Population and Health 2

Learning Outcomes

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

Learning Outcome 2.1.1: Understand the distribution of the world's people.

Learning Outcome 2.1.2: Understand why some regions have clustered populations and other regions are sparsely inhabited.

Learning Outcome 2.1.3: Define three types of density used in population geography.

Learning Outcome 2.2.1: Understand historical and recent rates of natural increase.

Learning Outcome 2.2.2: Recognize regional variations in fertility and mortality.

Learning Outcome 2.2.3: Describe the stages of the demographic transition.

Learning Outcome 2.3.1: Understand reasons for varying sex ratios and for reduced birth rates.

Learning Outcome 2.3.2: Understand the impact of the demographic transition on the percentages of young and old.

Learning Outcome 2.3.3: Understand variations in health-care services between developed and developing nations.

Learning Outcome 2.3.4: Summarize the four stages of the epidemiologic transition.

Learning Outcome 2.4.1: Summarize arguments supporting and opposing Malthus's theory of the connection between population and resources.

Learning Outcome 2.4.2: Understand the future population of the world's most populous countries and elements of a possible stage 5 of the demographic transition.

Learning Outcome 2.4.3: Understand reasons for a possible stage 5 of the epidemoiologic transition.

Learning Outcome 2.4.4: Understand reasons for declining birth rates.

Chapter Outline

Introduction More people are presently alive than at any other point in Earth's history, with population growth mostly concentrated in developing countries. Can Earth sustain more than the 7 billion people that currently call it home, let alone the added billions in the future? Geographers have unique perspectives on the ability of people to live on Earth. Population growth in developing countries, such as Indonesia (the fourth most populous country in the world), will greatly affect the future population of the world as a whole.

Key Issue 1: Where Are the World's People Distributed?

Introducing Population and Health Geographers examine population problems by first identifying where people are found across the Earth. The location of Earth's 7 billion people forms a regular distribution. Chapter 2 explains the spatial variation in population growth rates. With the rate of world population growth slowing in the twenty-first century, geographers have turned their attention to the global differences in access to health-care. The study of population geography is especially important for three reasons:

- More people are alive at this time than at any other point in Earth's long history.
- Virtually all global population growth is concentrated in developing countries.
- The world's population increased at a faster rate during the second half of the twentieth century than ever before in history; the rate has slowed in the twenty-first century but is still high by historical standards.

Overpopulation occurs when the number of people in an area surpasses the ability of the environment to support life at an adequate standard of living. The capacity of the Earth to sustain appreciable population growth differs at varying scales; some regions may feature a favorable balance between people and resources, whereas others may not. The **census** is the data source most readily used for analysis in population geography. Despite its importance, two issues relating to the census have been identified:

- **Nonparticipation**. Homeless (unsheltered) people, ethnic minorities, and citizens of other countries who do not possess proper immigration documentation may be less likely to participate in the census.
- **Sampling**. Statistical sampling techniques can be used to get a more accurate count, as well as to identify detailed characteristics of people, housing, and businesses. People sympathetic to the needs of the homeless and immigrants have been in support of sampling in contrast to people from more rural areas.

Distribution of the World's People The world's population is not distributed uniformly; two properties may be employed by Geographers to understand this distribution: concentration and density. These concepts can be displayed cartographically many ways, such as looking at concentration using a cartogram.

Population Concentrations Two-thirds of the Earth's population are clustered in four regions. These four regions are characterized by low-lying terrain, with fertile soil and temperate climate. Concentrations of people are found near oceans (or rivers with easy access to an ocean) rather than in the interior of major landmasses.

Four Clusters The four aforementioned population clusters – East Asia, South Asia, Europe, and Southeast Asia, exhibit differences in the pattern of the occupancy of the land.

East Asia Nearly a quarter of the Earth's population is centered in East Asia. East Asia's population is mostly concentrated in China, but also Japan, North and South Korea, and Taiwan. Population is clustered near fertile river valleys and the Pacific Coast. About half of China's population reside in urban areas.

South Asia Roughly a quarter of the world population lives in South Asia, comprising the countries of India, Pakistan, Bangladesh, and Sri Lanka. Population is concentrated along the Indus and Ganges rivers, and also along the two coasts of India (the Arabian Sea to the west and the Bay of Bengal to the east).

Europe Four dozen countries constitute Europe, ranging from Monaco (with 1 square kilometer in land area) to Russia (the world's largest country by land area, including its Asian part). People occupy mostly cities, with three-quarters of Europe's inhabitants living in urban areas.

Southeast Asia Approximately 600 million people live in Southeast Asia, with population concentrated on a series of islands that lie between the Indian and Pacific oceans. This concentration is distinguished by a high percentage of people working as farmers in rural areas.

Other Clusters Africa's two largest population clusters amount to roughly 300 million people, are located along the west coast between Senegal and Mogeroa and along the east coast between Eritrea and South Africa. Most Africans work as farmers. In the Western Hemisphere, northeastern United States, and southeastern Canada make up the largest population cluster, with 100 million people.

Sparsely Populated Regions The **ecumene** describes the areas of permanent 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.

Dry Lands Twenty percent of Earth's land surface is covered by areas too dry for farming. While deserts cannot support agricultural activity due to insufficient water supplies, some populations have adapted to these circumstances, raising animals that are tolerant to the climate.

Wet Lands Poor soil conditions, caused by very high levels of precipitation and extreme heat, hinder human occupation near the equator.

Cold Lands Few humans live near the North and South poles, as much of the land is permanently frozen (permafrost) and few animals capable of domestication are tolerant to the extreme cold temperatures.

High Lands Many high elevation areas in the world are inhospitable to human settlement due to the mountains dominating these landscapes being steep and snow covered. Some plateau and mountain regions can support human settlement, especially those at low altitudes (near the equator) where agriculture is possible at high elevations.

Population Density The number of people occupying a defined area of land, previously described in Chapter 1 as density, reveal the distribution of people compared to available resources. Three measures of density are widely used by Geographers: arithmetic density, physiological density, and agricultural density.

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. Physiological and agricultural densities may be used in concert to help geographers understand relationships between population and resources in a country.

Key Issue 2: Why Is World Population Increasing?

Natural Increase The **natural increase rate (NIR)** is the percentage by which a population grows in a year, excluding growth by migration.

Population Growth in History For the several hundred-thousand-year occupancy of Earth, the NIR was essentially zero. While the world NIR peaked in 1963 at a rate of 2.2 percent and has been in decline since the 1990s, the NIR during the second half of the twentieth century was considerably high by historical standards. The number of people added annually has decreased from a historic peak of 88 million in 1989 to the present level of 75 million people. This drop is less acute than the drop in NIR as the world population base is larger now than in the past. World population increased from 3 to 4 billion in 14 years, from 4 to 5 billion in 13 years, from 5 to 6 billion in 12 years, and from 6 to 7 billion in 12 years.

The NIR affects the **doubling time**, which is the number of years required to double a population, assuming a steady rate of natural increase. If the present rate of 1.2 percent per year holds, world population would double in approximately 54 years.

Life expectancy is the average number of years an individual can be anticipated to live, assuming current social, economic, and medical conditions remain in place. Life expectancy in developed countries is about 80 years, while in developing countries in sub-Saharan Africa is only 57 years.

Regional Variations in NIR More than 95 percent of the natural increase is concentrated in developing countries. In most countries of sub-Saharan Africa, the NIR is greater than 2.0 percent. In contrast to the relatively high NIR in developing countries, Europe's NIR is negative, meaning that population is in decline (and has been in decline since 1980). Since 1980, 67 percent of the world's population growth has been centered in Asia, 20 percent in Africa, and 9 percent in Latin America.

Births and Deaths Population increases rapidly in locations where more people are born than die, and it decreases in locations where more people die than are born.

Fertility The **crude birth rate (CBR)** is the total number of live births in a year for every thousand people alive in society.

Mortality The **crude death rate (CDR**) is the total number of deaths in a year for every thousand people in society.

The Demographic Transition 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, crude birth and death rates are both high, resulting in a low rate of natural increase. 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 rapid decline in crude death rates. Crude birth rates remain high, leading to rapid population growth. Developed regions such as Europe and North America 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: Moderate Growth Stage 3 is marked by a drop in fertility, which brings down the crude 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 crude death rate in stage 3 societies continues to fall but not as rapidly as the crude birth rate.

Stage 4: Low Growth Stage 4 is marked by a nearly equal low crude birth and death rates, and roughly zero natural increase. This condition is called **zero population growth (ZPG)**, a term often applied to stage 4 countries. Stage 4 resembles stage 1 in terms of growth, but otherwise is very different. Total population of a country is much higher in stage 4 than in stage 1. Also, instead of high crude birth and death rates, both are low. Life expectancies are much longer in stage 4 and society is much different.

Key Issue 3: Why Do Some Places Face Health Challenges?

Health and Gender Females the world over are exposed to a host of challenging health risks that deeply affect the size and composition of the population of individual countries and the world as a whole.

Baby Girls at Risk Every year, around 700,000 female babies are "missing" in China and India, as a result of gender-based selection. Over the past several decades, it is estimated that 117 million females have gone "missing" over the past several decades. The number of males per 100 females in the population is the **sex ratio**. The standard biological level for humans at birth is approximately 105 male babies for 100 female babies. 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 due to cultural preferences on the part of parents to have sons rather than daughters. In order to address the imbalance of male to female births, the "root cause" of this sex selection, gender inequality (as defined by the United Nations), must be recognized.

Mothers at Risk The **maternal mortality rate** is the annual number of female deaths per 100,000 live births from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes). The rate in many countries of Africa and Asia exceeds 100 deaths per 100,000 mothers, while fewer than 10 deaths per 100,000 mothers in most European countries.

Health and Aging A country's stage of the demographic transition determines the proportion of people in different age groups. The varying number of people in different age groups reveals the specific health challenges a country faces.

Population Pyramids A **population pyramid** provides graphical insight into the age and sex composition of a locations' population, with 5-year age cohorts and gender represented by bars. The youngest cohort is located at the base of the graph, while the oldest is at the top. We can tell by 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). Population pyramids help geographers identify which stage of the demographic transition a country occupies.

Caring for Young and Old 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 **infant mortality rate (IMR)** is the annual number of deaths of infants under 1 year of age, compared with total live births, expressed as the number of deaths among infants per 1,000 births. IMR is an indicator of 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. Life expectancy is most favorable in wealthy countries in Europe and least favorable in the poor countries of sub-Saharan Africa.

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. This burden can be analyzed using the elderly support ratio. The **elderly support ratio** is the number of working-age people (ages 15-64) divided by the number of persons 65 and older.

Medical Services Health conditions differ from country to country, and each country possesses different resources for people in need of health care.

Health Care Developed countries devote resources to protect populations that are unable to work. Investment into health care comprise more than 15 percent of total government expenditures in Europe and North America, in contrast to the less than 5 percent invested by sub-Saharan Africa and South Asia.

Medical Facilities The state of medical facilities in a developed country mirror the investment in health care. Most countries in Europe have more than 50 hospital beds per 10,000 people, compared to fewer than 5 in sub-Saharan Africa. Health care is available at little or no cost as a public service in most developed countries. The United States, however, is an outlier among developed countries in that private individuals are mandated to pay an average of 55 percent of health care expenses. While robust economic growth allowed for generous programs to be financed by developed countries in the past, sluggish economic growth has prevented these programs from sufficiently servicing populations in need of care.

The Epidemiologic Transition Epidemiology is the branch of medical science concerned with the incidence, distribution, and control of diseases that are prevalent among a population at a specific time and are produced by some special causes not generally present in the affected place. The **epidemiologic transition**, conceptualized by Abdel Omran in 1971, focuses on distinctive health threats in each stage of the demographic transition. Geographic concepts such as scale and connection are utilized by epidemiologists to understand the distribution and method of diffusion of possible epidemics, and to develop control and prevention strategies.

Stage 1: Pestilence and Famine 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 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. An early example of geographic tools used to study epidemiology is the GIS created by Dr. John Snow to determine the source of cholera in London in 1854. Dr. Snow overlaid maps of addresses of cholera victims and the location of water pumps over a map of the Soho neighborhood, displaying a cluster of victims around a single pump on Broad Street.

Stage 3: Degenerative Diseases 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 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. On the other hand, consumption of non-nutritious food and sedentary behavior have resulted in increased obesity rates in stage 4 countries.

Key Issue 4: Why Might Population Increase in the Future?

Population and Resources English economist Thomas Malthus was one of the first to predict that population increases would soon outpace the development of food resources, leading to a dramatic crisis as a result of the strain on resources. Malthus claimed that the populations grow geometrically, while food supply increase arithmetically. England entered stage 2 of the demographic transition several decades before Malthus stated these conclusions. Malthus posited that the only thing to prevent a "Malthusian" crisis would be a country's population following "moral restraint," lowering CBRs (unless disease, famine, war, or other disasters produced higher CDRs).

Contemporary Neo-Malthusians and Critics Malthus's views remain influential today. Supporters of Malthus's model suggest that characteristics of recent population growth pose even greater risks than when Malthus developed his thesis more than 200 years ago. However, criticism has been directed at both the population and resource depletion elements of Malthus's equation. Evidence from the past fifty years suggest both Neo-Malthusians and their critics are correct in certain aspects their analyses.

Population Futures It is vital for geographers and other researchers to project the future world population to assess possible trends in epidemiology, food scarcity, and other issues. The United Nations estimates that the world population in 2100 could grow to 15.8 billion or decline to 6.2 billion, depending on the outcomes of variant projections.

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.

China and India China and India together include more than one-third of the world's total population. As the world's two most populous countries, policies instituted in China and India will affect prospects for global overpopulation.

China's Population Policies 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. Since 2000, China has had a lower CBR than the United States. The number of people added to China's population each year has dropped by one-half, from 14 million to 4 million, during the past twenty-five years. Despite China abandoning the One Child Policy in 2015, China's CBR will likely not dramatically increase due to three decades of intensive educational programs (and coercion).

India's Population Policies India became the 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.

Epidemiologic Futures While the possible stage 5 of the demographic transition is introduced by an increased elderly population, a theoretical stage 5 of the epidemiologic transition could be brought about by a reemergence of infectious and parasitic diseases. Three reasons help explain the possible emergence of a stage 5 of the epidemiologic transition: evolution, poverty, and increased connections.

Possible Stage 5 Cause: 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.

Possible Stage 5 Cause: 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.

Possible Stage 5 Cause: Connections As they travel, people carry diseases with them and are exposed to the diseases of others.

AIDS The most lethal pandemic in recent years has been AIDS (acquired immunodeficiency syndrome). 39 million people have died worldwide since the beginning of the epidemic through 2014, and 37 million people currently have HIV (human immunodeficiency virus, the cause of AIDS). 26 million of the world's 37 million HIV sufferers live in sub-Saharan Africa.

Ebola Ebola, named for the river in the Democratic Republic of Congo, is a relatively "new" pandemic. The first known victim of Ebola in West Africa was a 2-year old boy in the village of Meliandou, Guinea, who died in December 2013. The virus rapidly spread in early 2014 to isolated villages in Guinea and the neighboring countries Sierra Leone and Liberia, areas among the poorest in the world. While the disease was spread by health care workers who traveled to other places while unknowingly infected, their destinations and homes possessed health-care systems able to treat patients.

Family Futures The world CBR steeply declined between 1990 and 2015, from 27 to 20. In developing countries during the same time period, CBR dropped from 31 to 22. Two strategies have been successful in lowering birth rates.

Lowering CBR through Education and Health Care Improving local economic conditions is one approach to decreasing crude birth rates. A community with more economic resources can increase expenditures on education and health-care programs that promote lower birth rates. According to this approach, women's educational opportunities are encouraged, making them more likely to gain employment skills and take economic control over their lives. Women would also have been knowledge of their reproductive rights, letting them make more informed reproductive choices, and increase awareness of available methods of contraception. Improved health-care programs, such as prenatal care, counseling about sexually transmitted diseases, and child immunization, lead IMRs to decline. With the survival of more infants ensured, women would be more likely to choose to make more effective use of contraceptives to limit the number of children.

Lowering CBR through Contraception Short-term solutions included in family-planning programs, such as contraception, can reduce crude birth rates much more quickly than prolonged economic shifts. Demand outstrips supply for contraceptives where they are needed most – in developing countries. Places where people have limited access to education and modern communication are susceptible to the acceptance of family-planning concepts; for example, in Bangladesh, 6 percent of married women used contraceptives in 1980 – in 2014, the number rose to 62 percent. Similar trends have been examined in Columbia, Morocco, and Thailand. Contraceptive usage is very low in sub-Saharan Africa, with only 30 percent of married women using them. Cheap and rapid distribution of contraceptives in sub-Saharan Africa could have a relatively large impact on lowering CBR in the region.

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 population increase in the future? The three reasons we should study population are given as:

- More people are alive at this time—about 7 billion—than at any point in Earth's long history.
- Virtually all global population growth is concentrated in less developed countries.
- The word's population increased at a faster rate during the second half of the twentieth century than ever before in history.

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 six-minute film on DVD (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 (about 7 billion in 2017) circle the globe?

Answer: 40,000 km X 1m/person= 40,000,000 people once around the equator.

7 billion divided by 40,000,000= 175 times

Now that your students are imagining a line of people long enough to circle the globe 175 times, have them calculate the speed at which the line would grow at the current population growth rate:

7 billion X .012= 84 million new people every year

84,000,000 m/year= 84,000 km/year

84,000 km/year= 9.59km/hr (Google can do the unit conversion very quickly)

9.59km/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 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 same 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 50 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.

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 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?

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Thinking Geographically Questions

2.1: The current method of counting a country's population by requiring every household to complete a census form once every 10 years has been severely criticized as inaccurate. The undercounting produces a geographic bias because people who are missed are more likely to live in inner cities, remote rural areas, or communities that attract a relatively high number of recent immigrants. Given the availability of reliable statistical tests, should the current method of trying to count 100 percent of the population be replaced by a survey of a carefully drawn sample of the population, as is done with political polling and consumer preferences? Why or why not?

While there are significant disadvantages to attempting to count 100 percent of the population in the census, ultimately the established method would yield a more accurate count of the total population. Despite the growing reliability of statistical sampling techniques, unauthorized immigrants and homeless people would most likely still be left in the shadows. While sampling would allow census enumerators to incorporate data that is readily available to help with estimates, such as eviction rates, waiting lists for public housing, reductions in affordable housing, and contacts with service providers, engagement with

community outreach organizations for both unauthorized immigrants and unsheltered populations would be the best option. (Source: Kearns, Brendan, "Down for the Count: Overcoming the Census Bureau's Neglect of the Homeless," National Coalition for the Homeless, http://nationalhomeless.org/publications/DownfortheCount_CensusReport.pdf).

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 have 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: 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.

2.4: Given evidence of declining birth rates around the world, what role should family-planning programs play in developing countries?

CBR is still high in developing countries, despite declining world CDRs. Family-planning programs can play an important part in placing downward pressure on still-high CBRs in developing countries, however it must be ensured that these programs are ethical in nature. Looking to the distrust that was sewn by sterilization campaigns set up by the government in India in the 1970s, it is vital that access to birth control and general reproductive education is made available for countries facing this situation.

Pause and Reflect Questions

2.1.1: Compare Figures 2-2 and 2-3. Which depicts the shape of countries more accurately? Why?

Figure 2-2 displays the shape of countries more accurately, as Figure 2-3 is a cartogram. A cartogram visualizes countries by the size of their population rather than land area, such that countries with large populations like China and India appear larger than countries with extensive land area, such as Canada or Russia.

2.1.2: Why are some land areas not part of the ecumene?

Areas of the Earth may be unsuitable for permanent human settlement, such as those dominated by a dry landscape, places that receive excessive amounts of precipitation, locations perpetually covered by ice, and some high-altitude mountain regions. However, there exist exceptions to all of the aforementioned landscapes that can support human settlement, such as dry landscapes where animals have adapted to the climate.

2.1.3: Which density measure differs most between Egypt and Ethiopia? What might account for this difference?

Physiological density is greater between Egypt and Ethiopia than arithmetic density or agricultural density. This difference may be explained by the wider availability of arable land in Ethiopia compared to Egypt.

2.2.1: Which region other than sub-Saharan Africa appears to have the highest natural increase rate?

South Asia appears to have the high natural increase rate outside of sub-Saharan Africa.

2.2.2: What region of the world appears to have the lowest CDR?

The Arabian Peninsula appears to be the region with the lowest CDR.

2.2.3: Name a country in Latin America that appears to be in stage 2, according to Figures 2-12, 2-14, and 2-15.

Guatemala appears to be in stage 2 of the demographic transition, taking into consideration its high CBR, relatively low CDR, and high NIR.

2.3.1: What other countries, in addition to China and India, appear to have "missing" females?

Vietnam, Albania, and Azerbaijan all appear to have "missing" females.

2.3.2: If the elderly support ratio is declining, does that mean the percentage of elderly people is increasing or decreasing?

It means that the percentage of elderly people is increasing.

2.3.3: Why might levels of hospital beds and physicians in developed countries of Europe be higher than in North America?

Private individuals are required to pay a higher percentage of health care costs in the United States, whereas in Europe health care is a public service and government expenditures are higher for health care services.

2.3.4: How prevalent are the stage 4 causes of death in your family?

Stage 4 causes of death are very common in my family, with most family members passing away from cancer or dementia.

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

Malthus would predict that in 200 years, there would be 256 people for every 10 units of food.

2.4.2: For every 10 baby boys, India has only 9 baby girls. How might population policies be contributing to India having so many more baby boys than girls?

Population policies, such as abortion, may be predominately skewed toward unborn girls than boys due to cultural preferences for sons over daughters.

2.4.3: Which region within the United States has the lowest number of AIDS cases? What geographic factors might explain this low level?

The northern states of the Mountain West, including Idaho, Montana, Wyoming, and the northern Plains states of North Dakota and South Dakota have the lowest cumulative AIDS cases in the United States. These states likely experience little in-migration, explaining this low level.

2.4.4: Why might birth rates have declined in most of the world, but not in North America?

Birth rates may have remained high in North America due to higher total fertility rates and high health care service standards.

Explore

Use Google Earth to explore Mahāmīd, a town of 45,000 near the banks of the Nile River. Fly to: *Mahāmīd, Luxor, Egypt*. Zoom in.

1. *What color is most of the land immediately in and around the town? Does this indicate that the land is used for agriculture, or is it desert? Zoom out until you see the entire band of green surrounded by tan.*

The town of Mahāmīd is surrounded by a tan color, representing a desert landscape.

2. *How wide is the green strip? What does the tan color represent? What feature is in the middle of the green strip?*

The green strip is approximately 10 miles long and 1 mile wide. The tan color represents the desert landscape surrounding Mahāmīd. Farming activity is present in the green strip, indicated by long, narrow strips of agriculture.

GeoVideo Questions

1. *In general, would the village farmers prefer to work in a new factory or remain on their land? Explain.*

   In general, it appears as if the farmers would prefer to remain on their land. It seems to be a complex situation, though. Farmers in the party secretary's meeting complained of insufficient compensation for the hardships they will endure as a result of the coming changes to the village – if they were properly compensated, would the villagers be willing to make the move? In Xiao Zhang's case, she would rather move to the city.

2. *Do village residents have a choice about whether their land becomes a new industrial city? Explain.*

   They do not have a choice. Ostensibly, the villagers have 'rights,' although they have no choice in the matter whether they are able to keep their farms or not. The party secretary tells the viewer that the key to getting the villagers to acquiesce is a job or "persuasion, persuasion, persuasion."

3. *In the view of China's economic planners, why is urbanization of the countryside essential?*

   They believe that the existing cities along China's eastern coast can no longer sustain the massive flows of people from the hinterlands – thus, new cities must emerge in the hinterlands to support these people and promote economic growth outside of the traditional urban centers.

Resources

Interactive population pyramids

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

http://www.census.gov/population/international/data/idb/informationGateway.php

In the "Select Report" section of the page, select the "Population Pyramid Graph" option from the dropdown menu. You may select up to 25 years of data for any country, and once the request is submitted (by clicking the "Submit" button), you may use the "Play" button located above the population pyramid to animate the changes that take place over time.

Population Reference Bureau

The Population Reference Bureau (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 ("Education," located in the "Topic/Geography" tab) 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/

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/

U.S. Census

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

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.