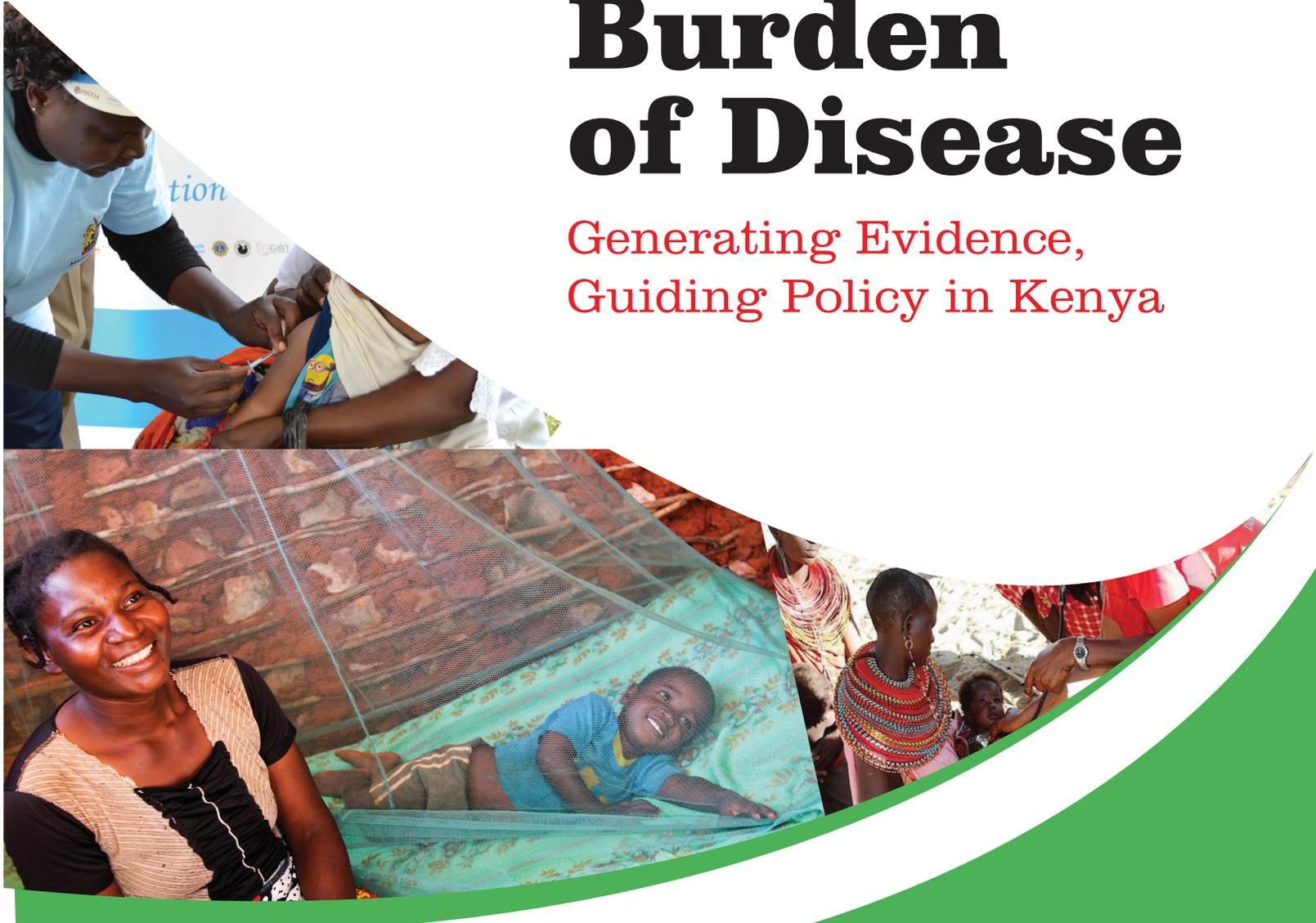


# The Global Burden of Disease

Generating Evidence,  
Guiding Policy in Kenya



A report produced by the Institute for Health Metrics and Evaluation and the International Centre for Humanitarian Affairs



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Guiding Policy in Kenya

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# Foreword

The effort towards improving the health of the population in Kenya continues to produce results driven by accurate and timely data. Over the past three decades, the country has witnessed impressive progress in tackling priority diseases such as malaria, HIV/AIDS and tuberculosis. Further, progress has been realized in addressing childhood diseases such as measles and diarrhea, largely through the expansion of key health interventions, including vaccines and other preventive health technologies. In addition, the country continues to focus on maternal health, by expanding health services to ensure that lives are not lost due to pregnancy-related complications.

Despite the impressive progress in tackling communicable, maternal and childhood diseases, the threat posed by the rising burden of non-communicable diseases (NCDs) risks eroding the recent gains realized by the health system in Kenya. Therefore, the Ministry of Health has partnered with various stakeholders with the aim of stemming the tide of NCDs and making further progress in improving health outcomes in the country.

This report on the burden of disease in Kenya, co-produced by the International Centre for Humanitarian Affairs (ICHA), based at the Kenya Red Cross Society (KRCS), and the Institute for Health Metrics and Evaluation (IHME), is the first of its kind in the country.

Leveraging different sources of data and over different time periods, the report presents one of the most reliable trends of the burden of disease and important risk factors over the last three decades. The report highlights the impressive progress the country has made over time, while pointing to areas that need further policy attention. In addition, the report provides a clear basis for setting priorities, as well as assessing health system performance. Therefore, health officials at the national and county levels will find the results presented here useful for their work, particularly as stewards of the health system.

It is our hope that the wide dissemination of these findings will promote debate across the health system with the aim of fostering effective delivery of services to address the burden of disease in the country. As we focus on the intricate role of health across the sustainable development goals, we are glad to note that this report takes a holistic approach that is key to entrenching health in all policies. More so it brings out the epidemiological transition towards Non communicable diseases and injuries that needs attention at both the national and county levels.

I take this opportunity to congratulate ICHA and IHME for producing this important piece of work that will be very useful towards strengthening the health system in Kenya. Further, efforts should be made to expand this work to meet the information needs of decision makers. For instance, a fine grain analysis to highlight trends at the sub-national level in the country would be a welcome step. Given the newly decentralized governance structure in Kenya, where counties are responsible for health service delivery.

**Dr. Kibachio Joseph Mwangi;**  
**MD, MPH (Lshmt), FRSPH.**

*Head; Division of Non-Communicable Diseases; Ministry Of Health,*



**Dr James Kisia**  
*Executive Director*  
ICHA



# Acronyms

**COPD** Chronic obstructive pulmonary disease

**DALYs** Disability-adjusted life years

**IHD** Ischemic heart disease

**LRIs** Lower respiratory infections

**MMR** Maternal mortality ratio

**NCDs** Non-communicable diseases

**YLDs** Years of lived with disability

**YLLs** Years of life lost

# About this report

*The Global Burden of Disease: Generating Evidence, Guiding Policy* in Kenya explores health progress in Kenya over the past 23 years and examines the challenges the country faces as its population grows and the landscape of its health shifts. This report is a collaboration between the International Center for Humanitarian Affairs (ICHA) based at Kenya Red Cross, and the University of Washington's Institute for Health Metrics and Evaluation (IHME). Using results from the Global Burden of Diseases, Injuries, and Risk Factors (GBD) study, which draws from the input of Kenyan data sources and researchers, we provide information about the causes of death and disability in Kenya, as well as the risk factors that contribute to poor health. Finally, the report highlights how policymakers are leading efforts to advance population-level health in addition to highlighting gaps.

This report complements Kenya's long history of using evidence to inform national health policies and programs to advance the health of all Kenyans. Recent evidence-informed policy efforts include the use of disease burden results to target the leading causes of health loss in Kenya for the Ministry of Health's Kenya Health Sector Strategy and Investment Plan (KHSSP), 2014-2018; health facility assessments to determine gaps in case management for non-communicable diseases for the Kenya National Strategy for the Prevention and Control of Non-Communicable Diseases, 2015-2020; and setting strategic national objectives in the updated Kenya Health Policy, 2014-2030. Collectively, the use of evidence in these high-level health policy plans lay the foundation for continued gains toward Kenya's Vision 2030, the nation's long-term goal for elevating Kenya to being a more prosperous, healthier country by 2030.

This report summarizes GBD 2013 findings for Kenya. Additional results for Kenya can be explored with a suite of data visualization tools hosted by IHME: <http://vizhub.healthdata.org/gbd-compare>

## About the Global Burden of Disease approach

Coordinated by IHME, GBD measures the years lost when people die prematurely or suffer from disability. GBD uses a comprehensive and comparable analytical framework to generate estimates of health levels and trends in Kenya and worldwide. The latest iteration of the GBD study, GBD 2013, quantified trends in premature death and disability due to 306 diseases and injuries, as well as 79 risks and risk factor groups, by age and sex in 188 countries between 1990 and 2013.

## Key terms

**Years of life lost (YLLs):** Years of life lost due to premature mortality.

**Years lived with disability (YLDs):** Years of life lived with any short- or long-term health loss, adjusted for severity. YLDs cover conditions that may last for only a few days, as well as those that can last a lifetime.

**Disability-adjusted life years (DALYs):** The sum of years lost due to premature death (YLLs) and years lived with disability (YLDs). DALYs are also defined as years of healthy life lost, and is therefore a measure of overall health loss.

**Life expectancy at birth:** The average number of years a person born in a given year can expect to live.

**Risk factors:** Potentially modifiable causes of disease and injury.

**Uncertainty intervals:** A range of values that are likely to include the correct estimate of a given indicator or measure of health. Limited data can lead to create wider uncertainty intervals, whereas greater data availability can contribute to narrower

**Under-5 mortality:** The probability of dying between birth and 5 years of age. This is expressed the number of under-5 deaths per 1,000 live births.

# Executive summary

## Introduction

To achieve its Vision 2030, Kenya must equip its health system and leaders with evidence for effective policymaking. In the backdrop of limited resources, efficient investment in health systems must be guided by strong evidence and supported by continuous performance assessment to ensure that the set targets are met. This is particularly true in the context of a newly decentralized governance structure in Kenya, where counties are responsible for health service delivery. Population-level health improvements within a decentralized governance structure elevate the need for timely, robust data on what kills and ails Kenyans in different parts of the country. With burden of disease data must come information on what health interventions work and which do not. The GBD study and other related research projects from IHME are aimed at answering fundamental questions that are central to improving population-level health.

## Changes in health for Kenya and Eastern sub-Saharan Africa

Compared with other countries in Eastern sub-Saharan Africa, Kenya has made remarkable progress, but disparities remain.

- **Overall health.** Rates of overall death and health loss<sup>1</sup> for all ages in Kenya are below that of the average rate across Eastern sub-Saharan Africa and of many neighboring countries.
- **Child health.** Childhood survival has improved across all countries in the region since 1990. Kenya's under-5 mortality fell to 58 deaths per 1,000 live births, compared to the regional average of 78 deaths per 1,000 live births.
- **Maternal health.** Among women of reproductive age (15-49), rates of health loss are lower than the regional average (390 maternal deaths per 100,000 live births) but are still high, with 277 maternal deaths per 100,000 live births.
- **Non-communicable diseases.** Despite overall progress, the burden of non-communicable disease is growing steadily in Kenya and across the region. Progress in reducing this burden is slow.

## Trends in life expectancy and survival

Kenya has rebounded the toll exasperated by HIV, attaining gains in overall life expectancy despite the impact of the HIV/AIDS epidemic.

- **Impact of HIV/AIDS.** Life expectancy of both males and females plummeted<sup>2</sup> between 1990 and the early 2000s as the HIV/AIDS epidemic expanded.
- **Overall gains in survival.** Since the 2000s, the life expectancy of Kenyans has steadily increased as survival for people living with HIV/AIDS has improved alongside reductions in death and disability from conditions like malaria, measles, and diarrheal diseases.

## Gains against HIV/AIDS and other communicable diseases

Kenya has made significant progress in reducing the burden of major infectious diseases.

- **HIV/AIDS.** Following the epidemic's peak in 2005, deaths from HIV/AIDS have decreased by more than 50% for both males and females, due to reduced incidence of new cases and improved survival of people living with HIV/AIDS.

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<sup>1</sup>In this report, overall "health loss" refers to disability-adjusted life years (DALYs), which are the years of healthy life lost from early death and disability.

<sup>2</sup>Between 1990 and 2000, life expectancy for females in Kenya decreased from 64 years to 59 years, and for men, it decreased from 62 years to 56 years.

- **Tuberculosis.** Though tuberculosis deaths increased between 1990 and 2000, deaths have fallen by nearly 40% since 2000. However, tuberculosis remains among the top five causes of death in Kenya.
- **Malaria.** Like tuberculosis, malaria deaths also increased between 1990 and 2000, but have fallen to an all-time low of 18.8 deaths per 100,000 population in 2013, a nearly 80% decrease since 1990. Unlike tuberculosis, malaria has fallen from the third-leading cause of death in 1990 to the sixth in 2013.
- **Diarrheal diseases,** lower respiratory infections (LRIs), and measles. Since the 1990s, rates of health loss from both diarrheal diseases and LRIs (e.g., pneumonia) have fallen by nearly 50%, though the burden of these disease among very young children is still high. The burden of measles was high but declined sharply by 90% between 2000 and 2005.

### Healthier mothers, infants, and children

Mothers and their children are safer and healthier due to improvements in delivery, reductions in early childhood diseases, and improved nutrition.

- **Mothers.** Increasingly more Kenyan women are surviving childbirth. There have been substantial declines in maternal mortality since 2004, particularly around conditions associated with delivery. Still, maternal mortality remains high in Kenya and progress in improving health is slow.
- **Infants.** Though the number of deaths of newborns has risen since the 1990s, rates of death due to neonatal conditions and infectious disease have decreased.
- **Children.** Kenya has realized substantial reductions in health loss among a subset of infectious diseases and conditions that largely affect children under 5 like LRIs, HIV/AIDS, diarrheal diseases, and especially measles.
- **Nutrition.** Deaths caused by childhood undernutrition have fallen by nearly 50% since 1990.

### Shifting burden toward non-communicable diseases (NCDs) and related risks

In the context of lifestyle changes characterized by high caloric intake, reduced physical activity, and an aging population, a new epidemic of NCDs, also known as chronic diseases, emerges.

- **Rise in major NCDs.** In 2000, NCDs accounted for 19.4% of the health loss (total DALYs) in Kenya across all ages and genders; by 2013 this proportion had risen to nearly 30%, due in large part to a rise in cerebrovascular disease (i.e., stroke) and ischemic heart disease.

### Policy implications

- **Decades of improvements move Kenya toward better health for all.** Since 1990, Kenya has made tremendous progress in addressing pressing health priorities, such as maternal and child health challenges. Major communicable diseases such malaria, tuberculosis, and HIV/AIDS are also on the decline, but remain a significant public health concern.
- **Combatting NCDs is a priority.** The emerging epidemic of NCDs and related risks factors may reverse Kenya's recent gains in health, unless urgent and deliberate actions are taken. The increased burden of NCDs, if remain unchecked, will have far-reaching socioeconomic effects in Kenya that span from the household to the health system. The continued rise in NCDs will require increased health resources or it will compromise gains in combatting HIV, maternal disorders, childhood diseases, and other conditions.
- **Mitigating risk factors will advance national health agenda.** Increasing higher rates of health loss can be attributed to risk factors such as poor diet, hypertension, high fasting blood glucose, high total cholesterol, and physical inactivity. These risk factors contribute to the development of NCDs, which may rise further if efforts to mitigate their effects are not prioritized.

# Regional context

## Leading causes of death and disability in Eastern sub-Saharan Africa

Across Eastern sub-Saharan Africa, the top five causes of health loss were dominated by communicable disorders, specifically HIV/AIDS, lower respiratory infections (LRIs), diarrheal diseases, tuberculosis, and malaria (Figure 1). Additionally, non-communicable diseases (NCDs) such as stroke, diabetes, and ischemic heart disease (IHD) are increasingly prominent across the region, especially in countries with higher economic development.

For countries, leading causes of death are also the leading causes of overall health loss; however, as shown in Figure 1, disabling conditions, such as lower back and neck pain, increasingly account for disease burden. In Kenya, the top five causes of death are HIV, LRIs, diarrhea, stroke, and tuberculosis. When focusing on the leading causes of early death and disability (DALYs), the rankings are similar.

**Table 1:** Leading causes of death and disability-adjusted life years (DALYs) in 2013 for both sexes combined, age-standardized

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

Location		Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
Global	Death	IHD	Stroke	COPD	LRI	Alzheimer's
	DALYs	IHD	Stroke	LRI	Back/Neck	COPD
Eastern sub-Saharan Africa	Death	HIV	Stroke	LRI	Diarrhea	TB
	DALYs	HIV	LRI	Diarrhea	TB	Malaria
Kenya	Death	HIV	LRI	Diarrhea	Stroke	TB
	DALYs	HIV	LRI	Diarrhea	TB	Stroke
Burundi	Death	Stroke	TB	LRI	Diarrhea	IHD
	DALYs	TB	Malaria	LRI	Diarrhea	HIV
Comoros	Death	Stroke	LRI	TB	Diarrhea	IHD
	DALYs	Stroke	LRI	TB	Diarrhea	Road injuries
Djibouti	Death	Stroke	LRI	IHD	HIV	TB
	DALYs	HIV	LRI	Stroke	Malaria	TB
Eritrea	Death	Diarrhea	Stroke	LRI	IHD	TB
	DALYs	Diarrhea	LRI	TB	Stroke	HIV
Ethiopia	Death	Stroke	LRI	Diarrhea	TB	IHD
	DALYs	LRI	HIV	Diarrhea	TB	Stroke
Madagascar	Death	Stroke	LRI	Diarrhea	IHD	COPD
	DALYs	Stroke	LRI	Diarrhea	COPD	IHD
Malawi	Death	HIV	LRI	Diarrhea	Stroke	TB
	DALYs	HIV	LRI	Diarrhea	TB	Stroke
Mauritius	Death	IHD	Diabetes	Stroke	CKD	LRI
	DALYs	Diabetes	IHD	Stroke	CKD	Back/Neck
Mozambique	Death	HIV	Malaria	TB	Stroke	LRI
	DALYs	HIV	Malaria	TB	LRI	Diarrhea
Rwanda	Death	Stroke	LRI	IHD	HIV	TB
	DALYs	HIV	LRI	War	Stroke	TB
Seychelles	Death	IHD	Stroke	LRI	HTN HD	Alzheimer's
	DALYs	IHD	Stroke	LRI	HTN HD	Diabetes
Somalia	Death	Diarrhea	LRI	TB	Stroke	IHD
	DALYs	Diarrhea	LRI	TB	Malaria	Stroke
Tanzania	Death	HIV	LRI	Diarrhea	TB	Stroke
	DALYs	HIV	LRI	Malaria	Diarrhea	TB
Uganda	Death	HIV	LRI	Stroke	IHD	TB
	DALYs	HIV	Malaria	LRI	TB	Road injuries
Zambia	Death	HIV	Stroke	LRI	TB	Diarrhea
	DALYs	HIV	Malaria	TB	LRI	Diarrhea
South Sudan	Death	Diarrhea	LRI	Stroke	TB	HIV
	DALYs	Diarrhea	HIV	LRI	TB	Stroke

### Legend

<b>Alzheimer's</b>	Alzheimer's disease	<b>IHD</b>	Ischemic heart disease
<b>Back/Neck</b>	Low back and neck pain	<b>LRI</b>	Lower respiratory infections
<b>CKD</b>	Chronic kidney disease		NN Preterm Preterm birth complications
<b>COPD</b>	Chronic obstructive pulmonary disease	<b>PEM</b>	Protein-energy malnutrition
<b>Diabetes</b>	Diabetes mellitus	<b>Road Inj</b>	Road injuries
<b>Diarrhea</b>	Diarrheal diseases	<b>STDs</b>	Sexually transmitted diseases other than HIV/AIDS
<b>HIV</b>	HIV/AIDS	<b>TB</b>	Tuberculosis
<b>HTN HD</b>	Hypertensive heart disease		

## Maternal and child health in Eastern sub-Saharan Africa

Kenya has made improvements since the 1990s in improving the health and children and mothers. Here we consider Kenya's progress in a regional context, looking at under-5 mortality and maternal mortality ratios (MMR) between 1990, 2000, and 2010 (Table 3 and Table 2)<sup>3</sup>.

Maternal mortality increased to its peak in 2004 (560 maternal deaths per 1,000 live births) and declined steadily since that point. In 2013, maternal mortality was high in Kenya (277 deaths per 100,000 live births) and throughout the region (390 deaths per 100,000 live births), especially compared to the average for developing countries (230 deaths per 100,000 live births).

**Table 2:** Maternal mortality<sup>5</sup> in Eastern Africa, 1990, 2000, and 2010, ranked from lowest to highest in 2013

	Ranking in 2013	1990	2000	2010	2013
<b>Seychelles</b>	1	17.3	13.1	12.2	11.7
<b>Mauritius</b>	2	22	17.5	15	14
<b>Mozambique</b>	3	121.8	83.2	51.6	45.8
<b>Kenya</b>	<b>4</b>	<b>151.5</b>	<b>114</b>	<b>66.3</b>	<b>58.2</b>
<b>Rwanda</b>	5	94.9	95.8	64.4	58.3
<b>Madagascar</b>	6	145.8	96.7	61.6	58.5
<b>Zambia</b>	7	163.3	158.7	68	62.6
<b>Uganda</b>	8	111.6	101.8	71.7	62.9
<b>Comoros</b>	9	203.9	144.3	82	74.4
<b>Malawi</b>	10	150.6	122.1	81.6	76.5
<b>Burundi</b>	11	163.2	138	86.9	80.1
<b>Tanzania</b>	12	174.8	152.2	97.8	80.5
<b>Somalia</b>	13	220.6	156.3	96.3	88.4
<b>Ethiopia</b>	14	175.5	179.1	92	88.7
<b>Djibouti</b>	15	227.1	166.2	104.4	89.9
<b>Eritrea</b>	16	188.8	157.3	118.5	113.7

<sup>3</sup>This statistic originates from the same source as the data in Table 2; however, the year 2004 is not depicted in the table.

<sup>5</sup>Maternal deaths per 100,000 live births

Across eastern African countries, under-5 mortality spiked in the 2000s, due to the emergence of HIV/AIDS in combination with the existing burden of communicable childhood diseases. Since the 2000s, childhood survival in Kenya has improved, reaching a mortality rate that is lower than in most countries in the region. But under-5 mortality is still high in Kenya. Though there have been massive gains in under-5 health, there remains a great need to ensure healthier childhoods for all.

**Table 3:** Under-5 mortality in Eastern Africa, 1990, 2000, and 2010, ranked from lowest to highest in 2013

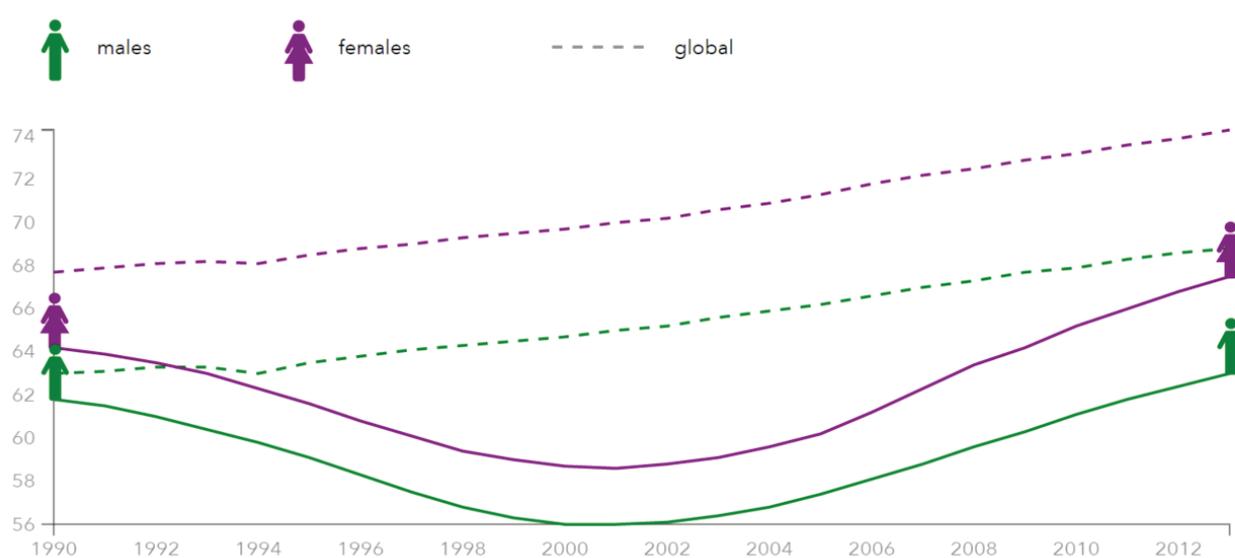
	Ranking in 2013	1990	2000	2010	2013
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<b>Kenya</b>	<b>5</b>	<b>94.9</b>	<b>95.8</b>	<b>64.4</b>	<b>58.3</b>
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<b>Malawi</b>	15	227.1	166.2	104.4	89.9
<b>Somalia</b>	16	188.8	157.3	118.5	113.7

# National trends

## Progress toward longer, healthier lives

Gains in life expectancy have occurred since the early 2000s (Figure 1). In 1990, male life expectancy at birth was 62 years and female life expectancy at birth was 64 years. This was comparable to the global average, which was 65 years for both sexes. However, life expectancy for both sexes fell amid Kenya's escalating HIV/AIDS epidemic in the early 2000s. Similar declines in life expectancy were seen throughout the region. Kenya's life expectancy fell to its lowest point since before the 1990s in 2000, and it continues to fall.

**Figure 1:** Life expectancy in Kenya, 1990-2013



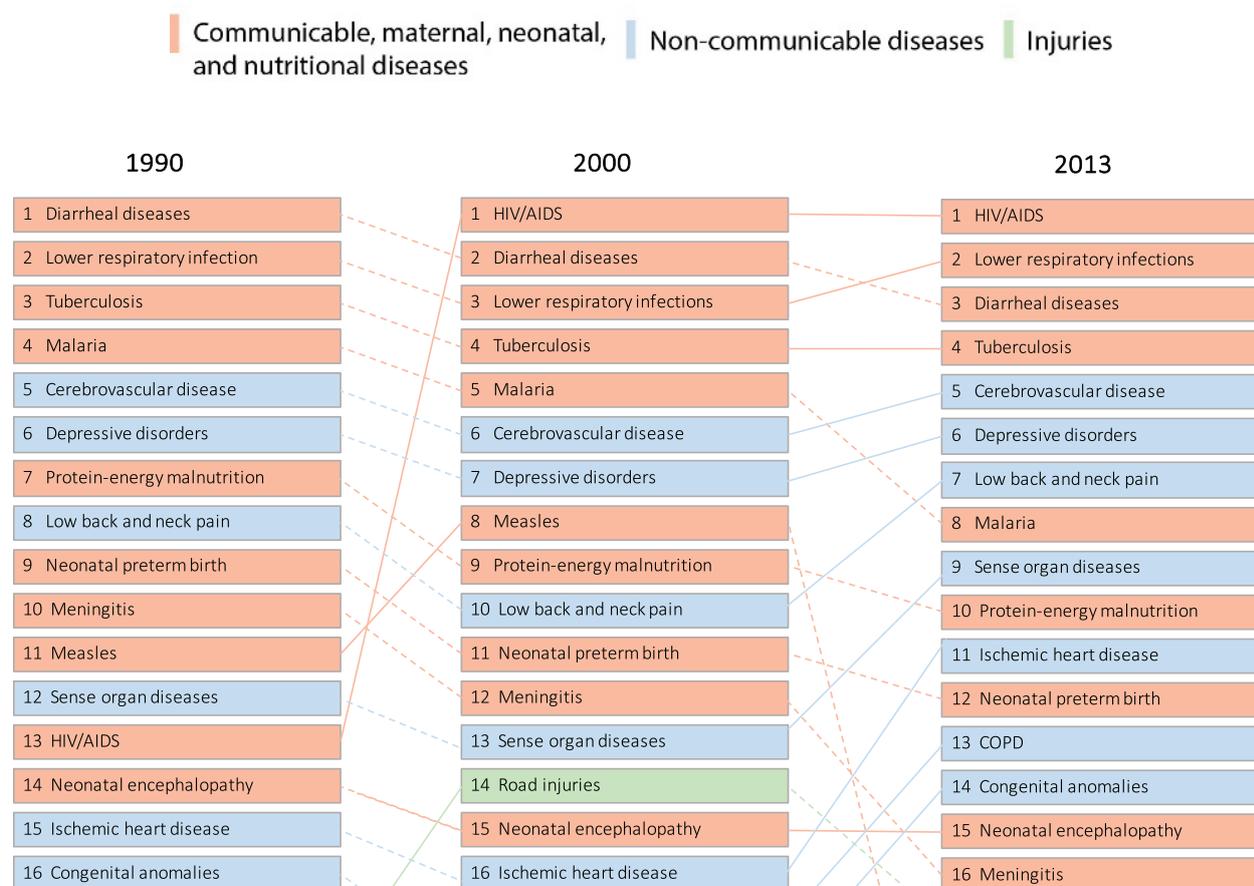
	Global		Kenya	
	1990	2013	1990	2013
males	63.0	68.8	61.8	63.0
females	67.7	74.3	64.2	67.5

## National shift in leading causes of lost health

HIV, malaria, pneumonia, diarrhea, TB continue to dominate the top causes of health loss in Kenya. However, increasingly, NCDs<sup>6</sup> account for a greater proportion of death and disability (Figure 2). Notable non-communicable conditions rising in the rankings are depression, congenital heart disease, low back pain, and COPD.

<sup>6</sup>About non-communicable diseases and their risk factors. Unlike communicable diseases, which are passed from person to person, NCDs develop gradually and are of a long duration (e.g., cardiovascular disease, cancers, chronic respiratory diseases, and diabetes). Like communicable diseases, NCDs affect all ages, but are observed in greater proportion among older people. The development of some NCDs are affected by both behavioral risk factors such as tobacco use, physical inactivity, and unhealthy diet, by metabolic risk factors such as elevated blood pressure and obesity, and by occupational and environmental risks such as air pollution and unsafe water and sanitation

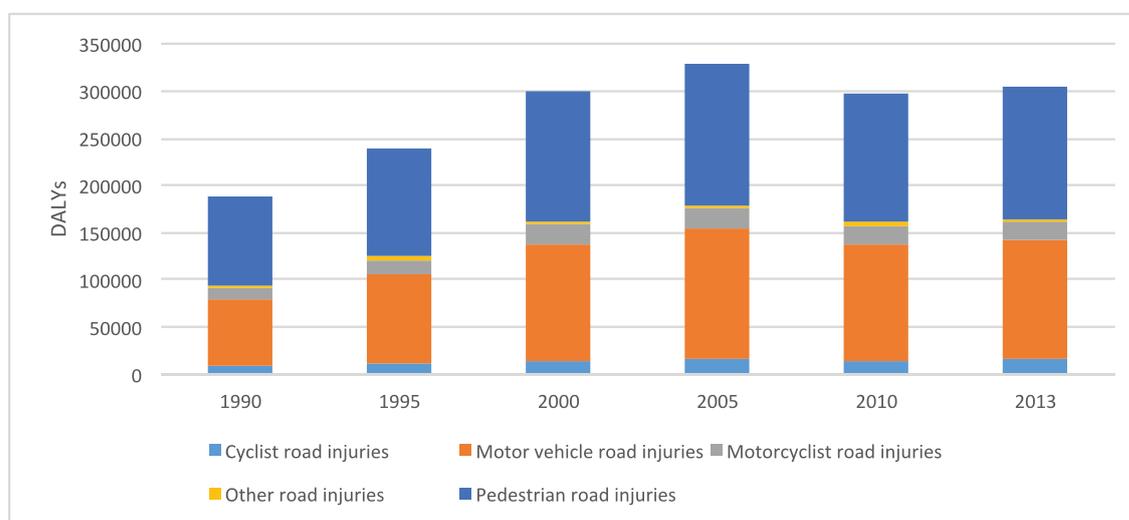
**Figure 2:** Leading causes of age-standardized disability-adjusted life years (DALYs) per 100,000 population in Kenya, both sexes combined, 1990, 2000, and 2013



### Transport injuries

Though road injuries are long-absent from the top ten causes of health loss in Kenya, there has been an increase in health loss due to transport injuries, especially among people between the ages of 20 and 34, since 1990. Within the category of road injuries, pedestrian road injuries accounted for 46% of all road injuries health loss, and motor vehicle accidents accounted for 41% of health loss in 2013 (Figure 3).

**Figure 3:** Total health loss to road injuries in Kenya, both genders, 1990-2013



## **Progress toward MDG6: Combat HIV/AIDS, malaria, and other diseases**

### **HIV/AIDS**

Kenya has made remarkable progress in reducing the burden of HIV/AIDS since the 2000s, with the number of estimated deaths from HIV/AIDS falling by 43% since 2000. However, as people live longer with HIV, the cumulative number of people needing ongoing care will continue to increase. To accommodate this growing demand, the health system stewards will need to work with all partners to efficiently allocate resources in a way that maximizes health as much as possible. The country also demonstrates ongoing commitment by the public and private sector to prevent and manage HIV/AIDS through the Kenya AIDS Strategic Framework and other economic and health sector initiatives.

### **Tuberculosis**

Kenya has made progress in reducing deaths from tuberculosis (TB) since the increase in TB-related deaths occurred between 1990 and 2000. Prior to the HIV epidemic, notification rates of TB were falling. However, the HIV epidemic increased vulnerabilities to TB and the notification rate of TB subsequently rose. Kenya developed a national TB strategy in the 1990s; since that time, treatment and detection efforts have been scaled up and the quality and coverage of the National TB Program has strengthened. Due in large part to the country's efforts to control both HIV and TB, TB deaths have fallen by nearly 40% since 2000.

### **Malaria**

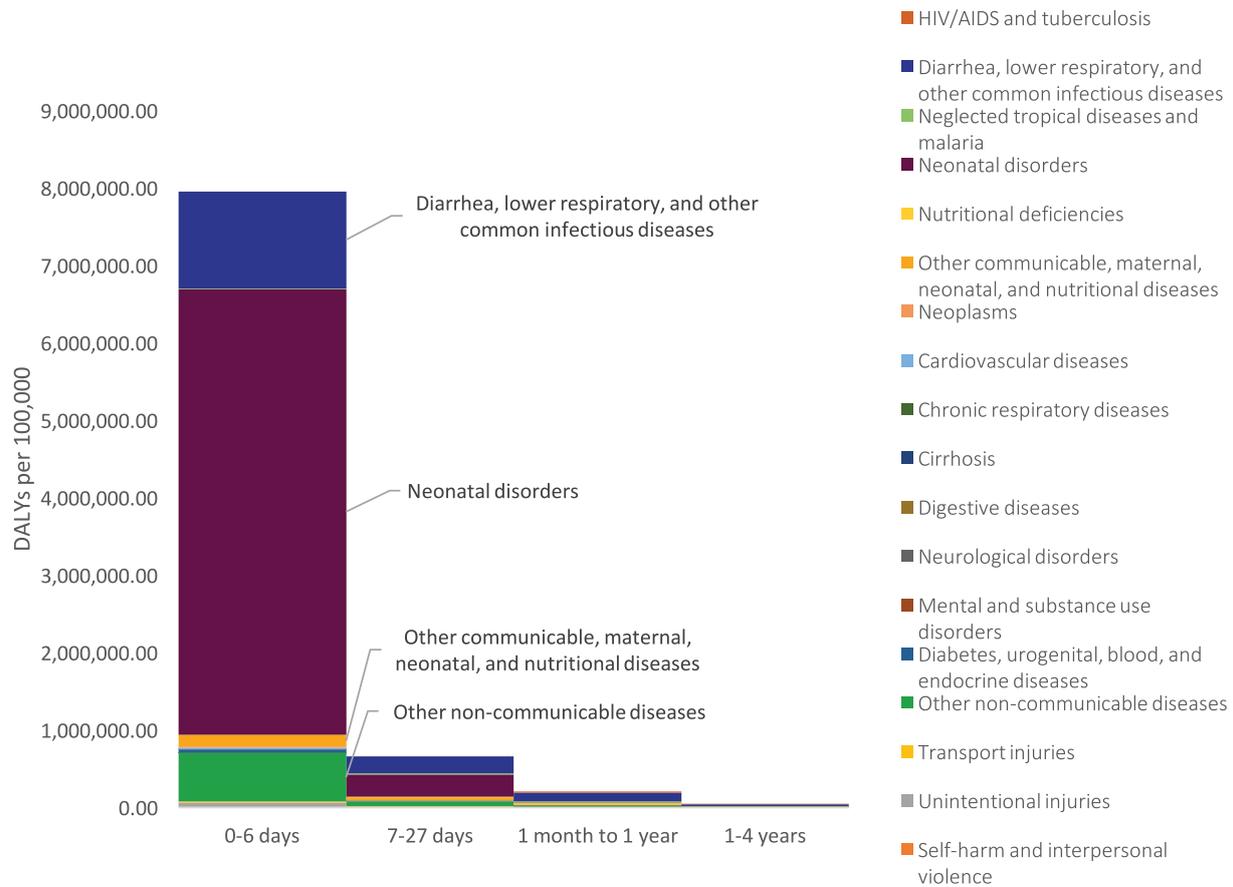
Kenya has recorded massive declines in malaria mortality since its peak in 2000. Gains are especially notable among children under the age of 5. Kenya has scaled up resources to expand malaria preventative interventions and treatment, especially for pregnant women and children. Kenya's malaria elimination and control efforts are shaped by its National Malaria Strategy, which covers the period of 2009 to 2017, was developed in line with the government's National Health Sector Strategic Plan and Kenya Vision 2030 plan, the Roll Back Malaria partnership, and the MDGs.

## **Better health of mothers, infants, and children**

### **Infants**

The highest rates of death and disability among children occur among newborns during the first month of life and especially during the first six days of life (Figure 4). Taken together, diarrhea, LRIs, and other common infectious disorders are the second-leading causes of death and disability among newborns in Kenya. Beyond the first week of life, survival for infants is substantially better. During the first year of life, the most common causes of death and disability are again, diarrhea, LRIs, and other common infectious disorders.

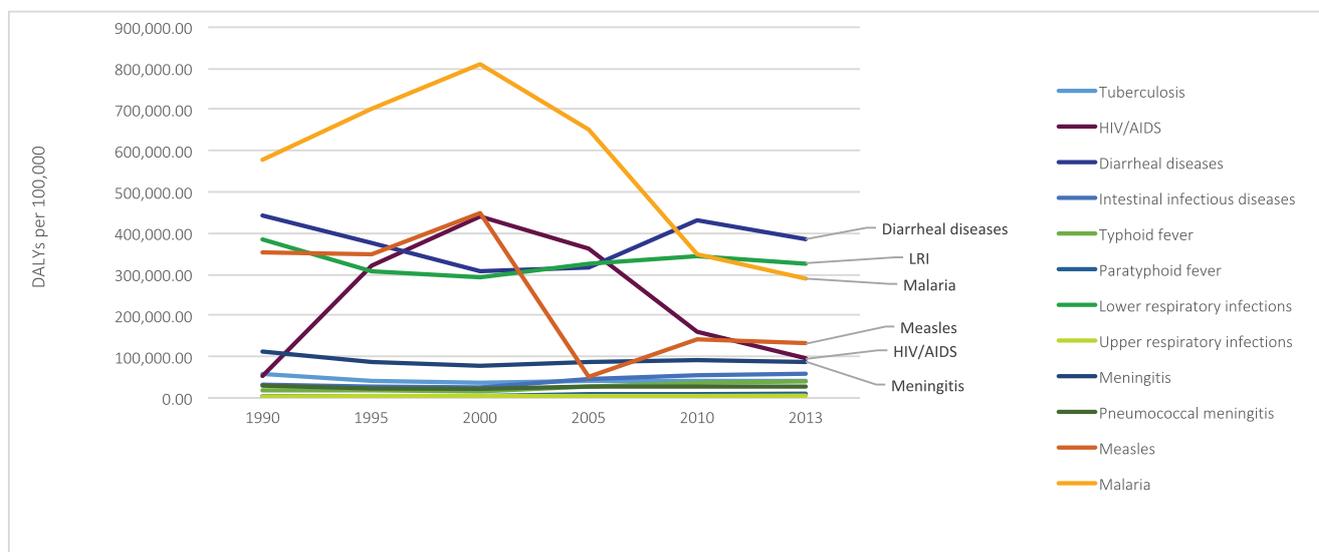
**Figure 4:** Causes of DALYs among children under the age of 5 years in Kenya, 2013



## Children

Much of the health loss among children between the ages of 1 year and 5 years in Kenya is due to conditions such as diarrheal disease, LRIs, and HIV/AIDS (Figure 5). While these major childhood killers remain high, there are notable decreases in child deaths from HIV, malaria, and measles.

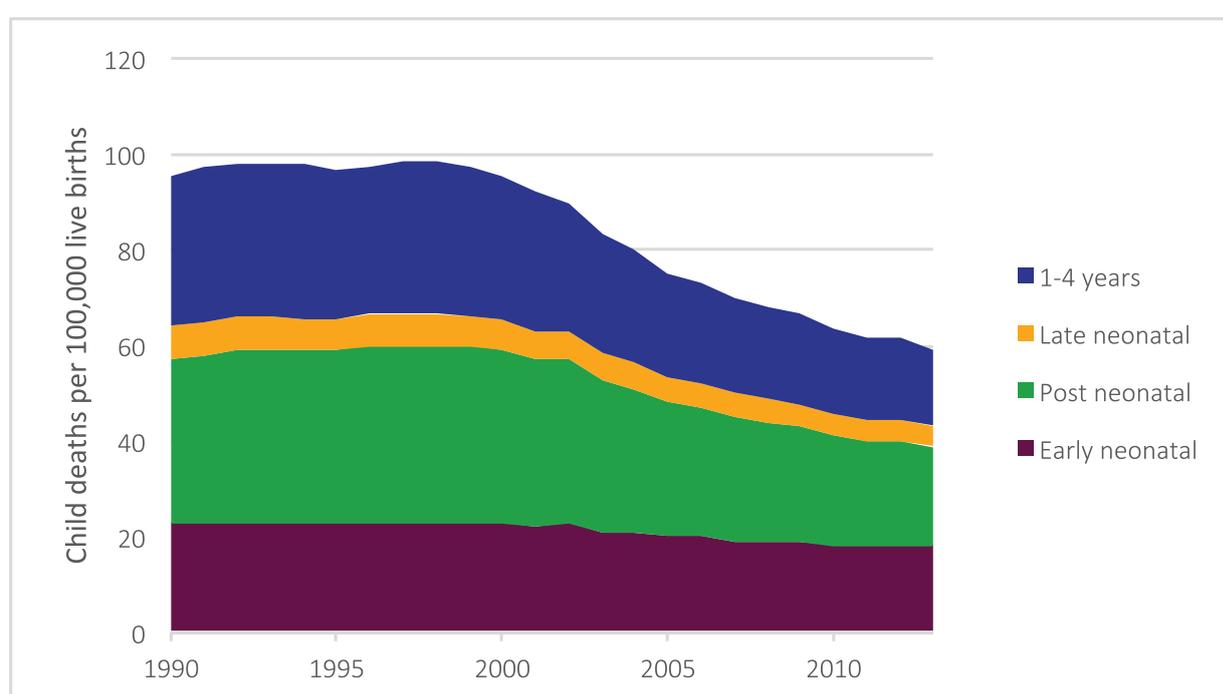
**Figure 5:** Trends in health loss (in DALYs per 100,000) among Kenyan children ages 1 year to 5 years in between 1990 and 2013



*Progress toward MDG4: Reduce childhood mortality by two-thirds between 1990 and 2015*

There was a 38% reduction in mortality (deaths among children <5 years old per 1,000 live births) among children under the age of 5 years between 1990 and 2013, with most progress occurring after 2000 (Figure 6). There have been large reductions in mortality among children between the ages of one to four; in the context of a growing population, this reflects progress combatting early childhood killers like malaria and HIV. A large proportion of under-5 mortality occurs in the post neonatal period (one month to one year), but a constantly large proportion of deaths still occur during the early neonatal (first seven days of life); this reflects the high burden of neonatal disorders and inadequate care during prenatal periods and birth.

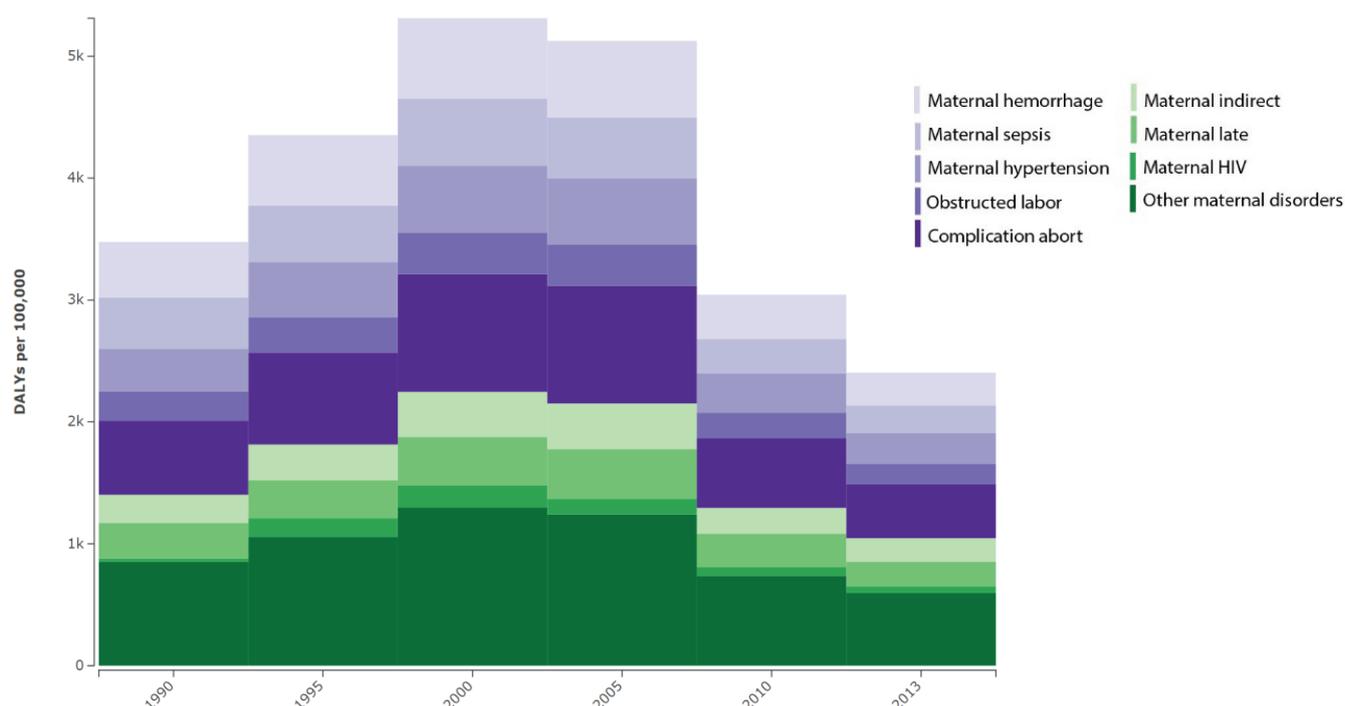
**Figure 6:** Under-5 mortality by neonatal period



### Maternal health

Maternal disorders fell from the eleventh-leading cause of death and disability to the seventeenth (Figure 2). However, there is still much avoidable death and disability due to maternal hemorrhage, obstructed labor, and maternal sepsis. Overall DALYs lost to maternal disorders have declined since 2000, due to a fall in health loss from complications of abortions, maternal hypertension, and other maternal disorders.

**Figure 7:** Composition trends of causes of death and disability among women of reproductive age due to maternal disorders (15-44)



### Progress toward MDG5: Improve maternal health

The main driver of declines in maternal mortality is a reduction in maternal HIV and reduced mortality from giving birth, ranging from complications associated with abortion, hemorrhage, and obstructed labor (Figure 7). In 2013, the Kenyan government addressed high maternal death and injury and the lack of access to quality maternal health services (including antenatal, delivery, and post-natal services) by waiving all user fees for maternity services at all public facilities. Though maternal mortality has markedly fallen in Kenya since that time, there is opportunity to further drive down the burden of maternal disorders.

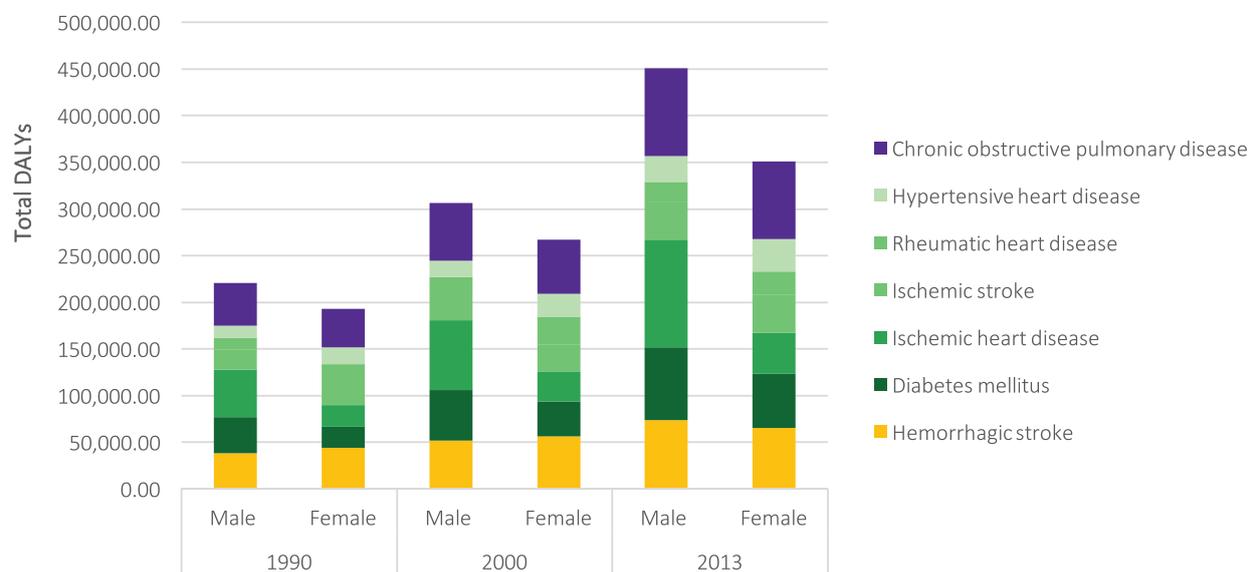
### Non-communicable diseases and related risks

Kenya recently published its first national strategy on tackling NCDs: Kenya National Strategy for the Prevention and Control of Non-Communicable Diseases, 2015-2020. This plan focuses on Kenya’s four major NCDs: cardiovascular diseases, cancers, chronic respiratory disease, and diabetes and in addition haemoglobinopathies, mental disorders, violence and injuries, oral and eye diseases plus chronic diseases with an infective origin like rheumatic heart diseases. It sets targets to reduce tobacco use, physical inactivity, harmful use of alcohol, sodium intake, raised blood pressure, obesity, and diabetes. This report explores some of the priority areas established by the MOH.

### Cardiovascular disease, stroke, and COPD, and diabetes

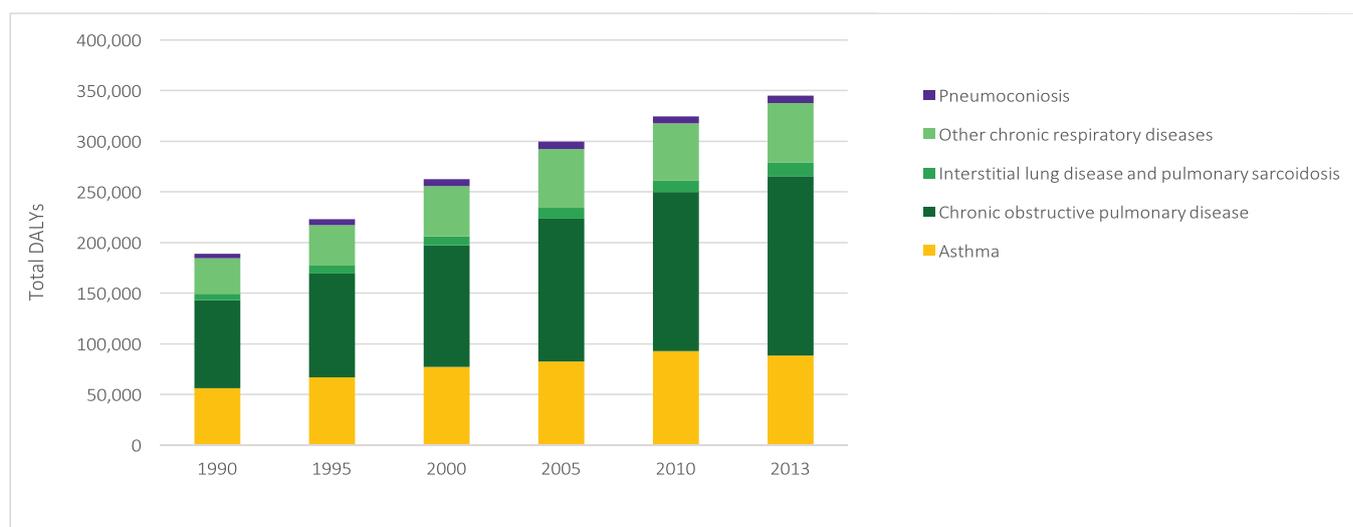
As life expectancy increases, the burden of NCDs affecting adults, namely cardiovascular disease, stroke, and COPD, and diabetes, rises. Notably, the presence of major NCDs are higher among males than females due to COPD and ischemic stroke (Figure 8). The health loss due to COPD and diabetes has risen substantially for both males and females since 1990. The rise of diabetes among females is substantial. Between 1990 and 2000, health loss due to diabetes among females increased by 152%, elevating the condition for the 22nd ranked cause of death and disability among Kenyan females to the 12th.

**Figure 8:** Total health loss (total DALYs) for select non-communicable diseases for all Kenyans in 1990, 2010, and 2013



Chronic respiratory diseases are on the rise in Kenya (Figure 9). The major chronic respiratory disease is COPD, which in 2013 accounted for over half of all chronic respiratory disease-attributable DALYs. Second to COPD is asthma, which accounted for a quarter of chronic respiratory disease-related DALYs. The disease burden of COPD has increased by 50% since 1990 and asthma has increased by nearly 40%.

**Figure 9:** Total health loss (total DALYs) due to chronic respiratory diseases

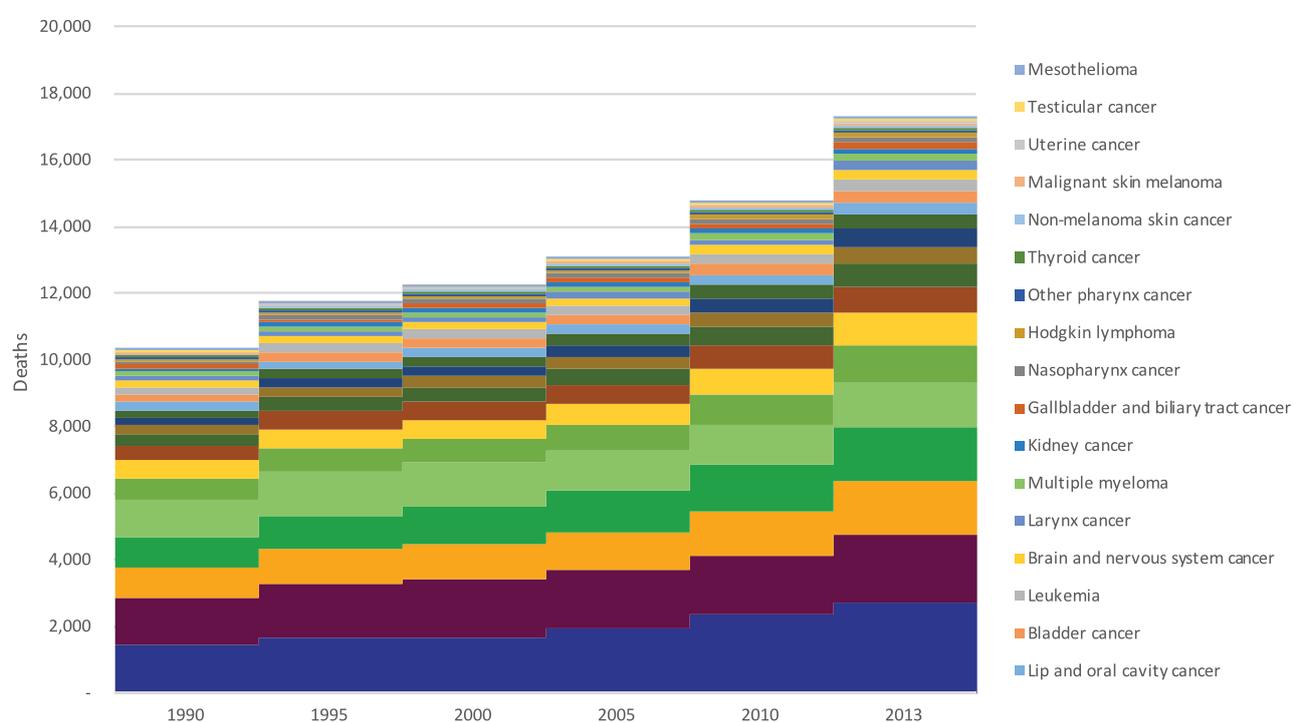


## Cancers

Deaths from cancers for both males and females are rising in Kenya, with a 69% increase in deaths due to cancer between 1990 and 2013 (Figure 10). Much of this increase is due to an 85% increase in esophageal cancer deaths among both males and females, with total deaths rising from 1,475 deaths in 1990 to 2,735 deaths in 2013.

There has been a great increase in breast and cervical cancer among females. In 1990, there were 1,366 deaths due to cervical cancer observed among females; by 2013 this had increased 26% to 2,000 deaths. Similarly, in 1990, there were 875 deaths due to breast cancer observed among females; by 2013 this had increased 81%, to 1,590 deaths.

**Figure 10:** Total deaths due to cancer among Kenyans, both sexes, 1990-2013



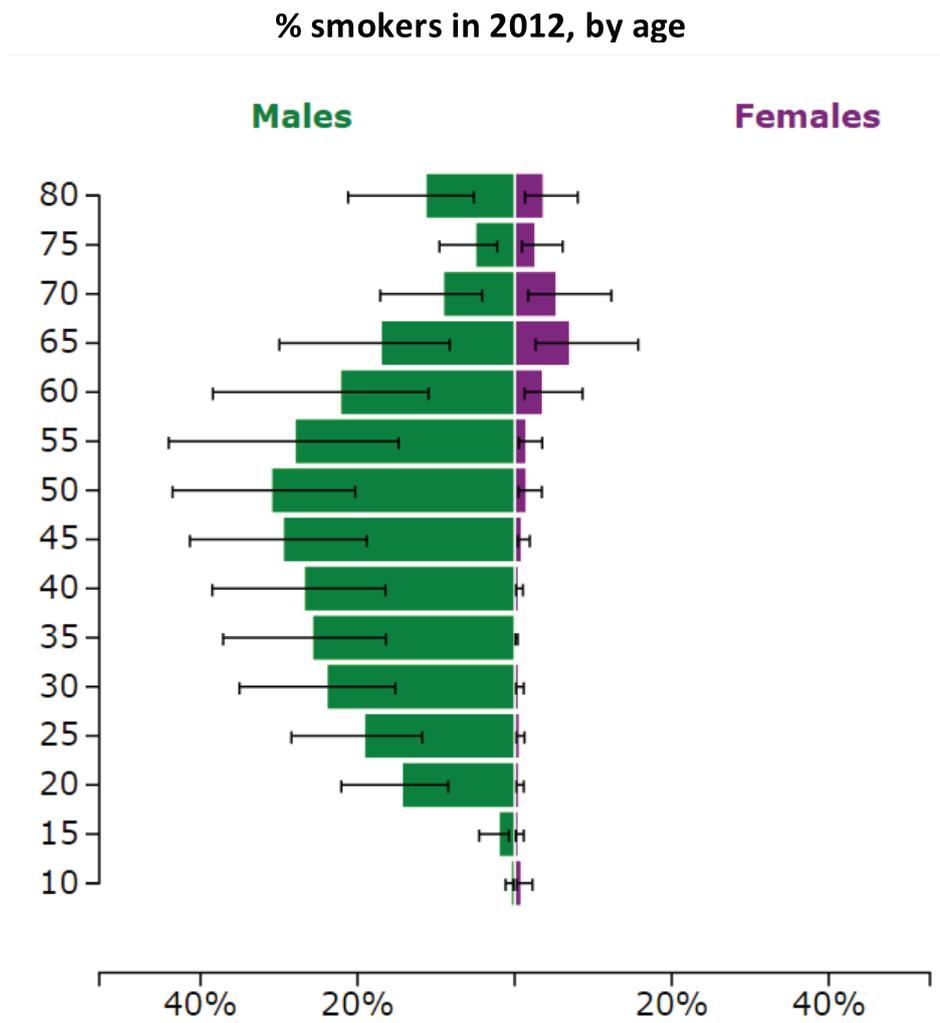
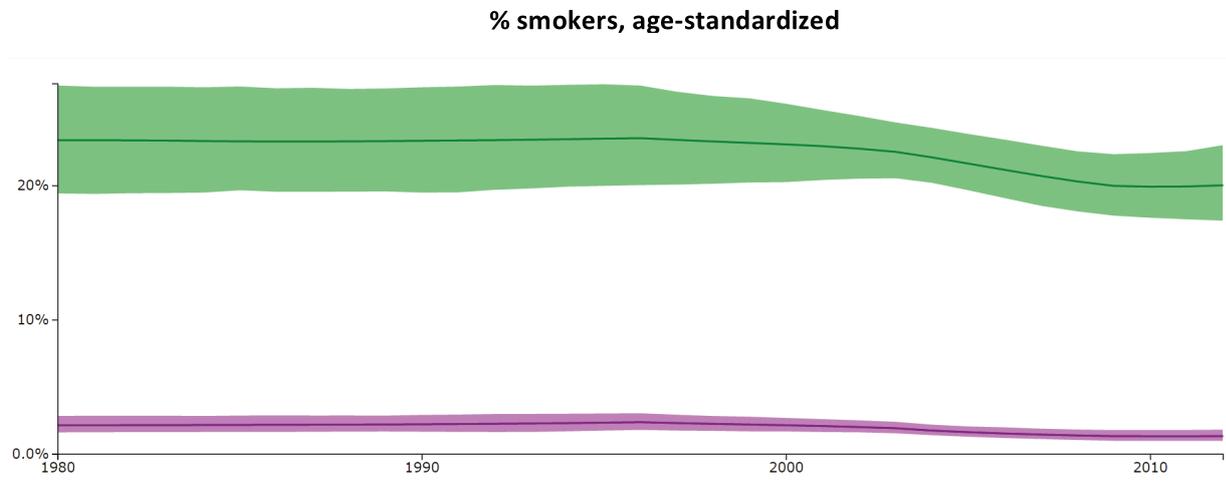
## Risk factors

### Men drive smoking rates in Kenya

Tobacco use is a risk factor for many NCDs, especially cardiovascular diseases, strokes, and some cancers. In 2013, nearly 32,000 years of life lost to disability and early death from cerebrovascular disease for both cerebrovascular disease and ischemic heart disease could be attributed to tobacco use.

Smoking prevalence among males is substantially higher than among females (Figure 11). There have been modest decreases in male smoking prevalence since the early 2000s, but it remains about 20%. The majority of these smokers are between 45 and 55 years old. In comparison, daily smoking prevalence among females remains less than 3%, though there have not been notable decreases in prevalence.

**Figure 11:** Smoking prevalence in Kenya

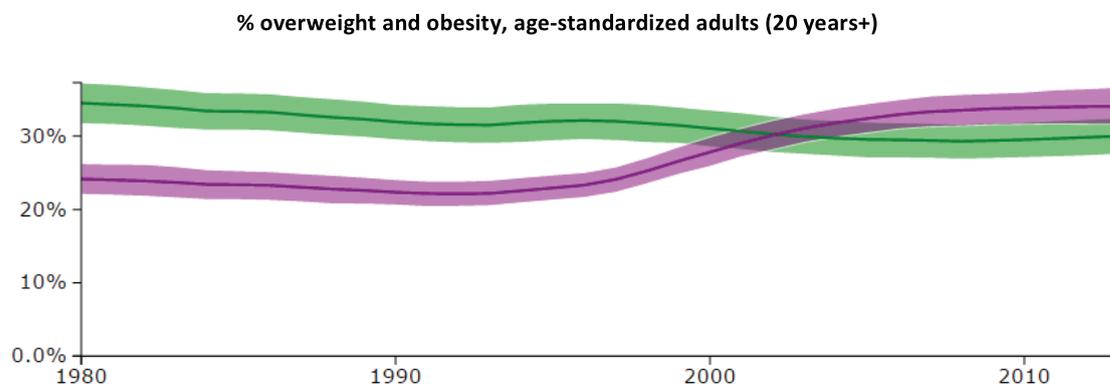


## Obesity rates rise among Kenyan females

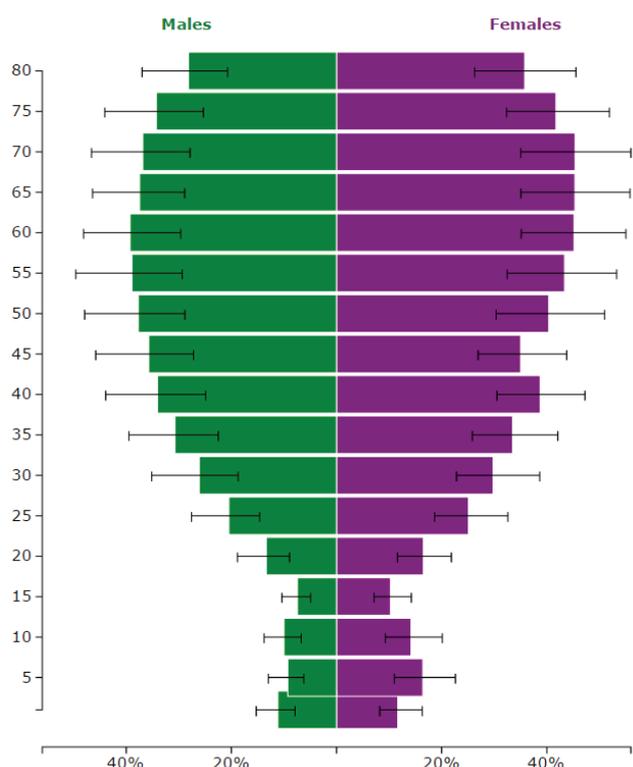
High body mass index (BMI) is a metabolic risk factor associated with non-communicable diseases, especially hypertensive heart disease, cerebrovascular disease, and ischemic heart disease. Overweight and obesity prevalence (BMI $\geq$ 25) among Kenyan females has increased since the late 1990s and is overtaking the prevalence observed among men; meanwhile the prevalence trends among males have remained constant over time (Figure 12). Considering the age distribution in the 2013, overweight and obesity are increasing with age for both sexes, peaking at around 55 and 60 years.

Meanwhile, obesity prevalence (BMI $\geq$ 30) among adults aged 20 years and older showed a clear sex difference, with more Kenyan females experiencing obesity than their male counterparts (Figure 13). Among Kenyan females, the greatest number of years of lost life due to disability and early death are attributable to high body mass index. Among men, it is the third-leading risk factor responsible for lost health, behind dietary risks and high blood pressure.

**Figure 12:** Overweight and obesity (BMI $\geq$ 25) prevalence in Kenya

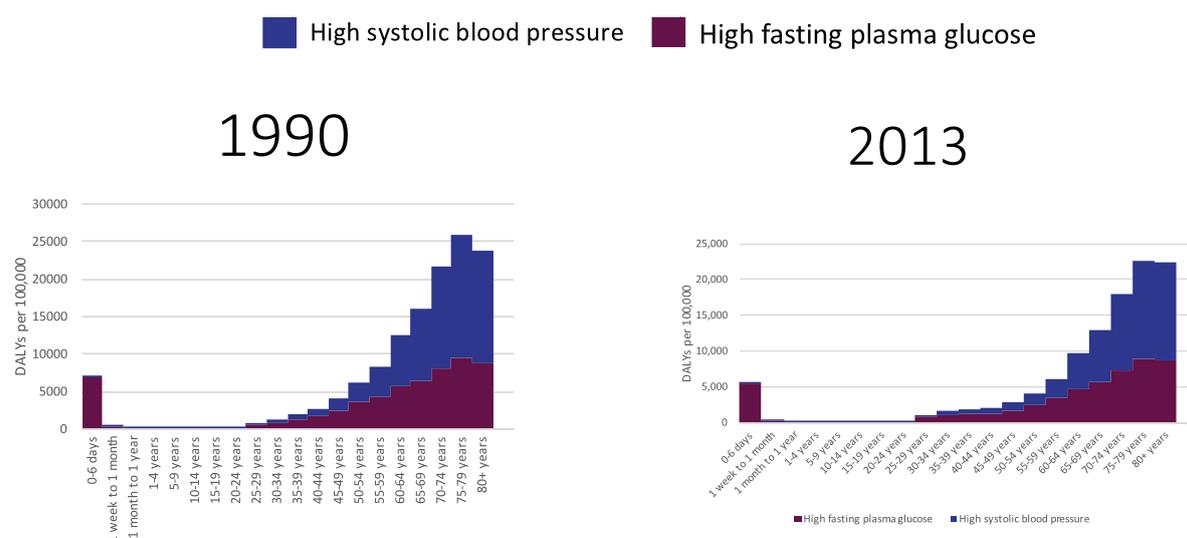


**Prevalence of overweight and obesity in 2013, by age**





**Figure 14:** Health loss due to high blood glucose and hypertension in Kenya, both sexes, 1990 and 2013



## Health policy implications

### Progress combatting major communicable diseases

Recent data from the GBD study provide clear evidence that Kenya has made significant progress in reducing the burden of communicable diseases such as malaria, HIV/AIDS and tuberculosis. The health impact of these diseases rose throughout the 1990s, peaking in the 2000s, at which point the trends began to reverse. This reversal may be attributed to the major expansion of priority health interventions such as antiretroviral treatment, insecticide treated nets for malaria prevention, artemisinin combination therapy, and the rollout of anti-tuberculosis treatment during this period.

### Improvements in child and maternal health

The under-5 and maternal mortality trends provide further evidence of progress during this period. Vaccine preventable diseases such as measles have shown a steady decline, and the burden of lower respiratory infections and diarrheal disease are on the decline. Despite declines in burden, these childhood diseases are of significant public health concern.

Amid overall signs of progress, early neonatal mortality trends remain stagnant and the decline in maternal mortality is slow, illuminating maternal health and neonatal care as areas requiring further investigation and policy attention. It is encouraging that the Kenyan government has prioritized reducing maternal and child mortality in its embracing of integrated approaches, as evidenced by the First Lady's initiative of Beyond Zero Campaign. Understanding the country's heterogeneity, as espoused by upcoming subnational burden of disease study in Kenya, would be a vital and informative guide for identifying trouble spots, measuring progress and benchmarking performance among peers.

### Emergence of an epidemic of chronic diseases

Sustaining Kenya's population health gains over the past three decades remains precarious considering the rapid emergence of NCDs. Like other major health challenges the country has faced, addressing NCDs requires an integrated approach including prevention, treatment, and rehabilitation measures. Tackling risk factors such as obesity, smoking cessation, and treatment of hypertension offers cost-effective ways of addressing some of the priority NCDs in the country. In addition, lifestyle measures – such as the promotion

of a healthy diet consisting of fruits, nuts, and vegetables, as well as increased physical activity – would go a long way toward keeping the Kenyan population healthy.

In addition to health promotion measures, the healthcare system must be appropriately re-oriented to address NCDs. This reorientation must ideally encompass all components of the health system, including maintaining appropriately trained human resources for health, equipping health facilities with the supplies needed to diagnose and treat NCDs, and effectively coordinating and data collection systems. A recent study carried out by IHME identified significant gaps in the Kenyan health system, particularly in terms of human resource for health, access to medicines and related health technologies, and elements of infrastructure.<sup>7</sup> It is encouraging that the Kenyan government has swiftly addressed some of these gaps, particularly in terms of access to medicines and health technologies through innovative public private partnerships. Further, the MOH has also recently launched the Kenya National Strategy for the Prevention and Control Non-Communicable Diseases 2015-2020, which offers a roadmap for all stakeholders to addressing the emerging challenges.

### **To improve health, improve data collection**

There remain significant challenges in data collection that merit policy attention. Within the general framework of treating chronic diseases, data collection systems should allow caregivers to track patients along the continuum of care. Unfortunately, the aggregate data collection systems, which are the mainstay of the country's health management information system, are less suited for such tracking, rendering them uninformative. Kenya should seek to leverage the available technology options (including mobile) to move toward having quality and actionable data. Furthermore, for the country to move toward a firmer evidential base, efforts should be made to integrate different data sources available (including those available from other sectors), such that decision-makers have a fuller view of trends and potential areas of intervention.

IHME and its partners recognize the informational gaps that many health systems decision-makers face in the effort to address the pressing population health challenges. These range from a lack of accurate death counts (and assignment to specific causes), to determining the investment case for different health interventions in the face of limited resources. Because of its status as an independent research institute, IHME is best placed to offer objective solutions based on the best available evidence. It is on this basis that, IHME and Kenya Red Cross have undertaken to produce this policy report, which gives a snapshot of the disease burden in the country based on the GBD 2013.

### **A deeper dive: IHME to provide subnational burden of disease estimates in Kenya**

Cognizant that Kenya is a large country where aggregate trends may mask important subnational differences, IHME has committed to produce subnational burden of disease estimates for Kenya in the upcoming GBD 2015. Subnational burden of disease data is particularly useful in the face of the decentralized health system structure, which was recently adopted with the new constitution. A subnational burden of disease study will help answer if a specific county health system is aligned to the population's true health challenges, and will help decision-makers better understand if the health system is effectively it is addressing those challenges. Subnational estimates would also form the basis for objective benchmarking and performance assessment that would be informative to the broader health system. In addition, such fine-grain understanding of burden of disease and risk factors will unmask the country's heterogeneity, pointing to areas where specific policy attention is needed and guiding decision-makers to effectively allocate resources.

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<sup>7</sup> "Health Service Provision in Kenya: Assessing Facility Capacity, Costs of Care, and Patient Perspectives."

## **About the International Centre for Humanitarian Affairs**

The International Center for Humanitarian Affairs (ICHA), strives to create an appropriate and effective knowledge management framework that synthesizes multiple information technologies to collect, analyze, and, manage information and knowledge for supporting decision-making in humanitarian action, disaster relief and improving community resilience. ICHA is a knowledge hub that focuses on generating data and information through action based research that is relevant to communities dealing with situations that call for humanitarian, resilience building and development action.

## **About IHME**

The Institute for Health Metrics and Evaluation (IHME) is an independent global health research center at the University of Washington that provides rigorous and comparable measurement of the world's most important health problems and evaluates the strategies used to address them. IHME makes this information freely available so that policymakers have the evidence they need to make informed decisions about how to allocate resources to best improve population health.

## **About Kenya Red Cross Society**

Kenya Red Cross Society is a national society of the Red Cross and Red Crescent Movement, created by the Act of Parliament of Kenya. It serves as a humanitarian organization that is dedicated to alleviating human suffering. It was established in 1965 and runs a number of projects which focus on famine, blood services, first aid projects, disaster and emergency services and education services.

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South "C" (Bellevue)  
Red Cross Road, Off Popo Road  
P.O. Box 40712, 00100-GPO, Nairobi, Kenya  
Tel: (254-20) 3950000 / 2355062/3, Fax: (254-20) 3950444  
Mobiles: 0722-206958, 0703-037000, 0733-333045  
Email: [info@redcross.or.ke](mailto:info@redcross.or.ke), Website: [www.redcross.or.ke](http://www.redcross.or.ke)