

RAPID HEALTH TRANSITIONS: GBD 2010 RESULTS

In many countries in East Asia and Pacific, loss of healthy life, or DALYs, from non-communicable diseases are rising, while DALYs from communicable, newborn, nutritional, and maternal causes are declining. To help decision-makers establish health service priorities within countries when faced with limited resources, we will explore changes in disease burden around the globe, in the East Asia and Pacific region, and in specific countries in this section. In another section entitled “Using GBD to assess countries’ health progress,” we will compare how well countries are performing in health relative to other countries in the region using a metric called age-standardized rates.

In terms of disease burden at the global level, GBD 2010 found that the leading causes of DALYs have evolved dramatically over the past 20 years. Figure 1 shows the changes in the global leading causes of DALYs in 1990 and 2010. Communicable, newborn, maternal, and nutritional causes are shown in red, non-communicable diseases appear in blue, and injuries are shown in green. Dotted lines indicate causes that fell in rank during this period, while solid lines signal causes that rose in rank.

Causes associated with ill health and death in adults, such as ischemic heart disease, stroke, and low back pain, increased in rank between 1990 and 2010, while causes that primarily affect children, such as lower respiratory infections, diarrhea, preterm birth complications, and protein-energy malnutrition, decreased in rank. Unlike most of the leading communicable causes, HIV/AIDS and malaria increased by 353% and 18%, respectively. Since 2005, however, premature mortality and disability from these two causes have begun to decline. Four main trends have driven changes in the leading causes of DALYs globally: aging populations, increases in non-communicable diseases, shifts toward disabling causes and away from fatal causes, and changes in risk factors.

To provide a closer look at the epidemiological changes occurring at the regional level, Figure 2 shows how the leading causes of premature death and disability, or DALYs, have changed over time in East Asia and Pacific. Figures showing changes in the leading causes of DALYs by country can be found in the Annex of this report.

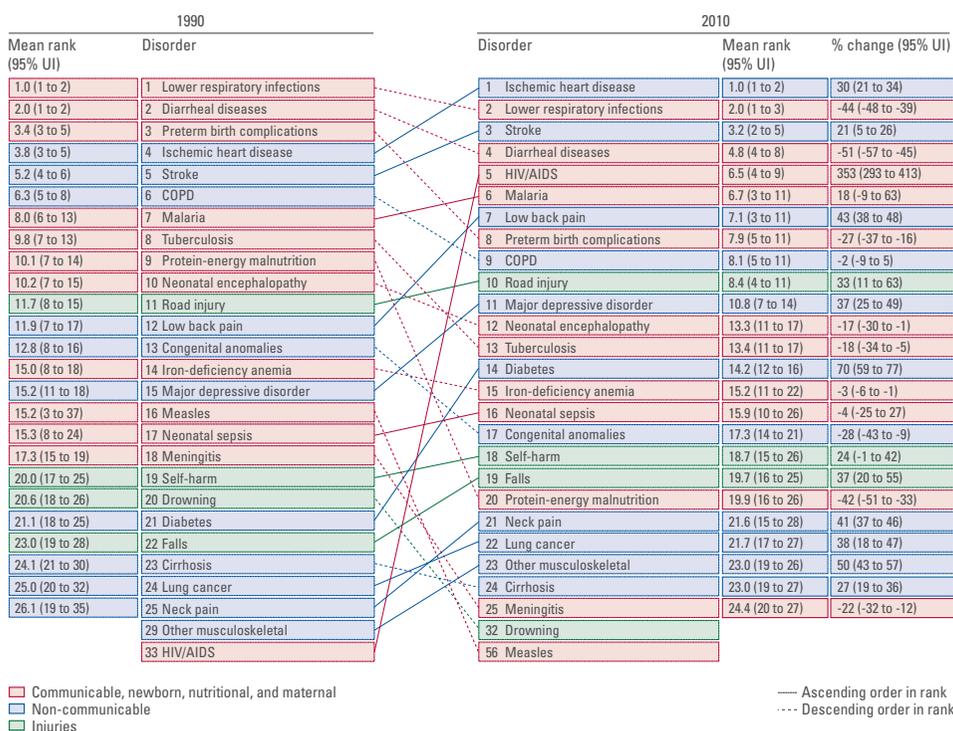
Cerebrovascular disease – or stroke – was the leading cause of premature death and disability in East Asia and Pacific in 2010, and rose from second to first place as a cause of DALYs between 1990 and 2010. Ischemic heart disease was the second leading cause of DALYs in the region.

Certain non-communicable diseases and injuries were much more prominent causes of premature death and disability in East Asia and Pacific compared to the world as a whole. Depression ranked sixth in this region, but ranked 11th globally. At the country level, depression ranked among the five leading causes of DALYs in

Malaysia, Thailand, Tonga, and Vietnam. Diabetes also ranked higher in East Asia and Pacific than it ranked at the global level – ninth versus 14th – and was a leading cause of DALYs in most of the smaller countries in the region, including Kiribati, the Marshall Islands, the Federated States of Micronesia, Samoa, the Solomon Islands, and Tonga.

Of the 25 leading causes of disease burden, trachea, bronchus, and lung cancers showed the biggest increase in terms of DALYs, rising 86% between 1990 and 2010. Diabetes, similar to global trends, rose 76% in the same period. Road injuries also were prominent health problems in the region. While road injuries were the 10th leading cause of disease burden globally, in East Asia and Pacific, they ranked third. The shift in rank between 1990 and 2010 was driven by a 51% increase in DALYs from traffic accidents and other road-related injuries. In Indonesia, Thailand, and Vietnam, road injuries were among the five leading causes of DALYs.

Figure 1: Global disability-adjusted life year ranks, top 25 causes, and percentage change, 1990-2010

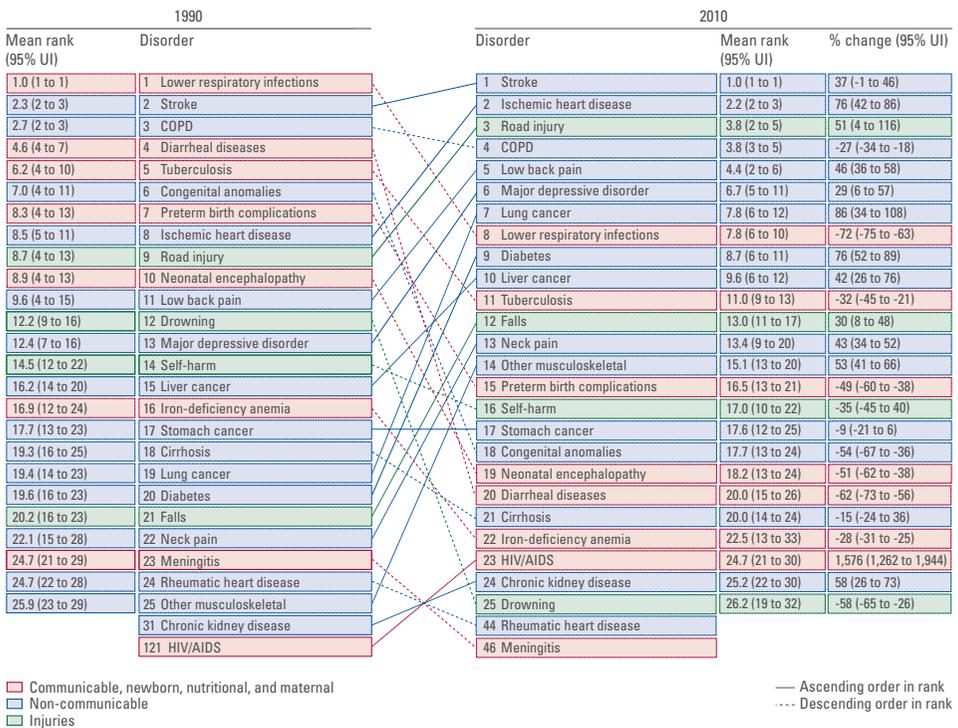


Note: Solid lines indicate a cause that has moved up in rank or stayed the same. Broken lines indicate a cause that has moved down in rank. The causes of DALYs are color coded, with blue for non-communicable diseases, green for injuries, and red for communicable, newborn, nutritional, and maternal causes. COPD: Chronic obstructive pulmonary disease. To view an interactive version of this figure, visit IHME's website: <http://ihmeuw.org/gbdarrowdiagram>.

There also were significant decreases in some causes of disease burden. DALYs due to self-harm fell 35% and from drownings, 58%. The burden of chronic obstructive pulmonary disease (COPD), a term used to describe emphysema and other chronic respiratory diseases, fell by 27%. On the whole, most communicable, newborn, maternal, and nutritional causes of DALYs dropped in rank in East Asia and Pacific, mirroring global trends in the epidemiological transition toward chronic diseases and injuries. The burden from diarrheal diseases, preterm birth complications, and lower respiratory infections fell in nearly every country in the region.

China stood out, in particular, for how advanced it was in transitioning from a profile more typical of a developing country to a health picture that is now dominated by non-communicable diseases and injuries. Of the 20 leading causes of DALYs in this country, only one infectious disease remained a leading cause: lower respiratory infections. The burden from these diseases fell by 80% in China between 1990 and 2010.

Figure 2: Disability-adjusted life year ranks, top 25 causes, and percentage change in East Asia and Pacific, 1990-2010



Note: Solid lines indicate a cause that has moved up in rank or stayed the same. Broken lines indicate a cause that has moved down in rank. The causes of DALYs are color coded, with blue for non-communicable diseases, green for injuries, and red for communicable, newborn, nutritional, and maternal causes.

HIV/AIDS did increase in terms of DALYs by 1,576% between 1990 and 2010. There have been reductions in the burden from HIV/AIDS in multiple countries in the region since 2005, but it remained among the five leading causes of DALYs in Malaysia, Myanmar, and Thailand. HIV/AIDS has risen in China, Indonesia, and the Philippines since 2005.

MOST OF THE WORLD'S POPULATION IS LIVING LONGER AND DYING AT LOWER RATES

In much of the world, GBD 2010 found that people are living to older ages than ever before, and the entire population is getting older. Since 1970, the average age of death has increased 20 years globally. Dramatic changes have occurred during this period in Asia, Latin America, and the Middle East, where the average age of death increased by 30 years or more. Sub-Saharan Africa, however, has not made nearly as much progress as other developing regions, and people in this part of the world tend to die at much younger ages than in any other region. Progress in sub-Saharan Africa has in particular been held back by the HIV/AIDS epidemic, maternal deaths, and child mortality caused by infectious diseases and malnutrition, but some of these trends have begun to change in the past decade.

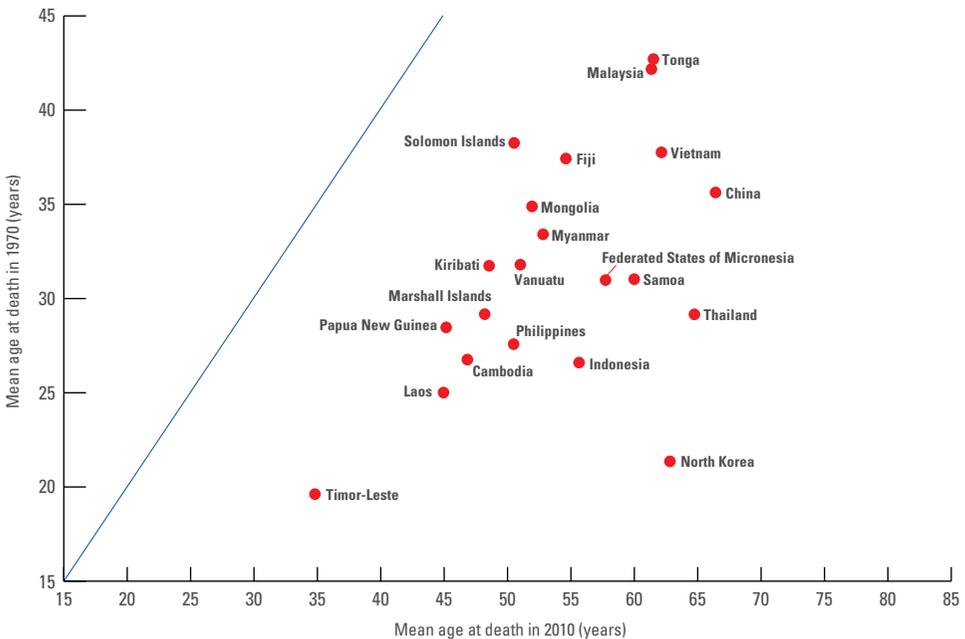
In East Asia and Pacific, the countries that made most progress in increasing the average age at death between 1970 and 2010 were China, Indonesia, Micronesia, North Korea, Samoa, and Thailand (Figure 3). All of these countries saw increases in the mean age of death by 25 years or more. Most of the other countries in the region succeeded in extending the average age at death between 15 and 24 years. The Solomon Islands saw an increase of only 12 years between 1970 and 2010. While globally the biggest increases in the mean age of death have tended to be in higher-income countries, East Asia and Pacific presents a mixed picture. The country with the biggest increase was North Korea, one of only three low-income countries in the region, ranking it among the fastest increases in the world, alongside upper-middle-income countries such as the Dominican Republic, Iran, and the Maldives. By contrast, Malaysia, an upper-middle-income country, saw a slower increase than Cambodia and Myanmar, the two other low-income countries in the region.

Yet another way to understand changes in global demographic trends is to explore reductions in mortality rates by sex and age group. Figure 4 shows how death rates have declined in all age groups between 1970 and 2010. These changes have been most dramatic among males and females aged 0 to 9 years, whose death rates have dropped over 60% since 1970. Among age groups 15 and older, the decrease in female death rates since 1970 has been greater than the drop in male death rates. The gap in progress between men and women was largest between the ages of 15 and 54, most likely due to the persistence of higher mortality from injuries, as well as alcohol and tobacco use, among men.

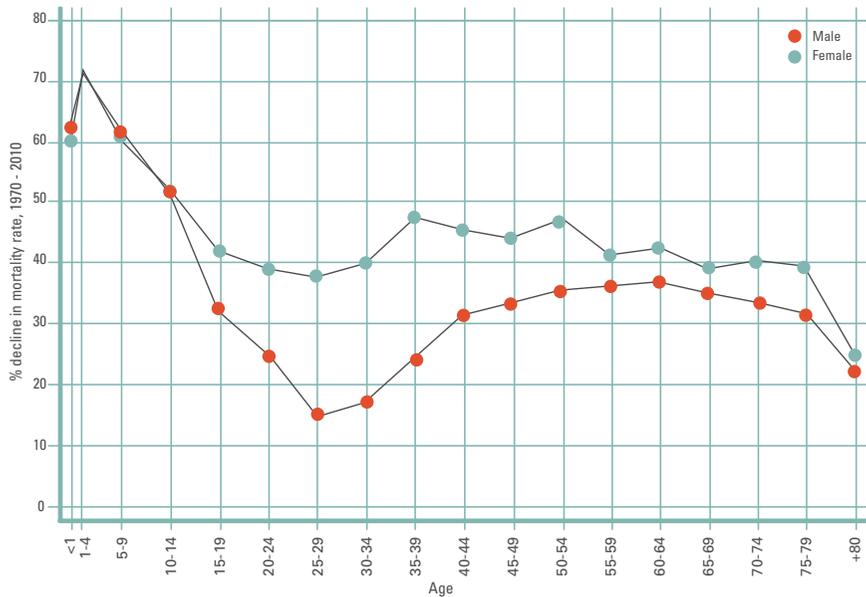
Figure 5 shows decreases in mortality rates in East Asia and Pacific. There were declines in every age group between 1970 and 2010, ranging from 12% for men aged 80 and older to more than 88% in males and females in the 1- to 4-year-old age group between 1970 and 2010.

As with the global results, women in most age groups in the region experienced greater declines in death rates than men. The most dramatic differences appeared in the 15 to 44 year age groups. Women between 20 and 24, for example, saw a 70.5% decline in mortality while men only saw a 43% decline.

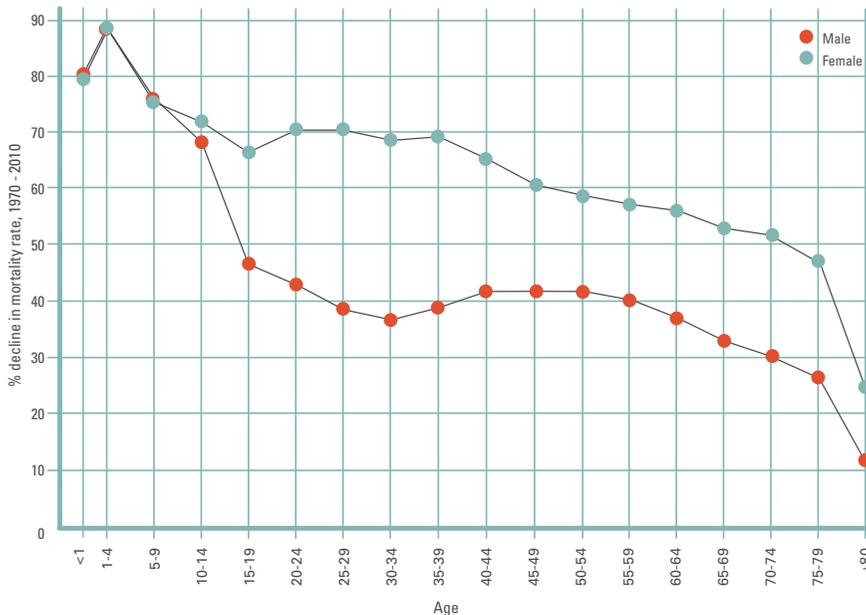
Figure 3: Average age of death for countries in East Asia and Pacific region, 1970 compared with 2010



Note: Countries falling on the right side of the 45-degree-angle line had a greater average age of death in 2010 compared to 1970.

Figure 4: Global decline in age-specific mortality rate, 1970-2010

Note: Higher values indicate greater declines in mortality; lower values indicate smaller declines in mortality.

Figure 5: Decline in age-specific mortality rate in East Asia and Pacific, 1970-2010

Note: Higher values indicate greater declines in mortality; lower values indicate smaller declines in mortality.

LEADING CAUSES OF DEATH ARE SHIFTING TO NON-COMMUNICABLE DISEASES

In part because many people are living longer lives and the population is growing older, the leading causes of death have changed. Worldwide, the number of people dying from non-communicable diseases, such as ischemic heart disease and diabetes, has grown 30% since 1990. To a lesser extent, overall population growth also contributed to this increase in deaths from non-communicable diseases.

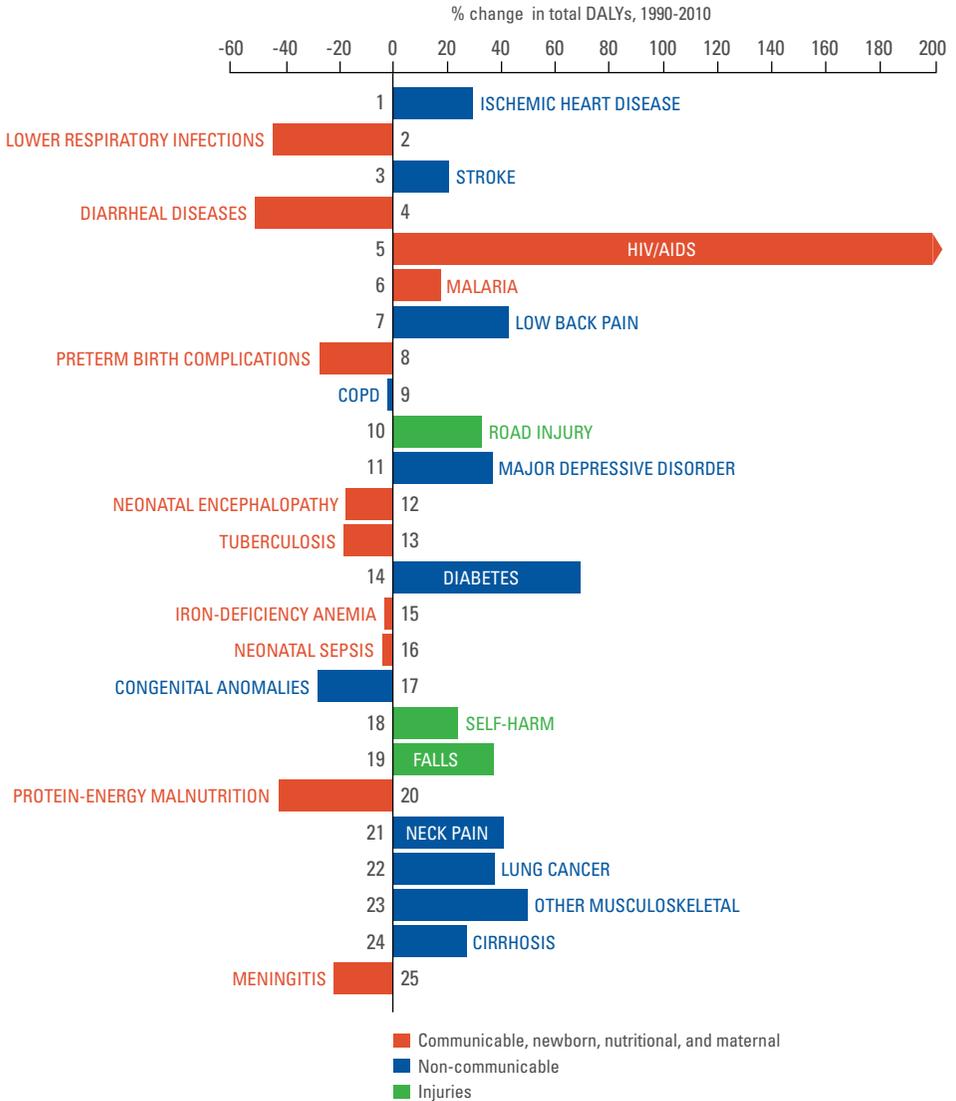
The rise in the total number of deaths from non-communicable diseases has increased the number of healthy years lost, or DALYs, from these conditions. Figure 6 shows global changes in the 25 leading causes of DALYs between 1990 and 2010 ordered from highest to lowest ranking cause from top to bottom.

Figure 7 shows the changes in the leading causes of premature death and disability in the East Asia and Pacific region from 1990 to 2010. Conditions such as ischemic heart disease, lung cancer, diabetes, and chronic kidney disease were the non-communicable diseases that experienced the most growth in this region. COPD, stomach cancer, congenital anomalies, and cirrhosis declined.

Globally, non-communicable diseases accounted for 54% of all DALYs in 2010. Communicable, maternal, neonatal, and nutritional causes accounted for 35% of DALYs, and injuries made up the remaining 11%. In most countries outside of sub-Saharan Africa, non-communicable diseases caused 50% or more of all DALYs. In Australia, Japan, and richer countries in Western Europe and North America, the percentage was greater than 80%.

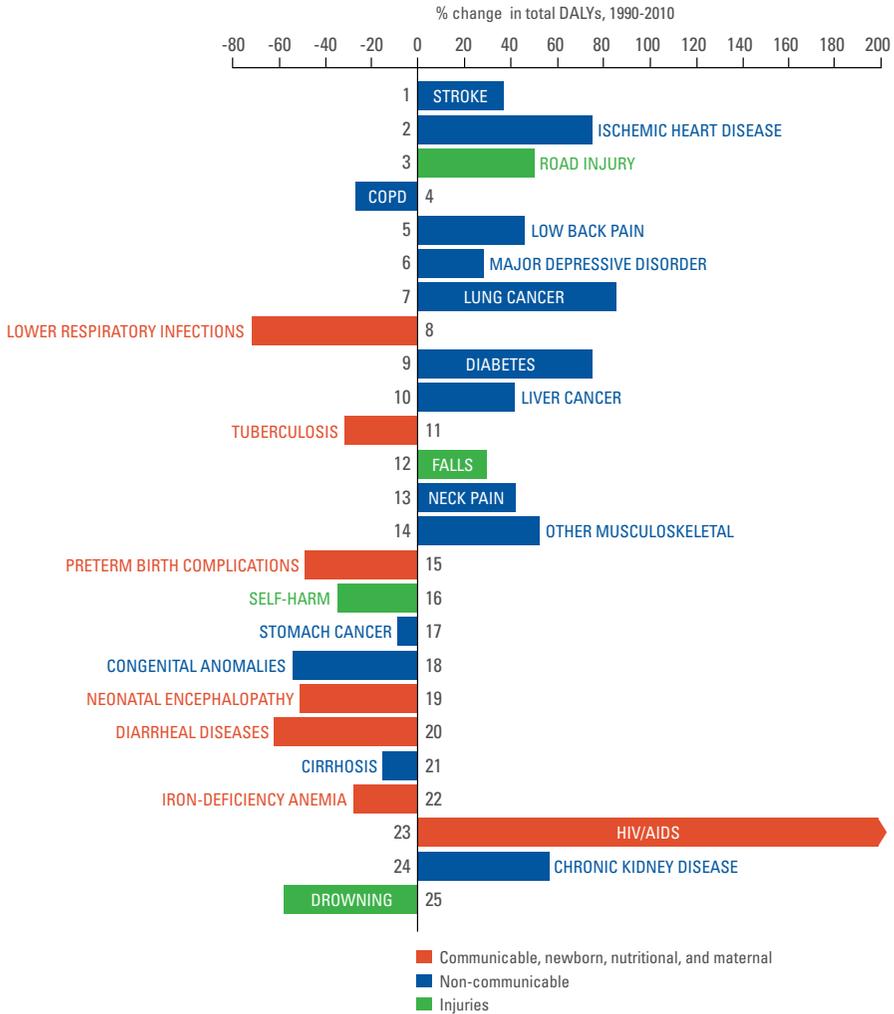
Figure 8 shows the important role played by non-communicable diseases in the East Asia and Pacific region. Singapore had the highest percentage of DALYs due to non-communicable diseases (84%), while Timor-Leste had the lowest percentage of DALYs from these conditions (41%).

An in-depth look at the country-level data reveals the specific diseases that are driving overall shifts from communicable to non-communicable diseases. As an example, Figure 9 displays the changes in the top 20 causes of DALYs in females in the Philippines between 1990 and 2010. The causes are organized by rank from top to bottom. Most non-communicable diseases rose over time. Among the top 20 causes in 2010, diabetes increased the most (288%); followed by breast cancer, which grew 200%; and chronic kidney disease and stroke, which each grew by more than 100%. Of the non-communicable diseases, asthma had the slowest rise at just 18% between 1990 and 2010, a trend seen throughout the region. Among communicable, nutritional, newborn, and maternal conditions, lower respiratory infections experienced the most dramatic decline, falling by 47%. Unlike many countries in the region and throughout the world, diarrheal diseases actually saw an increase of 37%, and many other communicable, newborn, nutritional, and maternal conditions also rose.

Figure 6: Global shifts in leading causes of DALYs, 1990-2010

Note: The leading 25 causes of DALYs are ranked from top to bottom in order of the number of DALYs they contributed in 2010. Bars to the right of the vertical line show the percent by which DALYs have increased since 1990. Bars on the left show the percent by which DALYs have decreased. Pointed arrows indicate causes that have increased by a greater amount than shown on the x-axis.

Figure 7: Shifts in leading causes of DALYs in East Asia and Pacific, 1990-2010



Note: The leading 25 causes of DALYs are ranked from top to bottom in order of the number of DALYs they contributed in 2010. Bars to the right of the vertical line show the percent by which DALYs have increased since 1990. Bars on the left show the percent by which DALYs have decreased. Pointed arrows indicate causes that have increased by a greater amount than shown on the x-axis.

Figure 8: Percent of global DALYs due to non-communicable diseases, 2010

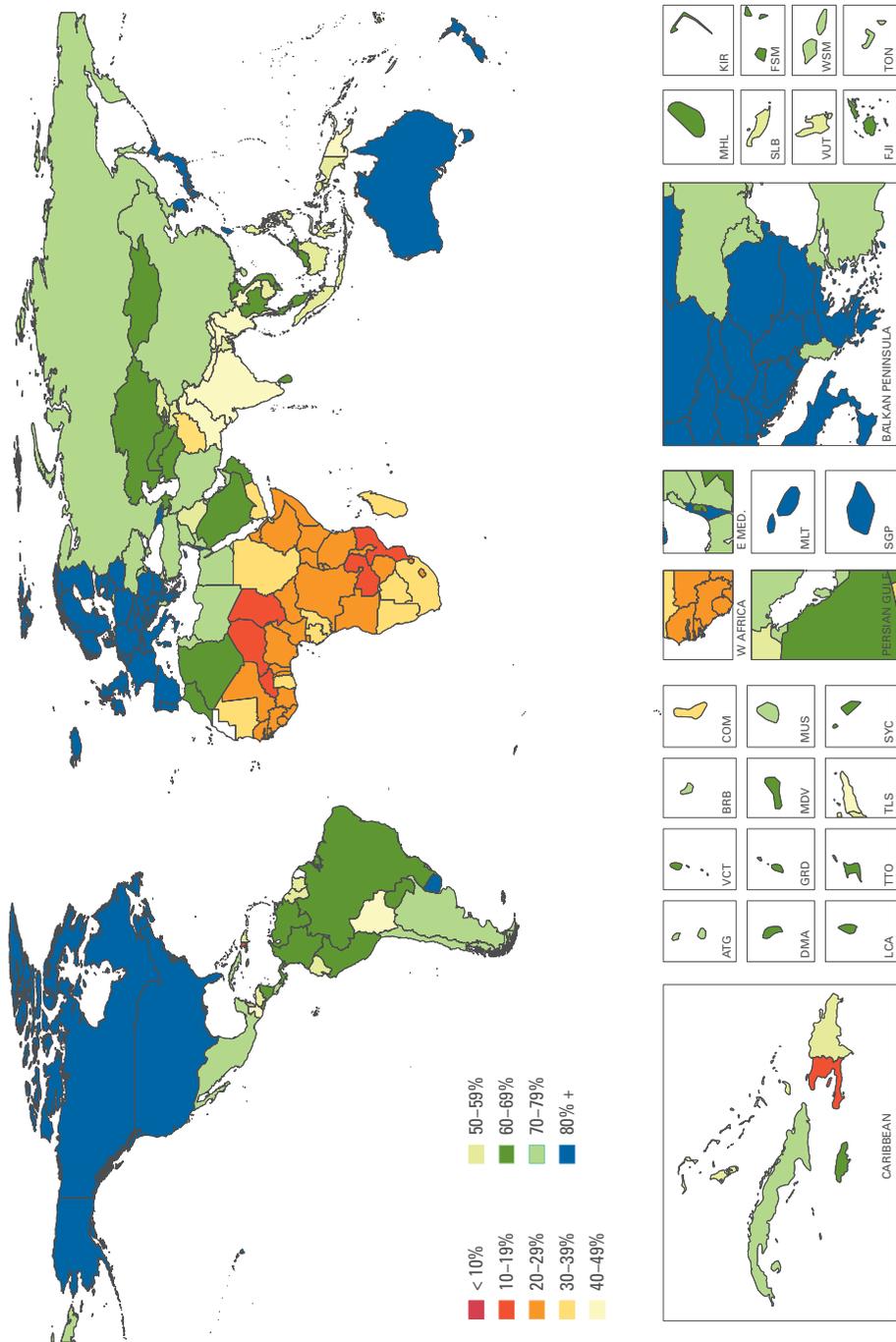
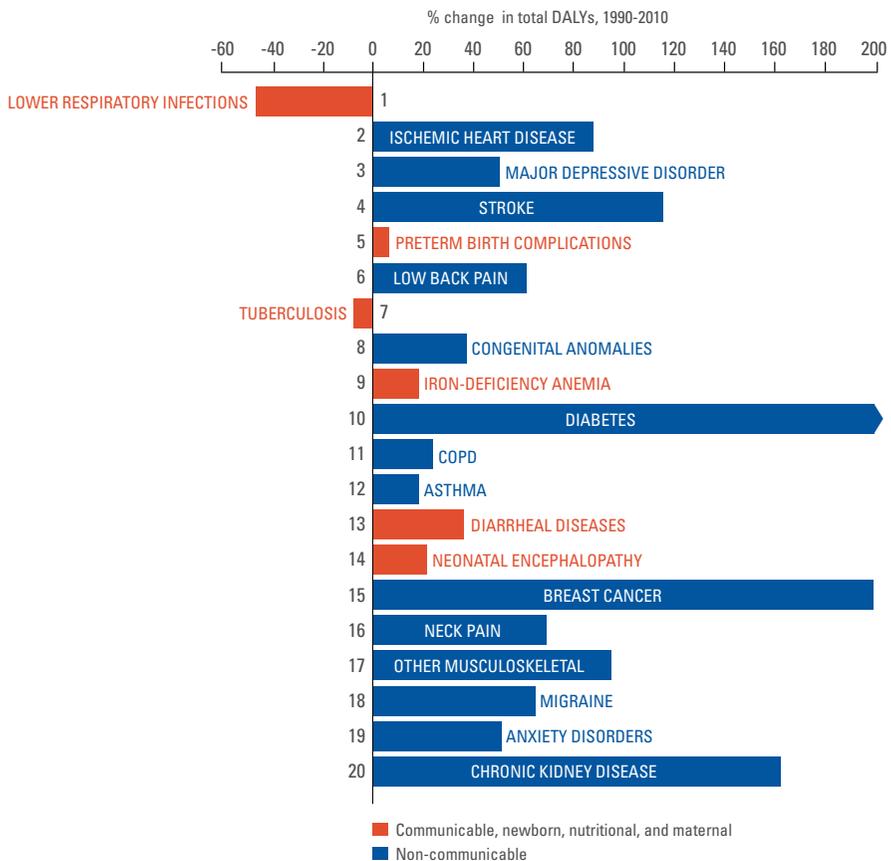


Figure 10 shows declines in DALYs among males in the Philippines from some communicable, nutritional, and newborn conditions coupled with increases in non-communicable diseases and injuries between 1990 and 2010. As with females, however, DALYs due to diarrheal diseases and neonatal encephalopathy increased. Out of all the non-communicable diseases shown in Figure 10, diabetes increased the most over the period (294%). Other leading causes of DALYs saw a doubling of the related disease burden, including chronic kidney disease (179%), hypertensive heart disease (178%), cirrhosis (158%), and interpersonal violence (134%). The Philippines was one of the few countries in the region where violence was among the five leading causes of DALYs for males.

Another visualization tool, GBD Compare, displays proportional changes in disease patterns over time using a treemap diagram, which is essentially a square pie chart.

Figure 9: Shifts in leading causes of DALYs for females, Philippines, 1990-2010

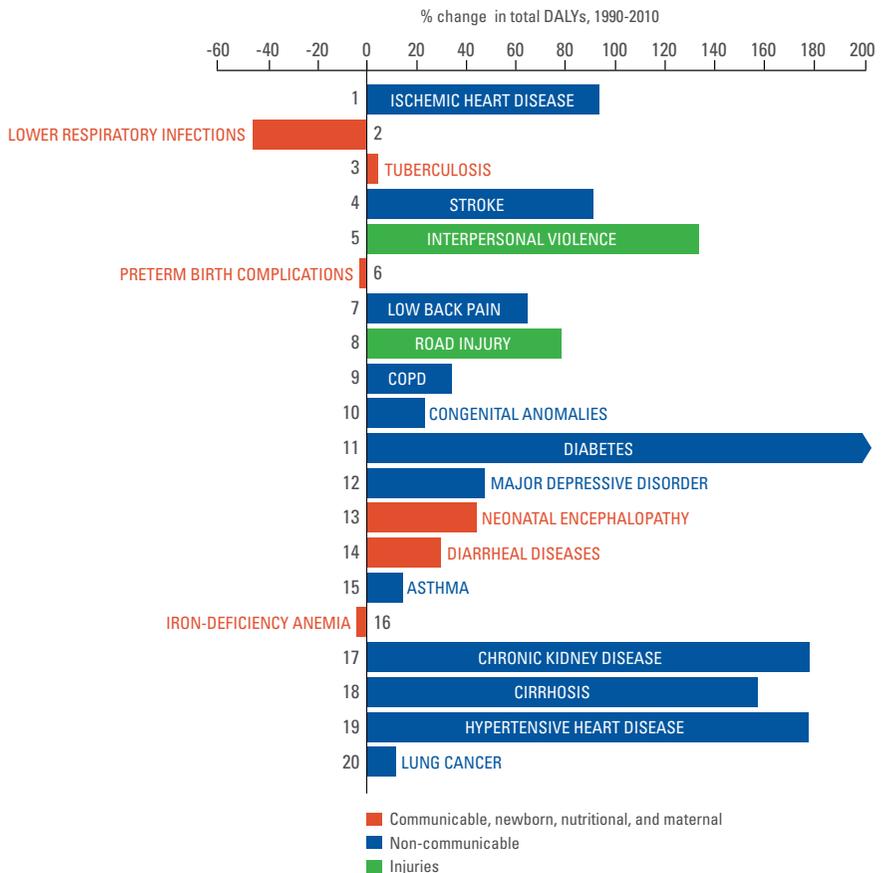


Note: The leading 20 causes of DALYs are ranked from top to bottom in order of the number of DALYs they contributed in 2010. Bars to the right of the vertical line show the percent by which DALYs have increased since 1990. Bars on the left show the percent by which DALYs have decreased. Pointed arrows indicate causes that have increased by a greater amount than shown on the x-axis.

Causes of DALYs are shown in boxes. The size of each box represents the percentage of total DALYs due to a specific cause. Figures 11a and 11b show how DALYs changed in Indonesia between 1990 and 2010. In 1990, non-communicable diseases accounted for 37% of DALYs in both sexes, while communicable, nutritional, maternal, and newborn causes accounted for 56%. Injuries made up the remaining 7%. By 2010, non-communicable diseases represented 58% of total disease burden. Communicable, nutritional, maternal, and newborn causes shrank to 33%, and injuries increased to 9%.

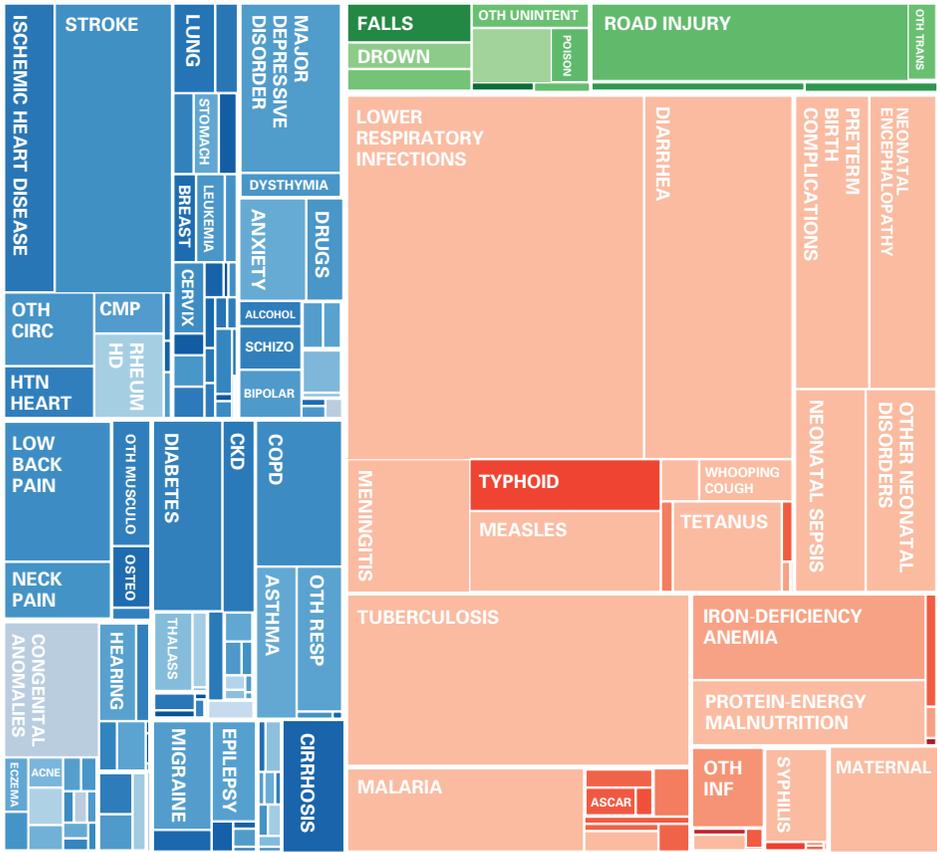
Premature death and disability from most communicable, nutritional, maternal, and newborn causes decreased during this period. The amount of health loss from most of the leading communicable diseases fell dramatically, with tetanus, syphilis, measles, meningitis, malaria, and lower respiratory infections all declining by more than

Figure 10: Shifts in leading causes of DALYs for males, Philippines, 1990-2010

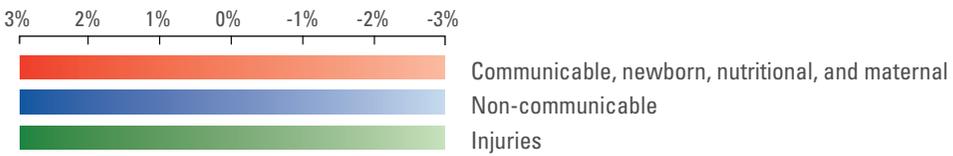


Note: The leading 20 causes of DALYs are ranked from top to bottom in order of the number of DALYs they contributed in 2010. Bars to the right of the vertical line show the percent by which DALYs have increased since 1990. Bars on the left show the percent by which DALYs have decreased. Pointed arrows indicate causes that have increased by a greater amount than shown on the x-axis.

Figure 11a: Causes of DALYs, both sexes, all ages, Indonesia, 1990



Annual % change, 2005 to 2010, DALYs per 100,000



Note: The size of each box in this square pie chart represents the percentage of total DALYs caused by a particular disease or injury. To view an interactive version of this figure, visit IHME's website: <http://ihmeuw.org/gbdcompare>.

50%. Still, the considerable burden of tuberculosis in Indonesia, and in other countries in the region, kept it as the second-leading cause of disease burden in 2010, accounting for over 5.8 million DALYs. DALYs from acute hepatitis C increased. At the same time, DALYs from many non-communicable causes rose. Increases occurred in causes such as lung cancer (105% increase), cirrhosis (95% increase), chronic kidney disease (90% increase), diabetes (86% increase), ischemic heart disease (85% increase), and stroke (76% increase). Between 1990 and 2010, health loss from injuries such as road traffic injuries and falls increased 36% and 52%, respectively.

DISABILITY INCREASES IN MIDDLE- AND HIGH-INCOME COUNTRIES

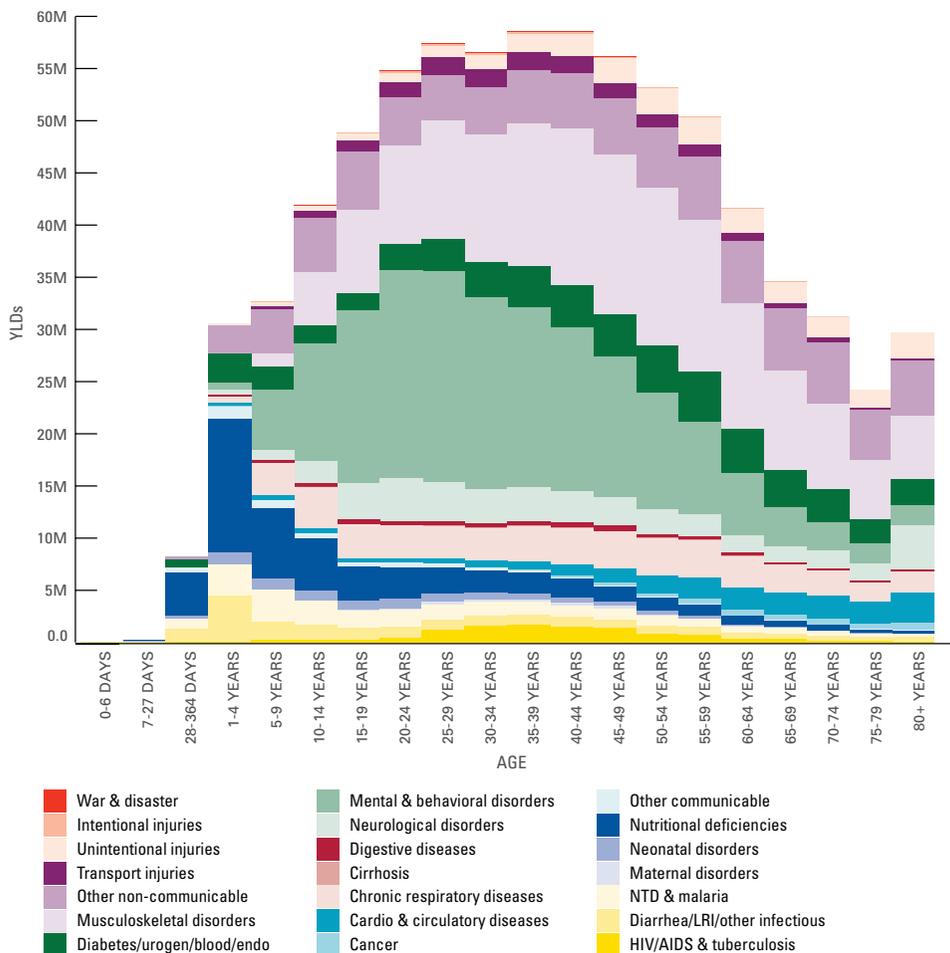
Most countries in the world have succeeded in reducing deaths early in life. To a growing extent, longer lives are redefining “old age” in many countries, and people in all age groups are dying at lower rates than in the past. Simply living longer does not mean that people are healthier. Little progress has been made in reducing the prevalence of disability, so people are living to an older age but experiencing more ill health. Many people suffer from different forms of disability throughout their lives, such as mental and behavioral health problems starting in their teens, and musculoskeletal disorders beginning in middle age. These findings have far-reaching implications for health systems.

DALYs, or healthy years lost, are calculated by adding together years lived with disability (YLDs) and years of life lost (YLLs, also known as years lost to premature death). Between 1990 and 2010, years lived with disability increased as a percentage of total DALYs in all areas of the world except Eastern Europe, southern sub-Saharan Africa, and the Caribbean. This disability transition has been most dramatic in the Middle East and North Africa, parts of Latin America, and many parts of Asia. The percentage of burden from YLDs also increased in sub-Saharan Africa with the exception of the southern part of the region.

Figure 12 tells a detailed story about the different conditions that caused disability globally in 2010. It is important to keep in mind that these estimates reflect both how many individuals suffered from a particular condition as well as the severity of that condition. Mental and behavioral disorders, such as depression, anxiety, and drug use, were the primary drivers of disability worldwide and caused over 40 million years of disability in 20- to 29-year-olds. Musculoskeletal conditions, which include low back pain and neck pain, accounted for the next largest number of years lived with disability. People aged 45 to 54 were most impacted by these conditions, as musculoskeletal disorders caused over 30 million years of disability in each of these age groups.

Figure 13 shows disability patterns in East Asia and Pacific. Similar to the global disability results, mental and behavioral as well as musculoskeletal disorders dominated in this region. As seen in the world as a whole, most disability in children under 5 was from nutritional deficiencies in East Asia and Pacific.

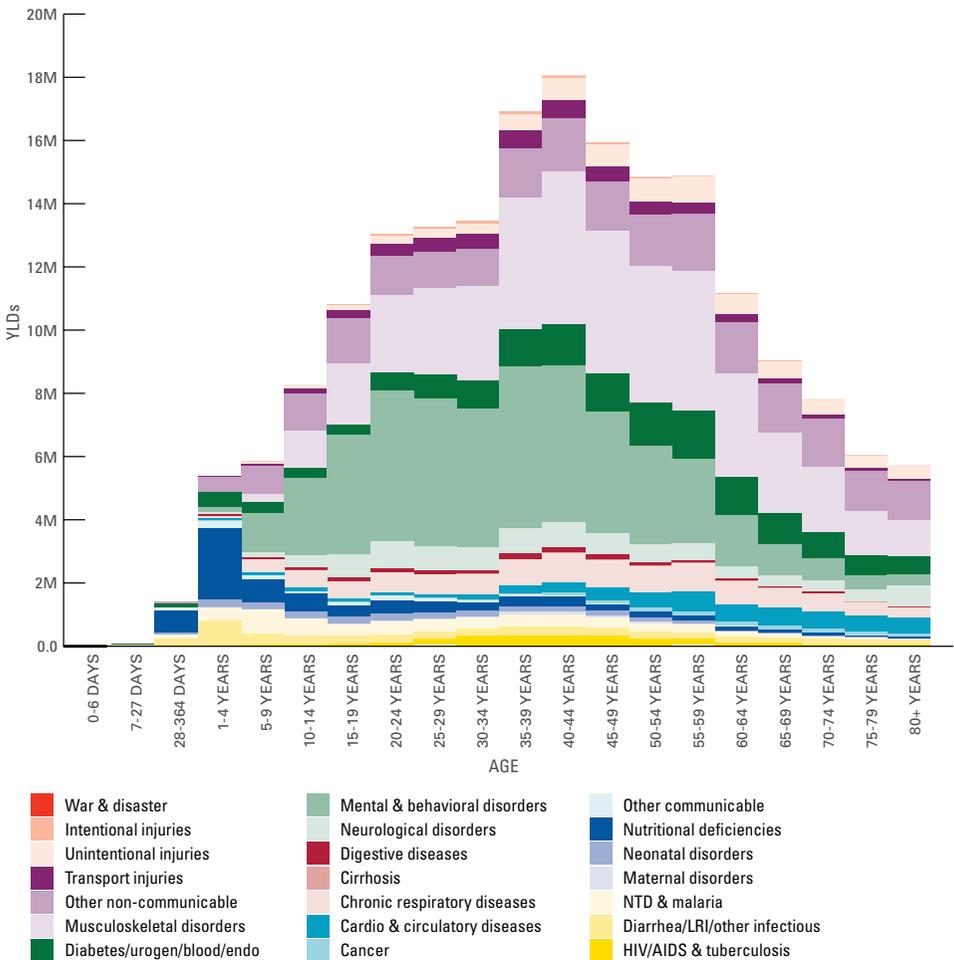
Figure 12: Global disability patterns by broad cause group and age, 2010



Note: The size of the colored portion in each bar represents the number of YLDs attributable to each cause for a given age group. The height of each bar shows total YLDs for a given age group in 2010. The causes are aggregated. For example, musculoskeletal disorders include low back pain and neck pain. To view an interactive version of this figure, visit IHME's website: <http://ihmeuw.org/gbdcausepattern>.

Another way to view the world's health challenges is by comparing how different conditions rank. Figure 14 ranks the leading causes of disability in the world and each of the six World Bank regions, using color coding to indicate how high a condition ranks in a region. Low back pain caused the most disability in East Asia and Pacific, Europe and Central Asia, and in the Middle East and North Africa. This condition can inhibit people's ability to perform different types of work both inside and outside the home and impair their mobility. In addition to low back pain, neck pain and other musculoskeletal disorders ranked in the top 10 causes of disability in most regions. Another musculoskeletal disorder, osteoarthritis, appeared in the top 20 causes of disability in every region.

Figure 13: Disability patterns by broad cause group and age in East Asia and Pacific, 2010



Note: The size of the colored portion in each bar represents the number of YLDs attributable to each cause for a given age group. The height of each bar shows total YLDs for a given age group in 2010. The causes are aggregated. For example, musculoskeletal disorders include low back pain and neck pain.

Depression was a major cause of disability across regions and was one of the top three causes of disability in every region. This disorder can cause fatigue, decreased ability to work or attend school, and suicide. Anxiety, a different type of mental disorder, was one of the top 10 causes of disability in all regions. Additionally, two other mental disorders, schizophrenia and bipolar disorder, appeared among the top 20 causes of disability in many regions.

While mental and musculoskeletal disorders ranked high among causes of disability across regions, Figure 14 also reveals substantial regional variation among other causes. Iron-deficiency anemia was the leading cause of disability in sub-Saharan Africa and South Asia, but it was less important as a cause of disability in the other regions. The substantial burden in these two regions contributed to iron-deficiency

Figure 14: Rankings of leading causes of disability by region, 2010

	GLOBAL	EAST ASIA & PACIFIC	EUROPE & CENTRAL ASIA	LATIN AMERICA & CARIBBEAN	MIDDLE EAST & NORTH AFRICA	SOUTH ASIA	SUB-SAHARAN AFRICA
LOW BACK PAIN	1	1	1	2	1	2	3
MAJOR DEPRESSIVE DISORDER	2	2	2	1	2	3	2
IRON-DEFICIENCY ANEMIA	3	6	5	5	3	1	1
NECK PAIN	4	3	3	3	6	7	6
COPD	5	5	11	13	8	4	4
OTHER MUSCULOSKELETAL	6	4	4	6	7	8	11
ANXIETY DISORDERS	7	10	7	4	4	6	5
MIGRAINE	8	11	8	7	12	5	13
DIABETES	9	7	6	10	5	10	23
FALLS	10	9	9	16	11	12	25
OSTEOARTHRITIS	11	8	10	11	9	19	18
DRUG USE DISORDERS	12	17	16	9	10	9	17
OTHER HEARING LOSS	13	12	13	15	16	11	12
ASTHMA	14	23	21	8	13	14	10
ALCOHOL USE DISORDERS	15	13	12	12	37	15	34
ROAD INJURY	16	16	14	21	14	13	22
BIPOLAR DISORDER	17	15	17	17	15	16	20
SCHIZOPHRENIA	18	14	18	18	18	22	29
DYSTHYMIA	19	18	19	19	19	20	26
EPILEPSY	20	20	22	14	20	26	14
ISCHEMIC HEART DISEASE	21	19	15	24	23	31	40
ECZEMA	22	22	23	20	21	21	21
DIARRHEAL DISEASES	23	25	28	22	17	23	15
ALZHEIMER'S DISEASE	24	34	20	26	39	49	62
TUBERCULOSIS	25	21	30	42	22	17	24

1-10 11-20 21-30 31-50 51-90

Note: In this figure, shading is used to indicate the ranking of each cause of disability in a particular region.

anemia's ranking as the third-leading cause of disability at the global level. Iron-deficiency anemia can lead to fatigue and lowered ability to fight infection, and may decrease cognitive ability.

COPD was the fourth top cause of disability in South Asia and sub-Saharan Africa, and it ranked fifth for the East Asia and Pacific region. In many other regions, COPD appeared in the list of the top 10 causes.

In East Asia and Pacific, many of the leading causes of disability were similar to global rankings, but there were key differences. Drug use disorders, asthma, and Alzheimer's disease all ranked lower as causes of years lived with disability in this region than they did in the world as a whole.

Other causes of disability were more important in East Asia and Pacific compared to global trends. Osteoarthritis was the eleventh cause of disability globally, but ranked eighth in East Asia and Pacific. Diabetes also ranked higher in this region compared to the world as a whole. Diabetes was the ninth-leading cause of disability globally, but ranked seventh in East Asia and Pacific.

Using GBD tools to identify leading causes of disability, such as mental and behavioral disorders and musculoskeletal disorders, can help guide health system planning and medical education. Decision-makers can use GBD's findings to ensure that health care systems are designed to address the primary drivers of disability in a cost effective way.

THE GLOBAL RISK FACTOR TRANSITION

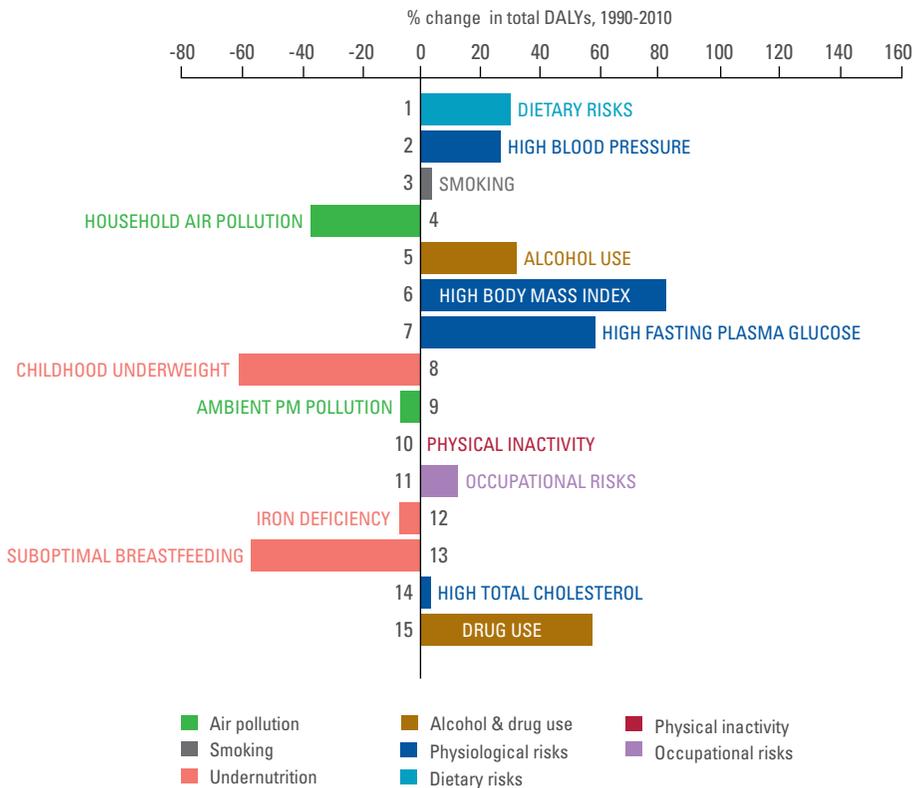
Data on potentially modifiable causes of health loss, or risk factors, can help policymakers and donors prioritize prevention strategies to achieve maximum health gains. GBD tools estimate the number of deaths, premature deaths, years lived with disability, and DALYs attributable to 67 risk factors worldwide. This study benefited from the availability of new data, such as newly available epidemiologic evidence about the health impacts of different risk factors; population, nutrition, health, and medical examination surveys; and high-resolution satellite data on air pollution.

Figure 15 shows changes in the 15 leading global risk factors for premature death and disability, or DALYs, between 1990 and 2010. Over this period, many risk factors that primarily cause communicable diseases in children declined. Examples of these risk factors are childhood underweight and suboptimal breastfeeding, which dropped by 61% and 57%, respectively, from 1990 to 2010. Childhood underweight is commonly used to measure malnutrition, and was formerly the leading risk factor for DALYs in 1990, but ranked eighth in 2010. DALYs attributable to household air pollution, which contributes to lower respiratory tract infections in children, dropped by 37% between 1990 and 2010. Unlike other risk factors that primarily cause DALYs from communicable diseases, progress in reducing premature death and disability from iron deficiency was much lower, declining by just 7% between 1990 and 2010.

Slow progress in reducing iron deficiency helps explain why iron-deficiency anemia ranks as the third-leading cause of disability globally.

As most risk factors for communicable diseases in children have declined, many risks associated with non-communicable diseases have grown. As the leading global risk factor for DALYs in 2010, dietary risks increased 30% between 1990 and 2010. Dietary risks include components such as high sodium intake and lack of fruit, nuts and seeds, and whole grains. GBD found the diseases linked to poor diets are primarily cardiovascular diseases as well as cancer and diabetes. While the focus of many public health messages about diet have stressed the importance of eating less saturated fat, GBD 2010's findings indicate that these messages should emphasize a broader range of dietary components.

Figure 15: Global shifts in rankings of DALYs for top 15 risk factors, 1990-2010



Note: The leading 15 risk factors are ranked from top to bottom in order of the number of DALYs they contributed in 2010. Bars to the right of the vertical line show the percent by which DALYs attributable to different risk factors have increased since 1990. Bars on the left show the percent by which DALYs attributable to different risk factors have decreased. Attributable DALYs were not quantified for physical inactivity for 1990.

GBD 2010 used the most recent data available on the effects of different dietary risk factors. It is important to note that these data are constantly evolving as new studies on diet are conducted. Compared to data on the negative health impacts of smoking, which have been well understood for decades, the scientific evidence surrounding dietary risk factors is much newer. Future updates of GBD will incorporate new data on risk factors as they emerge.

The second-leading global risk factor, high blood pressure, increased by 27% as a cause of DALYs between 1990 and 2010. High blood pressure is a major risk factor for cardiovascular and circulatory diseases. DALYs attributable to another risk factor for non-communicable diseases, tobacco smoking, increased slightly by 3% between 1990 and 2010. Smoking increases the risk of chronic respiratory diseases, cardiovascular and circulatory diseases, and cancer. DALYs attributable to another substance, alcohol use, increased 32% during this period. Alcohol use contributes to cardiovascular and circulatory diseases, cirrhosis, and cancer. In addition to being a contributor to non-communicable diseases, alcohol increases the risk of injuries.

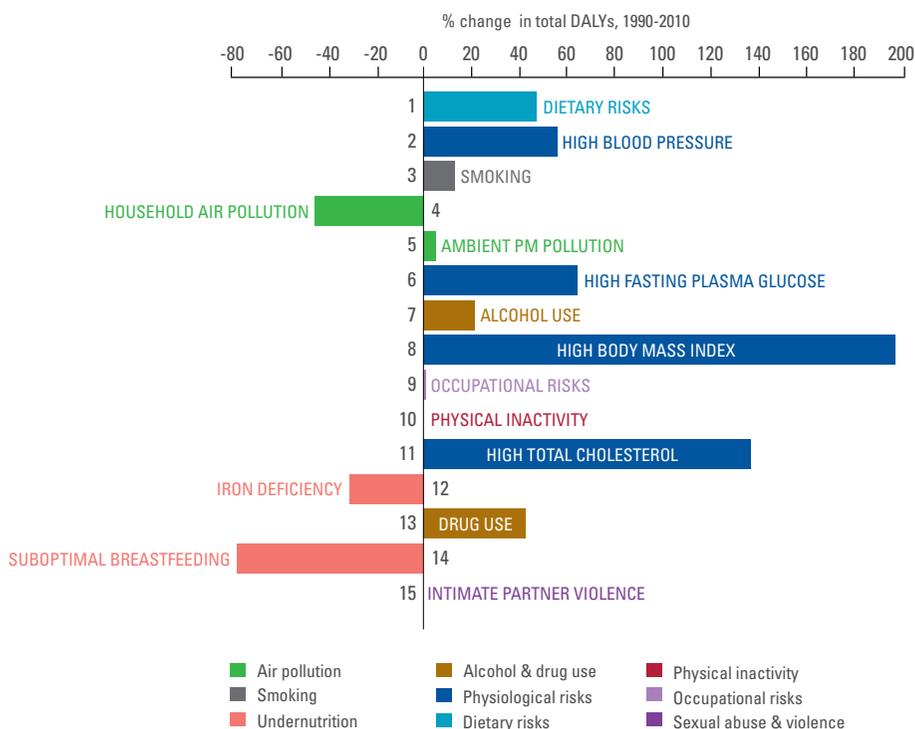
High BMI was another major contributor to DALYs in 2010 and was the sixth-leading risk factor. High BMI is typically used as an indicator of overweight and obesity. It increased by a dramatic 82% over the period 1990 to 2010. High BMI is a leading risk factor for cardiovascular and circulatory diseases as well as diabetes. It is striking that high BMI was a more important cause of poor health worldwide than childhood underweight in 2010, whereas childhood underweight was a much more prominent risk factor than high BMI in 1990.

Figure 16 shows changes in leading risk factors for East Asia and Pacific. Similar to global trends, many risk factors for communicable diseases declined between 1990 and 2010, but decreases were even more dramatic in the East Asia and Pacific region. However, in comparison to the world overall, premature death and disability attributable to risk factors for non-communicable diseases such as dietary risks, high blood pressure, smoking, and high BMI increased by greater amounts in this region. For example, DALYs attributable to high BMI increased 82% globally from 1990 to 2010, but rose by 198% in East Asia and Pacific. Ambient PM air pollution was a more important cause of premature death and disability (fifth) in the region than it was in the world as a whole (ninth), largely due to China's high levels of this risk factor. Increases in DALYs attributable to drug use between 1990 and 2010 were lower in the region than global increases.

Global and regional rankings of risk factors mask important differences across countries. Figure 17 shows substantial variation in leading risk factors for DALYs in select East Asia and Pacific countries in 2010. Dietary risks were the leading risk factors in most Southeast Asian countries, but high BMI dominated in many Pacific nations. High fasting plasma glucose also ranked high in the Pacific nations shown in Figure 17. Smoking ranked second or third in Cambodia, Indonesia, Laos, Malaysia, Myanmar, Papua New Guinea, the Philippines, Thailand, Timor-Leste, and Vietnam.

Stark contrasts existed between risk factors in upper-middle-income countries such as Malaysia and Thailand, where risk factors for non-communicable diseases constituted most of the top 10 risk factors, and low- and lower-middle-income countries including Cambodia, Laos, and Timor-Leste, where many more risks associated with childhood illness appeared among the top 10 risk factors. Household air pollution was the second-leading risk factor attributable to DALYs in Cambodia and Timor-Leste, and ranked first in Laos. Childhood underweight was the number one cause of premature death and disability in Timor-Leste, and was the fifth-leading cause in Cambodia and Laos. Suboptimal breastfeeding and iron deficiency were other risk factors that ranked among the top 10 in these low- and lower-middle-income countries. In Malaysia and Thailand, many non-communicable disease risks such as dietary risks, smoking, high BMI, high blood pressure, and high fasting plasma glucose were the dominant causes of DALYs.

Figure 16: Shifts in rankings of DALYs in East Asia and Pacific for top 15 risk factors, 1990-2010



Note: The leading 15 risk factors are ranked from top to bottom in order of the number of DALYs they contributed in 2010. Bars to the right of the vertical line show the percent by which DALYs attributable to different risk factors have increased since 1990. Bars on the left show the percent by which DALYs attributable to different risk factors have decreased. Attributable DALYs were not quantified for physical inactivity and intimate partner violence for 1990.

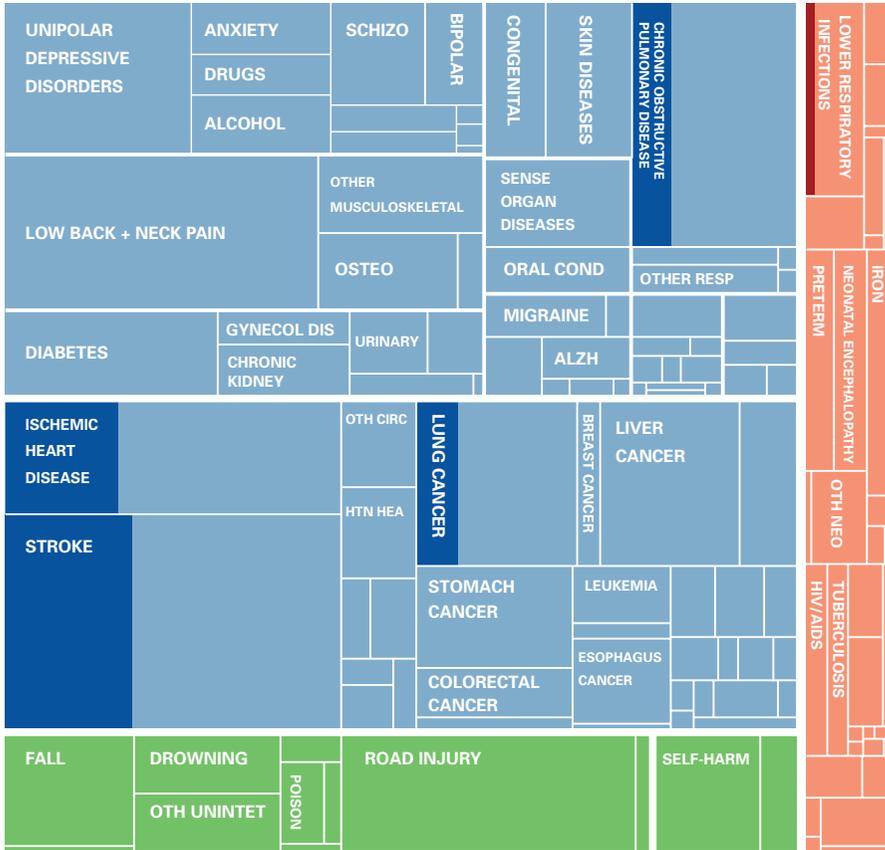
In addition to allowing users to explore how different risk factors rank across countries, decision-makers can use GBD visualization tools to understand how many DALYs could potentially be averted by addressing different risk factors. Figure 18 shows the number of DALYs attributable to outdoor air pollution, also known as ambient PM air pollution, that contributed to different diseases in China. The percentage of DALYs that could be averted by reducing this risk factor is shown in dark shading.

The figure indicates how reducing exposure to air pollution could prevent large amounts of premature death and disability from ischemic heart disease and stroke, as indicated by the portion of these causes that are shaded in dark blue. Lower levels of air pollution could also reduce DALYs from lung cancer and COPD.

Figure 19 shows how, in Vietnam, many DALYs could be averted by eliminating tobacco smoking, including second-hand smoke. Most DALYs from COPD and lung cancer were caused by tobacco smoking and second-hand smoke, as indicated by the dark blue portion of the boxes representing these causes. Substantial numbers of healthy years lost from ischemic heart disease, stroke, and liver cancer could also be prevented by reducing exposure to these risk factors.

Figure 20 shows the number of DALYs attributable to childhood underweight in children from 1 month to 11 months old in Timor-Leste. This figure can be used to understand the number of years of healthy life that could potentially be gained by ensuring that all children in this age group in Timor-Leste are a healthy weight. Children of healthy weight is defined as a population of children that matches the 2006 World Health Organization Child Growth Standards reference. 65% of the DALYs attributable to diarrhea and 100% of DALYs attributable to protein-energy malnutrition could also potentially be prevented in this age group, as indicated by the dark shading in the boxes representing these causes. Ensuring more children achieve a healthy weight would also greatly reduce illness from lower respiratory infections.

Figure 18: DALYs attributable to ambient particulate matter air pollution, both sexes, all ages, China, 2010



DALYs attributable to risk factor

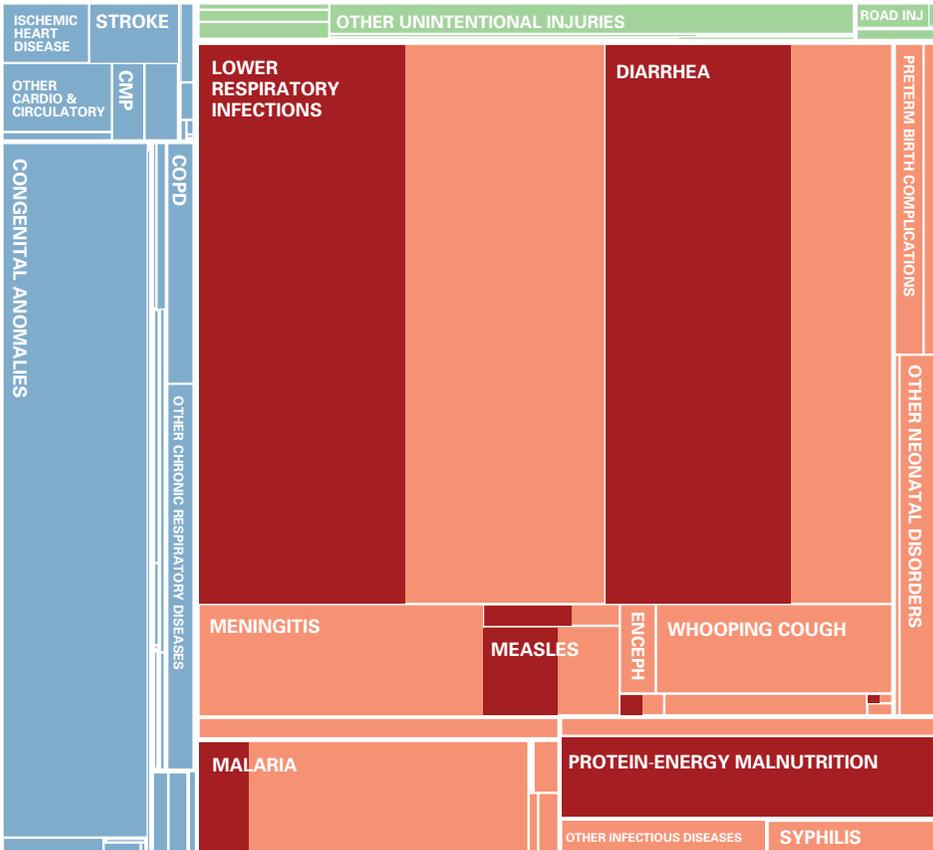
- Communicable, newborn, nutritional, and maternal
- Non-communicable
- Injuries

DALYs not attributable to risk factor

- Communicable, newborn, nutritional, and maternal
- Non-communicable
- Injuries

Note: The size of each box represents the percentage of total DALYs caused by a particular disease or injury, and the proportion of each cause attributable to the risk factor is shaded. To view an interactive version of this figure, visit IHME's website: <http://ihmeuw.org/gbdcompare>.

Figure 20: DALYs attributable to child underweight, both sexes, ages 1-11 months, Timor-Leste, 2010



DALYs attributable to risk factor

- Communicable, newborn, nutritional, and maternal
- Non-communicable
- Injuries

DALYs not attributable to risk factor

- Communicable, newborn, nutritional, and maternal
- Non-communicable
- Injuries

Note: The size of each box represents the percentage of total DALYs caused by a particular disease or injury, and the proportion of each cause attributable to the risk factor is shaded. To view an interactive version of this figure, visit IHME's website: <http://ihmeuw.org/gbdcompare>.