Trends in Mortality and Years of Life Lost across regions in Ethiopia: A Systematic Subnational Analysis in Global Burden of Disease Study 1990-2019

Yihunie Lakew¹, Shimelash Bitew¹*, Gail Davey²,³, Tizita Tilahun¹, Ababi Zergaw ³, Getachew Toller¹, Ally Walker⁴, Wondimye Ashenafi¹, Tezera Moshago Berheto¹, Sebsibe Tadesse⁴, Mohsen Naghavi ⁴, Awoke Misganaw ¹,⁴

Abstract

Background: Evidence on premature mortality from any cause is vital to understanding disparities in the availability and accessibility of health care and health resource allocation across regions and city administrations, yet this evidence is often lacking. This analysis investigates the levels and trends of mortality and age-standardized Years of Life Lost (YLL) rates and explores the cause-specific burden of disease variations across nine regions and two cities in Ethiopia from 1990 to 2019.

Methods: The Global Burden of Disease (GBD) 2019 utilized various data sources such as national census, demographic surveillance, household surveys, health service utilization, and other relevant data. The aim of GBD 2019 was to provide comprehensive information on the number of deaths, death rates, and years of life lost (YLLs). To determine the causes of death based on age, sex, year, and location, GBD 2019 applied a Cause of Death Ensemble Modelling (CODEm) approach, which involved using mixed-effects linear models and spatiotemporal Gaussian process regression (ST-GPR) models. This report specifically focuses on the trends and levels of deaths from all causes and age-standardized YLL rates for the top 25 causes of death in Ethiopia. The point estimates were accompanied by 95% uncertainty intervals (UI) to provide a measure of uncertainty.

Results: Overall, 559,997 (95% UI: 506,117-621,976) deaths occurred in Ethiopia in 2019 from all causes, with 317,818 (95% UI: 278,395-361,016) male deaths. In 2019 the age-standardized all-cause mortality rate was 993.5 per 100,000 population (95% UI: 915.0-1070.6). Males had a higher rate than females, 1,101.5 (963.4-1,246.0) per 100,000 population among males. A 38.2% decline in the number of deaths, a 58.4% decline in the age-standardized death rate, and a 68.3% decline in the age-standardized YLL rate were observed from 1990 to 2019 in Ethiopia. Age-standardized death rates due to communicable, maternal, neonatal, and nutritional diseases and disorders (CMNND), non-communicable diseases (NCDs), and injuries were 368.6 (95% UI: 329.7-413.5), 553.4 (95% UI: 501.9-604.9), and 71.6 (95% UI: 61.1-82.7) per 100,000 populations respectively in 2019. Neonatal disorders, diarrhea diseases, lower respiratory infections, tuberculosis, and stroke featured among the five leading specific causes of age-standardized YLL rates in all regions with different ranking orders. HIV/AIDS was the leading cause of age-standardized YLL rates in Addis Ababa and Gambella, causing respectively 4,381.9 (95% UI: 3,213.4-5,800.0) and 4,584.1 (95% UI: 2,776.2-7,087.1) YLL per 100,000 population in 2019. Tuberculosis was the leading cause of YLL in the Afar region, with YLL rates of 4,224.4 (95% UI: 3,303.1-5,286.2) per 100,000 populations in 2019.

Conclusion: There was a significant decline in age-standardized YLL rates between 1990 and 2019 across all regions, with some disparities. Neonatal disorders, diarrhea disease, lower respiratory infections, tuberculosis, HIV/AIDS, ischemic heart disease, and stroke were the leading causes of age-standardized YLL rates 2019 across the nation and regions. Federal, regional, and city administrative policymakers should focus on designing strategies, resources, and interventions on disease burden and avoiding leading causes of YLL. [Ethiop. J. Health Dev. 2023;37 (SI-2)]

Keywords: Cause of death, trends in mortality, Years of Life Lost, Ethiopia

Introduction

Ethiopia has a population estimated at 107.6 million, the second-highest population in Africa (after Nigeria) (1). Ethiopia has progressively expanded access to a range of primary healthcare services and introduced a three-tier public healthcare delivery system and public-private partnerships to achieve universal access to primary healthcare for its people (2). With the vision to see healthy, productive, and prosperous citizens, as aligned with Sustainable Development Goals (SDGs), particularly target three, Ethiopia has been implementing various health sector strategies. The second Health Sector Transformation Plan (HSTP II) is currently at work (3). However, drought, famine, ongoing conflict, and war in Tigray, Amhara, Afar, Oromia, and Benishangul-Gumuz could severely impact Ethiopia's health growth. In addition to deaths and injuries, the conflict harms people's health due to population displacement, violence, and the disintegration of social and medical services(4).

Avoiding premature death from any cause is a primary goal for the health care system, and morbidity and mortality reduction targets are central themes for the development agenda (5). Due to the lack of universal registration of vital events, most developing countries have limited and unreliable information on the number of deaths, how they occur, and when they happen. The burden of disease estimates (such as mortality and health loss measurements), is important to measure

¹National Data Management and Analytics Center, Ethiopian Public Health Institute, Ethiopia;
²Brighton and Sussex Medical School, UK;
³School of Public Health, Addis Ababa University,Ethiopia;
⁴Institute for Health Metrics and Evaluation, University of Washington, USA;
*Corresponding Author Email: sbitew0@gmail.com
health disparity among nations and regions and portray the trends across the year, ultimately informing service providers, program leaders, and policymakers to devise tailored intervention and prevention mechanisms. Globally, policy decisions and quality care require national and regional comparable disease burden estimates and risks. Disparities in socioeconomic status, cultural differences, and unequal access to health care are attributed to the uneven distribution of disease among regions and the need for acceptable and affordable prevention and control strategies (6). In order to improve the survival and striving of the people, timely scientifically sound evidence on mortality levels and trends at the sub-national level is very important. Reliable information on the number of deaths and their causes at the level of administrative regions is fundamental to effective disease prevention and treatment strategies (7,8).

Monitoring the progress of national health development goals and poverty reduction strategies requires reliable evidence on how leading causes of death change over time. This is particularly true for Ethiopia, where decentralized health policy and decision-making are practiced among nine regions and two administrative cities. Health service coverage, accessibility, and quality of care vary among these regions (9). Regional autonomy and scarcity of resources for public health action make national and regional morbidity and mortality estimates essential for priority setting in public health and health services. Because of regional variation in ecology, demography, and economy, the effect of disease burden is estimated to vary across the region over time (6). Emerging regions, including Gambella, Benishangul-Gumuz, Afar, and Somali are historically under-served by health services.

Previous GBD studies have reported national-level burden of disease, injury, and risk factor estimates for Ethiopia (10). Therefore, this analysis aims to investigate the levels and trends of deaths from all causes, age-standardized death rates, Years of Life Lost (YLL) rates, and the burden of disease from 1990 to 2019 in Ethiopia and across nine regions and two administrative cities, to show progress and changes, and to explore variations across the regions from 1990 and 2019. The results will guide rational priority setting for health policy, disease prevention and control strategies, health service planning, and research at the national and regional levels.

Methods
Overview of the methods and data sources
Ethiopia has a federal system of government and, in 2020, comprises 11 regions (Afar, Amhara, Benishangul-Gumuz, Gambella, Harari, Oromia, Somali, Sidama, Southern Nations Nationalities and People (SNNP), Southwest Ethiopia and Tigray) and two administrative cities (Addis Ababa and Dire Dawa). In this analysis, the Sidama and South West Ethiopia regions were part of the Southern Nations Nationalities and Peoples’ region. By the middle of 2019 in Ethiopia, 17,550 Health posts, 3,735 health centers, and 353 hospitals were available (3). In addition, 159,545 health workforces found in Ethiopia in 2019 (11).

Data was extracted from the Global Burden of Disease (GBD) data. GBD study has produced comparable estimates on health loss, causes of death, illness, injury, and risk factors for nearly every country by age and sex (12-14). The cause-of-death analyses presented in this paper were produced by the Ethiopia Subnational Burden of Disease Initiative, a collaborative endeavor between the Ethiopian Public Health Institute (EPHI) and the Institute for Health Metrics and Evaluation (IHME) part of GBD 2019. The EPHI, in collaboration with IHME, gathered all accessible data sources by location for Ethiopia and all regions and cities. These sources included the national census, demographic surveillance, household surveys, health service utilization, disease registry, disease notifications, and other data. A comprehensive description of data sources, quality, and modelling for GBD 2019 has been reported elsewhere at https://ghdx.healthdata.org/gbd-2019/data-input-sources?components=9&locations=179 (15,16). All data sources were evaluated for quality and corrected for known bias in each data source[15,16]. GBD 2019 regional results were reviewed by EPHI experts and GBD Ethiopia collaborators’ expert network of more than 800 Ethiopian researchers and health workers.

The GBD 2019 provides the number of deaths, death rates, and years of life lost (YLLs) for national and regional estimates of Ethiopia. GBD 2019 used all available data sources and applied a cause of death ensemble modeling (CODEm) to assign causes of death by age, sex, year, and location Briefly (15,16). Briefly stated, CODEm evaluates a variety of models, including mixed-effects linear models and spatiotemporal Gaussian process regression (ST-GPR) models, and builds an ensemble model based on the results of the many models (17). Out-of-sample predictive validity testing was used to select the ensemble model to estimate mortality rates (17). The posterior distribution of each component model was sampled in this model to produce uncertainty intervals in proportion to the weight of each model in the ensemble (17).

GBD categorization of diseases and injuries was used to present and interpret the estimates. GBD uses a hierarchy of mutually exclusive and collectively exhaustive causes of fatal diseases and injuries into four levels (16). The first level’s three broad groups are injuries, non-communicable diseases (NCDs) and communicable, maternal, neonatal and nutritional (CMNN) disorders. Level three was used to illustrate the cause-specific causes of death since it provides more disaggregated causes (16). Estimates were presented regarding the number of deaths from all causes, age-standardized death rates, and age-standardized YLL rates, with 95% uncertainty intervals (UI). Years of life lost for each leading cause were estimated using standard GBD 2019 methodology (18). According to this method, deaths that result from a specific cause are multiplied by the reference standard life expectancy at the age of the death, which is based
on the lowest recorded mortality rate for each 5-year age group in populations larger than 5 million (19). GBD 2019 created uncertainty intervals at crucial stages of all-cause and cause-specific mortality estimation to account for uncertainties resulting from adjusting sources, sample size, and other model settings.

From 1990 to 2019, percentage changes were recorded, with positive values to indicate rising trends and negative values to indicate falling trends. GBD 2019 estimated deaths from all causes, death rates, and years of life lost (YLLs) due to 369 diseases and injuries. All metrics were estimated separately for Ethiopia, 9 regions, and 2 administrative cities. The GBD cause-of-death database was used to compute cause-specific mortality rates. Years of life lost (YLLs) were estimated for each cause by location, age, and year by multiplying each cause-specific death by the normative standard life expectancy at each age. All rates presented are age-standardized per 100,000 populations. Diseases and injuries were organized into a leveled cause hierarchy from broadest (Level 1; communicable, maternal, neonatal, and nutritional diseases; non-communicable disease; and injuries) to most specific (Level 4) causes of death.

Ethics Statement
This study was produced as part of the GBD Collaborator Network and following the GBD Protocol (IHME ID 4239-GBD2019-042022). For GBD studies, a waiver of informed consent was reviewed and approved by the Institutional Review Board of the University of Washington (https://www.healthdata.org/gbd/2019).

Results
All-cause mortality
In 2019, 559,997 (95% UI: 506,117-621,976) deaths occurred in Ethiopia, and 317,818 (95% UI: 278,395-361,016) were among males. The highest number of deaths was from Oromia 198,153 (95% UI: 176,829-223,021), followed by Amhara 133,485 (95% UI: 118,983-149,286) and SNNP regions 113,738 (95% UI: 100,323-129,639). The differences between Oromia and other regions were statistically significant, but others were not. From 1990 to 2019, death declined by 38.2% in both sexes. Substantial declines in all-cause mortality for both sexes and all age groups were observed in Amhara (49.4%), Dire Dawa (46.9%), Benishangul-Gumuz (44.6%) and Harari (43.4%) regions. In contrast, all-cause mortality increased in Somali region by 15.4% from 1990 to 2019 (Table 1). A steep decline in deaths in Oromia, Amhara, and SNNP began in 2000. However, this is not statistically significant. (Figure 1).

Figure 1: Trends in deaths from all causes during 1990-2019, National and Sub-national states of Ethiopia
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Both sexes</td>
</tr>
<tr>
<td>Oromia</td>
<td>164,558 (151785-178466)</td>
<td>128,565 (118790-138694)</td>
<td>293,123 (273750-312354)</td>
</tr>
<tr>
<td>Amhara</td>
<td>149,800 (137895-162291)</td>
<td>114,012 (105340-123634)</td>
<td>263,812 (247750-281200)</td>
</tr>
<tr>
<td>SNNP</td>
<td>112,161 (103374-121918)</td>
<td>82,626 (76457-89406)</td>
<td>194,787 (182497-207636)</td>
</tr>
<tr>
<td>Somali</td>
<td>17,257 (15822-18796)</td>
<td>18,819 (16917-20905)</td>
<td>36,076 (33287-38932)</td>
</tr>
<tr>
<td>Tigray</td>
<td>31,476 (28556-34656)</td>
<td>24,361 (21818-26968)</td>
<td>55,837 (51565-60326)</td>
</tr>
<tr>
<td>Addis Ababa</td>
<td>12,883 (11526-14576)</td>
<td>10,883 (9524-12362)</td>
<td>23,766 (21669-26120)</td>
</tr>
<tr>
<td>Afar</td>
<td>9,057 (8017-10199)</td>
<td>8,378 (7190-9708)</td>
<td>17,435 (15815-19078)</td>
</tr>
<tr>
<td>Benishangul-Gumuz</td>
<td>6,034 (5459-6709)</td>
<td>5,956 (5290-6740)</td>
<td>11,990 (11057-13142)</td>
</tr>
<tr>
<td>Dire Dawa</td>
<td>2,478 (2234-2739)</td>
<td>2,000 (1785-2237)</td>
<td>4,478 (4081-4883)</td>
</tr>
<tr>
<td>Gambella</td>
<td>1,738 (1593-1895)</td>
<td>1,365 (1235-1502)</td>
<td>3,103 (2875-3342)</td>
</tr>
<tr>
<td>Harari</td>
<td>1,290 (1147-1424)</td>
<td>1,019 (905-1154)</td>
<td>2,309 (2104-2514)</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>508,733 (476121-542829)</td>
<td>397,984 (374945-421733)</td>
<td>906,716 (859267-955007)</td>
</tr>
</tbody>
</table>
In 2019, communicable, maternal, neonatal, and nutritional diseases and disorders (CMNND) contributed to 297,055 (95% UI: 257,369-347,338) deaths in Ethiopia. The highest number of deaths due to CMNND was observed in Oromia (109,733, 95% UI: 93,754-128,561), Amhara (66,571, 95% UI: 57,137-77,210), and SNNP (61,080, 95% UI: 51,970-73,103). In the same year, 219,284 (95% UI: 197,461-241,134) deaths occurred due to NCDs, and 43,658 (95% UI: 37,027-51,499) of these deaths were associated with injuries. Majority of NCD 74,689 (95% UI: 65,870-84,364) were contributed by Oromia, 57,283 (95% UI: 49,530-65,565) by Amhara, and 40,925 (95% UI: 35,787-46,605) by SNNP regions (Table 2). There is a statistical significant difference for Oromia and other regions but no statistical difference in the other regions.
Table 2: Deaths due to communicable, non-communicable and injuries, both Sexes Between 1990-2019 Sub-national and national in Ethiopia

<table>
<thead>
<tr>
<th>National and Sub-nationals</th>
<th>1990</th>
<th>2019</th>
<th>1990</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Communicable, maternal, neonatal, and nutritional diseases</td>
<td>Non-communicable diseases</td>
<td>Injuries</td>
<td>Communicable, maternal, neonatal, and nutritional diseases</td>
</tr>
<tr>
<td>Addis Ababa</td>
<td>13,026</td>
<td>5,924</td>
<td>4816</td>
<td>6,836</td>
</tr>
<tr>
<td></td>
<td>(11461-14859)</td>
<td>(5006-6887)</td>
<td>(4605-5072)</td>
<td>(5785-8131)</td>
</tr>
<tr>
<td>Afar</td>
<td>12353</td>
<td>3516</td>
<td>1567</td>
<td>5,813</td>
</tr>
<tr>
<td></td>
<td>(10910-13866)</td>
<td>(2603-4570)</td>
<td>(1340-1780)</td>
<td>(4967-6786)</td>
</tr>
<tr>
<td>Amhara</td>
<td>171356</td>
<td>55221</td>
<td>37235</td>
<td>66,571</td>
</tr>
<tr>
<td></td>
<td>(156818-188072)</td>
<td>(44258-65789)</td>
<td>(35043-39843)</td>
<td>(57137-77210)</td>
</tr>
<tr>
<td>Benishangul-Gumuz</td>
<td>8681</td>
<td>2286</td>
<td>1023</td>
<td>4014</td>
</tr>
<tr>
<td></td>
<td>(7708-9826)</td>
<td>(1639-2921)</td>
<td>(905-1160)</td>
<td>(3337-4824)</td>
</tr>
<tr>
<td>Dire Dawa</td>
<td>3165</td>
<td>880</td>
<td>434</td>
<td>1211</td>
</tr>
<tr>
<td>Gambella</td>
<td>2265</td>
<td>579</td>
<td>259</td>
<td>1240</td>
</tr>
<tr>
<td></td>
<td>(2017-2511)</td>
<td>(423-743)</td>
<td>(222-296)</td>
<td>(1020-1501)</td>
</tr>
<tr>
<td>Harari</td>
<td>1613</td>
<td>463</td>
<td>233</td>
<td>622</td>
</tr>
<tr>
<td></td>
<td>(1413-1823)</td>
<td>(322-598)</td>
<td>(204-269)</td>
<td>(527-746)</td>
</tr>
<tr>
<td>Oromia</td>
<td>212631</td>
<td>55,572</td>
<td>24920</td>
<td>109,733</td>
</tr>
<tr>
<td></td>
<td>(193752-232995)</td>
<td>(44077-68304)</td>
<td>(21743-27429)</td>
<td>(93754-128561)</td>
</tr>
<tr>
<td>Somali</td>
<td>26897</td>
<td>5,666</td>
<td>3512</td>
<td>26,335</td>
</tr>
<tr>
<td></td>
<td>(24430-29562)</td>
<td>(4351-7069)</td>
<td>(3112-4041)</td>
<td>(22478-30852)</td>
</tr>
<tr>
<td>SNNP</td>
<td>137778</td>
<td>37802</td>
<td>19206</td>
<td>61,080</td>
</tr>
<tr>
<td></td>
<td>(124131-151469)</td>
<td>(29082-47654)</td>
<td>(16718-21664)</td>
<td>(51970-73103)</td>
</tr>
<tr>
<td>Tigray</td>
<td>37373</td>
<td>13512</td>
<td>4952</td>
<td>13,600</td>
</tr>
<tr>
<td></td>
<td>(33946-41276)</td>
<td>(10495-16030)</td>
<td>(4477-5514)</td>
<td>(11608-15690)</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>627,138</td>
<td>181,421</td>
<td>98,157</td>
<td>297,055</td>
</tr>
<tr>
<td></td>
<td>(578013-681195)</td>
<td>(146929-215688)</td>
<td>(90841-105086)</td>
<td>(257369-347338)</td>
</tr>
</tbody>
</table>
Age-standardized death rates
2019, the age-standardized all-cause mortality rate was 993.5 per 100,000 population (95% UI: 915.0-1070.6). Males had a higher rate than females, which was 1,101.5 (963.4-1,246.0) among males and 882 (95% UI: 802-953) per 100,000 population among females. There is a statistically significant difference between males and females. From 1990 to 2019, the cause age-standardized death rate for both sexes declined by 58.4% in Ethiopia. The highest declines in death rates were observed in Benishangul-Gumuz (62.8%) and Tigray (61.6%) regions. The lowest decline in age-standardized death rates was observed in Somali (43.1%) region (Table 3, Figure 2).

Figure 2: Age-standardized Trends of death rates from all causes of death during 1990-2019, National and Sub-national states of Ethiopia
<table>
<thead>
<tr>
<th>National and Sub-nationals</th>
<th>1990</th>
<th>Female</th>
<th>Both Sexes</th>
<th>2019</th>
<th>Female</th>
<th>Both Sexes</th>
<th>Rate of change for both sexes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afar</td>
<td>3264.6</td>
<td>3602.2</td>
<td>3410.9</td>
<td>1249.8</td>
<td>1567.5</td>
<td>1353.4</td>
<td>-60.3</td>
</tr>
<tr>
<td></td>
<td>(2864.3-3674.2)</td>
<td>(3143.7-4075.8)</td>
<td>(3108.6-3711.4)</td>
<td>(1015.7-1517.3)</td>
<td>(1326.8-1849.8)</td>
<td>(1195.7-1526.2)</td>
<td></td>
</tr>
<tr>
<td>Benishangul-Gumuz</td>
<td>3006.8</td>
<td>3592.5</td>
<td>3263.9</td>
<td>1119.9</td>
<td>1345.6</td>
<td>1215.4</td>
<td>-62.8</td>
</tr>
<tr>
<td></td>
<td>(2666.3-3359.3)</td>
<td>(3139.0-4057.6)</td>
<td>(2995.1-3575.2)</td>
<td>(899.6-1381.1)</td>
<td>(1106.8-1602.0)</td>
<td>(1046.6-1394.0)</td>
<td></td>
</tr>
<tr>
<td>Somali</td>
<td>1726.6</td>
<td>2360.5</td>
<td>2066.0</td>
<td>1202.9</td>
<td>1127.5</td>
<td>1175.5</td>
<td>-43.1</td>
</tr>
<tr>
<td></td>
<td>(1504.8-1971.6)</td>
<td>(2038.1-2714.8)</td>
<td>(1868.0-2276.8)</td>
<td>(958.9-1461.3)</td>
<td>(963.2-1340.0)</td>
<td>(1007.8-1366.9)</td>
<td></td>
</tr>
<tr>
<td>Gambella</td>
<td>3281.5</td>
<td>1750.6</td>
<td>2355.7</td>
<td>1436.4</td>
<td>779.4</td>
<td>1097.6</td>
<td>-53.4</td>
</tr>
<tr>
<td></td>
<td>(2958.8-3638.6)</td>
<td>(1510.0-2027.7)</td>
<td>(2138.2-2613.6)</td>
<td>(1204.8-1721.9)</td>
<td>(692.4-875.0)</td>
<td>(985.2-1238.4)</td>
<td></td>
</tr>
<tr>
<td>SNNP</td>
<td>2826.0</td>
<td>2013.7</td>
<td>2431.0</td>
<td>1245.9</td>
<td>935.9</td>
<td>1091.6</td>
<td>-55.1</td>
</tr>
<tr>
<td></td>
<td>(2561.8-3092.4)</td>
<td>(1801.2-2239.3)</td>
<td>(2265.5-2615.8)</td>
<td>(1031.5-1461.8)</td>
<td>(818.6-1065.2)</td>
<td>(982.8-12114.4)</td>
<td></td>
</tr>
<tr>
<td>Tigray</td>
<td>2832.8</td>
<td>2280.8</td>
<td>2558.7</td>
<td>1073.2</td>
<td>896.0</td>
<td>982.6</td>
<td>-61.6</td>
</tr>
<tr>
<td></td>
<td>(2526.8-3159.6)</td>
<td>(1967.8-2581.5)</td>
<td>(2333.0-2788.8)</td>
<td>(888.9-1259.8)</td>
<td>(763.3-1051.7)</td>
<td>(869.5-1098.2)</td>
<td></td>
</tr>
<tr>
<td>Harari</td>
<td>3708.3</td>
<td>2087.5</td>
<td>2487.2</td>
<td>1134.7</td>
<td>851.9</td>
<td>981.4</td>
<td>-59.7</td>
</tr>
<tr>
<td></td>
<td>(3327.0-4060.7)</td>
<td>(1728.1-2475.2)</td>
<td>(2189.4-2786.2)</td>
<td>(917.3-1377.4)</td>
<td>(709.2-999.5)</td>
<td>(865.1-1101.0)</td>
<td></td>
</tr>
<tr>
<td>Amhara</td>
<td>2608.9</td>
<td>2121.0</td>
<td>2373.6</td>
<td>1135.7</td>
<td>783.3</td>
<td>955.4</td>
<td>-56.0</td>
</tr>
<tr>
<td></td>
<td>(2374.8-2855.1)</td>
<td>(1914.3-2533.9)</td>
<td>(2214.9-2544.1)</td>
<td>(943.7-1355.4)</td>
<td>(708.6-891.1)</td>
<td>(855.4-1065.9)</td>
<td></td>
</tr>
<tr>
<td>Addis Ababa</td>
<td>2161.4</td>
<td>1940.7</td>
<td>2046.4</td>
<td>1059.1</td>
<td>846.3</td>
<td>943.2</td>
<td>-53.9</td>
</tr>
<tr>
<td></td>
<td>(1916.3-2455.4)</td>
<td>(1653.1-2344.3)</td>
<td>(1852.8-2254.9)</td>
<td>(828.2-1256.1)</td>
<td>(711.5-1023.2)</td>
<td>(836.9-1055.4)</td>
<td></td>
</tr>
<tr>
<td>Oromia</td>
<td>2679.0</td>
<td>2054.0</td>
<td>2363.9</td>
<td>984.9</td>
<td>875.1</td>
<td>931.4</td>
<td>-60.6</td>
</tr>
<tr>
<td></td>
<td>(2429.1-2936.1)</td>
<td>(1849.3-2273.9)</td>
<td>(2192.7-2537.3)</td>
<td>(823.1-1159.5)</td>
<td>(769.6-965.8)</td>
<td>(842.9-1028.2)</td>
<td></td>
</tr>
<tr>
<td>Dire Dawa</td>
<td>2675.0</td>
<td>1858.9</td>
<td>2195.8</td>
<td>1048.8</td>
<td>822.8</td>
<td>930.8</td>
<td>-57.6</td>
</tr>
<tr>
<td></td>
<td>(2377.7-3003.8)</td>
<td>(1592.3-2162.9)</td>
<td>(1968.1-2417.6)</td>
<td>(879.2-1283.7)</td>
<td>(721.0-961.8)</td>
<td>(824.9-1054.7)</td>
<td></td>
</tr>
<tr>
<td>Ethiopia</td>
<td>2645.8</td>
<td>2119.0</td>
<td>2386.9</td>
<td>1101.5</td>
<td>881.7</td>
<td>993.5</td>
<td>-58.4</td>
</tr>
<tr>
<td></td>
<td>(2473.6-2824.0)</td>
<td>(1964.0-2271.1)</td>
<td>(2271.3-2509.0)</td>
<td>(963.4-1246.0)</td>
<td>(802.0-952.6)</td>
<td>(915.0-1070.6)</td>
<td></td>
</tr>
</tbody>
</table>
At national level, age-standardized death rate due to CMNN was 368.6 (95% UI: 329.7-413.5) per 100,000 population, NCDs were 553.4 (95% UI: 501.9-604.9) per 100,000 population, and injuries were 71.6 (95% UI: 61.1-82.7) per 100,000 population in 2019. In the same year, the highest age-standardized death rates caused by CMNN were observed in Afar (569.2, 95% UI: 490.9-654.0 per 100,000 population) and Somali (510.4, 95% UI: 436.1-594.8 per 100,000 population). The highest age-standardized death rates caused by NCDs were observed in Addis Ababa (616.4, 95% UI: 543.4-693.4), Afar (688.7, 95% UI: 601.5-783.9), and Benishangul-Gumuz (629.3, 95% UI: 528.9-742.2) per 100,000 population in 2019. The highest age-standardized death rates caused by injuries were observed in Afar (95.4, 95% UI: 76.4-119.0 per 100,000 population), Somali (84.1, 95% UI: 66.0-108.2 per 100,000 population) and Benishangul-Gumuz (83.9, 95% UI: 67.6-103.6 per 100,000 population) (Table 4). No statistically significant difference among regions.
**Table 4: Age-standardized death rates per 100,000 in both sexes from communicable, non-communicable and injuries, Between 1990-2019, Sub-national and national in Ethiopia**

<table>
<thead>
<tr>
<th>National and Sub-nationals</th>
<th>Communicable, maternal, neonatal, and nutritional diseases</th>
<th>1990</th>
<th>Communicable, maternal, neonatal, and nutritional diseases</th>
<th>2019</th>
<th>Communicable, maternal, neonatal, and nutritional diseases</th>
<th>Injuries</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>1312.3 (1189.7-1442.2)</td>
<td>833.4 (720.1-941.6)</td>
<td>241.2 (221.1-260.5)</td>
<td>368.6 (329.7-413.5)</td>
<td>553.4 (501.9-604.9)</td>
<td>71.6 (61.1-82.7)</td>
<td></td>
</tr>
<tr>
<td>Addis Ababa</td>
<td>890.1 (771.5-1043.1)</td>
<td>880.7 (757.3-1008.2)</td>
<td>275.5 (259.1-296.4)</td>
<td>274.0 (237.4-317.8)</td>
<td>616.4 (543.4-693.4)</td>
<td>52.8 (44.5-63.8)</td>
<td></td>
</tr>
<tr>
<td>Afar</td>
<td>2104.9 (1785.0-2404.7)</td>
<td>1044.9 (823.4-1314.7)</td>
<td>261.1 (218.8-307.8)</td>
<td>569.2 (490.9-654.0)</td>
<td>688.7 (601.5-783.9)</td>
<td>95.4 (76.4-119.0)</td>
<td></td>
</tr>
<tr>
<td>Amhara</td>
<td>1240.1 (1115.4-1386.2)</td>
<td>828.3 (705.4-935.0)</td>
<td>305.2 (283.5-335.4)</td>
<td>362.3 (316.4-418.8)</td>
<td>529.0 (459.2-600.7)</td>
<td>64.1 (51.7-81.0)</td>
<td></td>
</tr>
<tr>
<td>Benishangul-Gumuz</td>
<td>2009.8 (1742.6-2284.0)</td>
<td>996.3 (796.9-1212.1)</td>
<td>257.7 (224.3-297.9)</td>
<td>502.2 (425.9-587.9)</td>
<td>629.3 (528.9-742.2)</td>
<td>83.9 (67.6-103.6)</td>
<td></td>
</tr>
<tr>
<td>Dire Dawa</td>
<td>1224.2 (1044.6-1426.5)</td>
<td>783.0 (628.2-938.0)</td>
<td>188.5 (165.8-212.5)</td>
<td>338.6 (289.3-391.8)</td>
<td>533.5 (461.3-611.5)</td>
<td>58.7 (46.0-74.2)</td>
<td></td>
</tr>
<tr>
<td>Gambella</td>
<td>1411.2 (1176.5-1645.7)</td>
<td>750.1 (579.2-945.8)</td>
<td>194.5 (166.6-224.4)</td>
<td>415.8 (358.6-489.2)</td>
<td>608.0 (540.8-692.1)</td>
<td>73.8 (60.8-89.9)</td>
<td></td>
</tr>
<tr>
<td>Harari</td>
<td>1371.0 (1119.3-1673.9)</td>
<td>899.5 (648.3-1149.1)</td>
<td>216.8 (188.0-254.0)</td>
<td>338.8 (291.3-393.2)</td>
<td>580.0 (500.0-656.5)</td>
<td>62.6 (49.8-79.2)</td>
<td></td>
</tr>
<tr>
<td>Oromia</td>
<td>1358.2 (1199.2-1525.4)</td>
<td>806.2 (672.5-943.4)</td>
<td>199.6 (173.3-221.7)</td>
<td>347.1 (305.3-393.3)</td>
<td>520.5 (459.0-582.2)</td>
<td>63.8 (53.8-74.9)</td>
<td></td>
</tr>
<tr>
<td>Somali</td>
<td>1229.0 (1017.5-1438.5)</td>
<td>663.2 (508.9-829.5)</td>
<td>173.9 (150.5-205.9)</td>
<td>510.4 (436.1-594.8)</td>
<td>581.1 (482.3-688.1)</td>
<td>84.1 (66.0-108.2)</td>
<td></td>
</tr>
<tr>
<td>SNNP</td>
<td>1363.4 (1190.1-1527.1)</td>
<td>826.1 (688.6-984.6)</td>
<td>241.4 (209.9-270.5)</td>
<td>388.0 (343.2-444.1)</td>
<td>603.0 (532.0-684.3)</td>
<td>100.6 (81.0-119.0)</td>
<td></td>
</tr>
<tr>
<td>Tigray</td>
<td>1343.6 (1198.3-1505.1)</td>
<td>993.9 (851.0-1132.9)</td>
<td>221.2 (195.8-248.8)</td>
<td>318.6 (274.0-367.7)</td>
<td>600.2 (521.5-682.7)</td>
<td>63.8 (51.8-77.9)</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Data are presented as numbers of cases for communicable, maternal, neonatal, and nutritional diseases, non-communicable diseases, and injuries.*
In 2019, top five causes of age-standardized death rates for both sexes were stroke 90.2 (95% UI: 70.6-110.0), lower respiratory infections a rate of 86.4 (95% UI: 75.4-97.7), ischemic heart disease 84.2 (95% UI: 62.6-105.8), diarrheal diseases 76.4 (95% UI: 45.1-112.2), and tuberculosis 60.9 (95% UI: 50.4-71.5) per 100,000 populations (Table 7).

Years of life lost (YLLs)
In 2019, all-cause YLL was 30,188.2 (95% UI: 27,335.8-33,522.8) per 100,000 populations, and males accounted for 33,656.5 (95% UI: 29,329.6-38,434.0) in Ethiopia. Ethiopia’s age-standardized YLL rate was declined by 68.3% from 1990 to 2019. This is a statistically significant decline using 95% UI. YLL rates fell most dramatically between 2000 and 2015 across all regions. Age-standardized YLL rates were declined at the highest rates in Tigray (73%), Harari (71.4%), and Benishangul-Gumuz (70.1%). On the other hand, the lowest decline in the age-standardized YLL rate was observed in the Somali region, with a 50.3% change over this period (Table 5, Figure 3).
Table 5: Age-standardized YLLs/100,000 from all causes between 1990 and 2019, National and Sub-national estimates in Ethiopia

<table>
<thead>
<tr>
<th>National and Sub-nationals</th>
<th>1990 Male</th>
<th>Female</th>
<th>Both Sexes</th>
<th>2019 Male</th>
<th>Female</th>
<th>Both Sexes</th>
<th>YLLs change, and both sexes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afar</td>
<td>120900.5</td>
<td>136817.8</td>
<td>128,364.6</td>
<td>38024.6</td>
<td>45082.7</td>
<td>40,646.8</td>
<td>3891.2-46081.9</td>
</tr>
<tr>
<td>Benishangul-Gumuz</td>
<td>124591.5</td>
<td>145837.7</td>
<td>134,483.8</td>
<td>38301.6</td>
<td>42714.8</td>
<td>40,246.9</td>
<td>35285.3-51216.4</td>
</tr>
<tr>
<td>Somali</td>
<td>66194.0</td>
<td>84907.8</td>
<td>75,873.5</td>
<td>39101.0</td>
<td>35828.9</td>
<td>37,678.1</td>
<td>29916.1-42775.2</td>
</tr>
<tr>
<td>SNPP</td>
<td>112469.3</td>
<td>83537.1</td>
<td>98,483.9</td>
<td>37724.9</td>
<td>27971.0</td>
<td>32,890.5</td>
<td>24105.4-32513.6</td>
</tr>
<tr>
<td>Gambella</td>
<td>129431.5</td>
<td>76173.5</td>
<td>99,267.9</td>
<td>40161.1</td>
<td>23062.7</td>
<td>31,423.0</td>
<td>27436.2-36073.9</td>
</tr>
<tr>
<td>Amhara</td>
<td>107967.3</td>
<td>87694.3</td>
<td>98,094.5</td>
<td>34944.1</td>
<td>24309.9</td>
<td>29,627.0</td>
<td>19659.4-26958.5</td>
</tr>
<tr>
<td>Harari</td>
<td>134086.1</td>
<td>83990.5</td>
<td>101,652.6</td>
<td>33638.8</td>
<td>24647.6</td>
<td>29,023.2</td>
<td>26153.3-33252.0</td>
</tr>
<tr>
<td>Oromia</td>
<td>104212.0</td>
<td>81835.0</td>
<td>93,122.5</td>
<td>30159.1</td>
<td>25729.5</td>
<td>27,993.6</td>
<td>22546.6-29787.7</td>
</tr>
<tr>
<td>Dire Dawa</td>
<td>107149.0</td>
<td>79193.8</td>
<td>92,243.5</td>
<td>31504.1</td>
<td>24472.7</td>
<td>27,923.4</td>
<td>24822.9-31877.1</td>
</tr>
<tr>
<td>Tigray</td>
<td>108655.1</td>
<td>86908.4</td>
<td>97,852.0</td>
<td>29250.6</td>
<td>23650.8</td>
<td>26,435.5</td>
<td>20774.4-29063.4</td>
</tr>
<tr>
<td>Addis Ababa</td>
<td>78901.5</td>
<td>67035.9</td>
<td>72,811.2</td>
<td>27213.2</td>
<td>22406.3</td>
<td>24,588.0</td>
<td>19714.4-28204.5</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>104835.6</td>
<td>85016.8</td>
<td>95,166.8</td>
<td>33656.5</td>
<td>26577.4</td>
<td>30,188.2</td>
<td>18156.6-27566.7</td>
</tr>
</tbody>
</table>

Ethiop. J. Health Dev. 2023:37(SI-2)
In Ethiopia, the CMNN diseases were the leading causes of age-standardized YLL rates in 2019, with 15,843.9 (95% UI: 13,772.5-18,472.3) followed by NCDs, 11,927.4 (95% UI: 10,686.8-13,179.3) per 100,000 population. CMNN diseases were the leading causes of age-standardized YLL rates in Benishangul-Gumuz with 22,304.9 (95% UI: 18,846.5-26,500.6), Afar 21,728.6 (95% UI: 18,775.7-25,145.6), and Somali regions 21,631.8 (95% UI: 18,621.7-24,928.8) per 100,000 populations, respectively (Table 6).
<table>
<thead>
<tr>
<th>National and Sub-nationals</th>
<th>1990</th>
<th></th>
<th></th>
<th>2019</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>National</td>
<td>Sub-nationals</td>
<td>Communications, maternal, neonatal, and nutritional diseases</td>
<td>Communications, maternal, neonatal, and nutritional diseases</td>
<td>Communications, maternal, neonatal, and nutritional diseases</td>
<td>Communications, maternal, neonatal, and nutritional diseases</td>
<td>Communications, maternal, neonatal, and nutritional diseases</td>
<td>Communications, maternal, neonatal, and nutritional diseases</td>
</tr>
<tr>
<td></td>
<td>Ethiop.</td>
<td>Addis Ababa</td>
<td>Somali</td>
<td>Oromia</td>
<td>Harari</td>
<td>Gambella</td>
<td>SNPP</td>
<td>Tigray</td>
</tr>
<tr>
<td></td>
<td>YLLs/100,000</td>
<td>61919.5</td>
<td>38132.3</td>
<td>86666.4</td>
<td>60965.4</td>
<td>92855.9</td>
<td>61309.4</td>
<td>63269.0</td>
</tr>
<tr>
<td></td>
<td>(57137.1-66891.5)</td>
<td>(18219.8-25417.7)</td>
<td>(17979.9-24427.8)</td>
<td>(23035.8-38790.5)</td>
<td>(17333.7-25176.9)</td>
<td>(21748.2-37020.2)</td>
<td>(16359.6-26999.9)</td>
<td>(16847.4-25088.9)</td>
</tr>
<tr>
<td></td>
<td>Addis Ababa</td>
<td>21861.4</td>
<td>21141.7</td>
<td>30129.2</td>
<td>21406.4</td>
<td>29329.0</td>
<td>21727.0</td>
<td>20895.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(10561.1-12165.4)</td>
<td>(12909.8-14318.5)</td>
<td>(9882.4-13261.8)</td>
<td>(14816.5-16851.6)</td>
<td>(10878.2-13963.4)</td>
<td>(8123.5-10325.0)</td>
<td>(7846.7-9831.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11385.9</td>
<td>13537.2</td>
<td>11569.0</td>
<td>15722.7</td>
<td>12299.0</td>
<td>9207.1</td>
<td>8957.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(13772.5-18472.3)</td>
<td>(8668.1-12063.7)</td>
<td>(18775.7-25145.6)</td>
<td>(16053.2)</td>
<td>(18846.5-26500.6)</td>
<td>(12529.8-18046.2)</td>
<td>(12430.2-18009.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15843.9</td>
<td>10229.8</td>
<td>21728.6</td>
<td>16053.2</td>
<td>22304.9</td>
<td>15054.7</td>
<td>14919.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(10686.8-13179.3)</td>
<td>(10883.2-14942.9)</td>
<td>(13357.3-18132.4)</td>
<td>(11380.0)</td>
<td>(12342.6-17611.8)</td>
<td>(9324.1-12925.1)</td>
<td>(10261.2-14173.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11927.4</td>
<td>12685.1</td>
<td>15684.5</td>
<td>11380.0</td>
<td>14810.2</td>
<td>10981.3</td>
<td>9594.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2042.8-2860.0)</td>
<td>(1321.3-2124.3)</td>
<td>(2488.6-4128.7)</td>
<td>(1744.6-2826.7)</td>
<td>(2507.3-3895.7)</td>
<td>(1459.4-2456.3)</td>
<td>(1569.1-2677.0)</td>
</tr>
</tbody>
</table>
|                           | | 2416.9 | 1673.0 | 3233.8 | 2193.8 | 3131.8 | 1887.4 | 1849.7 | 2059.4 | 2023;37(SI-
| | | | | | | | | | 2) |
Leading specific causes of premature mortality rates
In 2019, the leading five causes of age-standardized YLLs for both sexes were neonatal disorders (including preterm birth, sepsis, and encephalopathy) 3,936.0 (95% UI: 3,102.0-5,062.4), diarrheal diseases 2,679.4 (95% UI: 1,823.9-3,760.2), lower respiratory infections 2,404.6 (95% UI: 2,059.4-2,833.3), tuberculosis 1,729.2 (95% UI: 1,421.6-2,049.9), and stroke 1,639.5 (95% UI: 1,277.3-1,998.8) per 100,000 people. In the same year, the leading specific causes of death by age-standardized YLL rates varied by region. HIV/AIDS was the leading cause of YLL for Addis Ababa 4,381.9 (95% UI: 3,213.4-5,800.0 YLL per 100,000 population) and Gambella 4,584.1 (95% UI: 2,776.2-7,087.1 YLL per 100,000 population). In contrast, tuberculosis was the leading cause in Afar, with a YLL rate of 4,224.4 (95% UI: 3,303.1-5,286.2) per 100,000 populations (Table 7). Neonatal disorders, diarrheal diseases, lower respiratory infections, tuberculosis, HIV/AIDS, malaria, stroke, and ischemic heart disease featured among the five leading specific causes of death in all regions, although ranking order varied across the regions (Table 7 and Figure 4 & 5).

Figure 4. Age-standardized major cause-specific death rates by national and sub-national states of Ethiopia (L3), 2019 Both sexes, age-standardized, 2019, deaths per 100,000

<table>
<thead>
<tr>
<th>Cause</th>
<th>Ethiopia</th>
<th>Addis Ababa</th>
<th>Afar</th>
<th>Amhara</th>
<th>Oromia</th>
<th>SNNP</th>
<th>Tigray</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Diarrheal diseases</td>
<td>4</td>
<td>11</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>5</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Cirrhosis and other chronic liver diseases</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Neonatal disorders</td>
<td>7</td>
<td>15</td>
<td>9</td>
<td>8</td>
<td>10</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>8</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>9</td>
<td>3</td>
<td>7</td>
<td>13</td>
<td>4</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Hypertensive heart disease</td>
<td>10</td>
<td>8</td>
<td>10</td>
<td>9</td>
<td>10</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>11</td>
<td>12</td>
<td>12</td>
<td>11</td>
<td>14</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Alzheimer's disease and other dementias</td>
<td>12</td>
<td>10</td>
<td>12</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>13</td>
<td>10</td>
<td>13</td>
<td>10</td>
<td>12</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Road injuries</td>
<td>14</td>
<td>16</td>
<td>17</td>
<td>14</td>
<td>18</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Meningitis</td>
<td>15</td>
<td>18</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>Protein-energy malnutrition</td>
<td>16</td>
<td>17</td>
<td>11</td>
<td>12</td>
<td>16</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Self-harm</td>
<td>17</td>
<td>19</td>
<td>20</td>
<td>19</td>
<td>24</td>
<td>22</td>
<td>19</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>18</td>
<td>13</td>
<td>22</td>
<td>23</td>
<td>23</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>Interpersonal violence</td>
<td>19</td>
<td>25</td>
<td>18</td>
<td>17</td>
<td>21</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>Falls</td>
<td>20</td>
<td>20</td>
<td>25</td>
<td>18</td>
<td>26</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Malaria</td>
<td>21</td>
<td>73</td>
<td>41</td>
<td>21</td>
<td>17</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Congenital birth defects</td>
<td>22</td>
<td>39</td>
<td>34</td>
<td>16</td>
<td>20</td>
<td>26</td>
<td>35</td>
</tr>
<tr>
<td>Asthma</td>
<td>23</td>
<td>31</td>
<td>19</td>
<td>20</td>
<td>22</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Cervical cancer</td>
<td>24</td>
<td>23</td>
<td>21</td>
<td>26</td>
<td>19</td>
<td>27</td>
<td>34</td>
</tr>
<tr>
<td>Maternal disorders</td>
<td>25</td>
<td>45</td>
<td>16</td>
<td>33</td>
<td>15</td>
<td>35</td>
<td>47</td>
</tr>
</tbody>
</table>
Figure 5: Age-standardized major cause specific YLLs by national and sub-national states of Ethiopia (L3), 2019.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Addis Ababa</th>
<th>Afar</th>
<th>Amhara</th>
<th>Benishangul-Gumuz</th>
<th>Dire Dawa</th>
<th>Gambella</th>
<th>Harari</th>
<th>Oromia</th>
<th>SNNP</th>
<th>Tigre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonatal disorders</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Diarrheal diseases</td>
<td>2</td>
<td>9</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>8</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Stroke</td>
<td>5</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>6</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>7</td>
<td>2</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>5</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Cirrhosis and other chronic liver diseases</td>
<td>8</td>
<td>6</td>
<td>8</td>
<td>7</td>
<td>9</td>
<td>8</td>
<td>9</td>
<td>7</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Congenital birth defects</td>
<td>9</td>
<td>20</td>
<td>18</td>
<td>9</td>
<td>12</td>
<td>11</td>
<td>18</td>
<td>11</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>10</td>
<td>8</td>
<td>11</td>
<td>11</td>
<td>14</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Malaria</td>
<td>11</td>
<td>40</td>
<td>22</td>
<td>10</td>
<td>8</td>
<td>5</td>
<td>9</td>
<td>8</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Meningitis</td>
<td>12</td>
<td>15</td>
<td>10</td>
<td>12</td>
<td>13</td>
<td>15</td>
<td>15</td>
<td>14</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Hypertensive heart disease</td>
<td>13</td>
<td>10</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>12</td>
<td>11</td>
<td>12</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>14</td>
<td>11</td>
<td>14</td>
<td>16</td>
<td>17</td>
<td>13</td>
<td>12</td>
<td>13</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>Road injuries</td>
<td>15</td>
<td>13</td>
<td>15</td>
<td>15</td>
<td>16</td>
<td>14</td>
<td>13</td>
<td>15</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>16</td>
<td>14</td>
<td>19</td>
<td>14</td>
<td>19</td>
<td>18</td>
<td>17</td>
<td>16</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Protein-energy malnutrition</td>
<td>17</td>
<td>25</td>
<td>12</td>
<td>25</td>
<td>11</td>
<td>17</td>
<td>20</td>
<td>20</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>Maternal disorders</td>
<td>18</td>
<td>28</td>
<td>9</td>
<td>21</td>
<td>10</td>
<td>23</td>
<td>34</td>
<td>23</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>Interpersonal violence</td>
<td>19</td>
<td>16</td>
<td>17</td>
<td>19</td>
<td>18</td>
<td>16</td>
<td>16</td>
<td>17</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>Whooping cough</td>
<td>20</td>
<td>47</td>
<td>16</td>
<td>17</td>
<td>20</td>
<td>26</td>
<td>21</td>
<td>18</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>Self-harm</td>
<td>21</td>
<td>19</td>
<td>20</td>
<td>23</td>
<td>23</td>
<td>24</td>
<td>19</td>
<td>22</td>
<td>22</td>
<td>19</td>
</tr>
<tr>
<td>Alzheimer's disease and other dementias</td>
<td>22</td>
<td>21</td>
<td>28</td>
<td>22</td>
<td>27</td>
<td>20</td>
<td>22</td>
<td>24</td>
<td>21</td>
<td>27</td>
</tr>
<tr>
<td>Leukemia</td>
<td>23</td>
<td>23</td>
<td>26</td>
<td>20</td>
<td>22</td>
<td>22</td>
<td>24</td>
<td>25</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>24</td>
<td>12</td>
<td>24</td>
<td>29</td>
<td>24</td>
<td>21</td>
<td>26</td>
<td>21</td>
<td>25</td>
<td>34</td>
</tr>
<tr>
<td>Other malignant neoplasms</td>
<td>25</td>
<td>22</td>
<td>29</td>
<td>24</td>
<td>26</td>
<td>25</td>
<td>23</td>
<td>26</td>
<td>29</td>
<td>27</td>
</tr>
</tbody>
</table>

Ethiop. J. Health Dev. 2023;37(SI-2)
### Table 7: Age-standardized top 20 causes of death in Rates and YLLs per 100,000 by national and sub-national, both sexes, 2019 (Level 3).

<table>
<thead>
<tr>
<th>Rank</th>
<th>Death rate</th>
<th>YLL rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ethiopia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stroke</td>
<td>90.2(70.62-110.04)</td>
</tr>
<tr>
<td>2</td>
<td>Lower respiratory infections</td>
<td>86.4(75.36-97.65)</td>
</tr>
<tr>
<td>3</td>
<td>Ischemic heart disease</td>
<td>84.2(62.56-105.75)</td>
</tr>
<tr>
<td>4</td>
<td>Diarrheal diseases</td>
<td>76.4(54.2-112.15)</td>
</tr>
<tr>
<td>5</td>
<td>Tuberculosis</td>
<td>60.9(50.44-71.5)</td>
</tr>
<tr>
<td>6</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>52.2(44.17-62.07)</td>
</tr>
<tr>
<td>7</td>
<td>Neonatal disorders</td>
<td>44.3(34.92-56.99)</td>
</tr>
<tr>
<td>8</td>
<td>Diabetes mellitus</td>
<td>36(31.01-41.43)</td>
</tr>
<tr>
<td>9</td>
<td>HIV/AIDS</td>
<td>33.6(28.68-39.58)</td>
</tr>
<tr>
<td>10</td>
<td>Hypertensive heart disease</td>
<td>32(17.85-53.09)</td>
</tr>
<tr>
<td>11</td>
<td>Chronic obstructive pulmonary disease</td>
<td>28.3(22.68-33.35)</td>
</tr>
<tr>
<td>12</td>
<td>Alzheimer's disease and other dementias</td>
<td>27.8(6.68-75.12)</td>
</tr>
<tr>
<td>13</td>
<td>Chronic kidney disease</td>
<td>26.2(22.48-30.08)</td>
</tr>
<tr>
<td>14</td>
<td>Road injuries</td>
<td>14.5(12.16-17.36)</td>
</tr>
<tr>
<td>15</td>
<td>Meningitis</td>
<td>14.1(12-16.55)</td>
</tr>
<tr>
<td>16</td>
<td>Protein-energy malnutrition</td>
<td>12.9(9.77-16.7)</td>
</tr>
<tr>
<td>17</td>
<td>Self-harm</td>
<td>10.1(8.21-12.9)</td>
</tr>
<tr>
<td>18</td>
<td>Breast cancer</td>
<td>9.7(7.96-11.64)</td>
</tr>
<tr>
<td>19</td>
<td>Interpersonal violence</td>
<td>9.7(7.94-11.89)</td>
</tr>
<tr>
<td>20</td>
<td>Falls</td>
<td>9.6(8.09-11.29)</td>
</tr>
<tr>
<td><strong>Addis Ababa</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Ischemic heart disease</td>
<td>116.5(93.99-139.84)</td>
</tr>
<tr>
<td>2</td>
<td>Stroke</td>
<td>116.2(96.78-137.59)</td>
</tr>
<tr>
<td>3</td>
<td>HIV/AIDS</td>
<td>95.6(71.23-125.38)</td>
</tr>
<tr>
<td>4</td>
<td>Lower respiratory infections</td>
<td>59.4(49.81-71.44)</td>
</tr>
<tr>
<td>5</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>47.2(38.14-58.42)</td>
</tr>
<tr>
<td>6</td>
<td>Tuberculosis</td>
<td>45.2(37.17-55.2)</td>
</tr>
<tr>
<td></td>
<td>Disorder</td>
<td>Prevalence</td>
</tr>
<tr>
<td>----</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>7</td>
<td>Diabetes mellitus</td>
<td>39.8(33-47.63)</td>
</tr>
<tr>
<td>8</td>
<td>Hypertensive heart disease</td>
<td>34.4(16.91-54.07)</td>
</tr>
<tr>
<td>9</td>
<td>Alzheimer's disease and other dementias</td>
<td>27.1(6.6-74.56)</td>
</tr>
<tr>
<td>10</td>
<td>Chronic kidney disease</td>
<td>27(22.3-32.27)</td>
</tr>
<tr>
<td>11</td>
<td>Diarrheal diseases</td>
<td>24.4(9.55-44.34)</td>
</tr>
<tr>
<td>12</td>
<td>Chronic obstructive pulmonary disease</td>
<td>22.9(16.88-28.26)</td>
</tr>
<tr>
<td>13</td>
<td>Breast cancer</td>
<td>15.5(11.29-20.74)</td>
</tr>
<tr>
<td>14</td>
<td>Neonatal disorders</td>
<td>12.9(8.85-18.16)</td>
</tr>
<tr>
<td>15</td>
<td>Road injuries</td>
<td>12.9(9.89-16.03)</td>
</tr>
<tr>
<td>16</td>
<td>Protein-energy malnutrition</td>
<td>11.2(9.2-13.43)</td>
</tr>
<tr>
<td>17</td>
<td>Meningitis</td>
<td>10.2(8.25-12.51)</td>
</tr>
<tr>
<td>18</td>
<td>Self-harm</td>
<td>9.1(6.95-12.18)</td>
</tr>
<tr>
<td>19</td>
<td>Falls</td>
<td>8.2(6.8-10.08)</td>
</tr>
<tr>
<td>20</td>
<td>Cervical cancer</td>
<td>8(5.44-11.28)</td>
</tr>
</tbody>
</table>

**Afar**

<table>
<thead>
<tr>
<th></th>
<th>Disorder</th>
<th>Prevalence</th>
<th>Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tuberculosis</td>
<td>140.4(113.05-171.19)</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>2</td>
<td>Stroke</td>
<td>130(101.08-160.22)</td>
<td>Neonatal disorders</td>
</tr>
<tr>
<td>3</td>
<td>Ischemic heart disease</td>
<td>118.2(88.68-154.84)</td>
<td>Diarrheal diseases</td>
</tr>
<tr>
<td>4</td>
<td>Lower respiratory infections</td>
<td>103.7(86.62-122.62)</td>
<td>HIV/AIDS</td>
</tr>
<tr>
<td>5</td>
<td>Diarrheal diseases</td>
<td>101.1(55.82-151.57)</td>
<td>Lower respiratory infections</td>
</tr>
<tr>
<td>6</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>63.4(48.41-82.03)</td>
<td>Stroke</td>
</tr>
<tr>
<td>7</td>
<td>HIV/AIDS</td>
<td>60.7(40.56-86.47)</td>
<td>Ischemic heart disease</td>
</tr>
<tr>
<td>8</td>
<td>Diabetes mellitus</td>
<td>44.7(37.44-53.71)</td>
<td>Cirrhosis and other chronic liver diseases</td>
</tr>
<tr>
<td>9</td>
<td>Neonatal disorders</td>
<td>37.5(28.99-49.26)</td>
<td>Maternal disorders</td>
</tr>
<tr>
<td>10</td>
<td>Hypertensive heart disease</td>
<td>37.4(20.89-59.95)</td>
<td>Meningitis</td>
</tr>
<tr>
<td>11</td>
<td>Protein-energy malnutrition</td>
<td>35.6(27.54-45.51)</td>
<td>Diabetes mellitus</td>
</tr>
<tr>
<td>12</td>
<td>Chronic obstructive pulmonary disease</td>
<td>32.1(21.92-45.83)</td>
<td>Protein-energy malnutrition</td>
</tr>
<tr>
<td>13</td>
<td>Chronic kidney disease</td>
<td>31.6(26.11-38.81)</td>
<td>Hypertensive heart disease</td>
</tr>
<tr>
<td>14</td>
<td>Meningitis</td>
<td>23.8(19.04-29.34)</td>
<td>Chronic kidney disease</td>
</tr>
<tr>
<td>15</td>
<td>Alzheimer's disease and other dementias</td>
<td>23.6(5.43-65.31)</td>
<td>Road injuries</td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td>Trend 1 (95% CI)</td>
<td>Trend 2 (95% CI)</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------</td>
<td>------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>10</td>
<td>Maternal disorders</td>
<td>19.4(15.5-23.49)</td>
<td>Interpersonal violence</td>
</tr>
<tr>
<td>11</td>
<td>Interpersonal violence</td>
<td>14.2(10.04-20.08)</td>
<td>Congenital disabilities</td>
</tr>
<tr>
<td>12</td>
<td>Asthma</td>
<td>13.8(8.91-20.93)</td>
<td>Chronic obstructive pulmonary disease</td>
</tr>
<tr>
<td>13</td>
<td>Self-harm</td>
<td>13.4(10.53-17.6)</td>
<td>Self-harm</td>
</tr>
<tr>
<td></td>
<td><strong>Amhara</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stroke</td>
<td>89.4(63.85-113.96)</td>
<td>Neonatal disorders</td>
</tr>
<tr>
<td>2</td>
<td>Diarrheal diseases</td>
<td>83.6(47.9-130.29)</td>
<td>Diarrheal diseases</td>
</tr>
<tr>
<td>3</td>
<td>Ischemic heart disease</td>
<td>82.6(57.25-108.94)</td>
<td>Lower respiratory infections</td>
</tr>
<tr>
<td>4</td>
<td>Lower respiratory infections</td>
<td>74.4(59.4-91.02)</td>
<td>HIV/AIDS</td>
</tr>
<tr>
<td>5</td>
<td>Tuberculosis</td>
<td>59.8(42.76-79.78)</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>6</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>50.3(37.16-73.63)</td>
<td>Stroke</td>
</tr>
<tr>
<td>7</td>
<td>Neonatal disorders</td>
<td>48(37.44-62.34)</td>
<td>Ischemic heart disease</td>
</tr>
<tr>
<td>8</td>
<td>HIV/AIDS</td>
<td>40.1(29.07-53.18)</td>
<td>Cirrhosis and other chronic liver diseases</td>
</tr>
<tr>
<td>10</td>
<td>Hypertensive heart disease</td>
<td>31.5(16.76-54.86)</td>
<td>Malaria</td>
</tr>
<tr>
<td>11</td>
<td>Chronic obstructive pulmonary disease</td>
<td>28.5(22.17-38.11)</td>
<td>Diabetes mellitus</td>
</tr>
<tr>
<td>12</td>
<td>Alzheimer's disease and other dementias</td>
<td>26.6(6.62-72.44)</td>
<td>Meningitis</td>
</tr>
<tr>
<td>13</td>
<td>Chronic kidney disease</td>
<td>22.6(17.82-27.8)</td>
<td>Hypertensive heart disease</td>
</tr>
<tr>
<td>14</td>
<td>Road injuries</td>
<td>12.9(10.13-16.31)</td>
<td>Chronic obstructive pulmonary disease</td>
</tr>
<tr>
<td>15</td>
<td>Meningitis</td>
<td>12.9(9.83-16.55)</td>
<td>Road injuries</td>
</tr>
<tr>
<td>16</td>
<td>Congenital disabilities</td>
<td>10.5(5.28-17.08)</td>
<td>Chronic kidney disease</td>
</tr>
<tr>
<td>17</td>
<td>Interpersonal violence</td>
<td>9.6(6.93-12.96)</td>
<td>Whooping cough</td>
</tr>
<tr>
<td>18</td>
<td>Falls</td>
<td>9.4(7.26-12.24)</td>
<td>Interpersonal violence</td>
</tr>
<tr>
<td>19</td>
<td>Self-harm</td>
<td>8.8(6.37-12.88)</td>
<td>Leukemia</td>
</tr>
<tr>
<td>20</td>
<td>Asthma</td>
<td>8.6(5.26-17.23)</td>
<td>Maternal disorders</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Disease</th>
<th>Trend 1 (95% CI)</th>
<th>Trend 2 (95% CI)</th>
<th>Trend 3 (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stroke</td>
<td>114.1(87.35-144.52)</td>
<td>Neonatal disorders</td>
<td>4794.2(3682.23-6308.66)</td>
</tr>
<tr>
<td>2</td>
<td>Diarrheal diseases</td>
<td>106.6(58.68-168.74)</td>
<td>Lower respiratory infections</td>
<td>3571.2(2772.41-4510.79)</td>
</tr>
<tr>
<td>3</td>
<td>Ischemic heart disease</td>
<td>104(76.61-136.98)</td>
<td>Diarrheal diseases</td>
<td>3468(2075.83-5236.29)</td>
</tr>
<tr>
<td></td>
<td>Condition</td>
<td>Prevalence</td>
<td>Cause</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------</td>
<td>---------------------</td>
<td>--------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Lower respiratory infections</td>
<td>101.8(84.02-121.72)</td>
<td>Tuberculosis</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Tuberculosis</td>
<td>100.8(81.21-123.74)</td>
<td>Stroke</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>55.8(42.99-73.42)</td>
<td>Ischemic heart disease</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Neonatal disorders</td>
<td>54(41.45-71.03)</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Diabetes mellitus</td>
<td>39.1(32.12-47.98)</td>
<td>Malaria</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Hypertensive heart disease</td>
<td>36.4(19.54-59.42)</td>
<td>HIV/AIDS</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Chronic kidney disease</td>
<td>28(22.56-34.65)</td>
<td>Maternal disorders</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Chronic obstructive pulmonary disease</td>
<td>27.6(17.93-40.11)</td>
<td>Protein-energy malnutrition</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Protein-energy malnutrition</td>
<td>27.5(21.07-34.18)</td>
<td>Congenital disabilities</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>HIV/AIDS</td>
<td>26.2(14.9-43.64)</td>
<td>Meningitis</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Alzheimer's disease and other dementias</td>
<td>24.5(5.78-67.95)</td>
<td>Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Meningitis</td>
<td>20(15.89-24.49)</td>
<td>Road injuries</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Malaria</td>
<td>17.3(2.08-51.94)</td>
<td>Chronic kidney disease</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Road injuries</td>
<td>17.1(13.84-21.17)</td>
<td>Interpersonal violence</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Cervical cancer</td>
<td>12.6(8.02-17.54)</td>
<td>Chronic obstructive pulmonary disease</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Congenital disabilities</td>
<td>11.9(6.25-20.5)</td>
<td>Whooping cough</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dire Dawa</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stroke</td>
<td>90.1(66.51-113.88)</td>
<td>Neonatal disorders</td>
</tr>
<tr>
<td>2</td>
<td>Ischemic heart disease</td>
<td>84.3(57.62-109.99)</td>
<td>HIV/AIDS</td>
</tr>
<tr>
<td>3</td>
<td>Lower respiratory infections</td>
<td>69.9(56.55-84)</td>
<td>Lower respiratory infections</td>
</tr>
<tr>
<td>4</td>
<td>HIV/AIDS</td>
<td>67.1(40.51-103.01)</td>
<td>Stroke</td>
</tr>
<tr>
<td>5</td>
<td>Diarrheal diseases</td>
<td>49.1(26.15-79.26)</td>
<td>Malaria</td>
</tr>
<tr>
<td>6</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>47.3(35.8-63.72)</td>
<td>Diarrheal diseases</td>
</tr>
<tr>
<td>7</td>
<td>Tuberculosis</td>
<td>47.1(36.58-58.63)</td>
<td>Ischemic heart disease</td>
</tr>
<tr>
<td>8</td>
<td>Neonatal disorders</td>
<td>40.5(30.27-53.58)</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>9</td>
<td>Diabetes mellitus</td>
<td>34.1(26.7-42.03)</td>
<td>Cirrhosis and other chronic liver diseases</td>
</tr>
<tr>
<td>10</td>
<td>Hypertensive heart disease</td>
<td>31.8(16.06-56.11)</td>
<td>Diabetes mellitus</td>
</tr>
<tr>
<td>11</td>
<td>Alzheimer's disease and other dementias</td>
<td>26.4(6.36-70.85)</td>
<td>Congenital birth defects</td>
</tr>
<tr>
<td>12</td>
<td>Chronic kidney disease</td>
<td>25.8(21.13-30.78)</td>
<td>Hypertensive heart disease</td>
</tr>
</tbody>
</table>

Ethiop. J. Health Dev. 2023:37(S1-2)
<table>
<thead>
<tr>
<th></th>
<th>Cause of Death</th>
<th>Years of Life Lost (95% UI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Malaria</td>
<td>21.5(2.26-54.94)</td>
</tr>
<tr>
<td>14</td>
<td>Chronic obstructive pulmonary disease</td>
<td>20.1(14.43-26.6)</td>
</tr>
<tr>
<td>15</td>
<td>Road injuries</td>
<td>14.1(9.05-22)</td>
</tr>
<tr>
<td>16</td>
<td>Protein-energy malnutrition</td>
<td>12.6(8.93-18.56)</td>
</tr>
<tr>
<td>17</td>
<td>Breast cancer</td>
<td>10.8(8.02-14.88)</td>
</tr>
<tr>
<td>18</td>
<td>Meningitis</td>
<td>10.3(8.16-12.92)</td>
</tr>
<tr>
<td>19</td>
<td>Falls</td>
<td>8.6(6.79-10.78)</td>
</tr>
<tr>
<td>20</td>
<td>Interpersonal violence</td>
<td>8.4(6.12-11.46)</td>
</tr>
<tr>
<td></td>
<td><strong>Gambella</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Stroke</td>
<td>113.5(82.92-142.58)</td>
</tr>
<tr>
<td>2</td>
<td>Ischemic heart disease</td>
<td>106(75.34-139.83)</td>
</tr>
<tr>
<td>3</td>
<td>HIV/AIDS</td>
<td>92(56.85-139.75)</td>
</tr>
<tr>
<td>4</td>
<td>Lower respiratory infections</td>
<td>82.4(68.39-97.19)</td>
</tr>
<tr>
<td>5</td>
<td>Tuberculosis</td>
<td>76.8(61.29-94.68)</td>
</tr>
<tr>
<td>6</td>
<td>Diarrheal diseases</td>
<td>66.2(31.72-106.05)</td>
</tr>
<tr>
<td>7</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>55.6(44.53-68.52)</td>
</tr>
<tr>
<td>8</td>
<td>Diabetes mellitus</td>
<td>38.5(31.52-46.44)</td>
</tr>
<tr>
<td>9</td>
<td>Hypertensive heart disease</td>
<td>34.4(18.72-62.25)</td>
</tr>
<tr>
<td>10</td>
<td>Neonatal disorders</td>
<td>31.5(23.57-41.73)</td>
</tr>
<tr>
<td>11</td>
<td>Chronic kidney disease</td>
<td>27.2(22.08-32.77)</td>
</tr>
<tr>
<td>12</td>
<td>Chronic obstructive pulmonary disease</td>
<td>26.2(19.13-34)</td>
</tr>
<tr>
<td>13</td>
<td>Alzheimer's disease and other dementias</td>
<td>25.2(6.01-68.84)</td>
</tr>
<tr>
<td>14</td>
<td>Malaria</td>
<td>16.2(3.45-42.65)</td>
</tr>
<tr>
<td>15</td>
<td>Road injuries</td>
<td>15.4(12.09-19.85)</td>
</tr>
<tr>
<td>16</td>
<td>Meningitis</td>
<td>13.1(10.51-16.1)</td>
</tr>
<tr>
<td>17</td>
<td>Protein-energy malnutrition</td>
<td>12.9(8.84-17.04)</td>
</tr>
<tr>
<td>18</td>
<td>Interpersonal violence</td>
<td>11.2(8.23-15.69)</td>
</tr>
<tr>
<td>19</td>
<td>Self-harm</td>
<td>10.4(7.56-14.69)</td>
</tr>
<tr>
<td>20</td>
<td>Asthma</td>
<td>9.6(6.3-18.03)</td>
</tr>
</tbody>
</table>

| Harari |

<table>
<thead>
<tr>
<th></th>
<th>Cause of Death</th>
<th>Years of Life Lost (95% UI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stroke</td>
<td>113.5(82.92-142.58)</td>
</tr>
<tr>
<td>2</td>
<td>Ischemic heart disease</td>
<td>106(75.34-139.83)</td>
</tr>
<tr>
<td>3</td>
<td>HIV/AIDS</td>
<td>92(56.85-139.75)</td>
</tr>
<tr>
<td>4</td>
<td>Lower respiratory infections</td>
<td>82.4(68.39-97.19)</td>
</tr>
<tr>
<td>5</td>
<td>Tuberculosis</td>
<td>76.8(61.29-94.68)</td>
</tr>
<tr>
<td>6</td>
<td>Diarrheal diseases</td>
<td>66.2(31.72-106.05)</td>
</tr>
<tr>
<td>7</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>55.6(44.53-68.52)</td>
</tr>
<tr>
<td>8</td>
<td>Diabetes mellitus</td>
<td>38.5(31.52-46.44)</td>
</tr>
<tr>
<td>9</td>
<td>Hypertensive heart disease</td>
<td>34.4(18.72-62.25)</td>
</tr>
<tr>
<td>10</td>
<td>Neonatal disorders</td>
<td>31.5(23.57-41.73)</td>
</tr>
<tr>
<td>11</td>
<td>Chronic kidney disease</td>
<td>27.2(22.08-32.77)</td>
</tr>
<tr>
<td>12</td>
<td>Chronic obstructive pulmonary disease</td>
<td>26.2(19.13-34)</td>
</tr>
<tr>
<td>13</td>
<td>Alzheimer's disease and other dementias</td>
<td>25.2(6.01-68.84)</td>
</tr>
<tr>
<td>14</td>
<td>Malaria</td>
<td>16.2(3.45-42.65)</td>
</tr>
<tr>
<td>15</td>
<td>Road injuries</td>
<td>15.4(12.09-19.85)</td>
</tr>
<tr>
<td>16</td>
<td>Meningitis</td>
<td>13.1(10.51-16.1)</td>
</tr>
<tr>
<td>17</td>
<td>Protein-energy malnutrition</td>
<td>12.9(8.84-17.04)</td>
</tr>
<tr>
<td>18</td>
<td>Interpersonal violence</td>
<td>11.2(8.23-15.69)</td>
</tr>
<tr>
<td>19</td>
<td>Self-harm</td>
<td>10.4(7.56-14.69)</td>
</tr>
<tr>
<td>20</td>
<td>Asthma</td>
<td>9.6(6.3-18.03)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Cause of Death</th>
<th>Years of Life Lost (95% UI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stroke</td>
<td>113.5(82.92-142.58)</td>
</tr>
<tr>
<td>2</td>
<td>Ischemic heart disease</td>
<td>106(75.34-139.83)</td>
</tr>
<tr>
<td>3</td>
<td>HIV/AIDS</td>
<td>92(56.85-139.75)</td>
</tr>
<tr>
<td>4</td>
<td>Lower respiratory infections</td>
<td>82.4(68.39-97.19)</td>
</tr>
<tr>
<td>5</td>
<td>Tuberculosis</td>
<td>76.8(61.29-94.68)</td>
</tr>
<tr>
<td>6</td>
<td>Diarrheal diseases</td>
<td>66.2(31.72-106.05)</td>
</tr>
<tr>
<td>7</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>55.6(44.53-68.52)</td>
</tr>
<tr>
<td>8</td>
<td>Diabetes mellitus</td>
<td>38.5(31.52-46.44)</td>
</tr>
<tr>
<td>9</td>
<td>Hypertensive heart disease</td>
<td>34.4(18.72-62.25)</td>
</tr>
<tr>
<td>10</td>
<td>Neonatal disorders</td>
<td>31.5(23.57-41.73)</td>
</tr>
<tr>
<td>11</td>
<td>Chronic kidney disease</td>
<td>27.2(22.08-32.77)</td>
</tr>
<tr>
<td>12</td>
<td>Chronic obstructive pulmonary disease</td>
<td>26.2(19.13-34)</td>
</tr>
<tr>
<td>13</td>
<td>Alzheimer's disease and other dementias</td>
<td>25.2(6.01-68.84)</td>
</tr>
<tr>
<td>14</td>
<td>Malaria</td>
<td>16.2(3.45-42.65)</td>
</tr>
<tr>
<td>15</td>
<td>Road injuries</td>
<td>15.4(12.09-19.85)</td>
</tr>
<tr>
<td>16</td>
<td>Meningitis</td>
<td>13.1(10.51-16.1)</td>
</tr>
<tr>
<td>17</td>
<td>Protein-energy malnutrition</td>
<td>12.9(8.84-17.04)</td>
</tr>
<tr>
<td>18</td>
<td>Interpersonal violence</td>
<td>11.2(8.23-15.69)</td>
</tr>
<tr>
<td>19</td>
<td>Self-harm</td>
<td>10.4(7.56-14.69)</td>
</tr>
<tr>
<td>20</td>
<td>Asthma</td>
<td>9.6(6.3-18.03)</td>
</tr>
<tr>
<td>Position</td>
<td>Disease</td>
<td>Incidence (95% CI)</td>
</tr>
<tr>
<td>----------</td>
<td>---------------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Stroke</td>
<td>102.7(78.39-126.79)</td>
</tr>
<tr>
<td>2</td>
<td>Ischemic heart disease</td>
<td>92(67.71-116.29)</td>
</tr>
<tr>
<td>3</td>
<td>Lower respiratory infections</td>
<td>77.1(63.09-92.52)</td>
</tr>
<tr>
<td>4</td>
<td>Tuberculosis</td>
<td>61(46.06-75.71)</td>
</tr>
<tr>
<td>5</td>
<td>Diarrheal diseases</td>
<td>52.2(26.81-86.27)</td>
</tr>
<tr>
<td>6</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>50.4(39.35-64.7)</td>
</tr>
<tr>
<td>7</td>
<td>Neonatal disorders</td>
<td>40.2(30.05-53.01)</td>
</tr>
<tr>
<td>8</td>
<td>HIV/AIDS</td>
<td>38.8(24.5-65.11)</td>
</tr>
<tr>
<td>9</td>
<td>Diabetes mellitus</td>
<td>37(29.18-45.21)</td>
</tr>
<tr>
<td>10</td>
<td>Hypertensive heart disease</td>
<td>36.2(18.43-61.89)</td>
</tr>
<tr>
<td>11</td>
<td>Chronic kidney disease</td>
<td>28.1(23.25-33.34)</td>
</tr>
<tr>
<td>12</td>
<td>Alzheimer's disease and other dementias</td>
<td>26.8(16.46-73.23)</td>
</tr>
<tr>
<td>13</td>
<td>Chronic obstructive pulmonary disease</td>
<td>23.2(16.54-29.01)</td>
</tr>
<tr>
<td>14</td>
<td>Malaria</td>
<td>19.8(2.64-52.44)</td>
</tr>
<tr>
<td>15</td>
<td>Road injuries</td>
<td>14.6(10.15-23.99)</td>
</tr>
<tr>
<td>16</td>
<td>Meningitis</td>
<td>12.9(10.12-16.16)</td>
</tr>
<tr>
<td>17</td>
<td>Protein-energy malnutrition</td>
<td>12.2(8.47-18.06)</td>
</tr>
<tr>
<td>18</td>
<td>Breast cancer</td>
<td>11.9(8.81-15.64)</td>
</tr>
<tr>
<td>19</td>
<td>Falls</td>
<td>9.2(7.39-11.16)</td>
</tr>
<tr>
<td>20</td>
<td>Interpersonal violence</td>
<td>9.2(6.57-12.5)</td>
</tr>
</tbody>
</table>

**Oromia**

<table>
<thead>
<tr>
<th>Position</th>
<th>Disease</th>
<th>Incidence (95% CI)</th>
<th>Associated Disease</th>
<th>Incidence (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lower respiratory infections</td>
<td>89.3(75.91-103.18)</td>
<td>Neonatal disorders</td>
<td>3962.8(3151.45-5047.45)</td>
</tr>
<tr>
<td>2</td>
<td>Stroke</td>
<td>77.5(57.53-98.33)</td>
<td>Diarrheal diseases</td>
<td>2636.7(1799.45-3752.16)</td>
</tr>
<tr>
<td>3</td>
<td>Ischemic heart disease</td>
<td>75(52.08-97.73)</td>
<td>Lower respiratory infections</td>
<td>2433.8(2042.25-2879.55)</td>
</tr>
<tr>
<td>4</td>
<td>Diarrheal diseases</td>
<td>71.4(43.92-110.98)</td>
<td>Tuberculosis</td>
<td>1424.6(1145.31-1764.27)</td>
</tr>
<tr>
<td>5</td>
<td>Tuberculosis</td>
<td>52.5(42.94-64.03)</td>
<td>Stroke</td>
<td>1382.5(1033.51-1753.97)</td>
</tr>
<tr>
<td>6</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>49.9(40.85-60.24)</td>
<td>Ischemic heart disease</td>
<td>1317.6(915.29-1719.34)</td>
</tr>
<tr>
<td>7</td>
<td>Neonatal disorders</td>
<td>44.6(35.47-56.81)</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>1250.9(1002.15-1549.27)</td>
</tr>
<tr>
<td>8</td>
<td>Diabetes mellitus</td>
<td>35.3(29.16-41.8)</td>
<td>HIV/AIDS</td>
<td>1154.7(791.12-1689.22)</td>
</tr>
<tr>
<td>9</td>
<td>Hypertensive heart disease</td>
<td>29.8(16.12-51.79)</td>
<td>Congenital birth defects</td>
<td>689.7(427.97-1142.24)</td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td>Mortality (YLL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------</td>
<td>-------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Alzheimer’s disease and other dementias</td>
<td>28.9(6.93-77.37)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Chronic obstructive pulmonary disease</td>
<td>27(20.6-32.21)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Chronic kidney disease</td>
<td>26.4(21.43-31.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>HIV/AIDS</td>
<td>23.9(16.38-33.96)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Protein-energy malnutrition</td>
<td>14.2(10.71-17.95)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Road injuries</td>
<td>13.9(11.31-17.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Meningitis</td>
<td>13.1(10.81-15.78)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Breast cancer</td>
<td>9.9(7.89-11.85)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Self-harm</td>
<td>9.5(7.42-12.49)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Falls</td>
<td>9.2(7.53-11.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Malaria</td>
<td>9.1(1.6-25.26)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Disease</th>
<th>Mortality (YLL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stroke</td>
<td>106.3(76.92-137.63)</td>
</tr>
<tr>
<td>2</td>
<td>Tuberculosis</td>
<td>105.8(78.4-148.83)</td>
</tr>
<tr>
<td>3</td>
<td>Diarrheal diseases</td>
<td>99.7(55.99-155.16)</td>
</tr>
<tr>
<td>4</td>
<td>Lower respiratory infections</td>
<td>97.6(79.26-118.67)</td>
</tr>
<tr>
<td>5</td>
<td>Ischemic heart disease</td>
<td>93.9(67-126.02)</td>
</tr>
<tr>
<td>6</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>55.5(41.23-75.1)</td>
</tr>
<tr>
<td>7</td>
<td>Neonatal disorders</td>
<td>48.9(38.58-62.57)</td>
</tr>
<tr>
<td>8</td>
<td>HIV/AIDS</td>
<td>43(31.4-59.89)</td>
</tr>
<tr>
<td>9</td>
<td>Diabetes mellitus</td>
<td>36(28.49-44.91)</td>
</tr>
<tr>
<td>10</td>
<td>Protein-energy malnutrition</td>
<td>33.3(23.07-46.02)</td>
</tr>
<tr>
<td>11</td>
<td>Hypertensive heart disease</td>
<td>31.7(16.68-56.83)</td>
</tr>
<tr>
<td>12</td>
<td>Chronic obstructive pulmonary disease</td>
<td>29.4(18.85-50.63)</td>
</tr>
<tr>
<td>13</td>
<td>Chronic kidney disease</td>
<td>26.1(20.38-33.81)</td>
</tr>
<tr>
<td>14</td>
<td>Alzheimer's disease and other dementias</td>
<td>24.1(5.66-65.44)</td>
</tr>
<tr>
<td>15</td>
<td>Meningitis</td>
<td>20.7(16.1-26.3)</td>
</tr>
<tr>
<td>16</td>
<td>Road injuries</td>
<td>16.4(12.71-20.75)</td>
</tr>
<tr>
<td>17</td>
<td>Interpersonal violence</td>
<td>12.3(8.6-17.16)</td>
</tr>
<tr>
<td>18</td>
<td>Asthma</td>
<td>11.5(7.18-18.97)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Disease</th>
<th>Mortality (YLL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Malaria</td>
<td>9.1(1.6-25.26)</td>
</tr>
<tr>
<td>20</td>
<td>Malaria</td>
<td>9.1(1.6-25.26)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Disease</th>
<th>Mortality (YLL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stroke</td>
<td>106.3(76.92-137.63)</td>
</tr>
<tr>
<td>2</td>
<td>Tuberculosis</td>
<td>105.8(78.4-148.83)</td>
</tr>
<tr>
<td>3</td>
<td>Diarrheal diseases</td>
<td>99.7(55.99-155.16)</td>
</tr>
<tr>
<td>4</td>
<td>Lower respiratory infections</td>
<td>97.6(79.26-118.67)</td>
</tr>
<tr>
<td>5</td>
<td>Ischemic heart disease</td>
<td>93.9(67-126.02)</td>
</tr>
<tr>
<td>6</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>55.5(41.23-75.1)</td>
</tr>
<tr>
<td>7</td>
<td>Neonatal disorders</td>
<td>48.9(38.58-62.57)</td>
</tr>
<tr>
<td>8</td>
<td>HIV/AIDS</td>
<td>43(31.4-59.89)</td>
</tr>
<tr>
<td>9</td>
<td>Diabetes mellitus</td>
<td>36(28.49-44.91)</td>
</tr>
<tr>
<td>10</td>
<td>Protein-energy malnutrition</td>
<td>33.3(23.07-46.02)</td>
</tr>
<tr>
<td>11</td>
<td>Hypertensive heart disease</td>
<td>31.7(16.68-56.83)</td>
</tr>
<tr>
<td>12</td>
<td>Chronic obstructive pulmonary disease</td>
<td>29.4(18.85-50.63)</td>
</tr>
<tr>
<td>13</td>
<td>Chronic kidney disease</td>
<td>26.1(20.38-33.81)</td>
</tr>
<tr>
<td>14</td>
<td>Alzheimer's disease and other dementias</td>
<td>24.1(5.66-65.44)</td>
</tr>
<tr>
<td>15</td>
<td>Meningitis</td>
<td>20.7(16.1-26.3)</td>
</tr>
<tr>
<td>16</td>
<td>Road injuries</td>
<td>16.4(12.71-20.75)</td>
</tr>
<tr>
<td>17</td>
<td>Interpersonal violence</td>
<td>12.3(8.6-17.16)</td>
</tr>
<tr>
<td>18</td>
<td>Asthma</td>
<td>11.5(7.18-18.97)</td>
</tr>
</tbody>
</table>

**Somali**

<table>
<thead>
<tr>
<th></th>
<th>Disease</th>
<th>Mortality (YLL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stroke</td>
<td>106.3(76.92-137.63)</td>
</tr>
<tr>
<td>2</td>
<td>Tuberculosis</td>
<td>105.8(78.4-148.83)</td>
</tr>
<tr>
<td>3</td>
<td>Diarrheal diseases</td>
<td>99.7(55.99-155.16)</td>
</tr>
<tr>
<td>4</td>
<td>Lower respiratory infections</td>
<td>97.6(79.26-118.67)</td>
</tr>
<tr>
<td>5</td>
<td>Ischemic heart disease</td>
<td>93.9(67-126.02)</td>
</tr>
<tr>
<td>6</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>55.5(41.23-75.1)</td>
</tr>
<tr>
<td>7</td>
<td>Neonatal disorders</td>
<td>48.9(38.58-62.57)</td>
</tr>
<tr>
<td>8</td>
<td>HIV/AIDS</td>
<td>43(31.4-59.89)</td>
</tr>
<tr>
<td>9</td>
<td>Diabetes mellitus</td>
<td>36(28.49-44.91)</td>
</tr>
<tr>
<td>10</td>
<td>Protein-energy malnutrition</td>
<td>33.3(23.07-46.02)</td>
</tr>
<tr>
<td>11</td>
<td>Hypertensive heart disease</td>
<td>31.7(16.68-56.83)</td>
</tr>
<tr>
<td>12</td>
<td>Chronic obstructive pulmonary disease</td>
<td>29.4(18.85-50.63)</td>
</tr>
<tr>
<td>13</td>
<td>Chronic kidney disease</td>
<td>26.1(20.38-33.81)</td>
</tr>
<tr>
<td>14</td>
<td>Alzheimer's disease and other dementias</td>
<td>24.1(5.66-65.44)</td>
</tr>
<tr>
<td>15</td>
<td>Meningitis</td>
<td>20.7(16.1-26.3)</td>
</tr>
<tr>
<td>16</td>
<td>Road injuries</td>
<td>16.4(12.71-20.75)</td>
</tr>
<tr>
<td>17</td>
<td>Interpersonal violence</td>
<td>12.3(8.6-17.16)</td>
</tr>
<tr>
<td>18</td>
<td>Asthma</td>
<td>11.5(7.18-18.97)</td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td>Tigray</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>1</td>
<td>Lower respiratory infections</td>
<td>31.2(24.15-37.86)</td>
</tr>
<tr>
<td>2</td>
<td>Stroke</td>
<td>96(67.34-123.71)</td>
</tr>
<tr>
<td>3</td>
<td>Ischemic heart disease</td>
<td>67.4(55.73-81.7)</td>
</tr>
<tr>
<td>4</td>
<td>Diarrheal diseases</td>
<td>62.1(50.89-74.44)</td>
</tr>
<tr>
<td>5</td>
<td>Tuberculosis</td>
<td>44.6(34.6-58.11)</td>
</tr>
<tr>
<td>6</td>
<td>Cirrhosis and other chronic liver diseases</td>
<td>34(20.02-53.15)</td>
</tr>
<tr>
<td>7</td>
<td>Neonatal disorders</td>
<td>30.8(25.61-36.63)</td>
</tr>
<tr>
<td>8</td>
<td>Diabetes mellitus</td>
<td>17.8(14.31-22.52)</td>
</tr>
<tr>
<td>9</td>
<td>Hypertensive heart disease</td>
<td>34(20.02-53.15)</td>
</tr>
<tr>
<td>10</td>
<td>Chronic obstructive pulmonary disease</td>
<td>13.9(11.11-17.56)</td>
</tr>
<tr>
<td>11</td>
<td>Chronic kidney disease</td>
<td>11.9(9.09-15.09)</td>
</tr>
<tr>
<td>12</td>
<td>Alzheimer's disease and other dementias</td>
<td>28.8(6.99-77.05)</td>
</tr>
<tr>
<td>13</td>
<td>HIV/AIDS</td>
<td>11.4(9.12-13.72)</td>
</tr>
<tr>
<td>14</td>
<td>Road injuries</td>
<td>117.9(91.08-147.91)</td>
</tr>
<tr>
<td>15</td>
<td>Meningitis</td>
<td>11.5(2.59-33.94)</td>
</tr>
<tr>
<td>17</td>
<td>Protein-energy malnutrition</td>
<td>13.9(10.2-18.57)</td>
</tr>
<tr>
<td>18</td>
<td>Interpersonal violence</td>
<td>11.9(9.09-15.09)</td>
</tr>
<tr>
<td>19</td>
<td>Malaria</td>
<td>11.5(2.59-33.94)</td>
</tr>
</tbody>
</table>

**Ethiop. J. Health Dev. 2023;37(SI-2)**
<table>
<thead>
<tr>
<th></th>
<th>Condition</th>
<th>Years of Life Lost (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Diabetes mellitus</td>
<td>38(30.89-45.87)</td>
</tr>
<tr>
<td>8</td>
<td>Hypertensive heart disease</td>
<td>36.6(19.77-61.88)</td>
</tr>
<tr>
<td>9</td>
<td>HIV/AIDS</td>
<td>33.8(19.21-50.31)</td>
</tr>
<tr>
<td>10</td>
<td>Neonatal disorders</td>
<td>30.8(23.75-40.55)</td>
</tr>
<tr>
<td>11</td>
<td>Chronic obstructive pulmonary disease</td>
<td>30.5(23.71-39.76)</td>
</tr>
<tr>
<td>12</td>
<td>Alzheimer's disease and other dementias</td>
<td>28.8(6.81-76.63)</td>
</tr>
<tr>
<td>13</td>
<td>Chronic kidney disease</td>
<td>26.8(21.83-32.75)</td>
</tr>
<tr>
<td>14</td>
<td>Road injuries</td>
<td>13(10.22-16.49)</td>
</tr>
<tr>
<td>15</td>
<td>Meningitis</td>
<td>11.4(8.58-13.97)</td>
</tr>
<tr>
<td>16</td>
<td>Protein-energy malnutrition</td>
<td>11.1(8.18-14.88)</td>
</tr>
<tr>
<td>17</td>
<td>Breast cancer</td>
<td>10.4(7.63-13.6)</td>
</tr>
<tr>
<td>18</td>
<td>Falls</td>
<td>10.2(8.07-12.67)</td>
</tr>
<tr>
<td>19</td>
<td>Interpersonal violence</td>
<td>9.7(7.36-12.84)</td>
</tr>
<tr>
<td>20</td>
<td>Cervical cancer</td>
<td>9.5(8.2-14.27)</td>
</tr>
</tbody>
</table>

Trends in Mortality and Years of Life Lost

Ethiop. J. Health Dev. 2023;37(SI-2)
**Discussion**

Overall, in 2019, 559,997 (95% UI: 506,117-621,976) deaths, 993.5 per 100,000 populations (95% UI: 915.0-1070.6) of age-standardized all-cause mortality rate and 30,188.2 (95% UI: 27,335.8-33,522.8) per 100,000 population of all-cause YLL were occurred in Ethiopia. From 1990 to 2019 number of deaths, all-cause age-standardized death rates and age-standardized YLL rates declined by 38.2%, 58.4%, and 68.3% in both sexes, respectively. This decline indicates an increased overall life expectancy by 21-93 years (95% CI, 21-79–22-07) in Ethiopia from 1990 to 2019 (6). This implies that the Ethiopian government and partners' commitment to addressing universal health coverage through primary health care services yielded fruit (20,21). However, there was a disparity of death reduction in Ethiopia’s regions and administrative cities except Somali. In the Somali region, the absolute number of deaths increased in 2019. This could be due to conflicts were happened in 2018 and 2019.

Deaths due to CMNNND have decreased in the last 30 years. However, death and premature mortality rates from CMNNNDs are still high in Ethiopia compared to global figures. Moreover, the changes were not uniform across the regions – for example, age-standardized death rates due to CMNNND in Somali and Benishangul-Gumuz regions were significantly higher than those in Amhara, Oromia, Tigray, and SNNP. Some regions like Gambella, Benishangul-Gumuz, Afar, and Somali have pastoralist and agro-pastoralist populations who have been severely under-served by health services. This may be due to their low Socio-demographic Index (SDI), poor health service accessibility, poor health workforce development and retention, and poor access to essential medicines because of their hard-to-reach natures (6). Regions vary in ecology, demography, and economy, leading to disease burden variations between regions, affecting health and mortality patterns over time (6).

In the last 30 years, age-standardized premature mortality rates have decreased significantly across all regions with unequal distribution. The decline was most significant between 2000-2015 across all regions and administrative cities. However, at the national level, stroke, lower respiratory infections, ischemic heart disease, diarrhoeal diseases, and tuberculosis remain the top five age-standardized specific causes of death in 2019. Neonatal disorders, diarrhoeal disease, lower respiratory infections, tuberculosis, and stroke were also the top five causes of age-standardized YLL rates in 2019. Despite being the leading causes of premature mortality, lower respiratory infections, tuberculosis, and diarrhoeal disease, premature mortality rates declined faster in Ethiopia than in the sub-Saharan Africa region or Eastern sub-Saharan Africa. The mortality decline between 2000 and 2015 might be due to the initiation of certain strategies and programs (22). These might include the introduction of the health extension program in 2003, the introduction of ART for HIV/AIDS, expansion of health care services and access, high workforce deployment, public and private partnerships, and strengthened primary health care services to address major risk factors (23). The vast majority of deaths caused by communicable diseases like HIV and malaria could be avoided using existing interventions.

From 2000 and 2015, non-communicable diseases (NCDs), including stroke, ischemic heart disease, hypertensive heart diseases, cancer, and diabetes, were among the leading causes of age-standardized deaths in Ethiopia and the regions. Preventing premature mortality from NCDs requires a strong implementation strategy and considerable resources. The efforts to counter infectious diseases between 2000 and 2015 could be a good lesson for achieving the SDGs. Recognizing this, the Essential Health Service package released in 2019 has several NCD interventions (24) and may lead to considerable improvements.

The findings of this study highlight the epidemiological transition happening in Ethiopia and its regions: a disease burden transition from predominantly infectious diseases to non-communicable diseases (25). As a result of this transition, ischemic heart disease and stroke were found to be among the five leading causes of age-standardized death rates in 2019 in Ethiopia and across regions. This trend suggests that non-communicable diseases have existed as problems over decades but have become more visible following greater reductions in common infectious, maternal, and nutritional diseases (26). This could largely be explained by population growth and aging: these two factors increase deaths from non-communicable diseases as declines in age-standardized death rates are counterbalanced by population growth and aging (27). These findings support claims that Ethiopia’s triple burden of NCDs and CMNNNDs exist (27,28). In addition, high premature mortality from CMNNNDs will likely lead to considerable economic and development challenges (29). This is comparable with another GBD study in Ethiopia (6).

**Implication of the findings for policies and practices**

The findings of this study highlight the trends and levels of death rate and YLL in Ethiopia’s regions and administrative cities. The findings will help evaluate Health Sector Transformation Plan I and NCD strategies at national and regional levels and create benchmarks for HSTP II (3). Therefore, these findings are also helpful for revising strategies and budget reallocations to incorporate more data on Ethiopia’s health, demographic and epidemiological transitions. However, the observed variations of disease burden in the regions may also vary among districts of each region, which requires further exploration to support policy at lower administrative levels.

The general limitations of the GBD approach also apply to this paper. These limitations have been discussed widely in other published GBD articles; however, we summarize the relevant limitations by focusing on data sources for Ethiopia (27,30,31). Regardless of rigorous and standardized methodology in estimating causes of death and cause-specific mortality, data incorporated into GBD 2019 were scarce for several Ethiopian regions. The cause of...
death data sources were mainly verbal autopsy and sibling history. In Ethiopia, verbal autopsy data sources lack national and regional representativeness, whereas sibling history data sources only address maternal health and related estimates. Because of the lack of completeness of these sources, there were considerable uncertainties (as indicated by the 95% UI for age-standardized death rates), which may affect policy debates, prioritization of causes, and health decisions. Limitations with verbal autopsy data sources also affected the uncertainty of the estimates. Variations in verbal autopsy data collection methods within and among data sources, including differences in recall period (between the time of death and interview), the type of questionnaire used, interviewers and physician reviewers, and completeness, may lead to low comparability of data (18,28,30). All verbal autopsy data sources represented regional locations, which greatly affects the uncertainty of national estimates during data processing and cause of death redistribution to provide national and regional estimates (32).

Conclusion
This analysis has shown that premature mortality rates decreased significantly from 2000 to 2015 across all regions of Ethiopia. Age-standardized YLL rates have decreased significantly between 1990 and 2019 across all regions with some disparities. Neonatal disorders, diarrheal disease, lower respiratory infections, tuberculosis, HIV/AIDS, ischemic heart disease, and stroke remained the leading causes of age-standardized YLL rates 2019 across the nation and regions.

Ethiopia needs a strong commitment to implement existing strategies to strengthen and integrate health services and to design multi-sectoral responses targeting non-communicable diseases. The triple burden of communicable, maternal, neonatal, and nutritional deficiency disorders, as well as non-communicable diseases and injury, should be considered in all strategy levels.

Competing interest:
The authors declare that they have no competing or potential conflicts of interest.

Acknowledgments: The authors thank the National Data Management and Analytics Center for Health under Ethiopian Public Health Institute, the Institute for Health Metrics and Evaluation at the University of Washington, and the GBD Collaborator Network of Experts for the collaborative initiative.

Funding: Bill and Melinda Gates Foundation funded EPHI and IHME collaborative GBD 2019 national and subnational burden of disease study. The funder of this study had no role in study design, data collection, data analysis, data interpretation, or the writing of the report.

Consent for Publication: Not Applicable.

Contributions of Authors: Vl, SB conceptualized and drafted the manuscript GD, TT, AZ, GT, AW, WA, TMB, ST, MN and AM reviewed the manuscript critically for important intellectual content and approved the final manuscript.

Acronyms:
CMNND Communicable, Maternal, Neonatal, and Nutritional Diseases and Disorders
CODEm Cause of Death Ensemble Modelling
EPHI Ethiopian Public Health Institute
GBD Global Burden of Disease
HEP Health Extension Program
HSTP Health Sector Transformation Plan
IHME Institute for Health Metrics and Evaluation
NCDs Non-communicable Disease
SDGs Sustainable Development Goals
SDI Socio-demographic Index
SNNP Southern Nations Nationalities and People
ST-GPR Spatiotemporal Gaussian Process
Regression
UI Uncertainty Intervals
YLL Years of Life Lost

References


quantifying the epidemiological transition. The Lancet 2015, 386:2145-2191.


