



**STATISTICAL REVIEW OF PROGRESS TOWARDS  
THE MID-TERM TARGETS OF THE  
KENYA HEALTH SECTOR STRATEGIC PLAN 2014–2018**

**Ministry of Health  
Republic of Kenya**

in collaboration with  
**World Health Organization**

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# Foreword

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The statistical review report on the performance of the Kenya health sector strategic plan (KHSSP) 2014–2018 is an important input into the overall mid-term review of the KHSSP. The report uses data from different sources including data from health management information system and household surveys to provide a comprehensive overview of the current status of performance of the health sector in Kenya. The primary focus of the report is on the core indicators and targets of KHSSP 2014–2018. The report also pays special attention to additional indicators that help to assess progress towards achieving other national priorities and global goals that came into effect after development of the KHSSP.

The statistical review report was prepared by the Kenya Ministry of Health in close collaboration with other health sector stakeholders drawn from counties, national institutions, private sector, Nongovernmental organisations, local and international partners. It highlights many areas where significant progress has been made and also areas where greater efforts are needed to achieve the KHSSP targets. The report includes equity analysis – a comprehensive assessment of inequality gaps between key sub-populations of Kenya. Equity analysis will guide us on which sub-populations of the country need a larger infusion of resources in order to achieve parity as well as improve the national average. The report also includes a comparative analysis of our performance with that of similar countries in the sub-region. The comparative analysis gives an idea on where we stand in relation to our peers.

This review report will prove handy to the senior management and technical experts of the Ministry of Health, County departments of health, other government ministries, departments and agencies that have an impact on the health sector. The report will also be useful for policy makers, parliamentarians, the civil society and the community at large. It is my anticipation that future reports from the Ministry of Health will contain a similar level of analytical thinking with comparative and equity considerations.

At a personal level, the report provides me with a perfect audit of where we are and what I need to focus on as a leader in the health sector. It is my hope therefore that all stakeholders in the health sector will use the report to increase efforts in service provision and raise standards for recording, documenting and reporting. We look forward to using the report to improve performance of health sector which will in turn improve the health of our people.

On behalf of the Ministry of Health, I would like to express my appreciation to all the partners of the Health Data Collaborative for providing both the technical and financial support for the mid-term review of the Kenya Health Sector Strategic Plan.

Dr Cleopa Mailu  
Cabinet Secretary  
Ministry of Health



# Acknowledgements

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Additionally, I would like to recognise and congratulate all those individuals, institutions and organisations – public or private, national or international – that contributed to the analysis and writing of this statistical review report. These include the staff from the Ministry of Health, counties, parastatals, national institutes such as Kenya Bureau of statistics, civil registration department, private sector, and health data collaborative partners, who participated in the statistical review workshop and made invaluable contribution to the statistical review through availing and reviewing data and contributing to the discussions that improved the quality, accuracy and completeness of data and information used in the report. To all those who contributed in one way or the other to this endeavour, please accept the sincere appreciation of the leadership of the Ministry for job well done.

I would however, on behalf of all who contributed, like to single out a few individuals and institutions to highlight the collective effort that went into producing this report. At the Ministry, I would like to recognise the efforts of the Technical working group led by Dr Isabel Maina, the head of health sector Monitoring and Evaluation unit under the guidance of Dr Peter Kimuu, the Head of the Department of Policy and Planning, and Dr David Soti, the head of Division of Health sector Monitoring, Health information system, e-health and health research. The vision, leadership and management, and support from the rest of your team made this possible. I would also like to recognise and congratulate partners of the Health Data Collaborative for accepting to work with Kenya and further providing technical, financial and moral support to the assignment. In a special way, we would like to thank Dr Ties Boerma, Dr Benson Droti and Dr Benjamin Musembi Nganda of WHO HQ and AFRO for their technical guidance. The team from the WHO country office Dr Hillary Kipruto, Mr. Cosmas Leonard, and Kennedy Chitala played an important role in providing technical and management support to the review team. The technical support from Dr Samuel Mwalili and Nicholas Kweyu from CDC, Hellen Gatakaa of USAID MEval-PIMA project as well as Dr Joseph Mungatu from Jomo Kenyatta University college of Agriculture and Technology cannot go unmentioned as well. The Ministry would like to thank all those who contributed to the development of this report (annexed). Once again, on the behalf of the Ministry of Health and on my own behalf, I thank you all.

Dr Nicholas Muraguri  
Principal Secretary  
Ministry of Health



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# Executive summary

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The KHSSP 2014–2018 is implemented at a time in which mortality and morbidity due to communicable diseases are declining, but still remain the leading cause of death in Kenya, and noncommunicable diseases (NCD) and injuries are on the rise.

The midterm statistical review of KHSSP focused on evidence for progress made during the first half of the implementation of the plan –2014 to mid-2016– using all available data sources, paying special attention to county progress. The most important data source was the health facility report as part of the Ministry’s DHIS-2. The DHIS-2 reporting rates have increased from 77% to 89% during 2013/14-2015/16 and the data quality is remarkably good for many core indicators.

## Considerable progress was made in many areas including:

### Better reproductive, maternal and child health

- Child mortality rates have been coming down by 40% in the past decade and high levels of coverage of essential interventions suggest that the decline will be continuing during KHSSP.
- Encouraging findings of the review include the solid increase in numbers of women delivering in health facilities (from 60 to 72%) and the continued increase in use of modern contraceptives with more than 75% of the demand for family planning met and leading to a decline in unintended births.
- Declines were observed in maternal deaths and stillbirths in health facilities, while the prevalence of low birth weight remained low at 5% of all births. Exclusive breastfeeding during the first 6 months of life is on the rise, more sick children are taken to a health care provider, and child stunting and underweight rates have been declining since 2009.

### Major progress is made in the battle against major infectious diseases

- Malaria parasite rates in children are down from 11% to 8%, driven by a decline from 37 to 28% in the Lake endemic zone. Malaria is now diagnosed in 17% of children under 5 taken to health clinics, compared to 27% four years earlier, and hospital mortality due to malaria is also declining. The use of long lasting insecticidal nets continued to increase and is high in endemic counties.
- There were major increases in the use of ART among persons living with HIV (from 44% in 2013/14 to 62% in 2015/16) and antiretroviral for PMTCT (from 69 to 80%).

### Evidence of good quality of services

- TB treatment success rates remained high at 88% but ART retention remained at just 74% after 12 months of treatment. In 2015, for the first time in Kenya’s history, the majority of children with malaria were diagnosed by laboratory test and not based on just clinical symptoms.

## The review data also brought out many old and new challenges:

### Stagnation in immunization coverage and need to increase RMNCH intervention coverage

- Even though immunization coverage in infants is still about 80%, there has been a modest decline in more than two-thirds of counties and nationally.
- Only 49% of pregnant women make four or more antenatal clinic visits. Reaching the poorest and more remote counties with maternal and child health interventions continues to be a challenge. Further increases in number of women delivering in health facilities are needed while ensuring that the quality of maternal and newborn care is high.

### **Infectious diseases are declining but the battle is far from over**

- There are 1.6 million persons living with HIV, of which 700,000 are not on ART, and about 100,000 new infections still occur every year. Strong prevention efforts while maintaining and further increasing ART coverage will be critical.
- Even though TB treatment success rates are high, many TB cases are not diagnosed timely, requiring greater action in communities.
- Malaria is still very high in the Lake zone and increased in the coastal endemic zone. Accelerating the increase of malaria intervention coverage in the endemic counties will be crucial.
- Pneumonia and diarrhoeal diseases remain leading killers in childhood and prevention, including improved sanitary facilities and hygiene, and treatment will need special attention.

### **NCDs are increasingly important and tackling the risk factors will be essential**

- Kenya has observed a dramatic increase in obesity. For instance, the percentage of women with obesity increased from 7 to 13% between 2009 and 2015. In several counties, mostly located in central Kenya, more than 40% of women and more than 20% of men are overweight or obese; 23% of adults have raised blood pressure and 2% have diabetes; 20% of men smoke tobacco and 23% of men engage in regular heavy episodic alcohol use.
- Only 1 in 7 women had ever been screened for cervical cancer and there is no national system of cancer registries. Data on mental health are completely lacking. The doubling of the number of motorized vehicles in 6 years' time presents a major challenge in terms of reducing the road traffic fatalities.

### **Progress requires a strong health system in all counties**

- Overall, there are an adequate number of health facilities (2.5 per 10,000 population) but the distribution across (and within) counties is unequal. The number of health workers is still low (9 per 10,000 population) and there are very large within-county differences, with the top quintile of counties having four times more health workers than the bottom quintile of counties.
- More people are using the services with now an average of 2.2 visits per person to an outpatient clinic per year, and 6 hospital admissions per 100 population per year. There are still however very large differences within Kenya. In some counties, the average person makes 4.5 visits in a year to the outpatient clinic, in other counties it is just over 1 visit per person in a year.

### **Intersectoral actions are needed to improve health and wellbeing for all Kenyans**

- While the review provided some evidence of intersectoral collaboration, much more is required to address the much broader array of health challenges that need to be overcome to reach the goals of Vision 2030 and the sustainable development goals.

Strategic Objective	Main advances during MTR	Key challenges and strategic actions
<b>1. Reduce the burden of communicable diseases</b>	Major increases in ART and PMTCT coverage; more HIV testing & counselling	1.6 million people living with HIV, 700,000 are not on ART; 100,000 new infections every year; maintain PMTCT and further increase ART coverage and enhance prevention efforts
	Malaria parasitaemia down; less malaria and better diagnostic practices in facilities; increase in LLIN use in endemic areas	Further increase coverage of all key malaria control interventions in endemic counties
	High TB completion/cure rates; TB-HIV intervention coverage	Increase TB case detection rates
	More sick children taken to health providers	Immunization coverage modestly declined in majority of counties
<b>2. Halt and reverse the rising burden of noncommunicable diseases</b>		Slow down the dramatic overweight/obesity increase
		Reduce hypertension and prevent diabetes increase, improving treatment coverage
		Increase cancer screening and treatment, such as cervical cancer
<b>3. Violence and injuries</b>	Road traffic fatalities per vehicle reduction	Reduce road traffic fatality rates in spite of vehicle increase through preventive measures
		Gender-based violence reduction
<b>4. Provide essential services (RMNCH)</b>	Family planning coverage increase	Reach the poorest with RMNCH interventions in all counties
	Institutional delivery rates increased in almost all counties	Improve ANC coverage (4+ visits); further efforts to increase institutional deliveries
		Reduce maternal mortality and stillbirth rates in health facilities
<b>5. Exposure to risk factors</b>	Exclusive breastfeeding increase	Tobacco use reduction, notably among men
	Salt iodisation full coverage	Reducing harmful use of alcohol among men
<b>6. Collaboration with other sectors</b>	Child stunting and underweight improvements	Continued reduction of child stunting in all counties, reducing differences; need for intersectoral action
	Access to drinking water higher	Little progress in access to improved sanitation; need for intersectoral action
<b>Health system investments</b>	Limited evidence of improvements in service access through increases in facilities	Fourfold differences in service access between the top and bottom counties; focus on disadvantaged populations and counties, and prevent oversupply of health facilities in some counties
	Increased demand with modest increase in outpatient and inpatient services	Focus on improving services in disadvantaged counties
		Some progress or high levels in quality indicators such as TB cure rate, diagnostic practices for malaria, facility based RMNCH services



# Introduction

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This report was prepared as part of the midterm review of the health sector strategic and investment plan (KHSSP) 2014–2018 in Kenya. The objective was to provide a statistical review of progress and performance at the national and county levels during the first three of implementation of KHSSP, focusing on the period FY2013/2014 to FY2015/2016. Conducting of the statistical review, including a capacity strengthening effort is part of the Kenya Health Data Collaborative roadmap priorities, as identified by the Ministry of Health and endorsed by development partners in May 2016. The analysis process included three workshops of the core team which consisted of about 25 monitoring and evaluation experts. This process was led by the Ministry of Health and supported by a WHO team, with participation of MEASURE/PIMA, CDC, other UN agencies and other partners at various stages of the process.

This report first describes the progress made under each of the Strategic Objectives. This is followed by a section on progress in efforts to increase health service access and a description of the health status indicators, based on the most recent data mainly from surveys. The last chapter provides a synthetic analysis, using indexes, to describe the situation and trends in counties. The annex provides the individual health statistical profiles for the 47 counties.

## Approach

The statistical assessment of progress focused on the 42 indicators and midterm targets of the KHSSP 2014–2018 that were associated with the six Strategic Objectives and health system investments and outputs. For some indicators no data were available. For other indicators new baseline data have become available and targets or indicator definitions were adjusted.

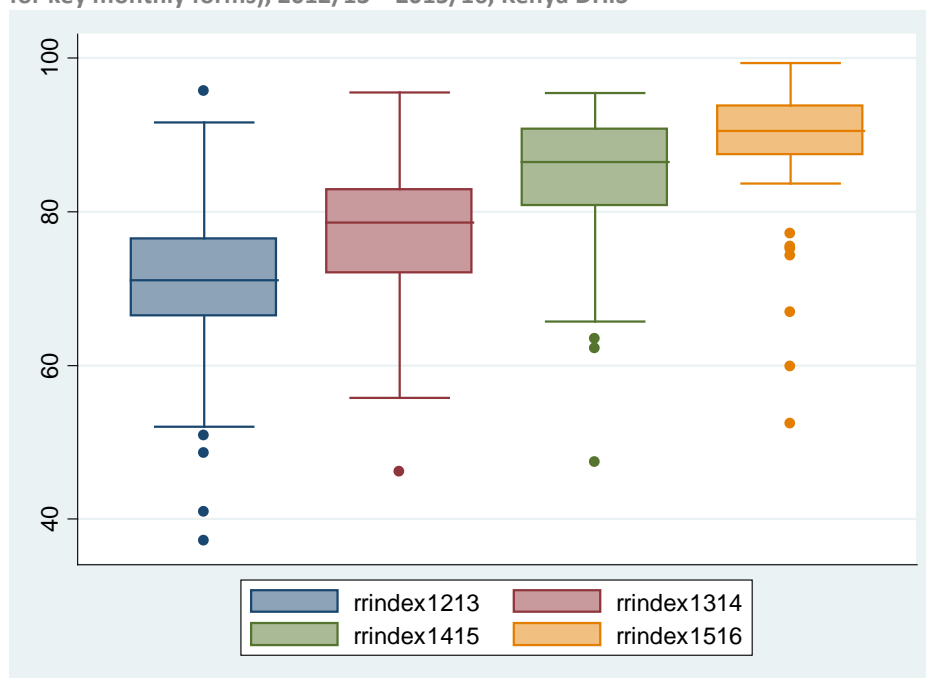
For many indicators, there was a wealth of data available on recent progress. This was due to the Ministry of Health DHIS2 which functions very well with high reporting rates (over 90% for several key forms such as RMNCH), rapid reporting (analysis up to June 2016 done) and consistent data sets. Figure 1 shows the reporting rate for counties during 2012/13 – 2015/16, with Kenya as a whole marked as a line within the box and the spread of counties indicated by the box and whiskers. The Kenya National Bureau of Statistics projections were used to estimate target populations, with adjustments where needed. The KNBS projections are based on the 2009 census and in quite a number of counties the projected target populations have been found to be problematic. Therefore, a major effort was made to improve the target population sizes, using adjustments for completeness of reporting and health sector outputs for high coverage interventions such as antenatal care visit and the first vaccination of pentavalent vaccine. The method used to improve county target populations for maternal and childhood interventions is explained in a separate document. This document also explains the procedure that was used to adjust for incomplete reporting where needed. A summary of the steps taken is shown in Annex A of the report.

In addition, the statistical review also benefited from the health surveys in 2014 and 2015. The KDHS 2014 provided baseline information at the start of the review period. The KDHS data can however not be used to assess progress within the KHSSP review period. Where no new data were available, the report considered the trend in the indicator between KDHS 2008–2009 and KDHS 2014 (e.g. for treatment of sick children or gender-based violence). The Malaria Indicator Survey 2015 and the NCD risk factor survey (STEPS) in 2015 added valuable data on levels and trends of leading public health problems. The NASCOP dashboard and specific data and estimates on HIV provided additional insights in trends for several HIV intervention coverage indicators. Statistics from other sectors were used where available.

The review paid careful attention to data quality. The open access policy and easy sharing of data greatly facilitated the analysis. This included the DHIS-2, which openly shares its password upon request, the TB individual level registry data (TIBU), the STEPS survey and reports from various programmes. On the other hand, it turned out to be more difficult or more time-consuming for the review team to obtain a comprehensive data set for the HIV

indicators, in spite of major investments in the programme and the presence of an advanced dashboard on the web, and the data from special activities such as the six-monthly malaria related health facility surveys. A comprehensive health data observatory that includes also relevant data from other sectors (e.g. on road traffic fatalities) is lacking, but the DHIS does include a wealth of data on many facility-based indicators.

**Figure 1: Reporting completeness index (average of reporting completeness for key monthly forms), 2012/13 – 2015/16, Kenya DHIS**



Hospital data are still missing for quite a few facilities. No comprehensive data set could be put together on diagnoses at discharge and causes of death. The lack of a comprehensive health data observatory that includes also relevant data from other sectors (e.g. on road traffic fatalities) is lacking, but the DHIS -2 does include a wealth of data on many facility-based indicators. Throughout the report DHIS-2 is referred to as DHIS.

## Priority areas for improving health statistics

The review identified a number of data gaps that will need to be addressed in the coming years to be able to monitor the national programme implementation, the SDGs, and especially county level progress and performance. The priorities include the following points:

- **DHIS:** the DHIS is functioning well, but is suffering from an overload of data elements and indicators. The DHIS contains too many indicators that have very limited usefulness. The demand for disaggregation further risks to increase the burden of recording and reporting for health workers. Digitalization of data entry at the service provider level is an important strategy to reduce the burden of recording and especially reporting, but still requires a rational approach to avoid an overload of data collection at the cost of service provision. The DHIS should be protected from programme and partner requests for more data through a formal approval process that is driven by technical expertise in all areas of data collection with a view of minimizing the burden of recording and reporting.



- There are several areas where data availability is limited. These include for instance neglected tropical diseases, cancer and outbreak diseases. The programmes need to strengthen the monitoring component in close collaboration with the central M&E team by making the right investments in the coming years. For instance, a national system of cancer registries is required. The integration of IDSR into DHIS is essential, including the mainstreaming of notifiable diseases.
- There are several areas where measurement is very challenging, such as gender based violence, and mental health. In these areas research studies and household surveys are likely to provide more relevant public health information than including poor-quality indicators in the DHIS.
- Data on mortality trends and causes are available but need to be strengthened. The strengthening of the civil registration and vital statistics system in Kenya will be essential for public administration and the generation of continuous data on mortality by cause by 2030. This will take time, although some counties can move faster than others as the baseline is good. In parallel to strengthening the CRVS system, it is possible to strengthen data by setting up a sample registration system with verbal autopsy and improving hospital based cause of death statistics using the ICD. This could be fast tracked by scaling up ongoing work to automate health data in the country.
- The administrative data systems need to be strengthened and more integrated with the DHIS. This includes the health workforce information system and the financial tracking system.
- Greater integration and data sharing in a central repository (or Kenya health data observatory) of all health-related data, including facility surveys, household surveys, administrative and service provision data is required to enhance data access and reduce fragmentation and duplication. Such an observatory is also the portal to improve communication and use of the data through dashboards, visualizations etc. as well as forms the basis for annual profiles to inform regular reviews of progress and performance. This is one of the priorities defined in the Kenya Health data Collaborative.
- The DHIS and also programme actions (such as malaria) show major progress in developing and producing county-specific data and making them available. Further investments are needed in regular production of county specific data in easy to use formats, where possible and relevant with sub-county data and statistics. This should be combined with enhanced capacity to strengthen data interpretation and use at the county level.



# Strategic Objective 1: accelerate reduction of the burden of communicable diseases

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## Main findings

- **Epidemic trends:** infectious diseases are the leading causes of morbidity and mortality in Kenya. In children, measles cases remained few, malaria prevalence declined by more than one-third but diarrhoea and pneumonia were still leading causes of childhood morbidity. HIV remains very common (an estimated 1.6 million people living with HIV) and TB notification rates are declining slowly. There were marked differences in the infectious disease epidemiology between counties that affect programmes. For instance, HIV and malaria prevalence were 4 times higher than national levels in the 4 counties bordering Lake Victoria while TB cases were more concentrated in urban populations.
- **Child infectious diseases:** immunization coverage was high with 88% and 87% of infants receiving 3 doses of pentavalent and measles vaccines respectively. Full immunization coverage was 82%, which is well below the KHSSP target for full immunization coverage. Data by county from the DHIS show that in 32 of the 47 counties immunization coverage levels in 2015/16 were lower than in 2012/13. Health seeking behaviour for treatment of sick under-fives – diarrhoea, ARI and fever – improved during 2008–2014, and ORS packet use rates increased considerably to 58% of children with diarrhoea.
- **Coverage of HIV, TB and malaria interventions** all showed recent positive trends. Major increases in numbers of people benefitting from PMTCT (from 67% to 80%), ART (from 35% to 56% for adults), LLIN use rates in especially endemic counties (increasing to 74% of children), and high levels of TB treatment completion and cure rates. In addition, coverage of HIV counselling and testing, HIV-TB interventions, and ACT treatment for malaria were all very high. In 2015 the reported number of malaria cases confirmed by lab test surpassed the suspected malaria cases for the first time due to increased testing for malaria.

## Data sources and analysis

- **Surveys:** household surveys are an important data source to assess the prevalence and coverage of interventions against infectious diseases. The KDHS 2008/09 and 2014 provide detailed immunization data by vaccine and region, as well as by socioeconomic and demographic characteristics; on childhood illness treatment patterns; and include malaria and HIV modules. No survey with HIV testing was conducted since KAIS 2012. The results of the first TB prevalence survey 2016 were not yet available. The Malaria Indicator Surveys 2010 and 2015 measure the burden of malaria and assess the coverage of interventions.
- **Facility data:** the DHIS includes data by county from 2012/13 on immunizations and selected HIV and malaria interventions, as well as outpatient and inpatient morbidity and mortality. The NASCOP HIV dashboard provided additional data. The TB data are derived from the electronic reporting system, which has individual records from 2012. For some counties the denominators based on population projections appeared to be problematic. An adjustment procedure was applied to make adjustment of numerators (for incomplete reporting) and denominators (for maternal and child health interventions).<sup>1</sup>

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<sup>1</sup> The full adjustment procedure is described in a separate document. See Annex A for summary.

Indicator	Baseline (Data source)	Achievement (Data source)	Target 2016	Progress	Comments
% of children who are fully immunized	84 (2012/13)	82 (DHIS 2015/16)	90		90% is end target; declining trend in 2/3 of counties
% of target population that received MDA	50 (2013)		95		Denominator data not available; on average 500,000 children received MDA annually
% School age children dewormed	49 (school based deworming programme)	71 (school based deworming programme)	85		Possible over-reporting because deworming done at schools; does not include school age children who do not attend school
% of children with diarrhoea who received ORS	39 (KDHS 2008)	54 (KDHS 2014)	10		No data after 2014; but target needs revision; fever and pneumonia treatment also positive trend
Prevalence of diarrhoea in children <5 years (%)	16.6 (KDHS 2008–2009)	15.2 (KDHS, 2014)	–		Very small reduction in diarrhoea prevalence
TB completion/cure rate (%)	88/83 (2012)	90 /85 (2014)	90/88		2018 targets for cure 90%
% of targeted under 1's provided with LLITN's	82 (revised, 2012/2013)	57 (DHIS2, 2015/2016)	85 (KHSSP 2014–2018)	–	Under-reporting because category for children under 1 was initially omitted from the reporting tool
% of children <5 years who slept under an LLIN	53 (KDHS 2014)	56 (KMIS 2015)	85		74% coverage in endemic areas
% of targeted pregnant provided with LLIN	80 (DHIS 2, 2012/2013)	88 (DHIS 2, 2015/2016)	70		Great progress; target surpassed.
% of pregnant women who slept under an LLIN	50 (KDHS 2014)	58 (KMIS 2015)	70		78% coverage in endemic areas
% of HIV positive pregnant women who received ARVs to prevent the risk of mother to child HIV transmission	67 (NASCOP & DHIS, 2012/13)	80 (NASCOP & DHIS, 2015/2016)	90		Progress to 80, but target not achieved
% of HIV positive individuals who received live-saving antiretroviral treatment	35% and 44% (2013, NASCOP & DHIS, adults & children)	Adults: 56%, Children: 62%			Denominator is all persons living with HIV for all years.

**KEY |** Red: limited or no progress; Orange: some progress but not enough to achieve target; Green: good progress, target achieved or on course to achieve target.

## 1.1 Introduction

The first Strategic Objective of KHSSP 2014–2018 focuses on accelerating the reduction of the burden of communicable diseases. There are several specific plans in place to address the burden of communicable diseases including:

- *Immunization*: multi-year plan for immunization 2011–2015, Division of Vaccines and Immunization, Ministry of Health.
- *HIV*: Kenya AIDS Strategic Framework 2014/15–2018/19 (Ministry of Health).
- *Malaria*: National Malaria Strategy 2009–2018 with a separate monitoring and evaluation plan (National Malaria Control Programme, Ministry of Health).
- *Tuberculosis, leprosy and Lung health*: National Strategic Plan for Tuberculosis, Leprosy and Lung Health 2015–2018 (National TB, Leprosy and Lung Diseases programme, Ministry of Health (2014).
- *Neglected tropical diseases*: Second Kenya National Strategic Plan for Control of the Neglected Tropical Diseases (NTDs) 2016–2020 (Ministry of Health, 2016).

The KHSSP proposed 9 indicators for this Strategic Objective, including indicators for immunization, TB, HIV (2), malaria (2), diarrhoea, and neglected tropical diseases (2). This section analyses these indicators, makes adjustments and provides additional information where needed.

## 1.2 Epidemiological context

Communicable diseases are among the leading causes of death and disability in Kenya. For instance, according to the Kenya burden of disease study 2013, in terms of DALYs, HIV, lower respiratory infections, diarrhoeal diseases and tuberculosis are the four leading causes and malaria is in 8<sup>th</sup> place.<sup>2</sup>

**Table 1: HIV prevalence, by county, derived from NASCOP/DHIS and KNBS data, 2015**

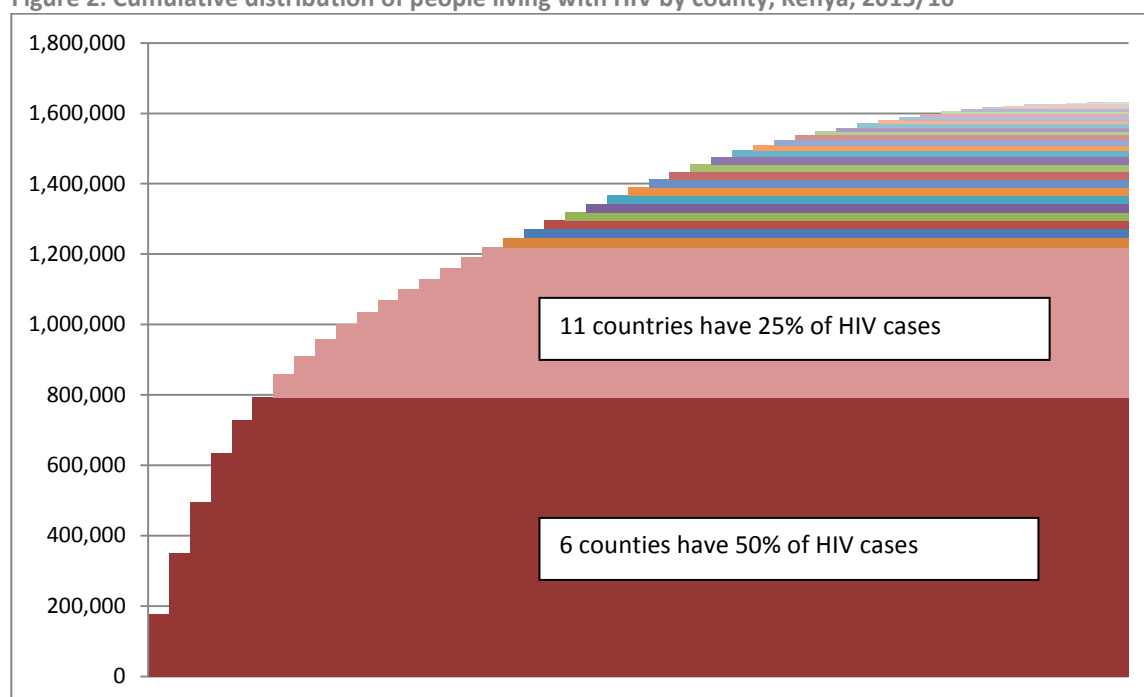
Below 2%		2.0-3.9%		4.0-7.8%		8% or higher	
Wajir	0.2	Elgeyo Marakwet	2.3	Isiolo	4.0	Migori	15.1
Tana River	0.7	Meru	2.4	Kericho	4.0	Kisumu	20.2
Mandera	1.0	Bungoma	2.6	Vihiga	4.1	Siaya	22.9
Garissa	1.2	West Pokot	2.6	Uasin Gishu	4.1	Homa Bay	26.0
Marsabit	1.6	Kilifi	2.7	Kajiado	4.1		
Lamu	1.8	Baringo	2.8	Makueni	4.2		
		Embu	2.9	Trans Nzoia	4.3		
		Kirinyaga	2.9	Murang'a	4.4		
		Kitui	3.2	Samburu	4.7		
		Tharaka	3.3	Narok	4.8		
		Turkana	3.3	Nakuru	4.9		
		Laikipia	3.3	Bomet	5.6		
		Nyandarua	3.5	Nairobi	5.9		
		Kwale	3.6	Kisii	6.0		
		Kiambu	3.6	Nyamira	6.5		
		Taita Taveta	3.6	Busia	6.8		
		Nyeri	3.7	Mombasa	7.5		
		Kakamega	3.8				
		Machakos	3.9				
		Nandi	3.9				

<sup>2</sup> Ministry of Health. Kenya National Strategy for the Prevention and Control NCDs 2015–2020. Nairobi. 2015. Ministry of Health. Kenya Mental Health Strategy 2015–2030. Nairobi. 2015.

HIV remains one of the key public health problems in Kenya. Based on the national survey with HIV testing in 2012 and data for women attending antenatal clinics, it appears that HIV prevalence rate in Kenya is not falling and has remained around 6% since 2010. This is in part expected because more and more HIV patients are now receiving ART and are living longer than their expected time of HIV-related death without antiretroviral treatment. Based on the KNBS population projections and the estimated HIV prevalence rates by May 2016, Kenya had 1.59 million people living with HIV, including almost 127,000 children under age 15. National HIV incidence, a better measure of the course of the epidemic, is not measured directly but estimated at about 100,000 new infections every year and does not appear to be declining.

The distribution of HIV is uneven. HIV prevalence rate among adult females was about 1.6 times higher than the rate among adult males (6.9% and 4.2% respectively in KAIS 2012). NASCOP/DHIS data on HIV testing in antenatal clinic results were used to estimate adult HIV prevalence by county, and this showed the very high prevalence in the four counties around Lake Victoria and much smaller variation in all other counties (Table 1). This has major epidemiological implications. There were 6 counties which account for half of all people living with HIV in Kenya: Nairobi (172,000), Homa Bay (169,000), Kisumu, Siaya, Migori and Nakuru. Another 11 counties accounted for 25% of HIV cases. The remaining 30 counties have one quarter of Kenya's 1.59 million people living with HIV (Figure 2).

**Figure 2: Cumulative distribution of people living with HIV by county, Kenya, 2015/16**

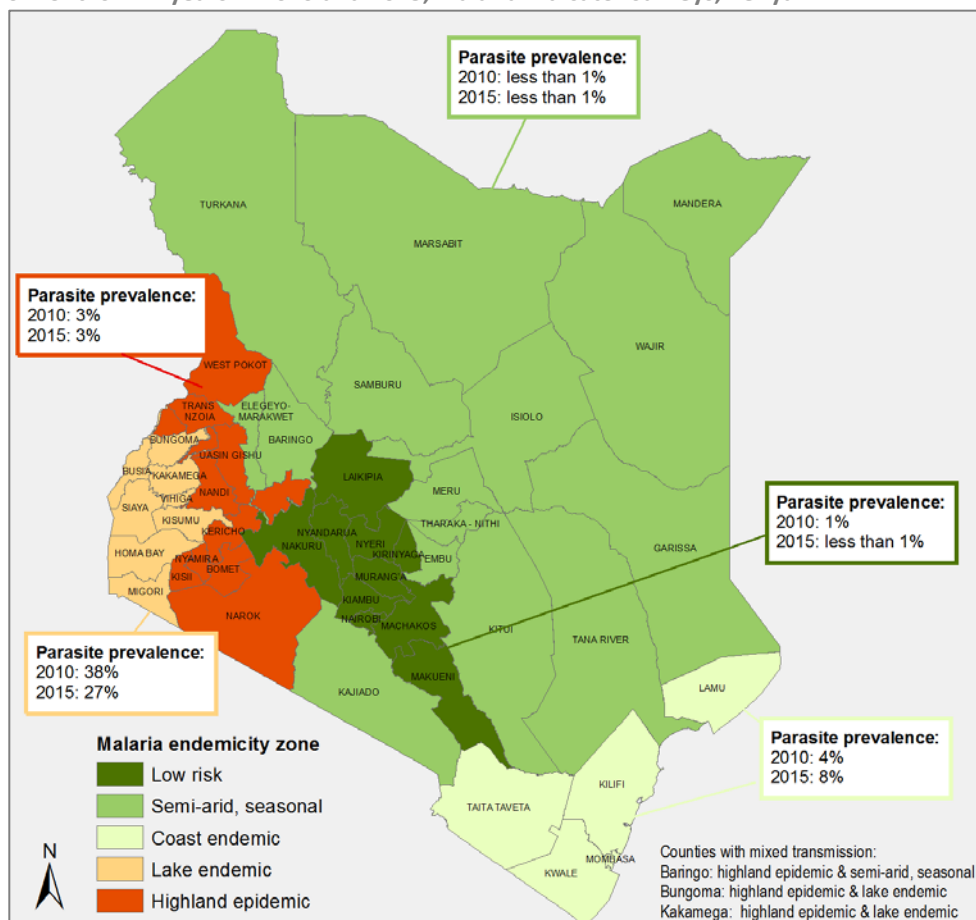


The TB case notification rate resumed its declining path in 2015 and reached a low of 187 per 100,000 population, which still corresponds with about 85,000 tuberculosis cases. Based on these data WHO estimates suggest that TB prevalence and incidence are declining, albeit slowly (Figure 3). The results of the 2016 TB prevalence survey were not yet available at the time of the preparation of this report.

TB is unevenly distributed, with the TB notification rates highest in the cities (Nairobi, Mombasa and Kisumu) and in several counties mostly located in Central Kenya (Figure 4). Low notification rates were observed in the Coastal and several Western/Rift Valley counties.



Figure 5: Malaria endemic zones with malaria parasite prevalence rates among children 6 months – 14 years in 2010 and 2015, malaria indicator surveys, Kenya



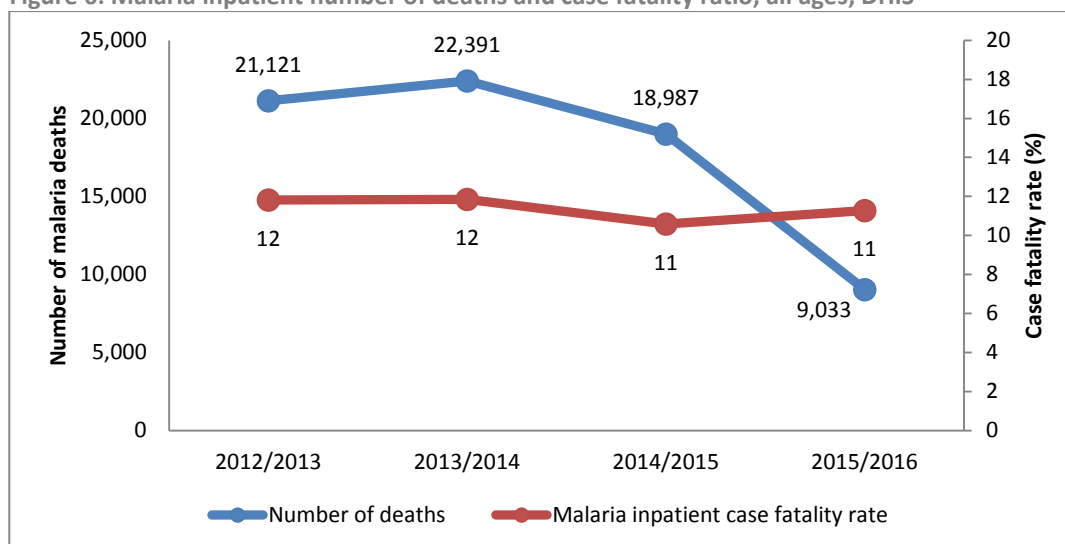
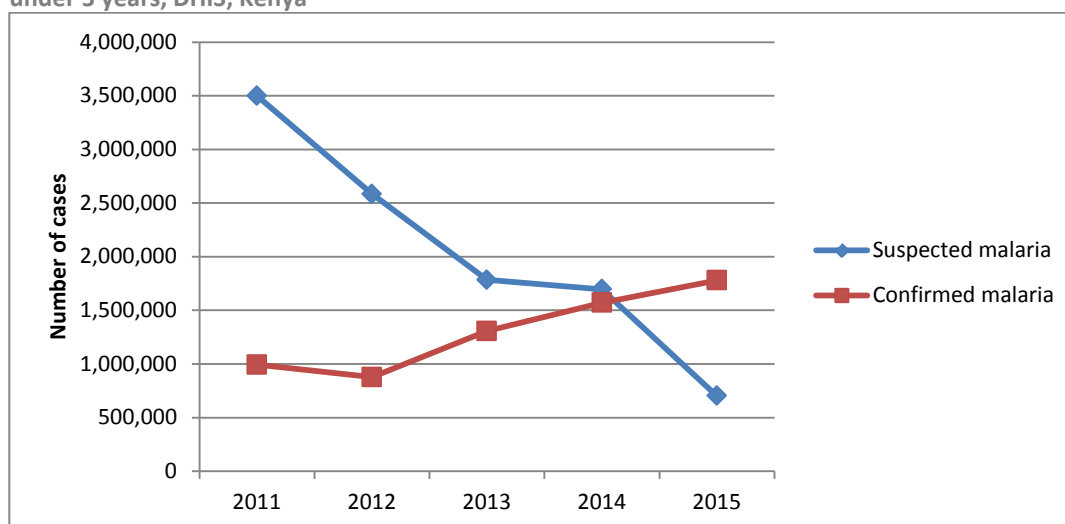
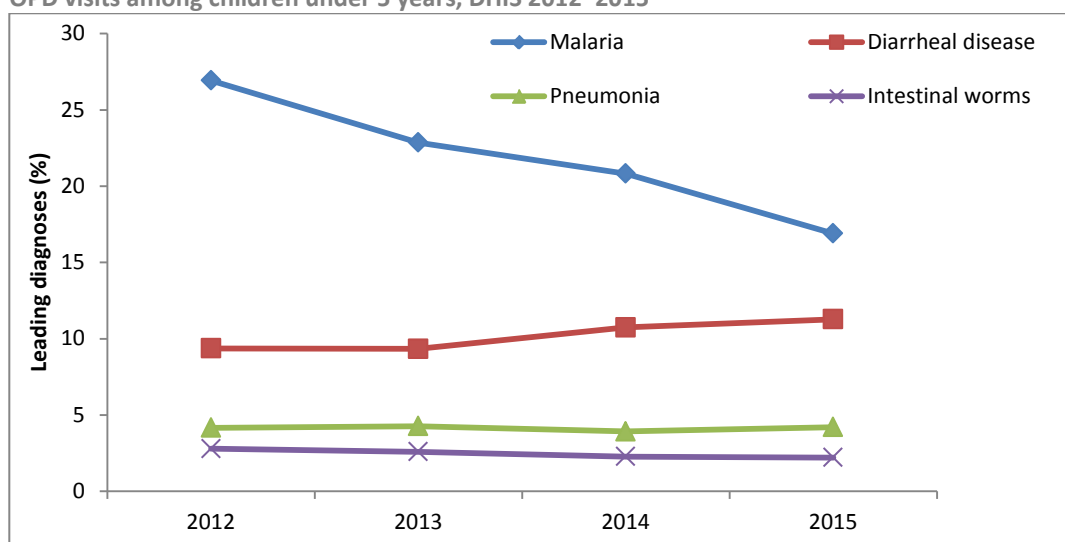
The KHSSP 2014–2018 section on health investment outputs includes two indicators on malaria. The malaria inpatient case fatality rate target of 8% in 2016 was not achieved. Even though the number of inpatient deaths was more than halved in 2015/16 compared to the preceding 3 years, inpatient case fatality rates remained at 11% as admissions also declined by half (Figure 6).<sup>3</sup> There is notable seasonal variation in inpatient malaria case fatality rate with peaks in the period December–February.

The second indicator is the proportion of people with fevers who test positive for malaria. No data were available on the total numbers tested. Importantly however in 2015 the number of confirmed cases exceeded the number of suspected cases in children under 5 for the first time in Kenya’s history, showing the rapid increase of testing, and as a consequence reduced total number of people diagnosed with malaria (Figure 7).

Infectious diseases are the leading diagnoses in OPD. Figure 8 shows the changes over time in the relative share of leading diseases in OPD visits among children under 5 years. Malaria is the most common diagnosis (suspected or confirmed) but has declined dramatically in the last few years. Diarrhoeal diseases account for about 10% of visits, while pneumonia is about 4%. Intestinal worms declined from 2.8 to 2.2% during 2012–2015.

<sup>3</sup> There was a possible over-reporting, by more than an excess of 250,000 admissions, of number of malaria admissions in May 2015. Consequently, admission figures for malaria for May 2015 were imputed by getting the average of the three preceding months.



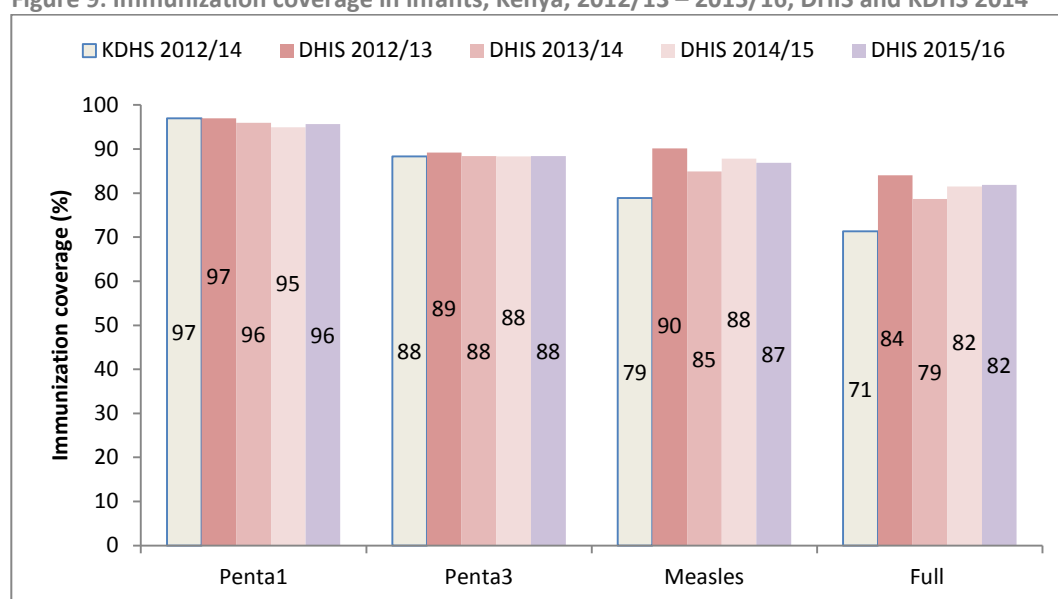
**Figure 6: Malaria inpatient number of deaths and case fatality ratio, all ages, DHIS**

**Figure 7: Number of suspected and confirmed malaria diagnoses in OPD among children under 5 years, DHIS, Kenya**

**Figure 8: Leading diagnoses of childhood illnesses as a percentage of total OPD visits among children under 5 years, DHIS 2012–2015**


### 1.3 Immunization coverage

The KDHS 2014 provides data for children in the year prior to 2014. Health facility reports are the basis for the trend assessment 2012/13 – 2015/16.<sup>4</sup> Immunization coverage among infants declined during the KHSSP (Figure 9). Both penta3 and measles immunization coverage remained at the same levels or were slightly lower in 2015/16 than four years earlier. Full immunization coverage – defined as an infant receiving all recommended vaccinations – was 79% in 2015/16. This was higher than the KDHS 2014 results for infants during 2013/14 (71%), but lower than reported DHIS data in 2013/14 (84%). Over-reporting of full immunization status among infants by health facilities, for example by including older children, is a potential explanation.

According to the KDHS 2014 the most important inequalities were by wealth quintile and education. Infants in the poorest quintile had full coverage of 66% while other quintiles had coverage of 80% or higher. There was also a small urban rural difference (83% and 77% full coverage respectively).

Figure 9: Immunization coverage in infants, Kenya, 2012/13 – 2015/16, DHIS and KDHS 2014



The differences by county were large (Figure 10). In 2015/16, 22 counties had Penta3 coverage rates above 90%.<sup>5</sup> At the other end, there were 6 counties with full coverage below 80%. In 32 of the 47 counties the Penta3 coverage rates in 2015/16 were lower than in 2013/14.

The difference between the average of the top 10 and the average of the bottom 10 coverage counties was 19% in 2015/16, pretty similar to the preceding years, with no reduction in the gap (Figure 11).

<sup>4</sup> Reporting rates are very good and went up from 89.4% in 2012/13 to 94.9% in 2015/16. By 2016 only one county had a reporting rate below 80%. DHIS reports on immunization for 2012/13 were higher than expected on the basis of the KDHS 2014 results and vaccination reports in the subsequent years and are therefore not included in this trend analysis.

<sup>5</sup> This is the new global targets proposed by GAVI: “percentage of countries reaching and sustaining 90% national coverage and 80% in every district with all vaccines included in the national programme.”

Figure 10: Pentavalent vaccine (3 doses) coverage rates among infants by county, DHIS, 2012/13–2014/15

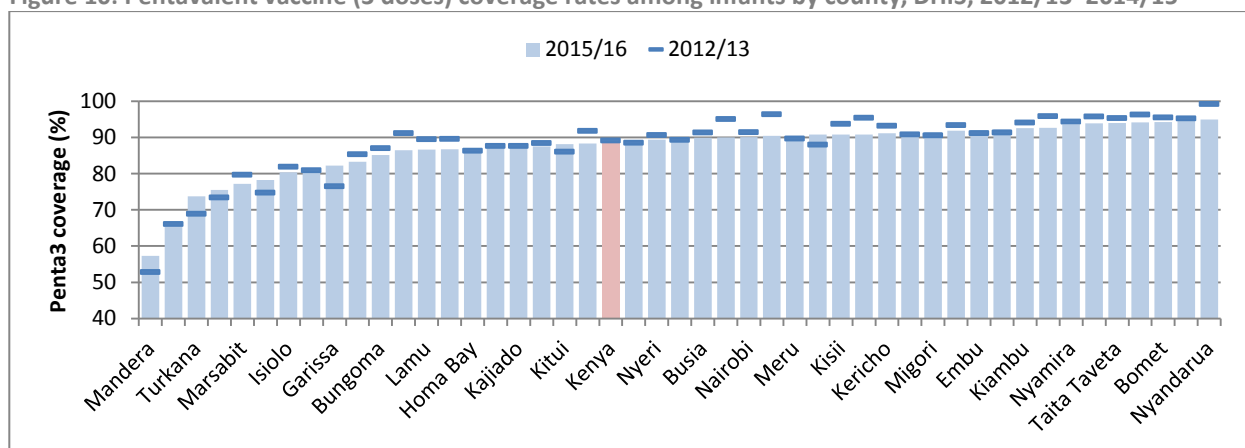
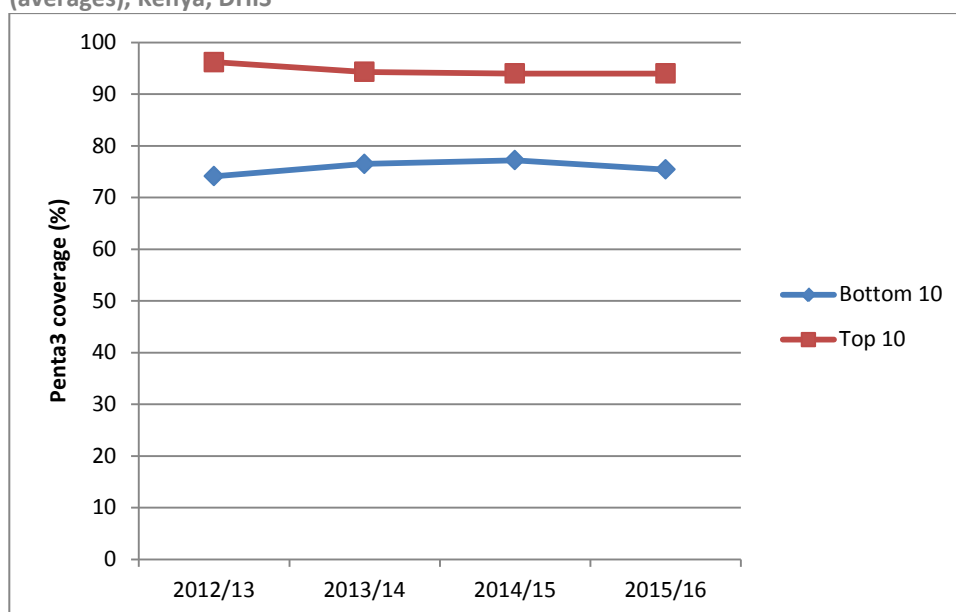


Figure 11: Coverage of pentavalent vaccine (3 doses) among the top 10 and bottom 10 counties (averages), Kenya, DHIS

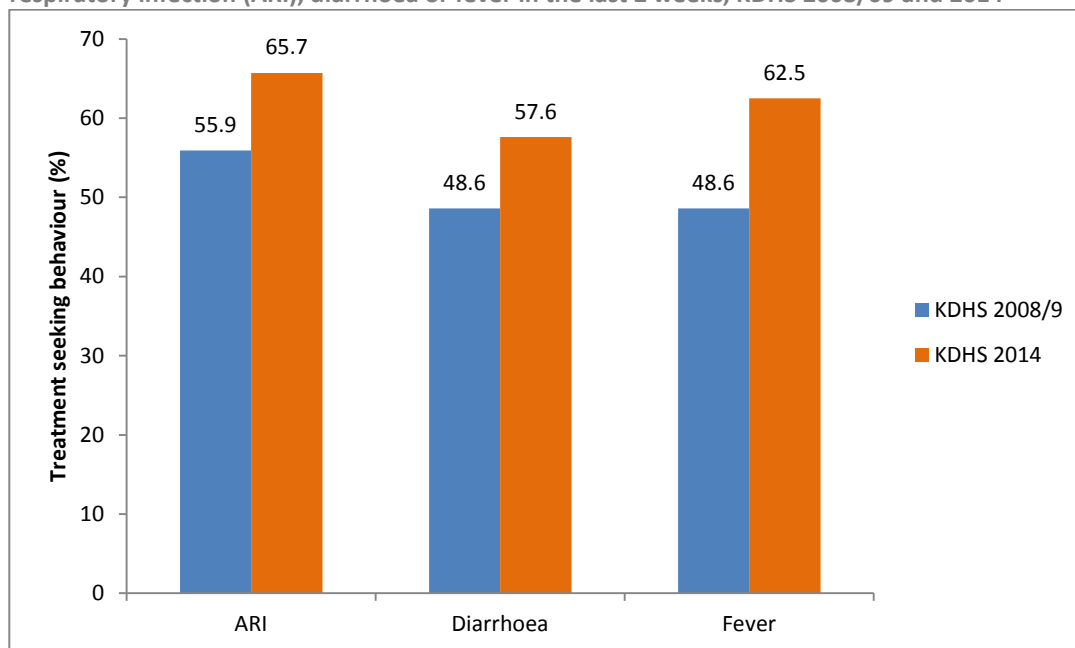


In 2015, there were 89 measles cases reported to WHO, down from 351 in 2014 and 190 in 2013. These numbers are considerably lower than 2011 (2395 cases). In 2014, 50 of the 351 cases were lab confirmed and four deaths occurred. Underreporting of measles cases and deaths, which is done through the integrated disease and response reporting system, is likely.

## 1.4 Treatment of sick children

The surveys provide information on health seeking behaviour when the mother perceives certain symptoms in her child. In the KDHS 2014, 8.5% of respondents said their child had symptoms of ARI, 15% had diarrhoea and 24% had fever in the last 2 weeks. In about 6 out of 10 cases the child was taken to a health provider, which was an increase since the previous KDHS (Figure 12). Among children with diarrhoea, 54% received ORS packets in 2014, up from 39% in 2008/09.

**Figure 12: Treatment seeking behaviour among children under 5 with symptoms of acute respiratory infection (ARI), diarrhoea or fever in the last 2 weeks, KDHS 2008/09 and 2014**



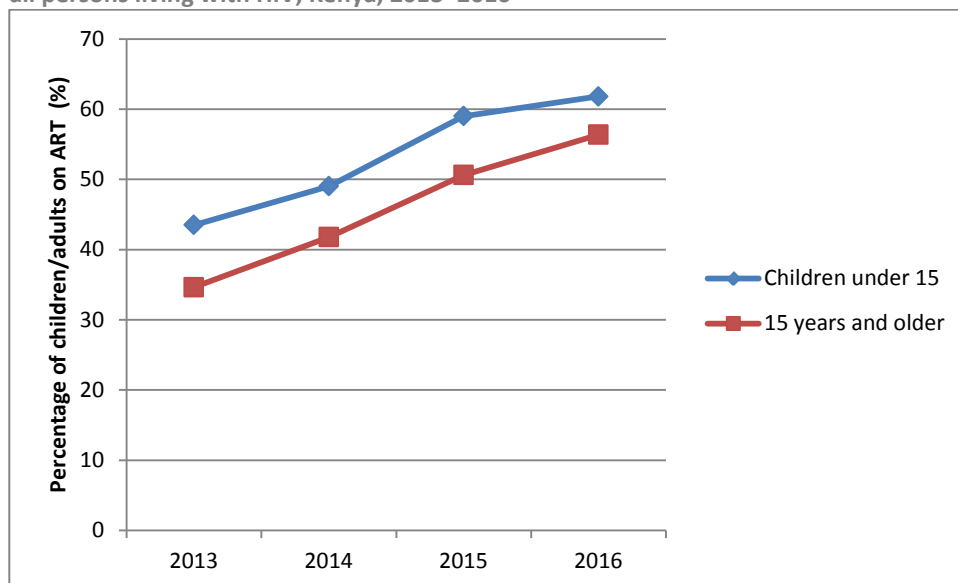
## 1.5 HIV intervention coverage

The aim in the KHSSP is to increase ART coverage among persons living with HIV by at least 1.4 times the 2013/14 baseline.<sup>6</sup> There are an estimated 1.59 million persons living with HIV mid-2016, including 127,000 children under age 15. Among adults (15 years and over) the number of people on treatment increased from 574,000 mid-2013 to 822,000 by mid-2016, corresponding with an increase in use among all persons living with HIV from 42% mid-2013 to 56% in mid-2016<sup>7</sup> (Figure 13). The percentage of children under 15 years on ART also increased from 49% to 62%. By May 2016, 75,000 children under 15 years were on treatment, out of an estimated 127,000 children living with HIV. Retention on ART at 12 months during the review period was high but remained relatively unchanged: 73% in 2011, 75% in 2012 and in 2013, and 74% in 2014. Cumulatively, it is estimated that use of ART helped to avert over 100,000 deaths during 2010–2015.

<sup>6</sup> The KHSSP target is to increase ART coverage from 64% in 2013/2014 to 90% in 2015/2016. Based on the current data the baseline however is not correct. Therefore, progress is assessed against the relative increase with a target of 40% increase (based on the 90% / 64% previous targets).

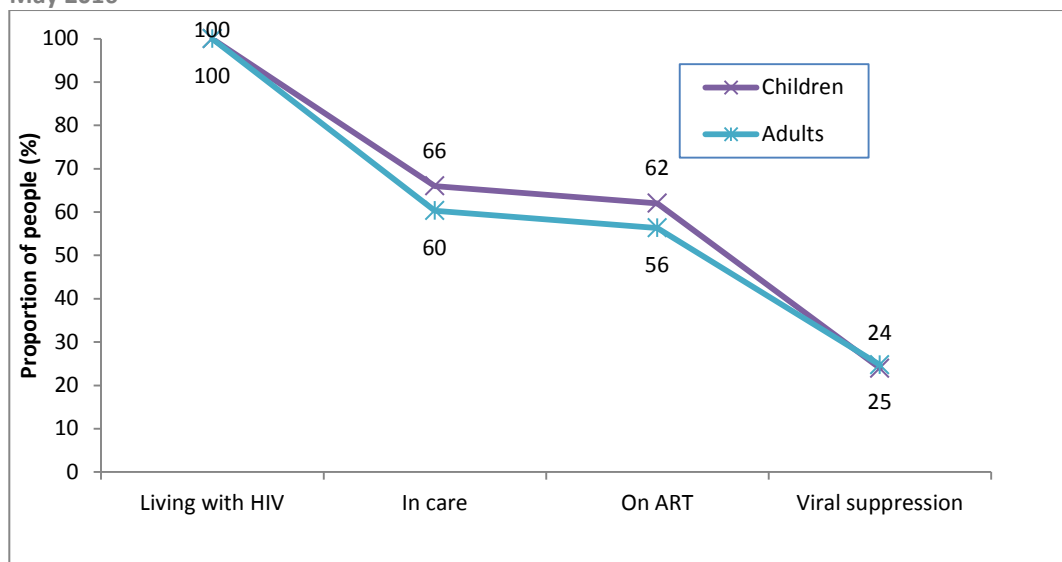
<sup>7</sup> The coverage computations are based on the KNBS projections and HIV prevalence rates provided by NASCOP, kept constant since 2013. The need for ART is calculated based on the 90-90-90 which assumes that by 2019 the country should have identified 90% of the persons estimated to be living with HIV. Identification means tested, identified to be HIV positive and effectively linked to care and treatment.

**Figure 13: Percentage of children (<15) and adults (15+ years) on ART among all persons living with HIV, Kenya, 2013–2016**



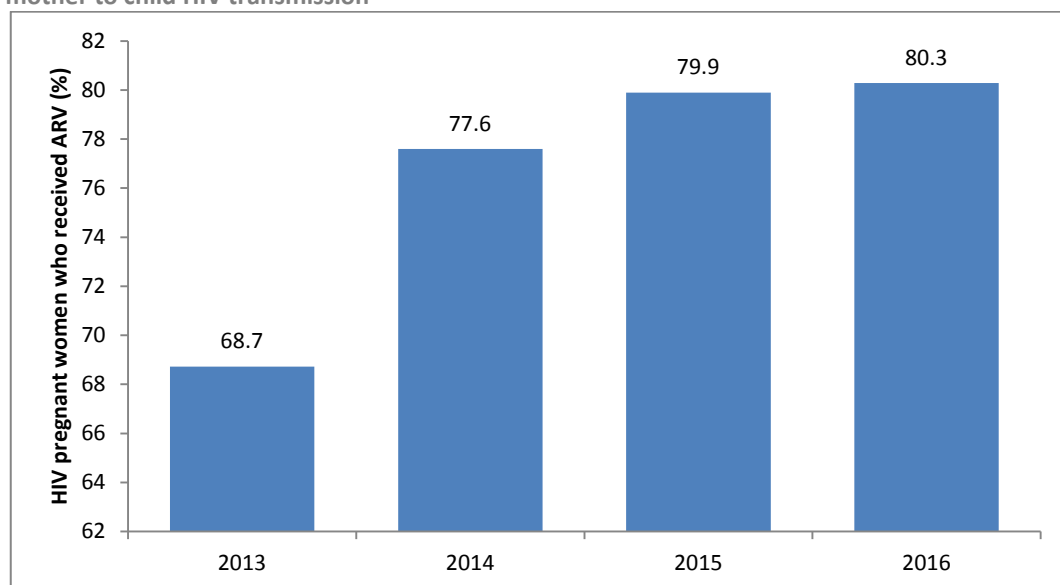
The 90-90-90 cascade provides further insight into the coverage and quality of services. Figure 14 shows the estimate proportion of people in care, on treatment and with viral suppression among people living with HIV. Both adults and children are still quite far from the 90-90-90 targets. The biggest drop is between the estimated number of people living with HIV and those in care, most likely because people do not know they are HIV infected. NASCOP produces regular data on the cascade by county.

**Figure 14: Proportion of people in HIV care, on ART and with viral suppression among all people living with HIV, adults (15+) and children (>15 years), computed from NASCOP data, May 2016**



Transmission of HIV from mother to child is the most common route of HIV infection in children. The aim in the KHSSP is to increase the proportion of HIV infected pregnant women who receive ART to reduce the risk of mother-to-child transmission of HIV (PMTCT coverage) from 69% in 2012/2013 to 80% in 2015/2016, with limited increase during KHSSP. The target of 90% was not achieved in spite of considerable progress in the past few years (Figure 15).<sup>8</sup> Overall, 26 counties have PMTCT coverage over 80%, and 6 counties have coverage over 90%. Among the six counties with the largest number of HIV cases, coverage is over 95% except Nairobi (86%).

<sup>8</sup> The PMTCT denominators were obtained from the revised numbers of deliveries, based on the first dose of pentavalent vaccination and antenatal care attendance. The HIV prevalence among pregnant women was obtained from NASCOP and DHIS data.

**Figure 15: Percentage of HIV pregnant women who received ARVs for reducing the risk of mother to child HIV transmission**

Voluntary HIV counselling and testing numbers doubled during 2012/13 and 2015/16 from 6 to over 12 million tests. The increase was gradual. In terms of coverage this means that the number of tests per 100 population (excluding pregnant women and ANC testing and excluding those who already know they are HIV positive) increased from 25 in 2012/13 to 35 in 2013/14 to 38 in 2014/15 and 53 in 2015/16. In four counties – Homa Bay, Kisumu, Migori and Siaya – more than 100 tests per 100 persons were done in 2015/16.

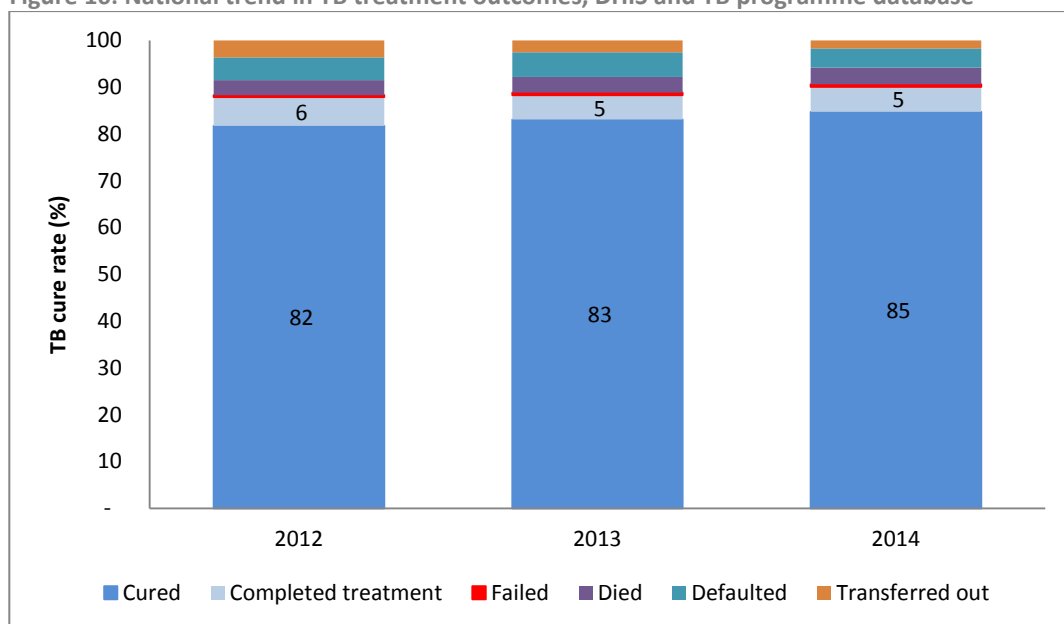
## 1.6 TB intervention coverage

There are currently no data on TB case detection rates<sup>9</sup>. WHO estimates suggest that TB case detection rate in Kenya during 2010–2014 was high but stagnant at around 80%. This also means that about 20% of the TB cases in Kenya were not detected each year during 2010–2014. The TB treatment success rate<sup>10</sup> was 90%, up from 88% in 2012 and 2013, and the 90% target was achieved. The TB treatment success rates were high in all counties (at least 83%).

TB cure rate is the only indicator of TB treatment success included in the KHSSP, aiming to increase TB cure rate from 83% in 2013 to 88% in 2016. The trend during 2012–2014 suggests that TB cure rate in Kenya was high and slowly increasing but remained below than the mid-term target (Figure 16).

<sup>9</sup> TB case detection rate refers to the proportion of estimated new smear-positive cases which are detected by the TB control program. It provides an indication of how effective national TB programmes are in finding people with tuberculosis and diagnosing the disease. A low case detection rate may be indicative of poor health care coverage or limitations in capacity if health facilities to detect TB.

<sup>10</sup> TB treatment success rate refers to "the percentage of new smear-positive TB cases registered under directly observed TB treatment strategy (DOTS) in a given year that successfully completed treatment, whether with bacteriologic evidence of success ("cured") or without ("treatment completed")".

**Figure 16: National trend in TB treatment outcomes, DHIS and TB programme database**

Several specific TB-HIV interventions had very high national coverage rates. Nearly all TB patients seen at the health facilities were tested for HIV during the review period: 96% in 2014 and 97% in 2015. In 2015, nearly all HIV positive TB patients received co-trimoxazole prophylaxis (99%) and life-long antiretroviral treatment (96%).

The number of patients in Kenya with resistance to anti-TB drugs is low but increased in 2015: there were 266 cases in 2013, 269 in 2014 and 368 in 2015. The increase was possibly due to a recent change in policy that included patients that are resistant to rifampicin. In 2015, Garissa county had the biggest number of TB drug resistant cases (69), followed by Nairobi (62).

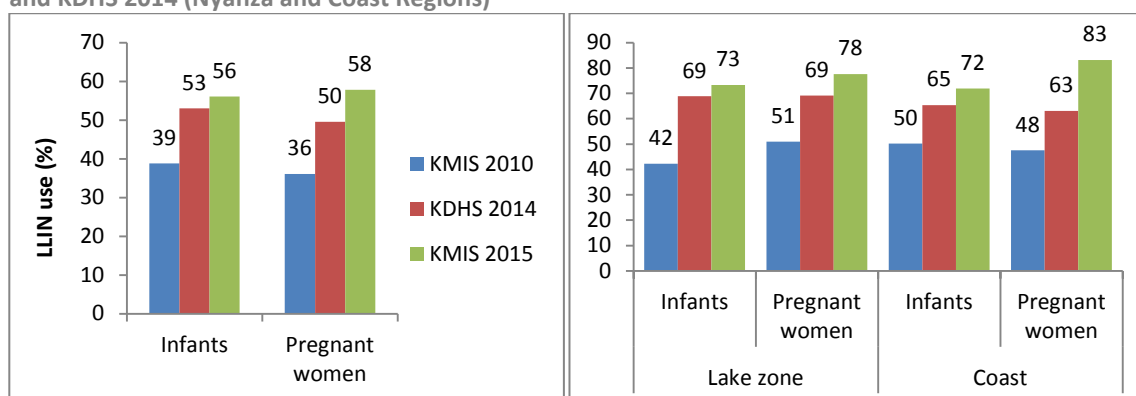
## 1.7 Malaria interventions<sup>11</sup>

Long-lasting insecticidal nets (LLIN) have been the main strategy for vector control during the review period. Ownership of ITNs, defined as the percentage of households with at least one LLIN, increased from 54% in the 2010 KMIS survey to 59% in KDHS 2014 and 63% in the KMIS 2015. The highest ownership levels were observed in the highly endemic zones (87% in the Lake endemic areas and 73% in the Coast endemic areas).

Use of LLIN among children under 5 and pregnant women continued to increase after 2010 and during 2014–2015 (Figure 17). In 2015, 58% of pregnant women and 56% of children under 5 years slept under a LLIN the night before. Both indicators, however, fell short of the respective 70% and 85% target for the midterm. LLIN use was higher in the two endemic areas, Lake and Coast, where more than 70% of children under 5 and about 80% of pregnant women slept under LLIN.

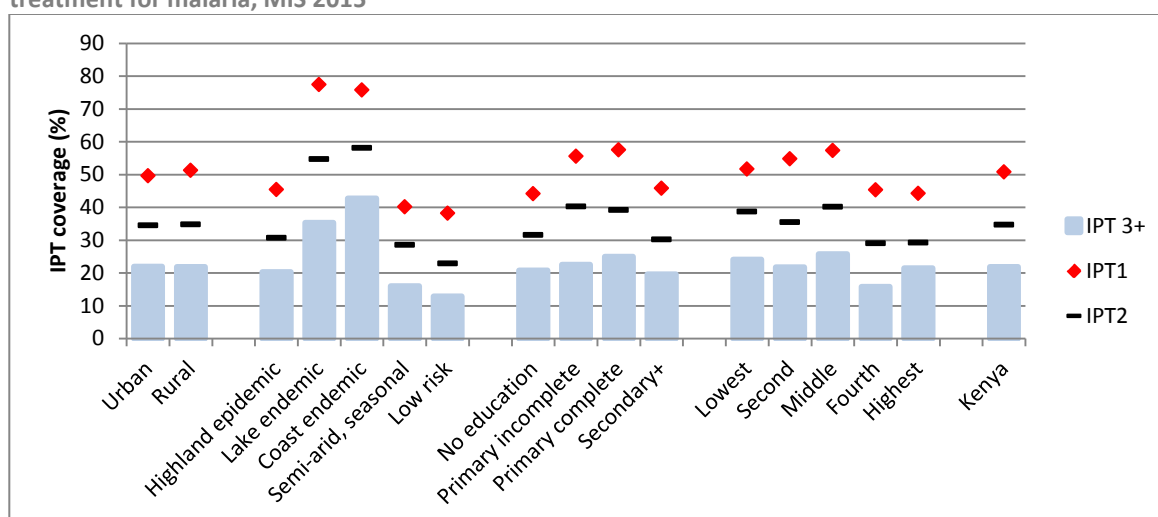
<sup>11</sup> The geographic patterns of malaria occurrence imply that interventions for malaria vary by levels of transmission. See Kenya Malaria Indicator Survey report 2015.

**Figure 17: LLIN use; children under 5 and pregnant women who slept under a LLIN the night before the survey, national and endemic zones, KMIS 2010 and KMIS 2015 (Lake and Coast areas) and KDHS 2014 (Nyanza and Coast Regions)**



Coverage of intermittent preventive therapy for pregnant women (IPT) was low (Figure 18). The current guidelines recommend that all pregnant women in malaria endemic zones (coastal areas and areas around Lake Victoria) receive at least three doses of IPT (IPT3). Coverage of IPT3 was very low in Kenya (10% in the KDHS 2014 and 22% in the KMIS 2015) and in the endemic zones around Lake Victoria (35%) and coastal zone (43%) (Figure 17).

**Figure 18: Percentage of pregnant women who received intermittent preventive treatment for malaria, MIS 2015**



Artemisinin-based combination therapy (ACT) is the recommended first-line treatment of uncomplicated malaria. Kenya has done very well in this regard, with almost all malaria positive cases (99%) receiving ACT in 2015, according to the MIS 2015.

## 1.8 Neglected tropical diseases intervention coverage

The “neglected tropical disease programme” in Kenya focuses on 14 neglected tropical diseases; three fewer than the number on the global list (Table 3). Some of the neglected tropical diseases were common while others, partly due to limitations in capacity to diagnose them, were quite rare. For instance in 2015/2016, 37,018 cases of schistosomiasis and 14,516 cases of jiggers infestations were reported compared to 281 for Leishmaniasis, 473 for trypanosomiasis, and none for dracunculiasis. There were 309 reported cases of dengue fever in 2014/2015. Reported number of new leprosy cases was generally on the decline. About 200 new leprosy cases were reported each year during 2006–2009. The number dropped to 154 in 2010 and remained below 150 since then although with peaking for some of the years: 122 in 2011, 146 in 2012, 114 in 201, 142 in 2014, and 131 in 2015.



Two indicators were included in the KHSSP 2014–2018 to assess performance of efforts towards addressing the burden of neglected tropical diseases, namely: percentage of the target population receiving mass drug administration (MDA) for schistosomiasis, and the percentage of school-age-children dewormed. The aim in the KHSSP is to increase the percentage of the target population receiving MDA for schistosomiasis from 50% in 2013 to 95% in 2016, and increase the percentage of school age children dewormed from 49% in 2013 to 85% in 2016.

**Table 2: List of neglected tropical diseases that the Ministry of Health in Kenya focuses on**

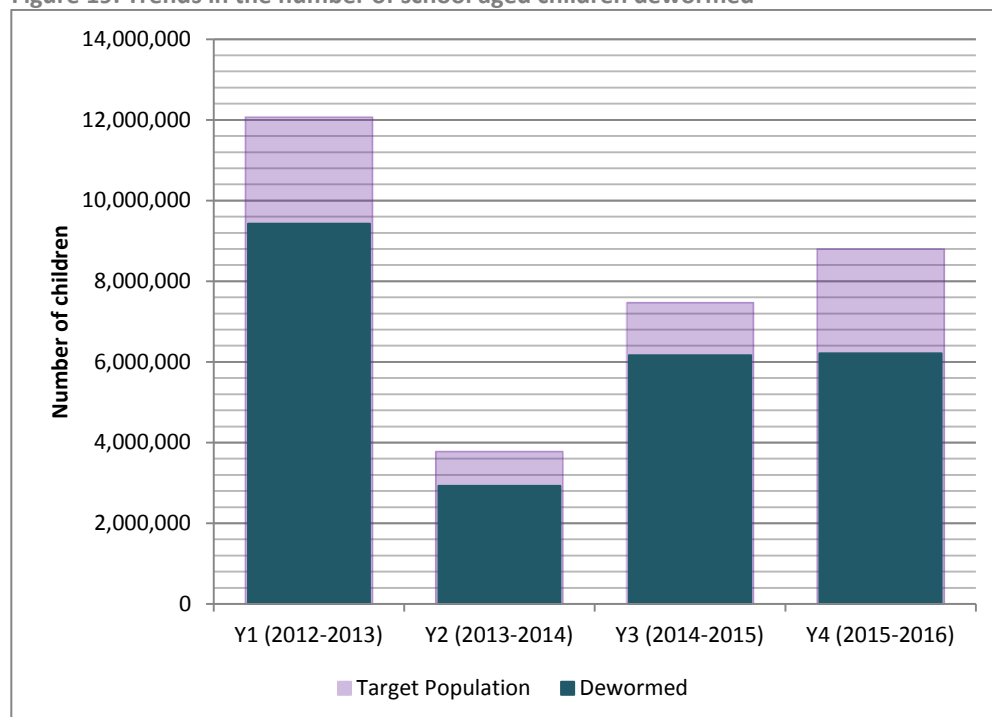
1. Dengue	10. Foodborne trematodiasis
2. Rabies	11. Lymphatic filariasis
3. Trachoma	12. Onchocerciasis
4. Leprosy	13. Schistosomiasis
5. Trypanosomiasis	14. Soil transmitted helminthiasis
6. Leishmaniasis	15. Buruli ulcer**
7. Taeniasis/Neurocysticercosis	16. Chaga disease**
8. Dracunculiasis (guinea worm)	17. Yaws**
9. Echinococcosis	**On global list, but not included in Kenya's list

Source: MOH NTD programme

However, denominator data for MDA (the population targeted to receive drug for schistosomiasis) was not available at the time of the review. Because MDA was done in schools, numerator data, i.e. the number that received MDA, was available for school-going children but not for adults and school-age children. The number of school-going children that received MDA was small and sharply undulating. The number increased dramatically from 191,318 in 2012/2013 to 549,734 in 2013/2014. It then dropped sharply to 79,038 in 2014/2015 before increasing sharply again to 459,734 in 2015/2016.

The target for deworming among school-going children was not achieved but a substantial number of the children took deworming tablets: 9,429,880 (78% of target) in 2012/2013, 2,928,963 (78% of target) in 2013/2014, 6,167,847 (83% of target) in 2014/2015 and 6,215,532 (71% of target) in 2015/2016 (Figure 19).

**Figure 19: Trends in the number of school aged children dewormed**





# Strategic Objective 2: prevention and control of noncommunicable diseases

## Main findings

- Performance of the indicators of overweight/obesity, prevalence and treatment of raised blood pressure and diabetes, tobacco use and harmful use of alcohol (especially men), and cervical cancer screening indicate that greater efforts are required to curb the rapid rise of NCDs and their risk factors. The rapid rise of NCDs is driven by a demographic and epidemiological transition.
- The data from the STEPS 2015 show that the prevalence of overweight and obesity have increased dramatically during the last decade, reaching epidemic proportions especially among women with 38% overweight or obese and 1 in 7 women obese. The increase was observed in all counties, but overweight and obesity varied more than five times between counties, ranging from less than 15% in northern counties to over 45% in most central region counties and cities.
- Raised blood pressure ( $\geq 140/90$  mm Hg) affected almost a quarter of adults (23%). Only one-sixth had been diagnosed, and effective treatment coverage, defined as people with raised blood pressure in the population and who have been identified and put on treatment and whose blood pressure has been controlled, was just 4%. For higher blood pressure ( $\geq 160/100$  mm Hg) the situation was only marginally better. Counties in central region and, to a lesser extent, eastern region had much higher prevalence of raised blood pressure than elsewhere in Kenya.
- Diabetes prevalence was 1.9% among persons 15–69 years but only 41% had been diagnosed and effective treatment, defined as people with diabetes in the population and who have been identified and put on anti-diabetes treatment and whose diabetes has been controlled, was only 7%.
- Cervical cancer screening rates were low throughout Kenya with only one in 7 women 25–49 years (ever) screened. There were almost no data on cancer incidence and mortality.
- There were no reliable data on the prevalence and treatment coverage for mental health disorders.

Indicator	Baseline (Data source)	Achievement (Data source)	Target 2016	Progress	Comments
% of adults with BMI $>25\text{kg/m}^2$	33, KDHS 2014, women 15–49	37, women 15–69; 18, men 15–69: (STEPS 2015)	NA		Baseline revised, according to new data; evidence of dramatic increase since 2008
Adults with raised blood pressure		23, both sexes, 15–69	NA		Replaces previous OPD indicator
% of women aged 25–49 years who were screened for cervical cancer	14 KDHS 2014	13 (STEPS 2015)	60		The target was based on a baseline of 50% which turned out to be incorrect.
% of new OPD visits due to mental health	<1 (2013, DHIS)	1 (DHIS 2015/2016)	2		The challenge of this indicator is that many patients are not properly diagnosed in outpatient clinics, which undermines the value of this indicator

KEY | Red: limited or no progress; Orange: some progress but not enough to achieve target; Green: good progress, target achieved or on course to achieve target.

### Data sources and analysis

- Surveys: the STEPS 2015 provides data for several risk factor indicators. STEPS included 4,500 adults between the ages 18–69 years. All counties were surveyed, but sample sizes are small. The indicators by county therefore have large confidence intervals. In addition, the KDHS 2014 provided data on women’s anthropometry (15–49 years).
- Facility data: data for the three indicators is problematic because of poor diagnostic practices and reporting (mental health conditions), incomplete and inaccurate reporting (raised blood pressure, is replaced by data from STEPS 2015), and cancer morbidity (poor reporting, no cancer registries).

## 2.1 Introduction

The second Strategic Objective of KHSSP 2014–2018 focuses on efforts to prevent a rise in the burden of noncommunicable diseases (NCDs). The prioritized interventions in the Kenya Essential Package for Health include improved NCD screening in health facilities and communities; workplace safety, health and hygiene; and food safety. Mental health is included as one of the priority conditions. It is noted that the fifth Strategic Objective (minimize exposure to major health risk factors) also includes a number of key multisectoral interventions against NCDs, such as tobacco and harmful alcohol use. The launch of the first Kenya National Strategy for the Prevention and Control of NCDs 2015–2020 and the Kenya Mental Health Strategy 2015–2030 are further evidence of greater emphasis on NCDs.<sup>12</sup> The findings of the health facility census (SARAM 2013) showed the poor readiness of health facilities to provide NCD services, which was lower than for almost all other services.<sup>13</sup>

Five indicators are selected in the KHSSP 2014–2018, including two population-based indicators and three health-facility based indicators. The 2013/14 baselines needed adjustments for several indicators, as data only became available after the initial targets had been set. In addition, a few indicators such as hypertension prevalence and treatment coverage only became available in 2015, but were added to this report because of their great significance for NCD control, replacing the hypertension indicator (i.e. % of new outpatient cases with high blood pressure) based on health facility data. For other indicators – outpatient morbidity for mental conditions and for cancers – good data were not available at the time of the review.

## 2.2 Epidemiological situation

There is limited information on the situation and trends in mortality and morbidity due to NCDs. Among OPD visits for persons 5 years and older only arthritis and hypertension are in the top 10 diagnoses, with both increasing in relative importance over time. Among inpatient admissions for persons 5 years and older, cardiovascular conditions, digestive disorders and diabetes all appeared in the top 10. The same three conditions were among the top 10 causes of death in hospitals. Details can be found elsewhere in this report.

In the absence of reliable cause of death information from a death registration system, modeling is used to obtain an idea of the relative importance of NCDs as a cause of death and burden of disease. WHO has estimated that 27% of all deaths are due to NCDs, (including cardiovascular diseases 8%, cancers 7%) and the probability of dying from the four leading NCDs (cardiovascular conditions, diabetes, cancer and chronic respiratory diseases) between ages 30 and 70 years was estimated at 18%.<sup>14</sup> Numbers of NCD deaths are increasing dramatically, for an important part driven by demographic changes and to a lesser extent by epidemiological changes. The IHME National Burden of

<sup>12</sup> Ministry of Health. Kenya National Strategy for the Prevention and Control NCDs 2015–2020. Nairobi. 2015. Ministry of Health. Kenya Mental Health Strategy 2015–2030. Nairobi. 2015.

<sup>13</sup> Ministry of Health. Kenya Service Availability and Readiness Mapping (SARA-M). Nairobi 2013.

<sup>14</sup> [http://www.who.int/nmh/countries/ken\\_en.pdf?ua=1](http://www.who.int/nmh/countries/ken_en.pdf?ua=1)

Disease modeling exercise provides similar estimates on trends in causes of death and DALYs.<sup>15</sup> NCDs are increasingly important, particularly because of the decline in mortality due to communicable diseases. In 2013, the top 10 NCDs included cerebrovascular disease, depression, low back pain and neck pain and sense organ disorders.

## 2.3 Overweight and obesity

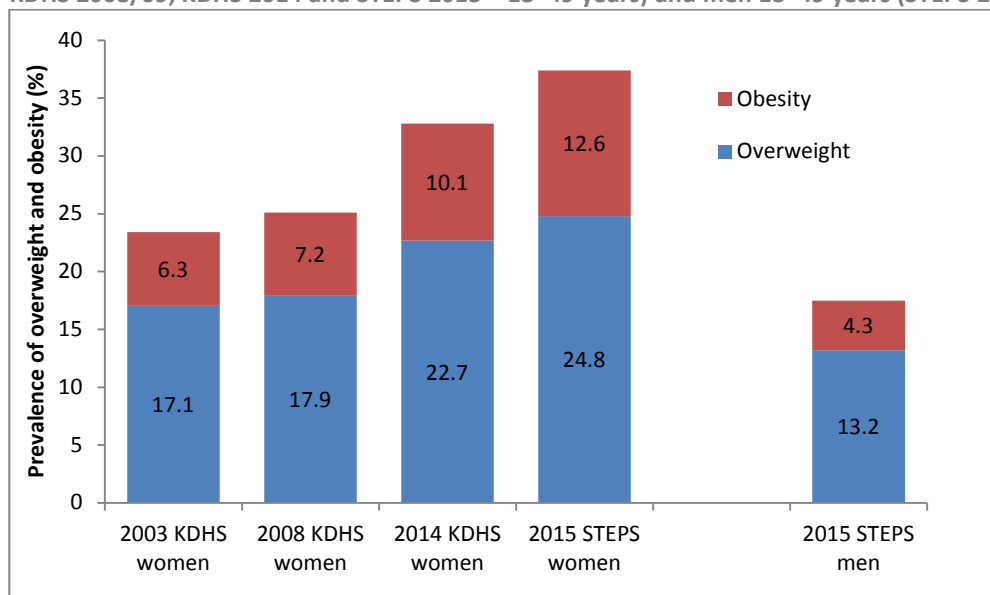
STEPS 2015 shows that the prevalence of overweight (BMI 25.0–29.9 kg/m<sup>2</sup>) and obesity (BMI ≥ 30) among adults 15–69 years was high, especially among women. It shows that 17.5% of men and 38.4% of women were either overweight (BMI 25.0–29.9) or obese (BMI 30 or higher), and 13.7% of women and 4.3% of men were obese.<sup>16</sup>

The prevalence of overweight or obesity has been increasing dramatically in recent years. Data for women 15–49 years from four national surveys since 2003 show that the prevalence of obesity increased rapidly after 2008, from 7.2% in the KDHS 2008/09 to 10.1% in KDHS 2014 and 12.6% in the STEPS 2015 (Figure 20). The prevalence of overweight also increased considerably.

The KDHS 2014 findings show that huge disparities of overweight and obesity by socioeconomic status. Half of all women in the highest wealth quintile were either overweight or obese compared to only 12% of women in the poorest quintile. Urban-rural differences were also large, with the urban prevalence of overweight or obesity 1.6 times higher than the rural prevalence in the STEPS 2015.

Figure 21 shows the trends in prevalence of overweight or obesity by region. The rapid increase occurred in every region, so it is a nationwide health issue. There were however dramatic differences between regions. Nairobi and Central regions had prevalence rates over 50% in the 2015 STEPS; Coast, Eastern and Nyanza were between 30 and 40%; Rift Valley, Western and particularly North-eastern had prevalence below 30%. The STEPS figures tend to be somewhat higher than the KDHS rates, especially in Nyanza (Figure 21). The differences between the KDHS 2014 and STEPS 2015 rates however were not statistically significant.

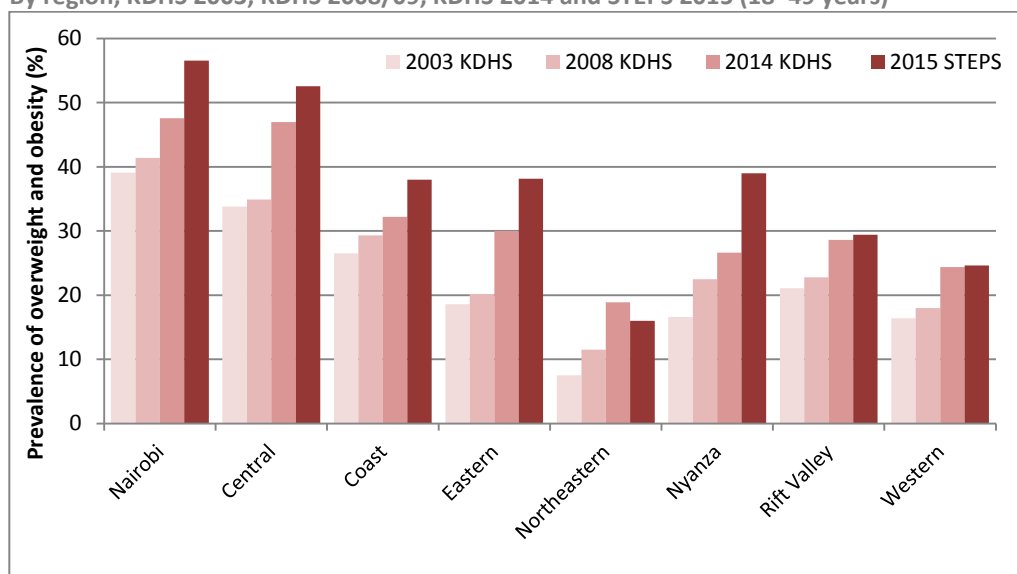
**Figure 20: Prevalence of overweight and obesity among women 15–49 years (KDHS 2003, KDHS 2008/09, KDHS 2014 and STEPS 2015 – 18–49 years) and men 18–49 years (STEPS 2015)**



<sup>15</sup> Institute for Health Metrics and Evaluation and International Center for Humanitarian Affairs. The Global Burden of Disease: generating evidence, guiding policy in Kenya. Seattle, Washington, USA: 2016.

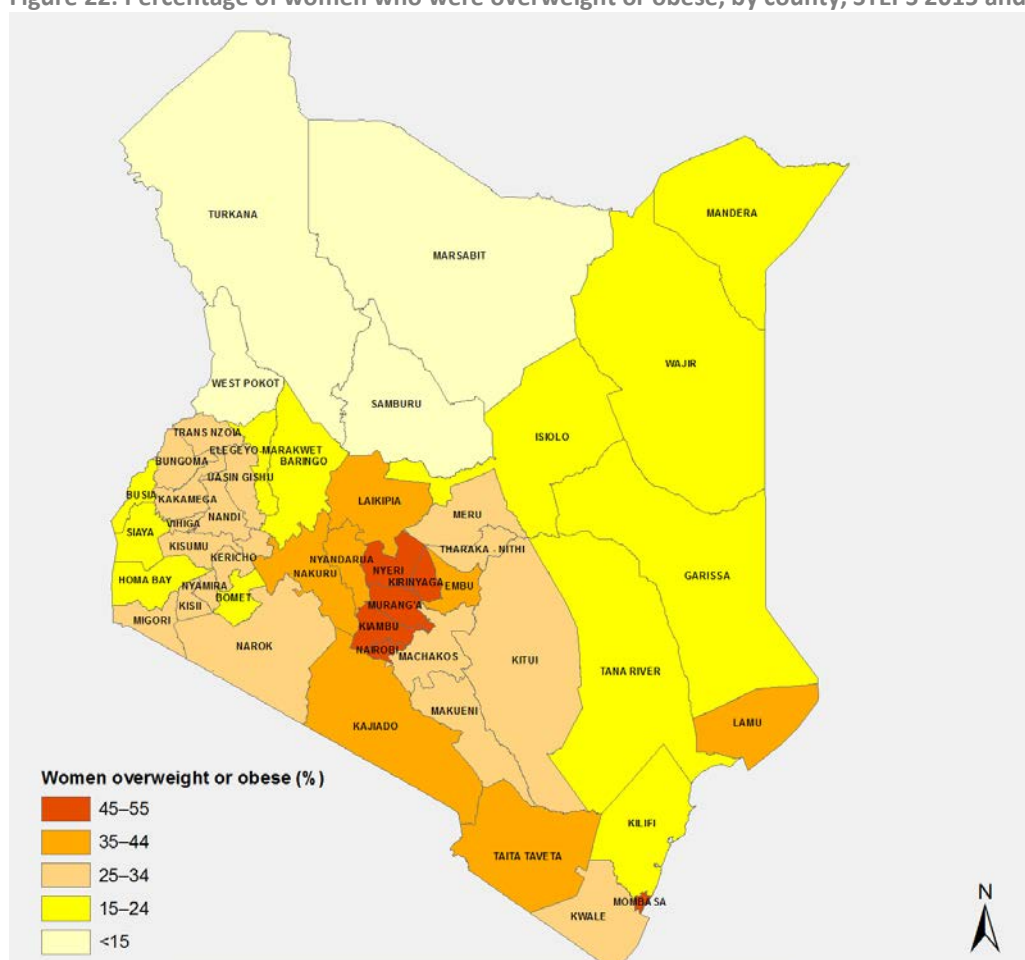
<sup>16</sup> STEPS also collected data on waist circumference. The average waist circumference for men is 78.9 cm and women 79.1 cm. More than a quarter of men (27%) and women (36%) have waist hip ratios above the normal value.

**Figure 21: Prevalence of overweight or obesity among women 15–49 years**  
By region, KDHS 2003, KDHS 2008/09, KDHS 2014 and STEPS 2015 (18–49 years)



County level prevalence rates were available from the 2014 DHS for women and for both sexes from the STEPS 2015. The latter however has small sample size. To obtain more stable estimates of the prevalence of overweight or obesity by county the data from the KDHS 2014 and the STEPS 2015 were combined. (Figure 22). STEPS 2015 also collected data on factors that are associated with weight increase among adults. Only 6.5% of the respondents 15–69 years had insufficient physical activity—defined as less than 150 minutes moderate activity per week—with little difference between men and women. However, 84% of respondents said they always or often added sugar when preparing food or beverages at home.

**Figure 22: Percentage of women who were overweight or obese, by county, STEPS 2015 and KDHS 2014**



## 2.4 Raised blood pressure

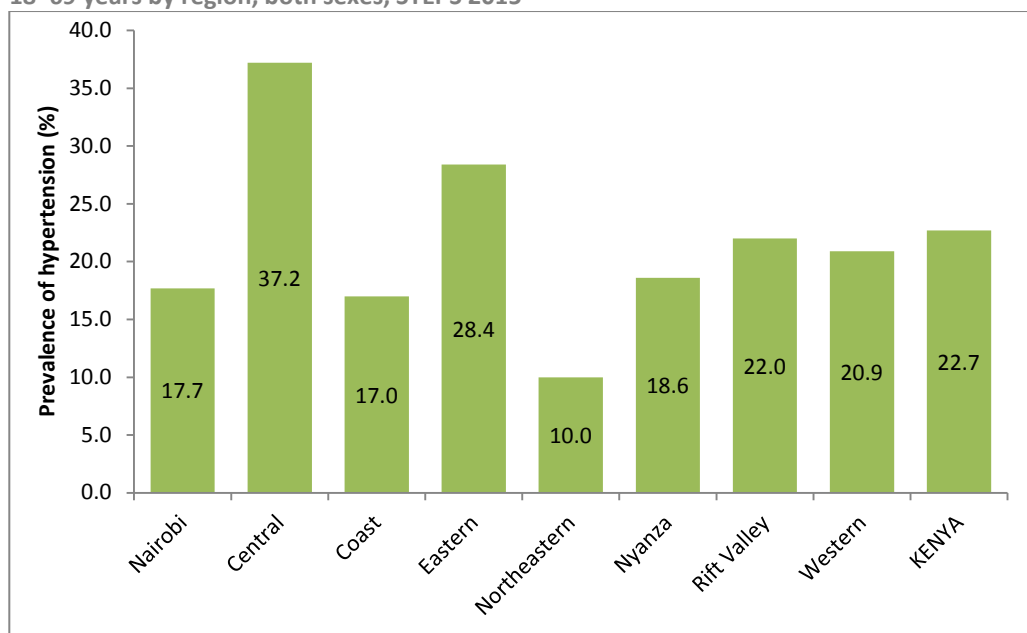
The original KHSSP indicator was the proportion of outpatients diagnosed with raised blood pressure. Data are reported through DHIS and the percentage of recorded new outpatient cases has been steadily increasing over the years with a rise from 1.9% in 2012 to 2.9% in 2016. This indicator however is not a good indicator of population prevalence since many people have hypertension but are not seen at clinics. The STEPS 2015 survey provides for the first time national data on the prevalence of raised blood pressure.

Among adults 18–69 years 22.7% had raised blood pressure (systole >140 mm Hg or diastole >90 mm Hg) or was already on treatment for hypertension. Differences between men and women were small. There were however large differences between counties (not shown because of large sampling errors) and regions. Figure 23 shows that Central region counties had much higher prevalence (37%) than any other region. Eastern region was a distant second with 28%.

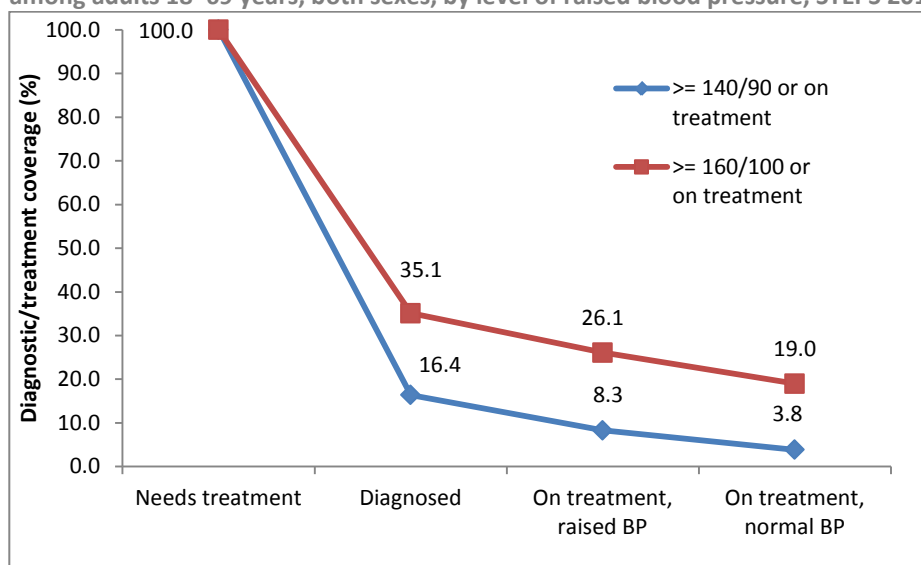
Treatment coverage was very low. Among all people with raised blood pressure ( $\geq 140/90$ , including those already on treatment with normal blood pressure), only 1 in 6 persons said they had been diagnosed in the last year. Only 12% were on treatment, and effective coverage –defined as normal blood pressure in the survey and on treatment among those who need treatment– was only 3.8% (Figure 24). If the analysis is limited to those with very high blood pressure (systole  $\geq 160$  or diastole  $\geq 100$ ), still only just over one third of people had been diagnosed and effective coverage was 19%.

STEPS 2015 also asked about salt intake, a possible risk factor for raised blood pressure. Overall, 23% of respondents said they always or often added salt or salty sauce to their food before eating or as they were eating. Only 4% said they always or often ate processed foods high in salt.

**Figure 23: Prevalence of hypertension (measured or on treatment) among adults 18–69 years by region, both sexes, STEPS 2015**



**Figure 24: Diagnostic coverage and effective hypertension treatment coverage among adults 18–69 years, both sexes, by level of raised blood pressure, STEPS 2015**



## 2.5 Cancer screening and admissions<sup>17</sup>

The recommended screening cycle for the cervical cancer in Kenya is every 5 years for women aged between 25–49 years with the exception for HIV positive women. The midterm target was 60%, but the baseline was assumed to be very high (50%) as well. The recent surveys show that the baseline should have been much lower and the targets for KHSSP need to be revised.

In general, however, coverage of cervical cancer screening among women 25–49 years was very low. In the KDHS 2014, only 18.8% of women 25–49 years had ever had cervical cancer screening. In STEPS 2015, cervical cancer screening coverage rates were similarly low, with 14.2% of women 25–49 years ever screened. Only Nairobi and Central Region had coverage higher than 20%. Among women 30–49 years (the WHO recommended age range for the indicator) the coverage of cervical cancer screening was equally low (17%), ranging from 0% in Wajir and West Pokot to 54% in Mombasa county (with large confidence intervals, as numbers by county in STEPS 2015 were small).

There are very few cancer registries in Kenya and inpatient data are deficient to monitor trends. During the period July 2015–June 2016 only nine facilities reported on inpatient cancer cases. The KHSSP indicator, the percentage of patients admitted with cancer, cannot be monitored.

## 2.6 Other NCD risk factors

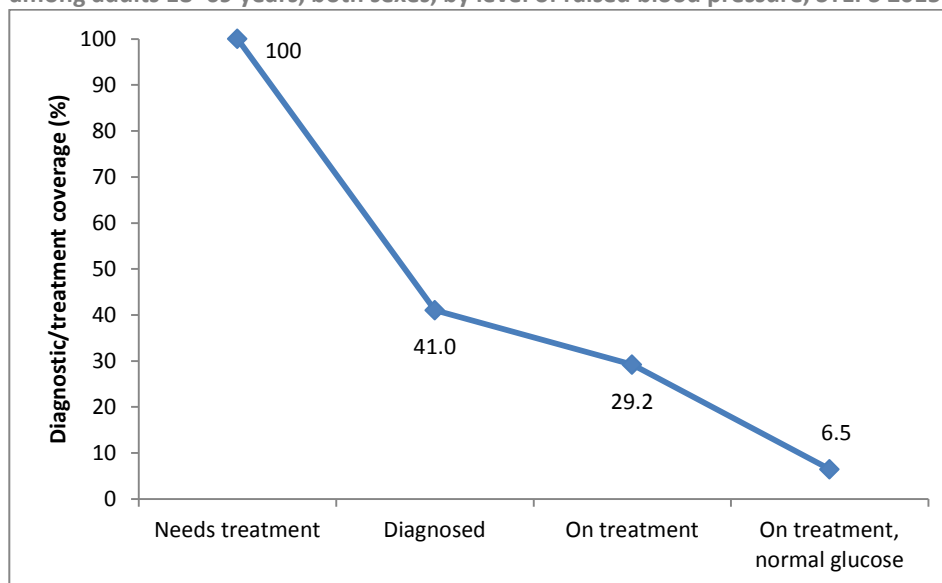
Diabetes is one of the priority NCDs in KHSSP 2014–2018, but there is currently no specific indicator. Overall, 1.9% of adults 18–69 years tested in the STEPS 2015 had raised fasting blood glucose ( $\geq 7$  mmol/l) or was currently on treatment for diabetes. Women had higher prevalence of diabetes than men (2.3% and 1.5% respectively).

The treatment coverage was low among those with raised blood glucose (including those on treatment now): 41% had been diagnosed, 29% were on diabetes treatment through insulin or oral medication and 6.5% were on treatment and had normal fasting blood glucose in the survey (below 7 mmol/l) (effective coverage) (Figure 25).

<sup>17</sup> KHSSP Strategic Objective 5 includes tobacco use which is one major risk factor for lung cancer.



**Figure 25: Diagnostic coverage and effective treatment coverage for diabetes among adults 18–69 years, both sexes, by level of raised blood pressure, STEPS 2015**



## 2.7 Mental disorders

The term 'mental disorders' is used to refer to a broad category of problems such as depression, schizophrenia, anxiety disorders, intellectual disabilities and disorders due to drug abuse. The Kenya Mental Health Policy 2015–2030 provides for a framework on interventions for securing mental health systems reforms in Kenya. There is very little information on the prevalence and treatment of mental health, neurological, and substance use in Kenya. The KHSSP 2014–2018 included an indicator on the percentage of outpatients that are diagnosed with mental health disorders. The challenge of this indicator is that many patients are not properly diagnosed in outpatient clinics, which undermines the value of this indicator.

In the DHIS data less than 1% of the new outpatient cases are diagnosed with mental disorders which is below the target of 3%. The outpatient data did not disaggregate the key different types of mental disorders. In 2015/16 91,049 cases were reported, of which 85% were 5 years and older. There was little change in the total numbers during the last 4 years. The SARA-M 2013 did include mental health related service readiness questions, e.g. on the availability of anti-depression medicines or training of the health worker.



# Strategic Objective 3: reduce the burden of violence and injuries

## Main findings

- In spite of the dramatic increase in the number of vehicles (doubled between 2009 and 2015), the rate of road traffic fatalities, based on civil registration data, hardly increased (from 11.8 to 12.4 per 100,000) between 2013 and 2015. There was decline in fatalities per 10,000 vehicles. The midterm target for new outpatient road traffic injuries is 3% against an achievement of 2.5% for 2015 from a revised baseline of 2.3% for 2013.
- Other injuries, most commonly cuts and falls, accounted for about 1% of all OPD diagnoses with little change over time and similar to the 1% midterm target.
- Less than 1% of new outpatient cases were as a result of gender-based violence during July 2015–June 2016, significantly lower than the target of 3%. The midterm target had been set at 3%. There is however most likely significant underreporting by health facilities, given the high rates of gender-based violence reported GBV (29% in 2014).
- The reporting rate for this indicator was very low as inpatient data was used. The percentage of facility deaths due to injuries was 5.1% against a target of 6%.

Indicator	Baseline (Data source)	Achievement (Data source)	Target 2016	Progress	Comments
Road traffic fatalities per 100,000 population	7.7/100,000 (2013, NTSA) 11.8/100,000 (2013, Civil registration)	6.9/100,000 (2015, NTSA) 12.4/100,000 (2015, CR)			Replaces KHSSP indicator on mortality in hospitals. More fatalities each year but rates were not going up.
Road traffic injuries in OPD as a % of all diagnoses	2.3	2.5	2		Indicator problematic. Actual numbers of road traffic injuries increased from 940,000 to 1.2M
Other injuries in OPD (% of all diagnoses)	1%	<1%	0.5		Indicator problematic. Actual numbers of other injuries increased from about 227,000 to 332,000.
% of women aged 15–49 years who experienced gender-based violence; last year (%)	24% (KDHS 2008/9); 5.5% often	20% (KDHS 2014); 5.0% often			KDHS 2008/09 and 2014 indicate no progress; OPD based indicator is at present problematic

KEY | Red: limited or no progress; Orange: some progress but not enough to achieve target; Green: good progress, target achieved or on course to achieve target.

## Data sources and analysis

- **Surveys:** the KDHS 2008/09, KDHS 2014 and the STEPS 2015 provide data on gender based and sexual violence, as well as unintentional injuries in the KDHS 2014
- **Facility data:** the OPD diagnoses related to injuries and especially violence are reported but currently of limited value for monitoring trends.
- **Administrative data:** the National Transport and Safety System Authority (NTSA) track road traffic related fatalities and injuries on a daily basis. The data are considered to be an under-report because they are mostly limited to deaths at the site of the accident, but may be used for trend assessment. The civil registration data have higher numbers as they also include deaths in the health facilities following the road traffic accident.

### 3.1 Introduction

The third Strategic Objective of KHSSP 2014–2018 is focused on reducing the burden of violence and injuries. The Kenya Essential Package for Health includes several interventions aiming to improve the services related to injuries and violence, including pre-hospital care, community management (e.g. responding to gender-based violence or child maltreatment) and disaster response management. The latter includes disaster risk reduction, response planning and management.

Injuries, intentional or non-intentional are an important cause of death and disability. For instance, in the WHO burden of disease estimates injuries accounted for 6.7% of all deaths in 2000 and for 7.6% in 2012. The proportion of deaths due to road traffic injuries increased from 1.4% to 2.4% during 2000–2012 (WHO estimates). Road traffic injuries did not appear in the leading 15 causes of DALYs in the Kenya burden of disease study 2013.<sup>18</sup>

The four KHSSP proposed indicators are based on outpatient and inpatient data are specific to gender based violence, road traffic injuries and other injuries. Strategic Objective 6 on strengthening cross sectoral collaboration also includes road safety and injury prevention.

### 3.2 Road traffic injuries

The National Transport and Safety Authority (NTSA) published daily reports of road traffic fatalities and reported about 3,000 deaths due to road traffic accidents every year. These data are however incomplete.<sup>19</sup> The civil registration data on cause of death are also incomplete but have higher numbers than those reported by NTSA. This is because they include victims of road traffic accidents who did not die at the site of the accident and were taken to health facilities. The number of road traffic fatalities increased from 3,892 in 2010 to 4,942 in 2013 and 5,488 in 2015.

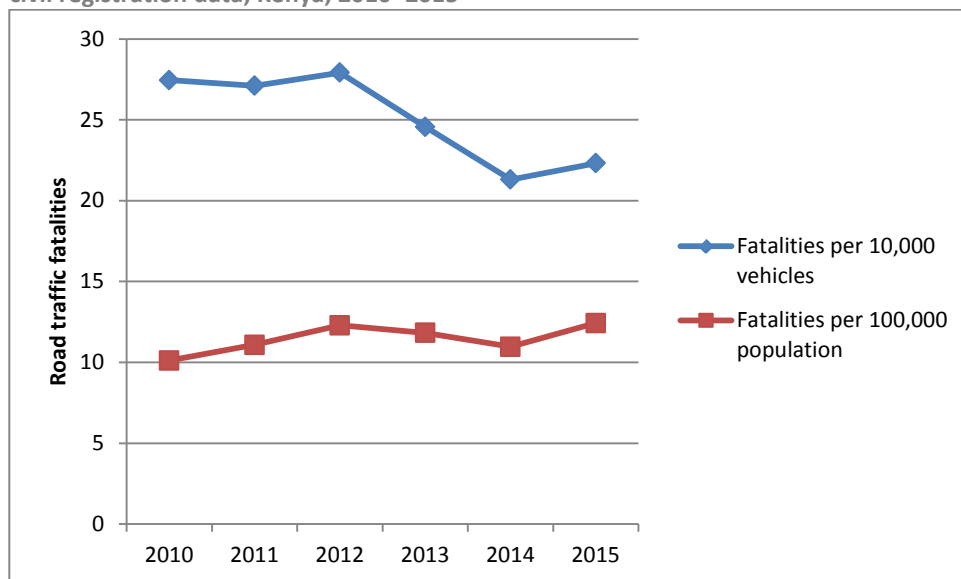
The number of vehicles is increasing rapidly. Between 2009 and 2015 the number of registered vehicles doubled from 1.2 to nearly 2.5 million. Based on the civil registration data this implies a modest increase in fatalities from 10 to 12 per 100,000 population, and decline in road fatalities by motorization levels (Figure 26). In 2015, there were 3,057 deaths or 12 fatalities per 100,000 population, and 22 fatalities per 10,000 vehicles.

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<sup>18</sup> Institute for Health Metrics and Evaluation and International Center for Humanitarian Affairs. The Global Burden of Disease: generating evidence, guiding policy in Kenya. Seattle, Washington, USA: 2016.

<sup>19</sup> The extent of underreporting is not clear, but WHO has estimated almost 13,000 traffic deaths per year for 2012, which would mean that only one-fourth of fatalities are reported by NTSA.

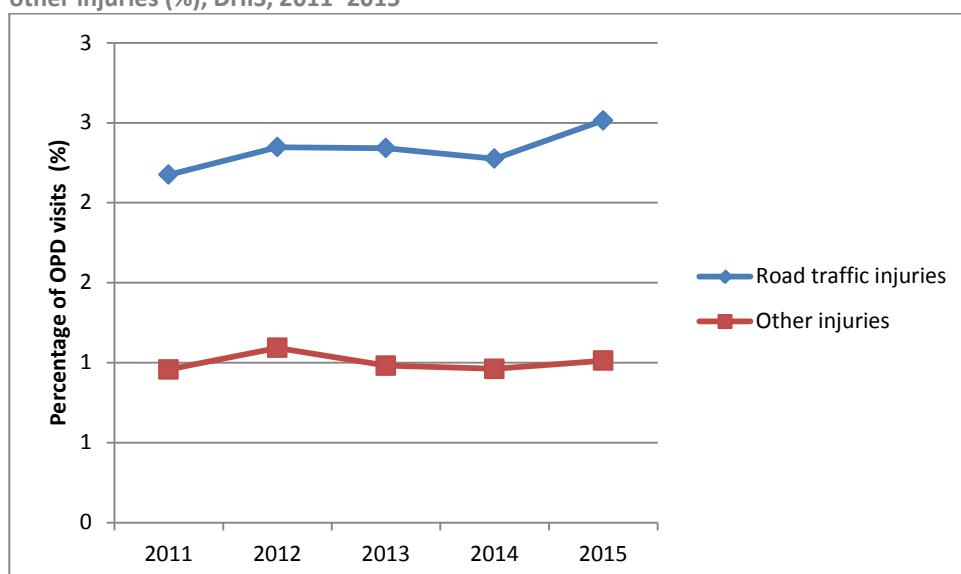
**Figure 26: Road traffic fatalities per 10,000 vehicles and per 100,000 population, civil registration data, Kenya, 2010–2015**



According to the NTSA data the most common victims were pedestrians (1,344 deaths or 44% of all fatalities), followed by vehicle drivers or passengers (33%), motor cycle riders or passengers (22%) and pedal cyclists (2%). In the NTSA records, Nairobi County recorded the highest number of road traffic fatalities at 668, followed by Nakuru County (258). Turkana had the lowest fatalities at 3. There was a mixed picture by county as some had reduced number of fatalities between the two years while others had increased. In terms of fatality rate per 100,000 population Nairobi and Nakuru were the top two, followed by Taita Taveta, Mombasa and Baringo.

The KDHS 2014 reports a surprisingly high proportion of men and women 15–49 years who were involved in a road traffic accident in the past 12 months: 8.8% of men and 3.2% of women. This would further suggest that the NTSA data are underreporting the number of road traffic injuries. Health facility data are not reliable in capturing road traffic injuries and fatalities, as many cases may not reach the health services. In 2015, 2.5% of outpatients visits were associated with road traffic injuries, slightly up from 2.3% in 2013 (Figure 27). Health facility data are not reliable in capturing road traffic injuries and fatalities, as many cases may not reach the health services.

**Figure 27: Percentage of OPD visits associated with road traffic injuries and other injuries (%), DHIS, 2011–2015**



### 3.3 Other injuries

The most common other injuries are burns and poisoning. Combined other injuries other than road traffic injuries account for 1.0% of all OPD visits, with little change over time. In terms of hospital admissions injuries were associated with about 4% of all admissions among children under 5 years, and with 6–8% among those aged 5 years and older. This includes road traffic injuries.

In the KDHS 2014 16.5% of women and 24.2% of men 15–49 said they had an unintentional injury (excluding road traffic injuries) in the last 12 months. The most common injury was cuts (60% and 66% of all unintentional injuries for women and men respectively), followed by falls (40% and 32% respectively).

### 3.4 Gender-based violence

Gender-based violence (GBV) is defined as violence that is directed against a woman because she is a woman or that affects women disproportionately.<sup>20</sup> It includes acts that inflict physical, mental or sexual harm or suffering, threats of such acts, coercion and other deprivations of liberty. Sexual violence is any sexual act, attempt to obtain a sexual act, or other act directed against a person's sexuality using coercion. Gender-based violence is very difficult to measure, as women often do not report such incidents in surveys, do not visit health facilities if GBV happens, are not recognized or recorded by the health as GBV, and because the definition of GBV is very broad and subject to individual variation.

The KHSSP 2014–2018 proposed an indicator: percentage of new outpatient cases that were diagnosed as a result of GBV. In 2015/16 only 6 per 100,000 diagnoses were coded as GBV, but the meaning of this figure is unclear given all the biases. The number of sexual violence cases among persons 5 years and older has remained at about 22,000 diagnoses per year during 2012/13–2015/16. For under-fives, 5,149 cases were reported in 2015/16, lower than 7,725 in 2013/14.

Nakuru County had the highest number of sexual violence cases reported (313) followed by Nairobi (193). Eleven counties did not report on this indicator. According to the DHIS where a rape survivors tool was implemented from May 2016 40% of rape survivors were adolescent girls aged 10–17 years; 39% were 18–49 years, 16% under age 10 and 6% 50 years or older.

The KDHS 2014 also reported on physical and sexual violence experiences. Physical violence is not rare: 20% of women reported to have experienced physical violence in the last 12 months, and 5% said this happened often. This was very similar to the results of the KDHS 2008/09 (24% and 5.5% respectively). For men the corresponding figures were lower: 11% and 1.4% respectively.

Overall, 7.8% and 2.3% of women and men 15–49 years respectively reported to have been involved in a sexual assault incident in the past 12 months. Sexual violence against women was more commonly reported in Western, Nyanza and Nairobi regions. The person committing the sexual violence against the women was the current husband or partner in 48% of cases, followed by the former husband or partner (25%).

The midterm target had been set at 3% an increase in relation to the less than 1% baseline target in an effort to increase reporting of sexual violence cases and additionally to make the health sector more responsive to address victims of sexual violence.

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<sup>20</sup> A similar definition can be used for men.

# Strategic Objective 4: improve person-centred essential health services

## Main findings

- Maternal mortality: the hospital maternal mortality declined gradually to 106/100,000 deliveries in 2015/16, with 27 of the 47 counties below 100.
- Family planning: use of modern contraceptives has been increasing rapidly between 2008 and 2014 and current trends appear to continue, based on the couple years of protection estimated from DHIS. There were however large differences between counties.
- Antenatal and delivery care: coverage of 4 or more ANC visits was increasing but slowly to 52% and falling short of the target; coverage of deliveries by health facilities is continuing to increase and reached 76% in 2015/16, continuing a positive trend that began around 2008. The increase occurred in 44 of 47 counties and the increase was largest in low coverage counties, suggesting positive effect of the free maternal health services.
- Stillbirth rates and low birth weight rates remained at the same levels during the last 3 years in health facilities.
- The recent trend data on maternal mortality, stillbirth rates and caesarean section rates suggests that the facilities were able to cope with the increasing numbers of deliveries without comprising the quality of care.

Indicator	Baseline (Data source)	Achievement (Data source)	Target 2016	Progress	Comments
Number of maternal deaths in health facilities per 100,000 deliveries	118 (DHIS 2013/14), revised	106 (DHIS 2015/16)	100		Good progress but pace not enough to meet target. On average about 1,100 maternal deaths each year during the review period
% of married women 15–49 years who used modern method of contraception	39 (KDHS 2008/09); CYP 1.26 mln (2013/14)	53 (KDHS 2014); CYP 1.62 mln (2015/16) up by 15%	80		Both sources confirm increase. Target too high.
Women of reproductive age receiving FP (%)	45% (DHIS 2, 2013)	60.9 (KDHS 2014)	80		Good progress. But target too high.
% of pregnant women who made 4 or more ANC visits	41 (2012/13, DHIS), revised	52 (2015/16, DHIS)	80		2018 target 80%
% of deliveries that took place in health facilities	58 (2012/13, DHIS), revised	76 (2015/16, DHIS)	(69)		Baseline was set too low, revised target
Stillbirth rate per 1,000 births in institutions(fresh)	13 (2013/14, DHIS)	12 (2015/16, DHIS)	10		MTR target based on baseline of 30%, here revised
Low birth weight (%)	4.9 (DHIS, 2013/14)	4.9 (DHIS, 2015/2016)	6		Baseline revised; only for babies born in health facilities
Facility-based under five deaths per 1,000	60 (2013)		20		No data

KEY | Red: limited or no progress; Orange: some progress but not enough to achieve target; Green: good progress, target achieved or on course to achieve target.

## Data sources and analysis

- **Surveys:** household surveys are an important data source to assess the coverage of several interventions related to the essential package, such as family planning, antenatal care and delivery care. The KDHS 2008/09 and 2014 provide data on trends by region and nationally, but cannot provide data on the progress during the KHSSP 2014–2018.
- **Facility data:** the DHIS includes data by county from 2012/13 on key interventions, as well as outpatient and inpatient morbidity and mortality. For some counties the denominators based on population projections appeared to be problematic. An adjustment procedure was applied to make adjustment of numerators (for incomplete reporting) and denominators (for maternal and child health interventions) (see Annex A).

## 4.1 Introduction

The fourth Strategic Objective of KHSSP 2014–2018 includes a large set of personal health interventions that are aiming to improve the access and quality of care of individuals seeking health care. The services range from emergency, maternity, reproductive health, inpatient, clinical laboratory, outpatient, radiology, surgery, rehabilitation to specialized services. The aim is also to ensure a closer and more comprehensive approach to customer care and response.

Many elements of this Strategic Objective are addressed by the indicators in other objectives. The KHSSP proposed 8 indicators for this Strategic Objective, mostly indicators that relate to the quality of reproductive, maternal and child health care. One indicator referred to surgical care (surgical rate for cold cases), but there were no data to assess progress. Two key strategic planning documents for reproductive, maternal, newborn and child health (RMNCH) are:

- National Roadmap for the attainment of the MDGs related to maternal and newborn health in Kenya 2010–2015. Division of Reproductive Health. Ministry of Health.
- Kenya reproductive, maternal, newborn, child and adolescent health (RMNCAH) investment framework, published by the Ministry of Health in January 2016. A new plan related to the Global Financing Facility

Data on customer satisfaction and on readiness of services in terms of health workforce, equipment, medicines and commodities, diagnostics etc. are not yet available. The last customer satisfaction survey was conducted in 2009, and last service readiness census in 2012–2013. A facility survey is planned for later in 2016, as well as a facility census in 2017.

## 4.2 Maternal mortality

The population level of maternal mortality in the KDHS 2014 was 362 per 100,000 live births for the period 2007–2014, which was lower than 520 for the 7 years preceding the KDHS 2008/09 (although confidence intervals are overlapping). One in 7 deaths (14.1%) among women of reproductive ages was due to pregnancy-related causes. At this point, it was not possible to say whether maternal mortality has declined since 2014.

The DHIS provides more recent information on maternal mortality in health facilities. There was a slight decline from 130 per 100,000 deliveries in 2012/13 to 118 in 2013/14, 103 in 2014/15 and 106 in 2015/16. This is close to the target of 100 per 100,000 deliveries, but still 1,105 maternal deaths occurred in health facilities in 2015/16. Maternal mortality ratios in health institutions vary considerably between counties (Figure 28). Levels over 200 per 100,000 deliveries for 2014/15 and 2015/16 were reported by four counties (Turkana, Isiolo, Garissa, and Kisumu). At the other end, Elgeyo Marakwet and Nyamira reported levels below 50. Underreporting of maternal deaths is



common and the data should be interpreted with caution. Notable is however that Nairobi, Mombasa and Kisumu cities all have maternal mortality ratios above the national average, presumably related to late referral of complicated cases.

**Figure 28: Stem-and-leaf plot of maternal mortality ratios in hospitals, by county, average of 2014/15 and 2015/16, DHIS, Kenya**



### 4.3 Family planning services

The use of modern methods of contraception can be measured through the household surveys and with the DHIS data, using the couple years of protection (CYP) approach. It is an indicator in Strategic Objective 4 and 5, but presented here.

The KDHS data show a dramatic increase of use of modern contraceptives among currently married women 15–49 years during the 5 years, increasing from 32% in 2003 to 39% in 2008/09 and 53% in 2014. Injectables were by far the leading contraceptive (26% in 2014). Implants were the second most common with 10% use, increasing fivefold between 2008 and 2014. In 2014, the percentage of demand satisfied by modern methods, which also takes into account the desire for children and other factors affecting fertility, was 71% among currently married women, up from 64% in 2008/09.

Current modern contraceptive use by married women 15–49 was higher in urban than rural areas, but the difference was small: 57% and 51% respectively. Women in the poorest wealth quintile however had much lower contraceptive use (29%) than all other quintiles where use ranged from 54–60%. Figure 29 shows the differences in coverage between counties, based on the KDHS 2014. CYP is the estimated protection provided by contraceptive methods during a one-year period, based upon the volume of all contraceptives sold or distributed free of charge to clients during that period.<sup>21</sup> Figure 30 shows the upward trend in CYP, suggesting that further increases in population use of modern contraceptives are occurring. The increase in CYP between 2013/14 and 2015/16 was 15%. This suggests that now over 75% of the demand for family planning is met.

<sup>21</sup> <https://www.usaid.gov/what-we-do/global-health/family-planning/couple-years-protection-cyp>. The facility data by method are converted into CYP as follows: 1 CYP is 4 injections, 1 IUD insertion, 1 implant, 3.5 provisions of oral contraceptives and 1 sterilization.

Figure 29: Use of modern contraceptives by currently married women 15–49 years, KDHS 2014

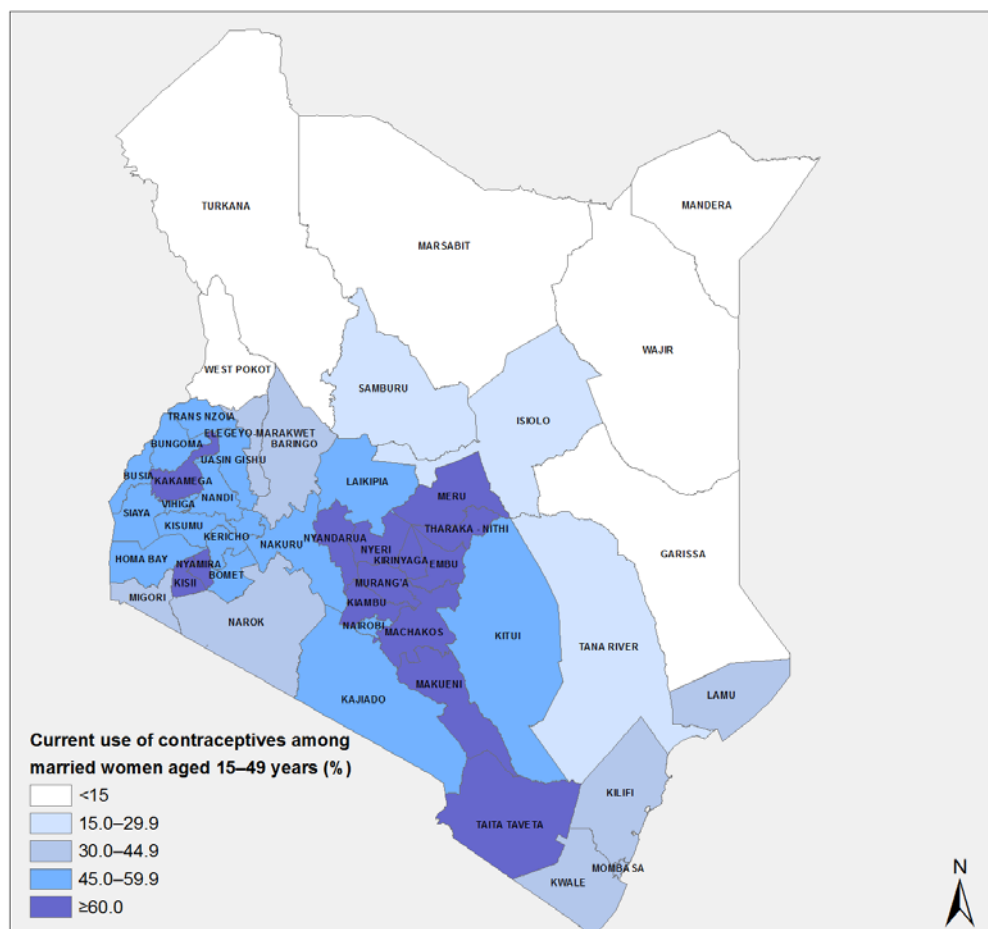
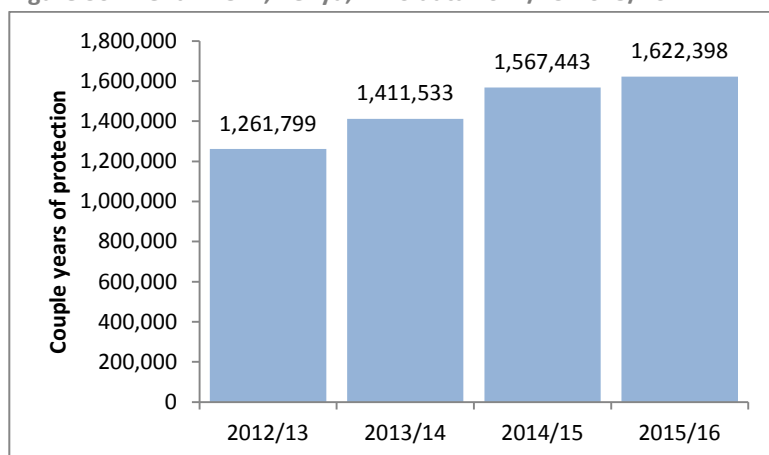


Table 3 compares the CYP by county with the KDHS 2014 data on use of modern contraceptives among currently married women. The CYP rates were computed by dividing the CYP by the estimated number of currently married women 15–49 years in each county.<sup>22</sup> The analysis shows that there is a high correlation between the KDHS contraceptive use rates in 2014 and the outputs of the family planning programme in terms of methods distribution in 2015/16. This indicates that there were no major changes between counties. Kericho county was having lower programme outputs in 2015/16 than expected based on the contraceptive prevalence rate in 2014. Migori county was the opposite with higher outputs than expected.

Figure 30: Trend in CYP, Kenya, DHIS data 2012/13–2015/16



<sup>22</sup> The KNBS projections were used to obtain the number of women 15–49 years in 2015/16 and the KDHS 2014 was used to obtain the proportion in a union (59.6%). The CYP per married women is lower than the contraceptive use rate because a significant proportion of women obtain contraceptives outside of health facilities (e.g. 17% in pharmacies, KDHS 2014) and because long-acting methods given in preceding years are not taken into account with the CYP method.

**Table 3: Comparison of use of modern contraceptives among currently married women, KDHS 2014, with CYP per married woman (%) obtained from the DHIS for 2015/16, by county**

Use of modern contraceptives among married women, KDHS 2014 (%)	Programme output 2015/16 (CYP per married woman)			
	Very low (<10%)	Low (10-19%)	Average (20-29%)	High (30% and over)
<15%	Turkana; Mandera; Marsabit; Wajir; Garissa; West Pokot			
15–29%	Isiolo	Samburu; Tana River		
30–44%		Lamu; Baringo; Narok; Elgeyo Marakwet	Mombasa; Kilifi; Kwale	Migori
45–59%		Kericho	Trans Nzoia; Uasin Gishu; Bomet; Homa Bay; Kajiado; Siaya; Laikipia; Nakuru; Vihiga; Nandi; Nairobi	Bungoma; Busia Kitui; Kisumu
60% and over			Taita Taveta; Kisii; Murang'a; Makueni; Embu; Machakos; Kiambu; Meru	Kakamega; Nyandarua; Nyeri; Tharaka Nithi; Kirinyaga

#### 4.4 Antenatal and delivery care

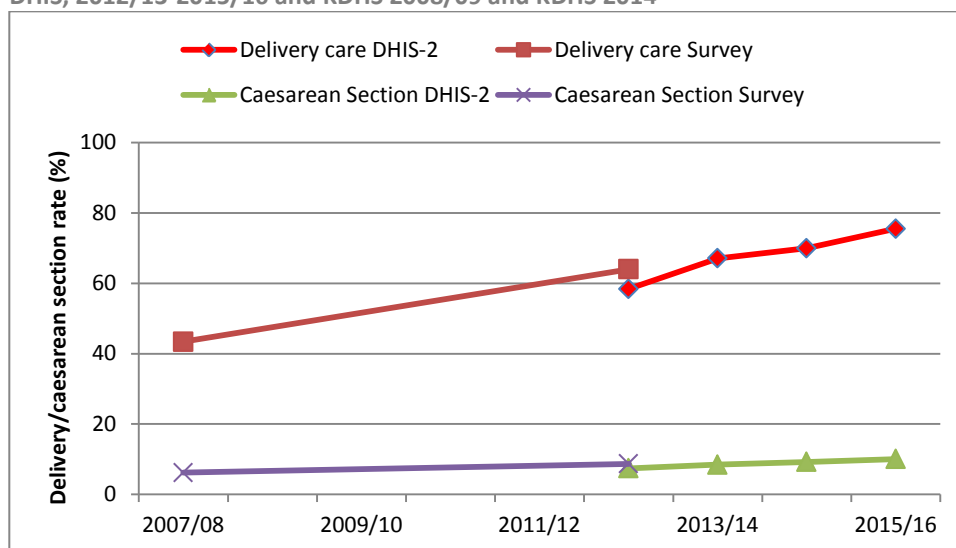
Coverage of the first visit of antenatal care (ANC) was nearly universal. In the KDHS 2014 96% of women made at least one ANC visit, and in the DHIS ANC coverage rates also range from 95–99% during 2012/13–2015/16. The proportion of pregnant women who made 4 or more antenatal care visits was much lower but increased from 47 to 58% in the KDHS 2008/09 and 2014. In the DHIS there was also an increase from 41 to 52%. This fell short of the 80% target for the MTR and for 2018 (Figure 31). The difference between the survey and DHIS maybe the result of women not accurately reporting the number of ANC visits in the survey or from poor reporting by facilities, or both.

Institutional delivery rates were taken as a proxy for the skilled birth attendance. In the KDHS 2014 results, 64% of deliveries during 2012–2014 occurred in health facilities, including 15% reported as having taken place in private health facilities. This was a substantial increase since the KDHS 2008/09 in which 43% of deliveries during 2004–2008 took place in health facilities. Skilled birth attendance rates were 44% and 62% in the KDHS 2008/09 and 2014 respectively.

This large increase in facility deliveries also resulted in an increase of caesarean section rates from 7.6% to 9.5%. This increase was almost entirely the result of more women delivering in health facilities, as the proportion of women with caesarean section among those delivering in a health facility remained constant at about 13%. This, like the continued decline of institutional maternal mortality ratios, also suggests that health facilities were able to keep up with the increased utilization, as caesarean section rates did not go down.

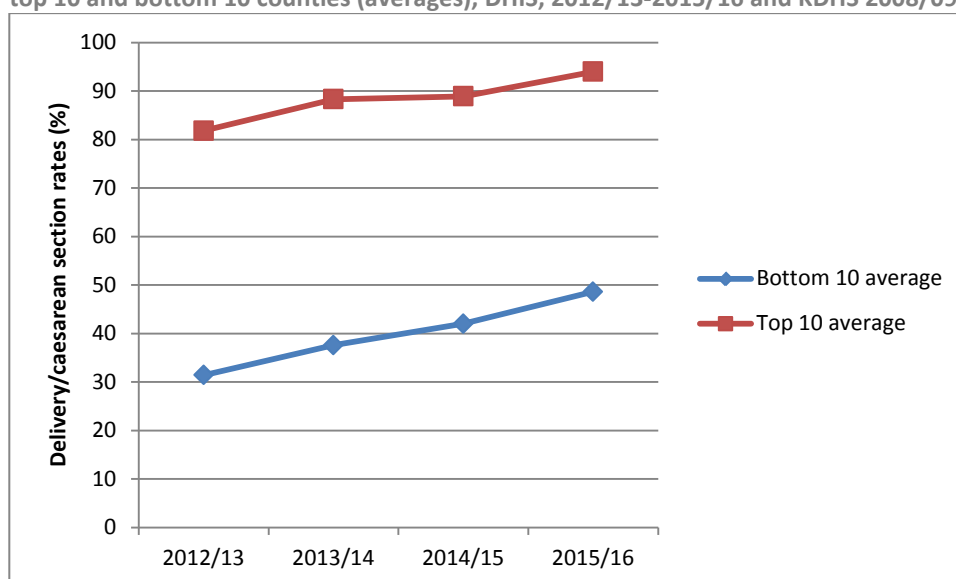
The DHIS provided insights into the trends after the beginning of KHSSP and the presidential initiative of free maternity services. There was a significant increase in the proportion of women delivering in health facilities from 58% in 2012/13 to 75.5% in 2015/16, exceeding the 2018 target already. The trend in the facility data was a continuation of the increase in institutional delivery rates that was first documented in the KDHS 2007/08 (figure 31)<sup>23</sup>.

**Figure 31: Trends in institutional delivery rates and caesarean section rates DHIS, 2012/13-2015/16 and KDHS 2008/09 and KDHS 2014**



The increase in delivery rates in health facilities occurred in 44 of the 47 counties (Figure 32). Several of the low coverage counties showed dramatic increases, such as Tana River, Wajir, Mandera and Kwale. The difference between the average of the top 10 counties and the bottom 10 counties was very large, but came down from 50% in 2012/13 to 45% in 2015/16. This is mainly because the top 10 counties cannot make much more progress as their average is above 90%, but the linear increase in the bottom 10 counties is encouraging.

**Figure 32: Trends in institutional delivery rates and caesarean section rates among the top 10 and bottom 10 counties (averages), DHIS, 2012/13-2015/16 and KDHS 2008/09 and KDHS 2014**



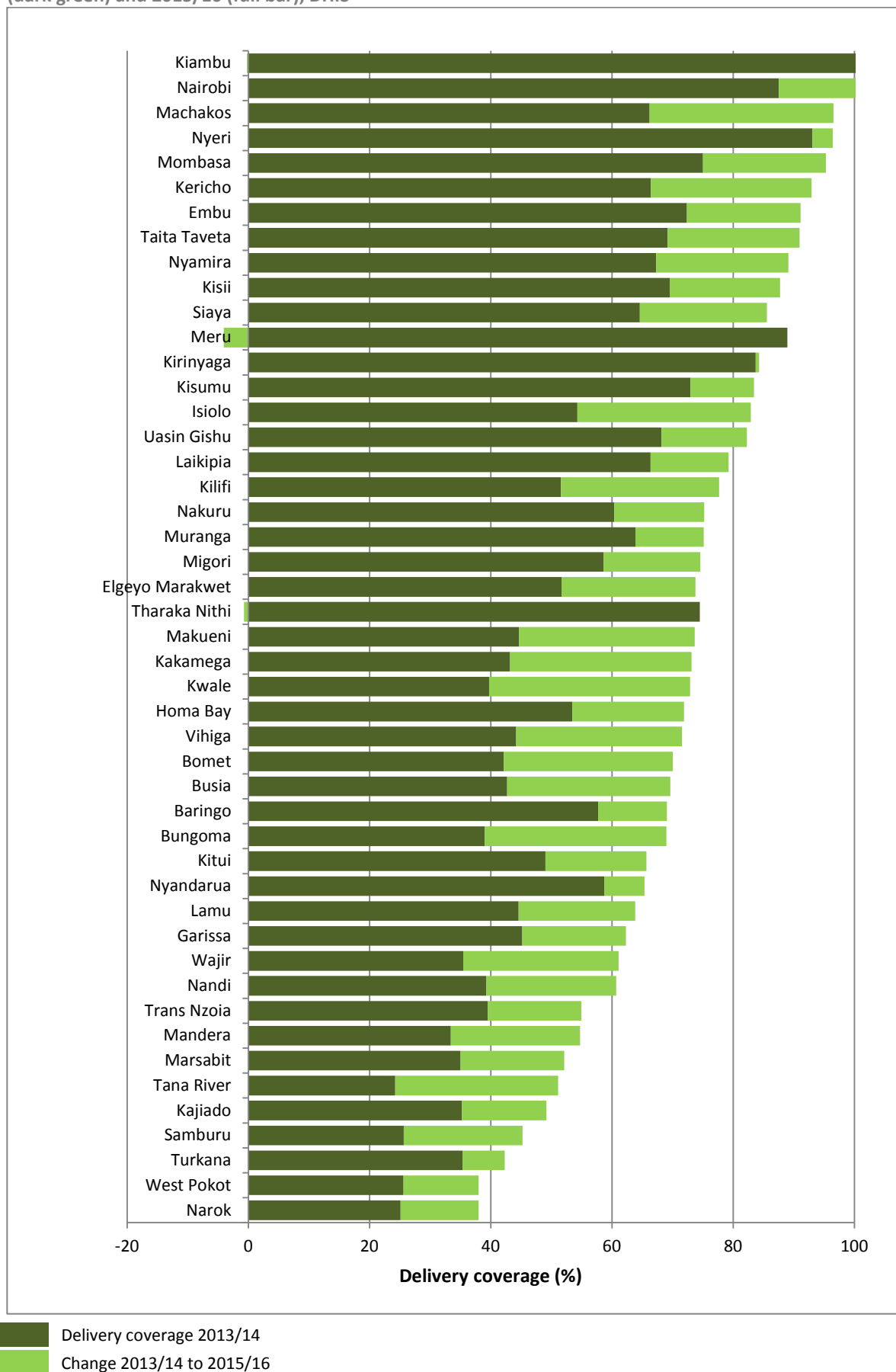
<sup>23</sup> In the KDHS 2003 institutional delivery rates for the five years preceding the survey were 40% and little progress was made between KDHS 2003 and KDHS 2008/09.

## **4.5 Stillbirths and low birth weight**

The overall stillbirth rate (fresh and macerated) in health institutions declined from 34 to 26 per 1,000 births during 2012/13 to 2015/16. The fresh stillbirth rate was 12 per 1,000 births, similar to the rate of 13 per 1,000 in the two preceding years. The KHSSP target for the MTR was 20 per 1,000 births, but this was based on a much higher baseline (30).

The proportion of newborns with low birth weight (<2,500 grams) remained at 5% from 2012/13 to 2014/15 which was the target for 2018. The respondents in the KDHS 2014 reported a higher prevalence of low birth weight for their babies: 7.6%.

**Figure 33: Institutional delivery coverage rates by county, in 2013/14 (dark green) and 2015/16 (full bar), DHIS**



# Strategic Objective 5: minimize exposure to health risk factors

## Main findings

- Tobacco use: smoking tobacco was largely limited to men, with about 1 in 5 smoking tobacco and with little change in smoking prevalence over time. Women rarely smoked tobacco.
- Alcohol use: about 5% of women and 34% of men drink alcohol in 2015. Almost one-fourth of men engage in heavy episodic drinking. There were no data to assess the trend in alcohol use.
- Exclusive breastfeeding increased to 61% of infants 0–5 months, on track for the KHSSP target.
- The target of full coverage of all households with iodised salt was achieved.

Indicator	Baseline (Data source)	Achievement (Data source)	Target 2016	Progress	Comments
% of adult population who smoke	17, men 15–54 years (KDHS 2014)	20, men 18–69 years, STEPS, 2015	15		Focus on men, less than 1% of women smoke
% of the population that consumed alcohol regularly	17, 15–49 years, KDHS 2014	19, 18–69 years, STEPS 2015	25		34% of men consume alcohol; 23% heavy episodic drinking
% of children 0–5 months who were exclusively breastfed	32 (KDHS 2008/09)	61 (KDHS 2014)	40		KHSSP End target is 70%
% of households that had iodised salt (%)	97.6 (KDHS 2008/09)	99.5 (2014)	100		
% of the population that is aware of health risk factors	30 (2013)		50		No data. Indicator problematic. Both numerator and denominator need to be defined e.g. which health risk factors

KEY | Red: limited or no progress; Orange: some progress but not enough to achieve target; Green: good progress, target achieved or on course to achieve target.

## Data sources and analysis

- Surveys: the KDHS 2008/09, KDHS 2014 and the STEPS 2015 provide data for several risk factors such as tobacco use.
- Facility data: the DHIS data for 2012/13–2015/16 on family planning use by method are used to estimate couple years of protection. All other indicators require survey data.

## 5.1 Introduction

The fifth Strategic Objective of KHSSP 2014–2018 is focused on putting into place health promotion interventions that would address risk factors to health. These included health promotion and interventions aimed at improvement of individual level behaviours, physical environment and societal environment. It included communicable conditions, NCDs and mental health, violence and injuries. There is some overlap with the sixth objective “strengthen collaboration with health-related sectors”.

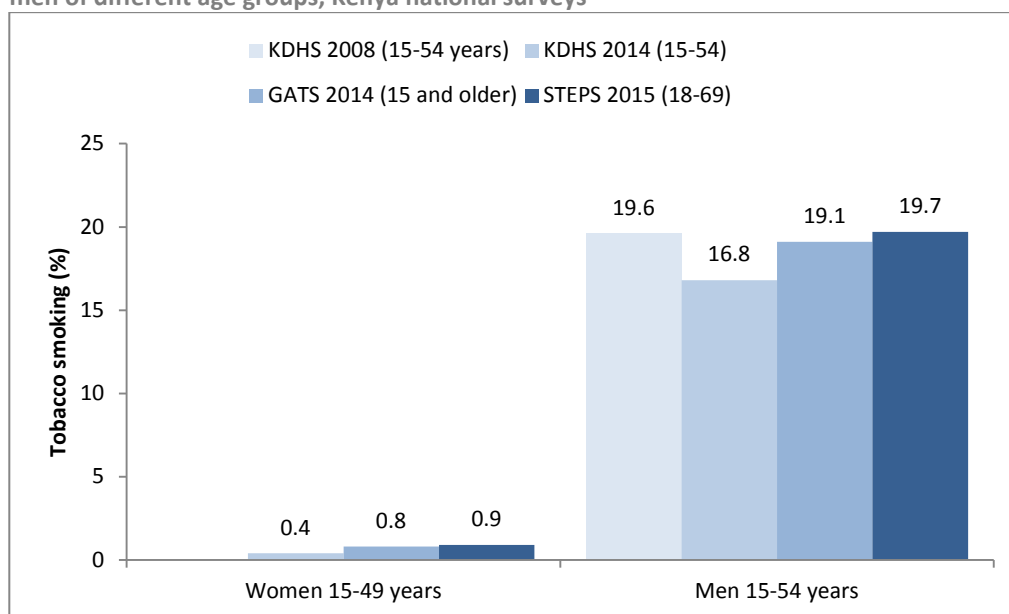
The KHSSP proposed 7 indicators for this Strategic Objective, including indicators for NCD prevention (tobacco and alcohol use), child nutrition (exclusive breastfeeding and salt iodization), family planning (couple years of protection due to all FP methods), population awareness of risk factors to health, and adult nutrition (screened adults with mid upper arm circumference who are above average). The latter indicator can be omitted given the progress in monitoring anthropometry among adults in Kenya, based on the KDHS 2008, 2014 and STEPS 2015.

## 5.2 Tobacco use and smoking

Kenya has rich body of survey data to document trends in tobacco use, including the KDHS surveys, the Global Adult Tobacco Survey 2014 and STEPS 2015. In general, the levels of tobacco use were fairly stable over time (Figure 34 and 35). There were persistent large differences in tobacco use between women and men. Men smoked tobacco almost 20 times more frequently than women. Among men, all surveys since 2008 showed that about 1 in 5 men 15–49 years were using tobacco. And most of those were smokers. The KDHS 2003 (not shown) also showed similar levels (23% smoking among men 15–54 years). The figures reported from GATS survey in 2014, which included all persons aged 15 years and over, were of a similar level as KDHS and STEPS. In all three recent surveys the majority of male tobacco users were smokers: 91% in the KDHS 2014, 79% of the GATS and 86% in the STEPS 2015. Among women only a small proportion smokes tobacco (less than 1% in all three recent surveys); most users chewed tobacco.

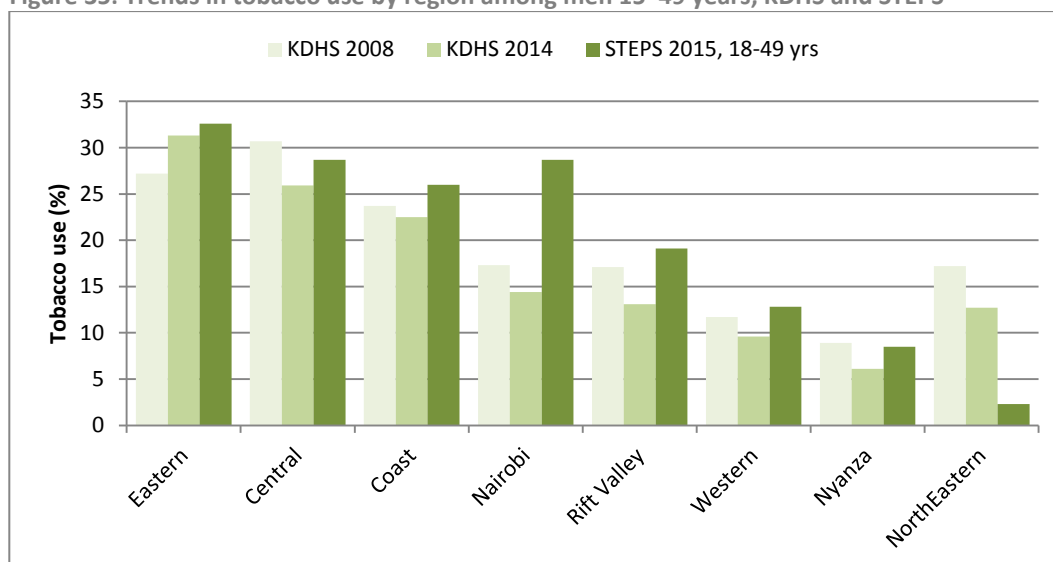
There were major differences between regions. Tobacco use is 25% or higher in Eastern, Central, Nairobi and Coast regions, below 20% in Rift Valley and Western, and below 10% in Nyanza and North-eastern. Nairobi may have had an increase, but the STEPS sample size for Nairobi was small and the difference with the preceding surveys was not statistically significant.

**Figure 34: Trends in current tobacco smoking among women 15–49 and men of different age groups, Kenya national surveys**



County level tobacco use rates are available from the STEPS 2015 (Figure 35). The sample size are small and the confidence intervals are therefore large. There are very large differences in tobacco use between the counties, with some exceeding 45% and some below 10% use.



**Figure 35: Trends in tobacco use by region among men 15–49 years, KDHS and STEPS**

Among women tobacco use was still uncommon. The STEPS survey suggested that tobacco use rates may have been increasing in 2015. Among women 18–69 years, tobacco use was found to be most common in Coast Region (11.5%), followed by Rift Valley (8%) and Eastern Region (5.7%). This often involved chewing tobacco among older women. In all other regions use was 1% or less. There were too few cases to analyse county levels.

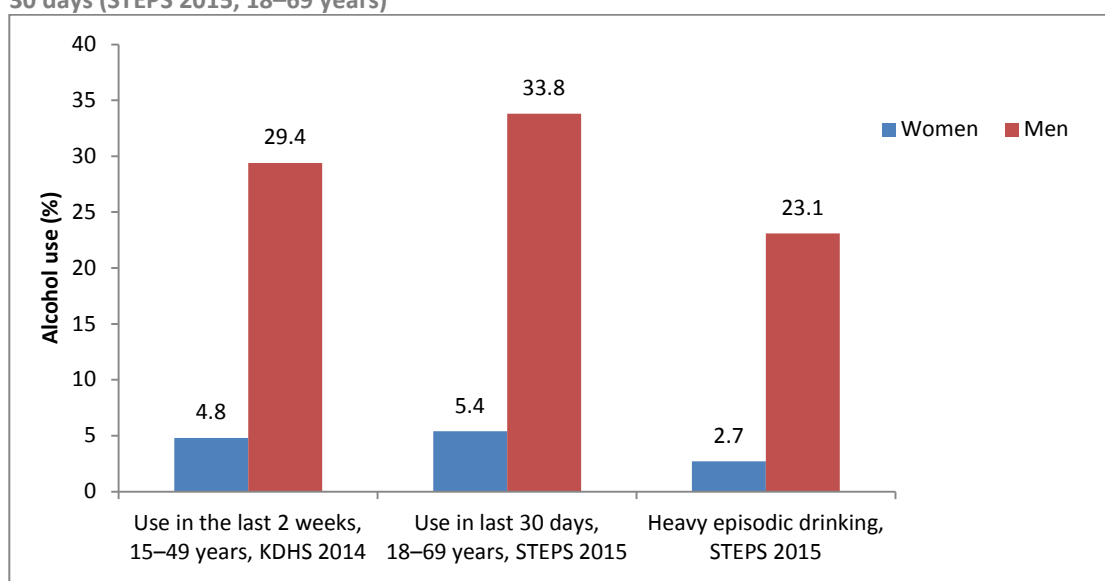
**Figure 36: Stem-and-leaf plot of tobacco use among men 18–69 years (%), by county, STEPS 2015**

### 5.3 Alcohol use

The majority of Kenya's adults are lifetime abstainers: 41% of men and 80% of women 18–69 years. About 5% of women and 30% of men were found to drink alcohol at least once every two weeks (KDHS 2014) or last 30 days (STEPS 2015) (Figure 37). For both sexes combined 19.3% of adults 18–69 years currently consume alcohol beverages in 2015. Among current drinkers, 26% drank on 3 or more days in the last week, 50% drank on 1 or 2 days, and 16% did not drink during the last 7 days.

The largest negative health impact is from heavy drinking and heavy episodic drinking. WHO defines heavy episodic drinking as having six or more alcoholic drinks in one occasion in the past 30 days. Approximately, 12.7% of Kenyans 18–69 years engage in heavy episodic drinking, that is 23% of men and 3% of women. This implies that among men who are considered current drinkers the majority (23/34%=68%) engaged in heavy episodic drinking.

Figure 37: Alcohol use in the past 15 days (KDHS, women 15–49 years) or 30 days (STEPS 2015, 18–69 years)



### 5.4 Exclusive breastfeeding

The KHSSP indicator targets aim for a dramatic increase in exclusive breastfeeding from 32% in 2013/14 to 50% midterm and 70% by the end of the plan. Reliable data could only be obtained from household surveys (and not from health facility data). The KDHS 2014 showed that breastfeeding is nearly universal in Kenya (98.7% initiated breastfeeding) and that exclusive breastfeeding is also very common: 72% at 0–3 months and 61% at 0–5 months. An additional 10% of children were receiving only plain water in addition to breastfeeding. These figures were remarkably better than in the KDHS 2008/09 when 43% of infants 0–3 months and 32% 0–5 months were exclusively breastfed. This indicates that there was a positive trend and the target of 70% exclusive breastfeeding at ages 0–5 months is achievable.

### 5.5 Salt iodisation

Inadequate amounts of salt in the diet present serious health risks for young children. In both the KDHS 2008/09 and KDHS 2014 household salt was tested for iodine content. In 2008/09, 97.6% of households had adequate (15+ ppm) iodine contents in salt. By 2014 the coverage was nearly universal: 99.5%. All counties but Lamu (89%) had more than 95% of households with iodised salt.

# Strategic Objective 6: strengthen collaboration with health-related sectors

## Main findings

- Nutrition: marked reductions in child stunting and underweight occurred during 2008–2014, in almost all counties, on track to reach the 2016 target.
- Water and sanitation: good and continued progress on access to improved drinking water supply, but little progress on improving household access to improved sanitary facilities
- Education: continued progress on women's education, continued high enrolment in primary schools.

Indicator	Baseline (Data source)	Achievement (Data source)	Target 2016	Progress	Comments
Reduce prevalence of stunting (%)	35 (KDHS 2008)	26 (KDHS 2014)	25		Good progress. Close to the target
Reduce the prevalence of underweight (%)	17 (KDHS 2013)	11 (KDHS 2014)	10		
% of households with improved drinking water source	60 (KAIS 2012)	71 (KMIS 2015) 67 (STEPS 2015)	70		
% of households with improved sanitation	55 (KAIS 2012) 48 (KDHS 2014)	52 (KMIS 2015) 59 (STEPS 2015)	75		Target of 75% was households with latrines
% of women with at least some secondary education	34 (KDHS 2008/09)	43 (KDHS 2014)	45		Completed secondary education 27%
Primary school enrolment rate (%)	60 (KHSSP)	88.2 (MTPII annual performance report)	75		Primary school enrolment 2013: 96%; secondary (gross): 49%
% of schools providing complete school health package	15 (MoE, 2013)	–	40		No data

**KEY** | Red: limited or no progress; Orange: some progress but not enough to achieve target; Green: good progress, target achieved or on course to achieve target.

## Data sources and analysis

- Surveys: the KDHS 2008/09 and KDHS 2014 provide data on water and sanitation, education and child anthropometric status. The KAIS and KMIS surveys also include water and sanitation questions.
- Facility data: all indicators require survey data.
- Administrative data: education data.

## 6.1 Introduction

The sixth Strategic Objective of KHSSP 2014–2018 is focused on strengthening collaboration with other sectors. The KHSSP specifically list the roles in health of 12 sectors. The actions were focused on information generation on activities in other sectors and their impact on health and advocacy for required investments with related sectors, donors and Ministry of Finance, based on evidence. The actions with a cross sectoral focus are not limited to the sixth Strategic Objective. In particular, the fifth objective on minimizing exposure to major health risk factors through intersectoral health promotion addressed several areas such as tobacco use, alcohol misuse and salt iodisation.

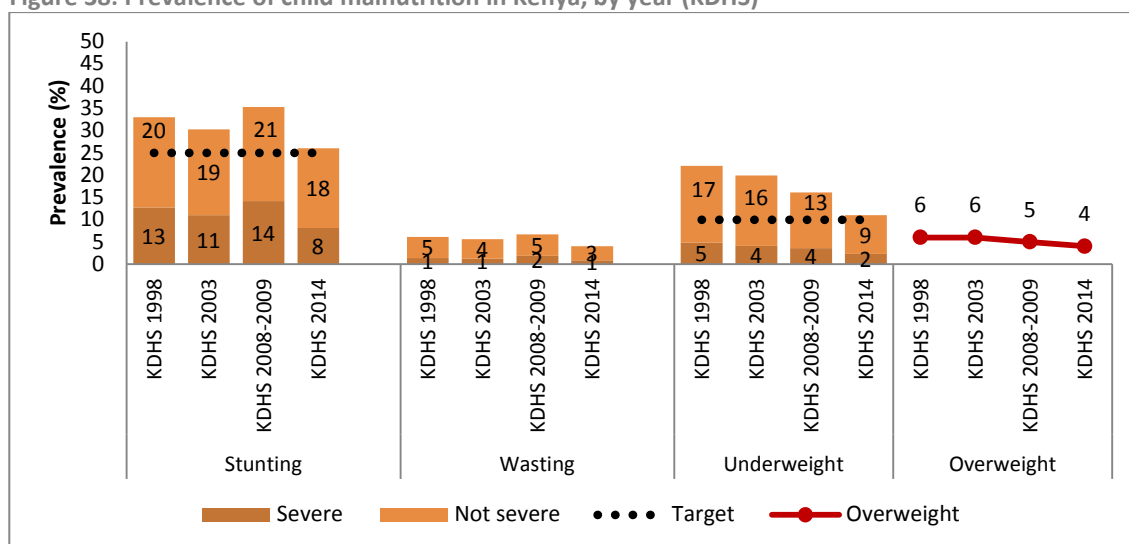
The nine indicators proposed for this Strategic Objective include two on child nutritional status, two on water and sanitation, one on infrastructure, three related to education, and one to housing. The analysis focused on the nutrition and water and sanitation indicators. No data are available on housing ventilation, schools providing a complete school health package, and classified road network in good condition.

## 6.2 Child anthropometry

Child nutrition is one of the key elements of the essential health care package in Kenya. The KHSSP uses two population-based indicators to monitor efforts towards improving child nutrition, namely: reducing the rate of stunting among children under 5 years from 35% in 2013 to 25% in 2016 and 15% in 2018, and reducing the rate of underweight among children <5 years from 17% in 2013 to 10% in 2016 and 5% in 2018.<sup>24</sup>

There are no data after KDHS 2014. The survey showed that prevalence of poor nutrition among children under 5 was high but there was good progress. The prevalence of stunting reduced by 1.8 points annually from 35% in the 2008–2009 KDHS survey to 26% in the 2014 survey, and of underweight reduced by 1 point annually from 16% in the 2008–2009 KDHS survey to 11% in the 2014 survey, with both edging closer to KHSSP midterm targets (Figure 38). If these trends continued, the stunting rate in 2016 should be somewhere around 22% and of underweight around 10%. Child overweight and wasting rates also declined<sup>25</sup>.

Figure 38: Prevalence of child malnutrition in Kenya, by year (KDHS)



<sup>24</sup> Stunting rate measures the proportion of children who are shorter than their expected height for that age i.e. their height-for-age is below minus two standard deviations (-2 SD) of the median (severe stunting is below -3 SD). Stunting is a sign of growth retardation and occurs mostly due to chronic malnutrition. Children who fail to achieve the expected weight for their age are considered to be underweight i.e. their weight-for-age is below -2 SD of the median (severe underweight if below -3 SD). Underweight occurs due to chronic or acute malnutrition.

<sup>25</sup> Children are considered overweight if their weight-for-height is more than +2 SD of the median.

The KDHS surveys show large disparities in child malnutrition by mother's education level and wealth status, with the rates of both stunting and underweight decreasing with increase in the mother's education level and wealth status. About a third of the children of mothers in the poorest quintiles were stunted compared to 25% for mothers in the third (middle) quintile, 21% in the fourth quintile and 14% in the fifth (highest) quintile. Similar patterns with much higher underweight rates were observed for women 15–49 in the KDHS 2014, where 20% of mothers in the lowest quintile were underweight, compared to 12% in the second lowest quintile, 9% in the third (middle) quintile, 7% in the fourth quintile and 4% in the fifth (highest) quintile.

Figure 39 shows the rates of stunting and underweight by region. All regions registered a decline in the rates of both stunting and underweight, with a faster decline in the underweight rate than the stunting rate. Differences between regions were small for stunting rate but quite large for underweight. The rates of both stunting and underweight were generally lower in the counties in Central region than elsewhere in Kenya. In the 2014 KDHS survey, stunting rates in three regions, Coast, Eastern and Rift valley, were higher than the 25% midterm target but the trend suggests that they were edging closer to the midterm targets. Stunting rate in Western and North Eastern region were right on the midterm target while Nyanza, Central and Nairobi region had rates lower the midterm target. In the 2014 KDHS survey, the 10% midterm target for underweight was already achieved in four regions, Nairobi, Central, Nyanza and Western region while rates in the other regions were higher but edging closer to the midterm target.

Figure 39: Rates of stunting and underweight, by region (KDHS)

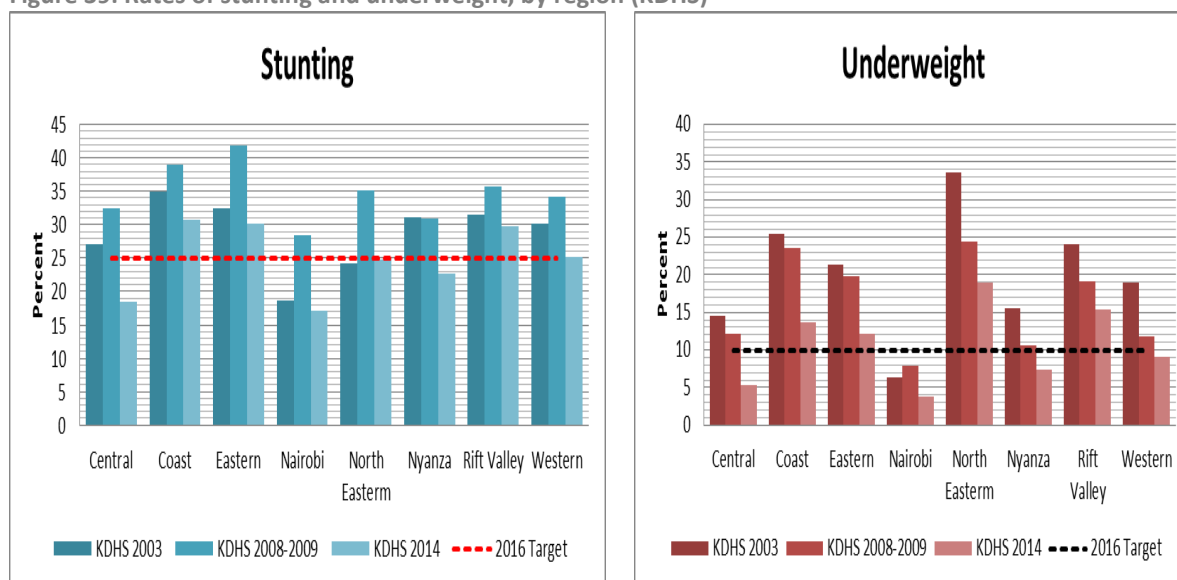
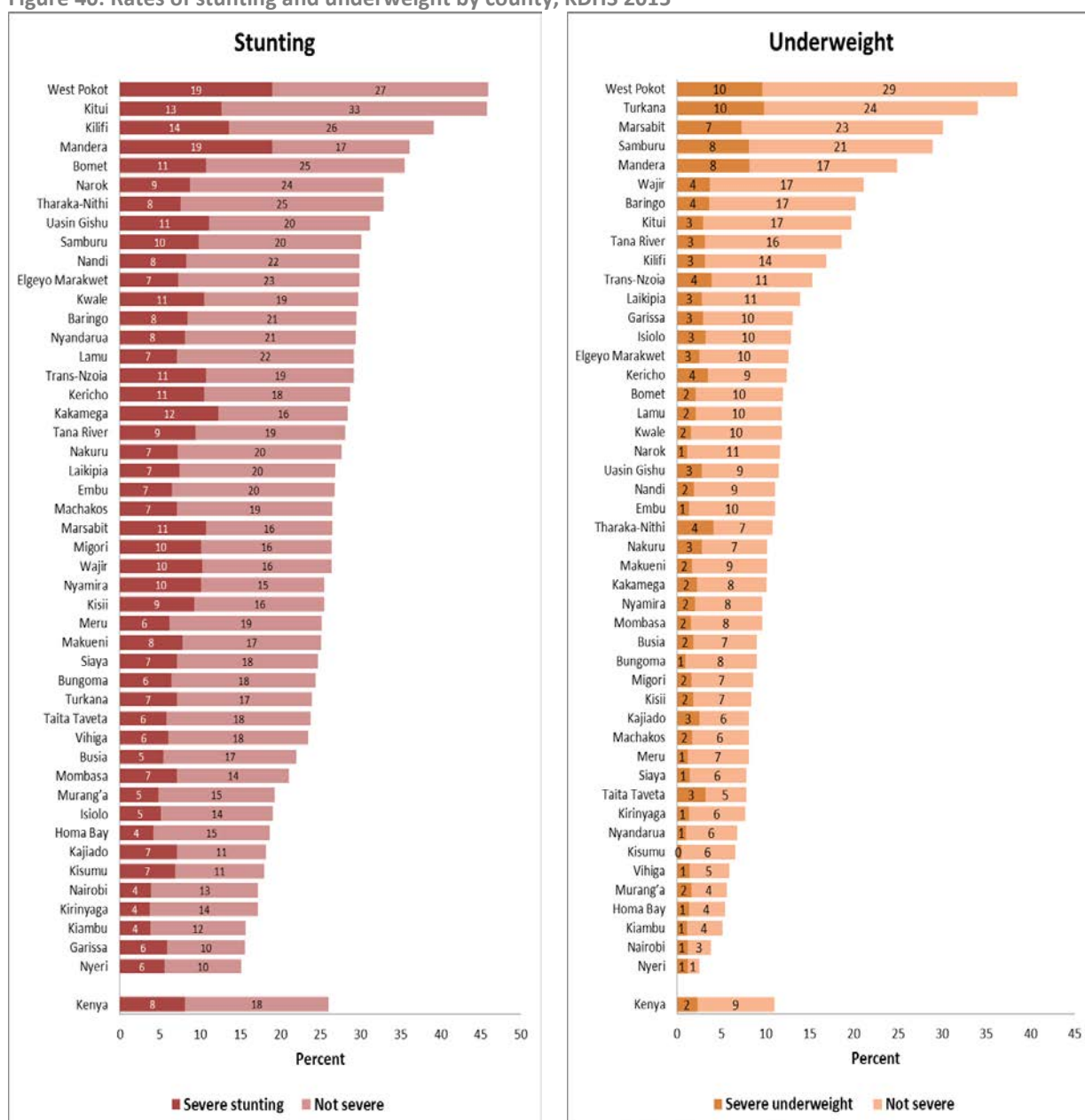


Figure 40 presents the rates of stunting and underweight by county in the 2014 KDHS survey. It shows very large differences in rates of stunting and underweight between the top and bottom counties, with absolute difference of up to 31 points for stunting and 36 points for underweight. Nyeri county had the lowest rates of stunting and underweight; the rates were highest in West Pokot county.

Figure 40: Rates of stunting and underweight by county, KDHS 2015

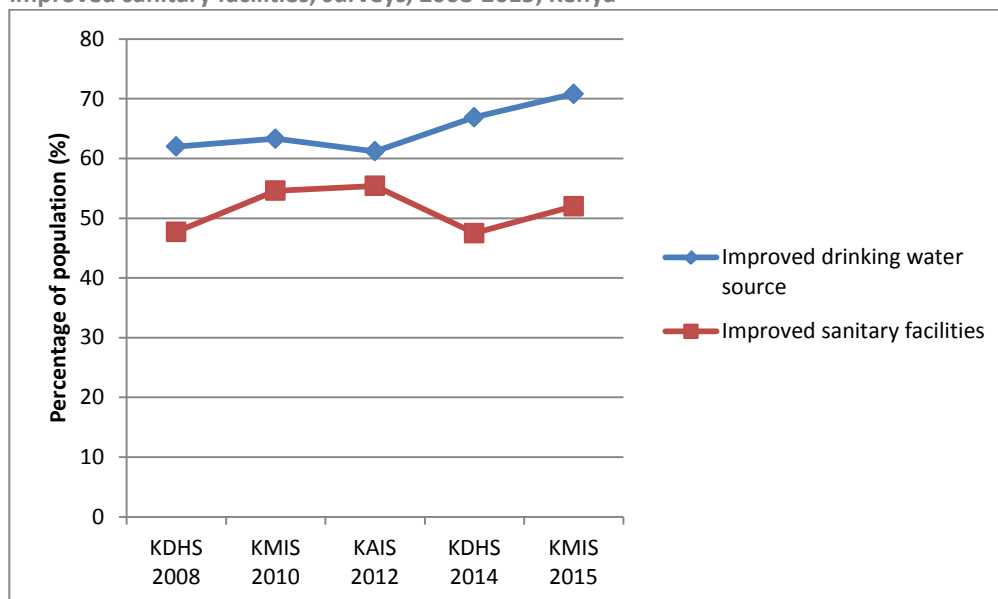


### 6.3 Water and sanitation

Five surveys since 2008 provide a picture of trends in the water and sanitation indicators. The percentage of the population with access to drinking water from an improved source increased from 61% in 2012 to 67% in 2014 and 71% in 2015 (Figure 41). The target for 2015/16 was 70%. Urban access was 88% and rural access 62%.

There was no increase in households with improved sanitary facilities. In the KMIS 2015 52% of households had improved facilities, which was slightly higher than in the KDHS 2014, but similar to values in the 2008, 2010 and 2012 surveys. Only 41% of rural households had access to improved sanitary facilities, compared to 74% of urban households. The MTR national target was 75% and 80% by the end of KHSSP.

**Figure 41: Access to improved drinking water supply (% of the population) and improved sanitary facilities, surveys, 2008-2015, Kenya**



## 6.4 Education

The primary school net enrolment rate increased gradually until 2011 to 96% and remained at that level during 2012 and 2013. The primary school completion rate by 2013 was 80%, 79% for girls and 82% for boys. The primary to secondary school transition rate was 77%, and slightly higher for girls than boys. The gross and net enrolment rate in secondary schools were gradually increasing to 49% and 33% respectively in 2013. The KHSSP MTR target is 75% school enrolment rate, from a baseline of 60%. The specifics of the indicator and target need to be clarified.

The percentage of women 15–49 years with secondary education in the KDHS 2008/09 and 2014 was 22% and 27% respectively. Women with any secondary education was 43% in 2014, up from 34% in 2008/09. The KHSSP midterm target was 45%. Nairobi and Central region have considerably higher rates than elsewhere in Kenya.





## 7. Health investments and outputs: access, quality and demand

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### Main findings

- County health budgets vary from less than KSh 1,000 to Ksh 4,000 per person per year for the period 2013/14–2015/16. Overall, the health budget for counties has increased from KSh 49 billion in 2013/14 to KSh 84 billion in 2015/16.
- Access to health care services in Kenya is improving but there are still substantial differences within the country and in several instances the midterm targets have not been met. Differences in health care access between counties were generally very large, with the access in Turkana, Wajir, Bomet, Narok, Mandera, Tana River and Kwale generally poorer than elsewhere, and generally better in Kirinyaga, Nyeri, Embu, Machakos, and Mombasa.
- The per capita outpatient utilisation rate increased from 1.8 in 2012/2013 to 2.2 in 2015/2016. However the utilisation rate during the review period remained stagnant at around 2.2 which is lower than the KHSSP target of 3.
- The inpatient admission rate increased steadily during the review period. It was 3.8 in 2012/2013, 4.2 in 2013/2014, 4.5 in 2014/2015, and 4.4 in 2015/2016.
- Caesarean section rate remained at around 13% of institutional deliveries and the population increased because more women were delivering in health facilities. This suggests that facilities were able to cope with the increased number of deliveries. This is further supported by the trends in maternal mortality and stillbirth rates in health facilities.
- Treatment of sick children: more children with diarrhoea were treated with oral rehydration therapy (39% (KDHS 2008–2009) to 54% (KDHS 2014)), more children with fever received treatment or advice from a health care provider (from 49% (KDHS 2008–2009) to 64% (KDHS 2014)) and more children with suspected pneumonia received treatment or advice from a service provider (from 56% (KDHS 2008–2009) to 66% (KDHS 2014))
- Core health workforce (doctors, clinical officers, nurses and midwives): Kenya aimed to increase the health worker density from 5 per 10,000 population in 2013 to 7 per 10,000 population in 2016. The data do not allow a reliable assessment of the trends, and the baseline is likely to be an underestimate of the true number at that time. It is estimated that there were 9 core health workers per 10,000 population in Kenya in 2016. There are large differences within Kenya with the top 2 urban counties having 2.5 times higher and the bottom 5 counties 4 times lower densities than the national average.
- Health facility density (per 10,000 population): Kenya aimed to increase the health facility density from 1.9 per 10,000 population in 2013 to 2.5 per 10,000 population in 2016. This target was not met. The density during the review period remained stagnant at 2.2–2.3 per 10,000 population but represents an improvement, albeit small, from the baseline value.
- Bed density: the average bed density in Kenya declined steadily during the review period but remained higher than the average in the African region of 10 beds per 10,000 population. In 2016, Kenya had 14.1 bed per 10,000 population, which represents one bed for every 709 people.

Indicator	Baseline (Data source)	Achievement (Data source)	Target 2016	Progress	Comments
Per capita outpatient utilisation rate	1.8 (DHIS 2012/2013)	2.2 (DHIS, 2015/2016)	3 (KHSSP)		Some progress from baseline but pace not enough to achieve the target
Inpatient admission rate per 100 population	3.8 (DHIS 2012/2013)	4.4 (DHIS 2016)			Some progress from the baseline but pace not enough to meet the target
Caesarean section rate (%)	8 (DHIS, 2012/2013)	10 (DHIS, 2015/2016)			The rate is just about right, close to the recommend rate at population level
Health worker density (number per 10,000 population)	5 (KHSSP, 2013 - SARAM)	9 (County reports, 2016)	7		Possible progress from baseline value data are inadequate to assess trends
Facility density (number per 10,000 population)	1.9 (MoH, 2013)	2.2 (MoH, 2016)	1 (revised; see notes)		More than double the required number of health facilities per 10,000 population
Inpatient bed density per 10,000 population	14.4 (DHIS, 2012)	14.1 (DHIS, 2016)	18 (Revised; SARA target; see notes)		The revised target not achieved but density is higher than the average in the African region

KEY | Red: limited or no progress; Orange: some progress but not enough to achieve target; Green: good progress, target achieved or on course to achieve target.

## Data sources and analysis

- Facility data/DHIS: All data were adjusted for reporting completeness to better assess the trend, as completeness was improving over time. It was assumed that the rate of service provision in non-reporting facilities was lower than that of reporting facilities (one quarter lower).
- Analysis of core health workforce is based on the most recent county reports on the number of health workers and the SARAM 2013. There is underestimation of the number of core health workers because the data only partially include nurses, midwives, and clinical officers in the private sector.
- Population denominator based on the projections by KNBS from the 2010 census.

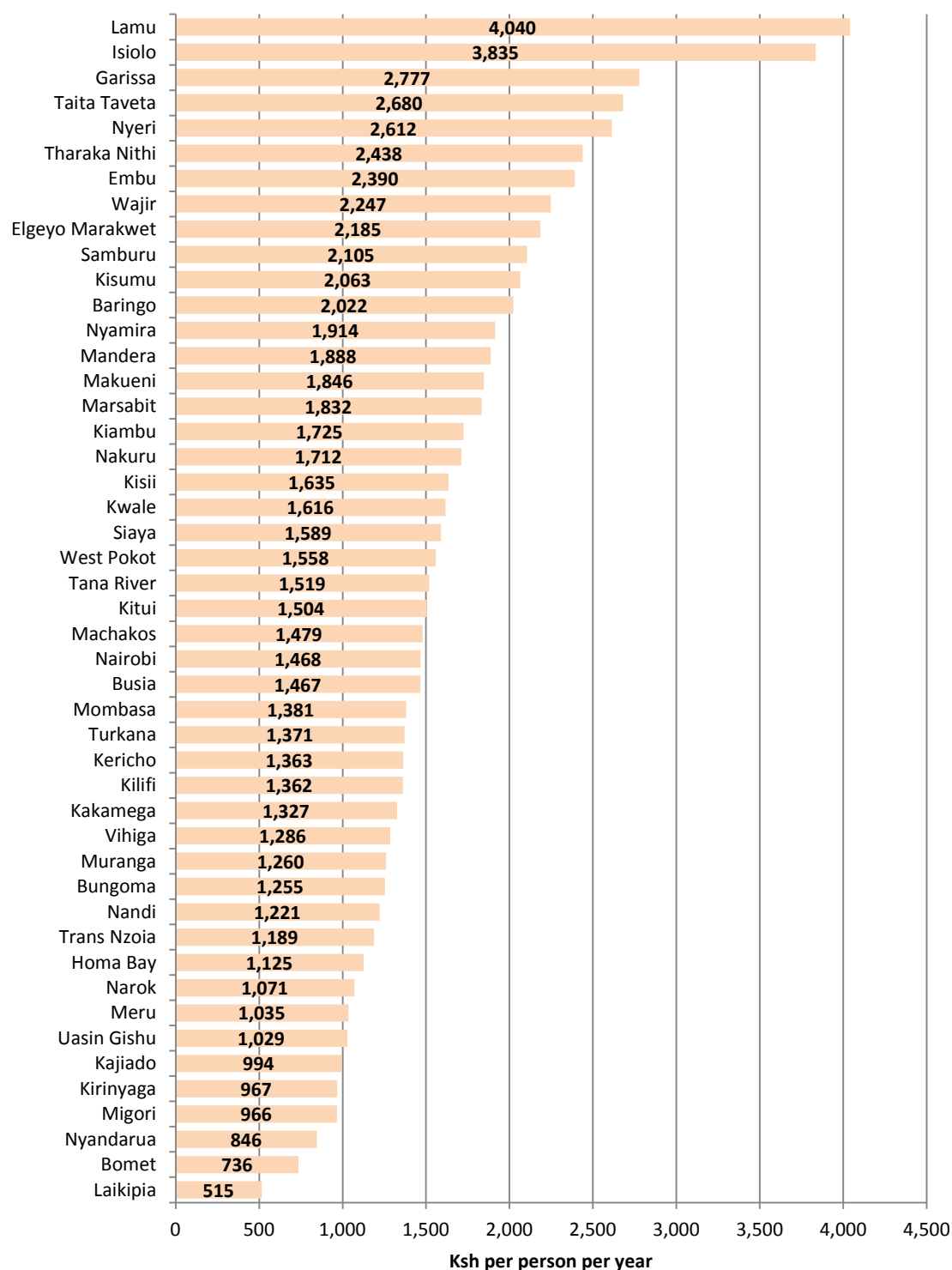
## 7.1 Introduction

One of the primary objectives of the KHSSP 2014–2018 is to improve access, quality and demand for health care services. Physical access, financial affordability and cultural acceptability are the key components of health care access outlined in the KHSSP.

Physical access has been defined as the physical presence of health care services which includes distance to health care facilities and the availability of ready-to-use health care services. The government has put in place specific plans to increase physical access to health care facilities. These include making all the KEPH services available in the hard to reach areas (Northern arid land and informal settings in urban areas), upgrading at least 40% of the dispensaries to fully functional primary care facilities, upgrading all the model health centres to primary care facilities, and ensuring that all facilities have at least 80% of their infrastructure functional.

The KHSSP has proposed six indicators for monitoring the progress and performance of efforts towards improving access to health care services, namely: outpatient utilisation rate, population living within a 5km radius, availability of basic and comprehensive emergency obstetric care, bed occupancy rate and the availability of immunization services. Data were not available for assessing the proportion of the population that lives within a 5km radius.

**Figure 42: Health budget per person per year, average for the period 2013/14-2015/16, by county**



## 7.2 County health financing

Data are available on county health budgets for the period 2013/14–2015/16. The total budget for health in the 47 counties increased from KSh 48.7 billion in 2013/14 to KSh 63.4 billion in 2014/15 and KSh 83.8 billion in 2015/16. The per capita allocation for health to counties was KSh 1,874 in 2015/16.

The distribution of the resources did not change much during the three years. Figure 42 shows the average amount per person per year that each of the counties budgeted for health. There is major variation from a high of more than KSh 4,000 in Lamu and KSh 3,835 in Isiolo, both small population counties, to less than KSh 1,00 per person per year in Laikipia, Bomet, Nyandarua, Migori, Kirinyaga and Kajiado.

## 7.3 Health facility density

Health facility density is a crude indicator of access to outpatient services. It is expressed as number of facilities per 10,000 population. In Kenya, the target is to have one dispensary for every 10,000 people, a health centre for every 30,000 people, a primary hospital (level IV) for every 100,000 people, a secondary hospital for every one million people and a tertiary hospital for every 5 million people. This means that at the minimum, there should be nearly 1.5 health facility (regardless of the level) for every 10,000 people in Kenya.

There were 556 hospitals and 8,975 primary care facilities in 2015. This means the target has been surpassed. Kenya almost 1.5 times the targeted number of health facilities (Figure 43). It is possible that the health facility density in Kenya is even higher than reported because the master facility list does not include all the private facilities.

Figure 43: Number of health facilities per 10,000 population

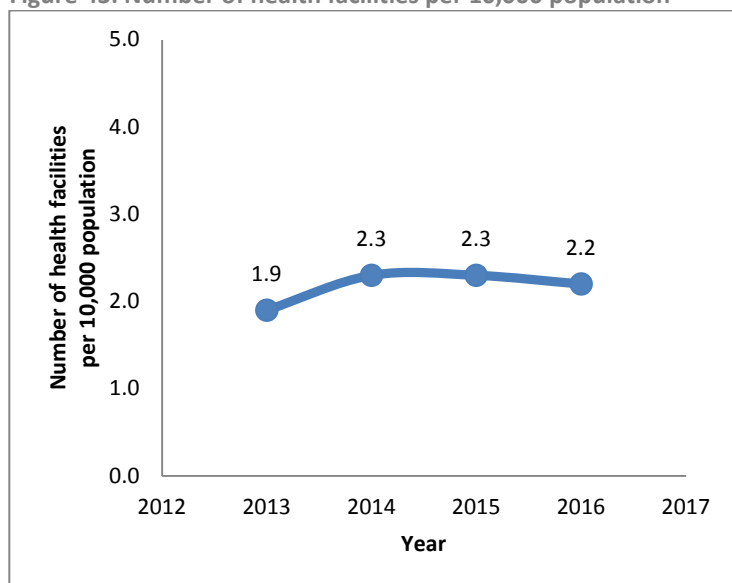
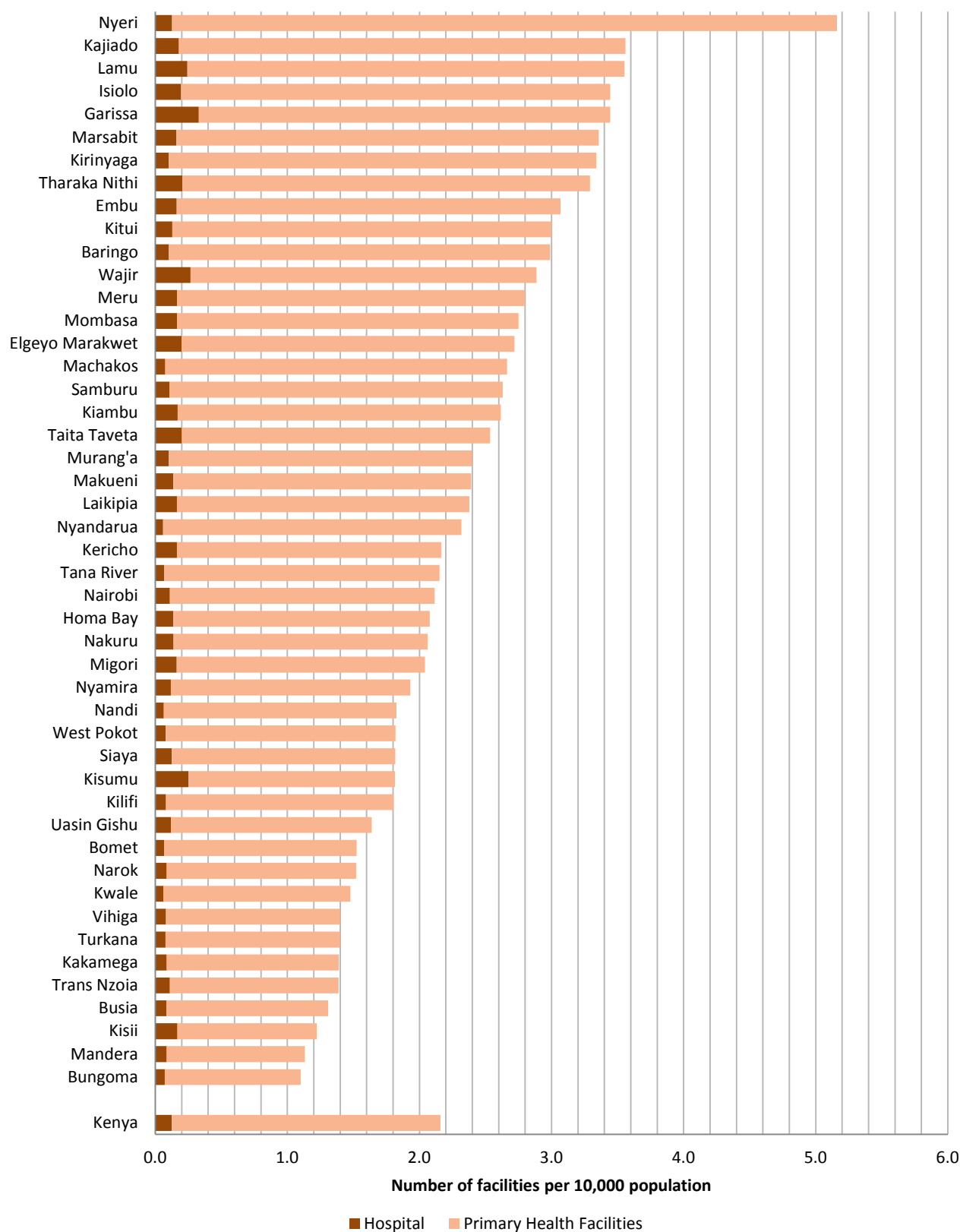


Figure 44 shows the health facility density in Kenya, by county. It shows very large differences between the counties, with, for instance, the density in Garissa county about six times higher than that in Nyandarua county. The density was higher than the mid-term target in 32 of the 47 counties. Densities were high in several of the more sparsely populated counties, where more facilities are required to provide access to the population. A major limitation of health facility density indicator is that it does not take into account that all facilities provide different amounts of service. If we consider hospitals, the target population for the lowest level hospital in Kenya (level IV hospital) of 100,000 people was surpassed. Hospital density in Kenya in 2015 was 1.3 per 100,000 population. This represents one hospital for every 78,431 people.

Surpassing the target for health facility density does not necessarily mean access to health care is good for all citizens. Determinants of health care access are many and varied including distance, funds, availability of services, health worker attitudes and practices, and other socio-cultural factors. Moreover, most of the health care facilities in Kenya are in urban areas where only 30% of the population live. Therefore, decisions on whether or not to construct additional health facilities should not be based on health facility density alone.

**Figure 44: Health facility density per 10,000 population in Kenya (MoH, 2016)**

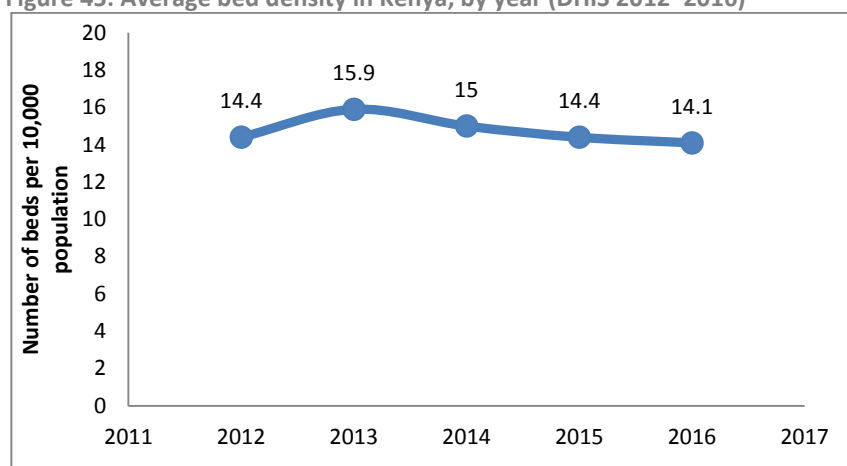


## 7.4 Inpatient bed density

Inpatient bed density is an indicator of access to inpatient services. It is expressed as the number of inpatient beds per 10,000 population. Assessment of inpatient bed density is based on all admission beds but excludes maternity beds. There is currently no global norm for density of inpatient beds in relation to total population. The global average for inpatient bed density is 27 per 10,000 and the average in the African region is 10 beds per 10,000 population. The service availability and readiness assessment survey (SARA) uses benchmarks of 18 and 39 inpatient beds per 10,000 derived from the average of lower- and upper-middle-income countries, respectively. The aim in the KHSSP was to increase the inpatient bed density from 50 per 10,000 population in 2013 to 150 per 10,000 population in 2016. This is higher than the global average and the average in the African region. Moreover, the baseline value is higher than the value calculated for 2013. The baseline and target have therefore been revised using the DHIS and SARA values to 14.4 (DHIS 2012) and 18 (SARA) per 10,000 population, respectively.

The average bed density in Kenya declined steadily during the review period but remained higher than the average in the African region of 10 beds per 10,000 population (Figure 45). In 2016, the density was 14.1 per 10,000 population. This means that on average, there is one inpatient bed for every 709 people in Kenya. Twelve counties had densities exceeding 18 per 10,000. Isiolo county had by far the highest bed density (45 per 10,000), followed by Embu (25).

Figure 45: Average bed density in Kenya, by year (DHIS 2012–2016)



## 7.5 Health workforce density

Health systems require a strong health workforce i.e. an adequate number of health workers with knowledge, skills, and motivation to deliver services across the country. The assessment of the level and distribution of the health workforce in Kenya was based on the availability and distribution of staff that are at the core of patient care, namely doctors, clinical officers, nurses and midwives, also referred to as core health professionals. It did not include the other cadres. The availability of core staff is a very good proxy indicator of the strength of health workforce. The minimum health workforce threshold required for effective delivery of health care services is currently unknown but WHO has proposed a threshold of 23 physicians, nurses and midwives per 10,000 population<sup>26</sup>.

Kenya aimed to increase the density of health workers from 5 per 10,000 population in 2013 to 7 per 10,000 population in 2016. The quality of data is however not good enough to track trends in the numbers and density of core health professionals. The best estimate for 2016 is based on county reports and the SARAM 2012, and several

<sup>26</sup> This is based on an analysis that countries with less than 23/10,000 generally fail to achieve adequate coverage rates for maternal and child health care interventions. WHO 2006 (pg. 11). Working together for health. The world health report 2006. Available at: [http://www.who.int/whr/2006/whr06\\_en.pdf](http://www.who.int/whr/2006/whr06_en.pdf).

data imputations had to be made to obtain the best estimate.<sup>27</sup> It is estimated that there were 9 health workers per 10,000. Because there are no reliable data over time, it is difficult to assess whether progress has made during KHSSP. As expected, there were more nurses/midwives than clinicians (doctors and clinical officers). The density per 10,000 population was 1.4 for doctors, 0.5 for clinical officers, and 7.3 for nurses. This corresponds with a skills mix of 2.7 nurses/midwives for on medical or clinical officer.

**Table 4: Percentage of approved positions that have been filled (county reports, 2016)**

	Level 2	Level 3	Level 4	Tertiary	Kenya
Medical officers	N/A	5	14	43	17
Clinical officers	5	9	9	19	9
Nurses and specialist nurse	16	15	14	30	16
Total	14	13	13	30	15

A related indicator for assessing the availability of health workers is the percentage of approved positions that have been filled. This indicator assesses the availability of health workers against the staffing norms established by the government for each health facility level. For instance, Kenya is expected to have 2 doctors at each level3 facility, 40 at each level4, and 121 at each tertiary level facility. Table 4 shows that only 15% of the approved positions in Kenya were filled, with the percentage in tertiary level higher compared to other facility levels.

There are large differences between the counties (Figure 46). The urban counties of Nairobi and Mombasa have densities above 24 per 10,000, and in all likelihood this is still an underestimate of the true number, as many work in the private sector and are not fully counted. Inequalities between counties in core health worker density were very large, with up to sevenfold difference between the county with the highest and the county with the lowest core health worker density. Overall, 43 of the 47 counties have a health worker density below 10 per 10,000 population and the densities were particularly low in Turkana, Mandera, Bomet, Kajiado, Narok, Migori, Kilifi and Kwale.

## 7.6 Outpatient and inpatient utilization rate

Outpatient utilization rate measures the number of visits for ambulant care in a defined administrative or health area during a year. It includes visits to all public and private facilities as well as mobile clinics but excludes visits for immunization services. It is expressed as per capita outpatient utilisation rate per year i.e. the average number of outpatient visit per person per year.

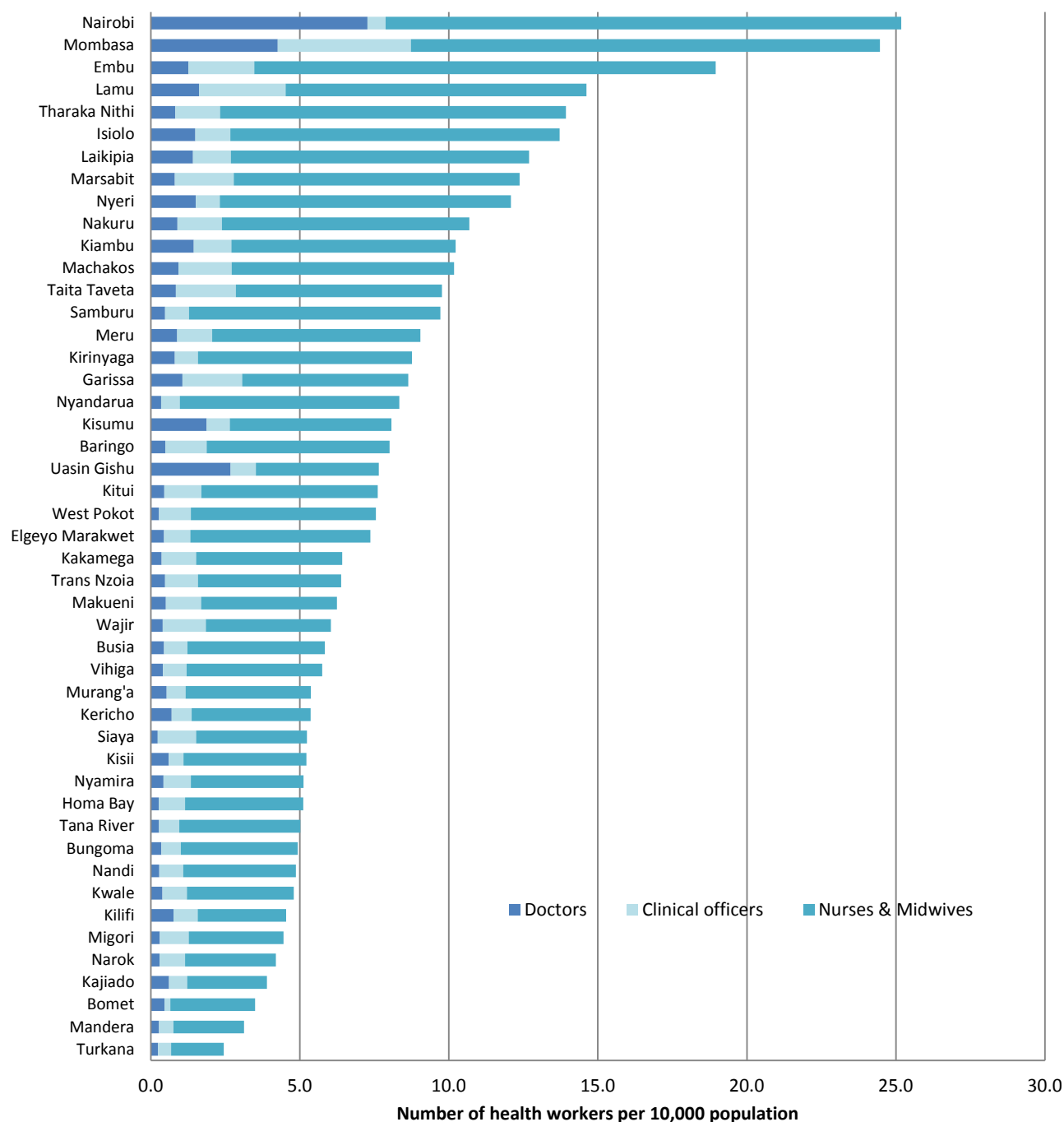
In countries of the Organization for Economic Co-operation and Development (OECD), the average number of physician consultations per person per year is about six. The World Health Organization's service availability and readiness assessment (SARA) uses five outpatient visits per person per year as a benchmark<sup>28</sup>.

<sup>27</sup> Two data sources were used, as at present there is still no complete health workforce information system: county reports on numbers of health workers by cadre and the health facility census conducted in 2012 (SARAM). The recent county reports were taken as starting point, but appeared to suffer from underreporting in several counties. If the county reports were lower than the headcount in the SARAM, the SARAM data were used as best estimate of number of health workers. In case of Nairobi, an additional adjustment was made, as there was a heavy underreporting of nurses (there were 2.5 times more medical and clinical officers than nurses). The number of nurses was estimated using a skills mix ratio of 2.2.

<sup>28</sup> Available at: [http://www.who.int/healthinfo/systems/sara\\_reference\\_manual/en/](http://www.who.int/healthinfo/systems/sara_reference_manual/en/).

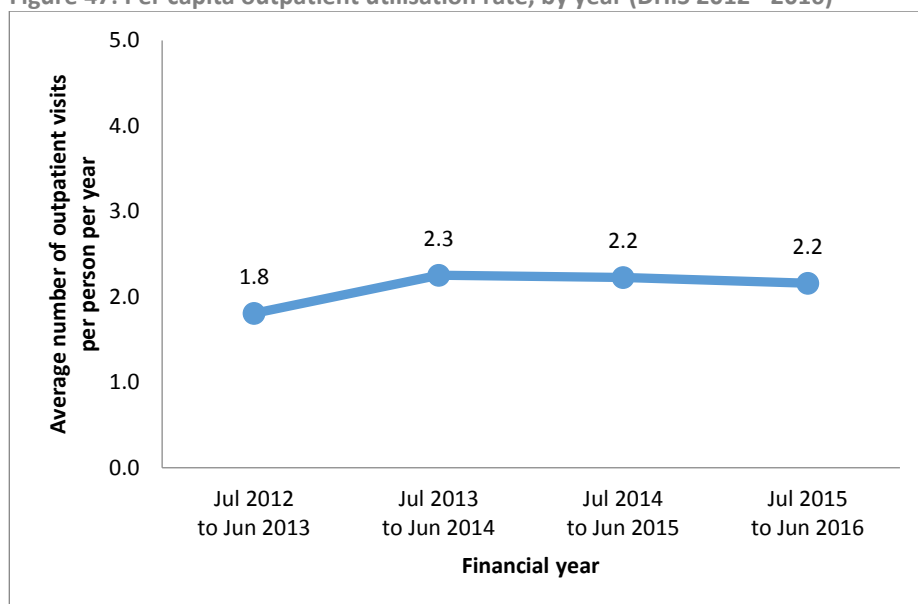
Kenya aimed to increase the per capita outpatient utilization rate from 1.8 in 2013 to 3 in 2016 and 4 in 2018. This intermediate target was not achieved. The per capita outpatient utilization rate during the review period was stagnant at around 2.2 i.e. on average; there were about two OPD visits per person each year during the review period.<sup>29</sup> This represents a slight increase from the July 2012 – June 2013 baseline value (Figure 47). However, the per capita OPD utilization in Kenya could be higher than reported because data for visits to most private facilities, especially to private for profit facilities, were considered to be incomplete.

**Figure 46: Health worker density by county, estimated from from county reports and SARAM 2012**



<sup>29</sup> The rates were based on the number of visits adjusted for incomplete reporting, assuming a  $k=0.75$ . This means that the number of OPD visits in non-reporting facilities was assumed to be somewhat lower than in the reporting facilities.



**Figure 47: Per capita outpatient utilisation rate, by year (DHIS 2012 - 2016)**

\*Values adjusted for reporting completeness

Per capita outpatient utilization rate during the review period varied widely between counties, with a fivefold difference between the county with the highest and the county with the lowest per capita outpatient utilization rate (Figure 48). During the review period, Trans-Nzoia county had the lowest per capita outpatient utilization rate, followed by Bungoma, Narok, Turkana, Vihiga, Mandera, Tana River, and West Pokot county. Kirinyaga had the highest density followed by Nyeri, Embu, Machakos, Murang'a and Mombasa.

Inpatient admission rate provides additional information on the availability and access to inpatient services. In developing countries with high disease burden, a low inpatient admission rate suggests limited access to inpatient services. Assessment of inpatient utilisation rate is based on all inpatient admissions excluding admissions for delivery. It is expressed as the number of patient discharges per 100 population per year. In OECD countries, which have an older population, there are about 15 discharges per 100 population per year. WHO's SARA facility survey uses 10 discharges per 100 people per year as a benchmark<sup>30</sup>.

Reporting rates for inpatient information was less complete than for other forms. The national reporting rates ranged from 61–71% during 2012/13–2015/16 which implies that the estimates national rates are less reliable.<sup>31</sup> Inpatient admission rate during the review period was almost constant at around 6 per 100 population. It was 5.6 in 2012/2013, 6.0 in 2013/2014, 6.1 in 2014/2015, and 5.7 in 2015/2016. Differences by county were very large (Figure 49). During the review period, the admission rates in Busia, Kirinyaga, Mombasa, Nyeri and Kisumu were higher than elsewhere. The rates were particularly low in Tana River, Bomet, Wajir, Narok, and Kwale. The top 10 counties had one average almost four times higher admission rates than the bottom 10 counties (9.7 and 2.6 per 100 population respectively).

<sup>30</sup> Available at: [http://www.who.int/healthinfo/systems/sara\\_reference\\_manual/en/](http://www.who.int/healthinfo/systems/sara_reference_manual/en/).

<sup>31</sup> As with outpatient data, a k=0.75 was selected for the non-reporting facilities.

**Figure 48: Per capita outpatient utilisation rate during the review period, by county (DHIS 2013 - 2016)**

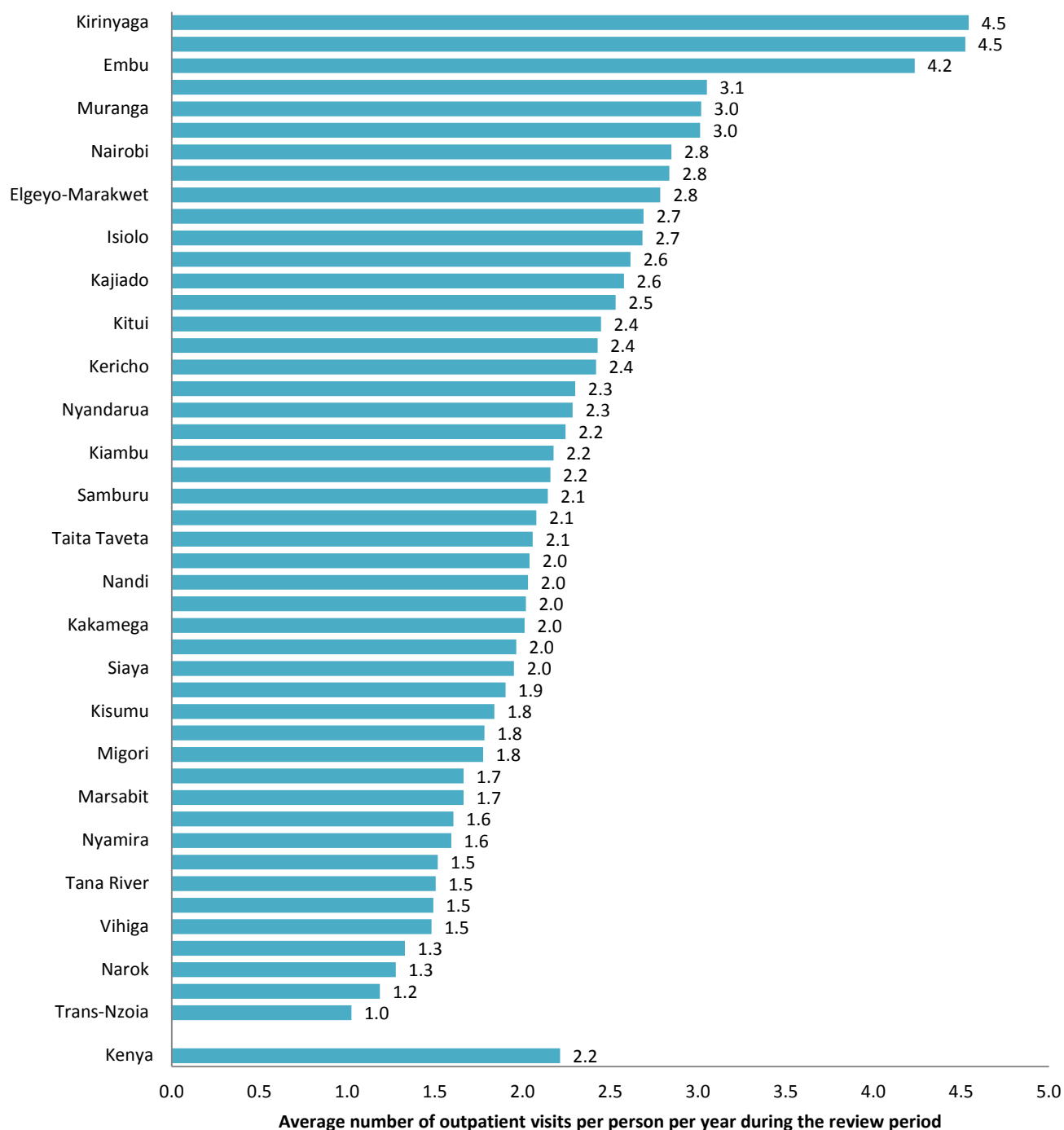
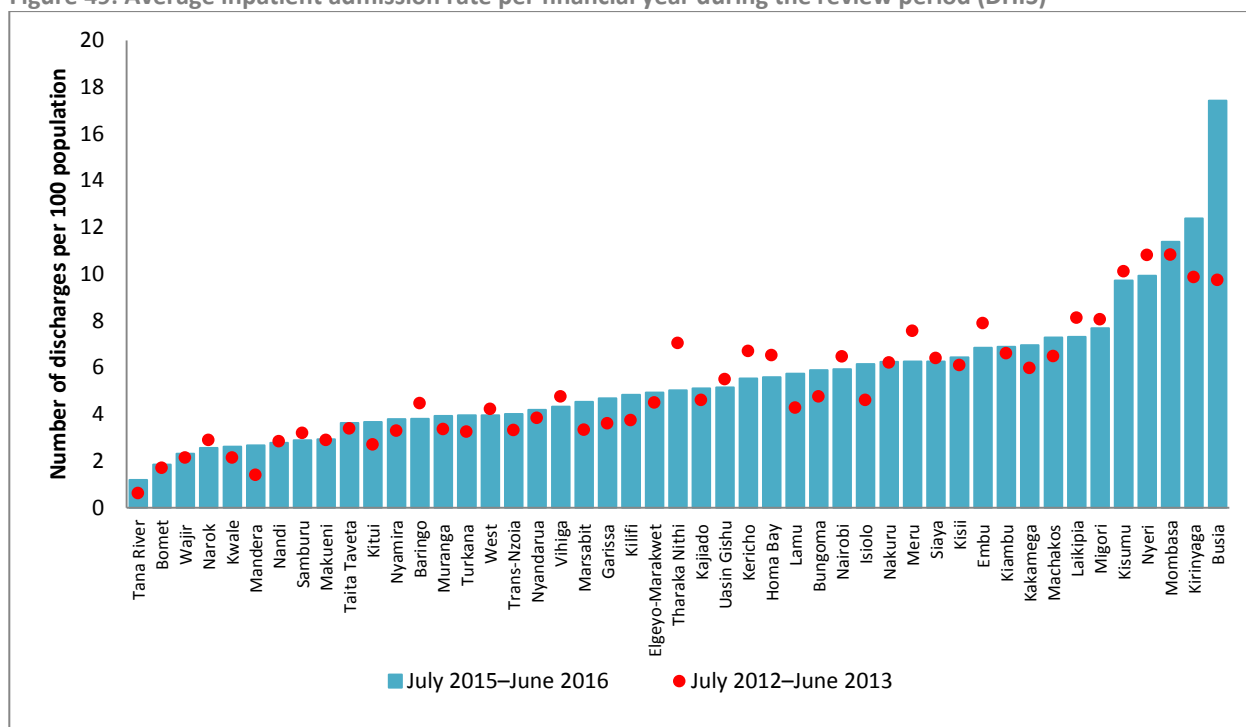


Figure 49: Average inpatient admission rate per financial year during the review period (DHIS)

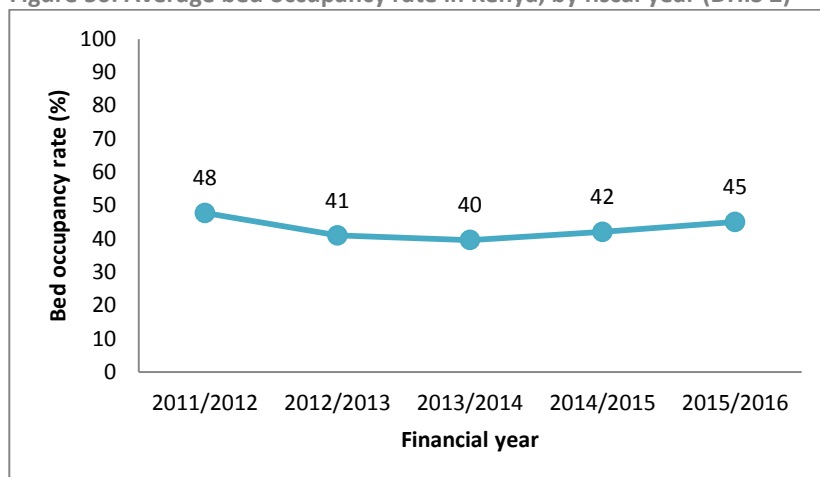


## 7.7 Bed occupancy rate

Bed occupancy rate is a measure of utilization of the available bed capacity. It indicates the percentage of beds occupied by patients in a defined period of time, usually a year. The aim of the KHSSP is to increase the bed occupancy rate from 85% in 2013 to 95% in 2016 and in 2018. The optimal bed occupancy rate is not known but bed occupancy rate above 85% is thought to be too high and a considerable risk to safe and efficient delivery of health services. Bed occupancy rate above 100% means there were more inpatients than available beds. The baseline value in the KHSSP needed revision because it was way higher than the value calculated when data became available (41% in 2012/2013). As shown by Figure 50, the average annual bed occupancy rate in Kenya during the review period remained fairly constant at slightly over 40%.

There were big differences between counties in bed occupancy rate. During 2015/2016, bed occupancy rate in Migori county was more than 100% – indicating a severe shortage of beds i.e. more patients admitted than the available beds. The rates were particularly low in Wajir (13%) and Vihiga (13%) which may suggest difficulties in access to inpatient services.

Figure 50: Average bed occupancy rate in Kenya, by fiscal year (DHIS 2)

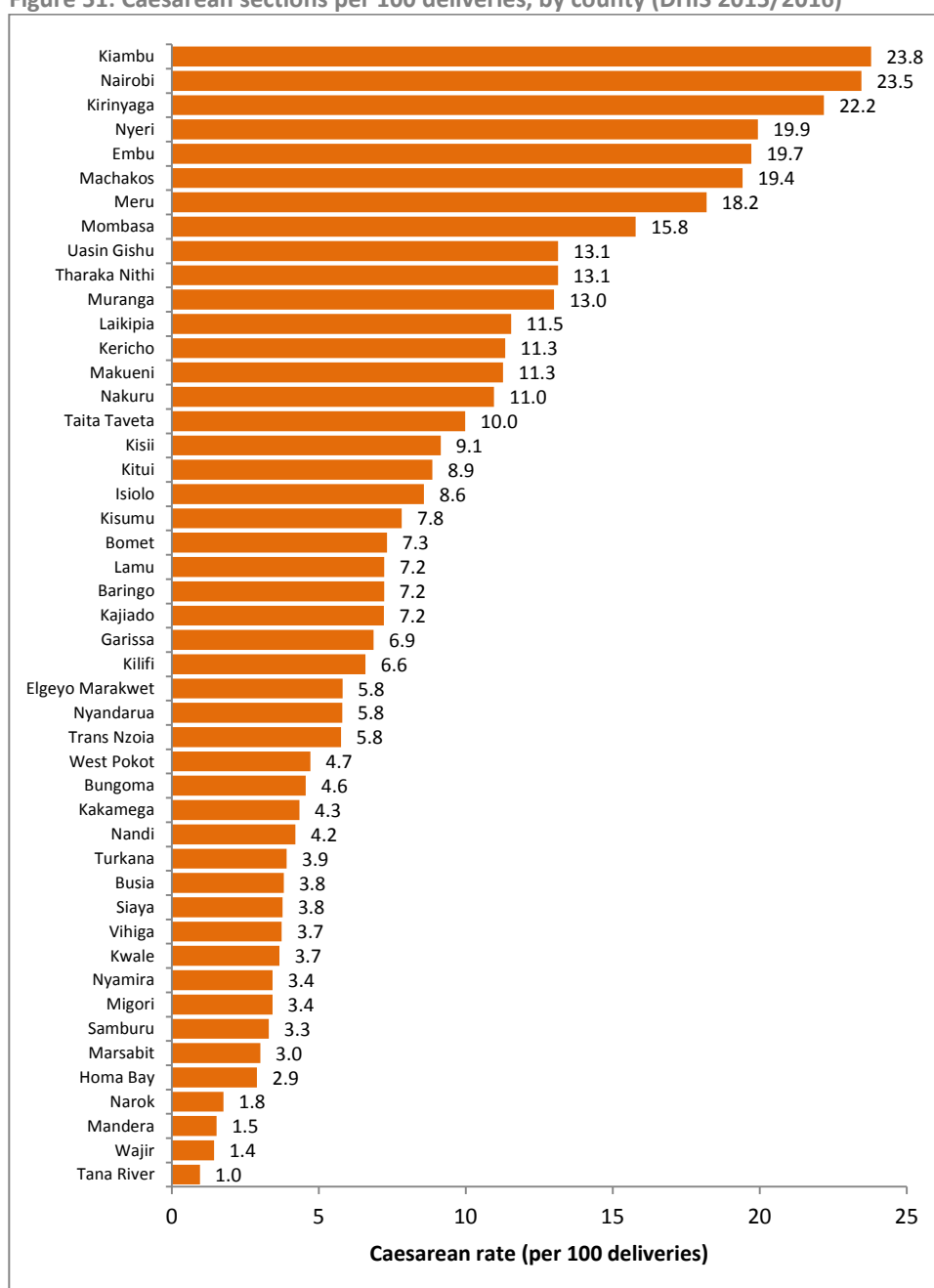


## 7.8 Caesarean section rate

There was an increase of caesarean section rates from 7.4% to 10.0% among all deliveries. This increase is almost entirely the result of more women delivering in health facilities, as the proportion of women with caesarean section among those delivering in a health facility remained constant at about 13%. This, like the continued decline of institutional maternal mortality ratios, suggests that health facilities were able to keep up with the increased utilization, as caesarean section rates did not go down. This was also supported by trends in institutional stillbirth rates and maternal mortality ratios (see relevant section).

However, caesarean rate in Kenya differed quite widely by county, with up to 23 point difference between the counties with the highest rate (Nairobi and Kirinyaga) and those with the lowest rate (Wajir, Mandera and Tana River) (Figure 51). This large difference is associated with differences in county institutional delivery rates and access to emergency obstetric services within facilities.

Figure 51: Caesarean sections per 100 deliveries, by county (DHIS 2015/2016)



## **Other indicators of health care access**

### **Oral rehydration therapy for diarrhoea**

Diarrhoea is a major cause of child morbidity and mortality. In Kenya, it is the third most common cause of morbidity in children under-five years. According to the KDHS (2014), about 15% of the children in Kenya had diarrhoea in the two weeks that preceded the survey.

Oral rehydration therapy is the recommended first line treatment for diarrhoea. It is cheap and should be readily available at all health care delivery levels, including private clinics. Knowledge of oral rehydration therapy among women in Kenya was found to be high and increasing. It was 78% in the 2008–2009 survey and 93% in the 2014 survey. Therefore, if access to health care is good, all children with diarrhoea should receive oral rehydration therapy. This however was not the case in Kenya. According to the KDHS, the percentage of children with diarrhoea receiving oral rehydration therapy was low but increasing. It was 39% in the 2008–2009 survey and 54% in the 2014 survey.

### **Treatment of fevers within 48 hours**

Another indicator of health care access is the proportion of children promptly treated for fevers. Malaria and respiratory tract infections are the leading cause of fever in children in Kenya. According to the KDHS 2014, 24% of children under five years had fever in the two weeks that preceded the survey. Of these, 63% received treatment or advice on the management of fevers. This represents a big improvement from the 49% in the 2008–2009 KDHS survey that received treatment of advice for fever.

### **Treatment of acute respiratory infection within 48 hours**

Acute respiratory infection (ARI) is one of the leading causes of childhood morbidity and mortality throughout the world. Early diagnosis and treatment is important for reducing the number of deaths among children.

The DHS considers a child with cough accompanied by short rapid breathing as having pneumonia and for which treatment or advice should be sought from a health worker. If health care access is good, ideally all children with suspected pneumonia should receive treatment from a health provider. This was not the case in Kenya. According to the KDHS (2014), only 66% of children under five years who were suspected to have pneumonia received treatment or advice from a health provider. This however represents an improvement from the 56% in the 2008–2009 survey who received treatment or advice from a health provider.

The performance of these indicators suggests that access to health care services for children in Kenya is limited but also improving.



## 8. Health status

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### 8.1 Life expectancy at birth

One of the objectives of the KHSSP is to increase the average life expectancy at birth from 60 years in 2013 to 62 years in 2016 and 65 years in 2018. In the absence of complete death registration, life expectancy is estimated from survey and census data on child and adult mortality. The most recent data are from the KDHS 2014 which provides mortality data based on years preceding the survey. Therefore, life expectancy trends during KHSSP can only be projected based on previous trends.

WHO estimates the average life expectancy at birth in Kenya at 62.6 years in 2013, increasing to 63.4 years in 2015<sup>32</sup>. Female life expectancy by 2015 is 65.8 years, compared to 61.1 years for men. Since 2000, life expectancy has increased at a rate of 0.8 years per year (1.3% average annual increase), driven by child and adult mortality declines.<sup>33</sup> According to the WHO estimates, the average life expectancy at birth in Kenya in the past several years was higher than the median of eight sub-regional countries of similar socio-economic status but was the third highest in the group after Rwanda and Ethiopia (Figure 52).

### 8.2 Child mortality

To assess the performance of efforts towards improving child health in Kenya, the KHSSP has selected two child mortality indicators: neonatal and under-five mortality rates per 1,000 live births. The aim is to reduce neonatal mortality rate per 1,000 live births from 31 in 2013 to 25 in 2016 and 15 in 2018, and under-five mortality rate per 1,000 live births from 74 in 2013 to 50 in 2016 and 35 in 2018.

The last three KDHS surveys show that the neonatal and under-five mortality rates in Kenya are decreasing at a fast pace. In the 2014 KDHS survey, the neonatal, and under-five mortality rates per 1,000 live births in Kenya were 22 and 52, respectively, for the five years preceding the survey (Figure 53).

Using the UN estimates that are based on all survey and census data, neonatal mortality has declined at a rate of 2.7% per year during 2005–2015. If this rate of decline continues post-2015 then neonatal mortality would be 22 by 2016 (target met), 20 by 2018 (target of 15 not met), and 15 per 1,000 live births by 2030 (SDG target of 12 not met).

For under-five mortality the rate of decline 2005–2015 was faster than for neonatal mortality: 5.5% per year. If this rapid pace of decline is maintained, under-five mortality rates would be 47 in 2016 (target surpassed), 42 in 2018 (target not met) and 25 per 1,000 live births in 2030 (SDG target of 25 met).

The midterm targets are likely to have been met, but the 2018 targets are too ambitious. Under-five mortality is on track for the SDG target, while the rate of decline of neonatal mortality rate needs to increase to an average of 4% per year. Compared to the UN estimates for the 8 subregional countries, Kenya is in third place for under-five mortality (after Rwanda and Tanzania) and in sixth place for neonatal mortality (Figure 56).

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<sup>32</sup> <http://apps.who.int/gho/data/view.main.SDG2016LEXv?lang=en>.

<sup>33</sup> In the KDHS 2014 adult mortality, measured by the probability of dying between ages 15 and 50 years, declined by 7.3% per year for women and 3.9% for men since the KDHS 2008/09.

Figure 52: Comparison of average life expectancy at birth in sub-regional countries (WHO estimates)

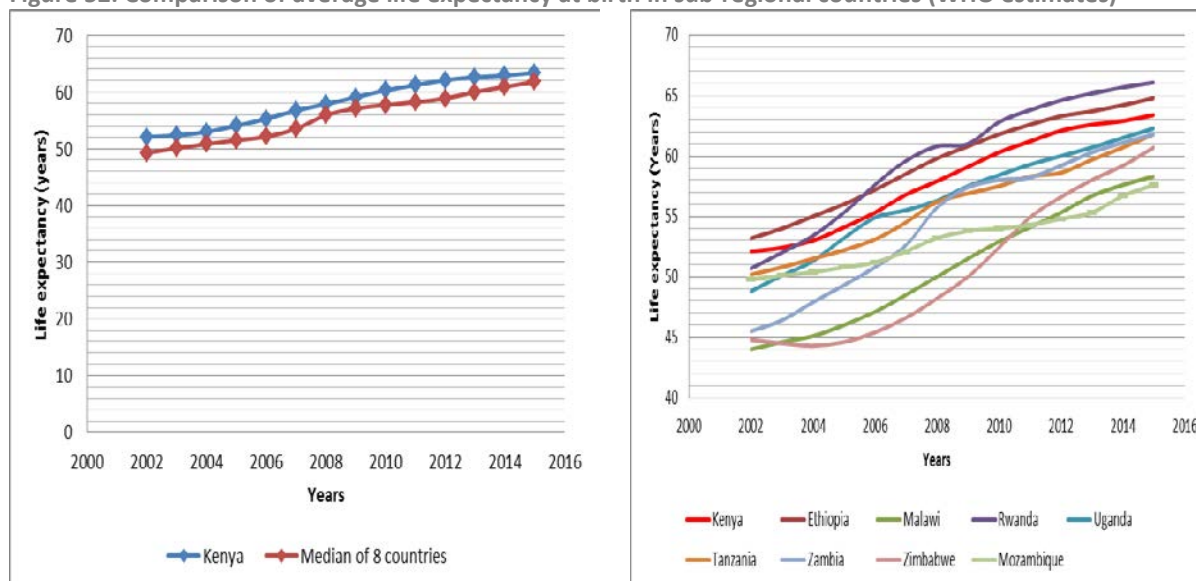
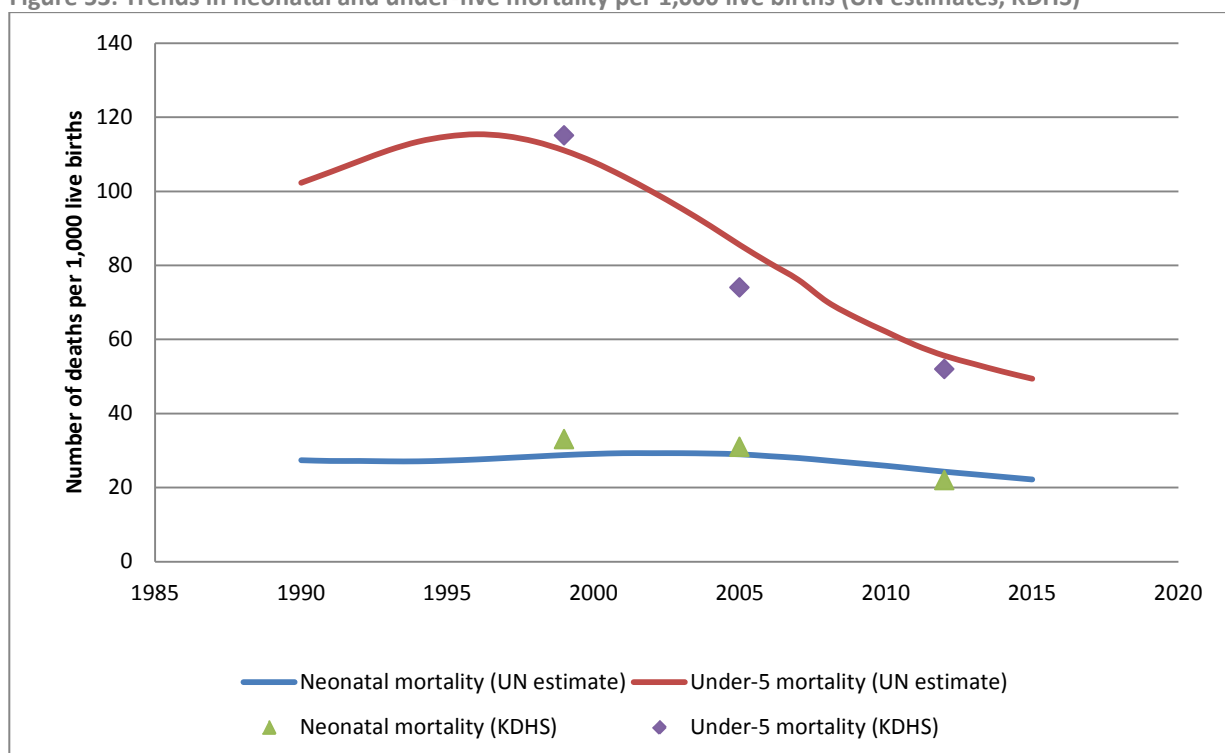


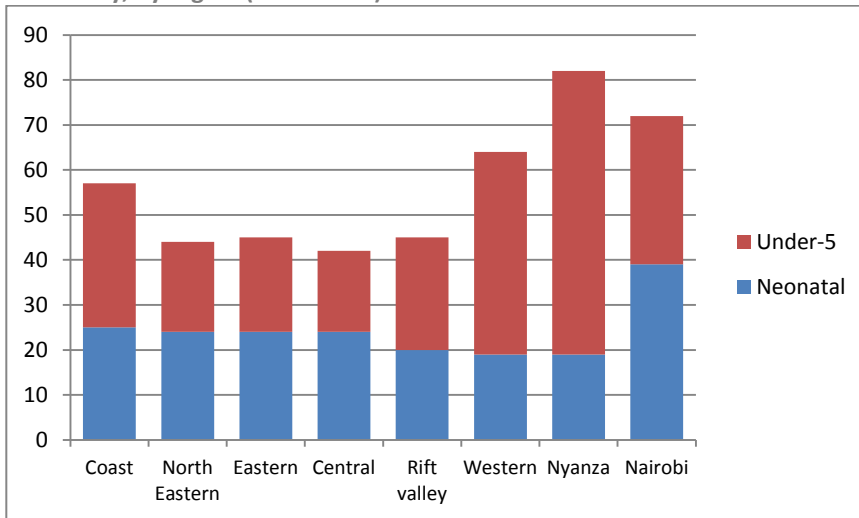
Figure 53: Trends in neonatal and under-five mortality per 1,000 live births (UN estimates, KDHS)



The KDHS provides data by region, showing substantial differences between the regions with the under-five and infant mortality rates substantially higher in Nairobi and Nyanza than elsewhere in Kenya. Nairobi also had the highest neonatal mortality rate (Figure 54). Changes in child mortality rates over time are not shown in this report but all the regions have registered substantial declines in neonatal, infant and under-five mortality rates. The 2009 census provides child mortality data by county, showing the very high mortality rates in the counties bordering Lake Victoria.



**Figure 54: Neonatal and under-five mortality rates for the 10 year period preceding the survey, by region (KDHS 2014)**



### 8.3 Maternal mortality

One of the key KHSSP objectives is to reduce the maternal mortality per 100,000 live births from 400 in 2013 to 300 in 2016 and 150 in 2018. According to the KDHS survey, the MMR in Kenya for the seven year period preceding the survey dropped quite substantially from 520 in the 2008–2009 survey to 362 in the 2014 KDHS survey. The proportion of deaths among women 15–49 years that occurred during pregnancy, childbirth or within 6 weeks postpartum was 14.1%, which was similar to 14.3% in the KDHS 2008/09.

Population level data to estimate the maternal mortality ratio during the review period were not available by the time of this review and the updated UN estimates including the KDHS 2014 data have not yet been published. The KDHS 2014 cannot provide disaggregated maternal mortality data by county. County data for institutional maternal mortality are available and these are discussed elsewhere in the report. Figure 55 shows maternal mortality by county as documented by the 2009 census.

Figure 55: Maternal mortality per 100,000 live births by county, Kenya, census 2009

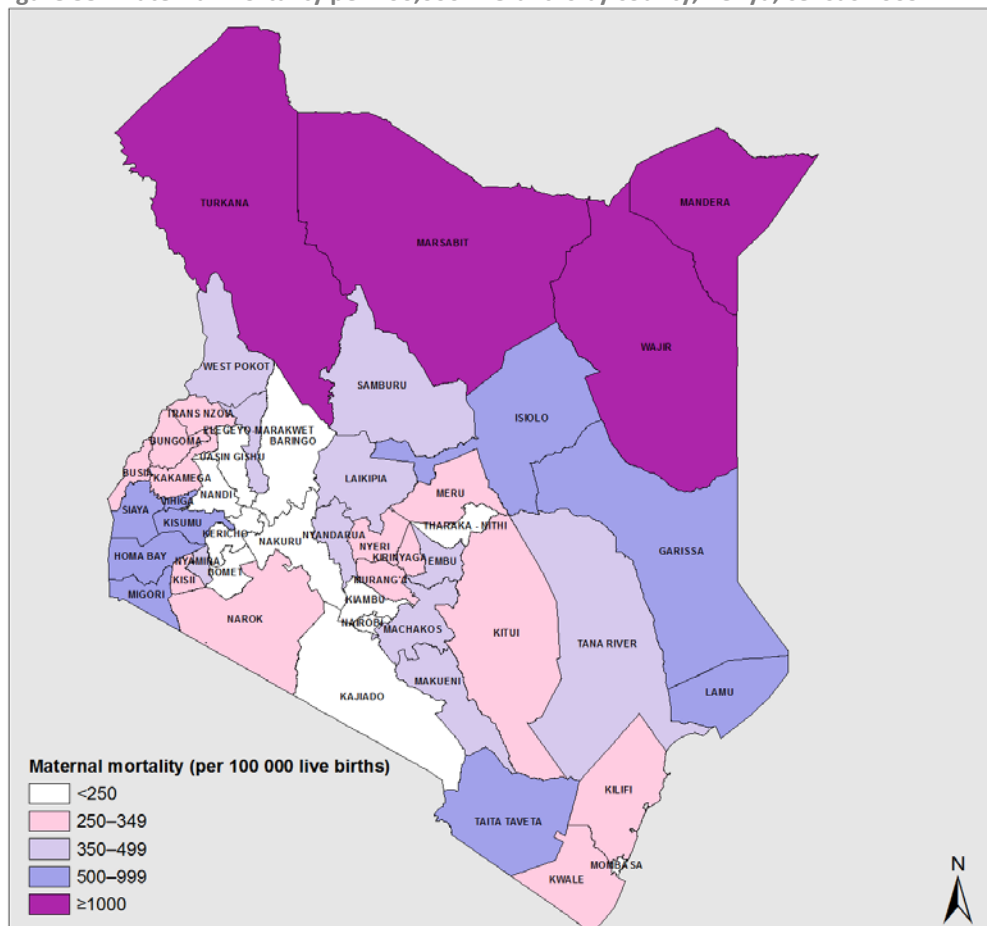
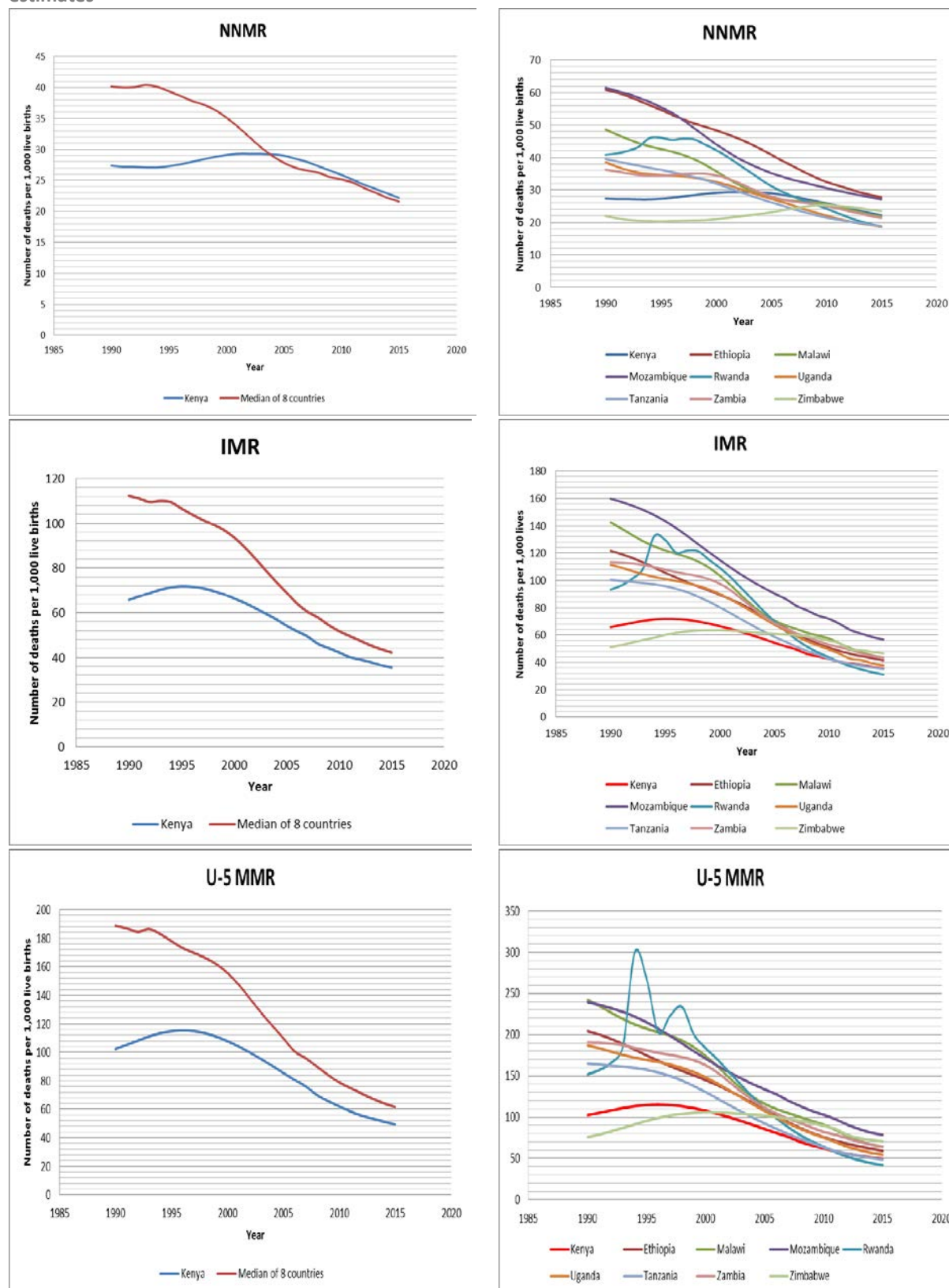


Figure 56: Cross-country comparison, neonatal, infant and under five mortality per 1,000 live births, IGME estimates



## 9. Integrated assessment of county progress and performance

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### Main findings

- This chapter uses summary measures or indexes to assess the situation and progress in counties. The *health system input* (including density of health facilities, hospital beds and health workforce) index shows very large differences between counties, with several but not all counties in northern, northeastern and Rift Valley having the lowest input scores, while most centrally located counties had the higher input scores.
- The *health system output* index (based on utilization and coverage of services) was positively associated with the input score, but there were exceptions. Counties with lower than expected outputs include several counties northern Kenya, which can be related to low population density of the counties or relative oversupply of for instance health workers. In other counties there was evidence of a high output for their inputs scores, such as Nyeri and Kirinyaga.
- The RMCNH service coverage index (family planning, antenatal visits institutional delivery, and full child immunization coverage) progressed only slowly during KHSSP, with only slight reductions in inequality between counties. The RMNCH index was highest in Kiambu, Nyeri and Nyamira (80%) and lowest in Mandera and West Pokot (less than 40%). Yet, progress had been greatest in counties like Mandera, Garissa and Wajir, as well as Kwale and Taita Taveta.
- The communicable disease control coverage index (HIV, TB and malaria) progressed more than the RMNCH index, driven by HIV and malaria intervention coverage. Meru, Busia, Bungoma and Laikipia counties made the greatest progress.
- The UHC access and coverage index brings all indicators together and is based on indicators for RMNCH, communicable disease control, NCD risk factors prevalence and service access. Mombasa county had the highest score. The analysis grouped by level of socioeconomic development of the county into quintiles and allowed the identification of stronger and weaker performers in 2016.
- The UHC index score was not related to the county health budget 2013–2016. Counties that had higher health system input scores (more infrastructure and more health workers) tended to have higher health budgets.
- The maps analyzing the numbers of the county target population not receiving specific services (no family planning, no full child immunization, no ART, home deliveries) or at risk (obesity, tobacco use) showed the great differences within Kenya by intervention. In terms of numbers of people in need or at risk obesity and tobacco use and lack of HIV treatment were particularly strongly concentrated (mostly in central Kenya for the NCD risk factors and Lake counties for HIV). Home deliveries (western Kenya and lake counties), family planning needs and lack of full immunization were less concentrated. Nairobi county often topped the list of numbers of target population not benefiting from interventions because of their large population size.

### 9.1 Introduction

Summary measures or indexes are a useful way to assess overall progress and performance of Kenya as a whole and, in particular, counties during the first half of the implementation of KHSSP 2014–2018. The summary measures have limitations as the availability of data for some areas is inadequate. For instance, no reliable trend data were available on the health workforce density in counties, or very limited data were available on treatment coverage for common illnesses.

In this final chapter, indexes of health service inputs and health service outputs including service coverage (RMNCH and communicable diseases control) were computed. In addition, an index of county socioeconomic development was computed based on the KNBS poverty index for counties (2012) and the mean years of education of women and men combined (based on data from KDHS 2014). The index results are presented in the specific county profiles. Here, the focus is on the differences between counties and the levels of progress that counties had made during the first half of KHSSP and to assess their current situation and progress against the strength of the health system and level of socioeconomic development.

## 9.2 Health system inputs

The health systems inputs index was constructed from three indicators. For each indicator an upper limit was set to correspond with 100% to be able to compute percentage score scores and to reduce the effects of oversupply of services on the analysis:

- Health facility density: the upper limit for the score was 2.5 health facilities per 10,000 population, or one facility per 4,000 population. This exceeded the current government targets, but since the majority of counties already had at least 2 facilities per 10,000 population, a higher cutoff was chosen to better capture variation between the counties. If a county had more facilities the score remained at 100%. If a county for instance had 1 facility per 10,000 population, the county score for this indicator was 40%.
- Hospital bed density: the arbitrary upper benchmark was set at 27 beds per 10,000 population, based on statistics available from middle and high income countries (global average).
- Core health professionals density: the benchmark used by WHO in the 2006 World Health Report of 23 core health professionals per 10,000 population was applied.

The health systems input index was given double weight to the health worker density indicator, as there are two indicators for health infrastructure.

The average county health budget 2013–2016 was higher in the lowest three of the five groups of counties according to level of socioeconomic development: KSh 1083, KSh 1909 and KSh1989 per capita per year in the least developed, lower than average and average groups respectively. In the higher than average and most developed county groups the averages were KSh 1226 and KSh 1440 per person per year respectively.

Table 5 shows the counties ranked by health system input index based on health workers, facility and bed densities. Nairobi and Mombasa counties are top of the list, even though private sector facilities may be undercounted. Less advanced counties like Tharaka Nithi, Isiolo and Marsabit also appear in the top 10. The lowest health input score – i.e. counties with the poorest access to inpatient and outpatient services – are Mandera, Kwale, Bungoma and Turkana.

**Table 5: Counties ranked according to health inputs score, with health worker, facility and hospital bed density per 10,000 population, Kenya, 2015/16**

Rank	county	Health workers	Facilities	Beds
1	Nairobi	25.2	2.0	19.0
2	Mombasa	24.5	2.7	14.6
3	Embu	19.0	3.1	25.1
4	Tharaka Nithi	13.9	3.3	22.0
5	Isiolo	13.7	3.4	44.7
6	Marsabit	12.4	3.4	19.3
7	Nyeri	12.1	5.2	21.7
8	Lamu	14.6	3.4	14.0
9	Laikipia	12.7	2.4	15.2
10	Machakos	10.2	2.8	18.7
11	Kiambu	10.2	2.6	17.7
12	Samburu	9.7	3.0	20.0
13	Garissa	8.6	3.6	20.3
14	Kirinyaga	8.8	3.4	16.0
15	Elgeyo Marakwet	7.4	2.7	16.5
16	Nakuru	10.7	2.1	14.4
17	Meru	9.0	2.9	13.3
18	Taita Taveta	9.8	2.5	12.2
19	Kisumu	8.1	1.8	21.0
20	Kitui	7.6	3.5	13.0
21	Baringo	8.0	3.1	11.0
22	Makueni	6.2	2.8	13.3
23	Kajiado	3.9	3.5	16.8
24	Migori	4.5	2.0	19.8
25	Wajir	6.0	2.9	11.7
26	Nyandarua	8.3	2.3	9.4
27	Homa Bay	5.1	2.1	15.9
28	Kericho	5.4	2.2	13.5
29	Nyamira	5.1	2.0	14.9
30	Uasin Gishu	7.7	1.6	13.7
31	Kisii	5.2	1.2	19.6
32	Muranga	5.4	2.4	7.7
33	Vihiga	5.7	1.5	13.0
34	Busia	5.8	1.4	13.6
35	West Pokot	7.5	1.9	7.5
36	Kakamega	6.4	1.5	12.0
37	Tana River	5.0	2.1	8.6
38	Siaya	5.2	1.8	10.0
39	Narok	4.2	1.6	10.7
40	Nandi	4.9	1.8	6.7
41	Bomet	3.5	1.6	10.6
42	Kilifi	4.5	1.8	7.1
43	Trans Nzoia	6.4	1.4	6.9
44	Turkana	2.4	1.7	9.1
45	Bungoma	4.9	1.1	8.4
46	Kwale	4.8	1.5	5.7
47	Mandera	3.1	1.2	7.4

KEY	Facilities per 10,000	≥20	15-19	10-14	5-9	<5
	Beds per 10,000	≥2.5	2.1-2.5	1.7-2.1	1.3-1.7	<1.3
	Health workers per 10,000	≥18	14.5-18	11-14.5	8-11	<8

### 9.3 Health service outputs

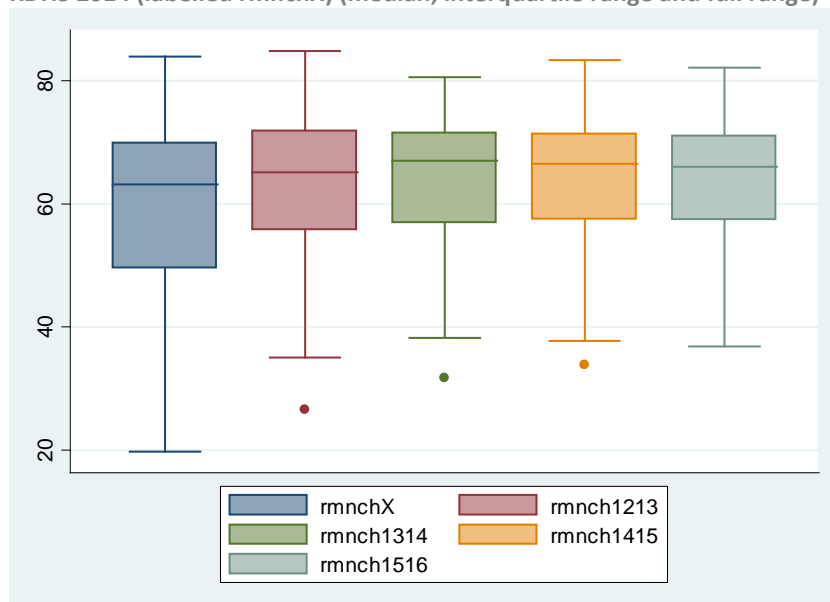
The index for services outputs was based on general service utilization, RMCNH and infectious disease control coverage indicators.

General service utilization: based on the outpatient services utilization, inpatient admission rate, and population caesarean section rate, giving equal weight to the three components. As with the inputs index, upper limits were introduced to obtain relative score for the counties on a scale of 0 to 100%.

- Outpatient visits: the upper benchmark of the number of visits per person per year was set at 5 visits, derived from middle and upper income statistics. No county had more than 5 visits.
- Inpatient admission/discharges: the upper limit of number of discharges per 10,000 population was set at 10 per 1000 population.
- Caesarean section rate –used here as an indicator of surgical capacity – the benchmark was set at 15%.

The RMNCH index included FP coverage<sup>34</sup>, antenatal visits (four or more), institutional delivery, and full child immunization coverage. Figure 57 shows the RMNCH index trends during 2012/13 to 2015/16 according to the DHIS data (labelled rmnch1213 etc.) as well as the situation according to the KDHS 2014 (labelled rmnchX). The box presents the interquartile range and the line shows the median. The whiskers of the box indicate the full range of county values and the dots are the outliers. There was an increase in the RMNCH coverage index from 2012/13 to 2013/14 but none after that. There was however a narrowing of the range over time, meaning less inequality between the counties. The KDHS 2014 shows greater differences than the DHIS data, which may in part be due to inclusion of pre 2012 data on the maternity related indicators in the KDHS index value.

**Figure 57: RMNCH index trends in counties according to the DHIS-based coverage statistics (2012/13-2015/16) and the RMNCH index value obtained from the KDHS 2014 (labelled rmnchX) (median, interquartile range and full range)**

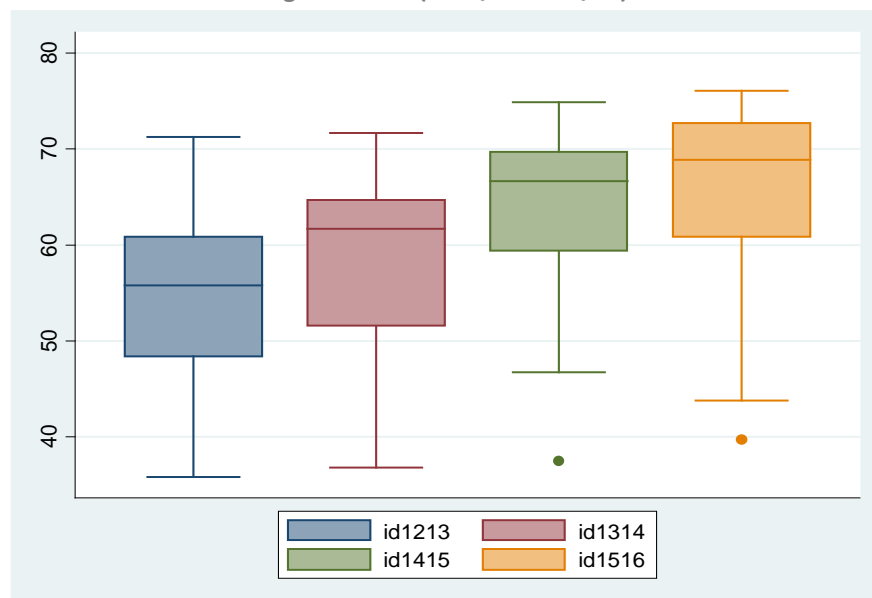


Communicable disease control: the index includes the following coverage indicators: HIV ART among adults, PMTCT, TB treatment coverage, LLITN use among the population and care seeking behaviour of fever in children. LLITN are only recommended in counties within endemic and epidemic zones. Therefore, the malaria intervention coverage rates in counties located in the lake endemic, coast endemic and highland epidemic zones were included

<sup>34</sup> Computed from couple years of protection and the KDHS current use of family planning methods among married women (long-term methods) and a conversion from contraceptive use rate to family planning coverage (use of modern methods among those who need family planning) using the formula from Barros et al. (2015).

in the index, but no malaria indicator was included in the other counties. Figure 58 shows the communicable diseases coverage index trends during 2012/13 to 2015/16 according to the DHIS data (labelled id1213 etc.). There was a major increase in the index over time, but no narrowing of the range over time, meaning the same inequality between the counties.

**Figure 58: Communicable disease control index trends in counties according to the DHIS-based coverage statistics (2012/13-2015/16)**



The overall service utilization and coverage index – the average of general service utilization, RMNCH and infectious disease control – shows that there is a twofold difference in the index between the top and bottom counties. Nyeri, Kirinyaga and Embu counties topped the list, followed by Mombasa, Machakos, Kiambu and Nairobi. The lowest values were observed in the eight less densely populated and less developed in the northern half of Kenya and Narok county.

**Table 6: Counties ranked according to the overall service provision index, with subscores on the service provision (general (outpatient, inpatient use, caesarean section rate), RMNCH and communicable disease control), Kenya, 2015/16**

Rank	County	General services	RMNCH	Infectious disease control	Overall service provision index
1	Nyeri	93.3	82.4	73.8	83.2
2	Kirinyaga	92.3	79.8	74.7	82.3
3	Embu	78.3	77.9	75.0	77.1
4	Mombasa	83.7	75.4	69.4	76.2
5	Machakos	76.6	76.6	75.0	76.1
6	Kiambu	70.8	81.0	74.8	75.5
7	Nairobi	72.6	77.6	71.8	74.0
8	Meru	68.9	74.1	75.0	72.7
9	Laikipia	67.8	69.2	74.3	70.4
10	Tharaka Nithi	64.6	74.3	71.6	70.2
11	Kisumu	61.3	76.7	72.4	70.1
12	Busia	58.9	72.9	74.9	68.9
13	Kericho	58.1	72.0	73.8	68.0
14	Uasin Gishu	54.4	73.8	71.7	66.6
15	Muranga	58.1	74.1	66.7	66.3
16	Nakuru	57.2	70.4	70.2	66.0
17	Taita Taveta	47.9	78.6	69.5	65.3
18	Kisii	52.8	73.8	69.3	65.3
19	Makueni	47.3	75.7	72.7	65.2
20	Kakamega	46.3	74.0	68.9	63.1
21	Kitui	44.9	67.4	76.1	62.8
22	Migori	46.0	72.5	68.9	62.5
23	Siaya	42.3	75.5	67.7	61.8
24	Lamu	49.3	63.7	69.1	60.7
25	Kajiado	48.3	63.6	67.8	59.9
26	Bungoma	37.6	67.6	74.0	59.8
27	Kilifi	43.8	68.1	67.2	59.7
28	Isiolo	55.0	63.0	60.9	59.6
29	Nyandarua	38.9	72.8	65.7	59.1
30	Nyamira	31.0	78.1	66.7	58.6
31	Elgeyo Marakwet	45.8	66.0	60.4	57.4
32	Vihiga	32.4	70.2	69.5	57.4
33	Bomet	35.4	69.0	64.6	56.3
34	Homa Bay	37.5	68.0	63.0	56.2
35	Kwale	35.1	68.5	60.9	54.8
36	Baringo	41.6	65.3	57.3	54.7
37	Trans Nzoia	32.8	63.9	64.1	53.6
38	Nandi	30.1	67.6	56.8	51.5
39	Garissa	41.8	52.6	55.4	49.9
40	Marsabit	32.9	49.6	58.8	47.1
41	Turkana	28.7	47.8	62.1	46.2
42	Tana River	15.1	54.5	65.7	45.1
43	Narok	21.6	54.1	54.2	43.3
44	West Pokot	33.1	43.3	52.9	43.1
45	Samburu	31.8	52.3	43.8	42.6
46	Wajir	22.2	46.2	45.8	38.1
47	Mandera	19.0	36.1	39.7	31.6

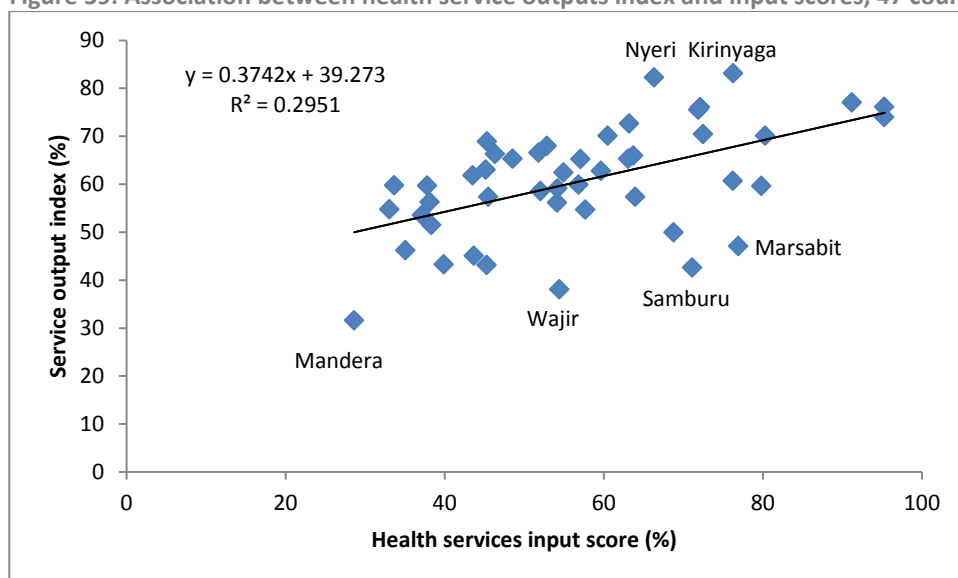
  

KEY	General services	≥75	60-74	45-59	30-44	<30
	RMNCH	≥80	70-79	60-69	50-59	<50
	Infectious disease control	≥80	70-79	60-69	50-59	<50



Figure 59 examines the extent to which counties had a relatively high or low service output – input ratio, based on the two indexes. There was a fairly good correlation between the input and output score as shown with the linear regression: higher inputs result in higher outputs, as expected, but with considerable variation among the counties. Several counties had low output for their input scores – these are located at a distance below the regression line. This could be indicative of relatively low workload for health facilities and health workers and low bed occupancy rates in health facilities. The counties with low outputs include Mandera, Wajir, Samburu and Marsabit, all counties with low population densities and low coverage of services. At the other end Nyeri and Kirinyaga were achieving higher service outputs than expected based on their input scores.

**Figure 59: Association between health service outputs index and input scores, 47 counties, Kenya**



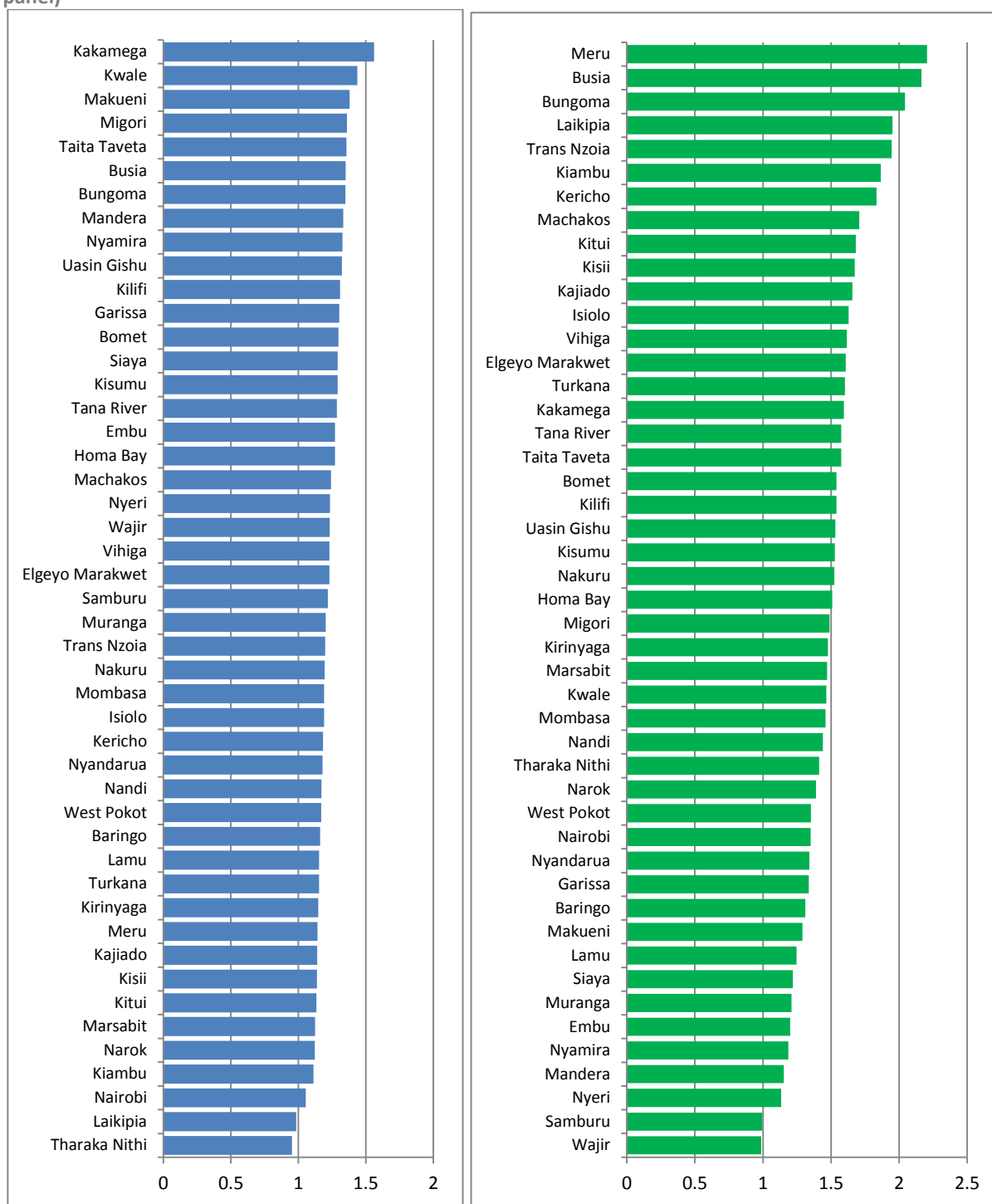
## County progress

County progress can be assessed for the RMNCH and communicable disease control indexes which have DHIS data for the past four years. The progress was assessed by comparing the relative change (as an odds ratio) during 2012/14 to 2015/16. A value of 1 means no change, less than 1 means a decline, and greater than 1 means progress.

Figure 60 also shows the relative progress in counties for RMCNH in the left panel, and for infectious disease control in the right panel. There was considerable variation in the progress of counties. In general, counties with lower coverage prior to KHSSP 2014–2018 made greater progress than counties that had higher coverage to begin with. The changes in the coverage index in 2012–2014 and 2015–2016 show a different pattern. Two counties had lower RMNCH coverage index values in 2015–2016 than in 2012–2014: Tharaka Nithi and Laikipia. All other 45 counties had a odds ratio value greater than 1. The largest progress was made in mixed group of counties: Kakamega, Kwale, Makueni, Migori and Taita Taveta. Some low coverage counties like Madera and Garissa also ranked high in terms of progress during KHSSP.

The communicable disease control progress was larger than for the RMNCH index, partly because these interventions had lower coverage to begin with (e.g. ART or ITN). Meru, Busia, Bungoma, Laikipia and Trans Nzoia made the greater progress. The least progress was made in some of the norther counties (Wajir, Samburu and Mandera) but also in Nyeri (at a much higher level of coverage), Nyamira and Embu.

Figure 60: RMNCH coverage index (ranked by 2015-16 index level, left panel) and communicable diseases control index, progress during 2012/14 to 2015/16 (odds ratio) by county (ranked by progress ratio, 1=same level, right panel)



## 9.4 Universal health coverage: SDG index

Monitoring coverage of essential health services is a key component of the WHO/World Bank framework for monitoring Universal Health Coverage (UHC). One approach to summarizing coverage of essential health services is to compute an index which combines tracer indicators of health service coverage into a single metric.

The SDG monitoring process has proposed an index of essential coverage and a financial protection indicator for UHC. In this report the focus was on the UHC essential service coverage by county. WHO has proposed 16 tracer indicators, with four indicators chosen for each of the four service coverage categories. Effective coverage, which captures the extent to which those in need of health services receive quality care that obtains the desired result, was the guiding principle for choosing tracer indicators. However, in several cases the selected indicator is only a proxy for effective coverage, which is currently not measurable for many important health service areas.

This analysis was based on the following data:

1. RMNCH: coverage of family planning, 4 antenatal visits & delivery care (as one indicator), full immunization in children, and fever treatment seeking behaviour in children (replacing the proposed indicator of pneumonia health seeking behaviour coverage for which no county data are available).
2. Communicable diseases control: ART, TB successful treatment coverage (using the WHO national estimate of 76% notification rate among incident cases and the county specific treatment success rates), ITN coverage in the population, and access to sanitary facilities.
3. NCD risk factor control: non-use of tobacco (men 18–69 years), no hypertension diagnosis (both sexes 18–69 years), cervical cancer screening (women 30–49 years). Diabetes was not included because of low prevalence.
4. Health system capacity: here the health system inputs score was used. The other proposed indicators of availability of medicines and IHR-related preparedness were not available.

Table 7 presents the results. The counties were grouped by the level of socioeconomic development based on education and poverty index into five quintiles (each quintile had 9–10 counties with comparable levels of socioeconomic development). Overall, Turkana and Mandera had the lowest UHC index (40 and 42%, while Mombasa and Nairobi counties had the highest (78 and 75%). As expected, the UHC index correlated well with the level of socioeconomic development: more developed counties had higher UHC index scores. Within the five quintiles of development there were however marked differences:

- Least developed counties: Turkana and Mandera scored lowest while Kilifi and especially Homa Bay were a positive outliers
- Lower than average developed counties: West Pokot was the outlier on the low side and fits better in the least developed counties in terms of UHC index. Busia was the main outlier on the positive side with high coverage rates for many indicators.
- Average level of development: most counties in the middle group had a UHC coverage index between 50–58% but Narok was an outlier with an index value below 45%.
- Higher than average level of development: the counties in this group, mostly located in Rift Valley, did not have higher levels of UHC index than the previous group. Four counties had index scores below 50% while Meru and Uasin Gishu had the higher scores of over 55%.
- Most developed counties: most counties would have been expected to have score over 55% which was the case in Nyeri, Kirinyaga, Nairobi, Kiambu and Mombasa. On the other hand, Kajiado, Nyandarua, Murang'a and Nakuru had scores of 51% or lower.

**Table 7: UHC index score by county level of socioeconomic development, DHIS 2016**

Least developed		Lower than average		Average		Higher than average		Most developed	
Turkana	42	Kitui	56	Nyamira	62	Migori	63	Mombasa	78
Mandera	41	Busia	64	Kisumu	65	Nandi	53	Kirinyaga	63
Wajir	52	Kwale	52	Bungoma	58	Trans Nzoia	55	Kajiado	56
Marsabit	54	West Pokot	48	Machakos	65	Kericho	62	Nyandarua	55
Garissa	57	Siaya	59	Lamu	64	Baringo	57	Nakuru	60
Tana River	53	Kakamega	58	Vihiga	57	Meru	64	Murang'a	56
Samburu	53	Tharaka Nithi	66	Kisii	61	Elgeyo Marakwet	57	Nairobi	74
Kilifi	54	Makueni	58	Embu	72	Uasin Gishu	65	Nyeri	63
Homa Bay	61	Isiolo	60	Taita Taveta	65	Laikipia	58	Kiambu	68
				Narok	51				
				Bomet	59				

There was no association between the per capita budget and the overall service utilization and coverage index or UHC index score. Also, the level of investment as measured by the health budget was not associated with the progress made during KHSSP. Finally, there was a positive correlation between health system inputs (facilities, beds, health workforce) and the size of the health budget allocation ( $r=0.6$ ), meaning counties with higher health system inputs received more health budget.

## 9.5 Quality of care

Quality of care is a core element of universal health coverage. The KHSSP quality of care indicators focus on client experiences with health care services, health care safety and effectively. The KHSSP has proposed five indicators for monitoring progress and performance of efforts with improving quality of health care, namely: TB cure rate, fevers tested for malaria, maternal death audits, malaria inpatient case fatality rate, and average length of stay.

- TB cure rate: the proportion of patients who completed treatment and were cured remained high in Kenya, indicating the good quality of care of TB patients. The results are discussed under Strategic Objective 1.
- Fevers tested for malaria: there was a significant change in the ratio confirmed and suspected malaria cases. This is indicative of a major shift in diagnostic practices for patients with fever in outpatient settings. In 2015 a crossover was achieved. For the first time in history more patients were confirmed malaria than suspected malaria cases. This is evidence of improved quality of care. The section under Strategic Objective 1 provides more details.
- Maternal death audits: in 2014 the tool for collecting data on maternal death audits was introduced. The percentage of maternal deaths audited in Kenya was 59.5% in 2015/16, which falls below the target of 70%.
- Malaria in-patient case fatality rate: case fatality rates remained at 11% in 2015/16, similar to preceding years. The number of malaria deaths however fell sharply between 2014/15 and 2015/16 (halved) which means that the number of admissions diagnosed with malaria also declined dramatically. This is most likely due to better diagnostic practices. This may conceal an actual improvement in the quality of care for malaria patients leading to a drop in case fatality. (see also the section on Strategic Objective 1).
- Average length of stay: 4.2 days for the medical wards in 2015/16, similar to 4.3 days for 2013/14. It is not clear how this indicator can be used to reflect the quality of care. It could be considered an efficiency measure.
- Institutional maternal mortality ratio: the national MMR went down from 130 to 118, 103 and 106 per 100,000 deliveries in health facilities during 2012/13 to 2015/16.

## 9.6 Other dimensions of inequality

This chapter focuses on the inequalities between the counties. The previous chapters examined the levels and trends in equity in the health indicators by sex, age, urban-rural residence and socioeconomic position. The household surveys are the main data sources for these data. Since the last comprehensive survey was in 2014, no recent trend data are available.

In spite of the dramatic progress in stunting rates among children under 5 years in all wealth quintiles, the large difference between the poorest and richest quintiles remained (Figure 61). Similarly there was considerable progress over time in the composite coverage index used by the Countdown to 2015 (includes coverage of family planning, maternal care, immunization and child treatment), especially in the KDHS 2014. The gap between the poorest and richest quintiles however reduced only marginally.

Figure 61: Stunting rates (%) in children under 5 years by wealth quintile, KDHS surveys 1993, 2003, 2008 and 2014

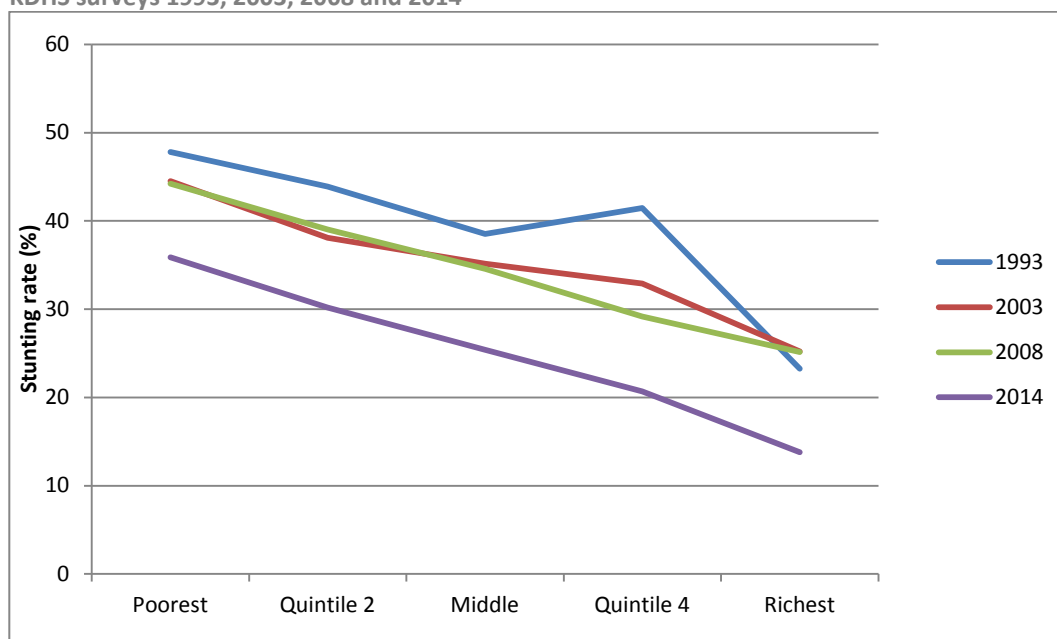
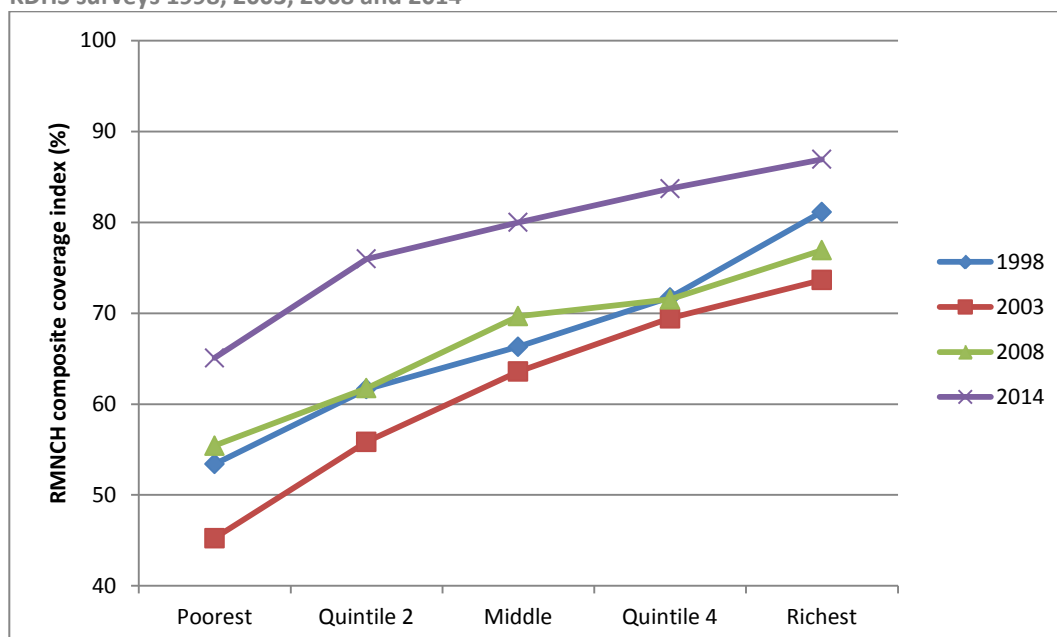


Figure 62: RMNCH composite coverage index (%) in children under 5 years by wealth quintile, KDHS surveys 1998, 2003, 2008 and 2014



## 9.7 In which counties do persons not receiving services live?

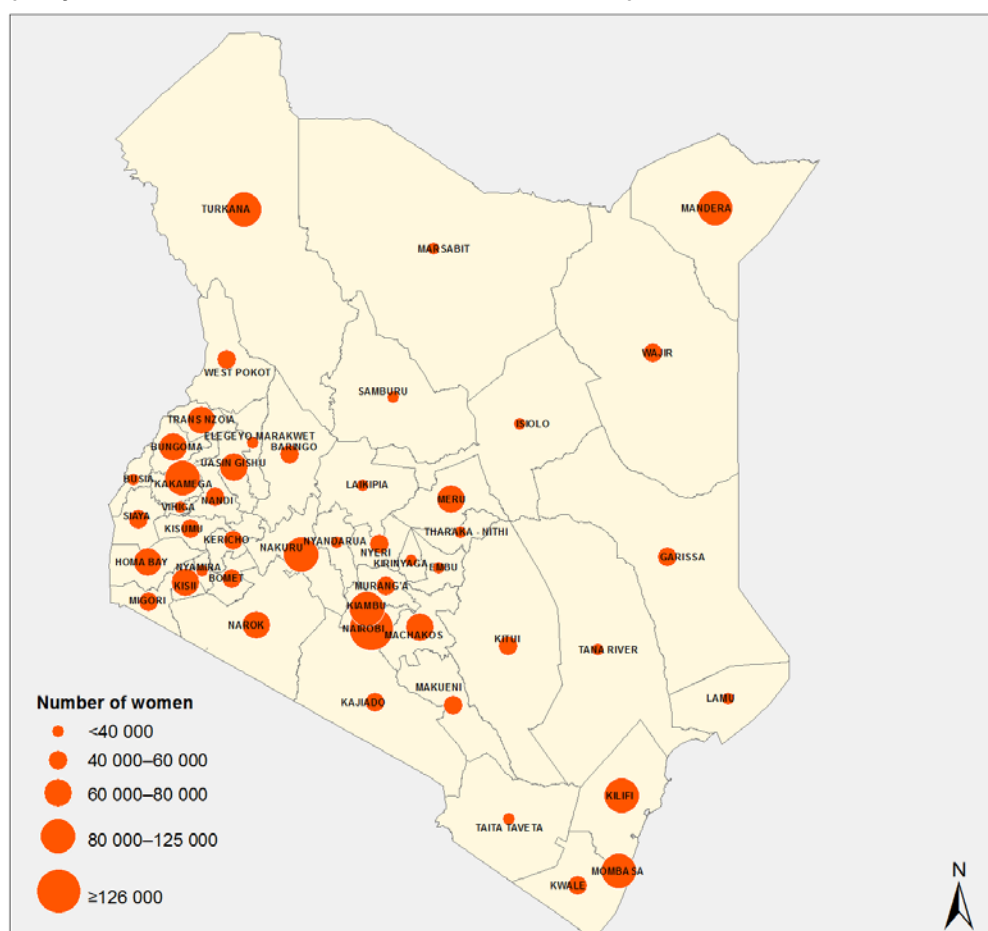
The report focused on the levels and trends in coverage of services in the counties, describing the proportion of persons who received the service among the target population, those who needed the service. Looking forward it is also useful to turn this around: where do the persons who do not receive the services live. This was determined not only by the coverage of the services but also by the size of the population in the counties. The average population size of a county in 2015/16 was just under 1 million. At the lower end two counties had populations below 250,000 (Isiolo and Lamu) and eight counties between 250,000 and 500,000 (Samburu, Tana River, Marsabit, Taita Taveta, Tharaka Nithii, Wajir, Elgeyo Marakwet, Laikipia). At the higher end, Nairobi is an outlier with a projected population of 4.3 million, and two counties had a population that exceeds 1.5 million (both about 1.8–1.9 million). Sixteen counties had populations between 1 and 1.5 million.

The following maps show the distribution of persons not receiving specific interventions and selected risk factors in 2015, showing the concentration of gaps in densely populated central Kenya for several indicators.

### Women in need of family planning 2015/16

Women not receiving family planning methods: 2.3 million. The counties that had the highest numbers of women with unmet need were distributed in all parts of Kenya, and the top 10 counties accounted for 52% of the total need in Kenya, led by Nairobi, Nakuru and Turkana (Figure 63).

**Figure 63: Number of women who need family planning but do not have access (unmet need) by county, 2015-16 (Kenya total: 2,258,295 women have unmet need for FP)**



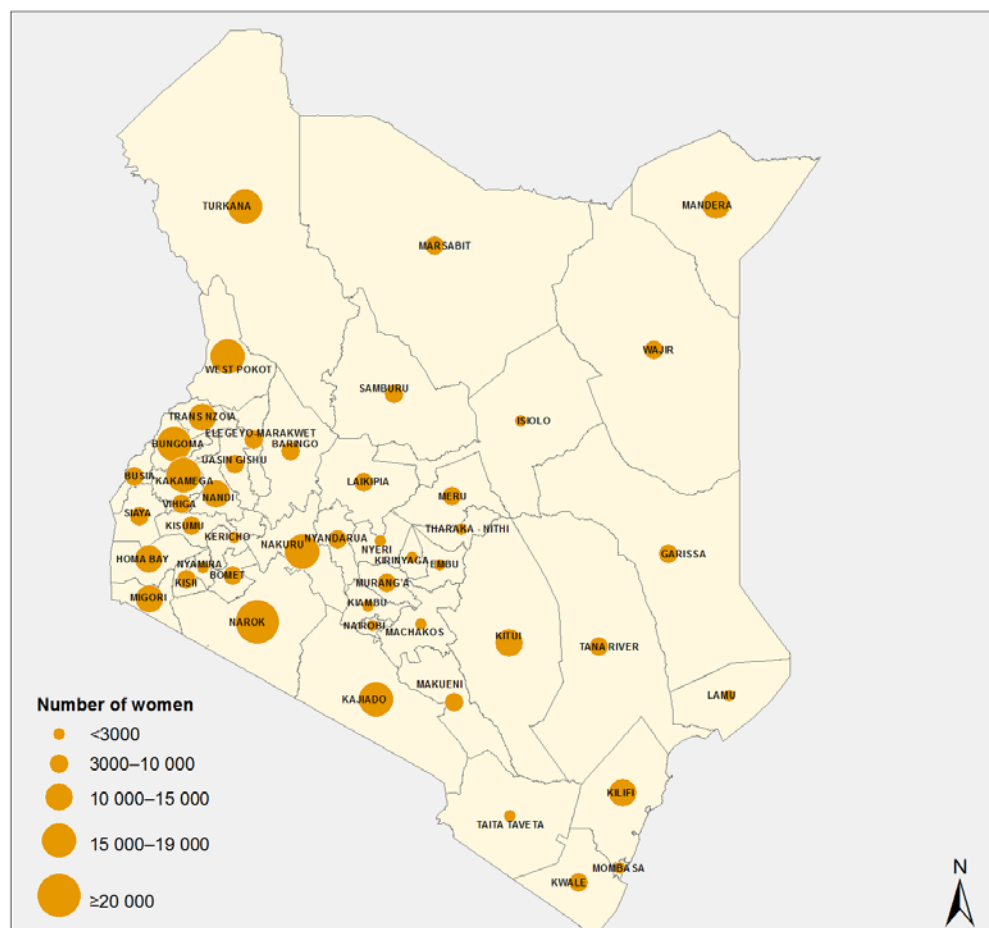
#### 10 counties with the highest numbers of women with unmet FP need (52% of total in Kenya)

Nairobi	328,617	Kilifi	89,709
Nakuru	125,993	Kakamega	88,004
Turkana	113,686	Mandera	87,868
Kiambu	101,172	Bungoma	78,236
Mombasa	96,788	Meru	76,966

## Women delivering at home 2015/16

Women delivering at home: an estimated 337,000 women delivered at home in 2015/16. The counties with the largest numbers were in the northwestern and western parts of Kenya, and the top 10 counties accounted for 49% of the total need. The top 3 counties were Narok, Turkana and Bungoma (Figure 64).

**Figure 64: Number of women who delivered at home by county, 2015-16**  
(Kenya total: 354,628 women delivered at home)



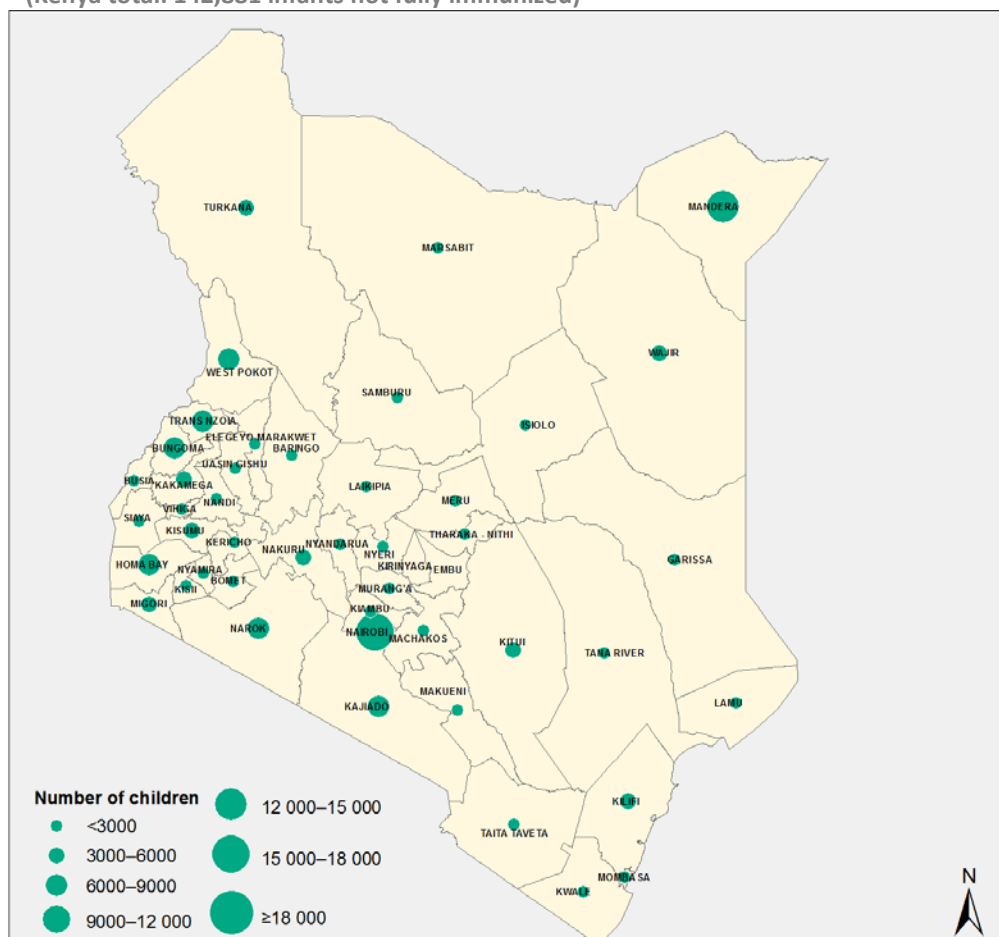
### 10 counties with the highest numbers of home deliveries (49% of total in Kenya)

Narok	27,922	West Pokot	17,411
Turkana	19,633	Nakuru	16,185
Bungoma	18,502	Trans Nzoia	13,823
Kakamega	18,134	Migori	11,565
Kajiado	17,748	Homa Bay	11,212

## Children not receiving Penta3 during infancy 2015/16

The KHSSP indicator infants not fully immunized was not used because of possible overreporting in DHIS. For three disease of pentavalent vaccination an estimated 145,000 infants were not immunized in 2015/16. Counties that had the largest numbers of not fully immunized children were located in central, Rift and western Kenya. The top 10 counties accounted for 59% of not receiving Penta3 and the top 3 were Nairobi, Mandera and West Pokot (Figure 65).

**Figure 65: Number of infants who not receiving Penta3 vaccination during infancy in 2015/16 (Kenya total: 142,881 infants not fully immunized)**



### 10 counties with the highest numbers of infants not fully immunized (59% of total Kenya)

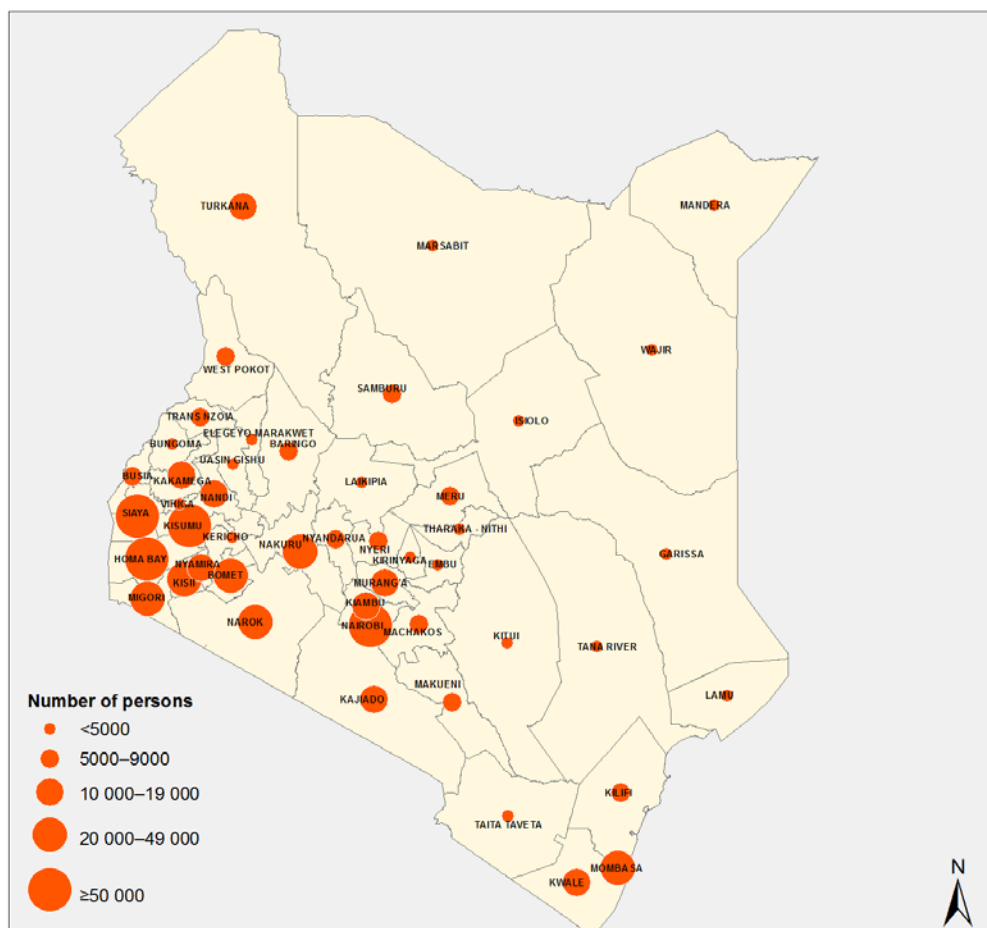
Nairobi	17,003	Homa Bay	6,886
Mandera	12,146	Trans Nzoia	6,643
West Pokot	8,681	Bungoma	6,459
		Kilifi	5,960
Narok	7,465	Nakuru	5,796
Kajiado	7,123		



## Persons of all ages living with HIV, who are not on ART, 2016

Persons living with HIV not on ART: an estimated 685,000 persons, all ages, live with HIV but are not on ART. The greatest need was located in the counties around Lake Victoria. The top 10 counties accounted for 63% of total unmet need and the top 5 were Homa Bay, Siaya, Nairobi, Kisumu and Migori (Figure 66).

**Figure 66: Number of persons all ages who live with HIV but are not on ART in 2016**  
(Kenya total: 685,000 persons who are living with HIV but are not on ART)



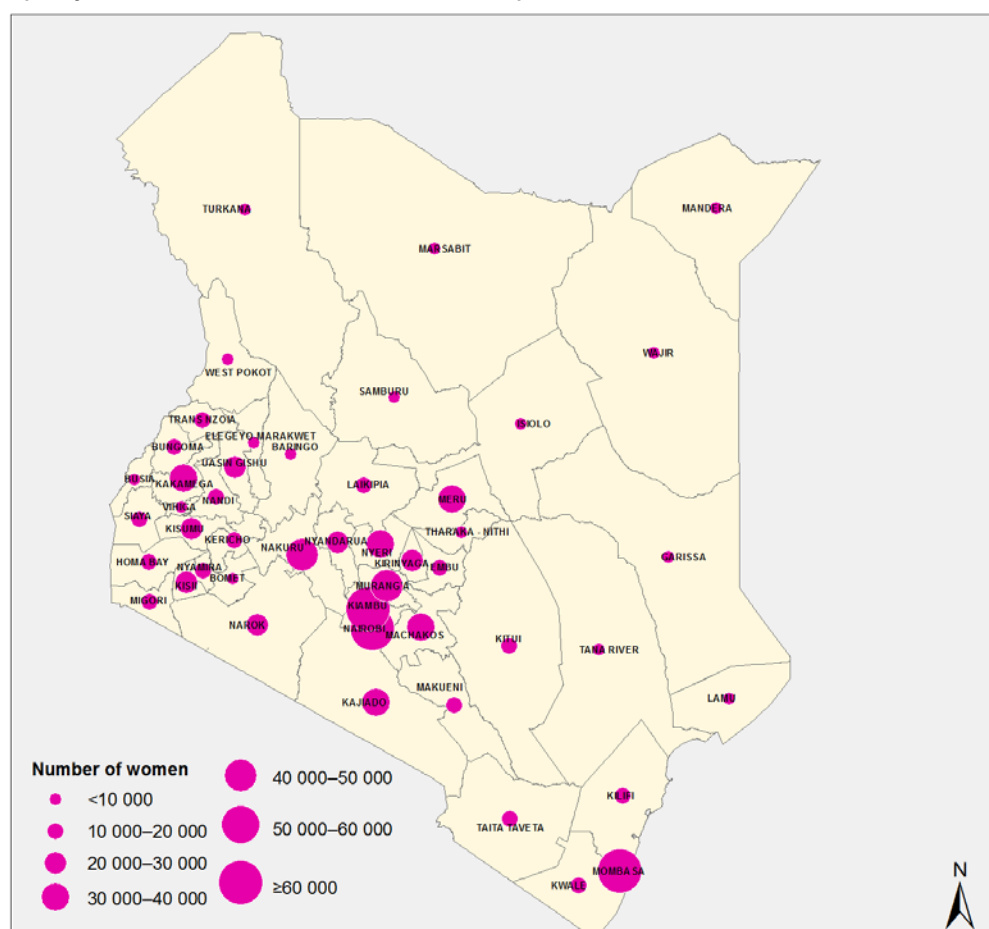
### 10 counties with the highest numbers of persons living with HIV but not on ART, all ages (63% of total in Kenya)

Homa Bay	90,275	Nakuru	32,975
Siaya	67,604	Kisii	25,989
Nairobi	61,006	Mombasa	22,816
Kisumu	53,960	Narok	21,504
Migori	35,711	Bomet	20,972

## Women 15–49 years who are obese

Women who are obese: nearly 1 million women 15–49 years were obese in 2015. Obese women were concentrated in central Kenya and urban counties. Two-thirds of all obese women lived in 10 counties and the top 3 were Nairobi, Kiambu and Mombasa (Figure 67).

**Figure 67: Number of women 15–49 years who are obese in 2015**  
(Kenya total: 992,417 women who are obese)



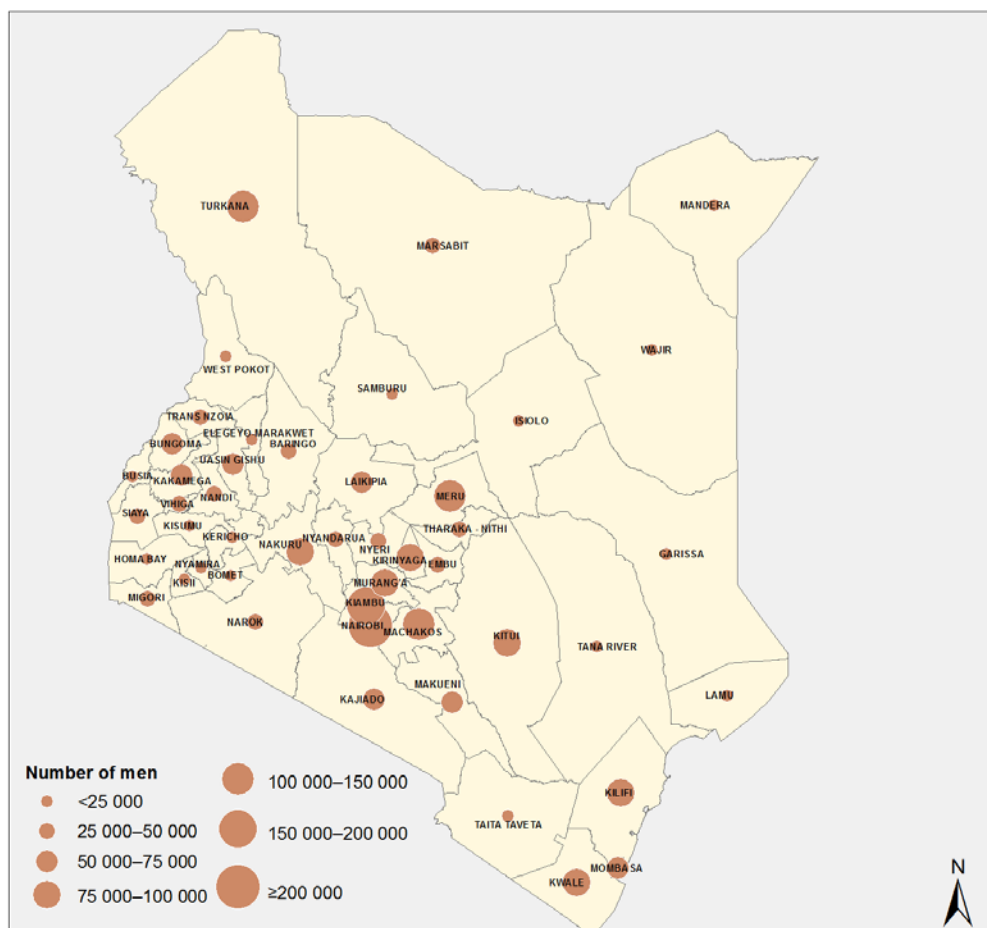
### 10 counties with the highest numbers of obese women 15–49 years (66% of total in Kenya)

Nairobi	216,745	Meru	39,489
Kiambu	101,365	Kajiado	38,278
Mombasa	71,728	Nyeri	32,635
Nakuru	48,117	Kakamega	32,507
Murang'a	46,615	Machakos	32,184

## Men 18–69 years who use tobacco

Men who are current users of tobacco: 2.1 million men 18–69 years were using tobacco in 2015, and its use was concentrated in the central parts of Kenya. The top ten counties accounted for 60% of all users, and Nairobi, Kiambu and Machakos had the highest numbers of tobacco users (Figure 68).

**Figure 68: Number of men 18–69 years who are using tobacco in 2015**  
(Kenya total: 2,110,861 men using tobacco)



### 10 counties with the highest numbers of men using tobacco (60% of total in Kenya)

Nairobi	327,182	Murang'a	96,018
Kiambu	152,036	Kilifi	89,603
Machakos	142,576	Kirinyaga	89,492
Meru	101,613	Nakuru	89,478
Turkana	100,832	Kitui	82,491



# Annex A: Quality assessment and adjustment of DHIS data and population denominators for county maternal and child health indicators

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## A summary of the methods used

The assessment and adjustment procedure for MCH coverage estimates is summarized in Table A.1. The aim is to adjust the numerators for incomplete reporting and the denominators for inaccuracies in standard projections of the last census.

First, the most recent survey-based data should be considered. The Kenya DHS 2014 provides an indication of the levels of coverage for key indicators by county. This provides a good external validation test for the coverage estimates generated from the facility reports, with projected denominators. The survey data can also be used to assess if there are indicators with near universal coverage. The KDHS 2014 shows that coverage levels of the first antenatal visit (ANC1) among births in the five years preceding the survey and the first dose of pentavalent vaccination (Penta1) among children 12–23 months are almost universal (95.5% and 97.5% respectively) and over 90% in nearly all counties. The previous national survey (KDHS 2008–2009) also shows near universal coverage. In Kenya, ANC1 coverage in the previous KDHS was 91.5%. This indicates that there is coverage levels have been high and near universal for a long time. Sampling errors at county levels are substantial and need to be considered when using the survey results, especially for Penta1 as this refers to a smaller population than ANC1.

The second step focuses on the numerator of the coverage indicators and involves adjustment for incomplete reporting. In 2015/16 national reporting rates for ANC1 and penta1 were high (96% and 95% respectively) and both were over 90% in the majority of counties. There was a modest increase in reporting rates (from 91% and 89% in 2012/13) which was more pronounced in some counties which can have an impact on the trends assessment. For deliveries in institutions RR was also very high.

No matter how the reporting completeness is used in the coverage computations, there is an underlying assumption about the extent to which the non-reporting facilities are providing services. In other words, the adjustment applied depends on assumptions about the number of service outputs (pregnancy care, vaccinations, etc.) provided at non-reporting facilities compared to those that reported. The adjustment can be expressed as follows:

$p(\text{adjusted}) = p + p(1/(c)-1)*k$ , where  $p$ =number of service outputs,  $c$ =reporting completeness,  $k$ =adjustment factor.

If no adjustment is made for incomplete reporting the missing reports are considered an indication that no services were provided during the reporting period ( $k=0$ ). It may however also be that services were provided, but not at the same level as in prior reporting periods, in which case the apparent incomplete reporting is rather an indication of a lower level of service provision ( $k$  is between 0 and 1). In other cases, it may be assumed that services were provided at the same rate in non-reporting facilities as in reporting facilities.

To select the most likely value of  $k$ , the national coverage is computed from the facility data for different values of  $k$  and compared with survey data at the national level. The value of  $k$  that approximates the national survey statistics was selected: 0.6 of  $k$  was selected for Penta1 and ANC1 and 1.0 for deliveries. The higher value for deliveries was chosen because it is likely that more larger private facilities are among the non-reporting facilities than among the

reporting facilities, offsetting the downward effect of the association between poorer reporting and lower delivery rates in other facilities. No county specific values of  $k$  were selected. Because reporting rates are high, the impact on the coverage estimates is modest, especially at lower values of  $k$ .

In the third step, the accuracy of the census projection is tested and, if problems are identified, an alternative denominator is computed from the health facility data. Based on the reporting-adjusted numbers of vaccinations in health facilities (step 2) and the official projections of the population under 1 year of age national and county penta1 coverage are computed. National Penta1 coverage rates ranges from 91–97% in the last 3 years which is close to the KDHS 2014, but county coverage rates indicate that there are major denominator issues at the county level. Counties with denominators that are too low: 6 counties –all in the northern part of Kenya– have coverage estimates exceeding 120%, while 11 counties have unlikely low penta1 coverage rates (below 80%). This may be true but is more likely a problem of overestimation of the target population.

Given the challenges with the accuracy of the census projections at the county level, the consistent picture of facility reports on Penta1 vaccinations, supported by consistent reporting of ANC1 visits, and the near universal coverage of Penta1 according to household survey data, the number of children with penta1 vaccinations are used as the denominator or target population of infants. The adjusted number of Penta1 vaccinations is used, with an increase of 3-10% to account for truly non-immunized children in all counties for each year, as computed in step 5. The only exception is Mandera county where the household surveys indicated a lower coverage (increased by 25%).

The slight relative decrease in the number of infants receiving Penta1 was taken into account in estimating the number of infants eligible for vaccination. This results in 1.45 million children under 1 year in 2015/16. The other target populations are derived from the number of infants with Penta1. For live births: increase the number of infants obtained from penta1 by 2% to add neonatal deaths; for deliveries: decrease the number of births by 1.5% to reduce for multiple births and add 2% for stillbirths which implies adding 0.5% to births; pregnancies: add 3% to deliveries to account for early fetal loss (late fetal loss or stillbirths are already accounted for). Early fetal loss is considerably higher than 3% but because most women do not visit ANC early in pregnancy, these are not included in the computations of the coverage rates.

**Table A.1: Summary of the method to compute MCH statistics with results for Kenya**

Step	Method	Result for Kenya
1	Obtain and review data from different sources	
1a	Check availability of recent survey data to obtain statistics for selected coverage indicators needed for the quality assessment and adjustment of health facility data	KDHS 2014 provides statistics on coverage of MCH indicators by county; focus on first antenatal visit (ANC1), first dose of pentavalent vaccine (Penta1) and delivery coverage; ANC1 and Penta1 coverage rates over 95% almost everywhere; delivery coverage 61%
1b	Obtain official population projections	KNBS provides projections for population under 1 by county
1c	Obtain health facility reports on services provided	Four years of data by county for key MCH indicators, including ANC1, Penta1 and institutional delivery rates
2	Assess health facility data quality (numerators)	
2a	Check completeness of facility reporting; adjust for non-reporting making assumptions about performance of non-reporting facilities, using adjustment factor based on comparison with survey data	Good reporting rates during 2012/13–2015/16, but increasing over time which may affect trends; adjustment factor of 0.6 is selected for non-reporting facilities for ANC1 and Penta1 and 1.0 for institutional deliveries
2b	Check annual consistency of coverage of interventions over time, by county, for key indicators	Good consistency over time for ANC1 and penta1, penta1 slightly higher than ANC1, suggesting more complete reporting
3	Compute target populations (denominators)	
3a	Compute Penta1 coverage with census projection-based denominator to assess level and identify outliers	National coverage 90-95 % (2012/13-15/16), but 6 northern counties have consistently over 120% penta1 coverage, 12 counties have unlikely low coverage (<80%)
3b	Revise the target population for infants based on reported penta1 numbers; smoothen the time trend using estimated growth rate; compute new targets for deliveries and pregnancies	Penta1 numbers from facilities used as target population, adding 2.5% for non-coverage of penta1; growth in number of births of 3% per year used to obtain time trend
4	Compute coverage rates with adjusted numerators and improved denominators	
4a	Compute Penta3, measles and full immunization coverage for infants, check national and county rates	Improved consistency and spread of the coverage rates by county; national level slightly lower than the 2014 KDHS
4b	Compute ANC1, ANC4, delivery, and other MCH indicators with the new denominators	Improved consistency and spread of the coverage rates by county; national levels close to 2014 KDHS










# Annex B: County health statistics profiles

## Explanatory note

### Panel: General statistics, health service inputs, health status, NCD risk factors

The different data sources for each indicator are provided in the county profiles. For each indicator, if relevant, the rank of the county among all 47 counties is shown. Rank number 1 is the best result. The colour codes refer to the ranks as follows:

	Top	Rank 1–9
	Better than average	Rank 10–18
	Average	Rank 19–29
	Worse than average	Rank 30–38
	Bottom	Rank 39–47

For these indicators there are generally no data available to assess trends during the first half of KHSSP 2014–2018. Therefore, only the most recent data on the levels in each county are presented.

General statistics	
Population, total 2015/16	Obtained from the KNBS projections; computed for all ages, Jan 1 2016 (the middle of the fiscal year)
Births 2015/16	Estimated number of births based on service data (3 <sup>rd</sup> pentavalent vaccine and first antenatal visit), 2015/16 (see Annex A of the full report)
Total Fertility Rate	Number of children per woman based on the fertility rates in the three years preceding the KDHS 2014, source: KDHS 2014.
Female education	Median number of years of education among women 15–49 years, KDHS 2014
Health service inputs	
Facilities	Number of health facilities, any type, public or private, per 10,000 population 2015/16, DHIS-2 based on SARAM and county reports
Facilities that are private for profit	Percentage of health facilities that are private according to the SARAM census of facilities conducted in 2013
Hospital beds	Number of hospital beds including cots and maternity beds per 10,000 population 2015/16, DHIS-2
Core health professionals	Number of physicians, clinical officers and nurses (registered and enrolled) per 10,000 population 2015/16; the current rate is an estimate based on the SARAM 2013 and the reports by counties which are variable in terms of capturing the private sector. Because underreporting is an issue, the highest number of the two sources was selected. For Nairobi, there appears to be underreporting of nurses and an adjustment was made to bring the Nairobi numbers closer to the national figures (see Report)
County health budget	Per capita budget allocation for health in 2014/15 and 2015/16
Health status	
Under 5 mortality	Based on the census mortality report (2012) which provides county level estimates of under 5 mortality per 1,000 live births (KDHS only provides provincial estimates)
Maternal mortality	Also based on census 2009
Life expectancy	Average number of years a person can expect to live, based on the mortality rates derived from the census 2009, men and women
HIV prevalence	15 years and over: percentage of persons aged 15 years and older who are living with HIV, based on MOH estimates Antenatal women: percentage of pregnant women attending antenatal clinics who were HIV positive, DHIS-2, 2015/2016

TB notifications	Number of TB cases notified by the health clinics per 100,000 population, obtained from the electronic individual record registers (TIBU)
Malaria parasite rate	Percentage of children 2–10 years with positive malaria test, based on malaria indicator survey 2015
Stunting, wasting, underweight	Percentage of children 0–59 months who are stunted (height for age below minus 2 standard deviations of the median), wasted (weight for height below minus 2 standard deviations of the median) or underweight (weight for age below minus 2 standard deviations of the median), KDHS 2014
NCD risk factors	
Overweight or obese	Percentage of women 15–49 years who had a BMI of 25 or higher, based on KDHS 2014 and STEPS 2015
Obesity	Percentage of women 15–49 years who had a BMI of 30 or higher, based on KDHS 2014 and STEPS 2015
Overweight or obese	Percentage of men 18–69 years who had a BMI of 25 or higher, based on STEPS 2015
Obesity	Percentage of men 18–69 years who had a BMI of 30 or higher, based on STEPS 2015
Tobacco use	Percentage of men 18–69 years who are currently using tobacco products, STEPS 2015
Raised blood glucose	Percentage of men and women 18–69 years, combined, who had raised fasting blood glucose (defined as $\geq 7$ mmol/l) or was currently on treatment for diabetes, STEPS 2015
Raised blood pressure	Percentage of men and women 18–69 years, combined, who had a raised blood pressure (systole $> 140$ mm Hg or diastole $> 90$ mm Hg) or was already on treatment for hypertension, STEPS 2015
Cervical cancer screening	Percentage of women 30–49 years who had ever had a cervical cancer screening test, STEPS 2015

### Panel: Leading diagnoses in OPD

The DHIS data for 2015/16 were used to obtain an idea of the leading diagnoses in outpatient departments (OPD). The figures use broad groupings of diagnoses. For malaria, the bar also stacked into two parts: the first part refers to suspected cases, the second to confirmed cases. For children under 5, the bar is also stacked to showing respiratory infections and or with pneumonia.

The inpatient data reporting on diagnoses at discharge and causes of death in hospitals were not available for all counties as reporting rates are still inadequate.

**Panel: Indexes ranked**

Eight indexes were computed (for details see main report). For each index the ranking of the county is shown with a star, the other counties in the same Region are shown by a square and all remaining counties are represented as a circle. The following indexes are included:






- Health system inputs: based on the density of health facilities, hospital beds and core health professionals. Counties at the top of the rankings have higher levels of access to services than those at the bottom.
- Health system outputs: based on utilization of outpatient services and inpatient services (admissions). Counties at the top of the rankings have the highest levels of service utilization. It is expected that if a county has a high level health system input, it will also have a high rank on the health system outputs, but there will be exceptions based on population distribution and other factors.
- NCD risks: based on the prevalence of overweight or obesity, tobacco use, raised blood pressure and raised blood glucose, all obtained from STEPS 2015 and KDHS 2014. Counties high on the list have lower NCD risks than counties low on the list.
- UHC index: based on the coverage of services in the areas of RMNCH, communicable disease control and NCDs, as well as health system capacity. The counties high on the list have the highest levels of UHC.
- RMNCH level index: based on the RMNCH index for 2015/16, which includes family planning, maternity care and immunization coverage. The counties highest on the list have the highest levels of RMNCH coverage in 2015/16.
- RMNCH index progress in KHSSP: this compares the situation in 2015/16 with the baseline which is defined as the RMNCH index in 2012/14. The counties at the top have made the most relative progress which was measured by the odds ratio to take account of the different starting levels.
- Communicable diseases control level index: based on the communicable diseases control index for 2015/16, which includes coverage of interventions against HIV (ART, PMTCT), TB (treatment coverage) and malaria (LLITN use in the population and treatment of children with fever). The counties highest on the list have the highest levels of the index in 2015/16.
- Communicable diseases control index progress in KHSSP: this compares the situation in 2015/16 with the baseline which is defined as the communicable diseases control index in 2012/14. The counties at the top have made the most relative progress which was measured by the odds ratio to take account of the different starting levels.

**Panel: General, RMNCH and communicable diseases**

The DHIS-2 provided data for each financial year in the period 2012-16, with June 2016 as the last month. For each county the values are given for the individual years and compared with Kenya as a whole. The KDHS 2014 value is also shown in the first column if available.

The county rank column present the ranking of the county for the value of the indicator in 2015/16. The colour coding is explained above.

For the progress column the difference between 2015/16 and the baseline (2012-14) was compared and the following colour coding was used:

	Strong progress	Increased by at least 20% of baseline value
	Some progress	Increased between 5–19% of baseline value
	No progress	Value is within plus or minus 5% of baseline value
	Some decline/deterioration	Decreased between 5–19% of baseline value
	Large decline/deterioration	Decreased by at least 20% compared to baseline value.

The indicators are defined as follows:

General statistics	
DHIS reporting index	Completeness of reporting by facilities, compiled by the Ministry of Health, as an average of all key reporting forms in DHIS-2.
Inpatient discharges	Based on DHIS-2 reports, refers to the number of discharges per 100 population. Admission rates will be slightly higher as these also include deaths in the facilities. Population figures are obtained from KNBS projections.
Outpatient visits	Based on DHIS-2 reports, refers to the number of OPD visits per person per year. Population figures are obtained from KNBS projections.
Reproductive, maternal, newborn and child health	
Contraceptive use	Based on DHIS-2 and KDHS 2014 data. The number of women using modern contraceptives among married women 15–49 years was computed from couple years of protection data in the DHIS-2 (for details see main report).
Antenatal care	Based on DHIS-2 data, with adjusted denominators. Percentage of pregnant women who made at least 4 or more antenatal visits in each financial year.
Delivery care	Based on DHIS-2, the percentage of women who delivered in a health facility among all deliveries, using the DHIS-2 derived adjusted denominators (see main report Annex A).
Caesarean section	Based on DHIS-2, the percentage of all deliveries that were caesarean sections. The progress 2012/14-2015/16 was only completed if the rates were below 15%. Above 15% it is difficult to judge if increases in caesarean section rates represent progress or simply a preference for this mode of delivery.
Maternal mortality	Based on DHIS-2, the number of maternal deaths in health institutions per 100,000 deliveries in those institutions. This is not the same as the population maternal mortality ratio which also includes deaths and deliveries in the communities. Note that the progress indicator now refers to the amount of reduction. The higher the reduction in maternal mortality, the higher the county appears in the rankings.
Fresh stillbirths	Based on DHIS-2, the number of fresh stillbirths (as opposed to macerated) per 1,000 births in health facilities.
Low birth weight	Based on DHIS-2, the number of births with a birth weight less than 25,000 grams among all births in health facilities.
Immunization	Based on DHIS-2, three indicators are presented: 3 <sup>rd</sup> dose of pentavalent vaccination, measles and full immunization coverage. All are based on the reports of number of infants who received the respective vaccinations out of all infants in the population.
Vitamin A supplements	Based on KDHS 2014, the number of children 6–59 months who received a dose of vitamin A during the last 6 months.

Communicable diseases	
ART treatment	Based on DHIS-2 and Ministry of Health data, the number of persons on ART (under 15 years and 15 and older) among all persons living with HIV. The estimates of the denominator by county were done based on the HIV prevalence data by county. The numerators were obtained from the MOH database as there were some differences with DHIS-2.
PMTCT	Based on DHIS-2 and MOH data, the number of HIV positive women who delivered and received ART treatment of prophylaxis to prevent HIV transmission to the child.
HIV testing and counselling	Based on DHIS-2, the number of persons who were tested and counselled among all persons 15 and over in the financial year. For some counties the ratio exceeds 100, implying that people were tested more than once during the year.
TB notifications	Number of TB cases notified by the health clinics per 100,000 population, obtained from the electronic individual record registers (DHIS-2 TIBU).
TB treatment	Based on DHIS-2 (TIBU), the number of persons who completed treatment among those who initiated TB treatment.
LLITN use	Based on county analysis by MOH using the malaria indicator surveys in 2010 and 2015: percentage of population (or pregnant women) who slept under a LLITN among the whole population (all pregnant women).
IPT 2	Based on county analysis by MOH using the malaria indicator surveys in 2010 and 2015, percentage of pregnant women who received at least two doses of intermittent preventive therapy against malaria among all pregnant women.
Fever treatment	Based on county analysis by MOH using the malaria indicator and KDHS surveys: percentage of children with fever who were taken to a health provider.

A caveat is that all numbers are subject to annual fluctuations, and potential inaccuracies in the numerator and denominators. The analysis was done carefully to obtain the best possible statistics for all indicators. For some indicators the values exceed 100%. This may occur because of inaccuracies in the denominator or because there was an increase in service use from neighbouring counties or countries. For progress calculations, baselines exceeding 100% were treated at the maximum coverage level of 100%.