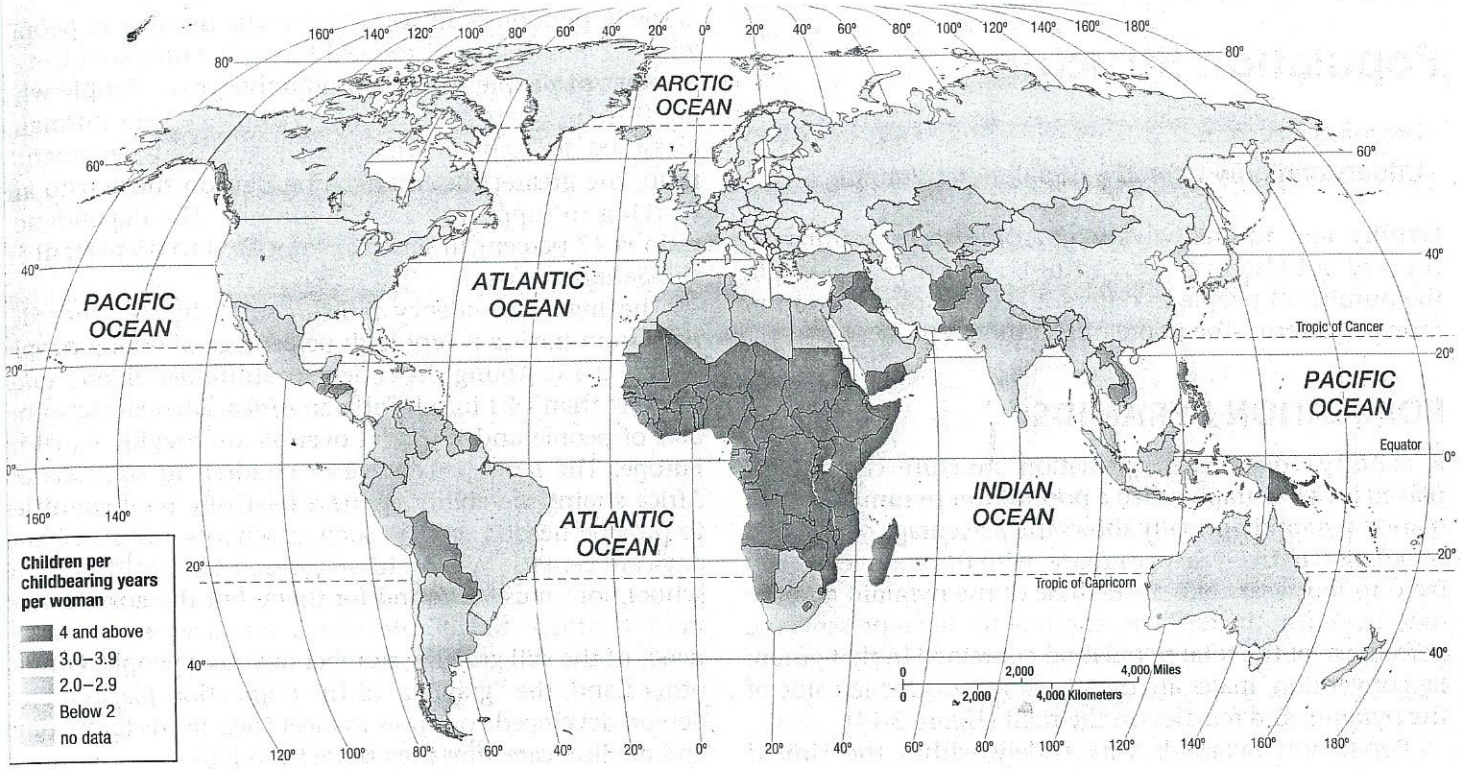
The final world map of demographic variables—CDR—does not follow the familiar pattern (Figure 2-13). The combined CDR for all developing countries is actually lower than the combined rate for all developed countries (Table 2-2). Furthermore, the variation between the world's highest and lowest CDRs is much less extreme than the variation in CBRs. The highest CDR in the world is 17 per 1,000, and the lowest is 1—a difference of 16—whereas

TABLE 2-2 COMPARING DEMOGRAPHIC FACTORS IN DEVELOPED AND DEVELOPING COUNTRIES

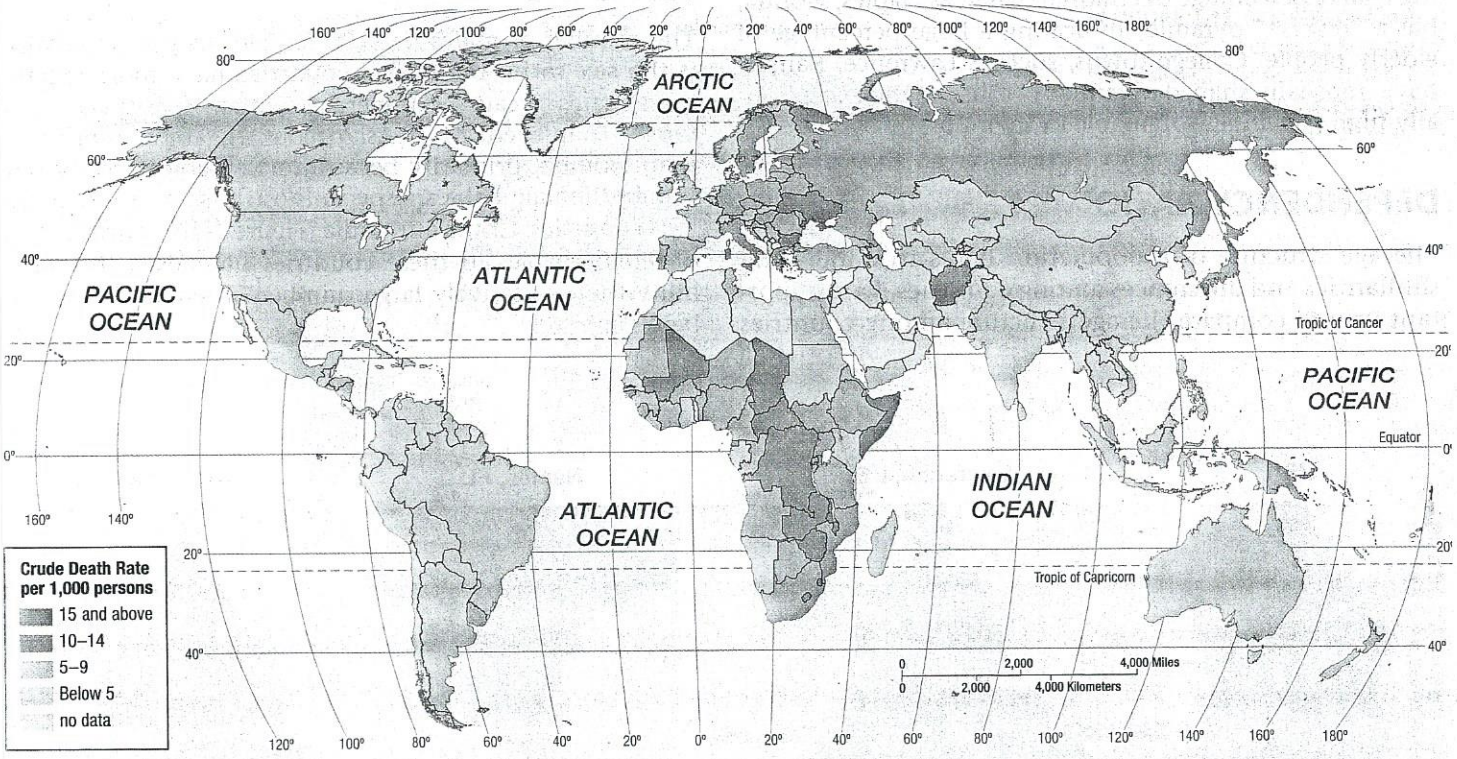
	Developed Countries	Developing Countries
Natural increase rate	0.2	1.4
Crude birth rate	11	22
Total fertility rate	1.7	2.6
Infant mortality rate	5	48
Life expectancy (years)	78	68
Crude death rate	10	8
Under age 15 (percent)	16	29
Age 65 (percent) and above	16	6



▲ **FIGURE 2-11 CRUDE BIRTH RATE (CBR)** The global distribution of CBRs parallels that of NIRs. The countries with the highest CBRs are concentrated in Africa and Southwest Asia.



▲ **FIGURE 2-12 TOTAL FERTILITY RATE (TFR)**
As with NIRs and CBRs, the countries with the highest TFRs are concentrated in Africa and Southwest Asia.



▲ **FIGURE 2-13 CRUDE DEATH RATE (CDR)** The global pattern of CDRs varies from those for the other demographic variables already mapped in this chapter. The demographic transition helps to explain the distinctive distribution of CDRs.

CBRs for individual countries range from 7 per 1,000 to 52, a spread of 45.

Why does Denmark, one of the world's wealthiest countries, have a higher CDR than Cape Verde, one of the poorest? Why does the United States, with its extensive system of hospitals and physicians, have a higher CDR than Mexico and nearly every country in Latin America? The answer is that the populations of different countries are at various stages in an important process known as the demographic transition, discussed later in this chapter.

Population Structure

Learning Outcome 2.2.3:
Understand how to read a population pyramid.

Fertility and mortality vary not only from country to country but also over time within a country. As a result, the number of people in different age groups in a country forms a pattern—the population structure.

POPULATION PYRAMIDS

A country's distinctive population structure can be displayed on a bar graph called a **population pyramid.** A population pyramid normally shows the percentage of the total population in five-year age groups, with the youngest group (zero to four years old) at the base of the pyramid and the oldest group at the top. The length of the bar represents the percentage of the total population contained in that group. By convention, males are usually shown on the left side of the pyramid and females on the right (Figure 2-14).

Population pyramids vary widely within the United States. For example, Laredo, Texas, which has a large Hispanic population, has a relatively broad pyramid, indicating a large percentage of children, whereas Naples, Florida, has a "reverse" pyramid, indicating a large percentage of elderly people. College towns, such as Lawrence, Kansas, have unusually shaped pyramids because of the exceptionally high percentage of people in their 20s.

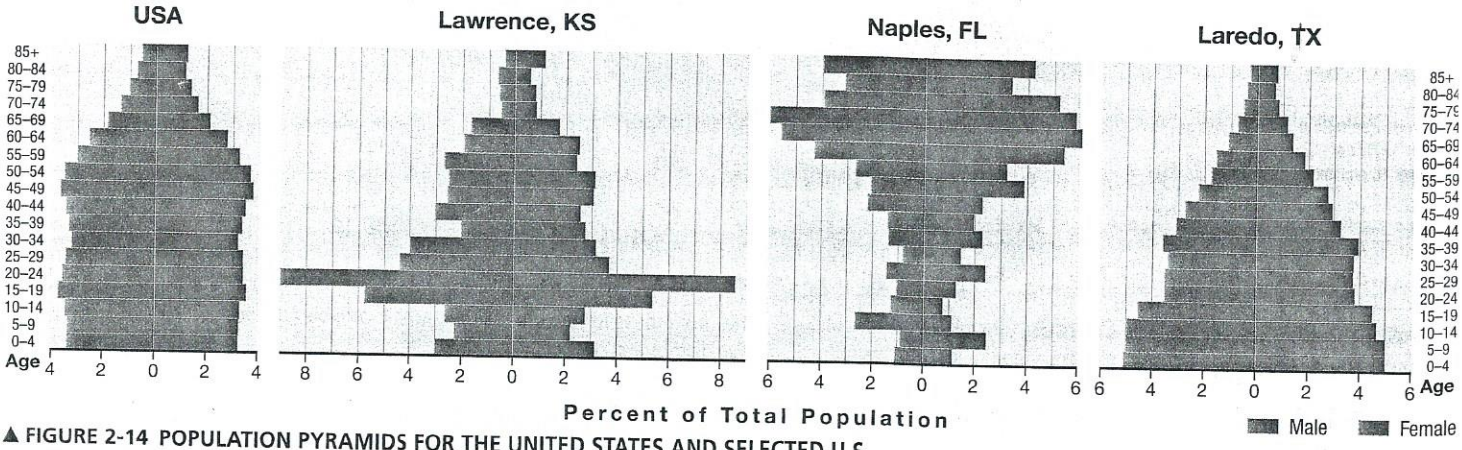
DEPENDENCY RATIO

The age structure of a population helps to understand similarities and differences among countries. One important way to compare the age structure among countries is the **dependency ratio,** which is the number of peop who are too young or too old to work, compared to th number of people in their productive years. People wh are 0 to 14 years of age and 65 and over are normall classified as dependents. The larger the dependenc ratio, the greater the financial burden on those who ar working to support those who do not. The dependenc ratio is 47 percent in Europe, compared to 85 percent i sub-Saharan Africa.

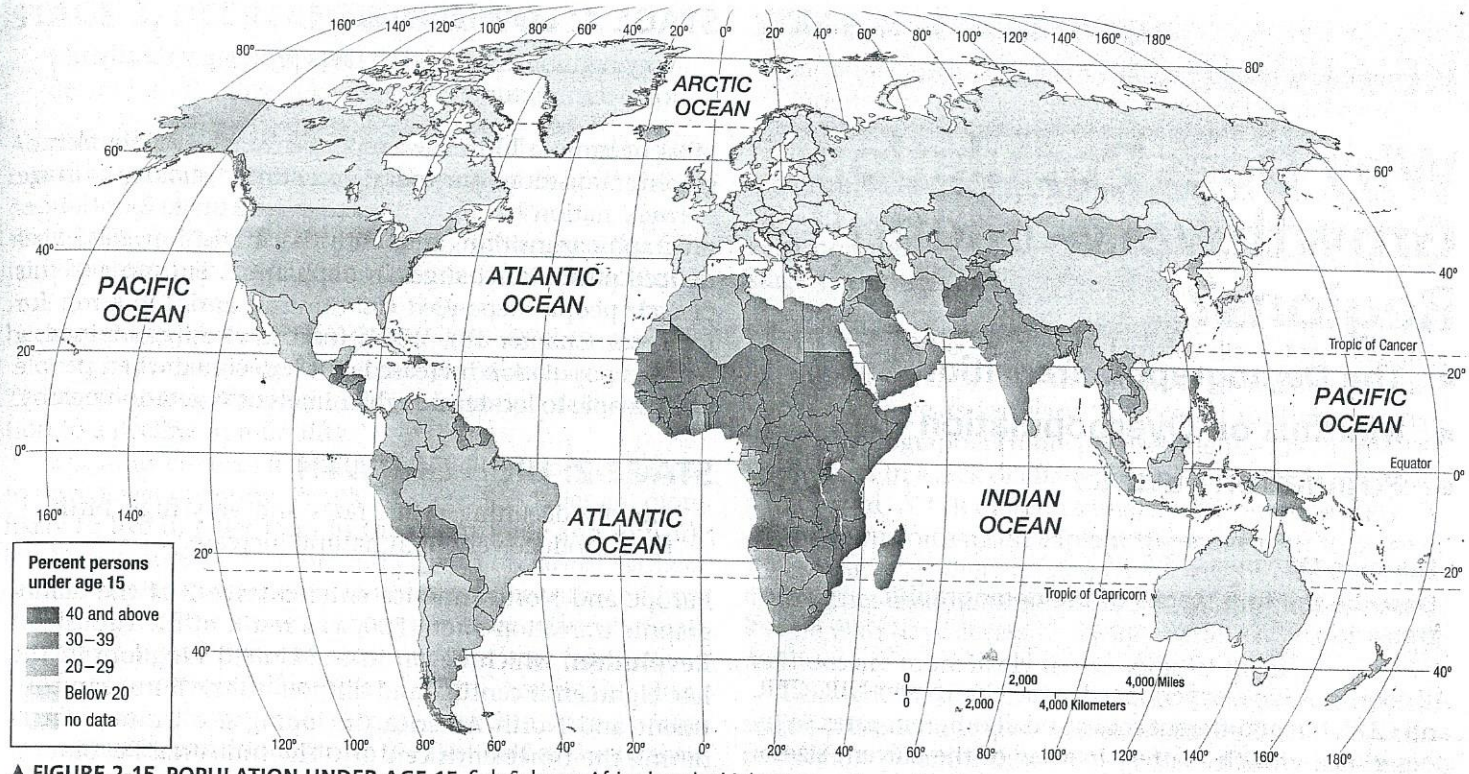
The high dependency ratio in sub-Saharan Africa de rives from having a very high percentage of young peopl (Figure 2-15). Young dependents outnumber elderly one by more than 14:1 in sub-Saharan Africa, whereas the num bers of people under 15 and over 65 are roughly equal in Europe. The large percentage of children in sub-Saharan Africa strains the ability of these relatively poor countrie to provide needed services such as schools, hospitals, and day-care centers. When children reach the age of leaving school, jobs must be found for them, but the governmen must continue to allocate scarce resources to meet the needs of the still growing number of young people. On the other hand, the "graying" of the population places a burden on developed countries to meet their needs for income and medical care after they retire from jobs.

SEX RATIO

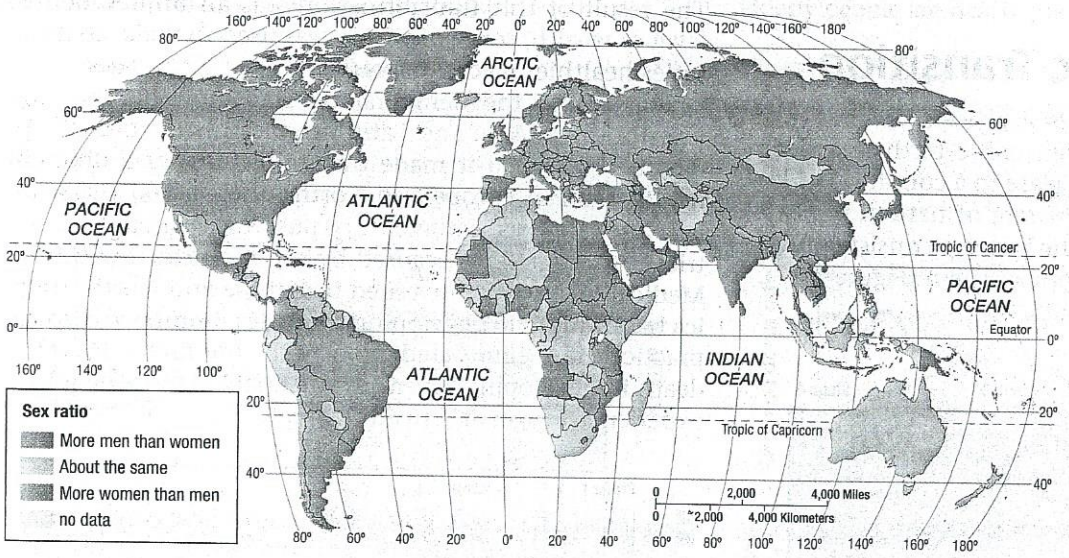
The number of males per 100 females in the population is the **sex ratio.** Developed countries have more females than males because on average women live seven years longer than men. Most Asian countries have more men than women, primarily because male babies greatly outnumber female babies, especially in the two most populous countries, China and India (Figure 2-16). The shortage of female babies in these countries has raised the possibility that a relatively large number of female fetuses are being aborted.



▲ **FIGURE 2-14 POPULATION PYRAMIDS FOR THE UNITED STATES AND SELECTED U.S. COMMUNITIES** Laredo has a broad pyramid, indicating higher percentages of young people and fertility rates. Lawrence has a high percentage of people in their twenties because it is the home of the University of Kansas. Naples has a high percentage of elderly people, especially women, so its pyramid is upside down.



▲ **FIGURE 2-15 POPULATION UNDER AGE 15** Sub-Saharan Africa has the highest percentage of persons under age 15.



◀ **FIGURE 2-16 SEX RATIO** A map of the percentage of people over age 65 would show a reverse pattern, with the highest percentages in Europe and the lowest in Africa and Southwest Asia.

Pause and Reflect 2.2.3

Name a type of community that might have a lot more males than females.

CHECK-IN: KEY ISSUE 2

Why Is Global Population Increasing?

- ✓ The NIR measures population growth as the difference between births and deaths.
- ✓ Births and deaths are measured using several indicators.
- ✓ A community's distinctive distribution by age and gender can be displayed in a population pyramid.

KEY ISSUE 3

Why Does Population Growth Vary among Regions?

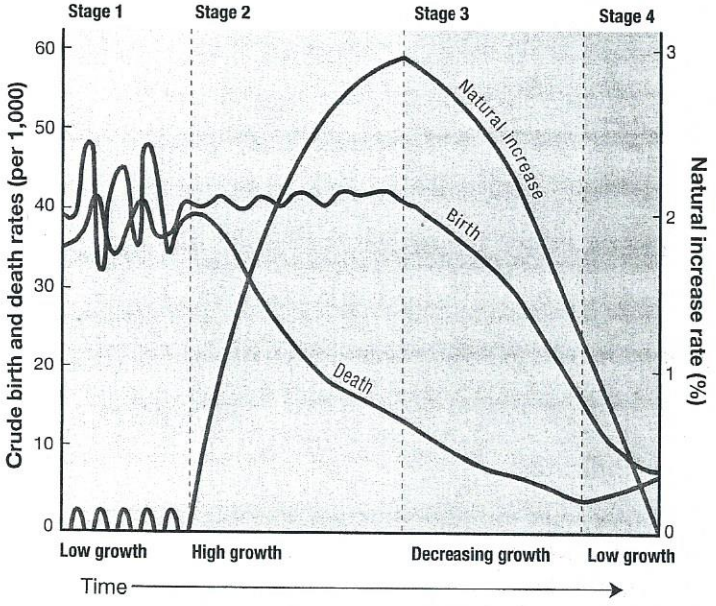
- The Demographic Transition
- Malthus on Overpopulation
- Population Futures

Learning Outcome 2.3.1
Describe the four stages of the demographic transition.

All countries have experienced some changes in NIR, CBR, and CDR, but at different times and at different rates. Why does global growth matter? In view of the current size of Earth's population and the NIR, will there soon be too many of us?

The Demographic Transition

The **demographic transition** is a process of change in a society's population from high crude birth and death rates and low rate of natural increase to a condition of low crude birth and death rates, low rate of natural increase, and higher total population. The process consists of four stages, and every country is in one of them (Figure 2-17).



▲ FIGURE 2-17 DEMOGRAPHIC TRANSITION MODEL The demographic transition model consists of four stages.

STAGE 1: LOW GROWTH

Very high birth and death rates produce virtually no long-term natural increase.

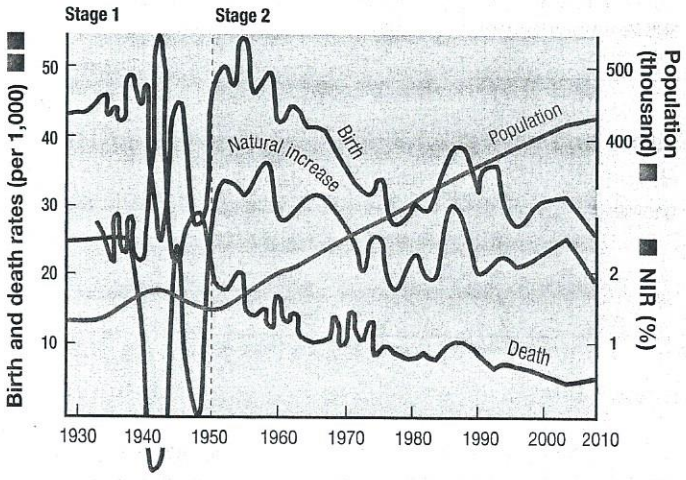
Most of human history was spent in stage 1 of the demographic transition, but today no country remains in stage 1. Every nation has moved on to at least stage 2 of the demographic transition, and, with that transition, has experienced profound changes in population. For most of this period, people depended on hunting and gathering for food (see Chapter 10). When food was easily obtained, a region's population increased, but it declined when people were unable to locate enough animals or vegetation nearby.

STAGE 2: HIGH GROWTH

Rapidly declining death rates and very high birth rates produce very high natural increase.

Europe and North America entered stage 2 of the demographic transition after 1750, as a result of the **Industrial Revolution**, which began in the United Kingdom in the late eighteenth century and diffused to the European continent and North America (including the United States) during the nineteenth century. The Industrial Revolution was a conjunction of major improvements in manufacturing goods and delivering them to market (see Chapter 11). The result of this transformation was an unprecedented level of wealth, some of which was used to make communities healthier places to live.

Stage 2 of the demographic transition did not diffuse to Africa, Asia, and Latin America until around 1950 (Figure 2-18), and it made that transition for a different reason than in Europe and North America 200 years earlier. The late-twentieth-century push of developing countries into stage 2 was caused by the **medical revolution.** Medical technology invented in Europe and North America has diffused to developing countries. Improved medical practices have eliminated many of the traditional causes of death in developing countries and enabled more people to experience longer and healthier lives.



▲ FIGURE 2-18 STAGE 2: CAPE VERDE Cape Verde entered stage 2 of the demographic transition in approximately 1950, as indicated by the large gap

STAGE 3: DECREASING GROWTH

Birth rates rapidly decline, death rates continue to decline, and natural increase rates begin to moderate.

A country moves from stage 2 to stage 3 of the demographic transition when the CBR begins to drop sharply. The CDR continues to fall in stage 3 but at a much slower rate than in stage 2. The population continues to grow because the CBR is still greater than the CDR. But the rate of natural increase is more modest in countries in stage 3 than in those in stage 2 because the gap between the CBR and the CDR narrows.

A society enters stage 3 when people have fewer children. The decision to have fewer children is partly a delayed reaction to a decline in mortality,

Economic changes in stage 3 societies also induce people to have fewer offspring. People in stage 3 societies are more likely to live in cities than in the countryside and to work in offices, shops, or factories rather than on farms. Farmers often consider a large family to be an asset because children can do some of the chores. Urban homes are relatively small and may not have space to accommodate large families.

Most countries in Europe and North America (including the United States) moved from stage 2 to stage 3 of the demographic transition during the first half of the twentieth century. The movement took place during the second half of the twentieth century in many countries of Asia and Latin America, including Chile (Figure 2-19).

STAGE 4: LOW GROWTH

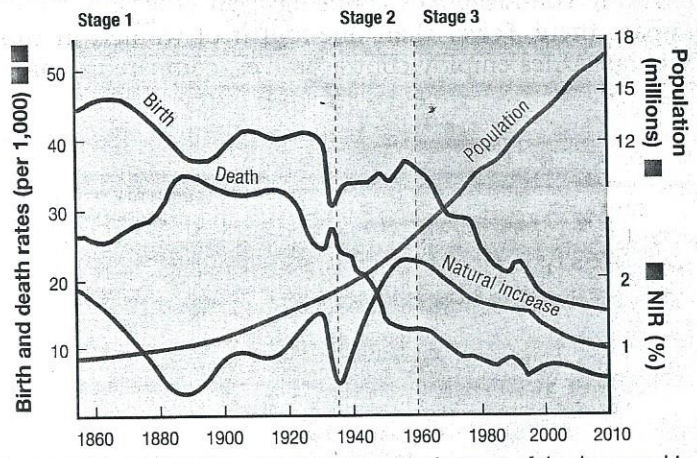
Very low birth and death rates produce virtually no long-term natural increase and possibly a decrease.

A country reaches stage 4 of the demographic transition when the CBR declines to the point where it equals the CDR and the NIR approaches zero. This condition is called **zero population growth (ZPG)**, a term often applied to stage 4 countries.

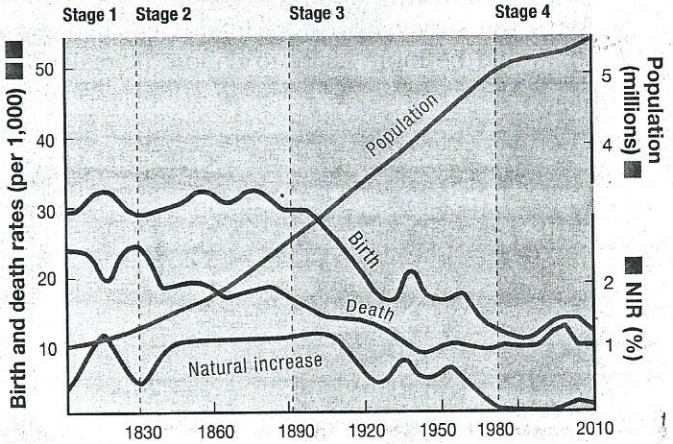
ZPG may occur when the CBR is still slightly higher than the CDR because some females die before reaching childbearing years, and the number of females in their childbearing years can vary. To account for these discrepancies, demographers more precisely define ZPG as the TFR that results in a lack of change in the total population over a long term. A TFR of approximately 2.1 produces ZPG.

Social customs again explain the movement to stage 4. Increasingly, women in stage 4 societies enter the labor force rather than remain at home as full-time homemakers. People who have access to a wider variety of birth-control methods are more likely to use some of them.

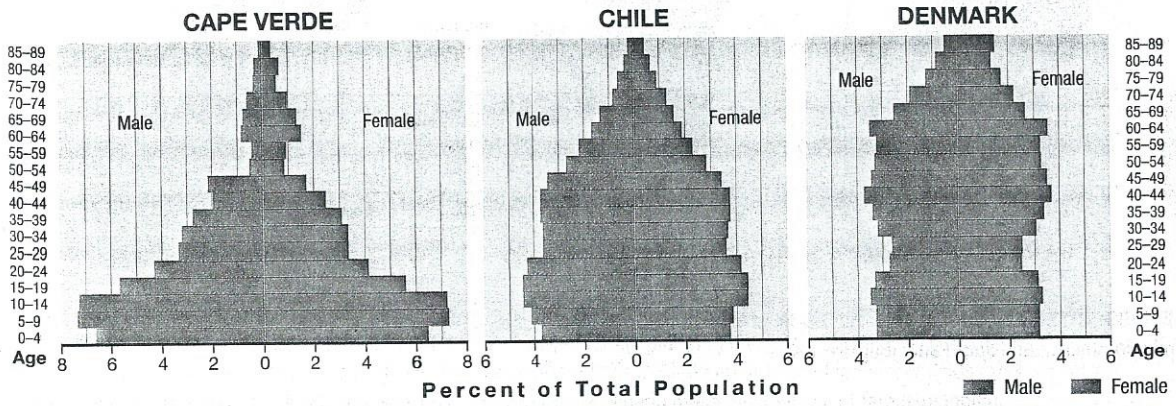
Denmark, like most other European countries, has reached stage 4 of the demographic transition (Figure 2-20). Denmark's population pyramid shows the impact of the demographic transition. Instead of a classic pyramid shape, Denmark has a column, demonstrating that the percentages of young and elderly people are nearly the same (Figure 2-21).



▲ **FIGURE 2-19 STAGE 3: CHILE** Chile entered stage 2 of the demographic transition in the 1930s, when death rates declined sharply, and stage 3 in the 1960s, when birth rates declined sharply.



▲ **FIGURE 2-20 STAGE 4: DENMARK** Denmark has been in stage 4 of the demographic transition and has experienced virtually no change in total population since the 1970s.



◀ **FIGURE 2-21 POPULATION PYRAMIDS** As a country moves through the demographic transition, the shape of the pyramid flattens. (left) Cape Verde's pyramid has a broad base, as is typical of a stage 2 country. (center) Chile's graph still resembles a pyramid. (right) Denmark's pyramid is flat, an indication of the aging of the population.

DECLINING BIRTH RATES

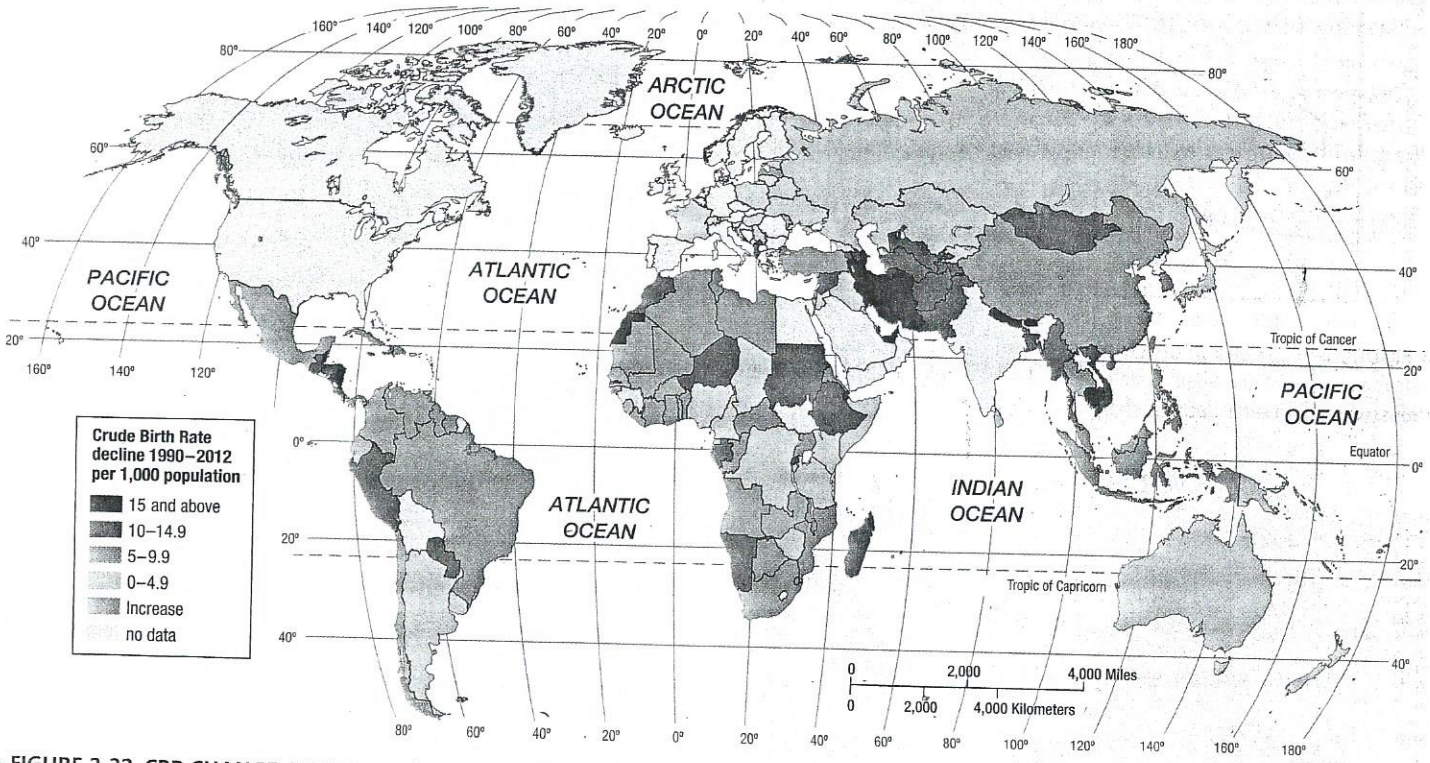
Learning Outcome 2.3.2
Summarize two approaches to reducing birth rates.

The CBR has declined rapidly since 1990, from 27 to 20 in the world as a whole and from 31 to 22 in developing countries (Figure 2-22). Two strategies have been successful in reducing birth rates:

1. **Lowering birth rates through education and health care.** One approach to lowering birth rates emphasizes the importance of improving local economic conditions (Figure 2-23). A wealthier community has more money to spend on education and health-care programs that promote lower birth rates. According to this approach:
   - With more women able to attend school and to remain in school longer, they would be more likely to learn employment skills and gain more economic control over their lives.
   - With better education, women would better understand their reproductive rights, make more informed reproductive choices, and select more effective methods of contraception.
   - With improved health-care programs, IMRs would decline through such programs as improved prenatal care, counseling about sexually transmitted diseases, and child immunization.
   - With the survival of more infants ensured, women would be more likely to choose to make more effective use of contraceptives to limit the numbe of children.
2. **Lowering birth rates through contraception.** The other approach to lowering birth rates emphasizes the importance of rapidly diffusing modern contraceptive methods (Figure 2-24). Economic development may promote lower birth rates in the long run, but the world cannot wait around for that alternative to take effect. Putting resources into family-planning programs can reduce birth rates much more rapidly. In developing countries, demand for contraceptive devices is greater than the available supply. Therefore, the most effective way to increase their use is to distribute more of them cheaply and quickly. According to this approach, contraceptives are the best method for lowering the birth rate.

Bangladesh is an example of a country that has had little improvement in the wealth and literacy of its people, but 56 percent of the women in the country used contraceptives in 2011 compared to 6 percent three decades earlier. Similar growth in the use of contraceptives has occurred in other developing countries, including Colombia, Morocco, and Thailand. Rapid growth in the acceptance of family planning is evidence that in the modern world, ideas can diffuse rapidly, even to places where people have limited access to education and modern communications.

The percentage of women using contraceptives is especially low in sub-Saharan Africa, so the alternative of distributing contraceptives could have an especially strong impact there. Fewer than one-fourth of women in sub-Saharan Africa employ contraceptives, compared to more



▲ **FIGURE 2-22 CBR CHANGE 1980–2012** The crude birth rate has declined in all but a handful of countries. Declines have been most rapid in Latin America and South and Southwest Asia.

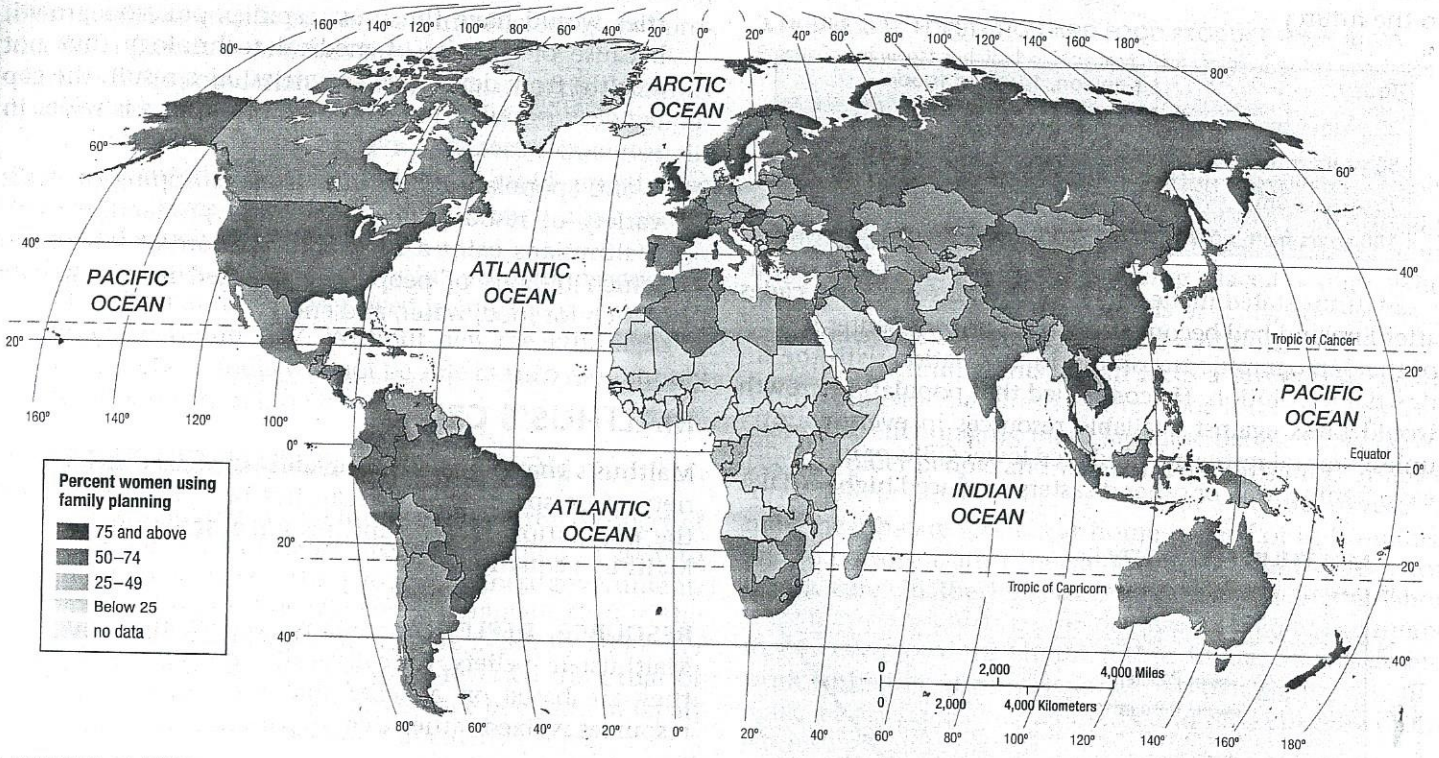
▲ **FIGURE 2-23 PROMOTING FEWER CHILDREN** Women talk about birth control at a health clinic in Kampong Cham, Cambodia.

than two-thirds in Asia and three-fourths in Latin America (Figure 2-25).

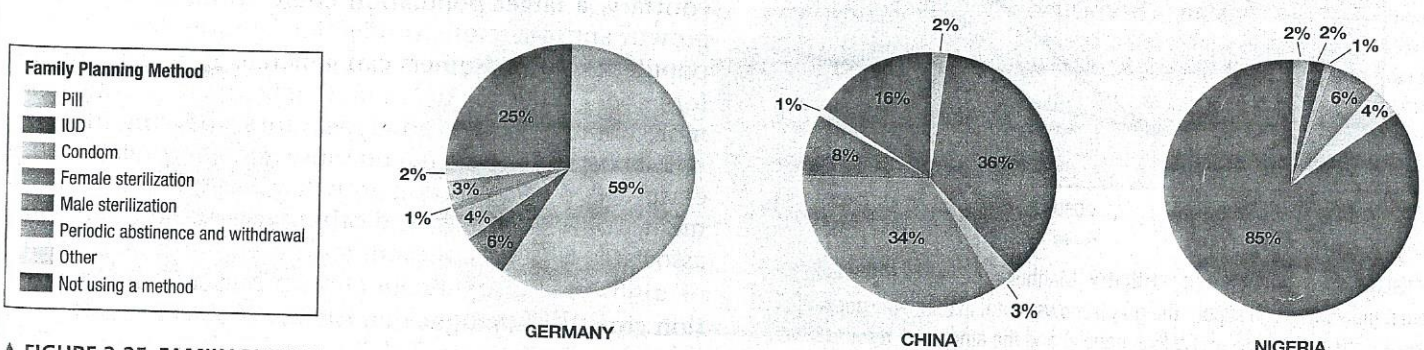
Regardless of which alternative is more successful, many oppose birth-control programs for religious and political reasons. Adherents of several religions, including Roman Catholics, fundamentalist Protestants, Muslims, and Hindus, have religious convictions that prevent them from using some or all birth-control methods. In the United States opposition is strong to terminating pregnancy by abortion, and the U.S. government has at times withheld aid to countries and family-planning organizations that advise abortion, even when such advice is only a small part of the overall aid program.

Pause and Reflect 2.3.2

Why have countries in Northern Europe had little if any decline in CBR since 1990?



▲ **FIGURE 2-24 WOMEN USING FAMILY PLANNING** More than two-thirds of couples in developed countries use a family-planning method. Family-planning varies widely in developing countries. China reports the world's highest rate of family planning; the lowest rates are in sub-Saharan Africa.



▲ **FIGURE 2-25 FAMILY PLANNING METHODS** The principal family-planning methods in developed countries like Germany are condoms and birth-control pills. The principal methods in China are intrauterine devices (IUDs) and female sterilization. People in sub-Saharan African countries such as Nigeria make minimal use of family-planning.

Malthus on Overpopulation

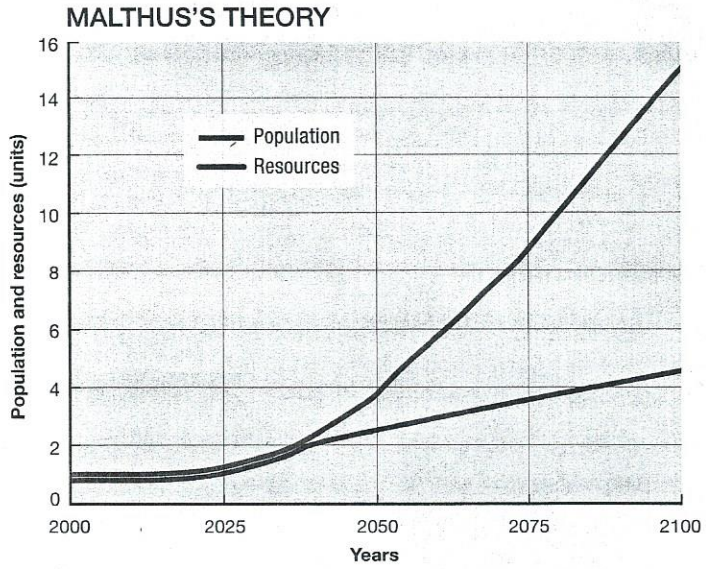
Learning Outcome 2.3.3
Summarize Malthus's argument about the relationship between population and resources.

English economist Thomas Malthus (1766–1834) was one of the first to argue that the world's rate of population increase was far outrunning the development of food supplies. In *An Essay on the Principle of Population*, published in 1798, Malthus claimed that the population was growing much more rapidly than Earth's food supply because population increased geometrically, whereas food supply increased arithmetically (Figure 2-26).

According to Malthus, these growth rates would produce the following relationships between people and food in the future:

Today:	1 person, 1 unit of food
25 years from now:	2 persons, 2 units of food
50 years from now:	4 persons, 3 units of food
75 years from now:	8 persons, 4 units of food
100 years from now:	16 persons, 5 units of food

Malthus stated made these conclusions several decades after England had become the first country to enter stage 2 of the demographic transition, in association with the Industrial Revolution. He concluded that population growth would press against available resources in every country unless "moral restraint" produced lower CBRs or unless disease, famine, war, or other disasters produced higher CDRs.



▲ **FIGURE 2-26 MALTHUS'S THEORY** Malthus expected population to grow more rapidly than food supply. The graph shows that if in 2000, the population of a place were 1 unit (such as 1 billion people) and the amount of resources were 1 unit (such as 1 billion tons of grain), then according to Malthus's theory, in 2100 the place would have around 15 billion people and 5 billion tons of grain).

Pause and Reflect 2.3.3
Calculate the units of population and food that Malthus predicted would exist in 200 years.

CONTEMPORARY NEO-MALTHUSIANS

Malthus's views remain influential today. Contemporary geographers and other analysts are taking another look at Malthus's theory because of Earth's unprecedented rate of natural increase during the twentieth century. Neo-Malthusians argue that two characteristics of recent population growth make Malthus's thesis even more frightening than when it was first written more than 200 years ago:

- In Malthus's time only a few relatively wealthy countries had entered stage 2 of the demographic transition, characterized by rapid population increase. Malthus failed to anticipate that relatively poor countries would have the most rapid population growth because of transfer of medical technology (but not wealth) from developed countries. As a result, the gap between population growth and resources is wider in some countries than even Malthus anticipated.
- World population growth is outstripping a wide variety of resources, not just food production. Neo-Malthusians paint a frightening picture of a world in which billions of people are engaged in a desperate search for food, water, and energy.

MALTHUS'S CRITICS

Malthus's theory has been severely criticized from a variety of perspectives. Criticism has been leveled at both the population growth and resource depletion sides of Malthus's equation.

RESOURCE DEPLETION. Many geographers consider Malthusian beliefs unrealistically pessimistic because they are based on a belief that the world's supply of resources is fixed rather than expanding.

POPULATION GROWTH. Critics disagree with Malthus's theory that population growth is a problem. To the contrary, a larger population could stimulate economic growth and, therefore, production of more food. A large population of consumers can generate a greater demand for goods, which results in more jobs. More people mean more brains to invent good ideas for improving life.

Marxists maintain that no cause-and-effect relationship exists between population growth and economic development. Poverty, hunger, and other social welfare problems associated with lack of economic development are a result of unjust social and economic institutions, not population growth. They argue that the world possesses sufficient resources to eliminate global hunger and poverty, if only these resources are shared equally.

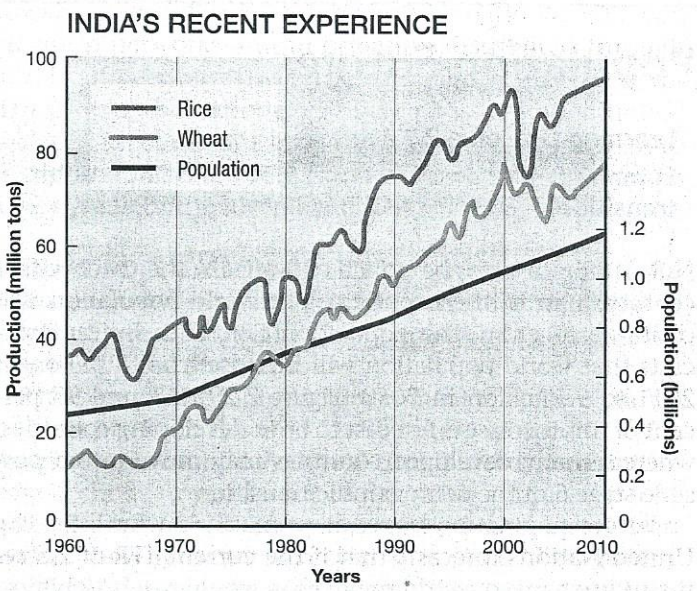
MALTHUS'S THEORY AND REALITY

On a global scale, conditions during the past half-century have not supported Malthus's theory. Even though the human population has grown at its most rapid rate ever, world food production has consistently grown at a faster rate than the NIR since 1950. Malthus was fairly close to the mark on food production but much too pessimistic on population growth.

Overall food production has increased during the last half-century somewhat more rapidly than Malthus predicted. In India, for example, rice production has followed Malthus's expectations fairly closely, but wheat production has increased twice as fast as Malthus expected (Figure 2-27). Better growing techniques, higher-yielding seeds, and cultivation of more land have contributed to the expansion in the food supply (see Chapter 10). Many people in the world cannot afford to buy food or do not have access to sources of food, but these are problems of distribution of wealth rather than insufficient global production of food, as Malthus theorized.

It is on the population side of the equation that Malthus has proved to be inaccurate. His model expected population to quadruple during a half-century, but even in India—a country known for relatively rapid growth (see the next section)—population has increased more slowly than food supply.

However, neo-Malthusians point out that production of both wheat and rice has slowed in India in recent years, as shown in Figure 2-27. Without new breakthroughs in food production, India will not be able to keep food supply ahead of population growth.



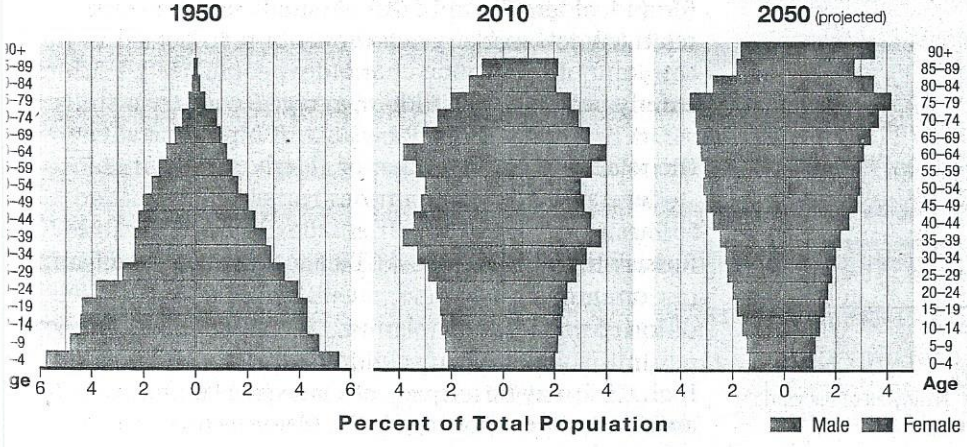
▲ **FIGURE 2-27 POPULATION AND FOOD PRODUCTION IN INDIA** Production of wheat and rice has increased more rapidly than has population.

JAPAN'S DECLINING POPULATION

Japan is an example of a country that faces the prospect of population decline in future, from 127 million in 2010 to 95 million in 2050, according to the Japanese government. With population decline will come a dramatic shift in the country's population structure (Figure 2-28). By 2050, the Japanese pyramid is expected to be reversed from that of 1950. Instead of a very high percentage of children, Japan will have a very high percentage of elderly people.

In the United States, the population is expected to continue to grow through immigration rather than through natural increase (see Chapter 3), but Japan discourages immigration. Japanese society, having placed a high value on social conformity for thousands of years, does not welcome outsiders from other cultural traditions.

With few immigrants, Japan faces a severe shortage of workers. Japan is addressing the labor force shortage primarily by encouraging more Japanese people to work, especially older people and women. Programs make it more attractive for older people to continue working, to receive more health-care services at home instead of in hospitals, and to borrow against the value of their homes to pay for health care. In the long run, more women in the labor force may translate into an even lower birth rate and therefore an even lower NIR in the future. Rather than combine work with child rearing, Japanese women are expected to make a stark choice: either marry and raise children or remain single and work.



◀ **FIGURE 2-28 JAPAN'S CHANGING POPULATION PYRAMIDS** Japan's population pyramid has shifted from a broad base in 1950 to a rectangular shape. In the future, the bottom of the pyramid is expected to contract and the top to expand.

Population Futures

Learning Outcome 2.3.4
Summarize the possible stage 5 of the demographic transition.

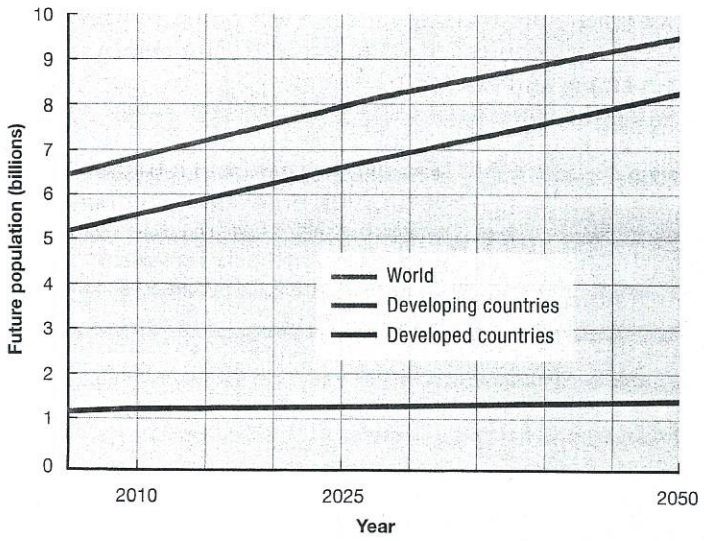
NIR is forecast to be much slower in the twenty-first century than in the twentieth, but world population will continue to grow. The Population Reference Bureau forecasts that world population will increase from 7 billion in 2011 to 9.5 billion in 2050 (Figure 2-29). Around 97 percent of this increase is forecast to be in developing countries, whereas many developed countries may move into a possible stage 5 of the demographic transition.

Future population depends primarily on fertility. The United Nations forecasts that if the current TFR of 2.5 remains unchanged, world population would reach 12 billion in 2050. On the other hand, if TFR declines in the next few years to 1.5, world population would actually decline to 8 billion in 2050.

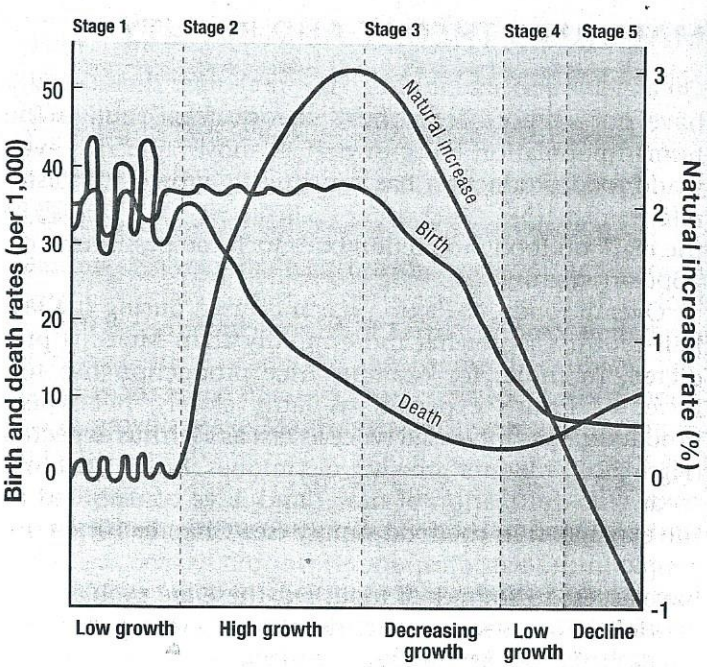
DEMOGRAPHIC TRANSITION POSSIBLE STAGE 5: DECLINE

A country that has passed through the four stages of the demographic transition has in some ways completed a cycle—from little or no natural increase in stage 1 to little or no natural increase in stage 4. Two crucial demographic differences underlie this process:

- The total population of the country is much higher in stage 4 than in stage 1.
- At the beginning of the demographic transition, the CBRs and CDRs are high—35 to 40 per 1,000—whereas at the end of the process the rates are very low, approximately 10 per 1,000.



▲ **FIGURE 2-29 FUTURE POPULATION GROWTH** Nearly all of the world's population growth is forecast to be in developing countries.



▲ **FIGURE 2-30 POSSIBLE DEMOGRAPHIC TRANSITION STAGE 5** Stage 5 of the demographic transition would be characterized by a negative NIR, because the CDR would be greater than the CBR.

The four-stage demographic transition is characterized by two big breaks with the past. The first break—the sudden drop in the death rate that comes from technological innovation—has been accomplished everywhere. The second break—the sudden drop in the birth rate that comes from changing social customs—has yet to be achieved in many countries.

Meanwhile, a possible stage 5 of the demographic transition is predicted by demographers for some developed countries. Stage 5 would be characterized by a very low CBR, an increasing CDR, and therefore a negative NIR (Figure 2-31). After several decades of very low birth rates, a stage 5 country would have relatively few young women aging into child-bearing years. As the smaller pool of women each chooses to have fewer children, birth rates would continue to fall even more than in stage 4.

The world's future population will definitely be older. The elderly support ratio is the number of working-age people (ages 15 to 64) divided by the number of persons 65 and older (Figure 2-30). A small number means that relatively few workers must contribute to pensions, health care, and other support that older people need. With more elderly people than children, a stage 5 country would experience an increased CDR because of high mortality among the relatively large number of elderly people.

Several European countries, notably Russia and other former Communist countries, already have negative NIRs. Russia's high CDR and low CBR are a legacy of a half-century of Communist rule. The low CBR may stem from a long tradition of strong family-planning programs and a deep-seated pessimism about having children in an uncertain world. The high CDR may be a legacy of inadequate pollution controls and inaccurate reporting by the Communists.

CHINA AND INDIA

The world's two most populous countries, China and India, will heavily influence future prospects for global overpopulation. These two countries—together encompassing more than one-third of the world's population—have adopted different family-planning programs. As a result of less effective policies, India adds 12 million more people each year than does China. Current projections show that India could surpass China as the world's most populous country around 2030.

INDIA'S POPULATION POLICIES. India, like most countries in Africa, Asia, and Latin America, remained in stage 1 of the demographic transition until the late 1940s. During the first half of the twentieth century, the Indian population increased modestly—less than 1 percent per year—and even decreased in some years because of malaria, famines, plagues, and cholera epidemics.

Immediately after gaining independence from England in 1947, India saw a sharp decline in death rate (to 20 per 1,000 in 1951), whereas the CBR remained relatively high (about 40). Consequently, the NIR jumped to 2 percent per year. In response to this rapid growth, India became the first country to embark on a national family-planning program, in 1952. The government has established clinics and has provided information about alternative methods of birth control. Birth-control devices have been distributed free or at subsidized prices. Abortions, legalized in 1972, have been performed at a rate of several million per year. All together, the government spends several hundred million dollars annually on various family-planning programs.

India's most controversial family-planning program was the establishment of camps in 1971 to perform sterilizations—surgical procedures in which people were made incapable of reproduction. A sterilized person was entitled to a payment, which has been adjusted several times but generally has been equivalent to the average monthly income in India. At the height of the program, in 1976, 8.3 million sterilizations were performed during a 6-month period, mostly on women.

The birth-control drive declined in India after 1976. Widespread opposition to the sterilization program grew in the country because people feared that they would be forcibly sterilized. The prime minister, Indira Gandhi, was defeated in 1977, and the new government emphasized the voluntary nature of birth-control programs. The term *family planning*, which the Indian people associated with the forced sterilization policy, was replaced by the term *family welfare* to indicate that compulsory birth-control programs had been terminated. Although Mrs. Gandhi served again as prime minister from 1980 until she was assassinated in 1984, she did not emphasize family planning during that time because of the opposition during her previous administration.

In the past several decades, government-sponsored family-planning programs in India have emphasized education, including advertisements on national radio and television networks and information distributed through local health centers. Given the cultural diversity of the Indian people, the national campaign has had only limited success. The dominant form of birth control continues to be sterilization of women, in many cases after the women have already borne several children.

CHINA'S POPULATION POLICIES. In contrast to India, China has made substantial progress in reducing its rate of growth. Since 2000, China has actually had a lower CBR than the United States.

The core of the Chinese government's family-planning program has been the One Child Policy, adopted in 1980. Under the One Child Policy, a couple needs a permit to have a child. Couples receive financial subsidies, a long maternity leave, better housing, and (in rural areas) more land if they agree to have just one child. The government prohibits marriage for men until they are age 22 and women until they are 20. To further discourage births, people receive free contraceptives, abortions, and sterilizations. Rules are enforced by a government agency, the State Family Planning Commission.

As China moves toward a market economy in the twenty-first century and as Chinese families become wealthier, the harsh rules in the One Child Policy have been relaxed, especially in urban areas. Clinics provide counseling on a wider range of family-planning options. Instead of fines, Chinese couples wishing a second child pay a "family-planning fee" to cover the cost to the government of supporting the additional person. Fears that relaxing the One Child Policy would produce a large increase in the birth rate have been unfounded.

Pause and Reflect 2.3.4

Why might China's One Child Policy result in many more male than female children?

CHECK-IN: KEY ISSUE 3

Why Does Population Growth Vary Among Regions?

- ✓ **The demographic transition has four stages characterized by varying rates of births, deaths, and natural increase.**
- ✓ **The CBR has declined since 1990 in all but a handful of countries.**
- ✓ **Malthus believed that population would outstrip resources, but critics argue that that hasn't been the case in the world as a whole.**

KEY ISSUE 4

Why Do Some Regions Face Health Threats?

- Epidemiologic Transition
- Infectious Diseases
- Health Care

Learning Outcome 2.4.1
Summarize the four stages of the epidemiologic transition.

As world NIR slows and the threat of overpopulation recedes, at least at a worldwide scale, geographers increasingly turn their attention to the health of the record number of people who are alive. Medical researchers have identified an **epidemiologic transition** that focuses on distinctive health threats in each stage of the demographic transition. Epidemiologists rely heavily on geographic concepts such as scale and connection because measures to control and prevent an epidemic derive from understanding its distinctive distribution and method of diffusion.

Epidemiologic Transition

The term *epidemiologic transition* comes from **epidemiology**, which is the branch of medical science concerned with the incidence, distribution, and control of diseases that are prevalent among a population at a special time and are produced by some special causes not generally present in the affected locality. The concept was originally formulated by epidemiologist Abdel Omran in 1971.

STAGE 1: PESTILENCE AND FAMINE (HIGH CDR)

In stage 1 of the epidemiologic transition, infectious and parasitic diseases were principal causes of human deaths, along with accidents and attacks by animals and other humans. Malthus called these causes of deaths "natural checks" on the growth of the human population in stage 1 of the demographic transition.

History's most violent stage 1 epidemic was the Black Plague (bubonic plague), which was probably transmitted to humans by fleas from migrating infected rats:

- The Black Plague originated among Tatars in present-day Kyrgyzstan.
- It diffused to present-day Ukraine when the Tatar army attacked an Italian trading post on the Black Sea.
- Italians fleeing the trading post carried the infected r on ships west to the major coastal cities of Southeaste Europe in 1347.
- The plague diffused from the coast to inland towns a then to rural areas.
- It reached Western Europe in 1348 and Northe Europe in 1349.

About 25 million Europeans— at least one-half of the con nent's population—died between 1347 and 1350. Five oth epidemics in the late fourteenth century added to the toll Europe. In China, 13 million died from the plague in 138

The plague wiped out entire villages and familie leaving farms with no workers and estates with no hei Churches were left without priests and parishione schools without teachers and students. Ships drifted air lessly at sea after entire crews succumbed to the plague.

STAGE 2: RECEDING PANDEMICS (RAPIDL DECLINING CDR)

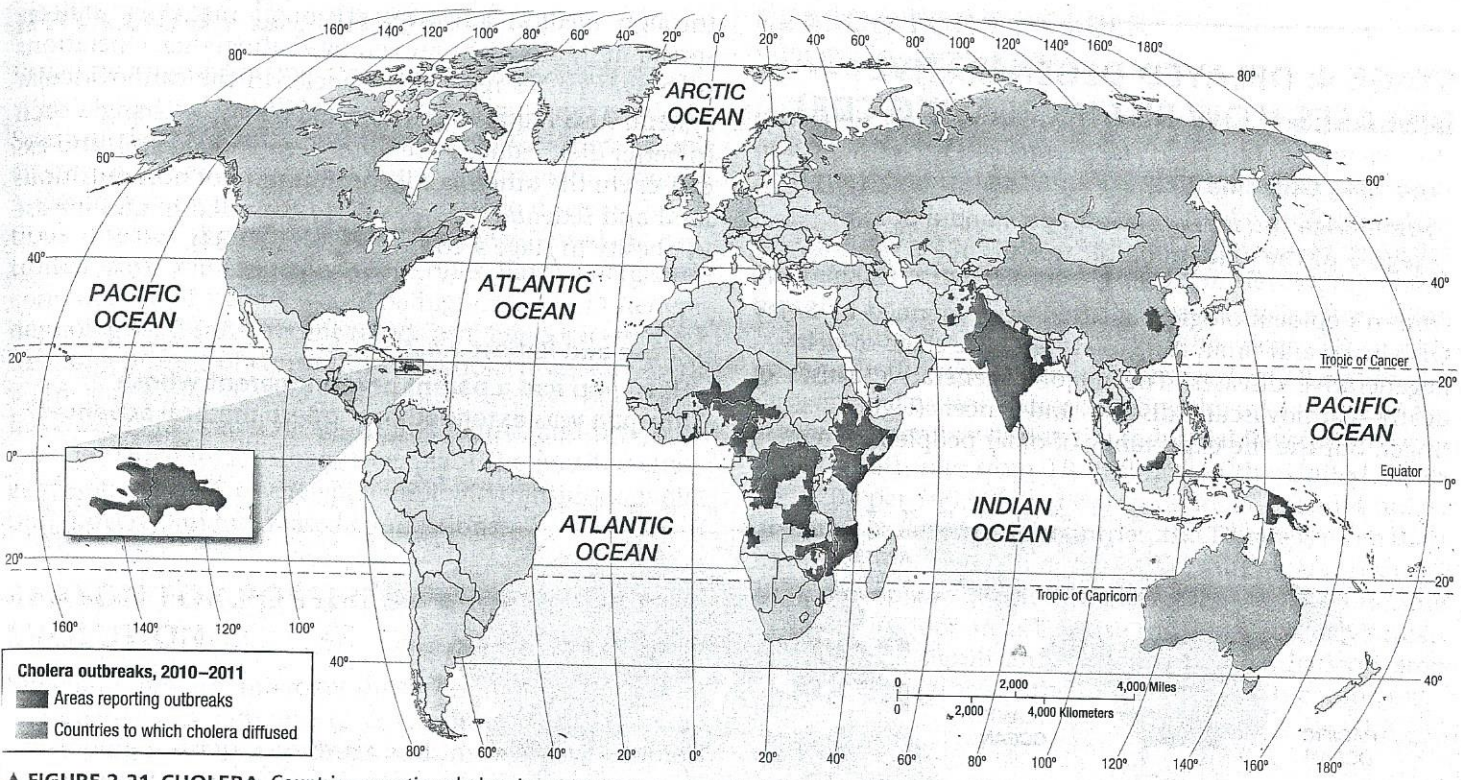
Stage 2 of the epidemiologic transition has been called th *stage of receding pandemics*. A **pandemic** is disease that oc curs over a wide geographic area and affects a very hig proportion of the population. Improved sanitation, nutri tion, and medicine during the Industrial Revolution re duced the spread of infectious diseases. Death rates di not decline immediately and universally during the earl years of the Industrial Revolution. Poor people crowde into rapidly growing industrial cities had especially high death rates. Cholera—uncommon in rural areas—becam an especially virulent epidemic in urban areas during the Industrial Revolution.

Construction of water and sewer systems had eradicated cholera by the late nineteenth century. However, cholera persists in several developing regions in stage 2 of the demographic transition, especially sub-Saharan Africa and South and Southeast Asia, where many people lack access to clean drinking water (Figure 2-31). Cholera has also been found on Hispaniola, the island shared by Haiti and the Dominican Republic, especially in the wake of an earthquake in 2010 that killed 200,000 and displaced 1 million.

A computer-based Geographic Information System was invented in the twentieth century, but the idea of overlaying maps to understand human and natural patterns is much older. A century before the invention of computers, GIS helped to explain and battle stage 2 pandemics.

Dr. John Snow (1813–1858) was a British physician, not a geographer. To fight one of the worst nineteenth century pandemics, cholera, Snow created a hand-made GIS in 1854. On a map of London's Soho neighborhood, Snow overlaid two other maps, one showing the addresses of cholera victims and the other the location of water pumps—which for the poor residents of Soho were the principal source of water for drinking, cleaning, and cooking (Figure 2-30).

The overlay maps showed that cholera victims were not distributed uniformly through Soho. Dr. Snow showed that



▲ **FIGURE 2-31 CHOLERA** Countries reporting cholera in recent years are found primarily in sub-Saharan Africa and South Asia.

a large percentage of cholera victims were clustered around one pump, on Broad Street. Tests at the Broad Street pump subsequently proved that the water there was contaminated. Further investigation revealed that contaminated sewage was getting into the water supply near the pump. Although no longer operative, the contaminated pump still stands in London and can be seen in the photo on page 42.

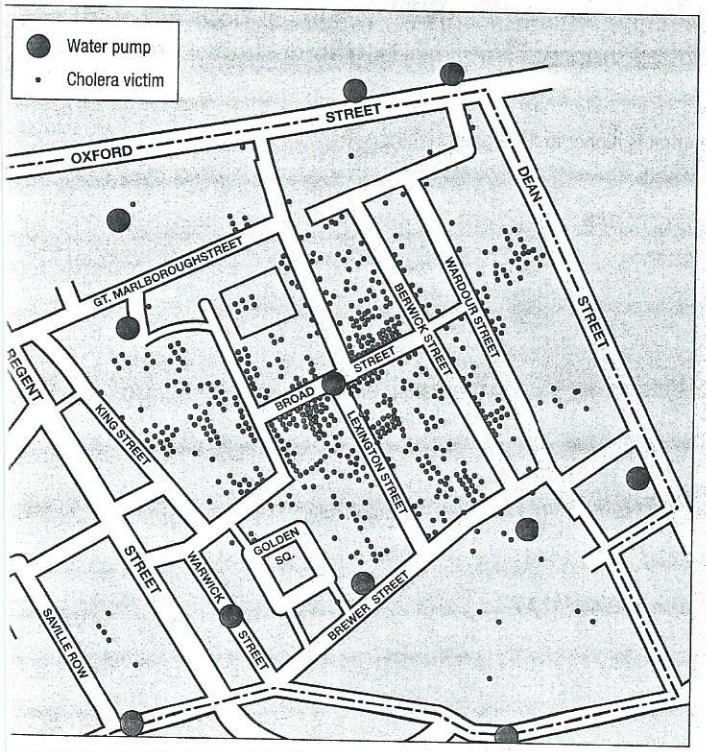


FIGURE 2-32 SIR JOHN SNOW'S CHOLERA MAP In 1854, Dr. John Snow mapped the distribution of cholera victims and water pumps to prove that the cause of the infection was contamination of the pump near the corner of Broad and Lexington streets.

Before Dr. Snow's geographic analysis, many believed that epidemic victims were being punished for sinful behavior and that most victims were poor because poverty was considered a sin. Now we understand that cholera affects the poor because they are more likely to have to use contaminated water.

STAGE 3: DEGENERATIVE DISEASES (MODERATELY DECLINING CDR)

Stage 3 of the epidemiologic transition, the stage of degenerative and human-created diseases, is characterized by a decrease in deaths from infectious diseases and an increase in chronic disorders associated with aging. The two especially important chronic disorders in stage 3 are cardiovascular diseases, such as heart attacks, and various forms of cancer. The global pattern of cancer is the opposite of that for stage 2 diseases; sub-Saharan Africa and South Asia have the lowest incidence of cancer, primarily because of the relatively low life expectancy in those regions.

Pause and Reflect 2.4.1

In what climate zone are most of the countries that have experienced cholera recently?

STAGE 4: DELAYED DEGENERATIVE DISEASES (LOW BUT INCREASING CDR)

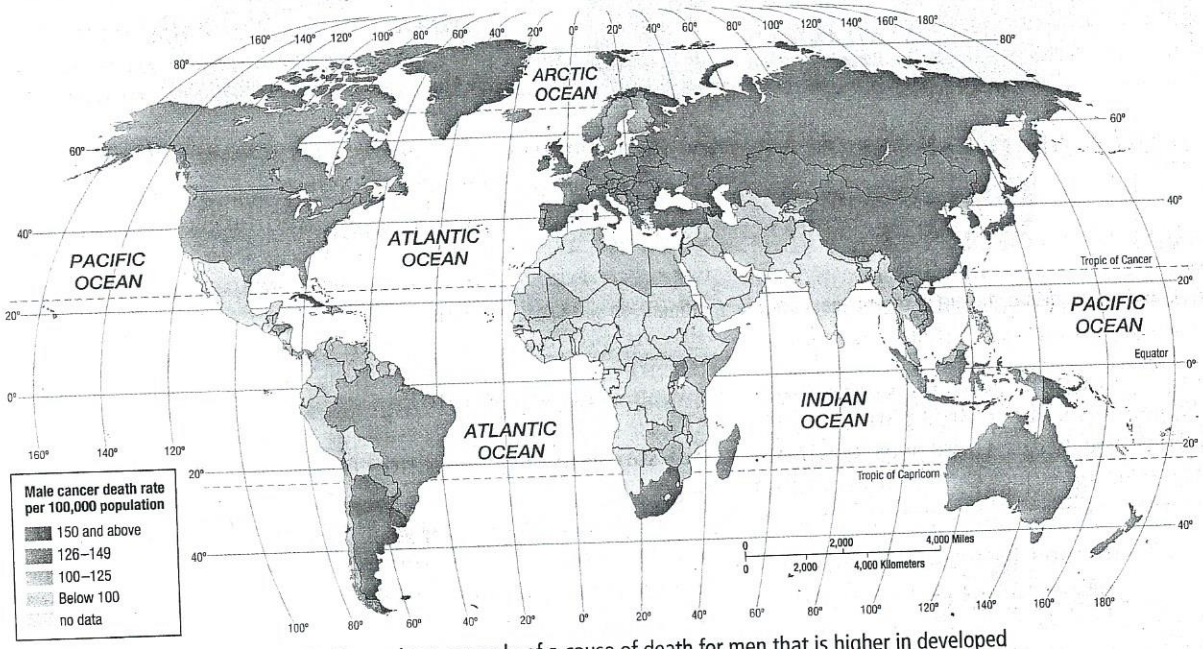
Learning Outcome 2.4.2

Summarize the reasons for Stage 4 and a possible stage 5 of the epidemiologic transition.

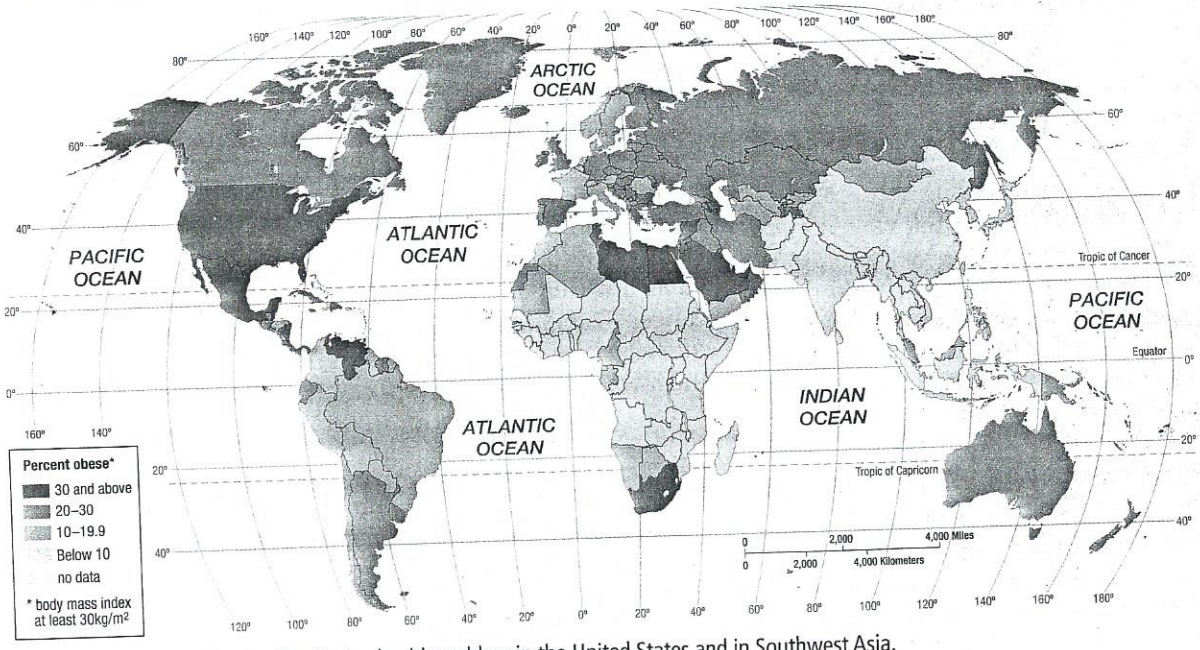
Omran's epidemiologic transition was extended by S. Jay Olshansky and Brian Ault to stage 4, the stage of delayed degenerative diseases. The major degenerative causes of death—cardiovascular diseases and cancers (Figure 2-33)—linger, but the life expectancy of older people is extended through medical advances. Through medicine, cancers spread more slowly or are removed altogether. Operations such as bypasses repair deficiencies in the cardiovascular system. Also improving health are behavior changes such as better diet, reduced use of tobacco and alcohol, and exercise. On the other hand, consumption of non-nutritious food and sedentary behavior have resulted in an increase in obesity in stage 4 countries (Figure 2-34).

Pause and Reflect 2.4.2

Have you had a parent or grandparent whose lifespan was extended by modern medical advances?



▲ **FIGURE 2-33 MALE CANCER** Cancer is an example of a cause of death for men that is higher in developed countries than in developing ones.



▲ **FIGURE 2-34 OBESITY** Obesity is a health problem in the United States and in Southwest Asia.

Infectious Diseases

Recall that in the possible stage 5 of the demographic transition, CDR rises because more of the population is elderly. Some medical analysts argue that the world is moving into stage 5 of the epidemiologic transition, brought about by a reemergence of infectious and parasitic diseases. Infectious diseases thought to have been eradicated or controlled have returned, and new ones have emerged. A consequence of stage 5 would be higher CDRs. Other epidemiologists dismiss recent trends as a temporary setback in a long process of controlling infectious diseases.

In a possible stage 5, infectious diseases thought to have been eradicated or controlled return, and new ones emerge. Three reasons help to explain the possible emergence of a stage 5 of the epidemiologic transition: evolution, poverty, and increased connections.

REASON FOR POSSIBLE STAGE 5: EVOLUTION

Infectious disease microbes have continuously evolved and changed in response to environmental pressures by developing resistance to drugs and insecticides. Antibiotics and genetic engineering contribute to the emergence of new strains of viruses and bacteria.

Malaria was nearly eradicated in the mid-twentieth century by spraying DDT in areas infested with the mosquito that carried the parasite. For example, new malaria cases in Sri Lanka fell from 1 million in 1955 to 18 in 1963. The disease returned after 1963, however, and now causes more than 1 million deaths worldwide annually. A major reason was the evolution of DDT-resistant mosquitoes.

REASON FOR POSSIBLE STAGE 5: POVERTY

Infectious diseases are more prevalent in poor areas than other places because unsanitary conditions may persist, and most people can't afford the drugs needed for treatment. Tuberculosis (TB) is an example of an infectious disease that has been largely controlled in developed countries but remains a major cause of death in developing countries (Figure 2-35). An airborne disease that is often called "consumption" and that damages the lungs, TB spreads principally through coughing and sneezing. TB was one of the principal causes of death among the urban poor in the nineteenth century during the Industrial Revolution.

The death rate from TB declined in the United States from 200 per 100,000 in 1900 to 60 in 1940 and 4 today. However, in developing countries, the TB rate is more than 10 times higher than in developed countries, and nearly 2 million people worldwide die from it annually. TB is more prevalent in poor areas because the long, expensive treatment poses a significant economic burden. Patients stop taking the drugs before the treatment cycle is completed.

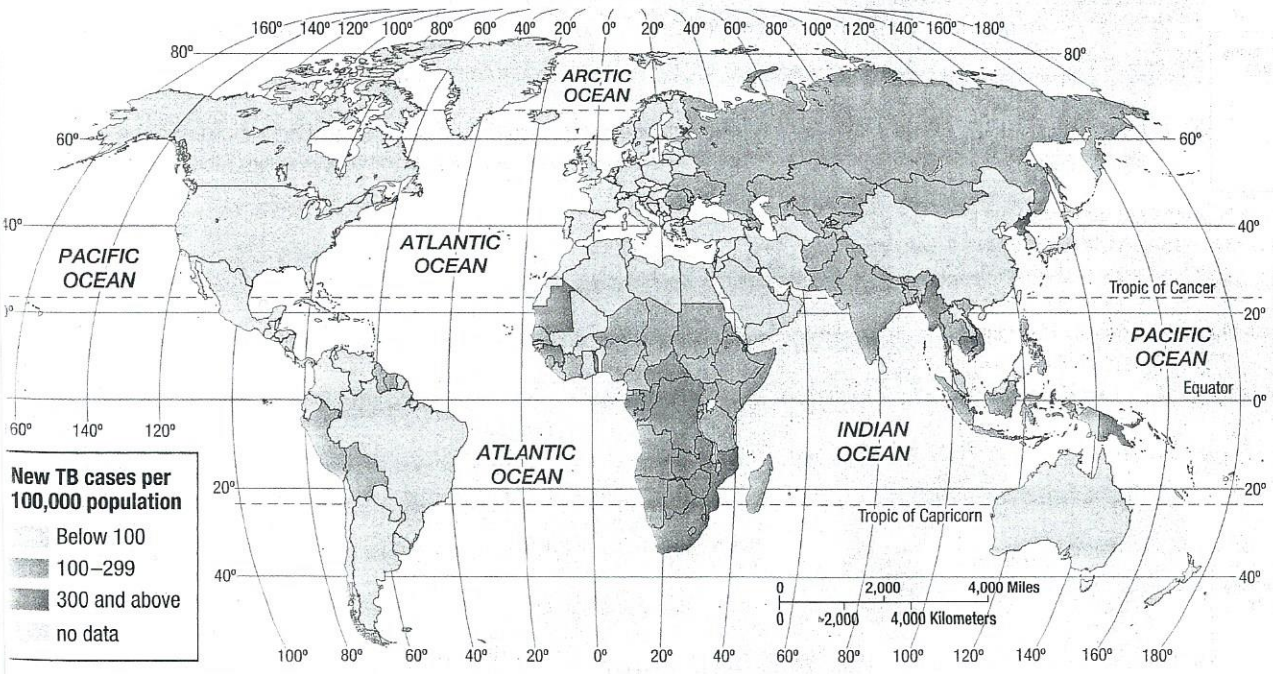


FIGURE 2-35 TUBERCULOSIS (TB) CASES Death from tuberculosis is a good indicator of a country's ability invest in health care, because treating the disease is expensive.