LEARNING OBJECTIVES

After reading this chapter, students should be able to:

- Explain the differences between more, less, and least developed nations.
- Assess the ways that globalization affects health around the world.
- Understand the changing patterns of disease in less developed nations.
- Identify the main types and causes of disease in the less developed nations.

Mahabouba Muhammad grew up in a small village in Ethiopia. Many Ethiopian girls receive little education and have few rights, but Mahabouba's situation was particularly poor: Her parents had divorced and left her with an aunt who treated her like a servant. As a result, Mahabouba eventually ran away to the nearest town to find work as a maid in exchange for room and board:

> *"Then a neighbor told me he could find better work for me," Mahabouba recalled. "He sold me for eighty birr [10 dollars]. He got the money, I didn't. I thought I was going to work for the man who bought me, in his house. But then he raped me and beat me. . . . I was about 13."*
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> *The man, Jiad, was about 60 years old and had purchased Mahabouba to be his second wife. In rural Ethiopia, girls are still sometimes sold to do manual labor or to be second or third wives. . . .*
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> *[Jiad and his first wife] wouldn't let Mahabouba out of the house for fear she might run away. Indeed, she tried several times, but each time she was caught and thrashed with sticks and fists until she was black, blue, and bloody. Soon, Mahabouba was pregnant, and as she approached her due date, Jiad relaxed his guard over her. When she was seven months pregnant, she finally succeeded in running away. . . .*
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> *Unable to afford a midwife when she went into labor, Mahabouba tried to have the baby by herself. Unfortunately, her pelvis hadn't yet grown large enough to accommodate the baby's head, a common occurrence with young teenagers. She ended up in obstructed labor, with the baby stuck inside her birth passage. After seven days, Mahabouba fell unconscious and at that point someone summoned a birth attendant. By then the baby's head had been wedged there for so long that the tissues between the baby's head and Mahabouba's pelvis had lost circulation and rotted away. When Mahabouba recovered consciousness, she found that the baby was dead and that she had no control over her bladder or bowels. She also couldn't walk or even stand, a consequence of nerve damage that is a frequent by-product of [obstructed pregnancies]. (Kristof and WuDunn, 2010: 93–94)*

Mahabouba's story—rape, beatings, pregnancy too young, unattended childbirth—is all too common in much of the world. As this suggests, the sources

and patterns of illness and death in poorer countries differ dramatically from those found in more affluent countries—and often reflect social conditions as well as biological forces. In this chapter, we first compare some of these differences. We then focus on explaining the main sources of death and disease (including illness and death in childbirth), focusing on the role played by social, economic, and political conditions and forces.

SETTING THE STAGE: KEY CONCEPTS

A few key concepts are needed to understand disease patterns around the world. This section lays out those concepts.

Understanding Development Patterns

In making international comparisons, politicians, social scientists, medical researchers, and others typically divide the world into two broad groups: the ***more* developed nations** and the ***less* developed nations**. Essentially, this division reflects the economic status of the various nations. The *more developed* nations are primarily defined by their relatively high gross national income (GNI) per capita compared with the *less developed* nations. In addition, the more developed nations are characterized by diverse economies made up of many different industries, whereas the less developed nations have far simpler economies, and in some cases still rely heavily on extractive industries such as mining or logging or a few agricultural products such as rubber or bananas. These economic differences—primarily resulting from centuries of exploitation by political and economic powers in the more developed nations—have left the less developed nations with high infant and maternal mortality, low life expectancies, and damaging levels of infectious and parasitic diseases.

That said, the less developed nations also differ substantially from each other. Sociologists and other researchers use the term **least developed nations** to refer to those less developed nations that suffer from the *least* diverse economy and *lowest* GNIs and life expectancies. For example, life expectancy in Ethiopia is only 65 years, and gross national product per capita is only $1,730 (Population Reference Bureau, 2017). Table 4.1 compares life expectancies and infant mortality rates in the least, less, and more developed nations. As is common in the field, except when directly comparing the less and least developed nations, this textbook uses the former term to refer to both groups.

Although dividing the globe into least, less, and more developed nations is a useful analytic tool, it is important to recognize that development level is a scale, not a dichotomy. Mexico and Thailand, for example, fall near the border between the more and less developed nations: Each has both complex industries and traditional agricultural crops, and each enjoys infant mortality rates and life expectancies approaching those found in the United States. And although infectious and parasitic diseases remain more common in Mexico and Thailand than in the

TABLE 4.1 Life Expectancy and Infant Mortality by Development Level

Country	Life Expectancy at Birth	Infant Mortality per 1000 Births
Most Developed		
Japan	84	1.9
Italy	83	3.0
France	82	3.5
Germany	81	3.3
Denmark	81	3.1
United States	79	5.8
Less Developed		
Mexico	77	18
China[a]	77	10
Philippines	70	21
Thailand	76	10
Bolivia	69	39
India	69	37
Least Developed		
Haiti	64	48
Ethiopia	65	48
Somalia	56	74
Sierra Leone	52	92
Afghanistan	64	60

[a]Does not include Hong Kong, which only became part of China in 1997 and operates under a separate political structure.

SOURCE: Population Reference Bureau (2017)

United States, chronic diseases are now the most common cause of death in all three nations (World Health Organization, 2010).

This terminology also should not keep us from recognizing that social conditions and hence health patterns vary from community to community and from social group to social group within each nation. Thus, conditions in central Detroit in some ways resemble those in Bangladesh, whereas conditions in wealthy sections of Bangkok resemble those in Beverly Hills. Within the less developed nations, the income gap—and consequently the "health gap"—between rich and poor has increased in the past two decades. These growing gaps in income and health largely stem from "structural adjustment" policies that have been heavily promoted by international organizations based in the most developed nations. These policies pressed developing nations to

cut back programs such as food subsidies and low-cost health care in exchange for economic aid from international nonprofit organizations (Kolko, 1999; Peabody, 1996).

Finally, although the terms *least developed*, *less developed*, and *more developed* imply linear progression from one status to the other, this is not necessarily the case. For example, economic and health conditions worsened in Eastern Europe after the collapse of the Soviet Union and in southern Africa after the start of the HIV/AIDS epidemic.

Understanding Globalization

Although it is important to understand development stages and disease patterns within individual nations, it is equally important to understand that *diseases respect no national borders*. Because of **globalization**, diseases and disease-causing conditions spread rapidly from less to more developed nations and vice versa (Quammen, 2013). For example, air pollution from China is now causing heart disease and asthma in the western United States, and the recycling of used U.S. electronics equipment across Asia is releasing toxic acids and metals into drinking water in those countries (Leahy, 2017).

Because the United States and Mexico share the same water, air, and, to a growing extent, economies where the two nations meet, U.S. citizens need to be especially concerned about health conditions in Mexico. For example, the many factories located in Juarez, a large city just south of El Paso, Texas, are notorious for spewing toxic chemicals into the air and aquifers shared by both countries (Collins, Grineski, and Aguilar, 2009). Similarly, only one-third of the sewage generated by residents of Juarez is appropriately treated (Schmidt, 2000). As a result, human wastes drain from Juarez into the Rio Grande, and from there into El Paso's drinking water supplies, making gastrointestinal disease a leading cause of infant mortality in both cities. As this example suggests, those who live in the more developed nations have a vested interest in understanding health and illness in the less developed nations.

Understanding Global Health

As this discussion of globalization suggests, dealing with health issues one nation at a time has inherent limitations. This problem has led to new interest in what is referred to as *global health* (Farmer, Kim, and Kleinman, 2013). **Global health** refers to the ways that health and illness transcend borders—along with people, goods, health providers, floods, crops, and so on. The idea of global health emphasizes that disease can be spread or prevented not only by national governments but also by myriad other players from the World Bank to local nonprofits, to small peddlers who move drugs, needles, food, and other supplies across borders. Finally, the concept of global health emphasizes the similarities as well as differences in health problems around the world and the importance of developing equitable solutions to those problems. As this suggests, the term is primarily used by those who take a critical stance toward health and society.

EXPLAINING DEATH AND DISEASE IN LESS DEVELOPED NATIONS

In this section, we look at the main types and causes of diseases in the less developed nations, including malnutrition, infectious diseases, maternal mortality, and war.

Chronic Disease

In a major change from past generations, chronic disease (especially heart disease and strokes) is rapidly emerging as a common cause of death in the less developed nations. Table 4.2 shows the leading causes of death around the world (WHO, 2018). However, residents of less developed nations who have chronic diseases are far less likely to have access to appropriate treatment than are residents of more developed nations.

TABLE 4.2 Leading Causes of Death Around the World

Least Developed Nations	Less Developed Nations*		More Developed Nations
	Lower Income	Higher Income	
Lower respiratory infections	Coronary heart disease	Coronary heart disease	Coronary heart disease
Diarrheal diseases	Stroke and other cerebrovascular disease	Stroke and other cerebrovascular disease	Stroke and other cerebrovascular diseases
Stroke and other cerebrovascular disease	Lower respiratory infection	Chronic obstructive pulmonary disease	Alzheimer's disease and other dementias
Coronary heart diseases	Chronic obstructive pulmonary disease	Trachea, bronchus, lung cancers	Trachea, bronchus, lung cancers
HIV/AIDS	Tuberculosis	Lower respiratory infections	Chronic obstructive pulmonary disease
Tuberculosis	Diarrheal diseases	Diabetes	Lower respiratory infections
Malaria	Diabetes	Alzheimer's disease and other dementias	Colon and rectum cancers
Maternal mortality	Maternal mortality	Road injury	Diabetes
Birth asphyxia and birth trauma	Cirrhosis of the liver	Liver cancer	Kidney diseases
Road injury	Road injury	Stomach cancer	Breast cancer

*For these data, the World Health Organization divides the less developed nations into two groups, based on gross national incomes.

SOURCE: World Health Organization (2018)

Ironically, the rise in chronic disease reflects in part the *problems* caused by rising incomes. As new middle classes have emerged in countries such as China and India, tobacco use, alcohol use, automotive travel, and obesity have all increased, causing deaths from lung cancer, alcohol-related disease and injuries, fatal accidents, diabetes, and heart disease. Moreover, these nations still have millions of poor citizens, so they are burdened by the economic, social, and health costs of both "diseases of wealth" such as diabetes and "diseases of poverty" such as tuberculosis (Yach et al., 2004).

Poverty, Malnutrition, and Disease

The primary cause of low life expectancies in the less developed nations is poverty. In Chapter 3, we saw that wealthy Americans experience less illness and live longer than do poorer Americans. In the same way, wealthier nations have lower rates of illness and mortality than do poorer nations. The average life expectancy is 65 years in the least developed nations, 71 years in the less developed nations, and 79 years in the more developed nations—a 14-year difference all told (Population Reference Bureau, 2017).

In large part, poverty causes disease and death by causing chronic malnutrition. Malnutrition causes disease and death by damaging the body's immune system, leaving individuals more susceptible to all forms of illness and contributing to both infant and maternal mortality. In addition, malnutrition leads to numerous health problems, including brain damage caused by iodine deficiency, blindness caused by vitamin A deficiency, and mental retardation caused by anemia. For these reasons among others, malnutrition underlies many deaths in the least developed nations.

The Roots of Chronic Malnutrition Given the link between malnutrition, illness, and death, investigating the roots of chronic malnutrition is clearly important. At first thought, we might easily assume that malnutrition in less developed nations that have not yet experienced the **epidemiological transition** results naturally from overpopulation combined with insufficient natural and technological resources. Yet on a global level, farmers now grow twice as much food as is needed to feed the world's population (Holt-Giménez and Peabody, 2008; Lappé, Collins, and Rosset, 1998; UNICEF, 2014). This bounty, however, may soon end because of population growth, changes in climate that will make it impossible to grow crops in many regions, the use of crops such as corn for fuel rather than for food, and the rise in meat eating in newly wealthy parts of Asia (Palmer, 2017).

For now, however, malnutrition cannot be blamed on population density (Lappé et al., 1998). The Netherlands, for example, is one of the most densely populated countries in the world, yet chronic malnutrition no longer occurs there. Similarly, malnutrition has largely disappeared from Costa Rica but remains common in nearby Honduras, even though the latter has twice as much cropland per person.

If overpopulation, lack of food, population density, and lack of cropland don't explain chronic malnutrition, what does? The answer lies in the social distribution

of food and other resources: *Malnutrition occurs most often in countries where resources are most inequitably distributed.* In other words, malnutrition occurs not in countries where resources are scarce but in countries where a few people control many resources while many people have access to extremely few resources (Dreze and Sen, 1989; Lappé et al., 1998). Similarly, within each country, malnutrition occurs most often among those groups—typically females and the poor—with the least access to resources (Messer, 1997). In essence, then, malnutrition is a disease of powerlessness.

If powerlessness causes malnutrition, then eliminating power inequities should eliminate malnutrition. Evidence from China (officially known as the People's Republic of China) and Costa Rica supports this thesis. In the past, both nations adopted socialistic strategies for redistributing resources somewhat more equitably. By giving farmland to formerly landless peasants, extending agricultural assistance to owners of small farms, working to raise the status of women, and so on, they made chronic malnutrition almost unknown within their borders. On the other hand, China has not proved immune to *acute* malnutrition caused by famines. According to Nobel Prize–winning economist Amartya Sen, famines occur only when (1) natural events reduce harvests *and* (2) nondemocratic governments (such as China's) can ignore citizen's basic needs because politicians know they can't be voted out of office (Sen, 1999). "Contemporary Issues: Linking Sanitation and Malnutrition," p. 76, further illustrates how power inequalities can continue to breed malnutrition, even when countries begin to develop and food becomes more widely available.

The Role of International Aid In less developed nations that are democratically run, international aid—both food aid and development projects—has

CONTEMPORARY ISSUES

Linking Sanitation and Malnutrition

Since the start of this century, India has experienced an economic boom. As a result, many more children across the country receive what should be enough calories and nutrients to foster healthy growth. Yet an estimated 65 million children under age five are malnourished, including one-third of those from wealthy families (Harris, 2014).

How could this be? Until quite recently, nutrition researchers assumed quite reasonably that malnourishment resulted solely from lack of healthy food. In the last few years, however, researchers have increasingly concluded that lack of proper sanitation is a major cause of malnourishment in densely populated countries like India (Harris, 2014). Because of continuing inequities in how public services are distributed around the nation, around half of all Indians lack toilets and must defecate outdoors. As a result, Indian children are constantly fighting infections caused by parasites and germs carried by rain down streets and alleys and into water supplies used for bathing and drinking. As a result, their bodies lack the energy needed for them to develop physically and mentally. Unfortunately, the resulting physical frailty and mental retardation are permanent.

helped improve citizens' standard of living and health status. But in nondemocratic nations, aid often has the opposite effect (Calderisi, 2006; Easterly, 2006; World Bank, 1998). In such nations, small, powerful elites often take control of food aid, sell it on the black market, and pocket the profits. Poor people can't afford to buy food aid sold in the marketplace, so it doesn't help them at all.

Like international food aid, internationally sponsored development projects have had mixed impacts on malnutrition and on health in general (Calderisi, 2006; Easterly, 2006; World Bank, 1998). According to the politically conservative World Bank, carefully designed projects, sensitive to local conditions and culture and located in countries with democratic governments, open trade, social safety nets, and conservative economic policies can reduce malnutrition and its root causes. In Peru, for example, malnutrition among children was cut in half by an internationally supported program that was developed with local input to teach parents to recognize the signs of malnutrition and provide them with cash subsidies to better feed their children (Marini and Arias, 2016).

On the other hand, when aid projects are not built around local needs and culture, the results can be harmful. For example, large dam projects around the world have brought electricity to urban elites and to factories run by multinational corporations while also flooding and destroying agricultural fields and bringing plagues of waterborne diseases to rural dwellers (Basch, 1999:280–281; Farmer, 1999). Similarly, agricultural development projects have often encouraged men to grow cash crops, leading them to take over farmlands that women had previously used to grow food. But in many countries, men consider feeding the family to be a woman's responsibility, and so men use their profits to purchase tobacco or other high-status goods for themselves rather than purchase food for their families. As a result, malnutrition increases among women and children (Lappé et al., 1998).

Infectious and Parasitic Diseases

One indirect result of malnutrition and poverty more broadly is a high rate of infectious and parasitic disease. As Table 4.2 shows, such diseases account for more deaths in the less developed nations (and far more in the least developed nations) than in the more developed nations.

As in Europe and the United States before the 20th century, the high rates of infectious and parasitic diseases in the less developed nations reflect the dismal circumstances in which many people live. As we've already seen, malnutrition leaves individuals far more susceptible to a wide range of diseases. In addition, overcrowding promotes the spread of airborne diseases such as tuberculosis, and contamination of the water supply with sewage spreads waterborne diseases such as cholera and intestinal infections. Similarly, poor housing and lack of clean water for bathing result in frequent contact with disease-spreading rats, fleas, and lice.

The infectious and parasitic diseases that cause the most deaths in the less developed nations are HIV/AIDS, tuberculosis, diarrheal diseases, and malaria. The next section discusses these four diseases plus a fifth, Zika virus, which is spreading rapidly.

HIV/AIDS In the less developed nations, HIV/AIDS now causes more deaths than any other infectious or parasitic disease. Heterosexual intercourse remains the major mode of HIV transmission (as it has been from the start), although illicit intravenous drug use and blood transfusions are also sources of infection (in the absence of funds to purchase sterile needles or medical equipment). Transmission from childbearing women to their babies, however, has declined sharply because of the use of antiretroviral drugs by pregnant women (UNAIDS/WHO, 2017).

Still, in the hardest-hit countries, around one-quarter of adults are infected with HIV/AIDS (Central Intelligence Agency, 2018). Sub-Saharan Africa accounts for almost two-thirds of all new infections (UNAIDS/WHO, 2017). HIV infection is also spreading rapidly in Eastern Europe and Central Asia, primarily among individuals who inject heroin and their sexual partners. Life expectancies for infected individuals have increased because of the development of antiretroviral drugs but remain under 50 years in the developing world (Population Reference Bureau, 2014).

As stunning as these numbers might appear, they understate the impact of HIV/AIDS. Unlike most illnesses, HIV/AIDS commonly strikes at midlife, normally the most economically productive years. In the hardest-hit countries, agricultural production is declining steeply, causing food shortages. Moreover, unlike most diseases, HIV/AIDS has struck not only the poor but also the middle and upper classes (because of their greater access to sexual partners, reduced commitment to traditional and more conservative sexual norms, and residence in cities where the disease is more common) (Fortson, 2008; WHO, 2009a). Deaths among teachers, doctors, businesspeople, and the like have crippled schools and the economy in numerous countries. The resulting increase in unemployment and poverty is sending ripples of illness and death throughout these countries. In addition, the deaths of many young mothers have produced a corresponding rise in deaths among children who lose their only (or best) provider.

Poverty primarily explains why HIV/AIDS has hit Africa especially hard. In addition, the epidemic has been stoked by labor migration, women's low status, and sexual behavior patterns. Labor migration is common across Africa because the need to earn a living draws African men from small villages to cities and other areas where factories, mines, and plantations offer jobs. These men often must live apart from their wives and families for weeks, months, and even years at a time. Such conditions foster the use of prostitutes and consequently foster the spread of sexually transmitted diseases (STDs), including HIV/AIDS. In turn, some migrants may eventually carry these diseases back to their villages (Hunt, 1996; UNAIDS/WHO, 2010).

Meanwhile, health conditions also deteriorate among women and children left in rural villages (Hunt, 1996). The loss of men's labor makes it more difficult for women to grow sufficient crops to feed themselves and their children, leaving them increasingly malnourished and susceptible to disease. Faced with these conditions, women's only option is to seek employment in cities, where many find that they must trade sex for cash or other favors to survive, even if doing so increases their risk of HIV/AIDS (Hunt, 1989; Simmons, Farmer, and Schoepf, 1996).

As this suggests, girls' and women's low social and economic status also fosters the spread of HIV/AIDS in Africa. In countries where girls and women have low status, they may face physical violence if they ask a husband or other sexual partner to use a condom, find that male teachers demand sex as a requirement for attending school, or be pressured into marriages or sexual relationships with older men who are more likely to be infected. In addition, because their low status often keeps them from accessing medical care, women are more likely than men to have untreated STDs that can produce open sores and thus increase the chances of infection for any woman who is exposed to HIV.

Sexual behavior patterns also play a role in the epidemic. Current research suggests that risks of infection are greater in Africa not because the average *number* of sexual partners is high there but because long-term, *concurrent* sexual partners are more common (UNAIDS/WHO, 2010). In Western countries, individuals typically have **serial sexual partners**—one after another—such as a first marriage followed by a brief sexual relationship or two and then a second marriage. In contrast, in parts of Africa (especially sub-Saharan Africa), individuals often have long-term **concurrent sexual partners**: multiple sexual relationships *during overlapping time periods*.

Concurrent partnerships increase the chances of spreading HIV/AIDS for two reasons. First, people around the world typically use condoms early in relationships but stop doing so if the relationship continues. Consequently, persons in long-term concurrent relationships are more likely than those in short-term monogamous relationships to reach the point where they stop using condoms (Mah and Halperin, 2010). Second, HIV/AIDS is most easily transmitted only when an individual is healthy enough to have an active sex life and has a "high viral load" (i.e., has many HIV cells in his or her body). If an individual hits that peak transmission point while he or she has concurrent sexual partners, then all of those partners—and all of their partners—will be at risk.

Tuberculosis Each year, tuberculosis infects around 10 million people and kills 1 million or so (WHO, 2017a). The disease is most common in Asia, followed by Africa. Tuberculosis is particularly devastating because, like HIV/ AIDS, it typically hits people during their prime work years, so it sharply curtails family incomes.

Because of a consolidated, worldwide effort to make powerful treatment available even in poor regions, rates of tuberculosis have been falling for the past two decades in most of the world (WHO, 2017a). However, because HIV/AIDS makes individuals more susceptible to other infections, tuberculosis continues to increase in those African nations where HIV/AIDS is most common.

Diarrheal Diseases In the more developed nations, diarrhea typically causes only passing discomfort. In the less developed nations, diarrheal diseases are the second leading cause of death among children younger than age five (WHO, 2009b).

Diarrhea is a symptom, not a disease, and can result from infection with any of several bacteria, viruses, or parasites. Diarrhea kills through dehydration and electrolytic imbalance. It also leads to malnutrition when affected children

not only eat less but also absorb fewer nutrients from the foods they do eat. In turn, malnutrition leaves children susceptible to other fatal illnesses. Conversely, other illnesses can leave children susceptible to both diarrheal diseases and malnutrition.

Diarrheal diseases (including dysentery, cholera, and infection with *Escherichia coli*) occur when individuals ingest contaminated water or foods. The likelihood of severe diarrhea is greatest when families lack refrigerators, sanitary toilets, sufficient fuel to cook foods thoroughly, or safe water for cooking and cleaning. WHO estimates that around 2 billion people lack access to "improved" water supplies, and many more lack access to truly safe water (WHO/UNICEF, 2014). The *number* of persons without safe water is greatest in Asia, but the *percentage* of those without safe water is highest in sub-Saharan Africa.

Survival rates for children with diarrheal diseases in less developed nations have improved rapidly in recent years. Before the 1960s, those suffering from diarrheal diseases could be treated only by using expensive intravenous fluids, thus making treatment unfeasible for many in the less developed nations. Since then, however, scientists have developed saline solutions and peanut butter pastes that keep children alive at least as well as more expensive treatments.

Malaria Each year, around 200 million people become infected with malaria, and approximately one-half million—mostly African children—die from the resulting anemia, general debility, or brain infections (Shah, 2010; WHO, 2017b). In addition, millions more find themselves unable to work because of continuing malarial chills and fevers, or die because malaria leaves them susceptible to other fatal illnesses.

Malaria poses the greatest threat to pregnant women, infants, and young children. Among pregnant women, malaria increases the risks of miscarriage, anemia, and premature labor, each of which increases the risk of potentially fatal hemorrhaging. Infants born to malaria-infected women typically have lower than average birth weight and hence a higher chance of death or disability.

Malaria is caused by protozoan parasites belonging to the genus *Plasmodium*. Malaria is transmitted only by *Anopheles* mosquitoes and consequently exists only where those mosquitoes live. The disease cycle begins when a mosquito bites an infected individual and ingests the parasite from the individual's blood. The parasite reproduces in the mosquito's stomach and then migrates to the mosquito's salivary glands. The next time the mosquito bites someone, it transmits the parasite to that person.

Because of this transmission cycle, eliminating *Anopheles* mosquitoes will eliminate malaria. Since the 1940s, antimalaria campaigns have depended heavily on pesticides to kill mosquitoes. Although such campaigns initially work well, over time pesticide-resistant mosquitoes evolve, and the pesticides lose their potency (Shah, 2010). As a result, nations must constantly search for new and more toxic pesticides, each of which can endanger birds, fish, and insects that benefit humans. Because of these problems, some recent campaigns have instead focused on

encouraging the use of insect repellents, mosquito netting, and screens to prevent infection. These campaigns also have focused on encouraging the use of drugs such as chloroquine and mefloquine, which can both prevent and treat malaria. Unfortunately, because these drugs can cause debilitating side effects and cost more than many residents of developing nations can afford, infected individuals often stop taking the drugs before they are cured. This continual undertreatment of malaria, like the undertreatment of tuberculosis, has encouraged the evolution of drug-resistant malaria.

Zika Zika virus burst into the news in 2015 when Brazil was hit with an epidemic of babies born with tiny heads and brains, leaving them with severe neurological and physical problems. Researchers quickly traced these problems to prenatal infection with Zika, which can be spread by mosquitoes and through unprotected sexual intercourse. Zika can also lead to serious neurological problems in infected adults.

To date there is neither a vaccine nor a treatment for Zika. Instead, governments and health authorities have relied on warning individuals to avoid both mosquitoes and unprotected sex. These measures, however, are almost meaningless for those most at risk (Lancet Global, 2016; Rasanathan, 2017). For example, many poor people in places like rural Brazil cannot afford to follow WHO's recommendations to avoid mosquitoes by using air-conditioning and insect repellant, wearing only clothes that have no holes in them, and avoiding areas where water must be carried home in buckets.

Similarly, in developing nations where Zika is common, women have been warned to avoid unprotected sex, avoid pregnancy, and consider abortion. Yet many poor women lack the power to force men to use condoms and lack access to birth control or abortion (whether because of cost or because it is illegal). Nor has there been much effort to help families care for children with devastating disabilities. This is a classic case of defining something as a personal problem rather than as a public issue. A more sociological approach would be to focus on strategies such as eliminating areas where mosquitoes breed and changing laws and health care systems to give women access to the information and care that they need.

Neglected Tropical Diseases

In addition to deaths from the major diseases just discussed, many of those living in the less developed nations are also susceptible to a **neglected tropical disease (NTD)**. This term refers to diseases that receive far less attention than they deserve given their impact. Around 2 billion people around the globe live with these diseases, mostly in the less developed nations (Hotez, 2016).

The core problem for those who suffer from NTDs is that wealthy people rarely get them. As a result, nations, pharmaceutical companies, and even nonprofits typically have little interest in spending money to develop or distribute

treatments because most who live with these diseases lack both political power and money to spend on treatments (Hotez, 2016).

The World Health Organization has officially declared 17 diseases as NTDs. The most common are the parasitic diseases ascariasis (which causes malnutrition, wheezing, and cognitive loss in children), trichuriasis (which causes severe bowel diseases), and hookworm disease (which causes iron deficiency and can lead to cognitive deficits, malnutrition, and death). All of these diseases make it difficult for children to succeed in school and for adults to function as workers. As a result, these disease lock poor people and nations into poverty. Many of these diseases can be effectively treated, and many have been cured, but much work remains to be done.

Infant Mortality

Like infectious and parasitic diseases, and as Table 4.1 shows, infant mortality is many times higher in the less developed nations than in the more developed nations (Population Reference Bureau, 2017). The most common causes of infant mortality in poorer nations are malnutrition and infections (particularly respiratory infections and diarrheal diseases). Because we examined these factors earlier in this chapter, we focus here on two other important sources of infant mortality: women's status and infant formula manufacturers.

The Role of Women's Status The low status of women plays a critical role in infant mortality in less developed nations. In these countries, infant mortality occurs most often among babies born to underfed, overworked mothers, many of whom suffer from untreated illnesses (WHO, Reproductive Health and Research Department, 2004).

These conditions reflect women's low status. Throughout the less developed nations, girls and women often spend long hours in heavy labor (Messer, 1997). Yet they typically receive less food and less health care (including immunizations) than do boys and men (Kristof and WuDunn, 2010; Messer, 1997). As a result, girls often enter their childbearing years already ill and malnourished—a situation that worsens as pregnancies further stress their bodies and drain their energy.

Similarly, infant mortality is highest among infants born to the youngest or oldest mothers and to infants born less than 18 months after a sibling. This situation occurs most commonly in cultures that expect women to marry at young ages, that judge women's worth by how many children they have (especially male children), and that restrict women's access to contraception. In part, these cultural values reflect the economic realities of agricultural life: In agricultural societies, children produce more economic resources than they consume, so a family with many children is more likely to survive than a family with few children. In addition, in the absence of pension systems, individuals can guarantee their security in old age only by having sons given that daughters generally are expected to take care of their husbands' parents rather than their own. For this reason, it is common for families in some parts of Asia to let girl babies die by giving them less food or medical care, to use medical technologies to identify and then abort female fetuses, or to kill girl babies outright (Kristof and WuDunn, 2010; Zhu, Lu, and Hesketh,

2009). This situation is discussed in "Ethical Debate: The Ethics of Prenatal Sex Selection," p. 84.

In sum, research suggests that if women's social status were higher, they would enter their childbearing years with healthier bodies, would wait longer before having babies, would wait longer between babies, and would have fewer babies in total, with each of these factors lowering the infant mortality rate. For all of these reasons, many researchers and public health workers have suggested that the most effective way to reduce infant mortality is to improve the status of women, thereby increasing their power to make decisions for themselves. This at least partly explains why infant mortality is so much lower in Costa Rica and China than in some other countries at similar levels of development.

Maternal Mortality

Women's low status plays a similar role in causing maternal mortality. Maternal mortality is now quite rare in the more developed nations but remains the primary cause of death among women of reproductive age in the less developed nations. For example, in Afghanistan 1 of every 32 women dies from childbirth complications compared to 1 of every 4600 women in the United Kingdom (Population Reference Bureau, 2014).

Most commonly, maternal mortality occurs when malnutrition or malaria leaves women anemic, which can lead to hemorrhaging during birth. In addition, in cultures that place low value on women, governments are less likely to invest money on prenatal or maternal care, increasing the risk to any woman who experiences complications during childbirth.

Maternal mortality is also more common among the 125 million girls and women in Africa, Indonesia, Yemen, and elsewhere who have experienced female genital cutting (UNICEF, 2013). Typically the clitoris and labia minora are removed, and sometimes the labia minora and parts of the labia majora as well. In addition, the sides of the vulva may be stitched together, leaving only a small opening for urine and menstrual fluid to escape. Most commonly, a midwife or other lay healer does the cutting using a razor blade, knife, or piece of broken glass.

Genital cutting is practiced because it is believed in these cultures to make women cleaner, prettier, more fertile, more docile, and healthier. Unfortunately, scar tissue and narrowed vaginal openings can make it difficult for a baby to emerge, causing women to die from hemorrhage. Belief, practices, and laws are changing, however, and rates of female genital cutting have declined over the last 20 years (UNICEF, 2013).

Finally, the risk of maternal mortality is especially high for women who give birth before age 20, after age 35, or more than three times—all situations that are common when women lack access to contraception. In addition, when women lack contraception, they often turn to abortion. Abortion is a technically simple procedure, far safer than childbirth when performed by trained professionals (whether doctors or not) working in sterile conditions with proper tools. In the absence of these conditions, however, women die from infections caused by unsterile instruments, hemorrhage when instruments pierce the uterus, and poisons

ETHICAL DEBATE

The Ethics of Prenatal Sex Selection

Zhang Zhiquan and his wife, Mei, live in a rural village in the People's Republic of China. Growing up in rural China, they learned early that couples needed sons to prosper and to care for them in their old age. They also learned that sons were essential for passing on the family name, that wives who produced no sons deserved mockery and abuse, and that girls were so useless that in the past many rural families did not even bother to name them. When Mei became pregnant, therefore, they had to decide what they would do if the baby were female. In the past, if they felt unable or unwilling to raise a daughter, their only options would have been to kill the baby or give her up for adoption—choices that some families still make. Now, however, they have one additional option: having a health care worker identify the fetus's sex through ultrasound or amniocentesis and perform an abortion if the fetus is female.

Half a world away, the same issues of sex preselection and selective abortion arise, although in a different form:

> *Sharon and James Black live in Denver, Colorado, with their two young daughters. Because they both believe that children need a parent home at the end of the school day, Sharon works only part time as a secretary, and James works two jobs so they can make ends meet. Sharon has just learned she is pregnant again. Although they had only planned on having two children, James always wanted a son with whom he can share his interests in sports and automobiles. Having another child, however, will further strain their finances and make it difficult for Sharon to return to full-time work for several more years. Consequently, continuing the pregnancy does not seem worthwhile unless they know that the fetus is male.*

Is prenatal sex selection ethically justified in these cases? Although the circumstances differ enormously, for both families, the birth of a daughter would bring substantial economic hardship. For both families, too, a daughter would enter life unwanted and already having failed to meet her parents' expectations. In addition, for the Chinese family and possibly (although to a lesser extent) the American family, the birth of another daughter might lower the wife's status and strain the marriage. Given these circumstances, wouldn't it be best for all concerned if the families use the available medical technology to determine their fetuses' sex and abort them if they are female?

For hundreds of thousands of couples in Asia and a growing number in the West, the answer, resoundingly, is yes. In China, for example, 120 boys are born for every 100

ingested in hopes of causing an abortion (Sedgh et al., 2007). Nevertheless, most of the less developed nations have restricted or outlawed abortion because of cultural traditions, religious beliefs, a desire by political elites to increase population, or political pressure from U.S. anti-abortion forces. Yet a comprehensive global study published in the prestigious medical journal *The Lancet* found that outlawing abortion has no effect on the number of women who *get* abortions but greatly increases the number who *die* from abortions (Sedgh et al., 2007).

Maternal mortality has declined significantly during the past 30 years, primarily because of decreases in the number of births per woman and increases in women's education, income, and access to skilled birth attendants (Hogan et al., 2010). Mortality is now concentrated in countries torn by war (including Afghanistan

females overall (Poston, Conde, and DeSalvo, 2011.). The ratio is considerably more skewed in rural areas and for second births to a couple.

Those who support prenatal sex selection argue that selective abortion causes little harm, whereas the birth of unwanted girls in poorer nations can financially strain families, leave mothers open to ridicule or even physical abuse, and result in child neglect, abuse, or abandonment. Those who oppose prenatal sex selection argue that it does more harm than good because it reinforces the low status of females. Although in rare circumstances families use medical technologies to ensure that their babies are female (such as families with a history of hemophilia, a disease that affects only males), in the less developed nations, prenatal sex selection almost always means selecting males. However, in the more developed nations, the preference for sons has declined substantially or even reversed (Andersson, Hank, and Ronsen, 2006; Edgar et al., 2006).

When families select male fetuses over female fetuses, they proclaim male babies preferable. Moreover, when health care workers help families to select male babies, the workers in essence validate this preference. Finally, when health care workers assist in prenatal sex selection—whether helping families to select males or females—they reinforce the idea that males and females are inherently different. After all, if male and female personalities, interests, and aptitudes were more similar than different, why would families need to choose one over the other?

In sum, to assess the ethics of prenatal sex selection, we need to weigh the potential benefits and costs for families and for society as a whole.

Sociological Questions

1. What social views and values about medicine, society, and the body are reflected in prenatal sex selection?
2. Which social groups are in conflict over this issue? Whose interests are served by allowing prenatal sex selection? By forbidding it?
3. Which of these groups has more power to enforce its view? What kinds of power do they have?
4. What are the intended consequences of permitting prenatal sex selection? What are the unintended social, economic, political, and health consequences of this policy?

and Ethiopia) and the southern African countries most severely affected by the HIV/AIDS epidemic.

The Role of Infant Formula Manufacturers A final cause of infant mortality in the less developed nations is the use of infant formula. Researchers estimate that 13% of all deaths before age five could be prevented if infants were breastfed during their first six months of life (UNICEF, 2005).

In the less developed nations, several factors contribute to the especially high rates of death and disease among infants who are not breastfed. First, in addition to the inherent nutritional limitations of breast milk substitutes, bottle-feeding itself can expose infants to tremendous risks. Infant formula is typically sold as a powder

that must be mixed with water and then transferred to a bottle before it can be used. In most of the less developed nations, this water contains dangerous infectious organisms. Those organisms can be killed if the water and bottle are boiled, but many families don't understand how or why they should do so. Moreover, throughout the less developed nations, many women and children already spend hours each day getting water and firewood and lack the time and energy to get the extra supplies needed to sterilize water and bottles.

Second, infant formula is not free. To cut the costs, families often stretch infant formulas by diluting them with water. Babies fed diluted formula in essence starve to death while filling their stomachs.

Finally, by altering the hormonal levels in a woman's body, breastfeeding serves as a moderately effective contraceptive. Breastfeeding thus helps women to space out pregnancies and gives each baby a better chance for survival.

Given all the benefits of breastfeeding, why don't more women in less developed nations breastfeed? Part of the answer lies in traditional cultural beliefs, such as the conviction that children require certain traditional foods for health or that it is unsafe for men to have sex with breastfeeding women (Dettwyler, 1995). Part of the answer lies in practical economic and social issues, such as the difficulty of meshing breastfeeding with paid work. And part of the answer lies with multinational food corporations that continue to active promote bottle-feeding despite international agreements (under the World Health Organization) against the practice. Use of infant formula is rising significantly, especially in the growing economies of China and southeast Asia where more women can now afford formula and more regard it as "modern" (Baker et al., 2016).

Respiratory Diseases

Finally, respiratory diseases such as emphysema are also major killers in the less developed nations, just as they are in the more developed nations. As with all disease in the less developed nations, poverty and malnutrition increase individual susceptibility to illness. In addition, long periods spent cooking over open fires in closed rooms expose millions of women to cancer-causing toxins equivalent to smoking several packs of cigarettes daily. Meanwhile, those who live in cities such as Caracas and Calcutta risk their health daily because of pollution from automobiles and industries.

Unfortunately, in some less developed nations, government officials lack the power to control polluting industries—or even profit from and promote these industries. Equally important, officials in less developed nations sometimes believe that pollution and the attendant morbidity and mortality are short-term costs they must pay to industrialize and improve their nation's health in the long run.

To these factors must be added the role of tobacco, which is a major cause of respiratory disease, heart disease, and cancer in both less developed and more developed nations (WHO, 2017c). Tobacco use has grown steadily in the less developed nations since 1964, when the U.S. surgeon declared tobacco a cause of lung cancer, U.S. sales of cigarettes plummeted, and tobacco manufacturers (most based in the

United States) turned to the less developed nations for new markets. Advertisements for tobacco are now ubiquitous in these nations (Savell et al., 2015).

War

The most unnatural cause of death and disease in the less developed nations (and elsewhere) is war. Political and economic instability, combined with environmental degradation, have made the less developed nations particularly vulnerable to war. Wars not only can wipe out a generation of soldiers but also can take astoundingly high tolls among civilians. For example, during the seven years after coalition forces led by the United States invaded Iraq in 2003, around 450,000 Iraqi civilians—many of them women and children—were killed by military forces (Hagopian et al., 2013).

Civilians are killed not only by bombs and guns but also by forced labor; malnutrition after soldiers burn crops, kill farm animals, and force farmers off their lands; and diseases that spread when refugees are forced into overcrowded, unsanitary camps and when soldiers destroy water, sewage, and health care facilities. During six years of warfare in Darfur, for example, 80% of those who died were killed not by guns or bombs but by diseases that spread when warfare led to economic, social, and ecological destruction (Olivier and Debarati, 2010).

Survivors, too, pay a huge price, often including both long-lasting disability and the psychological trauma of losing one's family, community, and work. The traumas are particularly high for victims of mass rape, a common tool of warfare that has been used extensively in recent years; those who survive can find themselves not only infertile or permanently disabled by their injuries but also stigmatized and sometimes abandoned by families and neighbors. Finally, an estimated 300,000 children in more than 30 less developed nations are serving as soldiers (UNICEF, 2010). Mortality rates are extremely high, as are the health risks experienced by those who survive. These children are exposed to all the horrors and dangers of warfare and to increased risks of malnutrition, disease, injuries from land mines, sexual abuse, and substance abuse, while losing opportunities for education and normal family life that might protect their mental and physical health as adults.

Disasters

The devastation wrought by earthquakes, tsunamis, floods, and other natural disasters in the less developed nations is impossible to miss: 200,000 people confirmed dead in 2004 when a tsunami hit Indonesia, another 200,000 killed by a hurricane in Haiti in 2010, more than 60,000 confirmed dead after a 2008 earthquake in China, and so on. In addition to the immediate deaths caused by natural disasters, many more people suffer poor health or even death when disasters kill crops; destroy sewer, water, and health care facilities; throw people into poverty; and scatter, disable, or kill health care workers.

Although humans can't prevent natural disasters, they can greatly reduce—or increase—their toll (Revkin, 2005). Schools, homes, and other structures can be retrofitted or built to withstand most earthquakes at costs far less than the cost of replacing or repairing damaged or destroyed structures. Dams, nuclear power

Mike Goldwater/Alamy Stock Photo

Whenever children serve as soldiers, they risk terrible injuries, psychological trauma, and of course death.

plants, and other dangerous structures can be located away from vulnerable flood plains and earthquake zones. And disaster-preparedness programs can be developed to warn people of impending disasters, offer means of escape, and secure public health infrastructures. For example, despite the extraordinary violence of the tsunami and earthquake that hit Japan in 2011, deaths were far lower than they otherwise would have been because the country had prepared so well for natural disasters. However, such preparation requires not only technical knowledge but also both the money and political will to act on that knowledge (Revkin, 2005). The less developed nations are particularly vulnerable to disasters because they lack the necessary funding and often are ruled by small elites who have no real commitment to protecting the citizenry.

The earthquake that struck Haiti in January 2010 illuminates these points. The earthquake's impact was particularly devastating not only because of its power but also because of the population's poverty and the government's corruption. When the earthquake struck, most of the population was already living in poverty, and half in extreme poverty (*The New York Times,* 2010). Government corruption had siphoned money into politicians' pockets and away from building hospitals, roads, clean-water systems, and earthquake-proof housing. As a result, many died when buildings were crushed, aid workers couldn't reach the injured, few hospital beds were available, and vulnerable water systems made it easy for cholera to spread.

Structural Violence

Many of the causes of ill health discussed in this chapter can be summed up under the term *structural violence*. **Structural violence** refers to social arrangements that

KEY CONCEPTS

Structural Violence

Structural violence refers to social structures and institutions that are embedded in a society's politics, culture, or economy and that either harm individuals or keep them from reaching their full potential.

Type of Violence	Committed by	Effects	Visibility of Effects	Example
"Ordinary" violence	Individuals	Injury, death	Obvious, concrete	Bar fight
Structural violence	Social structures, social institutions, or individuals working on behalf of social structures or institutions	Injury, illness, death, economic harm, social harm	Often hard to recognize	Laws that set the minimum wage too low for families to buy healthy food

are deeply embedded in the politics, culture, or economy of a society *and* that harm individuals or keep them from reaching their full potential (Farmer et al., 2006, 2013). (See "Key Concepts: Structural Violence," p. 89). This concept is particularly useful for explaining why poor populations are especially likely to fall ill and for protecting the health of those vulnerable populations.

The case of HIV/AIDS in Rwanda provides a useful example. Most Rwandans are extremely poor. Meanwhile, across the social classes, women continue to have far less power than do men. In addition, Rwanda experienced a massive, genocidal war during the 1990s that caused untold numbers of deaths and injuries and forced much of the population to flee to refugee camps. All these factors reflect and reinforce structural violence, and have contributed to an epidemic of HIV/AIDS in Rwanda.

As this suggests, effective interventions need to take structural violence into consideration (Farmer et al., 2006). For example, training doctors in the best ways to treat HIV/AIDS will have little effect if few Rwandans can afford to visit them. Instead, it may be more effective to train lay workers to provide basic, low-cost treatment. Similarly, any efforts devoted to reducing poverty in Rwanda would attack structural inequality at its roots and increase the odds that Rwandans could purchase both condoms and HIV/AIDS treatment.

IMPLICATIONS

One of the major threads throughout this chapter is the important role poverty plays in causing illness and death in the less developed nations. Consequently, reducing poverty in these nations should raise them to the health levels found in the more developed nations. Enacting various inexpensive public health measures

could also make a real difference. For example, deaths among children in poor countries have fallen precipitously in the last 20 years primarily because of interventions such as distributing insecticide-treated mosquito nets and increasing vaccination rates (UNICEF, 2014).

SUMMARY

1. The *more developed nations* are nations that have relatively high gross national income per capita and diverse economies composed of many different industries. The *less developed nations* are those nations with relatively low GNI per capita and relatively simple economies. The *least developed nations* are the worst-off subset of the less developed nations.
2. Compared with the more developed nations, the less developed nations have higher infant and maternal mortality, lower life expectancies, and a greater burden of infectious and parasitic diseases, especially HIV/AIDS, tuberculosis, diarrheal diseases, and malaria.
3. In a major change from past generations, chronic disease (especially heart disease) is rapidly emerging as a common cause of death in the less and even least developed nations.
4. The main reason for low life expectancy in the less developed nations is chronic malnutrition. Chronic malnutrition occurs most often in undemocratic countries where a few people control most resources. Within countries, malnutrition occurs most often among those groups with the least access to resources—typically poor women and their children. International aid can increase malnutrition when it increases power inequities.
5. HIV/AIDS has hit parts of Africa especially hard, primarily because of poverty. In addition, the epidemic has been stoked by labor migration (which takes men away from their families and increases their use of prostitutes), women's low status, and concurrent sexual partners (i.e., having more than one long-term sexual partner at a time).
6. Infant mortality is a far more common cause of death in the less developed nations. The most common killers of infants in the less developed nations are malnutrition and infections. In addition, the low status of women and the mass marketing of infant formula by multinational corporations have contributed to infant mortality.
7. Maternal mortality is the primary cause of death among women of reproductive age in the less developed nations. Because of their low status, girls are married off young, bear children before their bodies have matured enough to do so safely, receive too little food to nourish their fetuses or their own bodies, and lack access to birth control or safe abortions.
8. Political and economic instability, combined with environmental degradation, leave the less developed nations particularly vulnerable to war.

Wars typically kill far more civilians than soldiers, primarily by causing famines and spreading illnesses.

9. The less developed nations are particularly vulnerable to disasters because they lack the necessary economic funds to build earthquake-safe infrastructures and because in many cases they are ruled by small elites who have no real commitment to doing so.
10. *Structural violence* refers to social structures and institutions that are embedded in a society's politics, culture, or economy and that either harm individuals or keep them from reaching their full potential.

REVIEW QUESTIONS

1. How does poverty contribute to illness in less developed nations?
2. How do international politics and multinational corporations contribute to illness in less developed nations? How do undemocratic governments contribute?
3. How does the low status of women contribute to maternal mortality in less developed nations? To infant mortality?
4. How are the effects of natural disasters amplified by the political and economic conditions in less developed nations?

CRITICAL THINKING QUESTIONS

1. For the past five years, you have worked as a public health worker in a poor, urban, minority neighborhood in the United States. You have just accepted an exchange agreement to work for three years in Cape Town, South Africa. What parallels will you expect to see between these two settings in terms of the nature and sources of health problems and the best ways for dealing with health problems?
2. Identify the three changes you think would contribute most to improving the health of people in the less developed nations. Justify your choices.
3. Identify three *selfish* reasons why Americans (individuals, corporations, government, voluntary organizations) should care about illness and death in *less* developed nations.
4. Use the concept of *structural violence* to help explain why infant mortality is so much higher in poor nations than in wealthy ones.