Afar Region Health Atlas, 2021

Burden of Disease Unit (BoD), National Data Management Center (NDMC) for health, Ethiopia Public Health Institute, Ethiopia

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Abbreviations

Abbreviation	Term
AA	Addis Ababa
DALYs	Disability-Adjusted Life Years
DHS	Demographic and Health Survey
GBD	Global Burden of Disease
HALE	Health Adjusted Life Expectancy
HSTP	Health Sector Transformation Plan
LE	Life Expectancy
TFR	Total Fertility Rate
MDG	Millennium Development Goals
TB	Tuberculosis
SDG	Sustainable Development Goals
SDI	Socio-Demographic Index
WaSH	Water, Sanitation, and Hygiene
YLDs	Years Lived with Disability
YLLs	Years of Life Lost

Definitions

Term	Definition
Disability-adjusted life years (DALYs)	Years of healthy life lost due to premature death and disability. It is the sum of years of life lost and years lived with disability.
Healthy life expectancy (HALE)	The number of years that a person at a given age can expect to live in good health, considering mortality and disability.
Life expectancy	Number of years a person is expected to live based on their present age.
Replacement rate	The total fertility rate at which a population replaces itself from generation to generation, assuming no migration, or approximately 2.05 live births per woman.
Risk factors	Potentially modifiable causes of disease and injury.
Socio-demographic Index (SDI)	A summary measure that identifies where a country or regional segment area sit on the spectrum of development. Expressed on a scale of 0 to 1, SDI is a composite average of the rankings of the incomes per capita, average educational attainment, and fertility rates of all areas in the GBD study.
Total fertility rate	The average number of children a woman would bear if she survived through the end of the reproductive age span and experienced at each age a particular set of age-specific fertility rates observed in the year of interest.
Under-5 mortality	The probability (expressed as the rate per 1,000 live births) that children born alive will die before reaching the age of 5 years.
Years lived with disability (YLDs)	Years of life lived with any short-term or long-term health loss.
Years of life lost (YLLs)	Years of life lost due to premature mortality.

Compiled by

Tezera Moshago Berheto, Burden of Disease Unit, Team leader

Yihunie Lakew, Burden of Disease Unit, Senior Demographer

Wondeson Tekilemariam, Burden of Disease Unit, Public Health Expert

Chalie Belete, Burden of Disease Unit, Geo-spatial Epidemiologist

Shewayiref Geremaw, Burden of Disease Unit, R-programmer

Dr. Awoke Misganaw, NDMC Advisor, Clinical Assistant Professor, IHME

Dr. Alemnesh Mirkuzie, NDMC Senior Researcher and former NDMC Coordinator

Dr. Fentabil Getnet, NDMC Coordinator and Public Health Researcher

Lydia Haile, IHME, Post Bachelor Fellow

Ally Walker, IHME, Engagement Officer, East and Southern Africa, Ethiopia Subnational Burden of Disease Project

Prof. Mohsen Naghavi, IHME, Director of Subnational Burden of Disease Estimation

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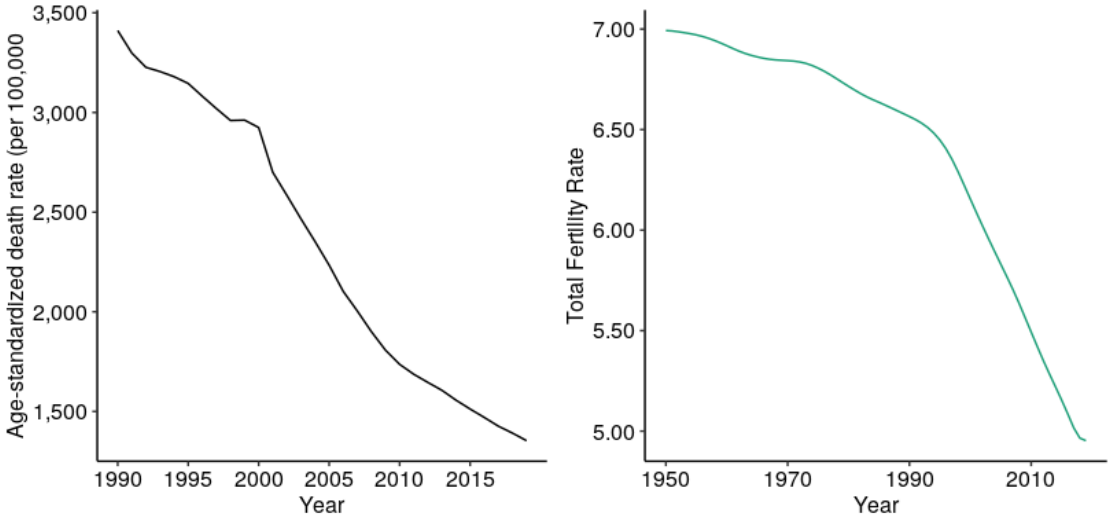
Executive Summary

This brief presents key results from EPHI and IHME collaborative subnational burden of disease analysis as part of Global Burden of Disease 2019 Study for Afar, a regional state of Ethiopia. For additional information, please refer to the GBD Results Tool, the GBD Compare visualization tool, and the EPHI National Data Management Center website.

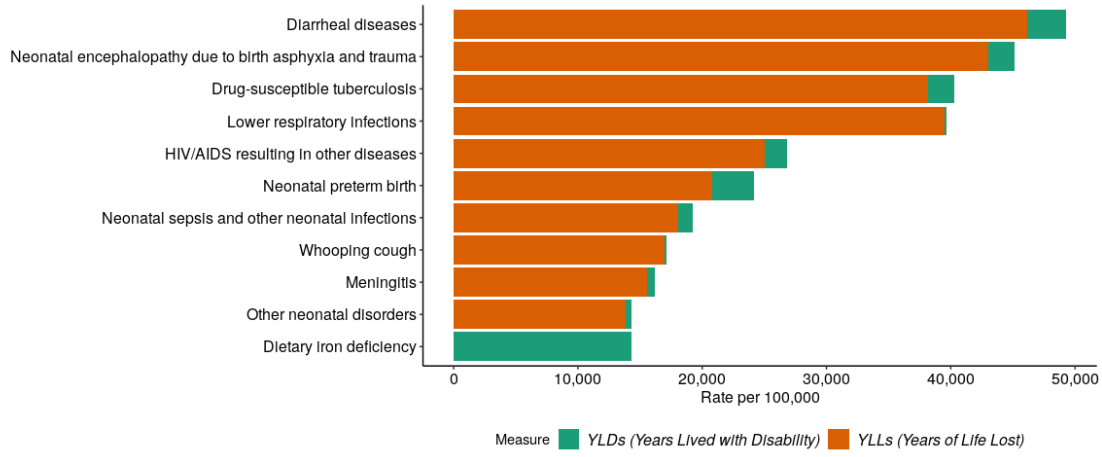
Mortality and fertility



All-cause mortality in Afar reduced from about **3,410** per 100,000 persons in 1990 to about **1,350** per 100,000 persons in 2019. The number of DALYs has significantly reduced from about 1,120,000 DALYs in 1990 to 677,000 in 2019. Total fertility declined from **6.6** births per woman in 1990 to **5** births per woman in 2019, a **25%** change.

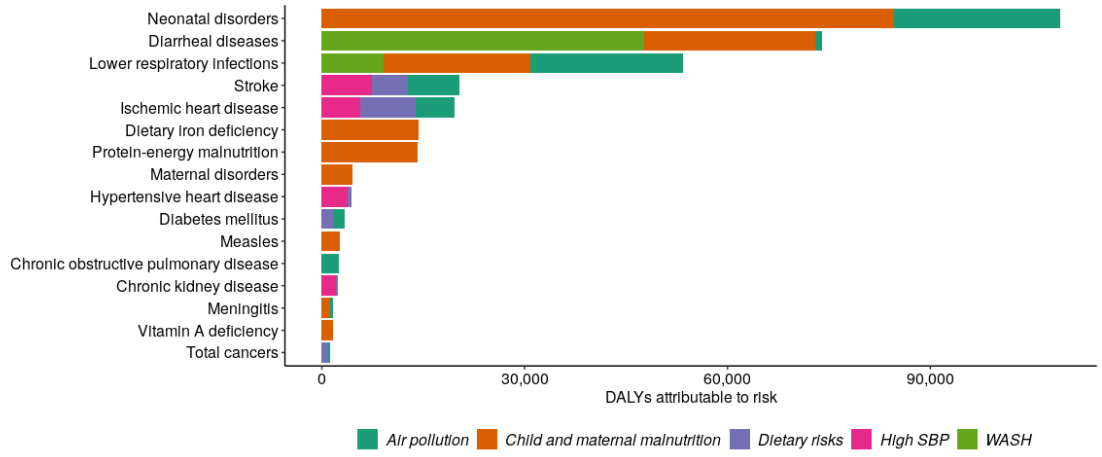
Causes of death and disability

Top twenty causes of YLLs and YLDs in Afar



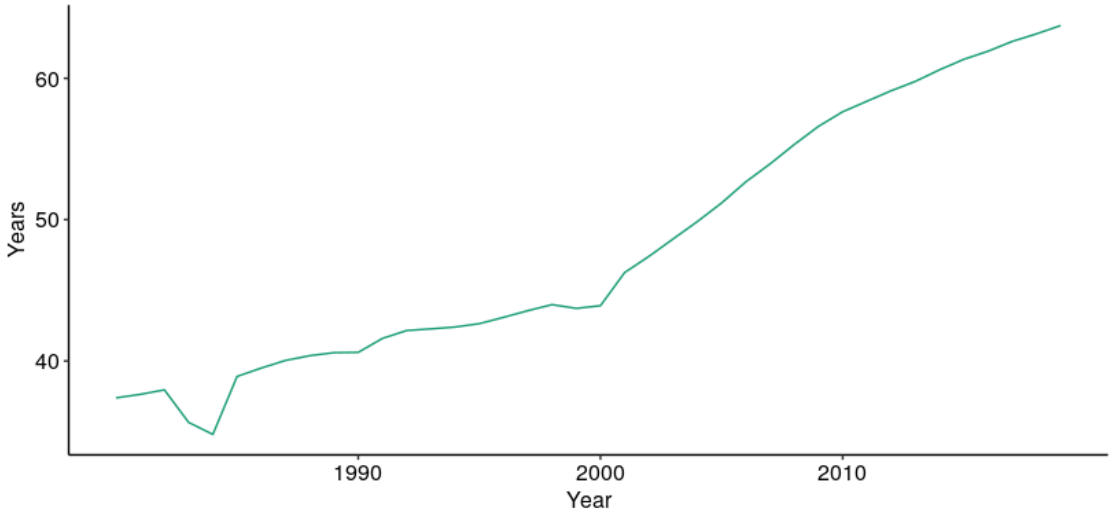
Of the twelve leading causes of YLLs and YLDs in Afar in 2019, *Diarrheal diseases*, *Neonatal encephalopathy due to birth asphyxia and trauma* and *Drug-susceptible tuberculosis* are the leading three causes.

Attributable morbidity and mortality



The figure above illustrates leading disease with DALYs attributable to air pollution, child and maternal malnutrition, dietary risks, high systolic blood pressure, and unsafe water, sanitation, and handwashing in Afar. *Child and maternal malnutrition* is the source of the greatest number of attributable DALYs, followed by *Air pollution*.

Life expectancy



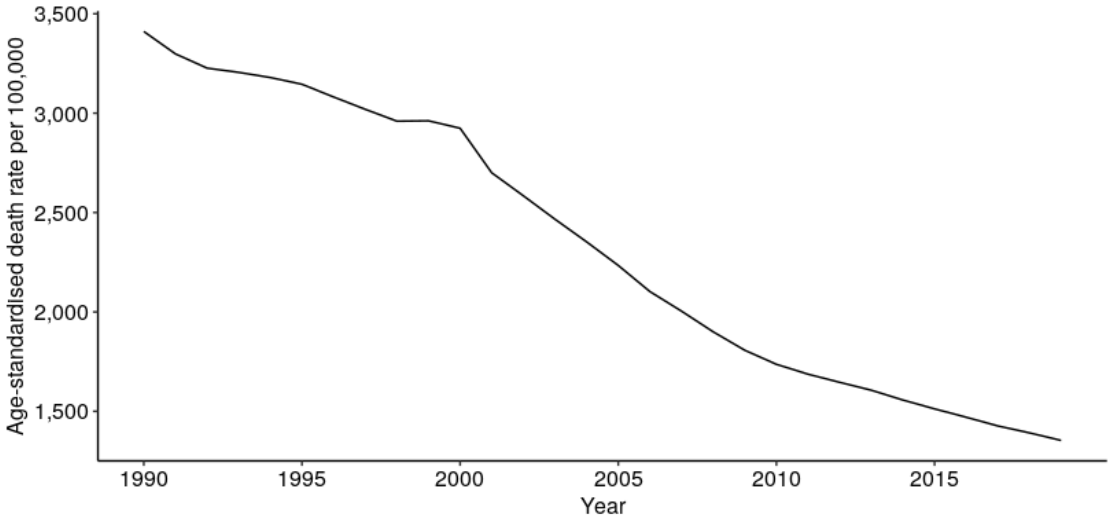
The life expectancy in Afar increased from **37** years in 1980 to **64** years in 2019.

Afar residents will live, on average, **56** healthy years, with **8** years lived with disability.

Chapter one: Mortality and Fertility Dynamics

This chapter contains health-related statistics for **Afar,** a regional state of Ethiopia. In this report, recently established Sidama and South West regions were reported under SSNP regional state. The data include the primary aspects and determinants of health such as basic demographic data, mortality, sociodemographic and regional disparities, total fertility rate, change in fertility in the last thirty years, life expectancy at birth, and socio-demographic index.

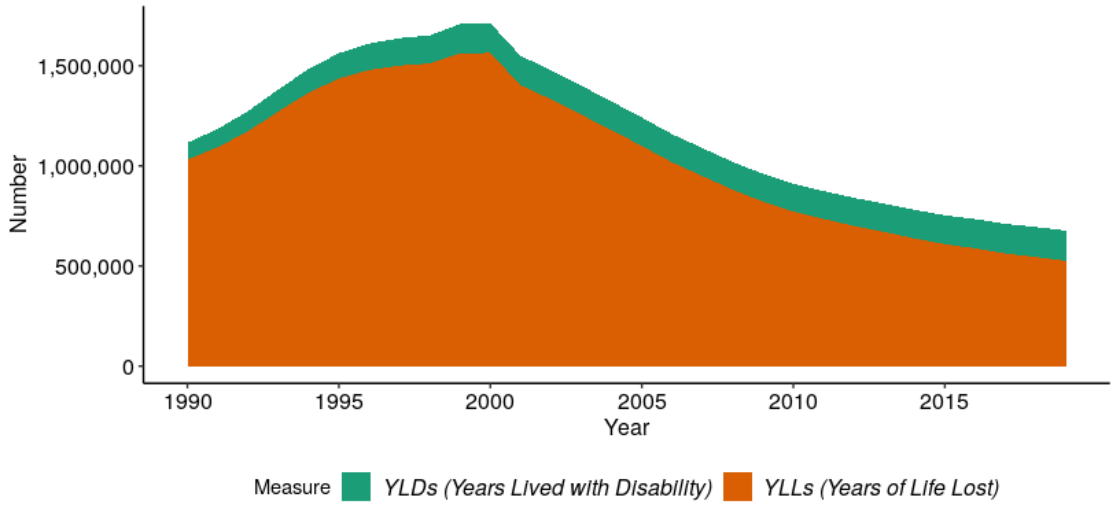
Figure 1.1: Age-standardised all-cause mortality rate, 1990–2019, Afar



Death and cause-of-death data are scarce in Afar due to the lack of complete death registration systems. Afar has made remarkable progress in the reduction of gross mortality over the last three decades. All-cause age-standardised mortality in Afar reduced from about 3,410 deaths per 100,000 persons in 1990 to about 1,350 deaths per 100,000 persons in 2019.

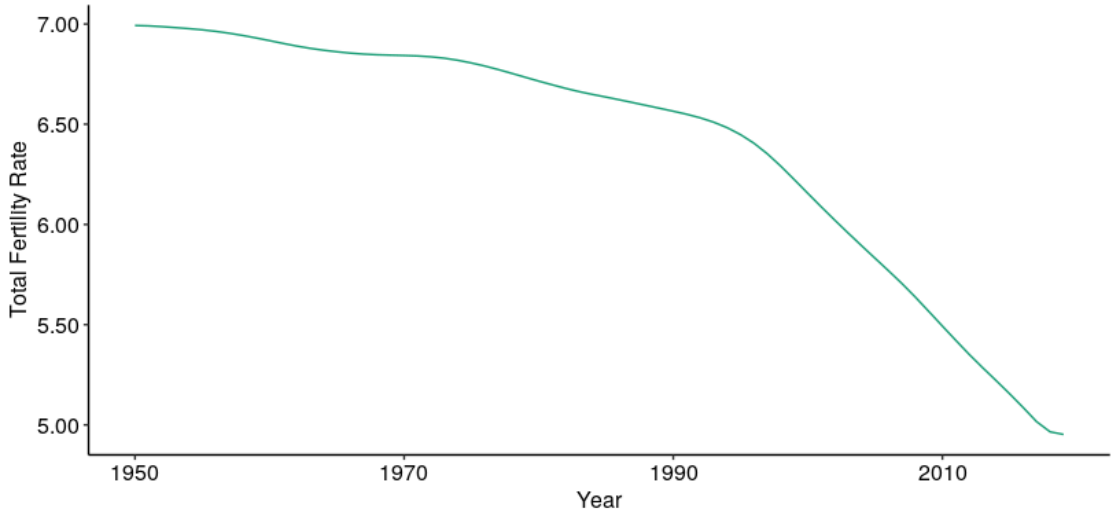
All-cause all-age mortality in Afar reduced from about **2,000** per 100,000 persons in 1990 to about **572** per 100,000 persons in 2019.

Figure 1.2: Trends in burden of YLLs and YLDs in Afar, 1990–2019



The number of DALYs significantly reduced from about **1,000,000** DALYs in 1990 to **680,000** in 2019. The pace of decline accelerated after the year 2000.

Figure 1.3: Trends of total fertility in Afar, 1950-2019



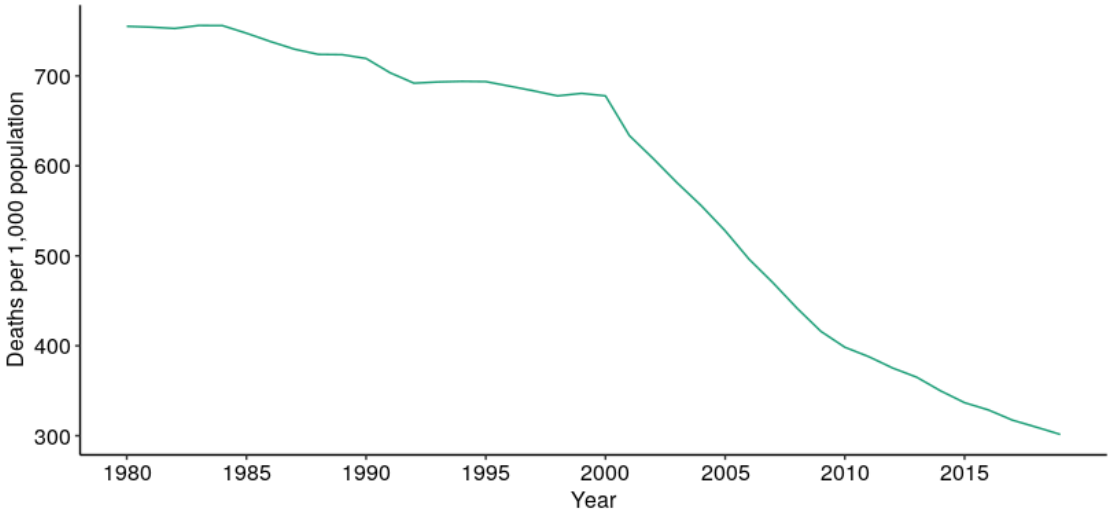
The fertility rate for Afar was **4.95** births per woman in 2019, a decrease from **6.99** births per woman in 1950.

Adult mortality

This section aims to describe levels, trends, and patterns of adult mortality in Afar. The **adult mortality rate** refers to the probability of a 15-year-old dying before reaching age 60, if subject to age-specific mortality rates of the specified year between those ages.

GBD results indicate that all-cause mortality has decreased at a fast pace in the last 30 years (**Figure 1.1**). According to the study, the adult mortality rate for women decreased from 516 deaths per 1,000 female adults in 2008 to 346 per 1,000 female adults and from 381 deaths per 1,000 male adults to 264 per 1,000 male adults in in 2019.

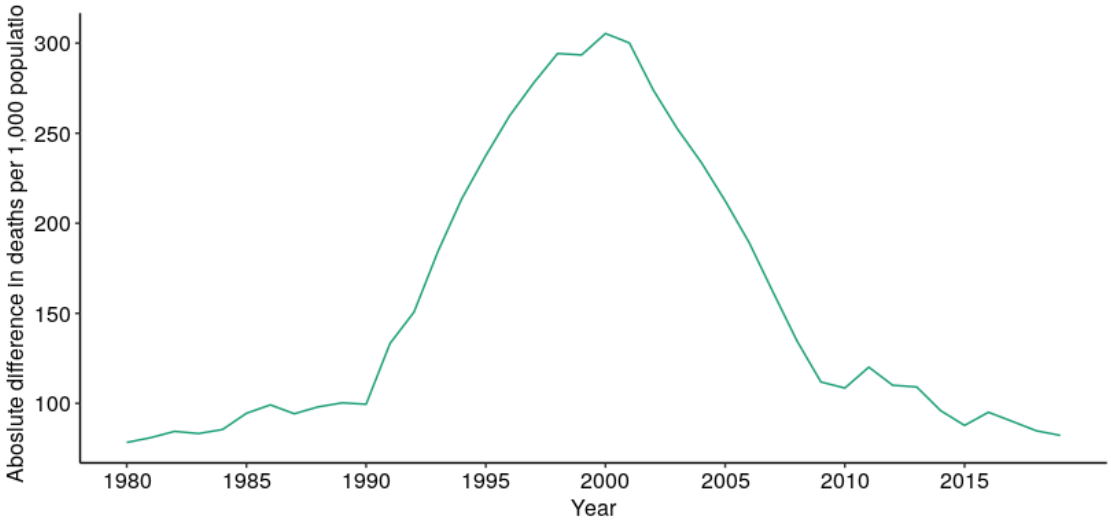
Figure 1.4: Adult mortality rate, Afar, 1980–2019



Adult mortality rate was very high and stagnant before 2000, when it started to decrease steadily in Afar. Afar had an adult mortality rate of **301** deaths per 1,000 adults in 2019, in comparison to a rate of **719** per 1,000 in 1990.

From 1990 to 2019, Afar exhibited a **58%** decrease in adult mortality.

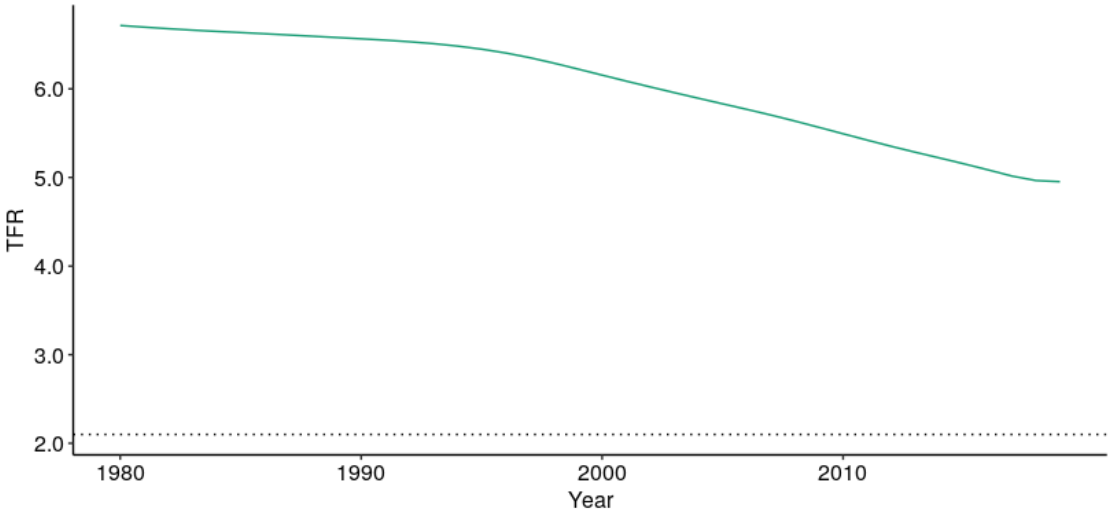
Figure 1.5: Difference between female and male probability of death by time, 1980–-2019, ages 15-60 (female - male)



The GBD data indicates that adult mortality is higher in women in Afar.

Total Fertility rate (TFR)

Figure 1.6: Total fertility rate in Afar, 1980-2019



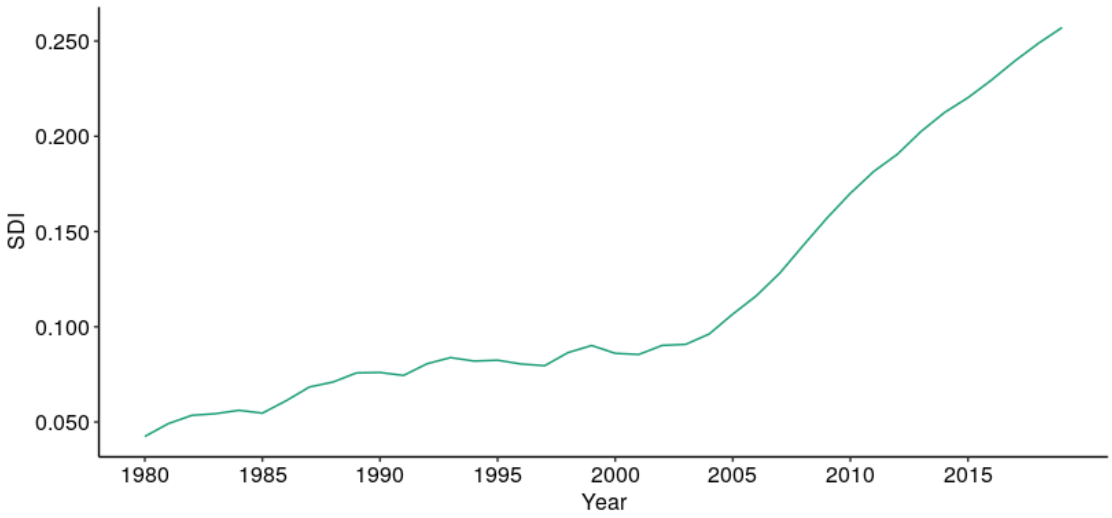
The figure above presents fertility trends and the magnitude of interregional differentials in fertility in Afar. Total fertility declined from **6.7** births per woman in the 1980 to **5** births per woman in 2019, a **25%** change.

Socio-demographic index

The **Socio-demographic index (*SDI*)** is a composite measure that identifies where countries or other geographic areas are found on the spectrum of development. According to the GBD study, SDI is based on average income per person, educational attainment, and total fertility rate (*TFR*). SDI is a composite average of the rankings of the incomes per capita, average educational attainment, and fertility rates of all areas in the GBD study.

SDI contains an interpretable scale from 0 to 1, where zero represents the lowest income per capita, lowest educational attainment, and highest TFR observed across geographic areas, and one represents the highest income per capita, highest educational attainment, and lowest TFR.

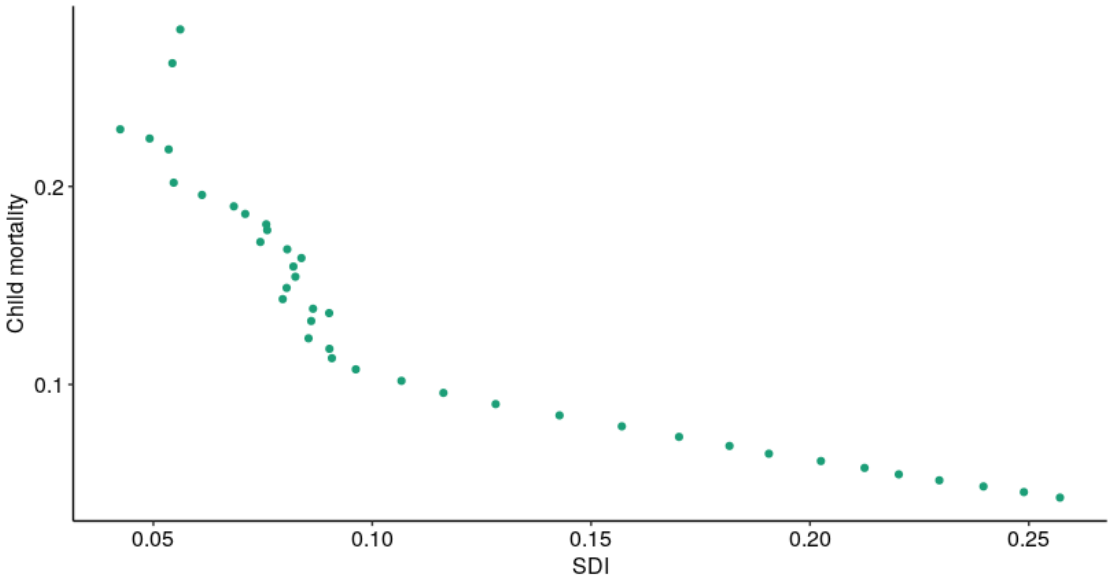
Figure 1.7: Socio-demographic index in Afar, 1980-2019



SDI improved throughout the nation over the last half century. The highest incremental improvement of SDI was recorded in *Addis Ababa*, *Harari* and *Dire Dawa* between 1950 and 2019. The SDI of Afar increased steadily from **0.04** in 1980 to **0.26** in 2019. *Somali*, *Afar* and *Amhara* regions had the slowest improvement in SDI.

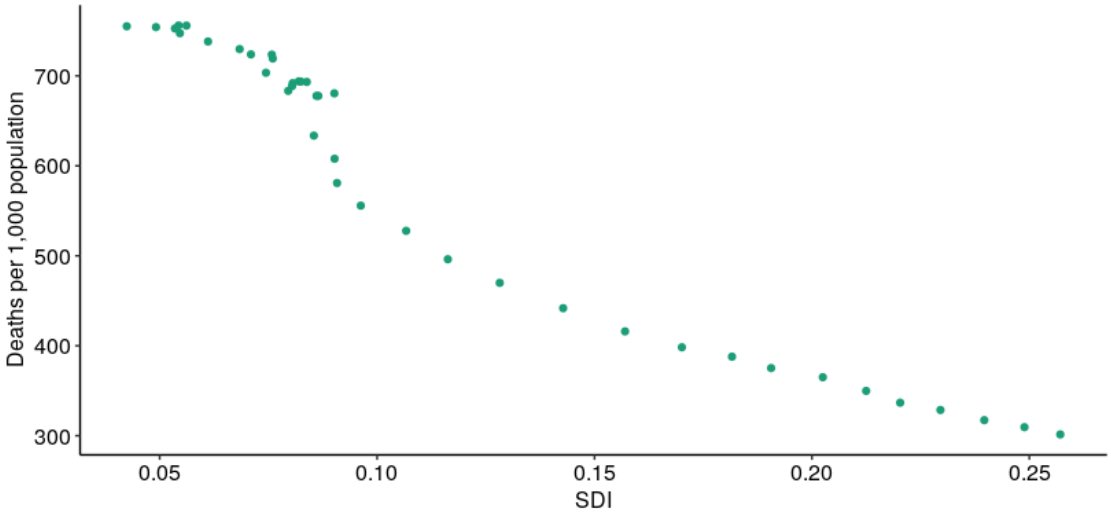
Afar had an estimated SDI of **0.26** in 2019, ranking **10** out of all regions in Ethiopia.

Figure 1.8: Socio-demographic index and child mortality in Afar, 1980-2019



A high socio-demographic index is correlated with low child mortality in Afar. As SDI improves, child mortality decreases. Regions with high SDI such as *Addis Ababa*, *Dire Dawa*, and *Harari* have relatively low child mortality rates whereas regions with low SDI such as *Somali* and *Afar* have high child mortality rates.

Figure 1.9: Socio-demographic index and adult mortality in Afar, 1980-2019



As presented in (**Figure 1.9**), adult mortality is negatively correlated with SDI.

Chapter two: Causes of death and disability

This chapter quantifies premature death and disability in terms of disability adjusted life years (*DALYs*), years of life lost (*YLLs*) and years lived with disability (*YLDs*) attributable to maternal and child malnutrition, high systolic blood pressure, air pollution and poor diet in Afar.

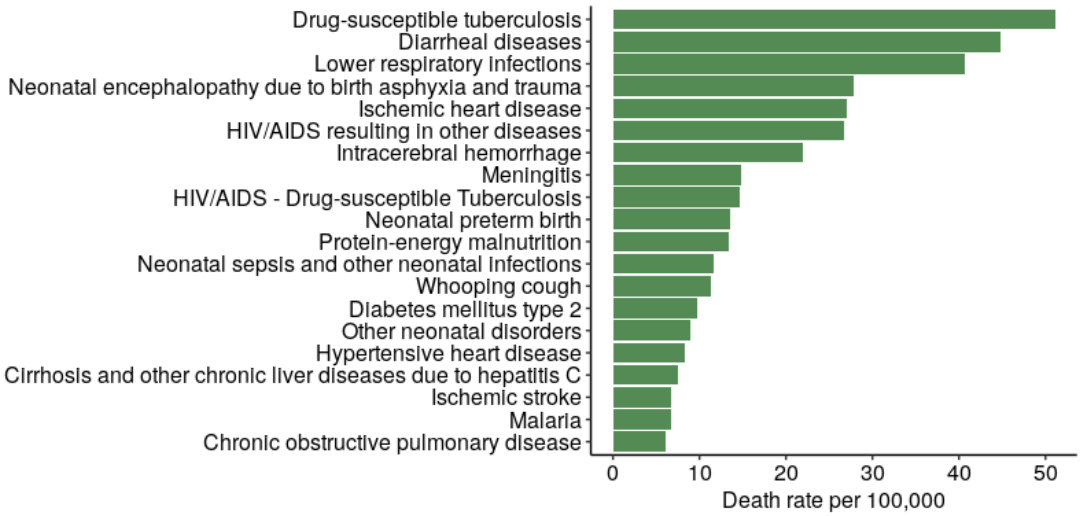
On the World Health Organization (WHO) website, it is clearly stated that mortality alone does not give a complete picture of the burden of disease borne by individuals in different population groups. DALYs are the summary measure used to give an indication of the overall burden of disease. One DALY represents the loss of the equivalent of one year of full health. Using DALYs, the burden of diseases that cause premature death but little disability (such as drowning or measles) can be compared to that of diseases that do not cause death but do cause disability (such as cataract causing blindness).

As a result of multi-sectoral interventions the burden of disease, stated in DALYs per 1000 population, has decreased in the last two decades in Africa. The continent, however, still bears the highest burden globally. Worldwide, a disproportionate proportion of DALYs are caused by communicable, maternal, neonatal, and nutritional causes.

Causes of Death

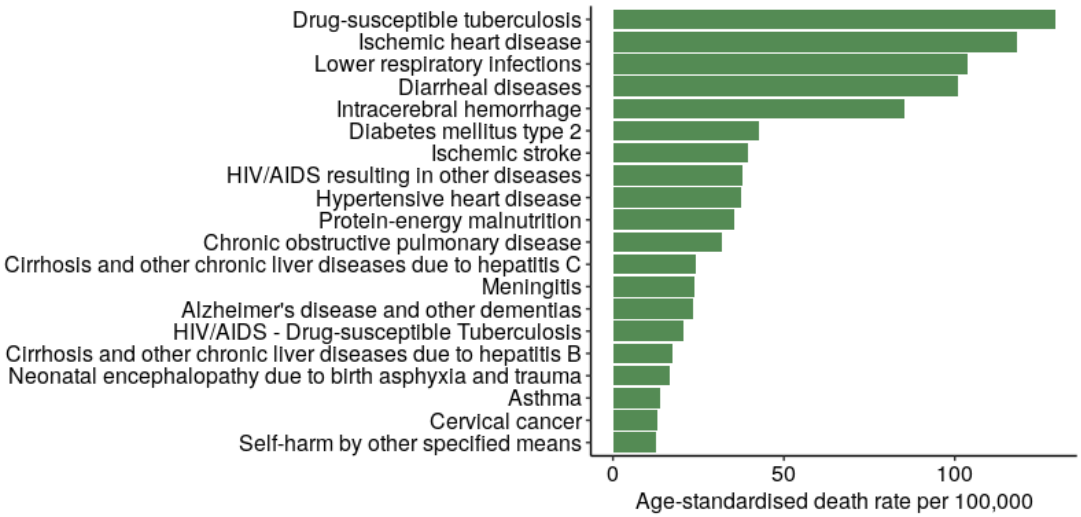
The leading causes of death, in order of total number of lives lost, are mainly associated with communicable and maternal disorders, non-communicable such as cardiovascular (*ischaemic heart disease, stroke*), respiratory (*chronic obstructive pulmonary disease, lower respiratory infections*), injuries and neonatal disorders that include *birth asphyxia, encephalopathy, and birth trauma, neonatal sepsis and infections*, and *preterm birth complications*.

Figure 2.1: The top twenty leading causes of death in Afar, all ages, 2019



The chart presents an estimation of the top twenty specific leading causes of death regardless of age and sex in Afar. *Drug-susceptible tuberculosis* , *Diarrheal diseases*, and *Lower respiratory infections* were the top three leading causes of death in 2019.

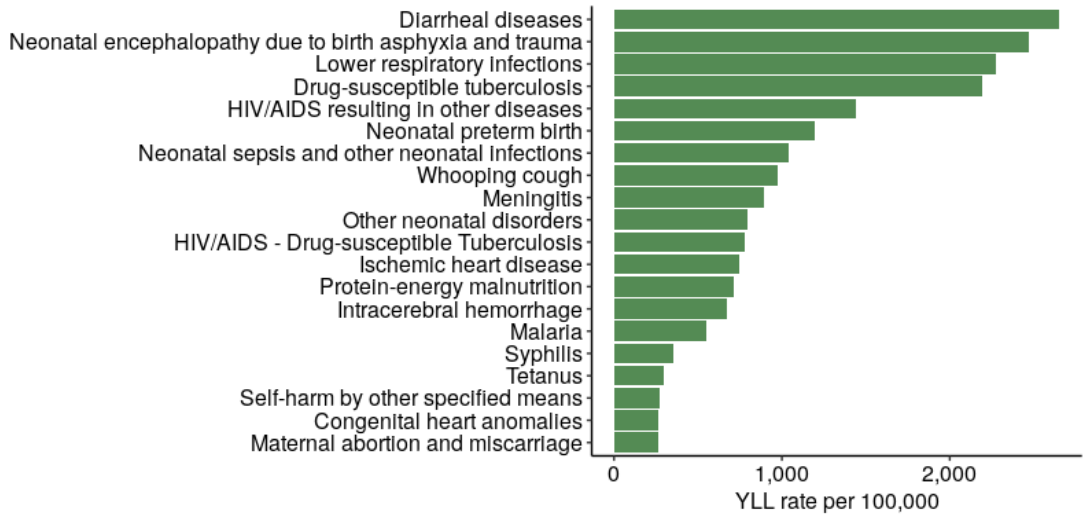
Figure 2.2: The age-standardised top twenty causes of death in Afar, 2019



The above figure presents an estimation of the age-standardised top twenty leading causes of death regardless of sex in Afar. *Drug-susceptible tuberculosis*, *Ischemic heart disease* and *Lower respiratory infections* were the leading causes of death in Afar.

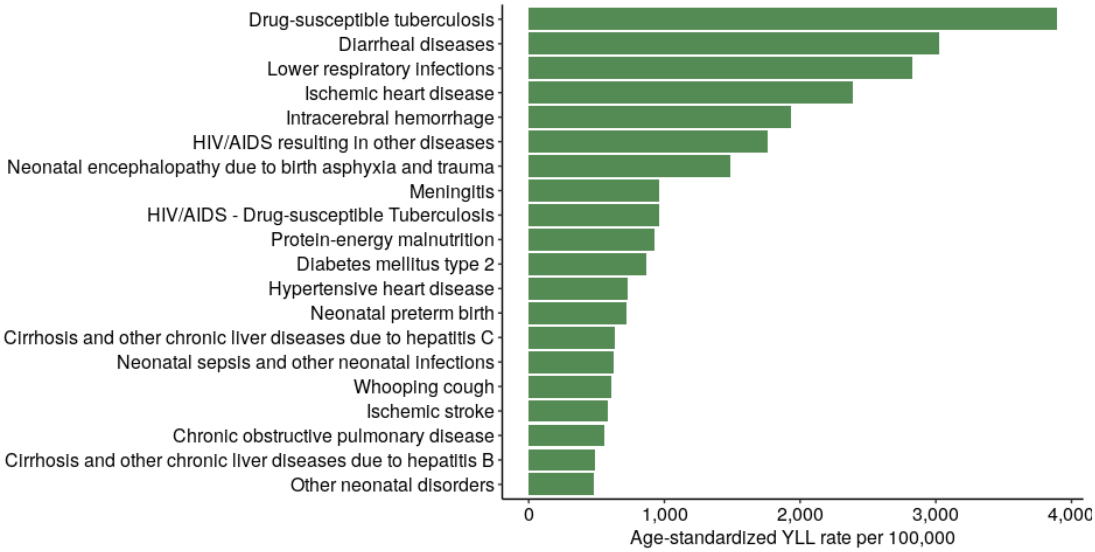
Causes of premature mortality

Figure 2.3: The top twenty causes of premature loss of life in Afar, all ages, 2019



The figure above presents an estimation of the top twenty diseases that results in a year of life lost (*YLL*) regardless of age and sex. *Diarrheal diseases*, *Neonatal encephalopathy due to birth asphyxia and trauma* and *Lower respiratory infections* cause the most YLLs in Afar.

Figure 2.4: Top twenty causes of age-standardised YLLs in Afar, 2019



The chart presents an estimation of age-standardised leading causes of disease that result a premature life lost regardless of sex. *Drug-susceptible tuberculosis*, *Diarrheal diseases*, and *Lower respiratory infections* cause the majority of YLLs in Afar.

Causes of disability

Figure 2.5: Top twenty causes of YLDs in Afar, all ages, 2019

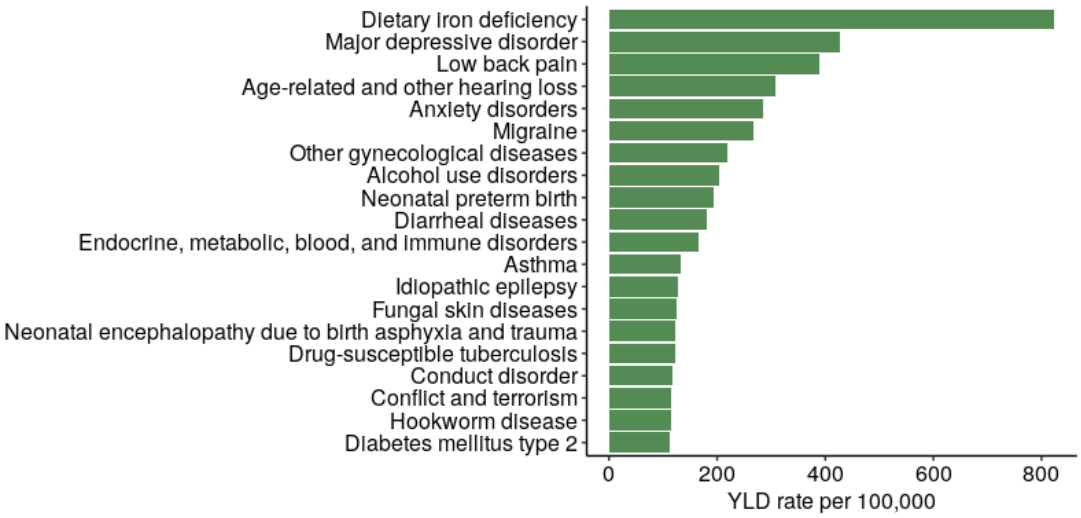
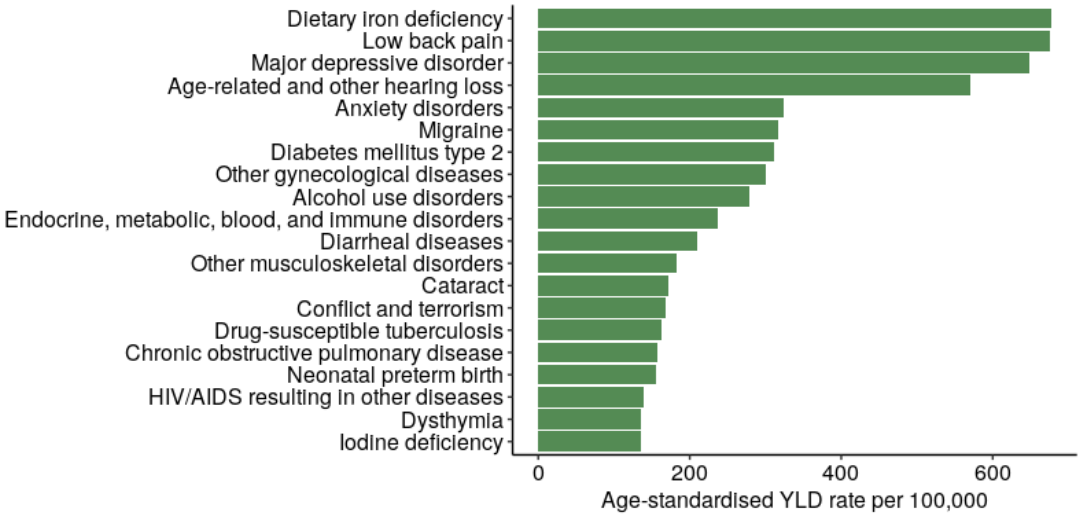
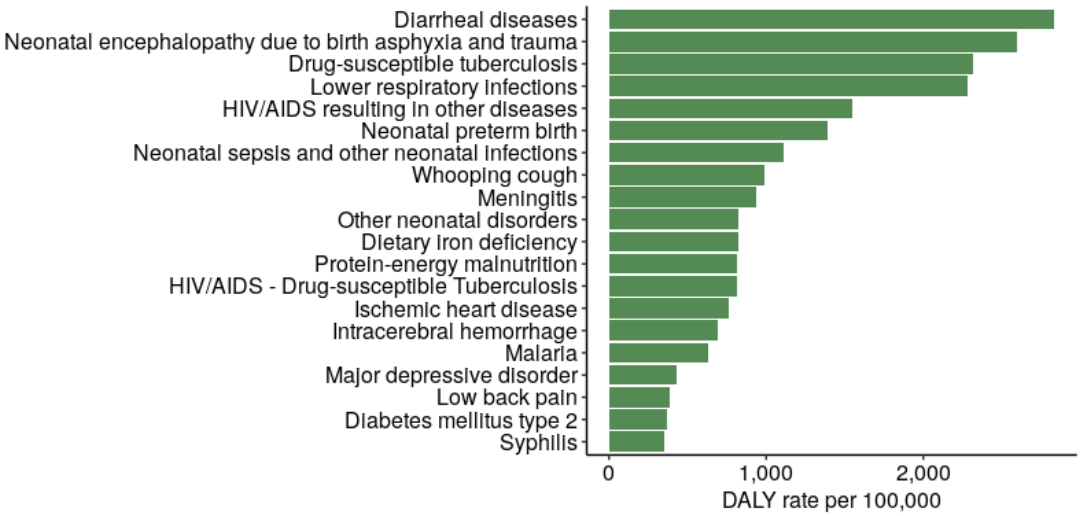


Figure 2.6: Age-standardised leading causes of YLDs in Afar, 2019



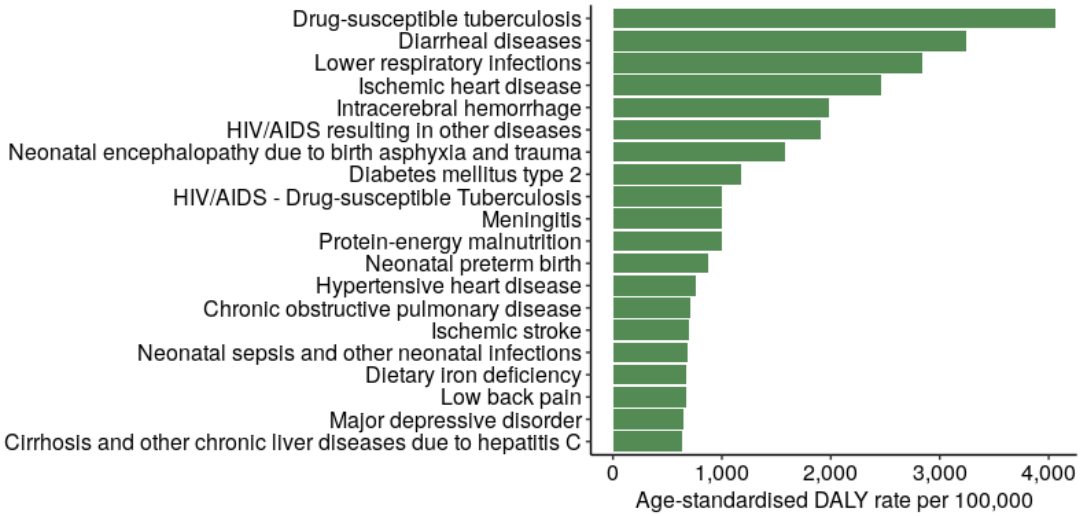
These figures present the leading causes of years lived with disability (*YLD*) rates regardless of sex in Afar. *Dietary iron deficiency*, *Low back pain* and *Major depressive disorder* are the first-, second- and third-leading causes of age-standardised YLDs in Afar.

Figure 2.7: The twenty leading causes of disability adjusted life years in Afar, all ages, 2019



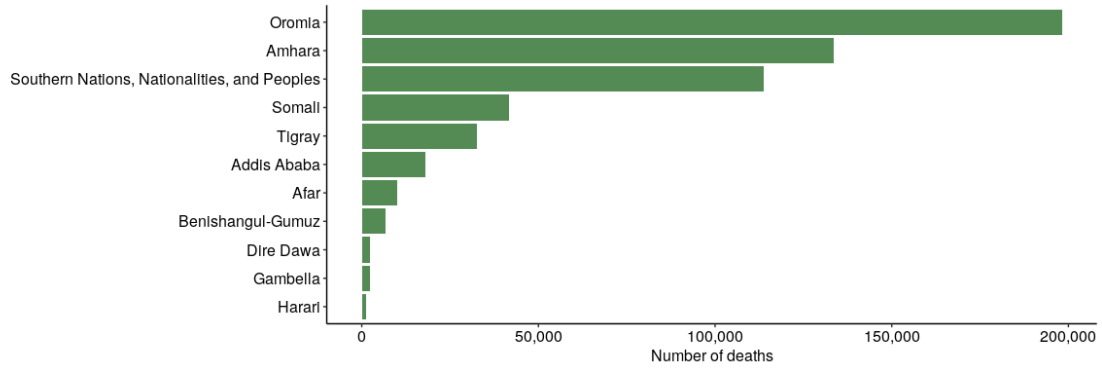
The graph presents the twenty most important drivers of increasing burden in number of disability adjusted life year (*DALYs*) regardless of sex in Afar. In 2019, *Diarrheal diseases*, *Neonatal encephalopathy due to birth asphyxia and trauma*, and *Drug-susceptible tuberculosis* were the top three drivers of DALYs in Afar.

Figure 2.8: Leading causes of age-standardised disability adjusted life years in Afar, 2019



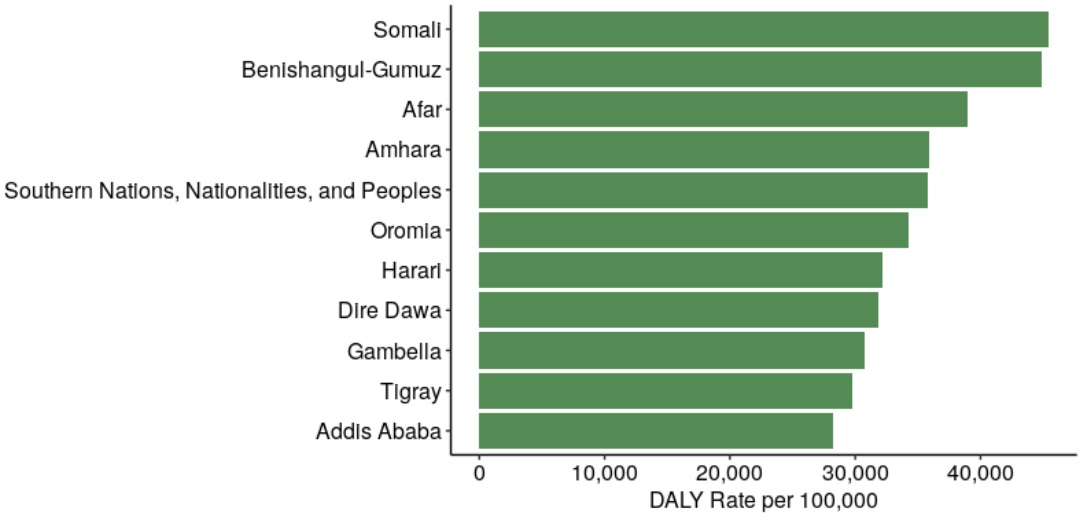
The figure shows the age-standardised twenty leading drivers of increasing burden in number of disability adjusted life year (*DALYs*) in Afar. In 2019, *Drug-susceptible tuberculosis*, *Diarrheal diseases*, and *Lower respiratory infections* were the top three drivers of age-standardised DALYs in Afar.

Figure 2.9: The burden of death by regions in Ethiopia, 2019



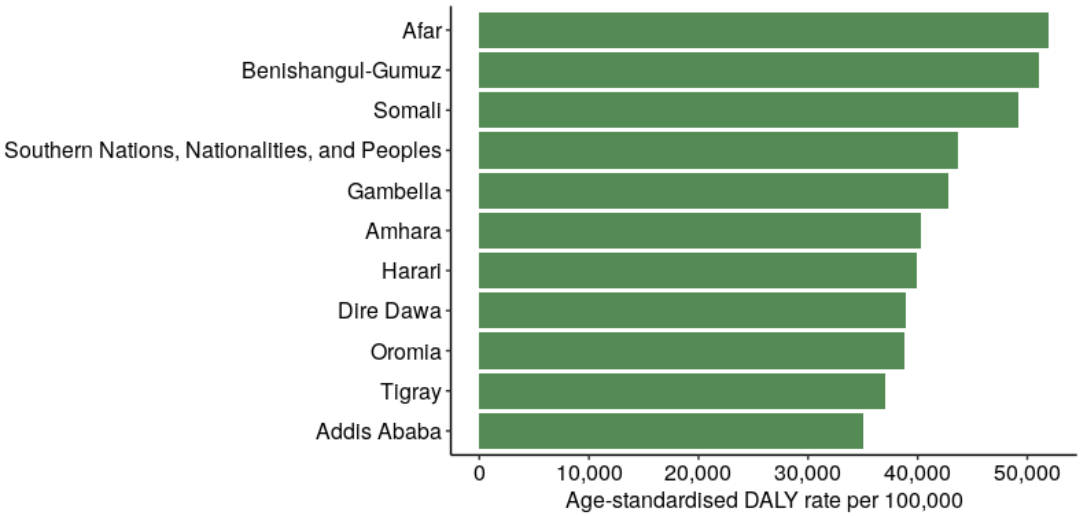
All-age and sex death counts show that *Oromia*, *Amhara* and *Southern Nations, Nationalities, and Peoples* regions have the highest number of deaths in the country. Afar ranks **7** in the number of deaths estimated nationally.

Figure 2.10: The burden of DALYs by regions in Ethiopia, 2019, all ages



All-age and both sexes combined DALY rates per 100,000 individuals for all causes in Afar show that *Somali*, *Benishangul-Gumuz* and *Afar* regions have the highest DALY rates. Afar ranks **3** in DALY rates nationally.

Figure 2.11: The burden of age-standardised DALYs by regions in Ethiopia, 2019



The figure above illustrates Afar show that *Afar*, *Benishangul-Gumuz* and *Somali* regions have the highest age-standardised DALY rates. Afar ranks **1** in age-standardised DALY rates nationally.

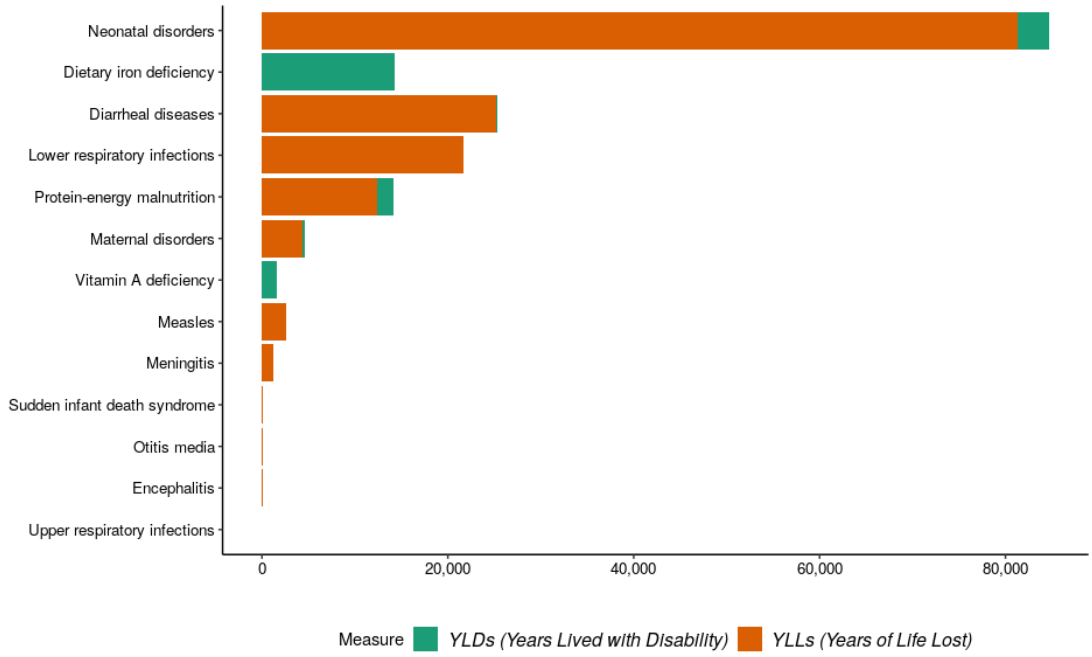
Chapter three: Attributable mortality and disability

Attributable risk (AR) is the portion of the outcome rate attributable to the exposure factor in an epidemiologic context. In the clinical context, it is the portion of the correct diagnosis rate attributable to a positive result or the portion of beneficial outcome rate attributable to a treatment. It allows us to quantify the added risk imposed by a factor that a particular population is exposed to and improves our understanding of public health by identifying the main drivers of poor health.

This chapter quantifies premature death and disability in terms of *DALYs*, *YLLs* and *YLDs* attributable to maternal and child malnutrition, high systolic blood pressure, and air pollution and poor diet in Afar.

Child and maternal malnutrition

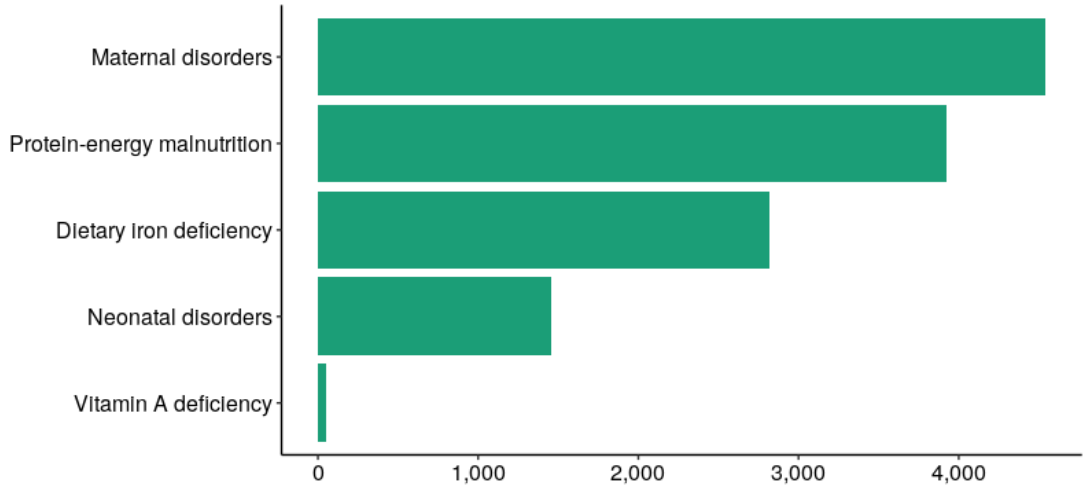
Figure 3.1: YLLs and YLDs attributable to child and maternal malnutrition in Afar, both sexes, all ages, 2019



The chart shows the thirteen leading diseases attributable years of life lost (*YLLs*) and years lived with disability (*YLDs*) due to child and maternal malnutrition in Afar both sexes, all ages, 2019. *Dietary iron deficiency*, *Neonatal disorders* and *Protein-energy malnutrition* are the top three leading causes of YLDs due to child and maternal malnutrition in Afar, whereas *Neonatal disorders*, *Diarrheal diseases* and *Lower respiratory infections* are the leading causes of YLLs due to child and maternal malnutrition in Afar.

Estimated attributable disability-adjusted life-years (*DALYs*), deaths, YLDs and YLLs for risk factors of child and maternal malnutrition in Afar are considerably high. About **25%** of total DALYs, **18%** of deaths, and **28%** of YLLs in Afar are attributable to child and maternal malnutrition. Child and maternal malnutrition caused a total of 170,000 DALYs, 1,810 deaths, 149,000 YLLs and 21,500 YLDs.

Figure 3.2: DALYs attributable to child and maternal malnutrition in Afar, both sexes, ages 15 to 64, 2019



Of the thirteen leading diseases with DALYs attributable to child and maternal malnutrition in Afar for both sexes, ages 15 to 64 in 2019, *Maternal disorders*, *Protein-energy malnutrition*, *Dietary iron deficiency*, and *Neonatal disorders* are the leading causes.

DALYs attributable to child and maternal malnutrition bore a significant burden of death and disability in Afar. The child and maternal malnutrition risk factors in GBD comprise low birth weight and short gestation, child growth failure, suboptimal breastfeeding, and micronutrient deficiencies. The *low birth weight and short gestation* category includes low birth weight for gestation and short gestation for birth weight. *Child growth failure* includes child stunting, child wasting, and child underweight. *Suboptimal breastfeeding* includes non-exclusive breastfeeding and discontinued breastfeeding, and *micronutrient deficiencies* include iron, vitamin A, and zinc deficiencies. Reducing child and maternal mortality and improving maternal and child health is a top priority of the Ethiopian health system.

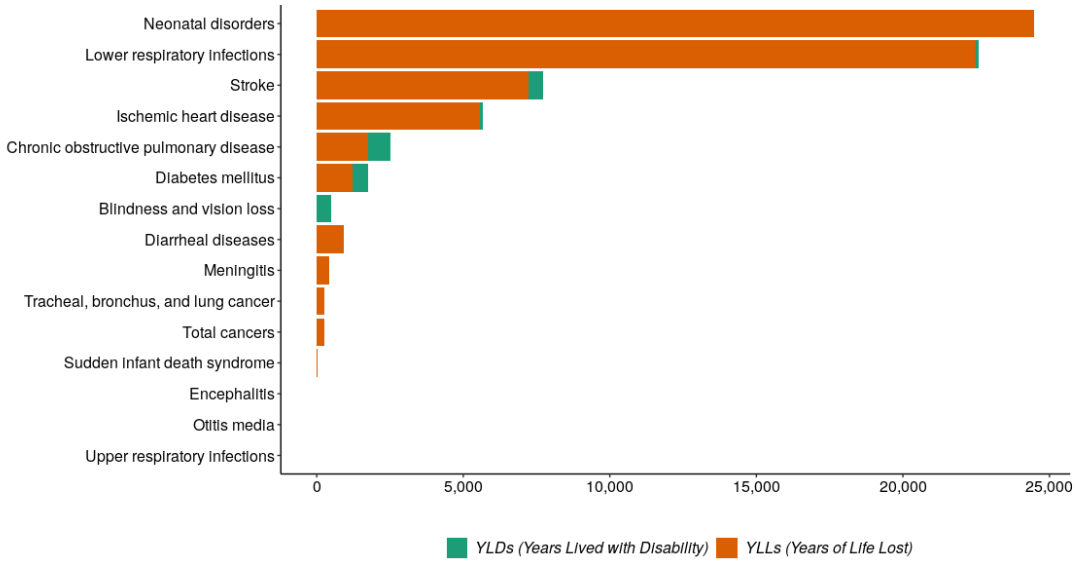
The present data indicates that majority of the causes of child death such as neonatal disorders, diarrheal diseases, lower respiratory infection are attributable to maternal and child malnutrition. About **25%** of all DALYs and **18%** deaths are attributable to child and maternal nutrition in Afar.

Innovative nutritional intervention is needed to prevent stunting, promote proper growth of the mother from conception through infancy to adulthood, prevent adverse outcomes of pregnancy, and improve child survival [1, 2].

Air pollution

Estimated attributable DALYs, deaths, YLDs and YLLs for risk factors of air pollution in Afar are very high. About **10**% of DALYs, **13**% of deaths, and **12**% of YLLs in Afar are attributable to air pollution. Air pollution causes 66,900 DALYs, 1,260 deaths, 2,520 YLDs and 64,400 YLLs in Afar.

Figure 3.3: YLLs and YLDs attributable to air pollution in Afar, both sexes, all ages, 2019



Of the fourteen leading diseases with DALYs attributable to air pollution in Afar for both sexes and all ages in 2019, *Neonatal disorders*, *Lower respiratory infections* and *Stroke* are the leading contributors to YLLs. In contrast, *Chronic obstructive pulmonary disease*, *Diabetes mellitus* and *Stroke* lead in YLDs attributable to air pollution.

Air pollution mainly includes ambient particulate matter pollution and household air pollution [3-6].Coal burning, industry emissions, construction activity, transport vehicles, waste burning, and diesel generators are the major sources of air pollution [3-5].

According to a study conducted by Sanbata et al, an estimated **95%** of the population in Ethiopia uses traditional biomass fuels, such as wood, dung, charcoal, or crop residues, to

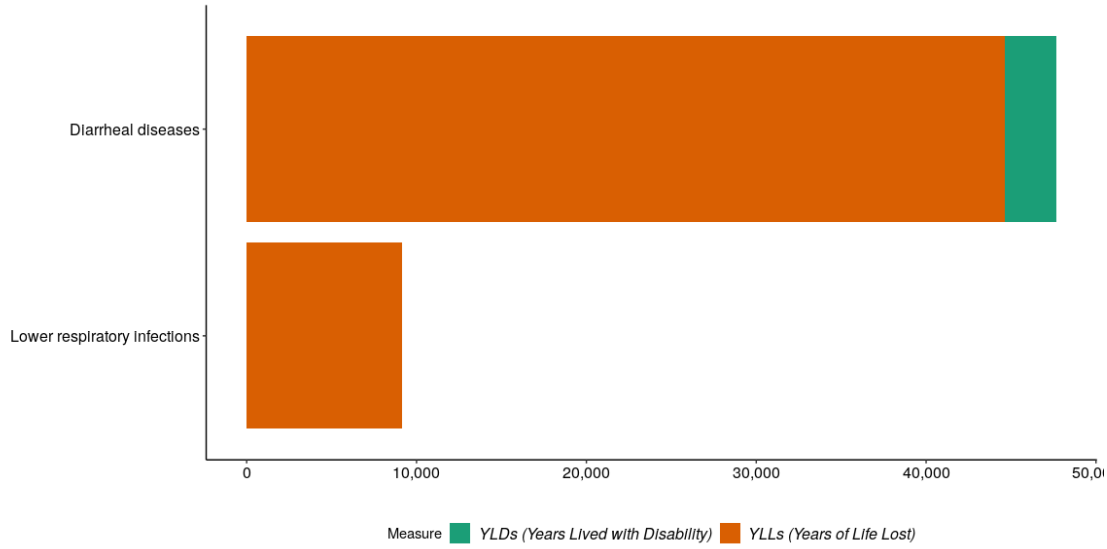
meet household energy needs [7]. In line with this, the Ethiopian Demographic and Health Survey revealed that only **8%** of rural households have electricity access in Ethiopia [8]. As a result of the harmful smoke emitted from the combustion of biomass fuels, indoor air pollution is responsible for more than 50,000 deaths annually and causes nearly 5% of the burden of disease in Ethiopia [7].

The present data reveals that **10**% of DALYs and **13**% of deaths from all causes are attributable to air pollution in Afar. In Afar, substantial progress has been made to improve access to electricity, but thus far the majority of Afar households use firewood or charcoal for household fuel.

Unsafe water, Sanitation and Handwashing

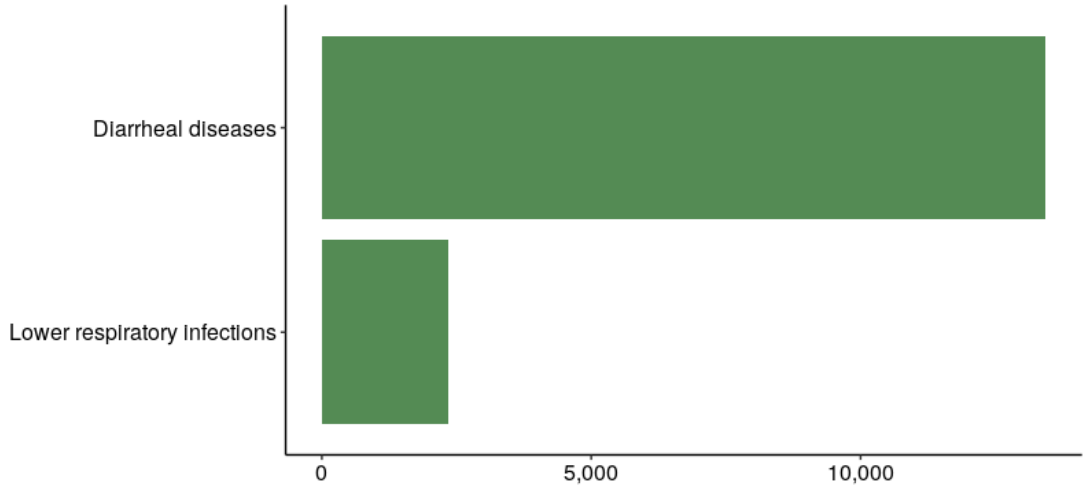
About **10**% of DALYs, **11**% of deaths, and **12**% of YLLs in Afar are attributable to unsafe water, sanitation, and hand washing practice. Unsafe water, sanitation and poor handwashing practices cause about 3,760,000 DALYs, 59,700 deaths, 201,000 YLDs and 3,560,000 of YLLs in Afar.

Figure 3.4: YLLs and YLDs attributable to unsafe water, sanitation, and handwashing in Afar, both sexes, all ages, 2019



About 44,600 and 9,130 years of life lost attributable to unsafe water, sanitation, and handwashing are due to diarrheal diseases and lower respiratory infections, respectively.

Figure 3.5: DALYs attributable to unsafe water, sanitation, and handwashing in Afar, both sexes, ages 15 to 64, 2019



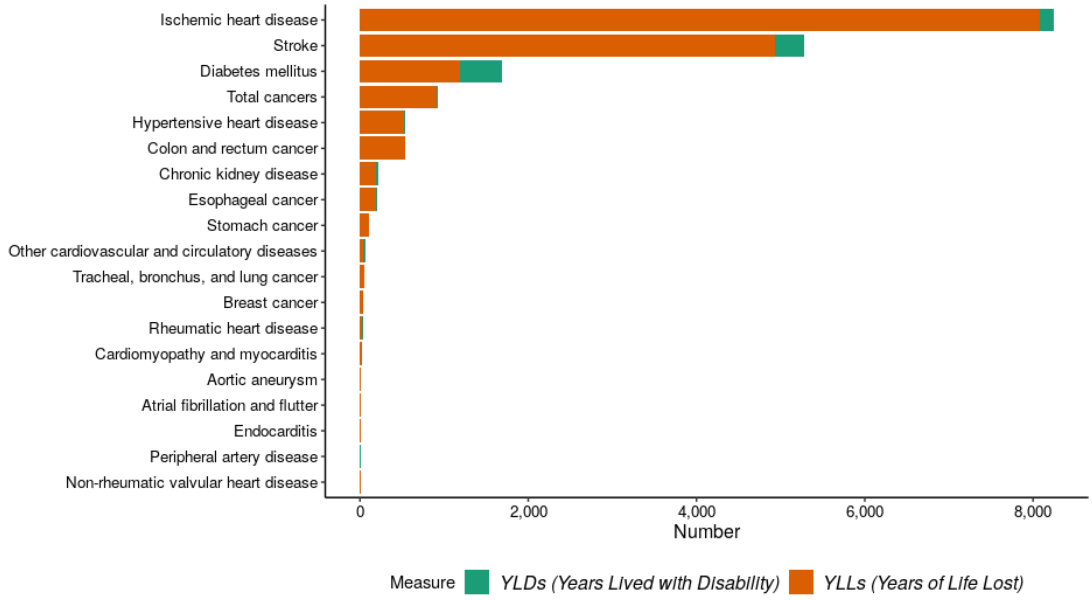
About 13,400 and 2,350 of DALYs attributable to unsafe water, sanitation, and handwashing are caused by diarrheal diseases and lower respiratory infections, respectively.

Every year notable deaths occur due to diarrheal and other infectious disease as result of inadequate water, sanitation, and hygiene; this disease burden can be reduced by increasing access to safe water and sanitation and promoting basic hygiene practices. The total burden from schistosomiasis, trachoma, ascariasis, trichuriasis and hookworm disease are highly attributable to unsafe WaSH. Unsafe WaSH is an important determinant in several additional diseases, such as malaria, yellow fever, filariasis, dengue, hepatitis A and hepatitis E, typhoid fever, and fluorosis.

A well-targeted and well-executed intervention to improve water or sanitation can reduce the prevalence of diarrheal disease by **75%**. The provision of clean water and soap enables and encourages people to wash their hands, reducing the likelihood of disease transmission. Safely managed sanitation can control flies and other insects that spread disease, and prevent contact with infectious organisms shed in faeces, such as helminth ova and diarrheagenic pathogens. An adequate and continuous supply of safe drinking-water on-premises can interrupt waterborne disease transmission. Collectively, these factors reduce rates of diarrhoea and malnutrition leading causes of death in poor countries.

Dietary Risk

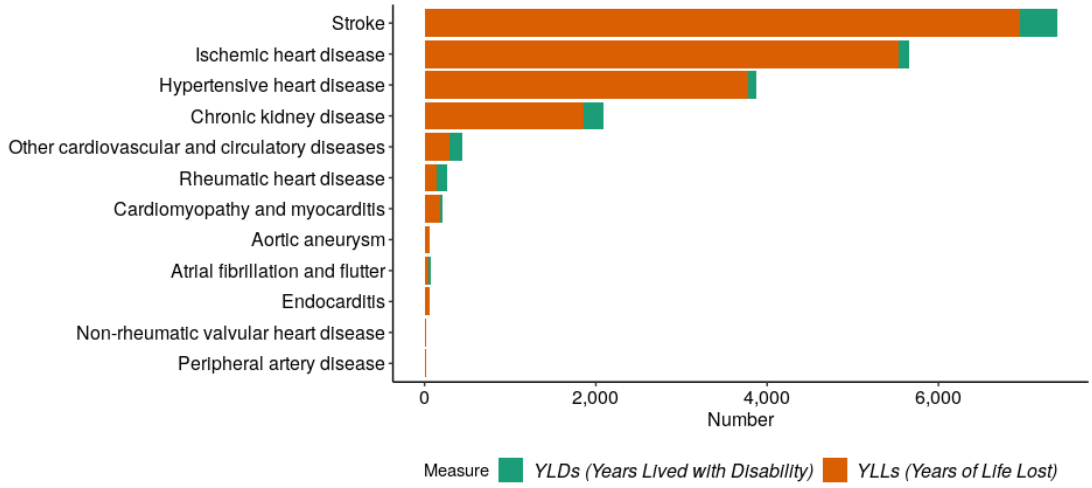
Figure 3.6: YLLs and YLDs attributable to dietary risks in Afar, both sexes, all ages, 2019



Of the eighteen leading diseases with DALYs attributable to dietary risks in Afar in 2019, *Ischemic heart disease*, *Stroke* and *Diabetes mellitus* are the top three causes.

High systolic blood pressure

Figure 3.8: YLLs and YLDs attributable to high systolic blood pressure in Afar, both sexes, all ages, 2019

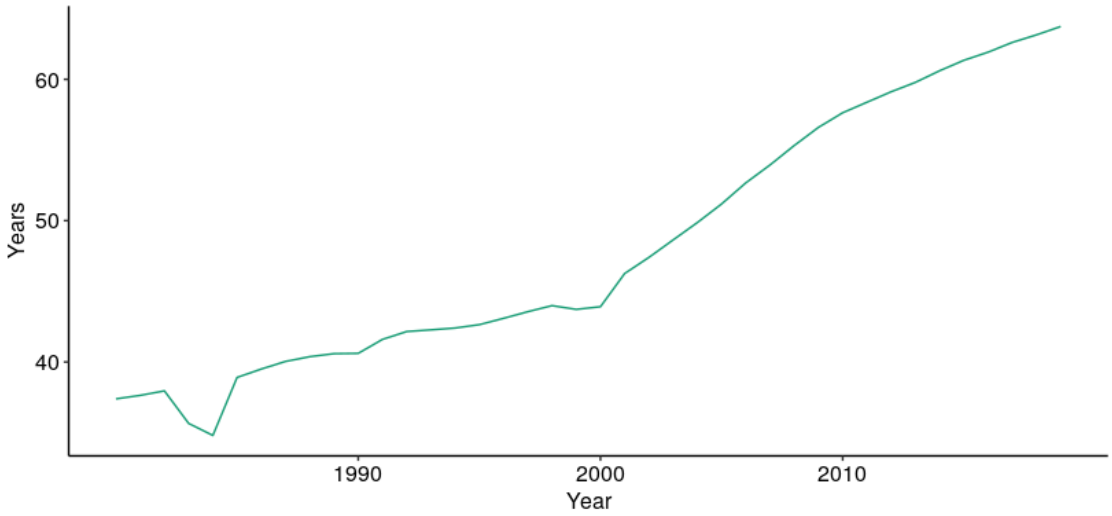


Of the twelve leading causes of YLLs and YLDs attributable to high systolic blood pressure in Afar in 2019, *Stroke*, *Ischemic heart disease* and *Hypertensive heart disease* are the leading three causes.

Chapter four: Life expectancy

Life expectancy is a numerical measure of the median time a person is expected to live, based on their year of birth, current age, and other demographic factors including gender.

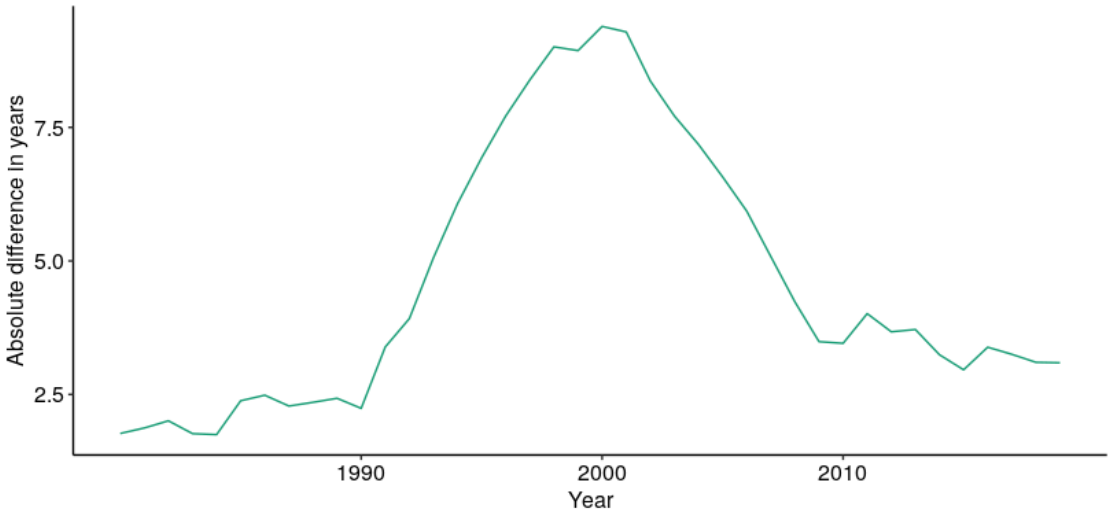
Figure 4.1: Life expectancy at birth in Afar, 1980-2019



The life expectancy in Afar is 63.7380564 years.

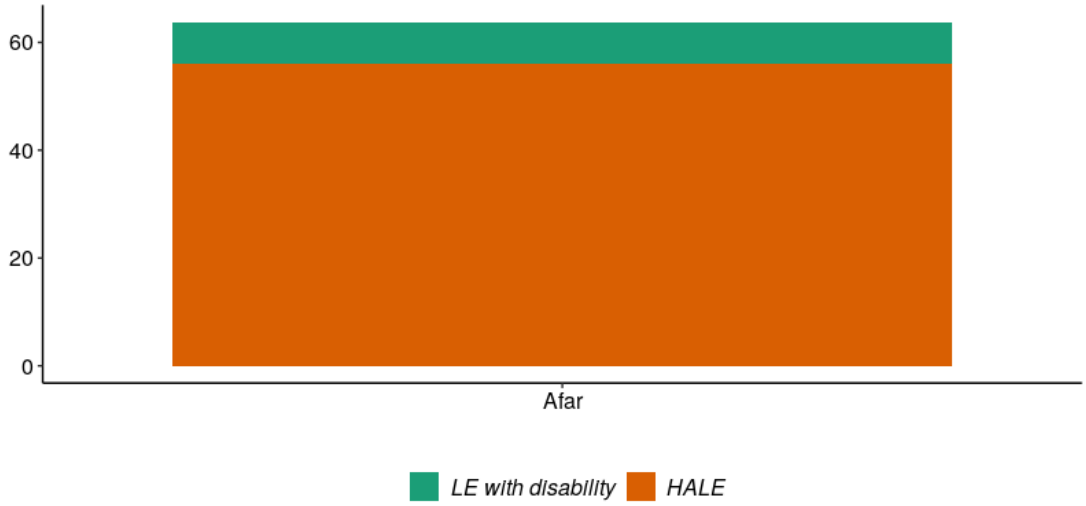
Through 1990 to 2019, life expectancy has changed by **57%** in Afar. The lowest percentage change was recorded in *Somali* and *Addis Ababa* while the highest percentage change was in *Benishangul-Gumuz* and *Afar*.

Figure 4.2: Difference in life expectancy at birth 1980-2019 , females-males



There is no single absolute difference in life expectancy at birth 1980-2019 between males and females in Afar. Generally, women do worse in Afar.

Figure 4.3: Life expectancy in Afar, 2019



Afar region population will live, on average, **56** healthy years, with **8** years lived with disability.

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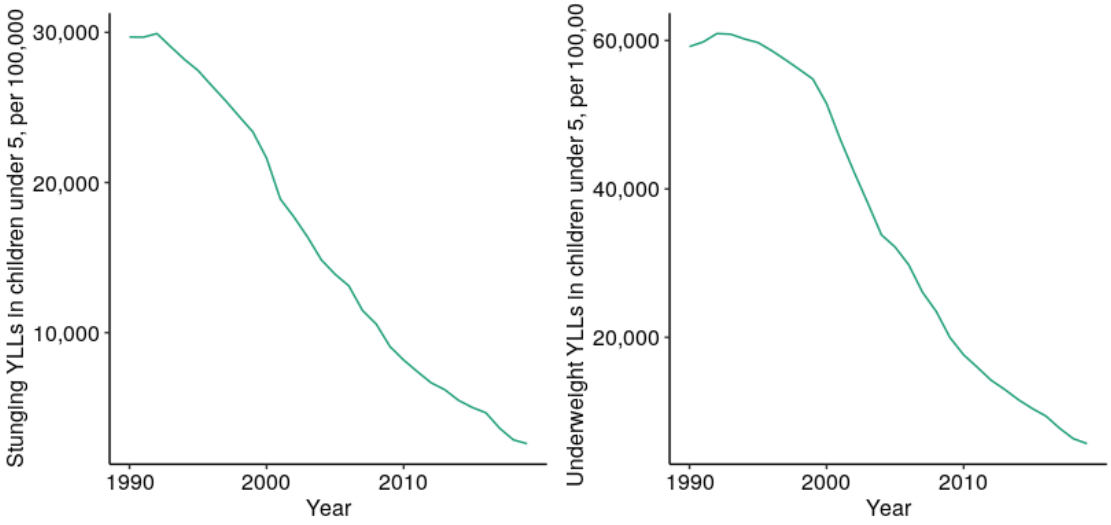
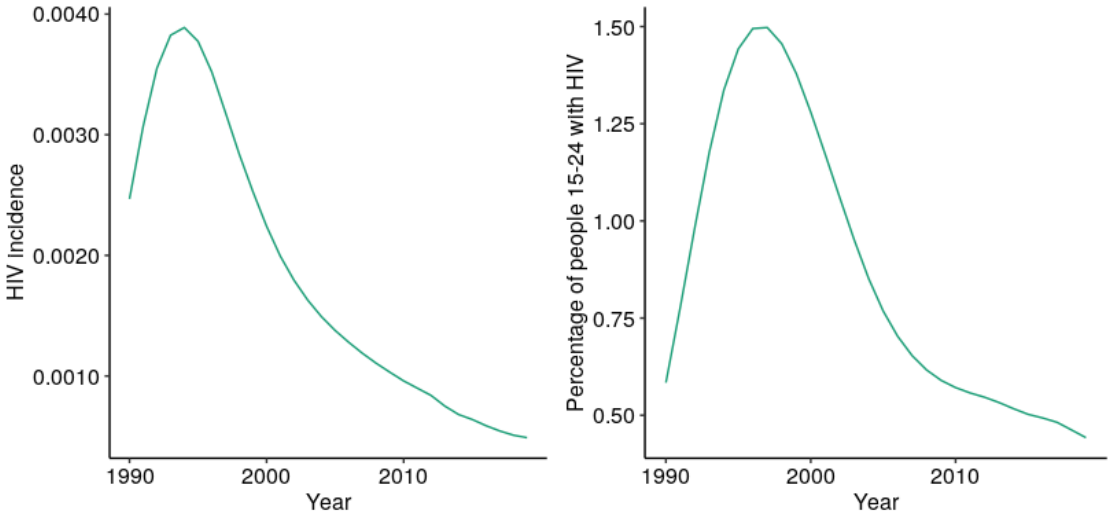
HSTP Indicator Annex

This annex contains information on Health Sector Transformation Plans for Afar that can be assessed by the Global Burden of Disease (GBD) study. The full list of HSTP-II indicators can be found here.

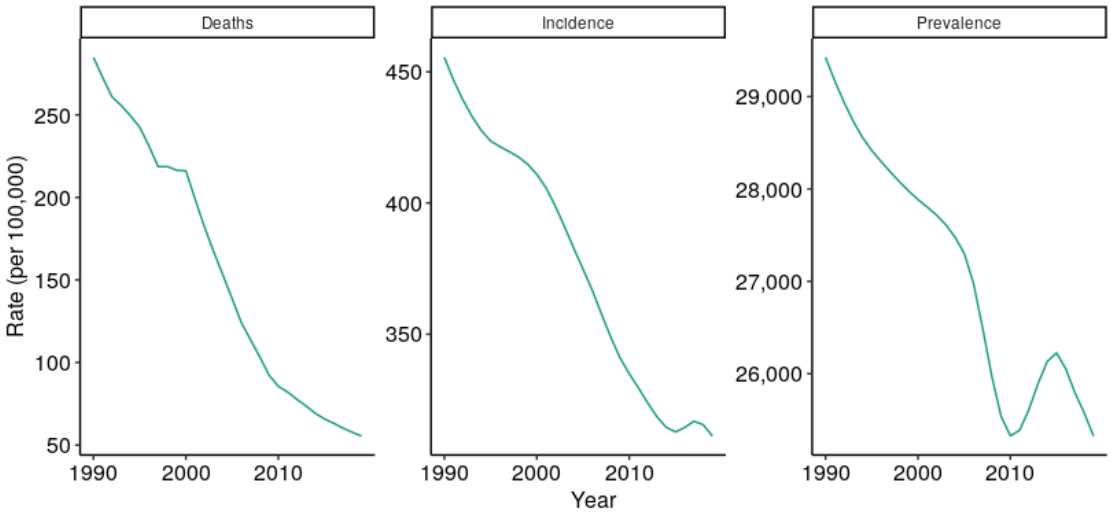
Stunting and Underweight YLLs in children aged less than 5 years, per 100,000



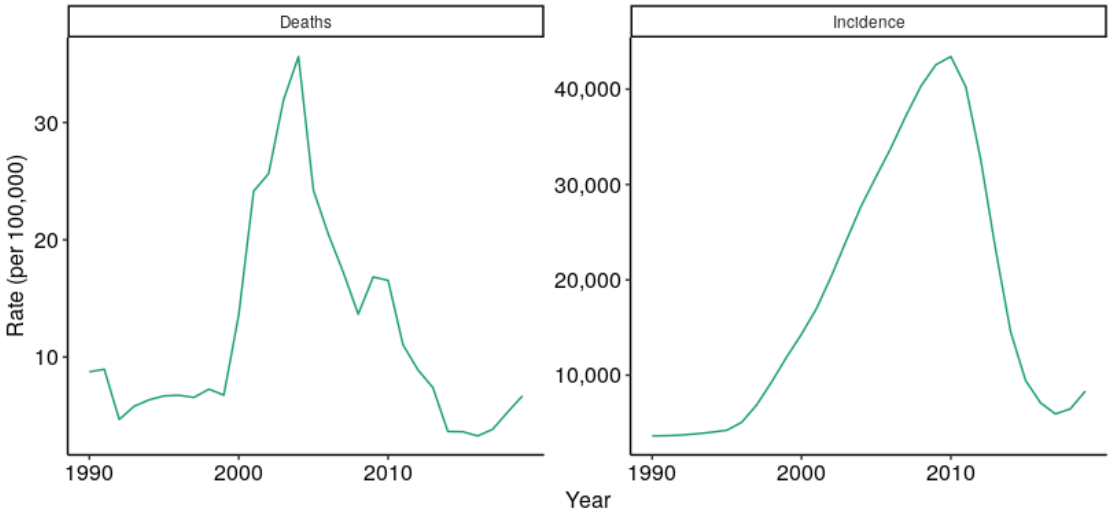
HIV incidence in Afar and percentage of young people aged 15-24 who are living with HIV



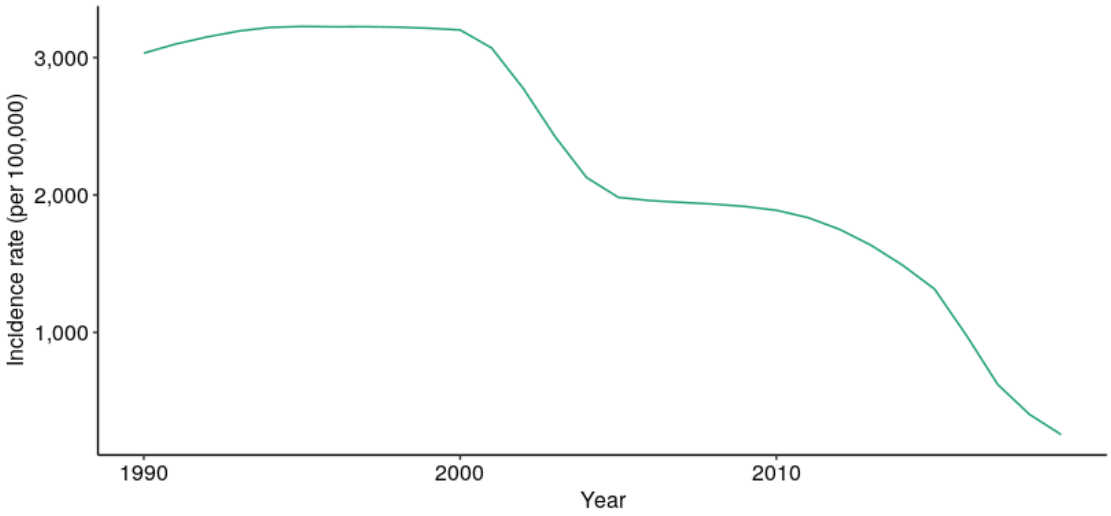
Tuberculosis prevalence, incidence, and mortality rate, per 100,000, all ages



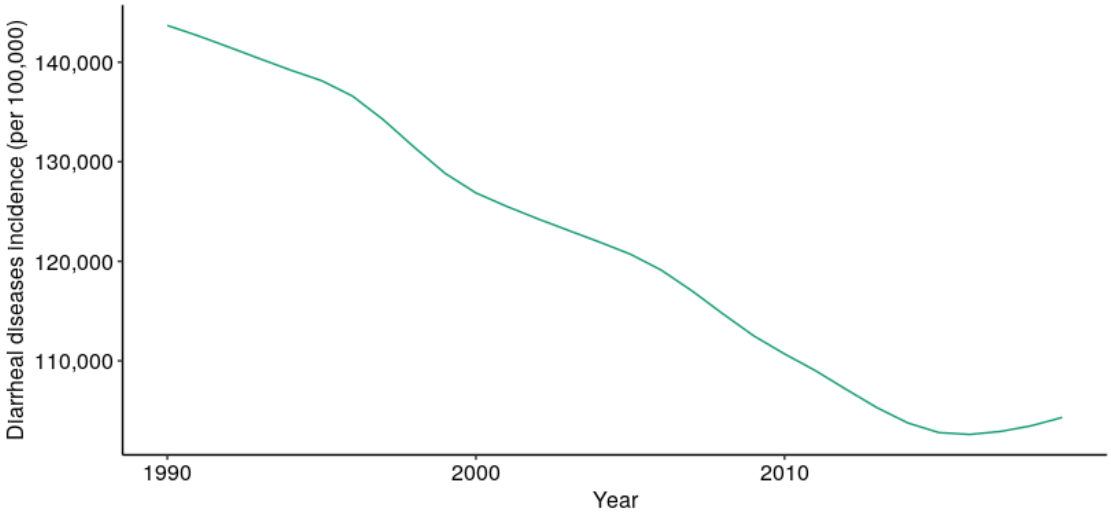
Malaria incidence and mortality per 100,000, all ages



Measles incidence



Diarrheal diseases incidence



Full table of key HSTP indicators

HSTP Indicator	GBD 2019 Estimate
Stunting YLLs in children aged less than 5 years per 100,000	2,603.77
Underweight YLLs in children aged less than 5 years per 100,000	5,672.90
HIV incidence, all ages, per 100,000	48.91
Percentage of young people aged 15-24 who are living with HIV	0.44
Tuberculosis prevalence rate (per 100,000 populations)	25,325.51
Tuberculosis incidence rate (per 100,000 populations)	311.16
Tuberculosis mortality rate (per 100,000 populations)	55.42
Malaria deaths (per 100,000)	6.70
Malaria incidence (per 100,000)	8,324.41
Measles incidence rate (per 100,000)	257.16
Diarrheal diseases incidence rate (per 100,000)	104,307.57
Neonatal sepsis incidence rate per 100,000	858.47
Neonatal encephalopathy incidence rate per 100,000	80.57
Viral hepatitis prevalence rate per 100,000	506.07
Prevalence of trachomatous trichiasis (TT) per 1,000	4.86
TF prevalence in 1-9 years old, %	0.00
Prevalence of schistosomiasis among children 5-14 years of age, %	0.00
Mortality rate due to all NCDs per 100,000	191.10
Diabetes prevalence rate (per 100,000)	1,389.91
Diabetes mortality rate (per 100,000)	10.83
Hypertensive heart disease prevalence rate (per 100,000)	62.29
Cancer incidence rate (per 100,000)	48.77
Cervical cancer incidence rate (per 100,000)	43.45

HSTP Indicator	GBD 2019 Estimate
Cancer mortality rate (per 100,000)	35.08
Depression prevalence rate (per 100,000)	3,060.24
Substance abuse prevalence rate (per 100,000)	2,316.89
Alcohol use disorders prevalence rate (per 100,000)	2,031.73
Bipolar disorder prevalence rate (per 100,000)	484.40
Epilepsy prevalence rate (per 100,000)	300.40
Cardiovascular disease mortality rate (per 100,000)	72.09
COPD mortality rate (per 100,000)	6.15
Tobacco DALY rate (per 100,000)	511.64
High alcohol consumption DALY rate (per 100,000)	1,022.82
Low physical activity DALY rate (per 100,000)	16.87
Low fruit consumption DALY rate (per 100,000)	271.85
Road accidents DALY rate (per 100,000)	634.35
Injury mortality rate (per 100,000)	46.71
Road traffic injury mortality rate (per 100,000)	9.98