

CHAPTER 2

Global Health Priorities

Global health priorities are established based on population needs assessments, economic evaluations of the tools that are available to deploy as interventions, donor values, and security considerations. Health metrics provide valuable information for priority-setting, decision-making, and monitoring of progress toward achieving global health targets. Global partnerships for development like the Sustainable Development Goals also shape the global health agenda and encourage transnational cooperation to address shared priorities.

▶ 2.1 Global Health Achievements

Innovations in health technology during the last century have created an incredible set of tools for global health work. New antibiotics were discovered along with a host of medications for treating noncommunicable diseases (NCDs) like heart disease and cancer. Life-saving vaccines were developed. Smallpox was eradicated. Oral contraceptives transformed family planning, and assisted reproductive technologies enabled many couples with infertility problems to have biological children. New diagnostic tools, such as electrocardiographs and MRIs, increased the quality of medical care, as did new therapies, like insulin for diabetes, dialysis for kidney disease, and contact lenses for vision impairments. Modern surgical techniques made joint replacements, open heart surgery, and organ transplants routine in some parts of

the world. These technological advances enabled many of the top 10 public health achievements of the 20th century that were highlighted by the U.S. Centers for Disease Control and Prevention (CDC) at the start of the new millennium (**FIGURE 2-1**)¹ as well as many of the leading global health achievements during the first years of the 21st century (**FIGURE 2-2**).²

While these health technologies are indisputably beneficial, the uneven distribution of access to them has generated a massive intensification of health disparities. People living in the world's richest countries now have access to an array of tools for health that would have been unimaginable 100 years ago, while children living in the world's poorest areas continue to succumb to easily preventable conditions like starvation and vaccine-preventable and antibiotic-treatable infectious diseases. At the same time that the health profiles of populations worldwide were becoming more

1	Vaccination
2	Motor-vehicle safety
3	Safer workplaces
4	Control of infectious diseases
5	Decline in deaths from ischemic heart disease and stroke
6	Safer and healthier foods
7	Healthier mothers and babies
8	Family planning
9	Fluoridation of drinking water
10	Recognition of tobacco as a health hazard

FIGURE 2-1 The U.S. CDC's top 10 public health achievements of the 20th century (1900–1999).

Reproduced from Ten great public health achievements: United States, 1990–1999. *MMWR Morb Mort Wkly Rev* 1999;48:241–3.

disparate, the 20th century brought potent reminders that all people around the world are at risk from a shared set of hazards. The emergence of HIV, virulent new strains of influenza, and drug-resistant pathogens prompted truly global research and response efforts. The goals of global health in the 21st century are to continue to create innovative solutions to public health problems; to increase access to health, healthcare services, and health technologies around the world; and to expand global communication and action about shared health concerns.

In an ideal world, there would be enough resources for all worthy global health goals to receive the funding they need to be achieved.

1	Reductions in child mortality
2	Vaccine-preventable diseases
3	Access to safe water and sanitation
4	Malaria prevention and control
5	Prevention and control of HIV/AIDS
6	Tuberculosis control
7	Control of neglected tropical diseases
8	Tobacco control
9	Increased awareness and response for improving global road safety
10	Improved preparedness and response to global health threats

FIGURE 2-2 The U.S. CDC's top 10 global health achievements in the first decade of the 21st century (2001–2010).

Data from CDC, Ten great public health achievements: Worldwide, 2001–2010. *MMWR Morb Mort Wkly Rev* 2011; 60:814–8.

In the real world, the amount of funding available for health interventions is limited. Advocates for various health problems and solutions must compete for attention and support, and only the proposals that garner buy-in from well-resourced groups are able to move forward. The gap between commendable ideas and the resources to implement them has created a demand for prioritization strategies that allow funders to make informed decisions about where and how to invest in global health. When future generations compile lists celebrating the major global health accomplishments of the 21st century, those lists will reflect the decisions today's global health leaders make about which projects to prioritize.

▶ 2.2 Prioritization Strategies

Funding agencies and planning committees use a variety of strategies to prioritize the types of activities that they will support.³ For example, some focus specifically on health and nutrition interventions, while others support broader education and economic development activities that enable healthier communities. Some give priority to prevention activities, and some prioritize treatment of existing health issues. Some prepare primary health facilities to address a diversity of health issues, and some focus on increasing access to advanced disease-specific care at tertiary hospitals. The priorities identified by groups viewing global health with different lenses provide insight into the common health challenges of nations and

populations around the world, and they point toward solutions for shared concerns. The PACES definition of global health—one that considers populations, action, cooperation, equity, and security to be identifiers of global health issues—also provides a framework for prioritizing items for the global health agenda (**FIGURE 2-3**).

One approach is to establish priorities based on the health concerns that affect the most people. The term **burden of disease** (BOD) refers to the adverse impact of a particular health condition (or group of conditions) on a population. Disease burden can be measured using health metrics (like the number of deaths from a particular disease) and economic indicators (like the total direct costs of medical care for a disease plus the indirect costs of absences from work or school due to the condition). Groups that

Lens	Key Questions
Populations	<p>What are the health issues that cause the greatest number of deaths, illnesses, and disability worldwide?</p> <p>Which populations have the greatest need?</p>
Action	<p>What are the “best buys” among the available interventions?</p> <p>How do we allocate resources to do the greatest good for the greatest number of people?</p>
Cooperation	<p>What are the goals of the partners?</p> <p>What problem is the partnership best equipped to solve?</p>
Equity	<p>What actions will do the most to improve the lives of children and other vulnerable populations?</p> <p>How will the intervention reduce health disparities?</p>
Security	<p>What are the greatest threats to peace?</p> <p>How will the intervention help to achieve the national interests of sponsoring governments?</p>

FIGURE 2-3 PACES: strategies for prioritizing global health issues.

prioritize global health spending based on a population lens make their decisions after looking at statistics about the conditions that cause the greatest BOD. For example, the **Global Burden of Disease (GBD)** project, a massive collaborative effort to quantify the epidemiologic profiles of every country in the world that was initiated by the World Health Organization (WHO) in the 1990s and is now housed at the Institute for Health Metrics and Evaluation (IHME) in Seattle has identified unhealthy diets, child and maternal undernutrition, untreated high blood pressure, tobacco smoke, and indoor and outdoor air pollution as some of the most common modifiable exposures that cause poor health and early death globally.⁴ The evidence that these risk factors cause a substantial BOD can be used to support proposals for interventions that will enable a large number of people to live longer, healthier lives. The GBD collaborators also release annual estimates of the causes of death, illness, and disability worldwide and for each country. These numbers inform the development of policy recommendations that can be acted on by governmental bodies and other public health funders and implementers.

Prioritization based on an action orientation often gives the highest ratings to the cost-effective interventions that have been identified as “best buys” because they help many people make meaningful gains in health status at a low cost per person (or at a low cost per adverse event averted by the intervention).⁵ In general, low-cost primary prevention activities are the most cost-effective interventions.⁶ The Disease Control Priorities (DCP) project has identified vaccinating children, preventing malaria and HIV infections, treating tuberculosis and common communicable childhood diseases to prevent them from spreading to other people, improving the basic care of newborns, distributing micronutrients to children and pregnant

women, taxing tobacco products to reduce use, expanding the use of cardiovascular medications to prevent heart attacks and strokes, and enforcing traffic laws to reduce injuries as some of the highest-impact global health interventions (**FIGURE 2-4**).⁷

Some groups make decisions based on the special interests and capabilities of the collaborators. For example, the 14 Grand Challenges in Global Health identified by the Bill & Melinda Gates Foundation in 2003 highlighted critical needs for new health technologies (**FIGURE 2-5**),⁸ and the Gates Foundation subsequently used that list as part of selecting proposals to fund. Because the Gates Foundation is led by people with expertise in computers and information technology, the foundation is uniquely prepared to support the development and dissemination of new tech products. When funding and implementation agencies have particular areas of expertise, they can maximize their impact by applying their existing knowledge and experience toward new projects that build on past successes.

Groups focused on equity prioritize projects that will address perceived injustices and reduce health disparities. Many equity-oriented programs focus on the health of infants and children because of the nearly universal belief that no child anywhere should suffer from abuse, hunger, or preventable diseases.⁹ Equity-focused initiatives may also focus on the health of other vulnerable populations, like refugees and other migrants, people in prison, people with disabilities, and older adults, or they may advocate for human rights.

Another common approach is to make prioritization decisions based on the security interests of sponsoring governments, including direct and indirect threats to national, regional, and global peace and stability. For example, the top public health challenges that the U.S. CDC has identified for the United States

	Target	Action
1	Child health	Vaccinate children against major childhood killers, including measles, polio, tetanus, whooping cough, and diphtheria.
2	Child health	Monitor children's health to prevent or, if necessary, treat childhood pneumonia, diarrhea, and malaria.
3	Tobacco use	Tax tobacco products to increase consumers' costs by at least one-third to curb smoking and reduce the prevalence of cardiovascular disease, cancer, and respiratory disease.
4	HIV/AIDS	Attack the spread of HIV through a coordinated approach that includes promoting 100% condom use among populations at high risk; treating other sexually transmitted infections; providing antiretroviral medications, especially for pregnant women; and offering voluntary HIV counseling and testing.
5	Maternal and child health	Give children and pregnant women essential nutrients, including vitamin A, iron, and iodine, to prevent maternal anemia, infant deaths, and long-term health problems.
6	Malaria	Provide insecticide-treated bednets in malaria-endemic areas to drastically reduce malaria.
7	Injury prevention	Enforce traffic regulations and install speed bumps at dangerous intersections to reduce traffic-related injuries.
8	TB	Treat TB patients with short-course chemotherapy to cure infected people and prevent new infections.
9	Child health	Teach mothers and train birth attendants to keep newborns warm and clean to reduce illness and death.
10	Cardiovascular disease	Promote use of aspirin and other inexpensive medications to treat and prevent heart attack and stroke.

FIGURE 2-4 Ten “best buys” in global health from the Disease Control Priorities Project.

Reproduced from *Pathways to global health research: strategic plan 2008–2012*. Bethesda MD: The John E. Fogarty International Center, National Institutes of Health (NIH); 2008, p. 22.

Improve childhood vaccines	1	Create effective single-dose vaccines.
	2	Prepare vaccines that do not require refrigeration.
	3	Develop needle-free vaccine delivery systems.
Create new vaccines	4	Devise testing systems for new vaccines.
	5	Design antigens for protective immunity.
	6	Learn about immunological responses.
Control insects that transmit agents of disease	7	Develop genetic strategy to control insects.
	8	Develop chemical strategy to control insects.
Improve nutrition to promote health	9	Create a nutrient-rich staple plant species.
Improve drug treatment of infectious diseases	10	Find medications and delivery systems to limit drug resistance.
Cure latent and chronic infection	11	Create therapies that can cure latent infection.
	12	Create immunological methods to cure latent infection.
Measure health status accurately and economically in developing countries	13	Develop technologies to assess population health.
	14	Develop versatile diagnostic tools.

FIGURE 2-5 Grand Challenges in Global Health.

Data from Varmus H, Klausner R, Zerhouni E, Acharya T, Daar AS, Singer PA. Grand challenges in global health. *Science* 2003; 302:398-9.

include protecting the environment, responding to emerging infectious diseases (including pandemic influenza and drug-resistant pathogens), and reducing the burden from violence (including the physical and psychological traumas sustained by military personnel deployed to conflict areas) (FIGURE 2-6).¹⁰ These types of threats to health and security cannot be

alleviated by any one country working in isolation. Once a country has identified its own strategic global health priorities, that country is prepared to advocate for those priorities in conversations with potential partners. Working with partner nations on achieving shared aims will then advance health security at home and abroad.

1	Institute a rational healthcare system (balance equity, cost, and quality).
2	Eliminate health disparities.
3	Focus on children's emotional and intellectual development.
4	Achieve a longer "healthspan" (healthy aging).
5	Integrate physical activity and healthy eating into daily lives.
6	Clean up and protect the environment.
7	Prepare to respond to emerging infectious diseases.
8	Recognize and address the contributions of mental health to overall health and well-being.
9	Reduce the toll of violence in society.
10	Use new scientific knowledge and technological advances wisely.

FIGURE 2–6 The U.S. CDC's top public health challenges for the early 21st century.

Data from Koplan JP, Fleming DW. Current and future public health challenges. *JAMA* 2000; 284:1696-8.

▶ 2.3 Health Metrics

As more resources have been devoted to global health efforts, it has become increasingly important to quantify the health needs in various parts of the world, identify major modifiable risk factors for common diseases, assess the impact of new public health interventions, and monitor changes in the health status of populations over time. The key measures of health and disease in populations include information about population size, the birth rates and death rates, the causes of death, the frequency and causes of various illnesses and disabilities, and the rate at which members of the population engage in risky behaviors. All of these measures provide an evidence base for making policy and funding decisions.¹¹

Health information comes from a wide variety of sources, including census data, registries, surveillance systems, household surveys, and health services records, such as hospital

patient files and insurance claims.¹² Many types of health data are disseminated through the websites and annual reports of major governmental and nongovernmental health organizations and through academic journal articles. The websites of the WHO, the U.S. CDC, the U.S. National Institutes of Health (NIH), and other health agencies provide easy-to-read and regularly updated information about hundreds of diseases. For example, the WHO's *Weekly Epidemiological Record* and the CDC's *Morbidity and Mortality Weekly Report (MMWR)* provide timely information about emerging health issues, such as new outbreaks of serious infections.

For comparative global health statistics, the best sources are often the appendices of the annual reports of UN agencies, such as the WHO's annual *World Health Statistics* report and UNICEF's annual *State of the World's Children* report. For disease-specific statistics, the reports of specialty organizations can be

helpful references. For example, some global cancer statistics are reported every year by the American Cancer Society and by the International Agency for Research on Cancer (IARC), which is part of the UN system.

For detailed information about particular research methods and findings, the best sources are academic and professional journals articles that have undergone **peer review**, which means that before the papers were published, the manuscripts were sent to experts in the field who scrutinized the methodology and evaluated the validity of the results. An **abstract** is a one-paragraph summary of the methods, results, and conclusions of a scientific investigation. Abstract databases like MEDLINE can be used to search for abstracts summarizing journal articles on selected topics. The full reports can then be found online or in a library. These various types of high-quality resources provide an evidence-based foundation for those who seek to create, implement, evaluate, or improve global public health policies and practices.

Most countries maintain **vital statistics** on their residents, population-level metrics about births, deaths, and other life events. Vital statistics are compiled from birth and death certificates, marriage and divorce certificates, census records, and other sources. Demographers use these statistics to understand the current population distribution and predict the size and characteristics of the population in future years. The **birth rate** is the annual number of births per 1000 people in the total population. The birth rate is usually highest in the lowest-income countries (FIGURE 2-7). The **death rate**, also called the **mortality rate**, is the annual number of deaths per 1000 people (or other units, such as per 100,000 people). Mortality rates can be presented for all-cause mortality and for specific causes of death. The all-cause death rate is usually higher in populations with a large percentage of older adults than in populations with an abundance of school-aged children because age-specific

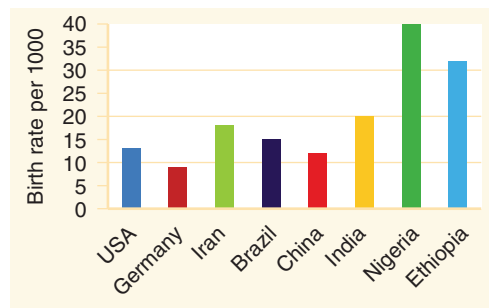


FIGURE 2-7 Birth rate per 1000 people in 2015 in featured countries.

Data from *World development indicators 2016*. Washington: World Bank; 2016.

mortality rates are higher for older adults than for younger people. Age-adjusted rates that account for differences in population age structures are usually used to compare mortality rates in two or more populations. While the crude (unadjusted) all-cause mortality rates are typically highest in high-income countries that have a large proportion of older adults, the age-standardized (adjusted) mortality rates are usually highest in low-income countries (FIGURE 2-8).

Measuring **mortality** (death) at the population level can be challenging for two principal reasons. The first is that in many parts of the world there is no system for reliably registering vital statistics. In places where most births and deaths occur in homes instead of in hospitals, few births and deaths are documented by government officials. The most disadvantaged populations—often the ones with the highest mortality rates—are the least likely to have their life events accurately counted. Thus, while very precise mortality statistics are available from high-income countries, death rates in low-income countries often must be estimated based on limited data. The second key challenge is assigning one cause of death to each deceased individual. Should a person with HIV/AIDS who dies of tuberculosis be recorded as an HIV death or a TB death? Should a person with advanced-stage

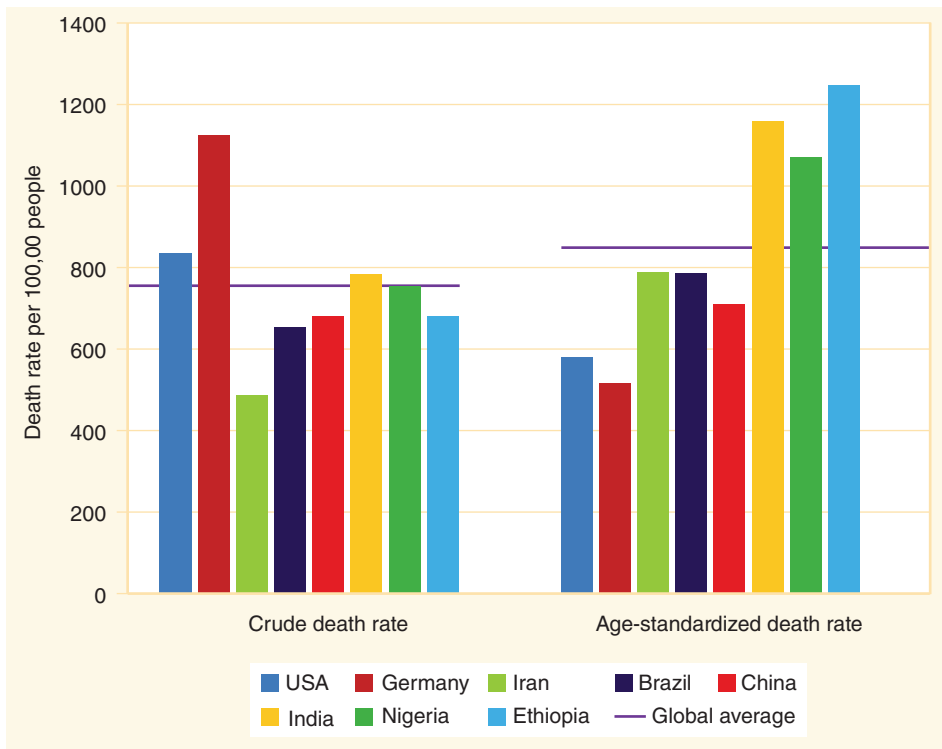


FIGURE 2-8 Crude and age-standardized all-cause mortality rates per 100,000 people in 2015 in featured countries.

Data from GBD Mortality and Causes of Death Collaborators. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016; 388:1459-544.

cancer who dies of pneumonia be counted as a cancer death or an infectious disease death? These decisions about how to assign causes of death can have a significant impact on which diseases appear to be the most common causes of mortality in a population. Even with these limitations, epidemiologists using standardized estimation methods and the best available data can make reasonably accurate assessments of the annual number and causes of death by age group and sex in every region of the world.

Another common way of examining mortality and survival at the population level is through the estimation of life expectancy (**FIGURE 2-9**). **Life expectancy** at birth is the

median expected age at death of all babies born alive. Life expectancy captures the burden from infant and child deaths in addition to the average age at death of adults. In places with high infant mortality rates, the median age at death is often in middle adulthood, which represents an age somewhere between a large number of child deaths and an even larger number of deaths in older adults. Life expectancies have increased over time in most countries, but they remain much higher in high-income countries than in low-income countries (**FIGURE 2-10**).¹³ Some estimates of life expectancy instead focus on **healthy life expectancy (HALE)**, which is the number of years the average individual born into the

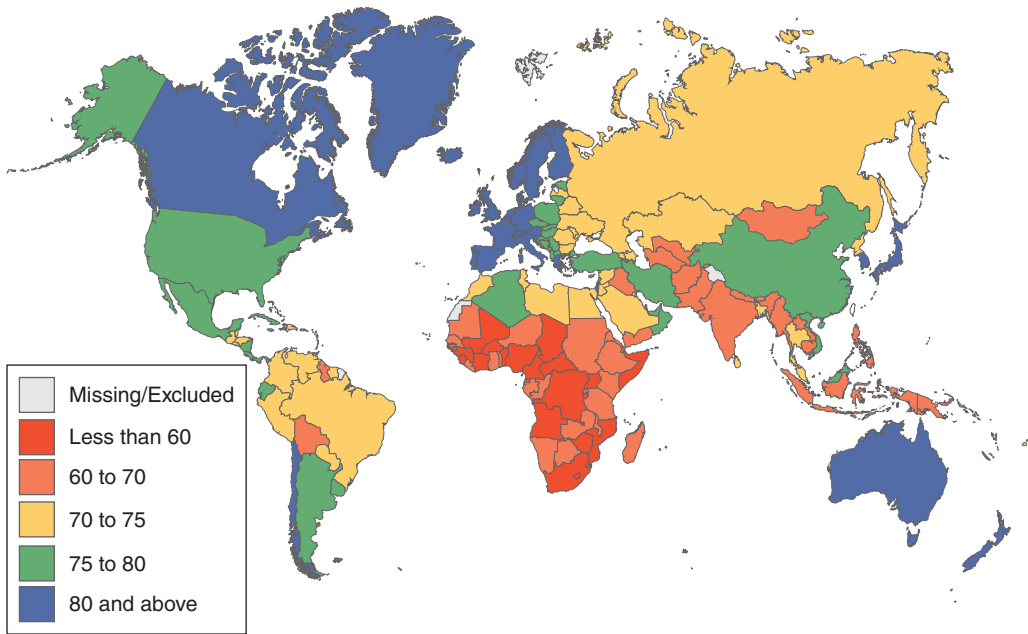


FIGURE 2-9 Life expectancy at birth (2015).
Data from *World development indicators 2016*. Washington: World Bank; 2016.

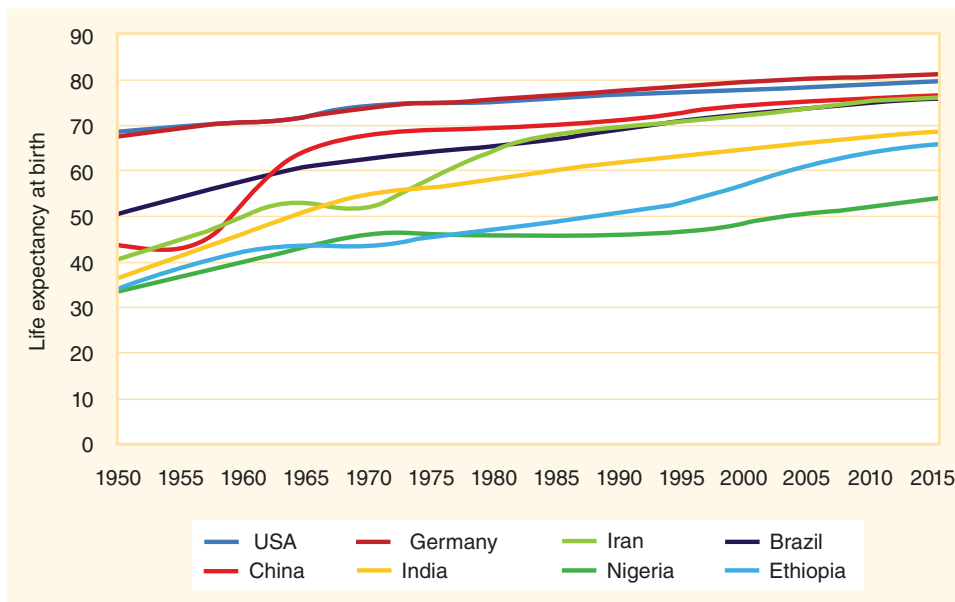


FIGURE 2-10 Life expectancy has increased over time.
Data from United Nations Department of Economic and Social Affairs. *World population prospects: the 2017 revision*. New York: UN; 2017.

population can expect to live without disability (FIGURE 2–11).¹⁴ In most countries, adults experience about 10 years in poor health before dying. Global health aims to increase life expectancies and increase HALEs, so that people live to older ages without experiencing extended periods of disability prior to death.

Morbidity refers to the presence of illness or disease, whether that disease is relatively mild, like the common cold, or quite severe. The two most common terms used to describe the morbidity rate for a particular disease in a population are incidence and prevalence (FIGURE 2–12). **Incidence** is the number of new

cases of the disease occurring in a time period divided by the total number of people at risk for that disease in that time period. Incidence is usually used to study infectious diseases, acute diseases (diseases that occur suddenly), and outbreaks. **Prevalence** is the number of total existing cases, whether newly diagnosed or long-established, divided by the total number of people in the population at the time the prevalence is measured. Prevalence is usually used to describe the frequency of chronic (long-lasting) exposures and diseases in a population, such as the percentage of adults in a country who have diabetes or asthma or who smoke tobacco products.

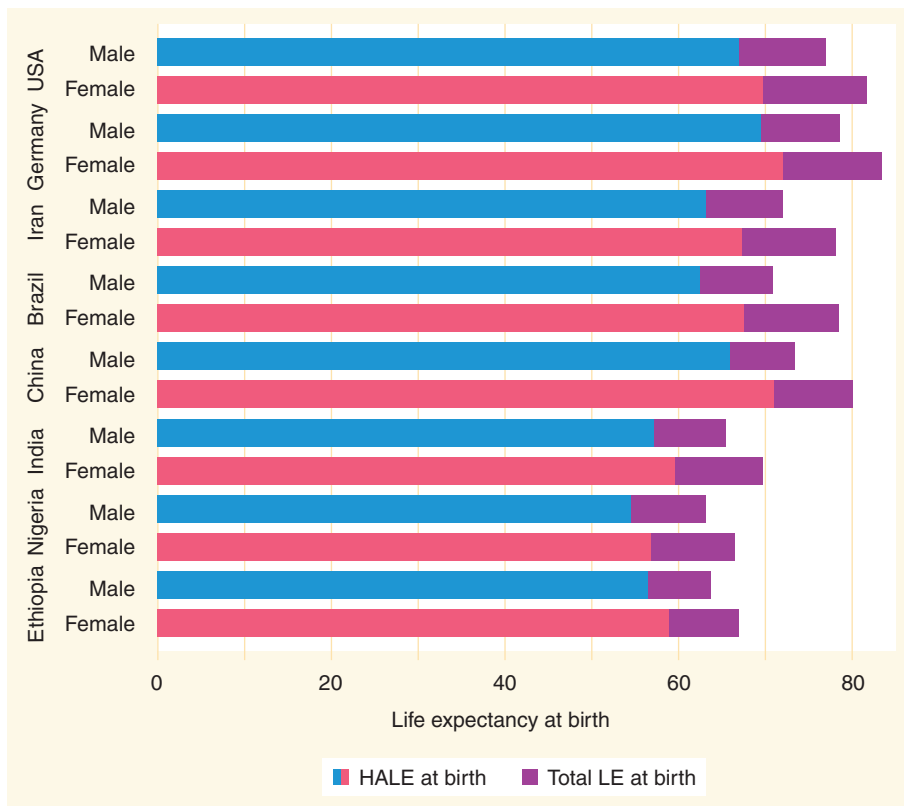


FIGURE 2–11 Life expectancy and healthy life expectancy (HALE) at birth.

Data from GBD 2015 DALYs and HALE Collaborators. Global, regional, and national disability-adjusted life years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: A systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016; 388:1603–58.

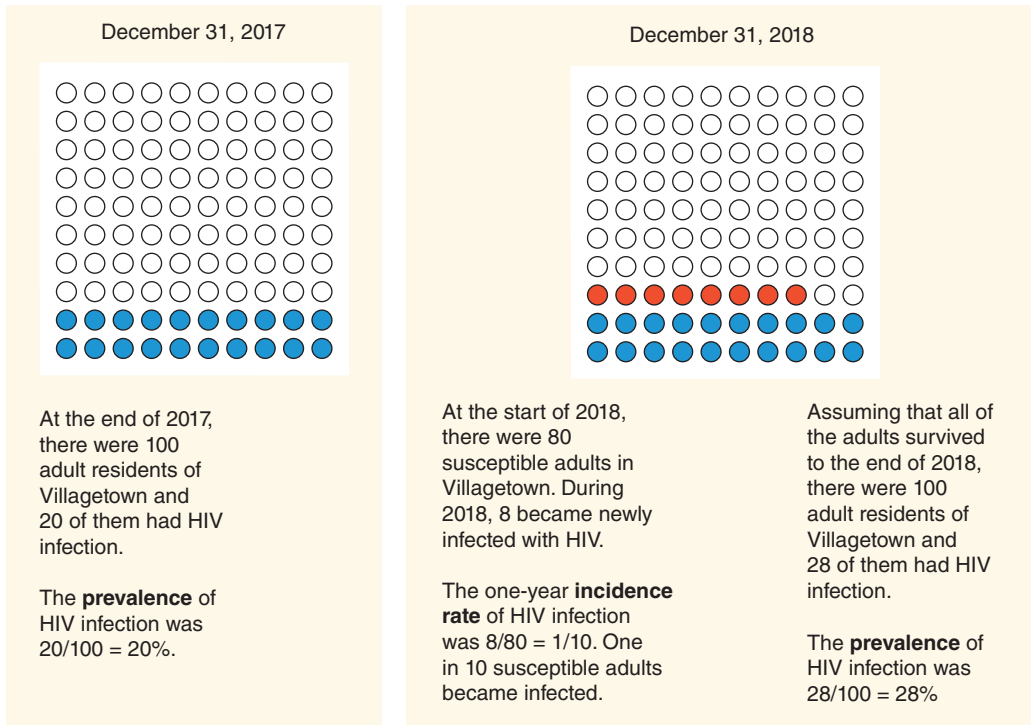


FIGURE 2–12 An example of incidence and prevalence.

Epidemiologists measuring incidence and prevalence must establish a clear case definition that spells out exactly which characteristics indicate that a person has (or does not have) the conditions of interest. They must also have a system in place for ascertaining the total number of people in the population being studied, especially if changes in the health status of a population are being tracked over time and the population might be growing or shrinking or aging. Age-adjustment can be used to standardize two populations with different age structures before their morbidity rates are compared.

A variety of more complex health metrics also are used to examine the disease burden at the population level. **Years of life lost (YLLs)** quantify the burden from premature mortality in a population. Premature mortality is any death before a selected target survival age. For example, if the goal is for everyone in a population to live to age 70, someone who dies at 60 years of age would contribute 10 YLLs to the population total. If the target for survival

is age 80, someone who dies at 60 years of age would contribute 20 YLLs to the population total. Diseases that kill children, who would have had decades of productive life remaining if they had survived, generate more YLLs per case than diseases that primarily affect older adults. An intervention that keeps one 5-year-old from dying will prevent the loss of up to 75 YLLs in a population that has a target survival age of 80 years, while an intervention that keeps a 75-year-old alive for at least 5 more years will generate only 5 averted YLLs. An intervention for people who are already older than the target survival age will not help reduce the number of YLLs in the population because only premature deaths count toward the total.

In the models created for the GBD project, the term disability refers to any short- or long-term reduction in health status.¹⁵ Weights are assigned to the level of disability caused by each type of physical or mental health condition. **Years lived with disability (YLDs)** quantify the burden to a population from

nonfatal health conditions that cause significant impairment and distress (FIGURE 2–13). The total number of YLDs in a population is a function of how often a condition occurs, how much disability the condition causes (that is, the weight associated with the disability), and how long the condition typically persists.¹⁶ A person who spends a year in a coma would

be considered fully disabled for that time period, contributing about one full YLD to the population total. Someone who is unable to work or go to school for 1 week due to a bout of influenza or a severely sprained ankle would contribute a tiny fraction of 1 YLD to the tally. The typical person contributes a small portion of one YLD to the population total each year. However, many small contributions from a particular cause can add up to a large number of YLDs across a population. Some of the most common causes of YLDs are back pain, depression, iron deficiency anemia, age-related hearing loss, diabetes, and migraine headaches.¹⁷

A **disability-adjusted life year (DALY)** is a measure of the total burden of disease in a population from both premature deaths and disability. The total number of DALYs in a population is the sum of YLLs and YLDs. One of the key benefits of using DALYs is that it highlights the high burden of disability caused by mental health disorders, pain, and other causes of reduced health status that are usually not fatal (FIGURE 2–14).¹⁷ The main criticism of DALYs is the difficulty in assigning weights to the amount of disability caused by various illnesses and impairments. It will never be possible to assign an accurate weight to the decrease in quality of life caused by blindness, loss of a limb, depression, a brain tumor, or asthma, because the experience of disability varies so much based on the individual,

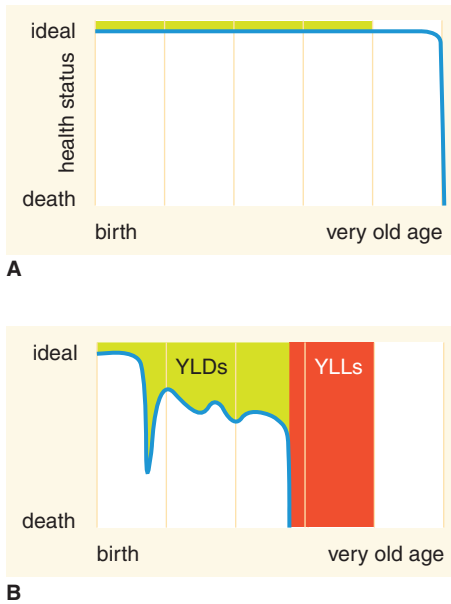


FIGURE 2–13 Examples of years lived with disability (YLDs) and years of life lost (YLLs) to premature mortality for different health trajectories.

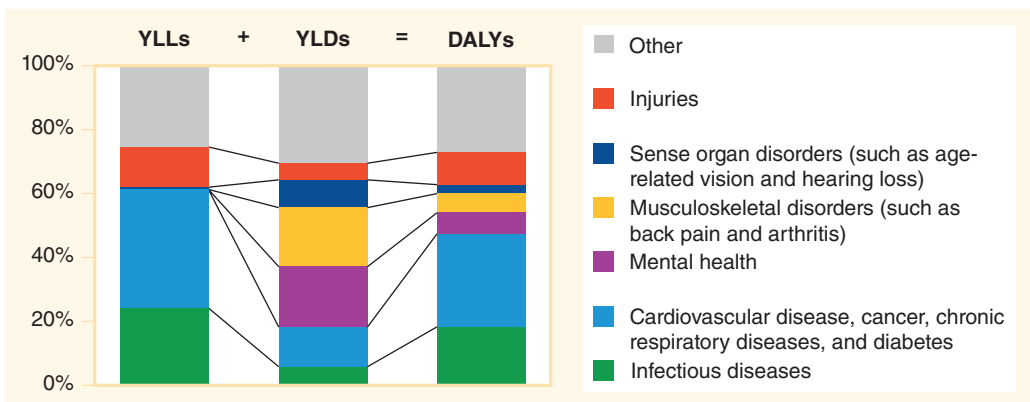


FIGURE 2–14 Global distribution of YLLs, YLDs, and DALYs in 2015.

Data from GBD 2015 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: A systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016; 388:1545–602.

living conditions, the level of community support, access to health care, and other individual factors. For example, the amount of disability caused by an amputated foot would be much higher for a manual laborer in a low-resource setting where prosthetics are not available than it would be for an office worker in a place where high-tech prosthetics are common.

Economists frequently use health-adjusted life year estimates similar to the DALY as part of cost-effectiveness analyses. A **quality-adjusted life year (QALY)** quantifies the additional duration of life and quality of life conferred to populations by successful public health interventions.¹⁸ A DALY is a bad thing to be avoided (the loss of a healthy year of life), while a QALY is a good thing to save.¹⁹ While vital statistics and simple measures of morbidity (like incidence and prevalence) can be directly measured, more complicated health metrics like DALYs and QALYs are estimated using complex equations. The results of these types of computational models are dependent on the assumptions of the modelers, such as assumptions about the target survival age in a population and the disability weights assigned to various conditions. Health metrics from different populations should only be compared

when they were calculated based on similar methods and assumptions. Health metrics computed using the same methods allow different populations (or the same population at two points in time) to be compared.

▶ 2.4 Millennium Development Goals

The **Millennium Development Goals (MDGs)** that were adopted by the United Nations in 2000 and endorsed by nearly 200 countries worldwide were a major contributor to the global health successes thus far in the 21st century. The MDGs spelled out eight major goals for significantly reducing global poverty by 2015 (**FIGURE 2-15**).²⁰ While the MDGs overall were about general socioeconomic development, most of the goals had direct links to health: eradicating extreme poverty and hunger (MDG 1); reducing child mortality (MDG 4); improving maternal health (MDG 5); combatting HIV/AIDS, malaria, and other diseases (MDG 6); and ensuring environmental sustainability (MDG 7). Each signatory country was committed to working toward these

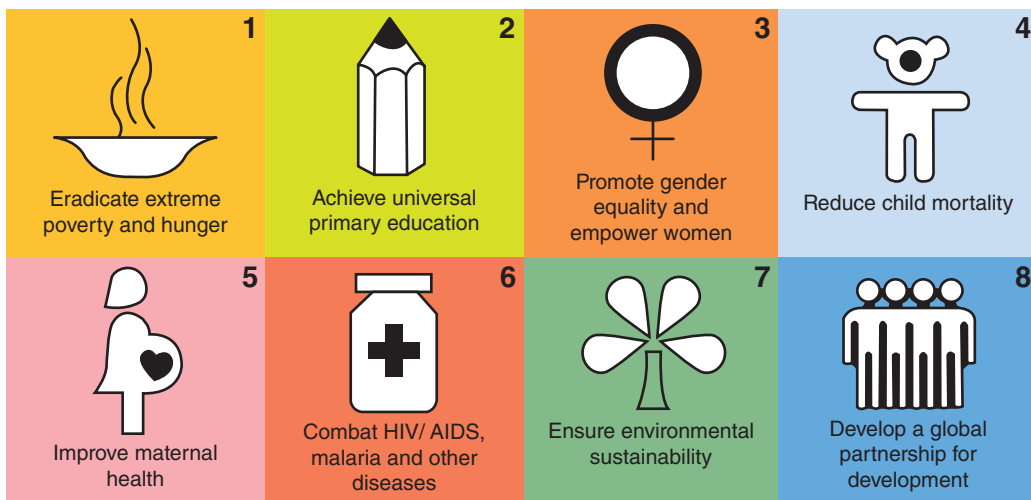


FIGURE 2-15 Millennium Development Goals (MDGs) (2000–2015).

Reproduced from United Nations. *United Nations millennium development goals*. <http://www.un.org/millenniumgoals/>. Reproduced with permission from UNDP Brazil.

goals, so the MDGs provided a blueprint for national- and international-level priority setting.

One of the main reasons the MDGs were so influential is that they provided a clear strategy for evaluation. When the eight MDGs were launched in 2000, they were accompanied by 18 targets that spelled out benchmarks for success (many of which used 1990 as the baseline year for comparison) and 48 specific indicators that were used to evaluate progress toward achieving those targets. These were later expanded to 21 targets and 60 indicators. Data about each of the 60 indicators were collected annually from most participating countries and were used to determine how much progress had been made toward reaching the goals at national, regional, and global levels. While some concerns were raised about how well the MDGs promoted equity, sustainability, local ownership of priorities, and holistic development (rather than relatively narrow, single-sector silos of focus), the general consensus was that the MDGs provided a helpful framework for global cooperation toward international development.²¹

The MDGs facilitated remarkable improvements in health status and quality of life for the world's lowest-income populations. Globally, there was a 44% reduction in hunger between 1990 and 2015, a 53% reduction in the mortality rate among children between birth and their fifth birthdays between 1990 and 2015, a 44% reduction in pregnancy-related deaths during that time period, a 45% reduction in new cases of HIV compared to the rate in 2000, and a 62% reduction in the percentage of people without reliable access to safe drinking water sources.²² Although not all of the goals were achieved, most lower-income countries had healthier populations in 2015 than they had when the MDGs were launched in 2000.²⁰ The success of the MDGs was the impetus to create a follow-up set of goals, called the Sustainable Development Goals (SDGs). Many of the MDG targets that were not reached are now included among the SDG targets along with a host of new targets and indicators covering a broader diversity of socioeconomic, health, and environmental issues (**FIGURE 2-16**).

SUSTAINABLE DEVELOPMENT GOALS



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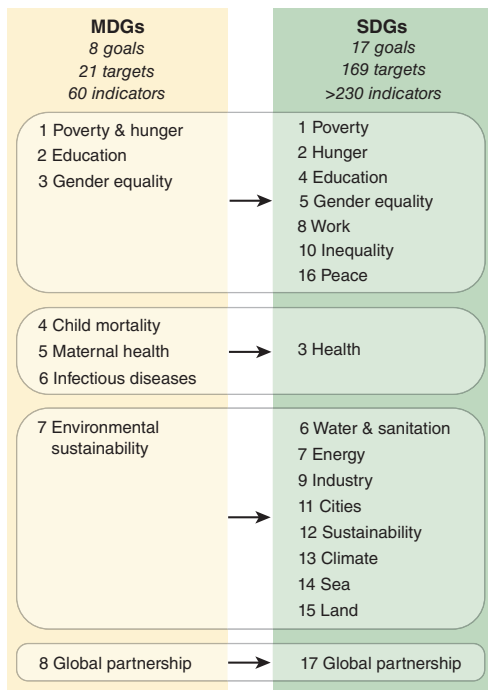


FIGURE 2-16 Transitioning from the MDGs to the SDGs.

▶ 2.5 Sustainable Development Goals

The **Sustainable Development Goals (SDGs)** are 17 goals established by the member countries of the United Nations at the end of 2015 that aim, by 2030, to end poverty, protect the planet, and promote prosperity and peace (**FIGURE 2-17**).²³ The 17 SDGs are operationalized through 169 targets and more than 230 indicators.²⁴ The preamble of the *2030 Agenda for Sustainable Development* that guides the SDG process states that the goals are “a plan of action for people, planet, and prosperity” that aim “to end poverty and hunger” in order to “ensure that all human beings can fulfill their potential in dignity and equality and in a healthy environment,”

“to protect the planet from degradation,” “to ensure that all human beings can enjoy prosperous and fulfilling lives,” and “to foster peaceful, just, and inclusive societies which are free from fear and violence.”²³

Like the MDGs, the SDGs consider health to be both a necessary prerequisite to and an outcome of economic growth. Two of the 17 SDGs focus specifically on health (SDG 3) and nutrition (SDG 2). Several of the SDGs address the socioeconomic determinants of health: poverty (SDG 1), education (SDG 4), gender equality (SDG 5), employment (SDG 8), equal opportunities for all people (SDG 10), peace (SDG 16), and good governance (SDG 17). The remaining SDGs address the environmental determinants of health: water and sanitation (SDG 6), affordable clean energy (SDG 7), safe work environments (SDG 9), healthy urban areas (SDG 11), sustainable consumption and production practices (SDG 12), and healthy climates (SDG 13), including healthy oceans (SDG 14) and land (SDG 15).

Unlike the MDGs, the SDGs are not singularly focused on the world’s poorest billion people. While the SDGs remain “focused in particular on the needs of the poorest and most vulnerable,” the SDGs mix goals for poverty reduction with a lengthy list of other targets that apply to countries across the economic spectrum, noting that “if we realize our ambitions across the full extent of the Agenda, the lives of all will be profoundly improved and our world will be transformed for the better.”²³ The goal is to improve “the lives of all” and not just some countries and some stakeholders. For example, although there is only one SDG focused specifically on health, SDG 3 includes a much greater diversity of targets and indicators than were encompassed by the three MDGs that aimed to reduce the burden from child mortality, maternal mortality, and infectious diseases (primarily HIV, malaria,

SDG	Theme	Goal
1	No poverty	End poverty in all its forms everywhere
2	Zero hunger	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
3	Good health and well-being	Ensure healthy lives and promote well-being for all at all ages
4	Quality education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5	Gender equality	Achieve gender equality and empower all women and girls
6	Clean water and sanitation	Ensure availability and sustainable management of water and sanitation for all
7	Affordable and clean energy	Ensure access to affordable, reliable, sustainable, and modern energy for all
8	Decent work and economic growth	Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all
9	Industry, innovation, and infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation
10	Reduced inequalities	Reduce inequality within and among countries
11	Sustainable cities and communities	Make cities and human settlements inclusive, safe, resilient, and sustainable
12	Responsible consumption and production	Ensure sustainable consumption and production practices
13	Climate action	Take urgent action to combat climate change and its impacts
14	Life below water	Conserve and sustainably use oceans, seas, and marine resources for sustainable development
15	Life on land	Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16	Peace, justice, and strong institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels
17	Partnership for the goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development

FIGURE 2–17 Sustainable Development Goals (SDGs) (2016–2030).

Reproduced from United Nations. *Transforming our world: The 2030 agenda for sustainable development*. New York: UN; 2015, p. 14.

and tuberculosis). The health-focused SDG targets include ambitious aims for further reducing maternal and child mortality, alleviating the burden from a diversity of infectious diseases (including hepatitis B virus and neglected tropical diseases), reducing the number of adults who die before their 70th birthdays from common NCDs (cardiovascular disease, cancer, diabetes, and chronic respiratory diseases), improving treatment of substance use disorders and other mental health conditions, preventing transportation-related deaths, and

increasing the accessibility of health services, medications, and vaccines (FIGURE 2-18).²⁵

Because all of these health conditions and the socioeconomic and environmental conditions that influence them are now among the priorities for global action for the next decade, the SDGs are deployed as a framework for the outline of this book. The links between all of the SDGs and health are described in the next two chapters (FIGURE 2-19). The specific health topics and conditions included among the SDG targets are described in the remaining chapters (FIGURE 2-20).

Target	Theme	Target	Theme
2.2	Child nutrition	3.8	Universal health coverage
3.1	Maternal mortality	3.9	Mortality due to air pollution
3.2	Child mortality	3.9	Mortality due to unsafe water and sanitation
3.3	HIV	3.9	Mortality due to unintentional poisoning
3.3	Tuberculosis	3.a	Tobacco use
3.3	Malaria	3.b	Access to essential medicines and vaccines
3.3	Hepatitis	3.c	Health workers
3.3	Neglected tropical diseases	3.d	Emergency preparedness
3.4	Noncommunicable diseases	6.1	Drinking water
3.4	Suicide	6.2	Sanitation
3.5	Substance abuse	7.1	Clean household energy
3.6	Road traffic injuries	11.6	Air pollution
3.7	Sexual and reproductive health	13.1	Natural disasters
16.1	Homicide		
16.1	Conflicts		

FIGURE 2-18 Examples of Sustainable Development Goals targets related to health.

Data from *World health statistics 2016: monitoring health for the SDGs*. Geneva: WHO; 2016.

SDG	Theme	Section
1	No poverty	3.2
4	Quality education	3.3
5	Gender equality	3.4
8	Decent work	3.5
10	Reduced inequalities	3.6, 3.7
16	Peace and good governance	3.8
6	Clean water and sanitation	4.2
7	Affordable and clean energy	4.3
9	Industry and infrastructure	4.4
11	Sustainable cities	4.5
12	Responsible consumption and production	4.6
13	Climate action	4.7

FIGURE 2–19 Where in this book to find information about the Sustainable Development Goals as determinants of health.

SDG Target	Theme	Chapter
(Many)	Socioeconomic determinants of health	3
(Many)	Environmental determinants of health	4
3.c	Health workforce	5
3.b	Access to affordable medicines and vaccines	5
3.b	Official development assistance for health	6
3.d	Health emergency preparedness	7

(continues)

SDG Target	Theme	Chapter
3.3	HIV	8
3.3	Tuberculosis	8
3.2	Child mortality	9
3.3	Hepatitis	9
3.3	Malaria	10
3.3	Neglected tropical diseases	10
3.7	Sexual and reproductive health	11
3.1	Maternal mortality	11
2.1, 2.2	Nutrition	12
3.4	Cancer	13
	Cardiovascular disease	14
	Diabetes and chronic respiratory diseases	15
3.a	Tobacco use	15
3.5	Substance abuse	16
3.4	Suicide	16
3.6	Road traffic injuries	17
16.1	Violence	17
(Many)	Child health	18
(Many)	Adult health	19

FIGURE 2–20 Where in this book to find information about the health issues featured as Sustainable Development Goals targets.

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