

# 2

## Population and Health

### Learning Outcomes

*After reading, studying, and discussing the chapter, students should be able to:*

**Learning Outcome 2.1.1:** Describe regions where population is clustered and where it is sparse.

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

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

**Learning Outcome 2.2.2:** Understand how to measure births and deaths through CBR and CDR.

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

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

**Learning Outcome 2.3.2:** Summarize two approaches to reducing birth rates.

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

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

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

**Learning Outcome 2.4.2:** Summarize the reasons for a stage 4 and possible stage 5 of the epidemiological transition.

**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.

**Learning Outcome 2.4.5:** Understand reasons for variations in health between developed and developing countries.

## Chapter Outline

### Key Issue 1: Where Is the World's Population Distributed?

**Introduction** Understanding the size, distribution, and changes of Earth's human population is an important part of geography. Population growth is most rapid in less developed countries, and geographers are concerned with population growth at the regional level. **Overpopulation** may be defined at the regional level as population relative to resources instead of absolute numbers of people.

**Clusters** East Asia holds 20 percent of the world's population. The population of East Asia is mostly in China but also Japan, North and South Korea, and Taiwan. Population is clustered near the large rivers and the ocean. China's population is only about half urban. South Asia's population is mostly in India but also Pakistan, Bangladesh, and Sri Lanka. Population is concentrated along the Indus and Ganges rivers, and also along the coasts. About 75 percent of South Asia's population is rural.

Southeast Asia's population is concentrated on the larger islands of Indonesia, the Philippines, Sumatra, Borneo, Papua New Guinea. Other large populations are along the rivers of the Southeast Asia mainland. The population of Southeast Asia is largely rural. Europe holds about 11 percent of the world's population. People live mostly in cities (around 75 percent urban). The largest population cluster in North America is in the northeastern United States and southeastern Canada. The largest population cluster in Africa is along the Atlantic coast, especially the portion facing south.

**Sparsely Populated Regions** The **ecumene** describes the areas of human habitation. Examining the changes in ecumene reveal some areas where humans do not live in large numbers. The ecumenes that are sparsely populated are very dry areas, very wet areas, very cold areas, and mountains. There are large cities in the mountains of Mexico and along the Andes because the climate is more temperate in the mountains in Latin America than in the lowlands. Africa also has some populations living at higher altitudes.

**Arithmetic Density** In population geography **arithmetic density** refers to the total number of people divided by the total land area (usually square kilometers or square miles). Arithmetic density enables geographers to compare the number of people trying to live on a given piece of land in different regions of the world.

**Physiological Density** Land suitable for agriculture is called arable land. In a region, the number of people supported by a unit area of arable land is called the **physiological density**. Physiological density can be considered a rough measure of a country's food security. A large difference between the physiological density and arithmetic density indicates that most of a country's land is unsuitable for intensive agriculture.

**Agricultural Density** The number of farmers per area of arable land is the **agricultural density**. Agricultural density is used by geographers as a measure of development. Many more machines are used for agriculture in more developed countries. With more machines being used in agriculture, fewer farmers are needed. Also, more developed countries have the technology and capital to allow a few people to farm extensive land areas and feed many people.

## **Key Issue 2: Why Is Global Population Increasing?**

**Components of Population Growth** The **crude birth rate (CBR)** is the total number of live births in a year for every thousand people alive in society. The **crude death rate (CDR)** is the total number of deaths in a year for every thousand people in society. The **natural increase rate (NIR)** is the percentage by which a population grows in a year. The NIR is computed by subtracting the CDR from the CBR.

**Natural Increase** The NIR is given as a percent change per year, while the CBR and CDR are usually given per a thousand. The NIR affects the **doubling time**, which is the number of years needed to double population, assuming a constant rate of natural increase. World NIR has decreased from a 1963 peak of 2.2 percent to around 1.2 percent, lessening concerns about rapid population growth. Still the average masks large regional differences: Most rapid growth is occurring in less developed countries while more developing countries have low or even slightly negative growth.

**Fertility** Geographers use the **total fertility rate (TFR)** to measure the number of live births in society. The TFR is the average number of children a woman will have in her childbearing years (roughly 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. The TFR attempts to predict future behavior of individual women in a world of rapid cultural change.

**Mortality** The crude death rate does not follow the global distribution of other indicators. This is because crude death rates are relatively high in places with a large portion of elderly people. Thus, the crude death rate is not an indicator of development.

**Population Pyramids** Population pyramids give a “snapshot” of the age and sex composition of a population. We can tell at one look whether a population is growing rapidly (wide base), has a long or short life expectancy (tall or short pyramid), or is aging and stable (straight sides).

**Dependency Ratio** One important way to compare age structure among countries is the **dependency ratio**, which shows the people who are too young and too old to work, compared to the number of people in their productive years. People who are 0–14 years of age or over 64 years old are normally classified as dependents. The large number of children in a poor country strains the ability of that country to be able to provide needed services such as schools, hospitals, and day care centers. The “graying” of a country’s population places a burden on the working population to meet the needs of older people for income and medical care after they retire from their job.

**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. The large number of male babies in countries like China and India has raised the possibility that a relatively large number of female fetuses are being aborted.

## **Key Issue 3: Why Does Population Growth Vary among Regions?**

The **demographic transition** is a model of population change where high birth rates and death rates transition to low birth rates and death rates. It is divided into four stages.

**Stage 1: Low Growth** In stage 1, birth rates and death rates are both high, resulting in a low rate of growth. For most of this period, people depended on hunting and gathering for food. When food was easily obtained, a region’s population increased, but it declined when people were unable to locate enough animals or vegetation nearby. There are no countries presently in stage 1.

**Stage 2: High Growth** The move to stage 2 is caused by a decline in death rates. Birth rates remain high, leading to rapid population growth. The more developed countries entered stage 2 as a part of the Industrial Revolution. Many less developed countries entered stage 2 much later as a result of the diffusion of medical technologies and knowledge into the less developed world (the **medical revolution**).

**Stage 3: Decreasing Growth** Stage 3 is marked by a drop in fertility, which brings down the birth rate and decreases the natural increase rate. A society enters stage 3 when people have fewer children. The decision to have fewer children is partly a reaction to a decline in mortality. The death rate in stage 3 societies continues to fall but not as rapidly as the birth rate.

**Stage 4: Low Growth** Stage 4 is marked by a low crude birth rate and crude death rate and nearly zero natural increase. This condition is called **zero population growth**, a term often applied to stage 4 countries. Stage 4 resembles stage 1 in terms of growth, but otherwise is very different. Instead of high birth rates and death rates, both are low. Life expectancies are much longer in stage 4 and society is much different. Finally, once the demographic transition has reached stage 4, the population has swelled during stages 2 and 3.

**Declining Birth Rates** Birth rates have continued to decline across the world but especially in developing countries. Most of this decline of birth rates has been attributed to economic development and the increased use of contraceptives. If women in less developed countries attend school longer they will learn employment skills and gain more economic control over their life. Educated women tend to have fewer children. Debate continues over birth control because some religions and governments are very opposed to any form of birth control.

**Contemporary Neo-Malthusians** Thomas Malthus predicted that population increases would soon outpace the potential increases in food supply, leading to a dramatic crisis as a result of the strain on resources. Malthus's views remain today. In Malthus's time only relatively wealthy entered stage 2 of the demographic transition. Countries in the last few decades have entered stage 2 of the demographic transition because of the transfer of medical technologies but not because of wealth. The gap between population growth and resources is wider in some countries than even Malthus anticipated. There is concern about the population growth outstripping water and energy supplies, not just food.

**Malthus's Critics** The critics of Malthus's theory argue that population growth is not so large that human ingenuity or cooperation can overcome any resources hurdles that arise. Critics of Malthus's theory believe that a larger population generates a greater demand for goods, which results in more jobs. More people also means more brains to invent ideas about how to improve life. Marxists believe that the world possesses sufficient resources to eliminate global hunger and poverty, if the resources were shared equally.

**Malthus's Theory and Reality** 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 Natural Increase Rate since 1950. Malthus was fairly close to the mark on food production but much too pessimistic on population growth. Many people in the world cannot afford to buy 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. Malthus expected population to quadruple during a half-century, which was inaccurate.

**Japan's Declining Population** Japan's population is expected decline from 127 million in 2010 to 95 million by 2050. Japan by 2050 will a very high percentage of elderly and a very low percentage of children. Japanese society has always placed a high value on social conformity dos not welcome immigrants from other backgrounds. Because of the lack of immigrants Japan faces a severe shortage of workers. They are now trying to encourage older people and woman to work. Programs are making it more attractive for older people to continue working. More women in the labor force may actually translate into a lower birth rate for Japanese women, which would cause the population to decline even more than expected.

**Demographic Transition Possible Stage 5: Decline** A possible stage 5 of the demographic transition is predicted by demographers for some developed countries. Stage 5 would be characterized by very low CBR, an increasing CDR, and therefore a negative NIR. The population of a country in stage 5 of the demographic transition would be much older. The **elderly support ratio** is the number of working age people (ages 15–64) divided by the number of persons 65 and older. Relatively few workers must contribute to pensions, health care, and other support that older people need.

**China and India** Immediately after gaining independence from England, India saw a sharp decline in death rate. India became to first country to embark on a national family planning program. The government spends several hundred million dollars annually on various family-planning programs including the distribution of birth-control devices and abortions. India's most controversial family-planning program was the establishment of sterilization camps. A sterilized person was entitled to payment which was roughly equivalent to a person's monthly income. People were opposed to the sterilization camps because they thought that eventually sterilization would be forced.

Since 2000, China has 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. Couples in China receive financial subsidies, a long maternity leave, better housing, and (in rural areas) more land if they agreed to have just one child. The government prohibited marriage for men until they are age 22 and women until they are age 20. Rules have changed in the twenty-first century as China has moved toward a market-based economy and families are becoming wealthier.

#### **Key Issue 4: Why Do Some Regions Face Health Threats?**

The **epidemiologic transition** roughly follows the demographic transition, but instead of changes in birth rates it tracks changes in the leading causes of death. The term *epidemiologic* comes from **epidemiology**, which is the branch of medical science concerned with 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.

**Stage 1: Pestilence and Famine (High CDR)** In stage 1 of the epidemiologic transition, infectious and parasitic diseases were principal causes of human deaths. Accidents and attacks by animals and other humans were also prevalent causes of death at the time. 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.

**Stage 2: Receding Pandemics (Rapidly Declining CDR)** 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.

**Stage 3: Degenerative Diseases (Moderately Declining CDR)** Stage 3 of the epidemiologic transition is characterized by a decrease in deaths from infectious diseases and an increase in chronic disorders associated with aging. Chronic disorders associated with aging include heart attacks and various forms of cancer. Sub-Saharan Africa and South Asia have the lowest incidence of cancer, primarily because of the relatively low life expectancy in those regions.

**Stage 4: Delayed Degenerative Diseases (Low but Increasing CDR)** The major degenerative causes of death—cardiovascular disease and cancers—linger, but the life expectancy of older people is extended through medical advances. Medical operations and healthier lifestyles increase people's life expectancy in stage 4 of the epidemiologic transition.

**Reason for Possible Stage 5: Evolution** In a possible stage 5, infectious diseases thought to have been eradicated or controlled return, and new ones emerge. Infectious disease microbes have continually 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.

**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 drugs needed for treatment. Tuberculosis is an example of an infectious disease that has largely been controlled in developed countries but remains a major cause of death in developing countries. Tuberculosis is more prevalent in poor areas because the long, expensive treatment poses a significant economic burden.

**Reason for Possible Stage 5: Increased Connections** Motor vehicles allow rural residents to have greater connections with urban areas and for urban residents to reach rural areas. Airplanes allow residents to have greater connections with people in other countries. As they travel, people carry diseases with them and are exposed to the diseases of others.

**Indicators of Health** The **infant mortality rate (IMR)** is the annual number of deaths of infants under one year of age, compared with total live births. The IMR is usually expressed as the number of deaths among infants per 1,000 births rather than as a percentage. Lower IMRs are found in countries with well-trained doctors and nurses, modern hospitals, and large supplies of medicine. Life expectancy is most favorable in wealthy countries in Europe and least favorable in the poor countries of sub-Saharan Africa.

**Provision of Health Care** Developed countries use part of their wealth to protect people who, for various reasons, are unable to work. Expenditures on health care exceeds 15 percent of total government expenditures in Europe and North America compared to less than 5 percentage in sub-Saharan Africa and South Asia. Not only do developed countries spend more on health care, they spend a higher percentage of their wealth on health care.

**Medical Services** Most countries in Europe have more than 50 hospital beds per 10,000 people, compared to fewer than 5 in sub-Saharan Africa. In most developed countries, health care is a public service that is available at little or no cost. The United States is a developed country where private individuals are required to pay an average off 55 percent of health care, more closely resembling the pattern in developing countries.

## **Introducing the Chapter**

Chapter 2 opens with a discussion of why the study of population is important. The reasons make a powerful opener to any discussion of the chapter's contents by emphasizing the "punch" of the fourth Key

Issue: Why might the world face an overpopulation problem? The three reasons we should study population are given as:

More people are alive at this time—about 6¾ billion—than at any point in Earth’s long history.

The world’s population increased at a faster rate during the second half of the twentieth century than ever before in history.

Virtually all global population growth is concentrated in less developed countries.

## **Icebreakers**

### **The “Village of 100”**

Numerous examples on the web and in the text introduce the concepts of the world’s population as a “global village.” The elementary concept of percentages is dramatized by imagining the world has a population of only 100. This concept is most frequently attributed to Donella Meadow’s “State of the Village” (1990). Beware: While there are many versions of this “village” on the Internet, not all are accurate. It is easiest to use reliably sourced data to construct your own village of 100.

With a large enough class you might consider having the students play out the village on a virtual map. I have started a class by handing out 100 note cards to students in a large lecture class with different information on each card. The students then arranged themselves in an outside common area according to the categories on the cards (world regions, more developed/less developed, etc).

### **Family size**

In a small class, have students fill out the number of children in their families, including themselves. Collect the slips and organize them in ascending order. Write the distribution on the board. Then ask the following questions:

What is the average family size? Mode? Median?

Is this representative of the average family size in the community (students may need to be reminded that not every couple has children)?

When did most parents start having children?

Do most parents practice conception?

How might these numbers vary elsewhere in the world?

The same exercise can be modified for a large-lecture class with a show of hands. Ask students who are only children to raise their hands, followed by those with only one brother or sister, continuing up until there are no more volunteers. It should be easy to estimate the average family size from this show of hands.

### **Population growth model**

Population Connection publishes a seven-minute film on DVD ([www.populationconnection.org](http://www.populationconnection.org)) modeling population growth from A.D. 1 to 2030, with million-person dots added to a world map as the time progresses (about 5 years/second). Students are initially very bored by the slow progress of human population from A.D. 1 to around 1800. The rapid expansion of human populations in the last 30 seconds of the film stimulates discussion.

## **Challenges to Comprehension**

### **Imagining Billions**

Students can have a very difficult time understanding the scale of world population size and growth. Here is an exercise that can be performed briefly in class (ask students with calculators to help with the calculation) or assigned as independent work:

Imagine the equator was entirely land; that is, 40,000 kilometers of Earth's surface. If we gave every person on Earth one square meter of soil, how many times would the present human population (6.7 billion in 2012) circle the globe?

Answer:  $40,000 \text{ km} \times 1 \text{ m/person} = 40,000,000$  people once around the equator.

$6.7 \text{ billion divided by } 40,000,000 = 167.5 \text{ times}$

Now that your students are imagining a line of people long enough to circle the globe 167 times, have them calculate the speed at which the line would grow at the current population growth rate:

$6.7 \text{ billion} \times .012 = 80 \text{ million new people every year}$

$80,000,000 \text{ m/year} = 80,000 \text{ km/year}$

$80,000 \text{ km/year} = 9 \text{ km/hr}$  (Google can do the unit conversion very quickly)

$9 \text{ km/hr} =$  a steady jog with no breaks, just to keep up with world population growth for one year!

### **Crude Death Rates**

Although it is addressed in the first paragraph after the measure is defined, students struggle with understanding how developed countries can have higher death rates than developing ones. It is helpful to take some time to discuss the age structure of a population and how older populations can have a moderately high rate even though the population is healthy.

### **Blaming the Victims**

Students can be challenged to appreciate how different life in other places can be. Students frequently misapprehend:

a) Women in less developed countries often do not have the same reproductive choices as in the more developed world; and



b) HIV/AIDS affects many innocent people (some are unforgiving of HIV/AIDS cases over the implied immorality of transmission).

To address (a), consider a discussion of what life is like in an underdeveloped country. A series of questions can help lead the discussion to a better understanding:

In a less developed country, how many years of school would a typical girl or boy experience?

Would the answer be different if he or she grew up on a farm or in a city?

If a young woman didn't want to get married and have children, what choices might she have in a rural community in a less developed country?

What pressures might there be for the woman to marry and reproduce?

To address (b), have the class consider whether everyone with HIV/AIDS is responsible for their illness. Students will volunteer several examples, (e.g., mother-to-child transmission).

## **Assignments**

### **Review/Reflection Questions**

- Refer to Table 2-1 on page 46 of your textbook. In terms of food supply, which measure of density is most important when considering whether a country's population is too large? Why?
- Describe the change brought about by the industrial and medical revolutions in terms of population growth. What effect did both revolutions have?
- List several differences between the industrial and medical revolutions. Why did both cause a move from stage 1 to stage 2? What is preventing countries now in stage 2 from moving to stage 3?
- What did Thomas Malthus predict about population growth? Was he right? Give an example of a neo-Malthusian argument from your own experience (some resource you think might become rare because of population growth).
- How is the epidemiologic transition like the demographic transition? How is it different? What does the epidemiologic transition mean when comparing the lives of people in the developed world with the lives of people in less developed countries?

For additional review and test prep materials, have your students visit **MasteringGeography™** to access a variety of resources, including interactive maps, videos, GoogleEarth activities, RSS feeds, flashcards, web links and self-study quizzes.

### **Demographic Data Collection and Analysis**

Purpose: students will look up demographic data for a variety of countries to become more familiar with demographic measures.

Choose or have the students choose 6 to 10 countries for analysis. You may wish to give students a representative sample of countries from around the world; if your teaching includes specific international examples it might be useful to include those countries.

## *Chapter 2: Population and Health*

Data selection: choose widely available data for the students to look up. Have the students assemble the data in a table.

Analysis: you may wish to have students perform regression analysis on two or more points of data, or simply to write a reflection on what they learned.

Here is an example:

Use the following countries in your analysis:

Afghanistan  
Bolivia  
Cambodia  
China  
France  
Lithuania  
Tanzania  
Turkey  
United States

Look up the following information for each country on [www.prb.org](http://www.prb.org) and assemble it into a table. Your table should be easy to read and fit onto one page. If you cannot fit it onto one page, please make sure that all column and row labels are present on the second page.

Crude Birth Rate (Births per 1,000 population)  
Crude Death Rate  
Rate of Natural Increase  
Infant Mortality Rate (Infant deaths per 1,000 live births)  
Life Expectancy  
GNI PPP per capita  
... and any other data you find personally interesting.

Include a column or row in your table in which you identify which stage of the demographic transition you believe each country to be in.

Once you have assembled your table, write a two- to three-page paper (500 to 750 words) on what you have learned from assembling this information: Do there appear to be any trends or relationships between the data? Are there any data that surprise you?

For additional review and test prep materials, have your students visit **MasteringGeography™** to access a variety of resources, including interactive maps, videos, GoogleEarth activities, RSS feeds, flashcards, web links and self-study quizzes.

## Thinking Geographically Questions

*2.1: Scientists disagree about the effects on 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?*

I believe that people who live in a densely populated urban area are more aggressive in general than people that live in a sparsely populated rural area. By no means is violence or aggression exclusive to urban areas, but there tends to be less hostility towards your fellow man in slow moving rural communities. Drive on the freeways in Southern California or try to hail a cab in New York City and you will see what I mean. People are much less guarded and are generally friendlier in small towns in the Midwest.

*2.2: Members of the baby-boom generation—people born between 1946 and 1964—constitute nearly one-third of the U.S. population. Baby boomers received more education than their parents, and women from this generation were more likely to enter the labor force than women before them. The baby boomers have delayed marriage and parenthood and have fewer children compared to their parents. They are more likely to divorce, to bear children while unmarried, and to cohabit. As they grow older, what impacts will baby boomers have on American population in the years ahead?*

The baby boomers are the first generation in U.S. history to leave things generally worse for their children than they had it. Up to this point every generation in U.S. history was generally better off than their parents. The baby boomers have awarded themselves large pensions and retirement packages that their children are going to have to somehow figure out how to pay for. They are also using up all the money in the nation's social security fund. Even though working people today are paying into social security, many experts predict that they won't get it back when they retire.

*2.3: Paul and Anne Ehrlich argue in The Population Explosion (1990) that a baby born in a developed country poses a greater 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?*

I generally agree with Paul and Anne Ehrlich. In developed countries we consume far more resources than people in developing countries. The developing countries are starting to consume more resources as they become developed. For example, China consumes far more resources than it did 20 years ago, even though the population has not increased substantially. It is just that the average person in China now uses and can afford more resources than they did before. A well-known geographer used the amount of electricity used in a country as a good measure of a country's level of development. The Chinese are using far more electricity than ever.

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

In the United States individuals are expected to pay for their own health care. The taxpayers in this country pay for the health care of the poor, disabled, and elderly. In Canada and Europe medical care for all is provided by the government. Health care is essentially free for everyone in Canada and Europe. The CDR in the United States is lower than it is in Europe. This is due to the fact that the population in the United States is generally younger than the population in Europe.

## Pause and Reflect Questions

*2.1.1: Why isn't North America one of the four major population clusters?*

The United States has less than 5 percent of the world's population. Canada has a large land area, but a small population. Countries like China and India have over a billion people. Other countries in the world's four largest population clusters might not have extremely large populations, but they have high arithmetic densities.

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

Switzerland has a high physiological and agricultural density.

*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?*

If we do not increase our NIR in the United States it will take more than 54 years to double our population.

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

I am an only child so my mother's TFR was below average in the United States.

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

Alaska has a higher percentage of males than females. Many young men move to Alaska (usually only temporarily) to work in the petroleum exporting industry or to work on fishing boats.

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

Many people from North Africa and Southwest Asia have migrated to Europe in the last 20 years and they are having large families. The CBR of the Europeans probably has declined in the last 20 years, but the CBR of the immigrants has made up for it.

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

Malthus predicted that by 256 people for every 10 units of food.

*2.3.4: Why might China's One Child Policy result in many more male than females children?*

The one child policy in China resulted in the abortion of female fetuses and the killing of female infants. Many couples wanted a boy instead of a girl.

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

Cholera is found in the tropical or 'A' climates. The 'A' climates include the Tropical Wet, Tropical Savanna, and Tropical Monsoon climates.

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

Of course I have. Who in a developed country has not had at least one of their grandparents or parents lifespan extended by medical advances?

*2.4.3: Have other pandemic diseases diffused rapidly in recent years?*

H1N1 (the bird flu) or SARS has diffused from Asia to North America. Luckily it was contained before it got out of hand. It was brought to North America by people who were exposed to the diseases while in Asia on business.

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

Men in less developed countries often times die due to warfare. Men also tend to take more risks than women and are involved in more accidents. Men also tend to consume more alcohol and do not handle stress as well as women. Men may be more prone to internalizing their stress than women are. Men also develop cardiovascular diseases in their 50s and 60s, a decade before women experience these health problems.

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

Most people in the United States pay for their own health care. This means going to the doctor or especially the hospital costs money. People will not go see the doctor sometimes even when they should because they don't want to pay the doctor's bill. Medical bills are very expensive.

## **Google Earth Questions**

*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?*

The brown areas represent desert; the green areas represent more fertile soils that allow vegetation. Most agriculture would be in the green area, since desert is too dry to grow most crops.

*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?*

New Orleans is below sea level. Graves dug below the surface would hit water very quickly.

*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?*

The population is clustered in settlements, especially the capital city Praia.

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?*

Other damaged buildings.

## Resources

### Interactive population pyramids

The U.S. Census Bureau's International Data Base has an interactive population pyramid application at:

[www.census.gov/ipc/www/idp/informatonGateway.php](http://www.census.gov/ipc/www/idp/informatonGateway.php)

From the "Data Access" page, select the "Country" tab, then the country and year(s) of interest and press the "Submit" button. Go to the "Population Pyramids" tab and you will see the dynamic pyramid followed by the pyramid(s) for the years you selected. You can select a different country and/or year(s) and click the "Submit" button to see the resulting pyramids.

This application illustrates how a population pyramid can display demographic data in an easily understood format. The "dynamic" model, where the pyramid grows through a progression of past demographic data and into a forecast for 2050, helps students understand how each generation's reproductive choices affect a country's population structure.

### Population Reference Bureau

The Population Reference Bureau ([www.prb.org](http://www.prb.org)) has a wealth of demographic data, as well as data on education, employment, health, and environment. It features data on the United States and most countries around the world. One section of the website ("Educators") focuses on using demographic data in teaching.

### World Health Organization Statistical Information System (WHOSIS)

The WHO is the authoritative source of health data for the world, especially valuable as a resource for further investigation into the chapter's section on epidemiological transition.

[www.who.int/whosis/en/](http://www.who.int/whosis/en/)

### Gapminder

Gapminder features an easy-to-use interactive chart tool and map. The chart allows users to select variables on each axis and watch trends unfold through time.

[www.gapminder.org/](http://www.gapminder.org/)

### U.S. Census

The U.S. Census features a wealth of demographic and economic data on the U.S. population.

[www.census.gov/](http://www.census.gov/)

## **Connections between Chapters**

### **Back to Chapter 1**

The introduction of Chapter 2 underlies the key geographic concepts associated with the study of population, reinforcing the geographic nature of population distribution and change. This introduction also helps students understand the types of questions asked in the Key Issues.

### **Forward to Chapter 3**

Chapter 3, Migration, forms a natural step from Chapter 2, as those countries experiencing rapid population growth frequently are source regions for international migration, while countries in stage 4 of the demographic transition often experience net in-migration.