

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. After a quarter-century of intensive educational programs, as well as coercion, the Chinese people have accepted the benefits of family planning.

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 rats on ships west to the major coastal cities of Southeastern Europe in 1347.
- The plague diffused from the coast to inland towns and then to rural areas.
- It reached Western Europe in 1348 and Northern Europe in 1349.

About 25 million Europeans—at least one-half of the continent’s population—died between 1347 and 1350. Five other epidemics in the late fourteenth century added to the toll in Europe. In China, 13 million died from the plague in 1380.

The plague wiped out entire villages and families, leaving farms with no workers and estates with no heirs. Churches were left without priests and parishioners, schools without teachers and students. Ships drifted aimlessly at sea after entire crews succumbed to the plague.

STAGE 2: RECEDING PANDEMICS (RAPIDLY DECLINING CDR)

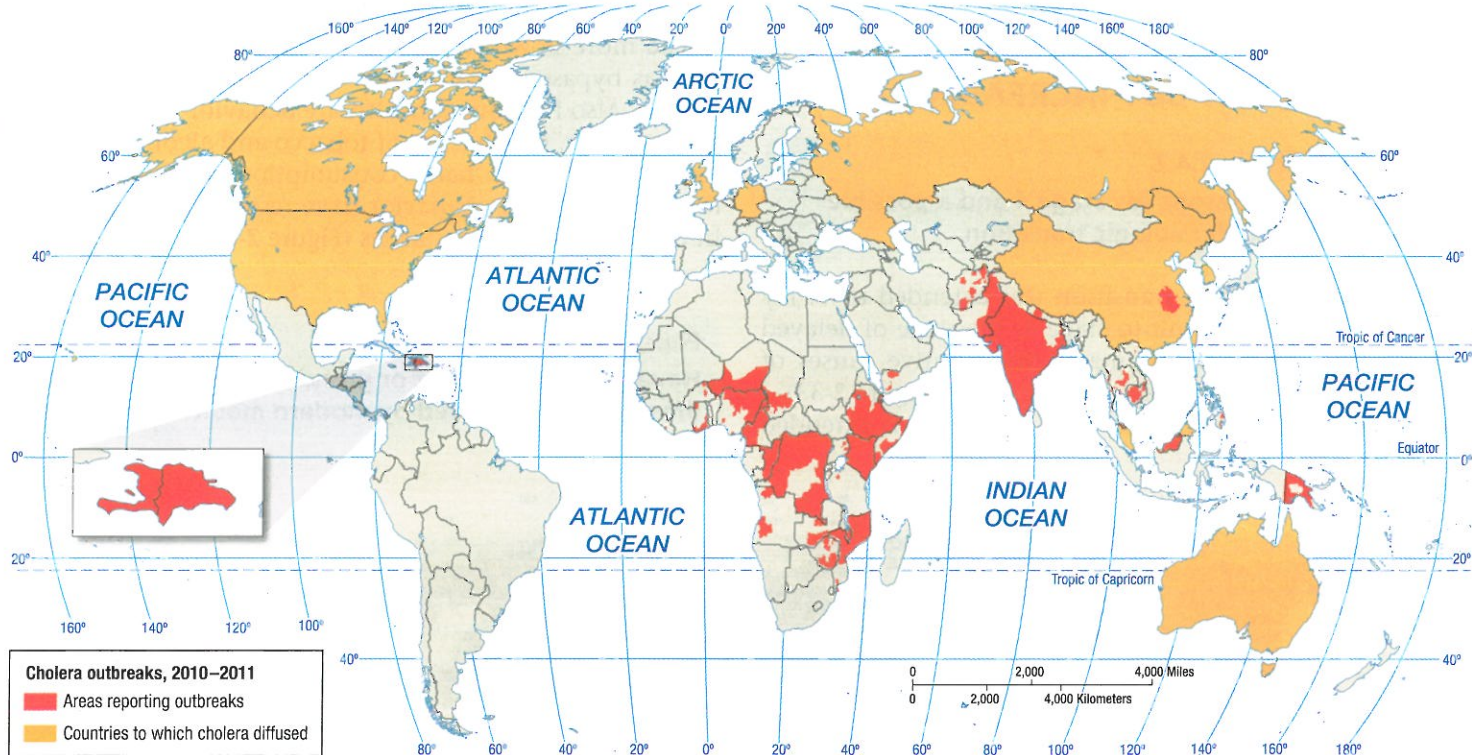
Stage 2 of the epidemiologic transition has been called the *stage of receding pandemics*. A **pandemic** is disease that occurs over a wide geographic area and affects a very high proportion of the population. Improved sanitation, nutrition, and medicine during the Industrial Revolution reduced the spread of infectious diseases. Death rates did not decline immediately and universally during the early years of the Industrial Revolution. Poor people crowded into rapidly growing industrial cities had especially high death rates. Cholera—uncommon in rural areas—became 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



▲ 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.

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.

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

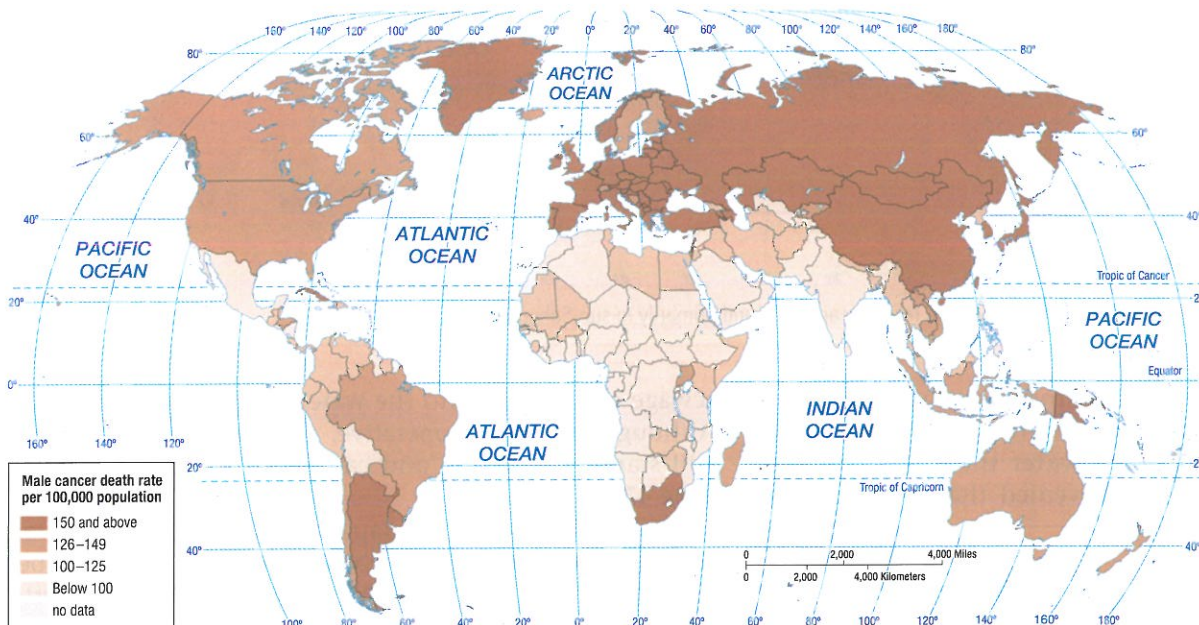
Summarize the reasons for Stage 4 and a possible stage 5 of the epidemiologic transition.

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

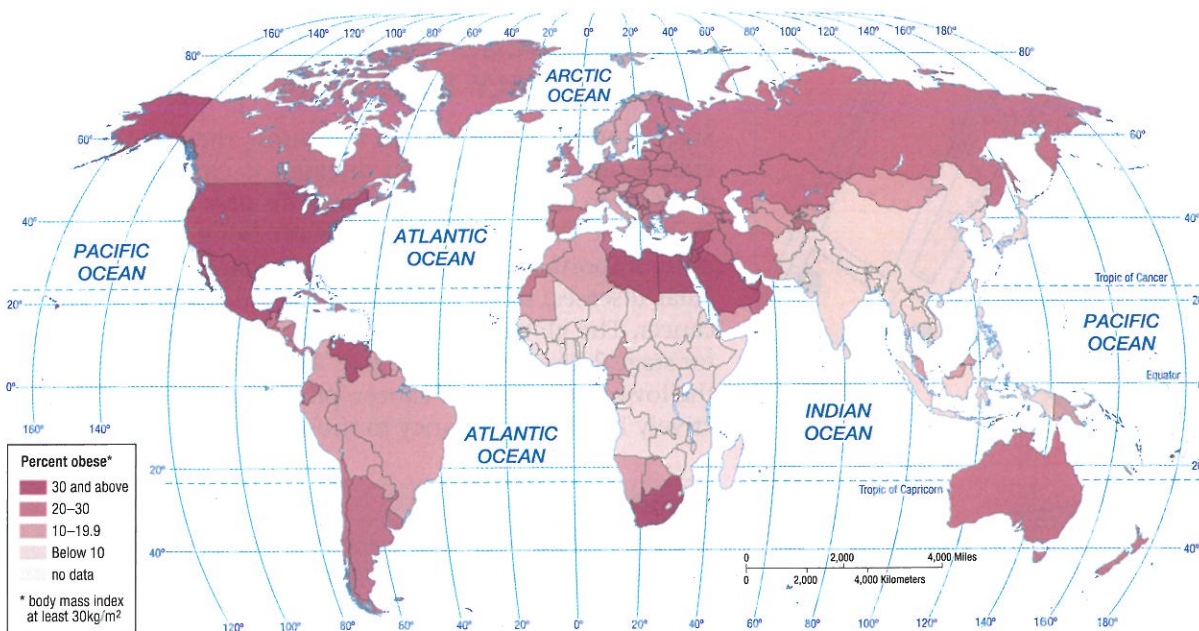
through medical advances. Through medicine, cancers spread more slowly or are removed altogether. Operations such as bypasses repair deficiencies in the cardiovascular system. Also improving health are behavior changes such as better diet, reduced use of tobacco and alcohol, and exercise. On the other 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

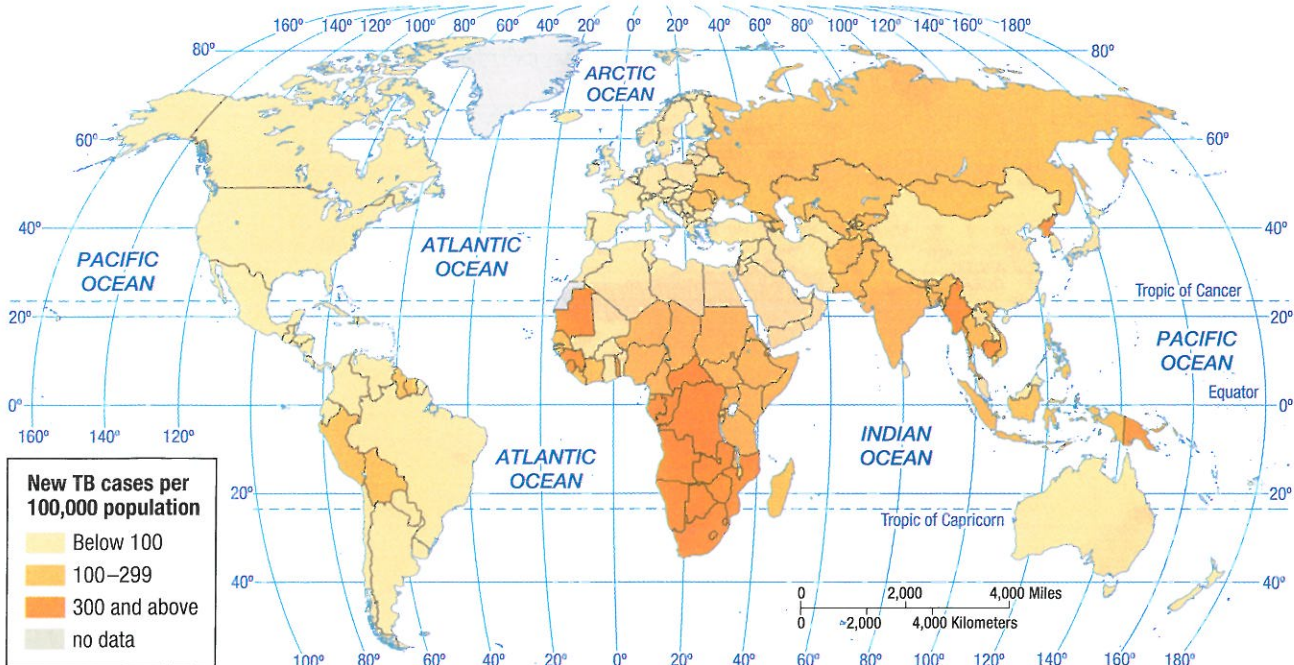
Infectious disease microbes have continuously evolved and changed in response to environmental pressures by developing resistance to drugs and insecticides. Antibiotics and genetic engineering contribute to the emergence of new strains of viruses and bacteria.

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 to invest in health care, because treating the disease is expensive.

REASON FOR POSSIBLE STAGE 5: INCREASED CONNECTIONS

Learning Outcome 2.4.3

Describe the diffusion of AIDS.

Several dozen “new” pandemics, such as H1N1 (swine) flu and severe acute respiratory syndrome (SARS), have emerged over the past three decades and have spread through the process of relocation diffusion, discussed in Chapter 1. Motor vehicles allow rural residents to have greater connections with urban areas and for urban residents to easily reach rural areas. Airplanes allow residents of one country to easily connect with people in other countries. As they travel, people carry diseases with them and are exposed to the diseases of others.

The most lethal pandemic in recent years has been AIDS (acquired immunodeficiency syndrome). Worldwide, 30 million people died of AIDS from the beginning of the epidemic through 2010, and 34 million were living with HIV (human immunodeficiency virus, the cause

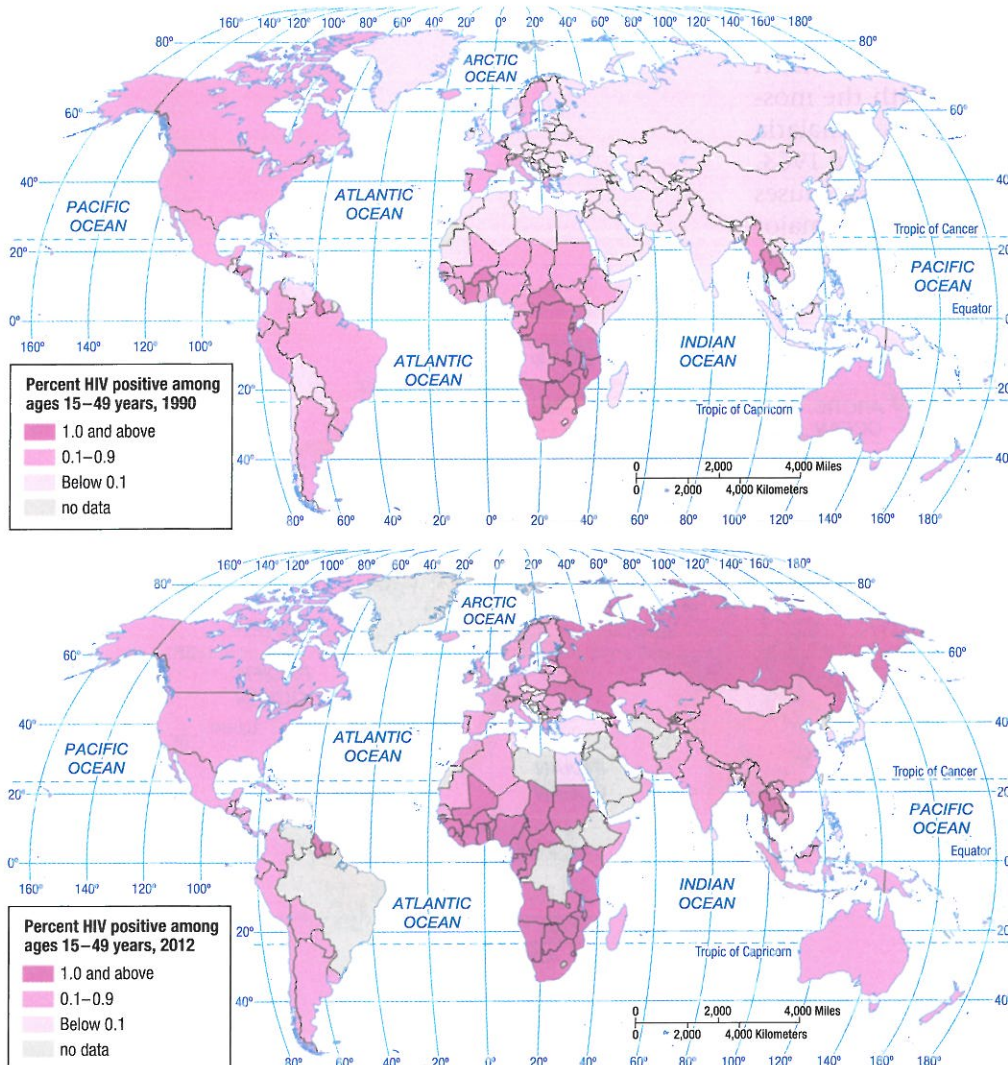
of AIDS). The impact of AIDS has been felt most strongly in sub-Saharan Africa, home to 23 million of the world’s 34 million HIV-positive people (Figure 2-36).

AIDS diffused from sub-Saharan Africa through relocation diffusion, both by Africans and by visitors to Africa returning to their home countries. AIDS entered the United States during the early 1980s through New York, California, and Florida (Figure 2-37). Not by coincidence, the three leading U.S. airports for international arrivals are in these three states (Figure 2-38). Though AIDS diffused to every state during the 1980s, these three states, plus Texas (a major port of entry by motor vehicle), accounted for half of the country’s new AIDS cases in the peak year of 1993.

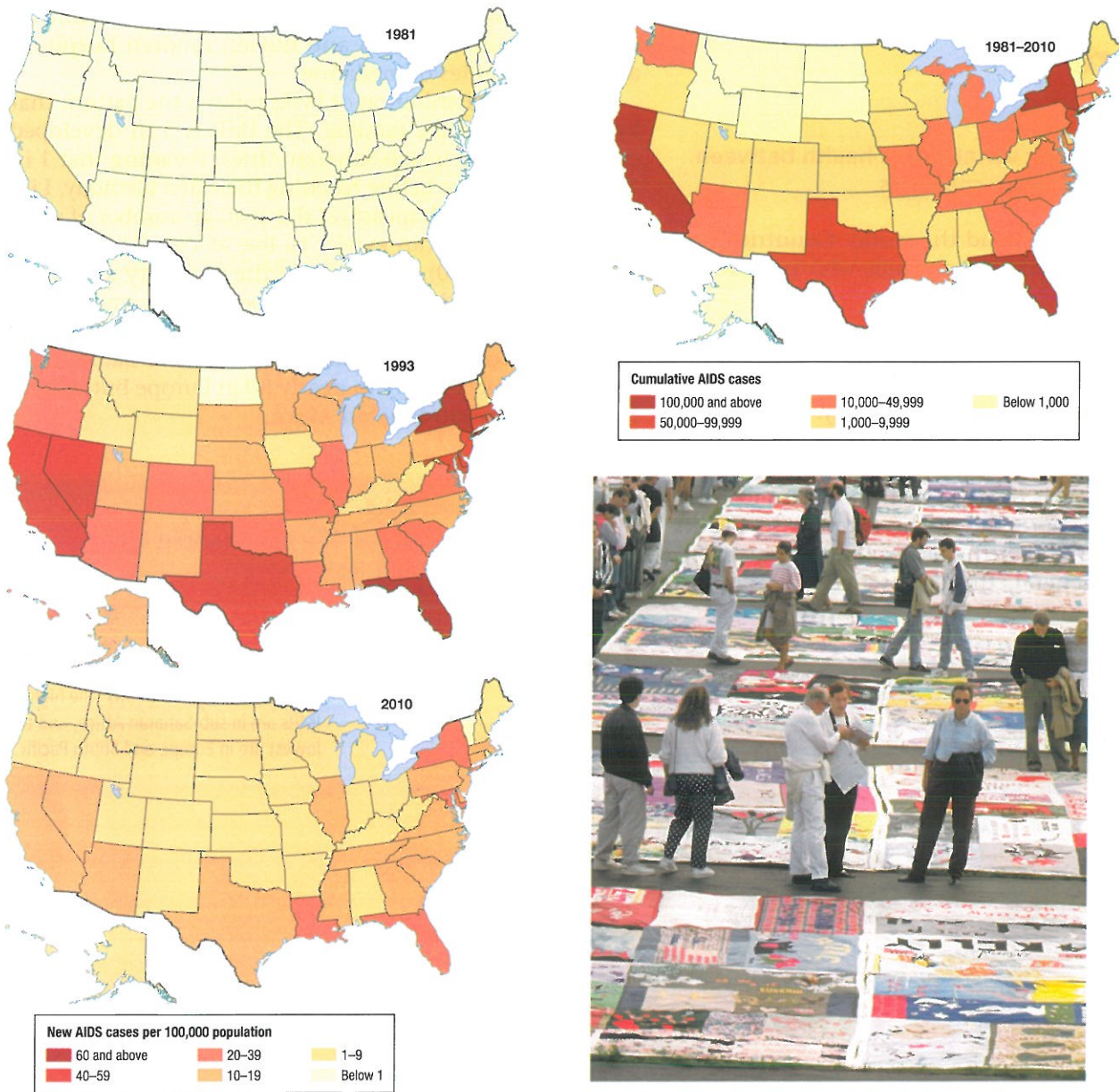
The number of new AIDS cases dropped rapidly in the United States during the 1990s and in sub-Saharan Africa in the 2000s. The decline resulted from the rapid diffusion of preventive methods and medicines such as AZT. The rapid spread of these innovations is an example of expansion diffusion rather than relocation diffusion.

Pause and Reflect 2.4.3

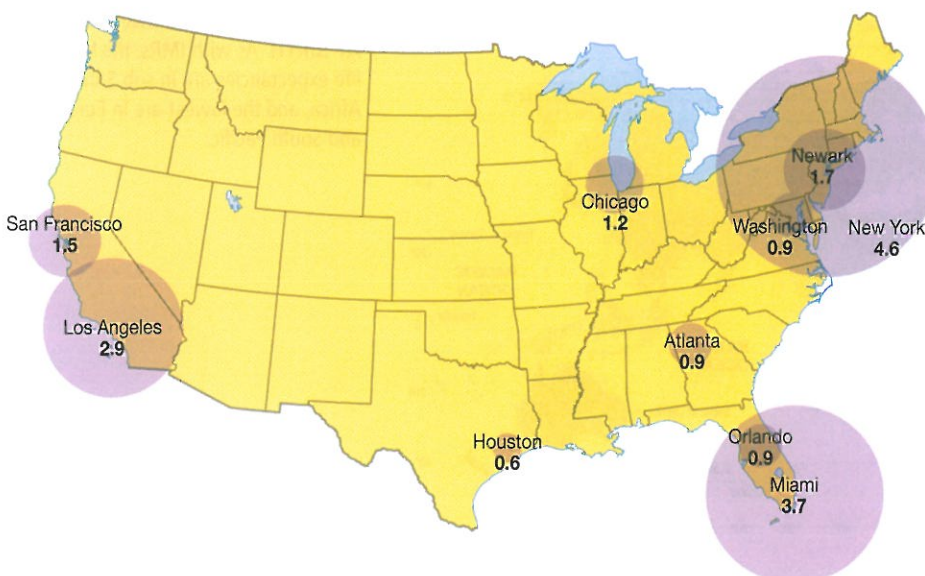
Have other pandemic diseases diffused rapidly in recent years?



◀ **FIGURE 2-36 DIFFUSION OF HIV/AIDS** The highest rates of HIV infection are in sub-Saharan Africa and Russia.



▲ **FIGURE 2-37 DIFFUSION OF HIV/AIDS IN THE UNITED STATES** AIDS diffused from states with relatively high immigration rates, such as California, Florida, and New York. The AIDS Memorial Quilt was assembled as a memorial to people who have died of AIDS.



◀ **FIGURE 2-38 INTERNATIONAL PASSENGER ARRIVALS AT U.S. AIRPORTS 2011** Because AIDS arrived in the United States primarily through air travelers, the pattern of diffusion of AIDS in Figure 2-37 closely matches the distribution of international air passenger arrivals.

Health Care

Learning Outcome 2.4.4

Understand reasons for variations in health between developed and developing countries.

Health conditions vary around the world. Countries possess different resources to care for people who are sick.

INDICATORS OF HEALTH

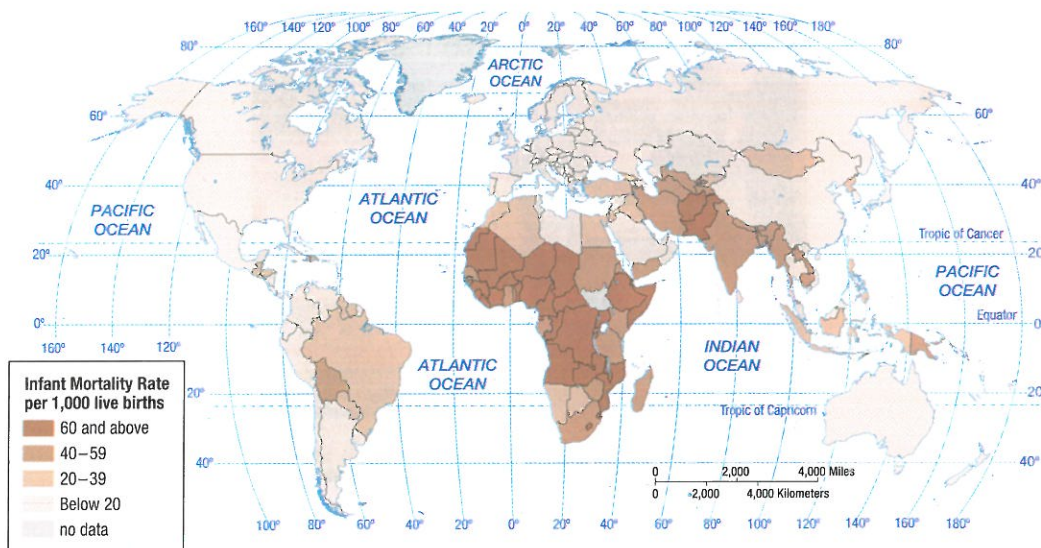
Two important indicators of health in a country are the infant mortality rate and life expectancy. The **infant mortality rate (IMR)** is the annual number of deaths of infants under one year of age, compared with total live births (Figure 2-39). As is the case with the CBR and CDR, the IMR is usually expressed as the number of deaths among infants per 1,000 births rather than as a percentage (per 100). In general, the IMR reflects a country's

health-care system. Lower IMRs are found in countries with well-trained doctors and nurses, modern hospitals, and large supplies of medicine.

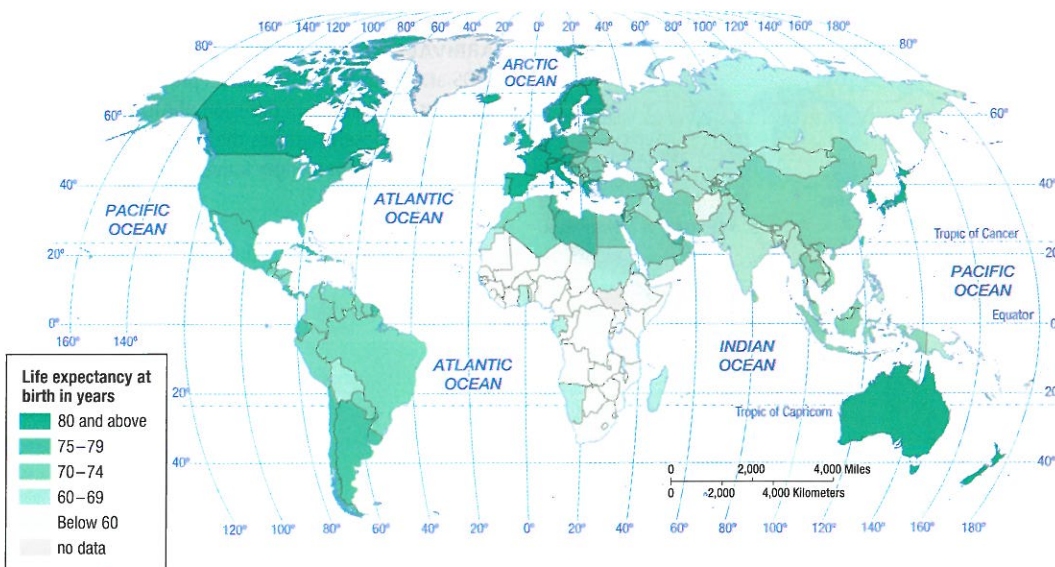
The global distribution of IMRs follows the pattern that by now has become familiar. The IMR is 5 in developed countries and 80 in sub-Saharan Africa, meaning that 1 in 12 babies die there before reaching their first birthday. **Life expectancy** at birth measures the average number of years a newborn infant can expect to live at current mortality levels (Figure 2-40). Like most of the mortality and fertility rates discussed thus far, life expectancy is most favorable in the wealthy countries of Europe and least favorable in the poor countries of sub-Saharan Africa. Babies born today can expect to live to nearly 80 in Europe but only to less than 60 in sub-Saharan Africa.

Pause and Reflect 2.4.4

Why do men have lower life expectancies than women in most countries?



◀ **FIGURE 2-39 INFANT MORTALITY RATE (IMR)** The highest IMRs are in sub-Saharan Africa, and the lowest are in Europe and South Pacific.



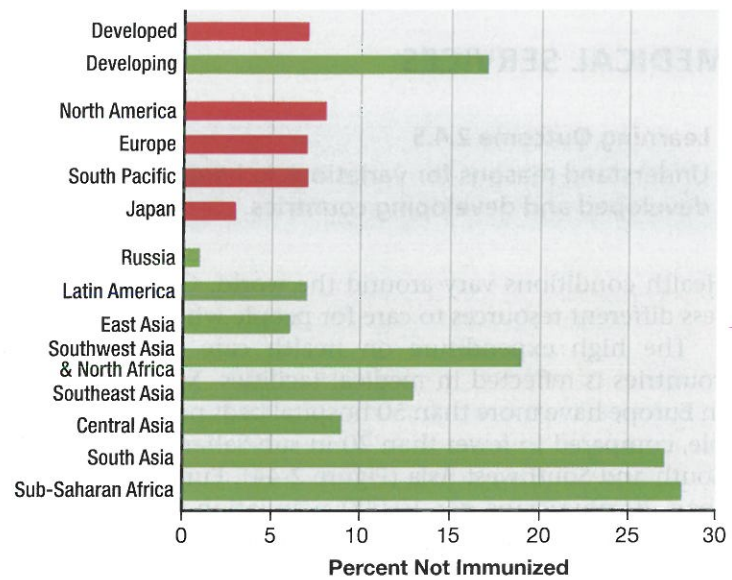
◀ **FIGURE 2-40 LIFE EXPECTANCY AT BIRTH** As with IMRs, the highest life expectancies are in sub-Saharan Africa, and the lowest are in Europe and South Pacific.

PROVISION OF HEALTH CARE

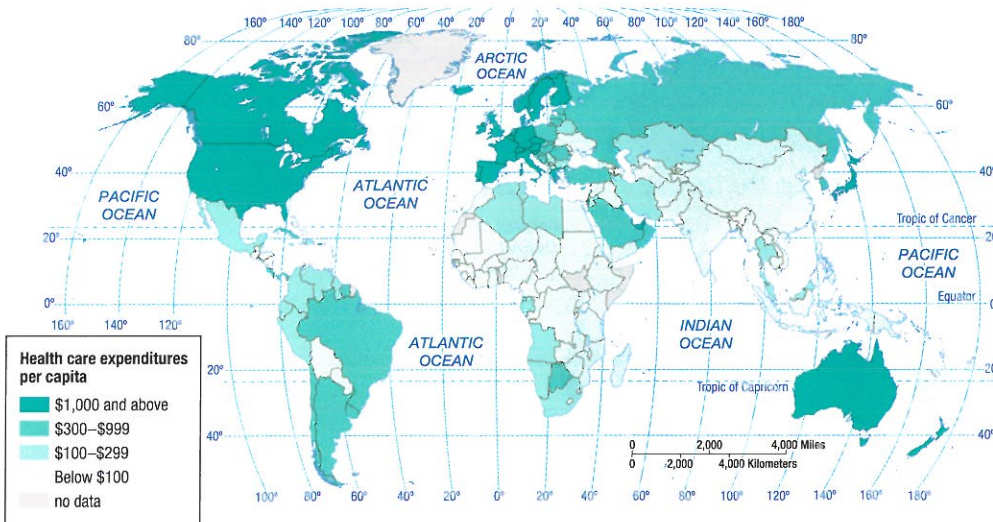
Even if they survive infancy, children remain at risk in developing countries. For example, 17 percent of children in developing countries are not immunized against measles, compared to 7 percent in developed countries. More than one-fourth of children lack measles immunization in South Asia and sub-Saharan Africa (Figure 2-41).

Developed countries use part of their wealth to protect people who, for various reasons, are unable to work. In these countries, some public assistance is offered to those who are sick, elderly, poor, disabled, orphaned, veterans of wars, widows, unemployed, or single parents. Annual per capita expenditure on health care exceeds \$1,000 in Europe and \$5,000 in the United States, compared to less than \$100 in sub-Saharan Africa and South Asia (Figure 2-42).

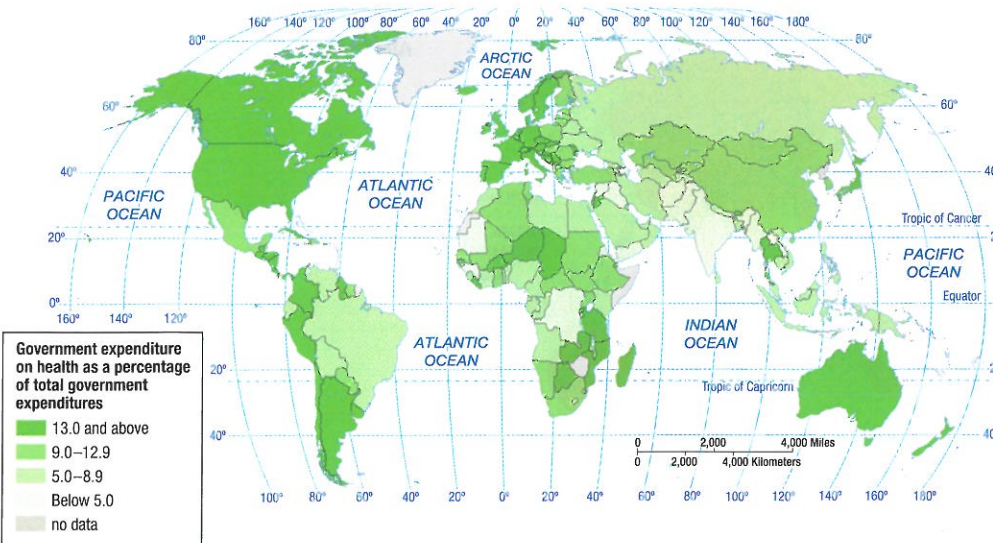
Expenditures on health care exceed 15 percent of total government expenditures in Europe and North America compared to less than 5 percent in sub-Saharan Africa and South Asia (Figure 2-43). Countries in Northern Europe, including Denmark, Norway, and Sweden, typically provide the highest level of public-assistance payments. So not only do developed countries spend more on health care, they spend a higher percentage of their wealth on health care.



▲ FIGURE 2-41 CHILDREN LACKING MEASLES IMMUNIZATION
The lowest rates of immunization are in sub-Saharan Africa and South Asia.



◀ FIGURE 2-42 HEALTH CARE EXPENDITURES The lowest levels of per capita health care expenditure are in sub-Saharan Africa and South Asia.



◀ FIGURE 2-43 GOVERNMENT EXPENDITURES ON HEALTH CARE The lowest levels of government expenditures are in Africa and Asia.

MEDICAL SERVICES

Learning Outcome 2.4.5

Understand reasons for variations in health between developed and developing countries.

Health conditions vary around the world. Countries possess different resources to care for people who are sick.

The high expenditure on health care in developed countries is reflected in medical facilities. Most countries in Europe have more than 50 hospital beds per 10,000 people, compared to fewer than 20 in sub-Saharan Africa and South and Southwest Asia (Figure 2-44). Europe has more than 30 physicians per 10,000 population, compared to fewer than 5 in sub-Saharan Africa (Figure 2-45).

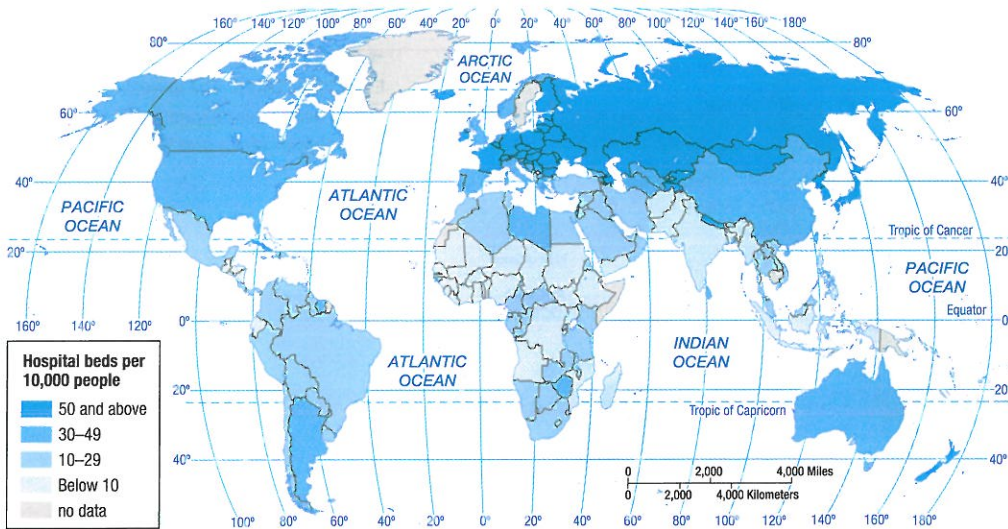
In most developed countries, health care is a public service that is available at little or no cost. Government programs pay more than 70 percent of health-care costs in most European countries, and private individuals pay less than 30 percent. In developing countries, private individuals must pay more than half of the cost of health

care (Figure 2-46). An exception to this pattern is the United States, a developed country where private individuals are required to pay an average of 55 percent of health care, more closely resembling the pattern in developing countries.

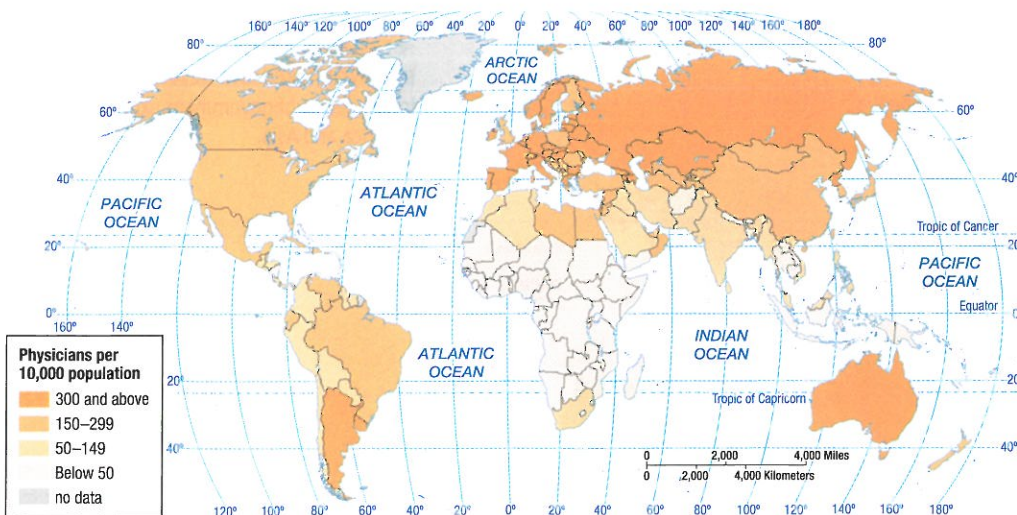
Developed countries are hard-pressed to maintain their current levels of public assistance. In the past, rapid economic growth permitted these states to finance generous programs with little difficulty. But in recent years economic growth has slowed, while the percentage of people needing public assistance has increased. Governments have faced a choice between reducing benefits and increasing taxes to pay for them. In some of the poorest countries, threats to health and sustainability are not so much financial as environmental. For a case in point, read the following Sustainability and Inequality in Our Global Village feature.

Pause and Reflect 2.4.5

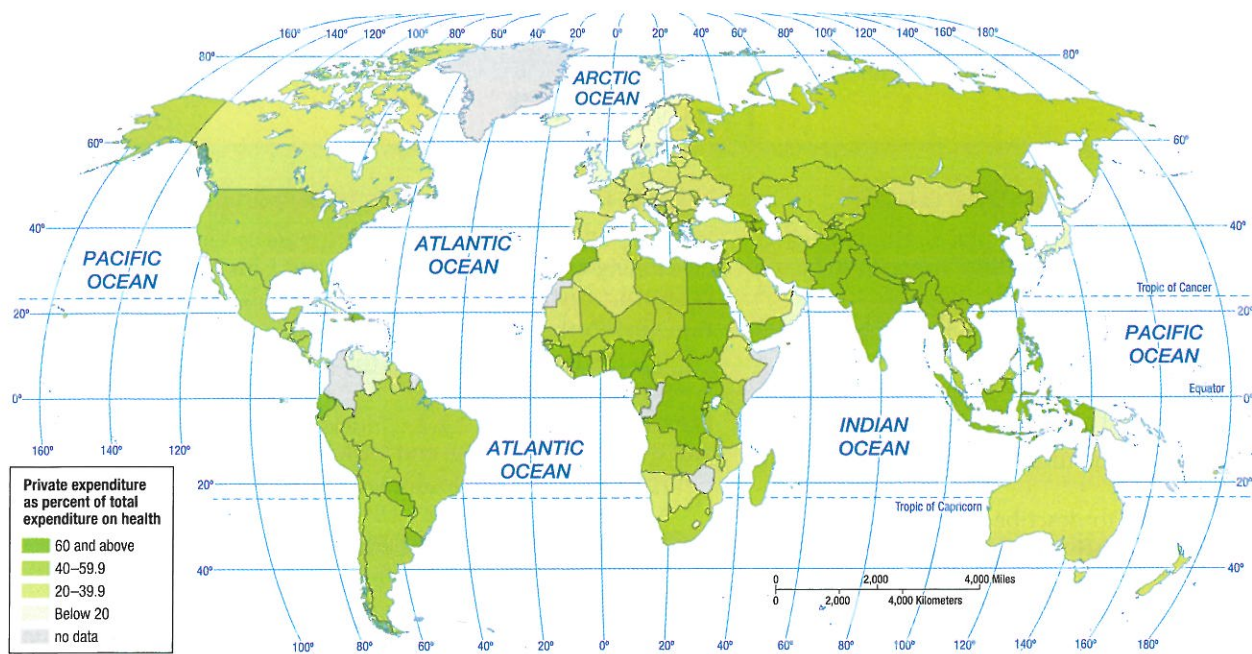
Why might levels of hospital beds and physicians be lower in North America than in other developed countries?



◀ **FIGURE 2-44 HOSPITAL BEDS PER 10,000 PEOPLE** The lowest rates are in sub-Saharan Africa and South Asia.



◀ **FIGURE 2-45 PHYSICIANS PER 10,000 PEOPLE** The lowest rates are in sub-Saharan Africa.



▲ **FIGURE 2-46 PUBLIC EXPENDITURES ON HEALTH CARE AS A SHARE OF TOTAL HEALTH CARE EXPENDITURES** The highest percentages are in Europe.

SUSTAINABILITY AND INEQUALITY IN OUR GLOBAL VILLAGE

Overpopulation in Sub-Saharan Africa

Overpopulation—too many people for the available resources—does not appear to be an immediate threat to the world, even in India, where the seven billionth human was said to have been born on October 31, 2011 (Figure 2-47). However, it does threaten areas within sub-Saharan Africa.

Sub-Saharan Africa was not classified in Key Issue 1 as one of the world's population concentrations. Geographers caution that the size, density, or clustering of population in a region is not an indication of overpopulation. Instead, overpopulation is a relationship between population and a region's level of resources. The capacity of the land to sustain life derives partly from characteristics of the



▲ **FIGURE 2-47 THE WORLD'S SEVEN BILLIONTH HUMAN**

Nargis Kumar, born October 31, 2011, to Vinita and Ajay Kumar, of Lucknow, India, was declared the world's seven billionth person by Plan International, a nongovernmental organization for children's' welfare.

natural environment and partly from human actions to modify the environment through agriculture, industry, and exploitation of raw materials. See for example, the image of Mali on page 44.

The track toward overpopulation may already be irreversible in Africa. Rapid population growth has led to the inability of the land to sustain life in parts of the region. As the land declines in quality, more effort is needed to yield the same amount of crops. This extends the working day of women, who have the primary responsibility for growing food for their families. Women then regard having another child as a means of securing additional help in growing food.

CHECK IN: KEY ISSUE 4

Why Do Some Regions Face Health Threats?

- ✓ The epidemiologic transition has four stages of distinctive diseases.
- ✓ A resurgence of infectious diseases may signal a possible stage 5 of the epidemiologic transition.
- ✓ The provision of health care varies sharply between developed and developing countries.

Summary and Review

KEY ISSUE 1

Where Is the World's Population Distributed?

Global population is concentrated in a few places. Human beings tend to avoid parts of Earth's surface that they consider to be too wet, too dry, too cold, or too mountainous.

LEARNING OUTCOME 2.1.1: Describe regions where population is clustered and where it is sparse.

- Two-thirds of the world's people live in four clusters—East Asia, South Asia, Europe, and Southeast Asia.

LEARNING OUTCOME 2.1.2: Define three types of density used in population geography.

- Arithmetic density is used to describe where people live in the world. Physiological density compares population to resources. Agricultural density measures economic efficiency of food production.

THINKING GEOGRAPHICALLY 2.1: Scientists disagree about the effects of high density on human behavior. Some laboratory tests have shown that rats display evidence of increased aggressiveness, competition, and violence when very large numbers of them are placed in a box. Does very high density cause humans to behave especially aggressively or violently?

GOOGLE EARTH 2.1: Egypt's very high physiological and agricultural densities can be seen from the air. What do the brown and green features represent? Would you expect to find most agriculture in the brown area or the green area? Why?



KEY ISSUE 2

Why Is Global Population Increasing?

Virtually all the world's natural increase is concentrated in the developing countries of Africa, Asia, and Latin America.

LEARNING OUTCOME 2.2.1: Understand how to measure population growth through the natural increase rate.

- The natural increase rate is the percentage by which a population grows in a year.

LEARNING OUTCOME 2.2.2: Understand how to measure births and deaths through CBR and CDR.

- The CBR is the total number of live births in a year for every 1,000 people alive. The CDR is the total number of deaths per 1,000 people.

LEARNING OUTCOME 2.2.3: Understand how to read a population pyramid.

- A population pyramid displays the percentage of population by age and gender. A pyramid with a broad base means a country has a relatively high percentage of young children.

THINKING GEOGRAPHICALLY 2.2: Members of the baby-boom generation—people born between 1946 and 1964—constitute nearly one-third of the U.S. population. As they grow older, what impact will baby boomers have on the American population in the years ahead?

GOOGLE EARTH 2.2: Cemeteries such as this one in New Orleans are unusual. People are buried above ground rather than in graves. What physical features of New Orleans's site and situation discussed in Google Earth 1.2 would account for this?



Key Terms

Agricultural density (p. 49) The ratio of the number of farmers to the total amount of land suitable for agriculture.

Arithmetic density (p. 48) The total number of people divided by the total land area.

Census (p. 45) A complete enumeration of a population.

Crude birth rate (CBR) (p. 50) The total number of live births in a year for every 1,000 people alive in the society.

Crude death rate (CDR) (p. 50) The total number of deaths in a year for every 1,000 people alive in the society.

Demographic transition (p. 56) The process of change in a society's population from a condition of 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.

Demography (p. 44) The scientific study of population characteristics.

Dependency ratio (p. 54) The number of people under age 15 and over age 64 compared to the number of people active in the labor force.

Doubling time (p. 50) The number of years needed to double a population, assuming a constant rate of natural increase.

Ecumene (p. 47) The portion of Earth's surface occupied by permanent human settlement.

Epidemiologic transition (p. 64) Distinctive causes of death in each stage of the demographic transition.

Epidemiology (p. 64) 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.

Industrial Revolution (p. 56) A series of improvements in industrial technology that transformed the process of manufacturing goods.

Infant mortality rate (IMR) (p. 70) The total number of deaths in a year among infants under one year of age for every 1,000 live births in a society.

Life expectancy (p. 65) The average number of years an individual can be expected to live, given current social, economic, and medical conditions. Life expectancy at birth is the average number of years a newborn infant can expect to live.

KEY ISSUE 3

Why Does Population Growth Vary among Regions?

The demographic transition is a change in a country's population.

LEARNING OUTCOME 2.3.1: Describe the four stages of the demographic transition.

- Stage 1 has high CBR and CDR and low NIR. In stage 2 the NIR rises because the CDR declines. In stage 3 the NIR moderates because the CBR starts to decline. Stage 4 has low CBR, CDR, and NIR.

LEARNING OUTCOME 2.3.2: Summarize two approaches to reducing birth rates.

- The CBR can be lowered either through education and health care or through diffusion of contraception.

LEARNING OUTCOME 2.3.3: Summarize Malthus's argument about the relationship between population and resources.

- Malthus argued in 1798 that population would grow more rapidly than resources. Recent experience shows that population has not grown as rapidly as Malthus forecast.

LEARNING OUTCOME 2.3.4: Summarize the possible stage 5 of the demographic transition.

- Japan and some European countries may be in a possible stage 5, characterized by a decline in population, because CDR exceeds CBR.

THINKING GEOGRAPHICALLY 2.3: Paul and Anne Ehrlich argue in *The Population Explosion* (1990) that a baby born in a developed country poses a graver threat to sustainability than a baby born in a developing country because people in developed countries place much higher demands on the world's supply of energy, food, and other limited resources. Do you agree with this view?

GOOGLE EARTH 2.3: Cape Verde, an example of a stage 2 country, comprises 10 islands off the west coast of Africa. If you zoom in on the largest island, is the population dispersed evenly through the island or is it clustered in a settlement?



Medical revolution (p. 56) Medical technology invented in Europe and North America that has diffused to the poorer countries in Latin America, Asia, and Africa. Improved medical practices have eliminated many of the traditional causes of death in poorer countries and enabled more people to live longer and healthier lives.

Natural increase rate (NIR) (p. 50) The percentage growth of a population in a year, computed as the crude birth rate minus the crude death rate.

Overpopulation (p. 44) A situation in which the number of people in an area exceeds the capacity of the environment to support life at a decent standard of living.

Pandemic (p. 64) Disease that occurs over a wide geographic area and affects a very high proportion of the population.

Physiological density (p. 48) The number of people per unit of area of arable land, which is land suitable for agriculture.

Population pyramid (p. 54) A bar graph that represents the distribution of population by age and sex.

KEY ISSUE 4

Why Do Regions Face Health Threats?

The epidemiologic transition is a change in a society's distinctive types of diseases. Health care is better in developed countries, but even they are threatened by infectious diseases diffused through modern means of transportation.

LEARNING OUTCOME 2.4.1: Summarize the four stages of the epidemiologic transition.

- Stage 1 was characterized by pestilence and famine, stage 2 by pandemics, and stages 3 and 4 by degenerative diseases.

LEARNING OUTCOME 2.4.2: Summarize the reasons for a stage 4 and possible stage 5 of the epidemiologic transition.

- Evolution, poverty, and increased connections may influence the resurgence of infectious diseases.

LEARNING OUTCOME 2.4.3: Describe the diffusion of AIDS.

LEARNING OUTCOME 2.4.4: Understand reasons for variations in health care between developed and developing countries.

- Health care varies widely around the world because developing countries generally lack resources to provide the same level of health care as developed countries.

LEARNING OUTCOME 2.4.5: Understand reasons for variations in health between developed and developing countries.

THINKING GEOGRAPHICALLY 2.4: Health-care indicators for the United States do not always match those of other developed countries. What reasons might explain these differences?

GOOGLE EARTH 2.4: Several hundred thousand died, some from infectious diseases, after an earthquake hit Haiti January 12, 2010, the date this Google Earth image was taken.



The roof of the cathedral in the capital Port au Prince collapsed. What other evidence of the earthquake can be seen in images from January 2010?

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Sex ratio (p. 54) The number of males per 100 females in the population.

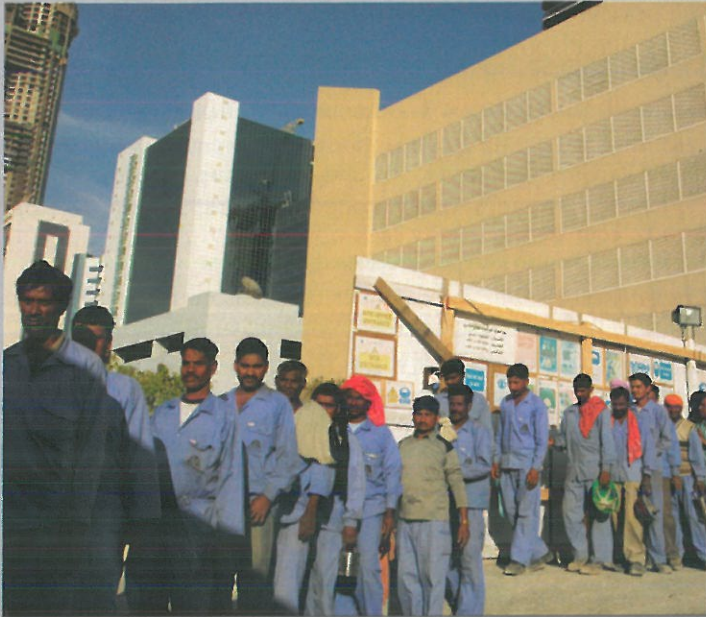
Total fertility rate (TFR) (p. 52) The average number of children a woman will have throughout her childbearing years.

Zero population growth (ZPG) (p. 57) A decline of the total fertility rate to the point where the natural increase rate equals zero.

Chapter

3

Migration



Why are these immigrants lining up in Dubai? Page 95



Why are these people watching a parade in New York? Page 100

KEY ISSUE 1

Where Are Migrants Distributed?

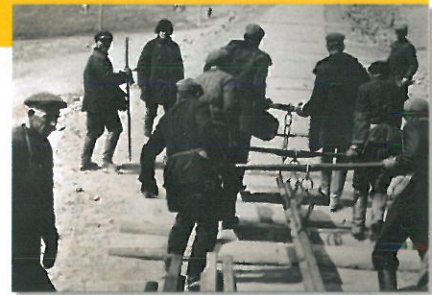


A World of Migrants 79

People are on the move around the world. Where are they heading, and where are they coming from?

KEY ISSUE 2

Where Do People Migrate Within a Country?



Moving Across Town or Across Country 84

Some people are moving into cities, while others are moving out of them.