

ANALYTICAL REPORT
TO INFORM THE TANZANIA HEALTH SECTOR STRATEGIC PLAN
2015/2016 – 2019/2020
(HSSP IV)

Draft
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**Ministry of Health, Gender, Community Development, Elderly and
Children**

in collaboration with a consultants' team from

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Countdown to 2030 for Women's, Children's and Adolescents' Health

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1. EXECUTIVE SUMMARY

This report presents a statistical review of progress and performance of the health sector during 2015-2018 in comparison to the targets of the health sector strategic plan 2015/16-2019/20 (HSSP IV), with special attention of progress in reproductive, maternal, newborn, child and adolescent health (One Plan II). The analysis focuses on the 59 indicators and national targets of HSSP IV, including 20 indicators on RMNCAH, as well as regional progress analyses.

The findings are based on an extensive analysis of health facility data (DHIS2), surveys and administrative data. The most recent TDHS was conducted in 2015/16 and mostly provides data on levels and trends preceding HSSP IV, but the 2017 survey on malaria (TMIS) provides data on several indicators during HSSP IV. Most importantly, the progress assessment is based on DHIS2 data 2015-2018, with much attention for data quality, and updated program and health system data, where available.

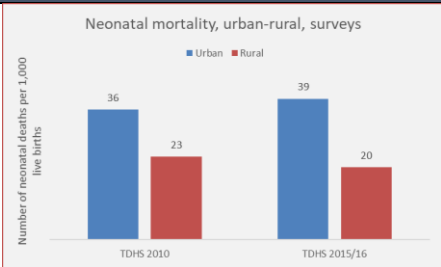
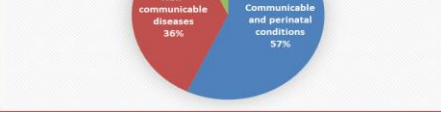
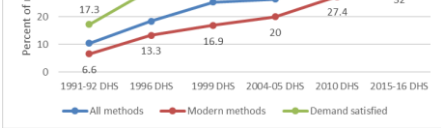
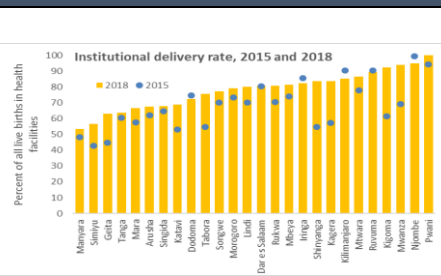
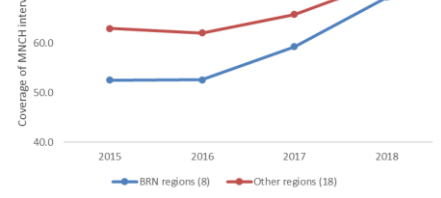
Reporting completeness of DHIS2 was over 95% and data consistency was generally good. The data quality was considered adequate for the ascertainment of trends at national and subnational levels during 2015-2018. NBS population projections were used to assess coverage trends at the Tanzania mainland level, while subnational indicators were also based on health-facility data derived target populations to improve the assessment of coverage statistics.

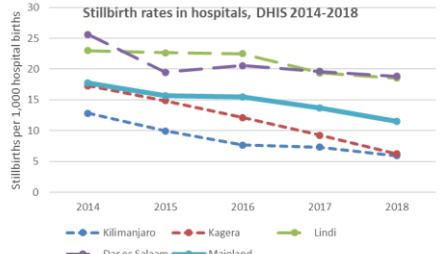
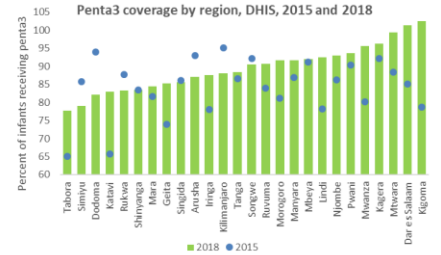
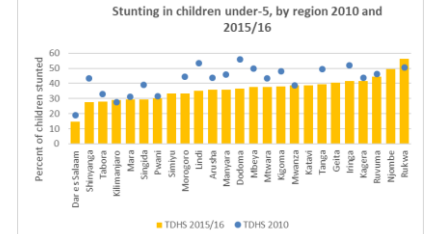
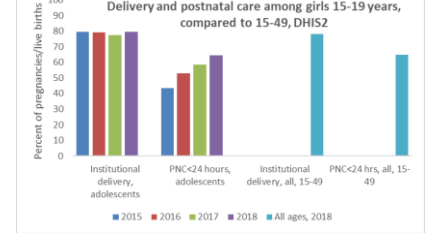
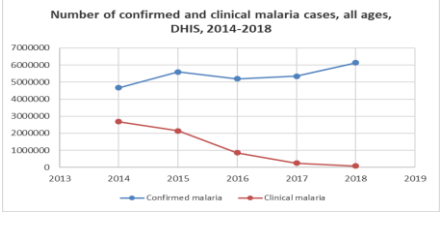
Overall progress

HSSP IV is the first national health strategic plan in the Sustainable Development Goals era 2016-2030. During the preceding decade, Tanzania made major progress in reducing newborn and child mortality, childhood malnutrition and in the battle against major communicable diseases including HIV, TB and malaria. This statistical assessment of progress during 2015-2018 shows many positive developments in terms of expanding program coverage for family planning with modern methods, antenatal, delivery and postnatal care, PMTCT and HIV treatment. The improvements occurred in almost every region and were particularly strong in most but not all BRN focus regions. Also, the quality of care appears to have improved considerably according to the star rating assessment in all regions.

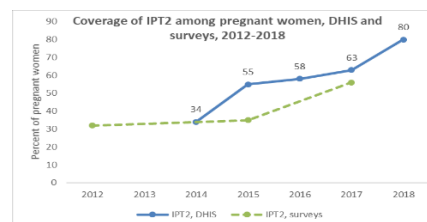
Yet, many of the HSSP IV targets will not be met unless dramatic acceleration of efforts will take place during 2019 and 2020. Neonatal and child mortality need to decline faster than in the previous decade to reach the HSSP IV and SDG targets. In particular, urban children need greater attention. Adolescent childbearing remains persistently high and a source of concern, even though maternal and newborn health care coverage is the same for adolescent and older mothers. Fertility and unmet need for family planning are still high in spite of positive trends. Several indicators suggest that maternal and newborn care in health facilities can be improved greatly, and in general the quality of care should continue to be a priority. The coverage of malaria and TB interventions needs to increase to make a greater impact on disease control. Access to improved drinking water source and sanitary facilities is improving but still far from targets, especially in the rural population. The health system strength has only improved piecemeal during HSSP IV, most prominently access to essential medicines and health information systems. Major gaps in health workforce in almost all regions, and service access in some regions, need to be addressed, against a backdrop of a declining budget for health which is a source of concern.

There is some evidence of the increasing burden of non-communicable diseases, an inevitable trend as the battle against infectious diseases is successful and risk factors for NCDs are on the rise, but this will require further data and analysis in preparation of the HSSP V. For almost all indicators there are persistent inequalities between urban and rural populations, the poorest and richest households and between regions, and there is only limited evidence of reductions. Appropriate targeting of councils and regions, as well as the poorest populations, based on reliable data is needed to reduce inequalities and make major progress towards universal health care.

MORTALITY	
No new data on mortality were collected during HSSP IV, but to achieve the SDG targets for neonatal and child mortality acceleration of the decline observed pre-2015 will be required.	
Inequalities in mortality between the poorest and richest children were decreasing during 2005-2016, and, uncharacteristically, urban children had no survival advantage over rural children. Urban neonatal mortality rates were high, especially in Dar es Salaam.	
By 2015/16 under-5 mortality in the three highest mortality regions was more than twice as high as in the three lowest mortality regions (107 and 47/1,000 live births respectively), but the gap was reduced since TDHS 2010.	
Communicable diseases continued to be the leading causes of death in hospitals (about 6 in 10 deaths), but NCD were gradually becoming more prominent, accounting for more than one-third of hospitals deaths in 2018. Only one in 10 deaths took place in hospitals.	
FERTILITY AND FAMILY PLANNING	
Fertility in Tanzania declined from 5.2 to 4.9 children per woman according to TMIS 2017, surpassing the target of 5.0 for 2020.	
Modern contraceptive use continued to increase during HSSP IV, as measured by couple years of protection, even though there is still considerable unmet need. Implants became the most popular method, overtaking hormonal injections.	
MATERNAL AND NEWBORN CARE	
During 2015-2018 there were major increases in the coverage of antenatal, delivery and postnatal care: ANC four or more visits increased from 37% to 59%, institutional delivery care from 66% to 78% and postnatal visit within 2 days after delivery from 42% to 68%. The increases occurred in all regions.	
The increases were most pronounced during 2017 and 2018 and were stronger in the BRN regions than elsewhere. Monthly DHIS data suggest that the increase started early 2017, even before the introduction of new decentralized financing schemes.	
There are few good indicators of quality of care, but the DHIS2 data showed 2018 improvements in coverage of anemia testing (61% of pregnant women), syphilis testing (61%), IPT2 coverage (80%), deworming with mebendazole (88%), HIV testing (99%) and C-section rates. Several other indicators suggest however that the quality of care did not improve across the board, such as treatment for syphilis and neonatal care (kangaroo mother care, neonatal resuscitation).	
DHIS2 indicate that stillbirth rates, including fresh or intra-partum stillbirth rates (from 6.4 to 5.0 per 1,000 health facility	

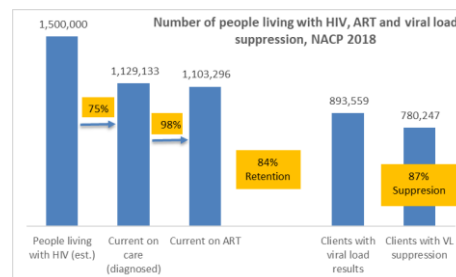
births), and low birthweight rates (from 5.5% to 5.0% among health facility live births declined during 2015-18. No new data were available on maternal mortality from surveys, and no reliable estimate of maternal mortality based on health facility data could be obtained from DHIS2 or program data, as completeness of reporting was poor.	
CHILD IMMUNIZATION Immunization coverage levels among infants remained high with 9 out of 10 children receiving the recommended vaccines. Three-quarters of the regions had an increase in penta3 coverage during HSSSP IV, but there were still 8 regions with penta3 coverage below 85%. Five regions accounted for 50% of all infants not receiving penta3.	
CHILD NUTRITION - No new data were collected for child treatment indicators or child nutrition. Until 2015/16 there was a significant decline in stunting in children under 5 years and breastfeeding practices were improving. - Inequalities in child stunting between regions were large, with Dar es Salaam (14.5%) and Rukwa (over 50%).	
ADOLESCENTS - Childbearing before age 20 remained common (21% of girls 15-19). - Coverage of antenatal, delivery and postnatal care for adolescent girls 15-19 years is the same or slightly higher than among older women. - Sexual and marital behaviours, as well childbearing in adolescence did not change much in the period 2005-2015, but no data are available beyond 2015.	
REPRODUCTIVE CANCERS - Coverage of cervical cancer screen and treat programs remained low in spite of a small increase in the numbers of women screened: by 2018 an estimated 5.3% of women 30 years and older were screened (or about 21% coverage if the screening interval is 5 years) and 54% of positives received treatment. - HPV vaccination for young girls was not an indicator in One Plan II.	
MALARIA - Survey and facility data indicate a significant decline in malaria incidence, prevalence and mortality which started well before HSSP IV. The 2020 target of parasite prevalence among children (<1%) however is still far off (7% in 2017). - Malaria diagnostic practices in health facilities improved greatly and 99% of reported cases are now lab-confirmed and no longer based on clinical assessment only. More children with fever were tested for malaria (43%).	

- Use of insecticide treated nets (ITN) use declined to just over 50% under-fives and pregnant mothers and remained far from the 80% targets. IPT2 among pregnant increased, reaching the 80% target.



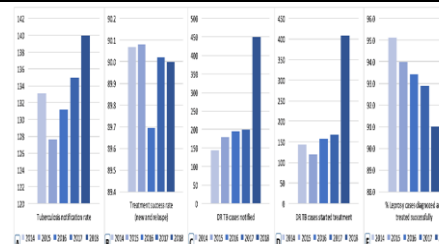
HIV

- HIV prevalence is gradually declining among young people, suggesting reduced HIV incidence, but young women 15-24 years still have a considerably higher prevalence than young men (2.4% and 0.6% respectively).
- A major increase in access, clients accessing HIV care and number of people on ART. ART coverage increased in all regions and was estimated at 75% among all people living with HIV (47% among children) in 2018.
- By 2018, PMTCT interventions were almost universally accessible, utilization rates are high and PMTCT coverage rates were over 90% during HSSP IV, reaching the target, resulting in a decline in HIV positive infants



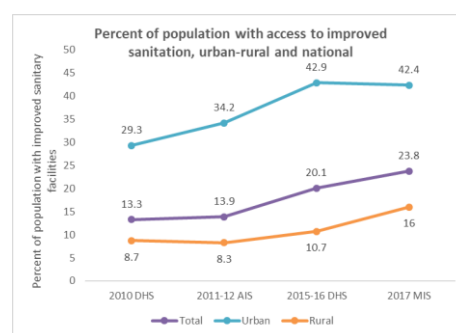
TUBERCULOSIS

- Tuberculosis (TB) case detection rates in 2018 were well below target (50%). TB notification rates declined until 2015 but increased since from 128 to 140. This is not necessarily due to an increase in TB cases but could be due to improvements in case detection.
- TB treatment success rates remained as high as 90% and the target has been achieved.



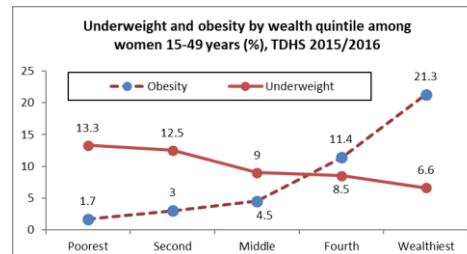
ENVIRONMENT & OUTBREAKS

- Access to improved drinking water and sanitary facilities increased gradually but is likely to fall short of 2020 targets, particularly because of insufficient progress in the rural population. By 2017, 51% did not have access to improved drinking water and 76% did not have access to improved sanitary facilities.
- Neglected tropical diseases have no indicator in HSSP IV, but the program data indicate progress in the battle against several NTDs such as trachoma and filariasis, as well as high coverage for preventive mass drug treatment efforts to control schistosomiasis and soil-transmitted helminths.
- The external assessment of the integrated disease surveillance and response program in 2018 indicated that the program capacity had strengthened since 2016, but timely and complete reporting rates remained suboptimal at 80% in 2018.



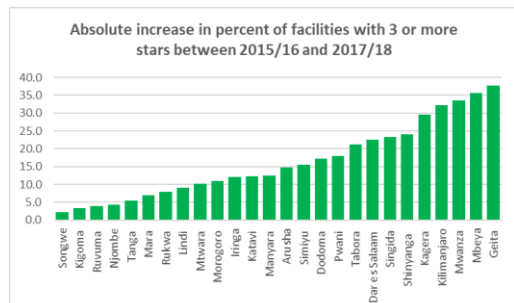
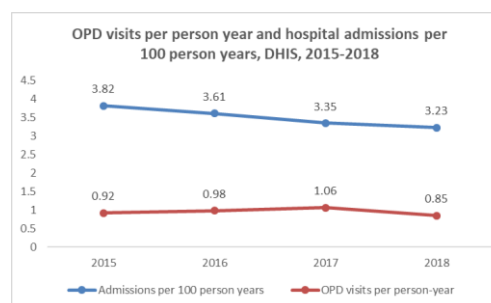
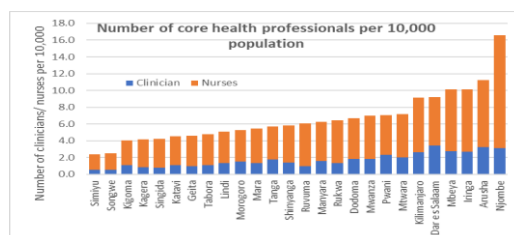
NCD

- There is a dramatic increase in obesity (and overweight) in Tanzania, as shown by survey data from women 15-49 years where obesity prevalence increased from 6% to 10% in just 5 years.
- Obesity and overweight are increasing everywhere in mainland Tanzania, but by 2015/16 obesity was three times higher among urban women than rural women (18% and 6% respectively), and more than 10 times higher among the wealthiest women compared to the poorest quintile women (21% and 2% respectively).
- There are no new data to assess trends in hypertension or raised blood glucose, but the 2012 STEPS did establish that both risk factors are common among men and women 25-64 years



HEALTH SYSTEM

- Financing: the share of the government budget allocated to health is falling, especially in 2018/19. Total health expenditure has been stable since 2009 at US\$ 35 per capita, which does not suffice for basic health services. Health insurance coverage is increasing slightly but remains low.
- Workforce: there were modest increases in the numbers of health workers, but major gaps remained and the core health professionals density per 10,000 population hardly increased. There were large regional differences, with the 5 highest density regions having 5 times more core health professionals than the 5 lowest density regions.
- Utilization and infrastructure: OPD utilization increased to 1.1 visit per person per year by 2018, but admission rates declined to 3.2 per 100 person years. The medicines supplies were very good according to the tracer items in DHIS2 (>95%). National assessments in 2015/16 and 2017/18 showed that the percent of facilities with three-star rating or higher increased from 2% to 18% but is still far from the 50% target.
- Health information system: the information systems have improved their completeness and accuracy, even though there is still considerable scope for further improvements.



1 INTRODUCTION

The Health Sector Strategic Plan IV (July 2015 – June 2020) (HSSP IV) is the key Ministry of Health, Community Development, Gender, Elderly and Children document that provides the guiding framework for the detailed planning and implementation of health sector activities. HSSP IV is monitored with 59 indicators with baseline for 2015, or nearest year, and targets for 2020. Annual health sector reviews are conducted, informed by a health sector performance profile, to assess progress towards the targets for the indicators of HSSP IV. This report provides an analysis of the progress and performance of HSSP IV to inform the midterm review of HSSP IV which was conducted in the middle of 2019.

In parallel with and connected to HSSP IV Tanzania has multiple other cross-cutting strategies and plans that are relevant for this review. These included several overall development initiatives with a health component, notably Tanzania Vision 2025, Health Policy 2007, and the Primary Health Care Service Development Programme (Mpango wa Maendeleo ya Afya ya Msingi (MMAM)) 2007-2017. The Big Results Now initiative ran from 2013/14 to 2016/17 and received special attention in selected regions.

In addition, there are programme-specific strategies and plans which are key contributors to achieving the targets of the HSSP and have more detailed monitoring plans. These include plans for maternal, newborn and child health, nutrition, AIDS, TB, malaria and others. The specific achievements of these plans are often reviewed and evaluated in special reviews. Ideally, such reviews are well linked to the national HSSP progress and performance reviews. In this report, special attention is paid to the priority areas of One Plan II – Strategic Plan to Improve Reproductive, Maternal, Newborn and Child Health 2016-2020, as this analysis will be used to inform the overall midterm review of One Plan II. One Plan II has nearly 100 indicators, of which 20 are also part of HSSP IV.

The primary objective of this analytical report is to review statistical progress and performance of Tanzania's health sector during 2015-2018 in comparison to the goals and targets of HSSP IV. It provides a synthesis of relevant data, including health and other household surveys, census, health facility and disease surveillance data, facility assessments, administrative resources data, policy data and research studies. Special attention is given to district council level progress using the health facility data. Several analyses should also contribute to the situation analysis for the next health sector strategic plan.

The analytical review was carried as a desk review of technical reports including population surveys, programme evaluation reports, policy documents and research studies, as well as analysis of existing survey and health management information system (HMIS) data. A core analytical team conducted the analyses and prepared the report. The team consisted of the Ministry of Health, Community Development Gender Elderly and Children, Muhimbili University of Health and Allied Sciences, University of Dar es Salaam, Ifakara Health Institute, Sokoine University, Countdown to 2030 for Women's, Children's and Adolescents' Health, and World Health Organization.

2 DATA AND METHODS

The analytical report is based on analysis and synthesis of existing data, including preliminary data from recent data collection efforts. All existing reports and analyses were brought together. While the focus is on the period 2015-2018, in some instances, attention was also paid to the trends prior to 2015 to help interpret more recent data. The main sources of data are:

Population health surveys

Tanzania Demographic and Health Surveys 2010, 2015/16 (TDHS)

Tanzania HIV and Malaria Indicator Surveys 2011/12, 2017 (TMIS)

Other surveys: STEPS 2012, National TB prevalence survey 2012, HIV Impact Survey 2016 (THIS)

Health facility data and reports

HMIS data base / DHIS2 : 2014 – 2018

Program databases and annual / analytical reports of disease programmes

Hospital record review study 2006-2015

Facility assessments

Star rating facility assessments 2015/16 and 2017/18; program assessments; data quality reviews

Administrative data

Financing: National Health Accounts 2016/17

Human resources: national data base

Infrastructure: national database of health facilities (DHIS2)

Other: Demographic Surveillance Systems (Magu/Kisesa 2010-2017, Ifakara/Rufiji until 2015; research studies

The two most important data sources are the Tanzania Demographic and Health Surveys (TDHS) 2015/16 and the health facility data (DHIS2). The TDHS was conducted at the start of HSSP IV and provides mostly retrospective information (e.g. the 3 or 5 years prior to the survey) for the indicators and does not provide information that can be used to track progress during HSSP IV. The TMIS 2017 and THIS 2016 provide additional data on malaria and HIV. The health facility reports, often referred to as Health Management Information System (HMIS), provide critical information on a range of indicators and can be disaggregated to district and regional level on an annual basis. The recording and reporting by health facilities is paper-based in almost all health facilities but councils are using the national DHIS2 and results are more standardized and easily accessible through this web-based electronic system. The DHIS2 had full mainland coverage from 2014 and data for 2014-2018 were used for this analysis. Appendix A describes how this report used the health facility data, including a data quality assessment. The results of the data quality assessment of DHIS (completeness, consistency) are also presented in the section on health information systems.

Each section includes an assessment of progress against targets for key HSSP IV indicators. The indicators were divided into three groups: health system inputs, coverage and health impact. Some additional data were available on the quality of care which may affect the extent to which coverage improvements lead to health improvements. Since reducing inequalities and poverty is one of the main objectives of the health and development plans, special attention was given to the extent to which inequalities in Tanzania mainland by gender, socioeconomic status or region have changed over time. Detailed analyses by council were beyond the scope of this report. While DHIS2 allows analysis by council, many program data were not available in this format. Further analyses at the council level will be done in the future to inform the HSSP situation analysis and provide council statistical profiles. In the final section overall performance and efficiency were assessed by comparing inputs and results at the regional level and considering Tanzania's progress in relation to other countries in the region.

One Plan II has 99 indicators of which 20 overlap with HSSP IV. This report will expand the sections that are relevant to One Plan II (e.g. family planning, newborn health) with indicators from One Plan II and also pay attention to the additional areas of focus in One Plan II including adolescent health, gender based violence and violence against children, reproductive cancers, and community.

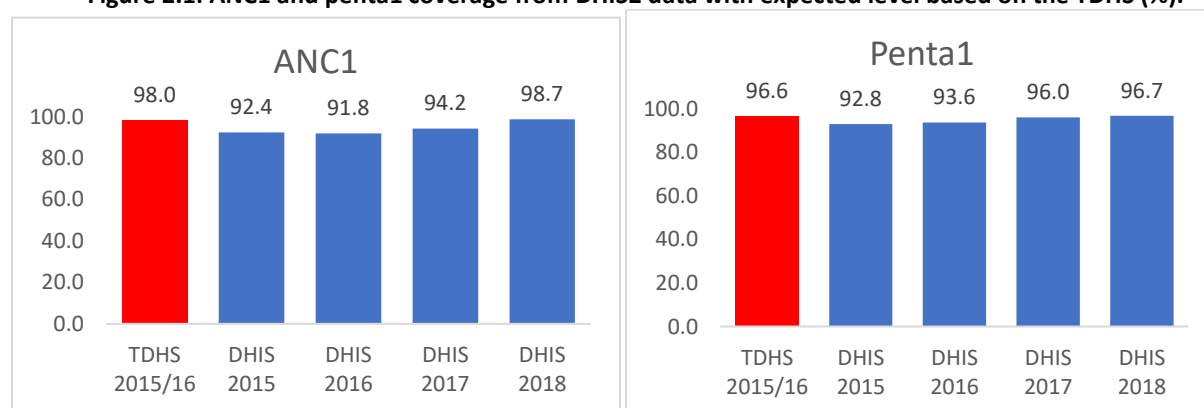
Using DHIS2 data for coverage statistics for HSSP IV indicators: the DHIS2 is the most important source of data to assess progress during HSSP IV 2015-2018. The national surveys such as the TDHS 2015/16 provide baseline information but cannot be used to track recent progress. Therefore, coverage rates of HSSP IV core indicators are based on DHIS2 data and an estimated target population for the specific indicator.

Reported data in DHIS2 for 2015-2018 is good for most indicators: the first step is to ensure that the quality of the reported data is acceptable for the statistics. Data quality was assessed by completeness of reporting, the presence of extreme outliers, consistency of reported data over time and internal consistency between the numbers such as ANC and immunization, all at the council, regional and national levels. Health facility reporting rates were excellent (98% in 2018), extreme outliers were few, and the consistency checks gave satisfactory results in most cases. The transition year 2014 had poorer data quality and therefore the focus was on 2015-2018.

Increases for many indicators, especially in 2018, look valid: For many indicators, especially RMNCH, there is an increase in reported numbers over time in the majority of councils and regions. The increase is often faster than population growth (which was 3.1% during the period 2015-2018 in the NBS population projections), which means an increase in coverage. The year 2018 shows a large increase in the reported numbers for several indicators such as institutional deliveries. This increase occurred in the majority of councils and there is no clear evidence to suggest that this is a data quality problem, although it cannot be excluded that this is due to improvements in reporting at the health facility level.

National level and trends in coverage based on DHIS were plausible: to assess the coverage of interventions a population denominator or target population is needed, such as total population in need of the service, live births, pregnancies, children eligible for immunization. The NBS population projections provide the overall mid-year population and are also used to obtain an estimate of the number of live births. For 2018, the NBS projected 2,009,848 births for mainland Tanzania, up from 1,881,453 in 2015. Using these NBS projections to estimate the number of pregnant women and the number of infants eligible for immunization, the national coverage in 2018 for first ANC visit is and for first pentavalent dose vaccination is close to what we expect on the basis of the TDHS 2010 and 2015/16 (Figure 2.1). The modest increase in ANC1 and penta1 over time may be due to improved reporting in DHIS2 or overestimation of the target population in 2015-2016. The NBS projections, however, result in unsatisfactory results at the regional and council level. Therefore, we also explored alternative methods to obtain coverage estimates for HSSP IV indicators based on DHIS2 data (see Appendix A).

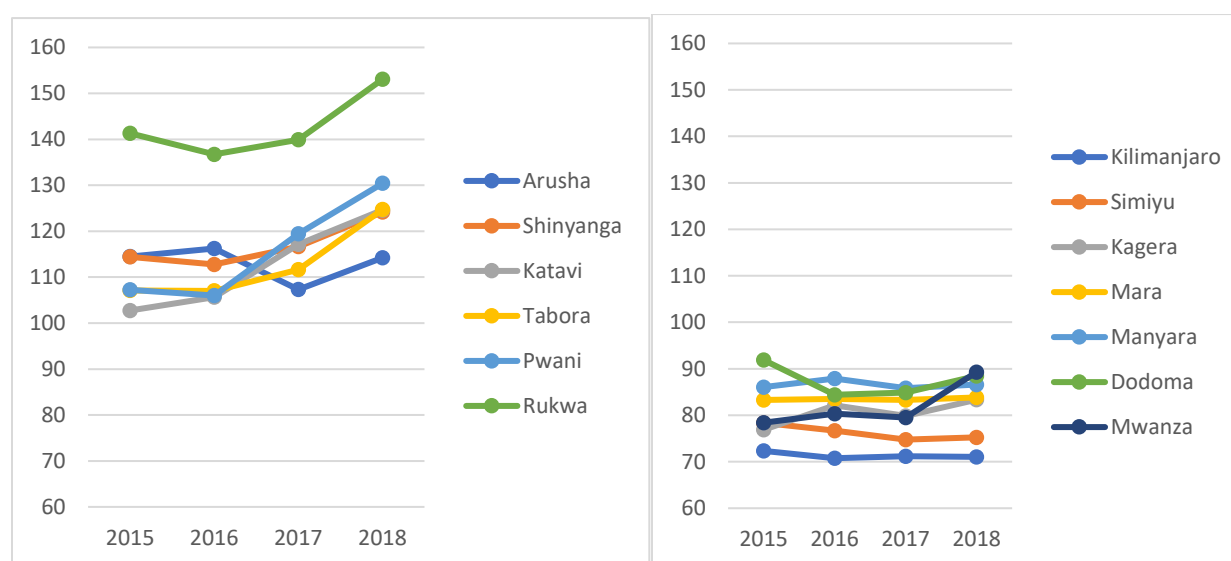
Figure 2.1: ANC1 and penta1 coverage from DHIS2 data with expected level based on the TDHS (%).



Coverage estimate and population projections were less accurate for regions (and councils): Almost every pregnant woman in mainland makes at least one ANC visit (98% according to TDHS, over 90% in all regions), and almost every child gets penta1 vaccination (97% according to TDHS, over 90% in all regions except Katavi 87%). Based on the DHIS reported numbers and the population projection from NBS, six regions have over 110% ANC1 coverage in 2018, Pwani even 130% and Rukwa consistently 140% or higher (Figure 2.2, left panel below). The projected target populations may be too low and not suitable for the coverage estimation from DHIS. At the lower end there are seven regions with ANC1 coverage below 90%, most prominently Kilimanjaro with about 70% coverage (Figure 2.2,

right panel below). The projected target populations may be too high. The picture for penta1 immunization is the same as for ANC. If we consider the council level there are many councils with very implausible coverage levels, which may be due to population changes which affect the accuracy of the population projections.

Figure 2.2: ANC first visit coverage among pregnant women, using the NBS projections of births to compute the target populations.



Additional approaches: using health facility data to estimate target populations: Because nearly all pregnant women make at least one ANC visit and nearly all children are immunized at least once, we can also use the reported numbers in DHIS for the estimation of coverage of for example institutional delivery rate. We added a small proportion (3%) to take into account those that never use ANC or immunization to the reported numbers by council and region. This leads to better estimates of the coverage for the MTR report (Appendix A).

Way forward

This analytical report to inform the midterm review (and One Plan II) used the NBS projections for the mainland coverage estimates. The report also used the projected total population figures for all regions and councils and note the results may be due to changes in the population which affect the accuracy of the population projections.

For selected RMNCH indicators the regions and councils DHIS-2 derived target populations of pregnant women, births and infants (based on first pentavalent vaccination numbers) were used, as the population projections were giving less accurate results such as unlikely high or unlikely low coverage of immunization or antenatal care. This will help provide a more accurate assessment of progress and performance of regions and councils in antenatal care, delivery and postnatal care and child health indicators during HSSP IV. For all statistics presented in the analytical report it will be clearly marked whether the health facility-based denominator was used and these are not intended to replace the official population projections by NBS.

As a way forward, it will be important to organize technical meetings between Ministry of Health, PO-RALG and NBS meet and discuss the different methods, such as further refining projections, the additional use of GPS methods, and the use of health facility data-derived denominators, to improve the target population estimates for the councils and regions.

3 MORTALITY AND CAUSES OF DEATH

Main findings

- The TDHS 2015/16 indicated that under-5 mortality in Tanzania continued its decline during HSSP III to 67 per 1,000 live births for 2011-2015, which puts it in the middle of 10 countries in the eastern African region. Neonatal mortality was declining but at a slightly slower pace than at older ages in childhood and therefore was becoming more prominent in child mortality.
- Inequalities in mortality between the poorest and richest children were decreasing during 2005-2016, and, uncharacteristically, urban children had no survival advantage over rural children. Urban neonatal mortality rates were especially high, especially in Dar es Salaam.
- By 2015/16 the bottom three regions had twice as high mortality than the top three regions (107 and 47/1,000 live births respectively), but the gap was reducing since TDHS 2010.
- Life expectancy continued to increase for men and women and was estimated at 62 and 66 years for 2016.
- DHIS2 has initiated a system of reporting individual causes of death by hospitals since 2014. About 10% of deaths take place in hospitals. The quality of cause of death data still needs considerable improvement, but based on current data, communicable diseases, NCD and injuries accounted for about 58%, 35% and 7% of deaths in hospitals respectively, with an increasing proportion due to NCD.

Indicator	Baseline (Year)	Target 2020	Achievement	Comments
Under-five mortality per 1,000 live births	81 (TDHS 2010 for 2006-10)	54	67 (TDHS 2015/6 for 2011-15)	Major progress in the past decade but MDG target not met; inequalities are modest
Infant mortality rate per 1,000 live births	51 (TDHS 2010 for 2006-10)	-	43 (TDHS 2015/6 for 2011-15)	Good progress in last decade, especially in the post neonatal period
Neonatal mortality per 1,000 live births	26 (TDHS 2010 for 2006-10)	19	25 (TDHS 2015/6 for 2011-15)	Little progress, neonatal deaths are now 37% of under-5 mortality
Life expectancy at birth (years)	60/64 (M/F) (Census 2012)	59/62	62/66 (WHO estimates 2016)	Targets met, due to improvements in child and adult mortality

Data sources and quality: TDHS 20015/16 is the main sources of national data on mortality. The rates are generally presented for the 5-year (or 10-year if disaggregated) periods before each survey. The child mortality data quality in Tanzania is good, but it has to be kept in mind that there are currently no data to ascertain the trends beyond 2015/16. The survey analysis was done using two time points for TDHS 2010 and TDHS 2015/16. All regional mortality rates were re-computed from the TDHS surveys using the regional classification in the TDHS 2015/16. Songwe region was not included in this analysis as it was established in 2016.

This chapter presents data on the four mortality indicators of HSSP IV, as well as the main causes of death in hospitals. There were no new mortality data collected since the TDHS 2016/17, except the TMIS 2017 which uses a truncated birth history. The data from the TMIS 2017 are not used in this section.

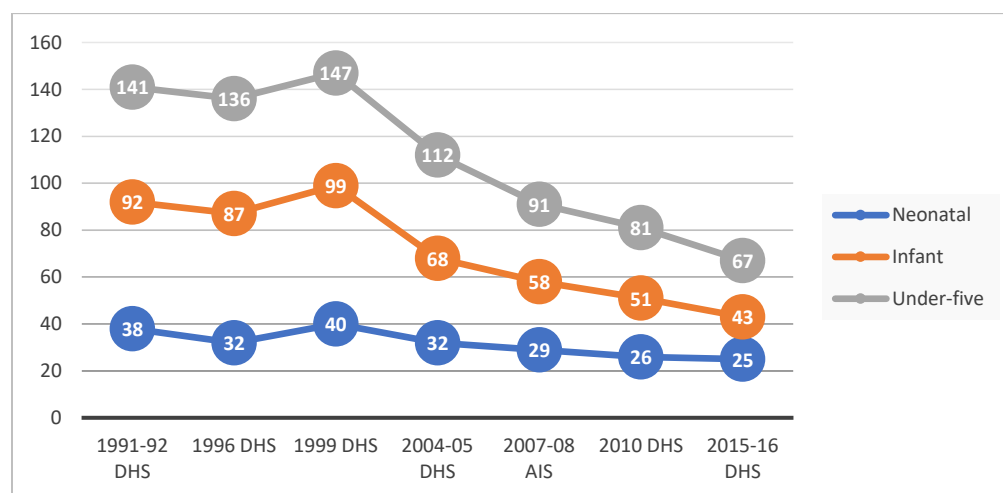
MORTALITY

Life expectancy according to the 2012 census was 63 years for women and 60 years for men. No new life expectancy rate was computed by the national statistical office but the TDHS 2015/16 data indicate that the decline in child mortality was continuing and that also adult mortality declined: in the TDHS 2010 adult mortality 15-49 years was 5.0 and 5.1 per 1,000 population respectively (refers to the six-year period before the survey, that is 2004-2010) and in the TDHS 2015/16 adult mortality rates were 4.3 and 4.6 per 1,000 (referring to 2009-2015). The most recent estimates of life expectancy at birth by WHO were 62 years for men and 66 years for women for 2016.

There was a strong decline in under-five and infant mortality since early nineties, and the decline continues in the last TDHS 2015/16 (Figure 3.1). At this pace of decline under-5 mortality was 5.4% reduction per year during 2004-2015. To achieve the SDG target of 25 per 1,000 live births in 2030, the annual rate of decline would have to be 6.5% per year. Therefore, an acceleration of the child mortality decline is still required to meet the SDG target for under-five mortality.

The decline for neonatal mortality has been slower, with 2.2% reduction per year during 2004/05-2015/16. To achieve the SDG target of 12 per 1,000 live births the decline will need to accelerate to 4.9% per year. In the TDHS 2015/16, 37% of under-5 deaths occurred during the neonatal period. This is up from 29% in the TDHS 2004/05.

Figure 3.1 Under-5, infant and neonatal mortality per 1,000 live births, survey data.



Inequalities in child mortality: urban-rural

Tanzania has a very unusual urban – rural mortality pattern. In most countries, urban children have better survival rates than rural children. In Tanzania mainland this is not the case (Figure 4.2). The urban-rural differences in under-5 and neonatal mortality have been small in almost all surveys. In the TDHS 2010 the difference was negligible (91 and 95 per 1,000 live births in rural and urban mainland respectively), but in TDHS 2015/16 the difference had increased to 8 points. This is not statistically significant, but the fact that urban children do not seem to have any advantage of rural children urgently needs further investigation.

In particular, the urban neonatal mortality seems to be elevated. Furthermore, Dar es Salaam region has particularly unfavourable survival rates (see below (Figure 3.2). It is noted that the under-5 mortality rates refer to the 10-year period before the survey. We also computed 5-year rates which have larger sampling errors: the results however were very similar to the 10-year period.

Figure 3.2: Trends in under-five (left panel) and neonatal (right panel) mortality per 1,000 live births, by urban-rural residence, national surveys.

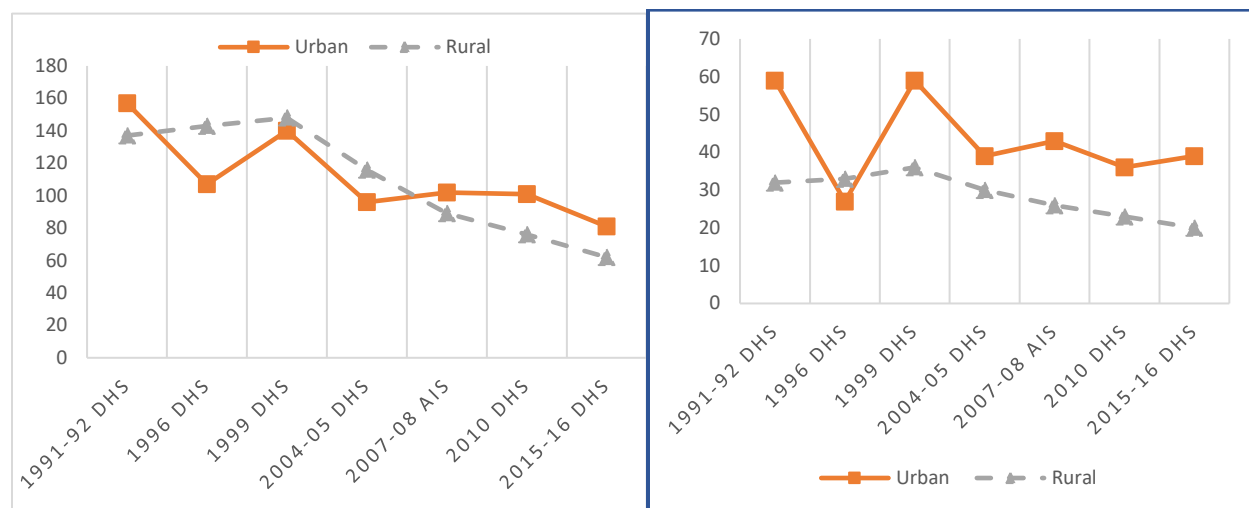
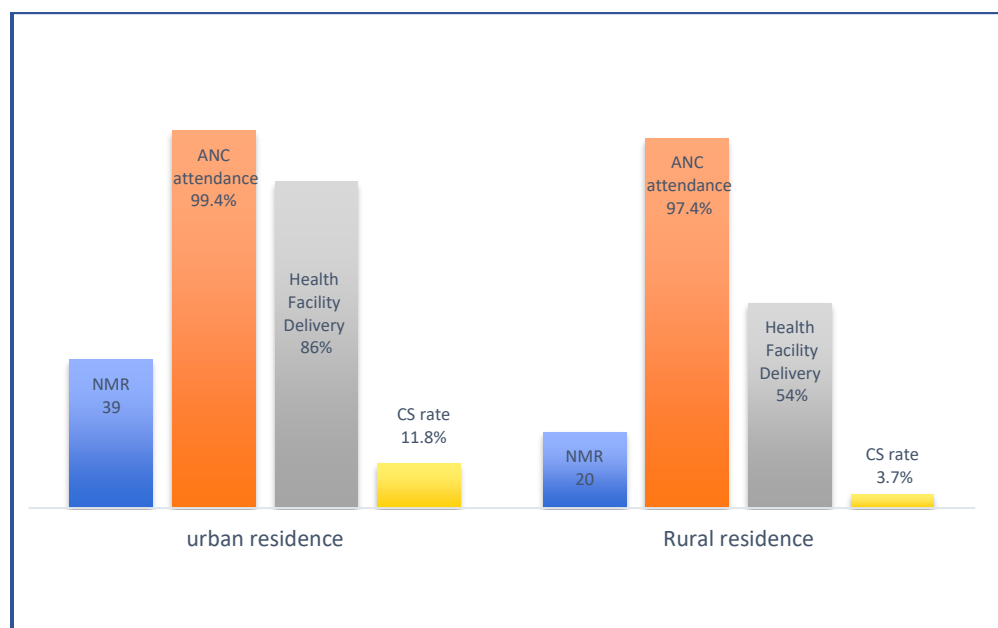


Figure 3.3 shows a few additional coverage statistics that may affect newborn mortality. Utilization of health care (ANC attendance, health facility delivery and C- section rate) are all higher in the urban areas compared to the rural areas. This could be linked to quality of care, epidemiological differences, mortality measurement issues and requires further investigation. Neonatal mortality among the poorest women was also markedly lower than the wealthiest women (20 and 37 respectively), which is very unusual. Further disaggregated analyses by region, place of residence and wealth are presented in Chapter 10 of this report.

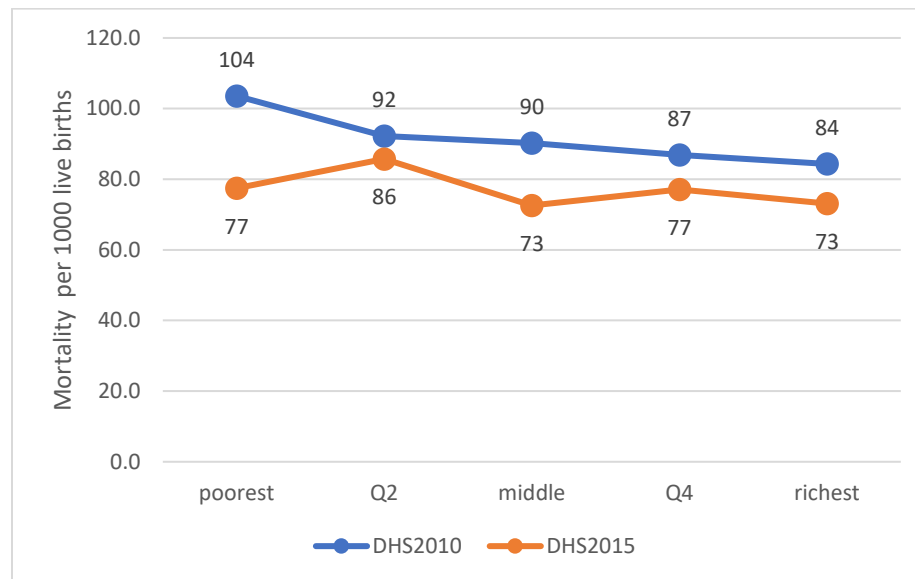
Figure 3.3: Urban rural differences in coverage of antenatal care, delivery care and C-section rates, TDHS 2015/16.



Inequalities in child mortality: poorest and richest households

The poorest made significant progress and reduced the gap with children in the richest households. For under-5 mortality the poorest made major progress (from 104 to 77 per 1,000 live births in TDHS 2010 and 2015/16 respectively, for the 10-year periods before the surveys), while the richest quintile only made modest progress. Remarkably, there was only a small difference in child survival between the poor and the rich in the TDHS 2015/16 (77 and 73). (Figure 3.4).

Figure 3.4: Trends in under-five mortality per 1,000 live births by wealth quintiles, TDHS 2010 & TDHS 2015/16.



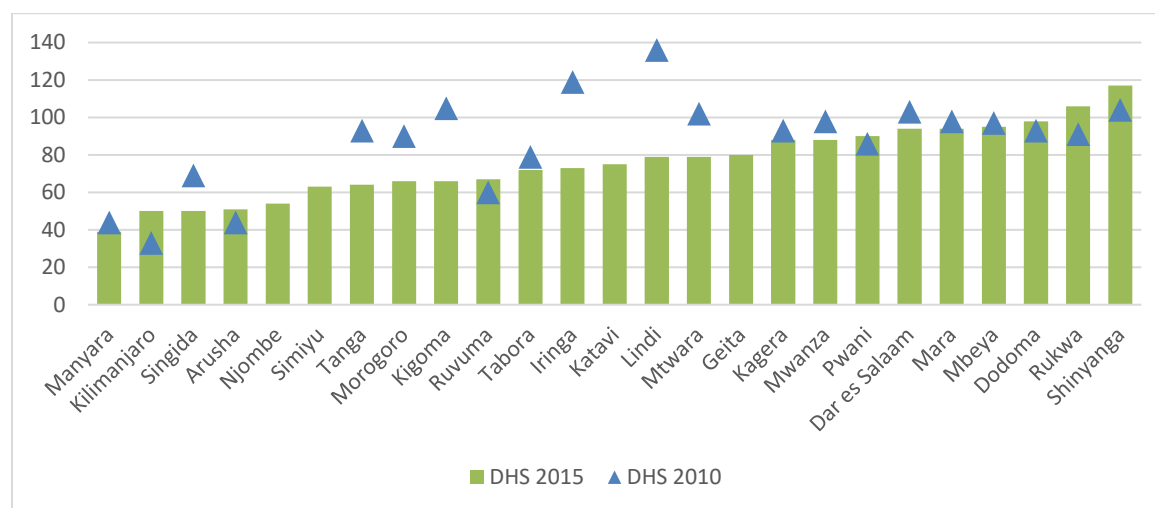
Inequalities in child mortality: regions

Figure 3.5 shows the levels and trends in under-5 mortality by region of the mainland. It must be kept in mind that the rates refer to the 10-year period before the survey and also have large confidence intervals because of smaller sample sizes at the regional level. Under-five mortality rates range from about 50 per 1,000 live births or lower in the northern zone regions (Manyara, Kilimanjaro, Arusha), Singida and Njombe to over 100 in Rukwa and Shinyanga.

In 14 of the 21 regions existing in 2010 under-5 mortality was lower in the TDHS 2015/16 than in 2010, with most progress in Lindi, Iringa, Kigoma Tanga and Mtwara. Dar es Salaam has an exceptionally high under-5 mortality for a capital city region: 94 per 1,000 for 2006-2015. The 2012 census shows a similar pattern of regional mortality rate (the correlation coefficient was moderately high ($r=0.47$) between census 2012 and TDHS 2015/16) but with lower levels and a smaller gap between the regions.

The latest survey shows a considerable narrowing of the differences between regions in 2015/16, much of which occurred during HSSP III. In 2010, the absolute gap between the averages of the three lowest mortality regions (Kilimanjaro, Rusha, Manyara) and the three highest mortality regions (Mara, Lindi and Iringa) was 96 per 1,000 live births. In the TDHS 2015/16, this gap between the lowest three (Manyara, Singida, Kilimanjaro) and the highest three (Dodoma, Rukwa, Mara) had come down to 60 points. New regions (Katavi, Simiyu, Njombe and Geita) were only assessed at one time point (TDHS 2015/16). Njombe region showed lowest under five mortality amongst the new regions.

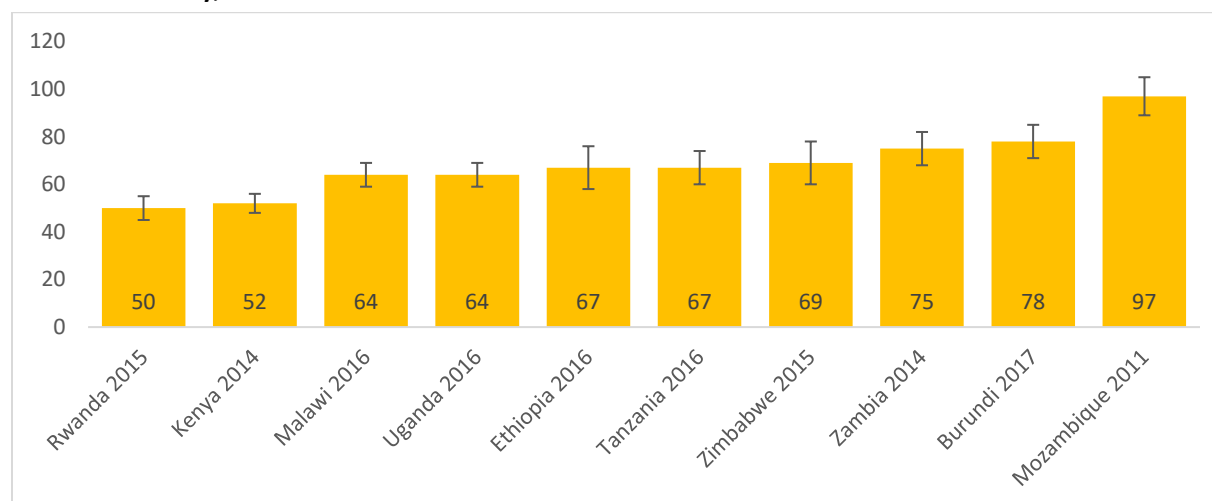
Figure 3.5: Trends in under-five mortality per 1,000 live births by region, TDHS 2010 & TDHS 2015/16



Comparative analysis child mortality

The national mortality estimates from household surveys refer to the five-year period prior to the survey. According to the most recent DHS results on under-5 mortality from 10 countries in the eastern and southern Africa region, Tanzania is in the middle of the 10 countries, well behind Rwanda and Kenya, but at similar levels as Malawi, Uganda, Ethiopia and Zimbabwe (Figure 3.6).

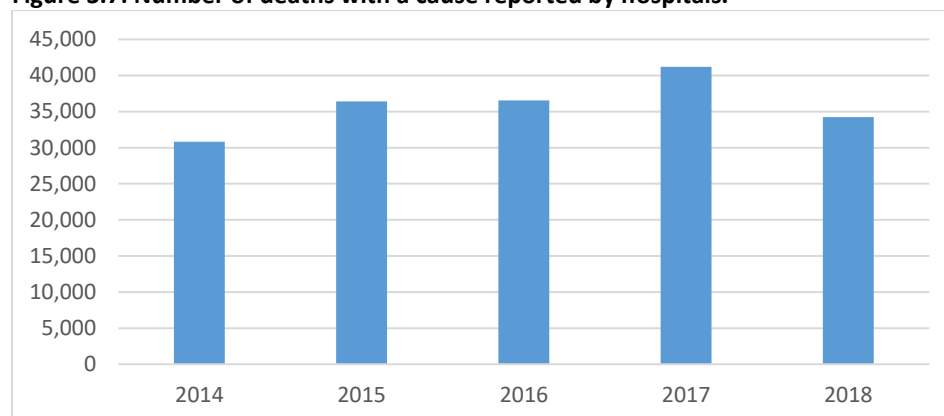
Figure 3.6: Under-5 mortality per 1,000 live births, selected countries in eastern and southern Africa, most recent DHS survey, with 95% confidence intervals.



CAUSES OF DEATH

The Ministry of Health established a system of reporting of causes for individual deaths within the DHIS2. During 2015-2018 the cause of death was reported for 35,000 – 40,000 deaths (peak of 41,186 deaths in 2017) with this system (Figure 3.7). It should also be acknowledged that hospital deaths constitute only a small proportion of all deaths in the country. Overall, NBS estimates that there are about 350,000- 400,000 deaths in 2018. Therefore, the hospital death cover only 10% of all deaths, and 90% of deaths occur in the community. There is no increase in the proportion deaths covered, which was 9.1% in 2015 and 9.6% in 2018 (34,255 deaths out of the NBS estimate of 372,146 deaths). In 2017, 10.8% of deaths occurred in hospitals and were reported through the DHIS2.

Figure 3.7: Number of deaths with a cause reported by hospitals.



The use of ICD was still haphazard and a large proportion of causes of deaths were not reliable (often referred to as ill-defined or garbage codes, such as old age or heart failure or respiratory failure). The ICD requires the reporting and analysis of the underlying cause of death, which is the condition that sets in motion the sequence of events that lead to the death. A review indicated that 75.2% of codes could be considered as valid codes in 2018.

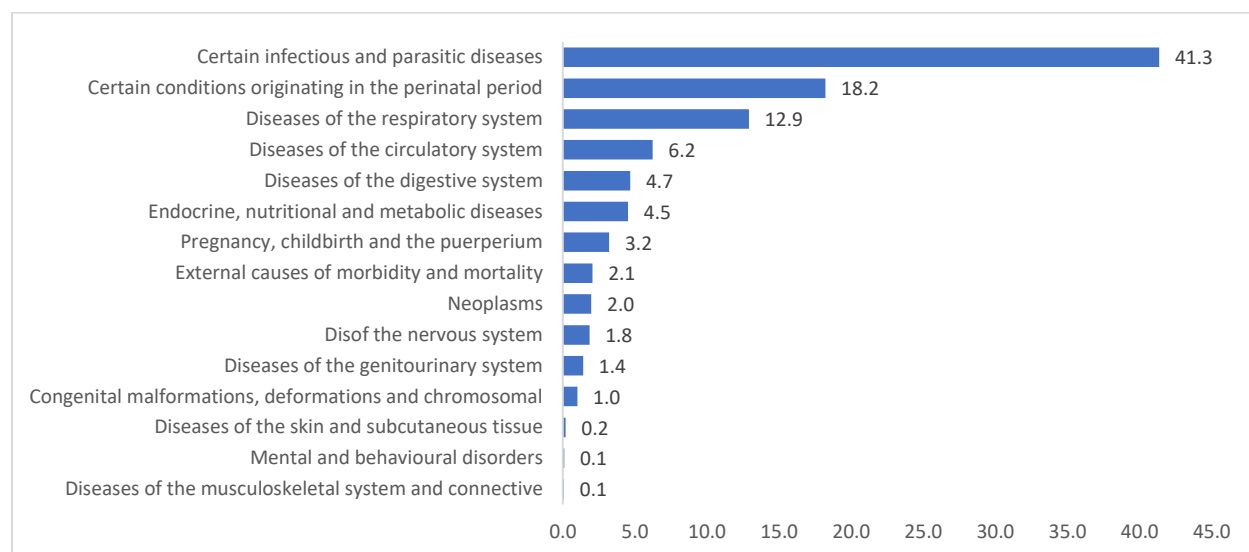
After extensive recording and regrouping of the DHIS2 data, certain infectious and parasitic diseases merged as the leading cause of death in hospitals in 2018: 41.3% of all deaths at all ages (Figure 4.5). Conditions originating in the perinatal period (mostly neonatal causes such as intrapartum death, prematurity) is second with 18.2%, followed by diseases of the respiratory system (12.9%) and circulatory system (6.2%). Diseases of the digestive system complete the top 5. Further analyses by age and sex is required to gain further insights into the epidemiological patterns and if possible, trends within hospital mortality.

A study involving review of cause of death records in 38 hospitals for the 10 year period 2006-2015 provides further insights into the cause of death patterns and trends, even though the data quality was a major obstacle and the data have to be interpreted with caution.¹ The median age at death was 30 years. Some key findings include:

- More deaths occurred among males (55.4%) than females (44.6%)
- The five leading causes of death were malaria (12.75%), respiratory diseases (10.08%), HIV/AIDS (8.04%), anaemia (7.78%) and cardio-circulatory diseases (6.31%) (Figure 3.9).
- From 2006 to 2015, there was a notable decline in the number of deaths due to malaria (by 47%), HIV/AIDS (28%) and tuberculosis (26%).
- During the same period, there was an increase in number of deaths due to neonatal disorders by 128%.

¹ Hospital mortality Patterns and Causes of Death in Tanzania 2006-2015. National Institute for Medical Research, Dar es Salaam, Tanzania and Ministry of Health, Community Development, Gender, Elderly and Children, Dar es Salaam, Tanzania.

Figure 3.8: Distribution by percentage of main causes of death, grouped 2018 (source: DHIS2)



Categorizing causes of death into three groups as per the Global Burden of Disease, statistics indicate that more than half (57.6%) of the deaths were due to Group I (communicable diseases, maternal and perinatal causes and nutritional conditions), while a third were caused by Group II (Non-Communicable Diseases) and 6.7% were by Group III (Injuries and external causes) (Figure 4.9). While there was an overall decline in the number of deaths due to communicable diseases, an overall increase in deaths due to non-communicable diseases and injuries increased over the years.

Figure 3.9: Pattern of the top 20 causes of hospital death in Tanzania, 2006-2015

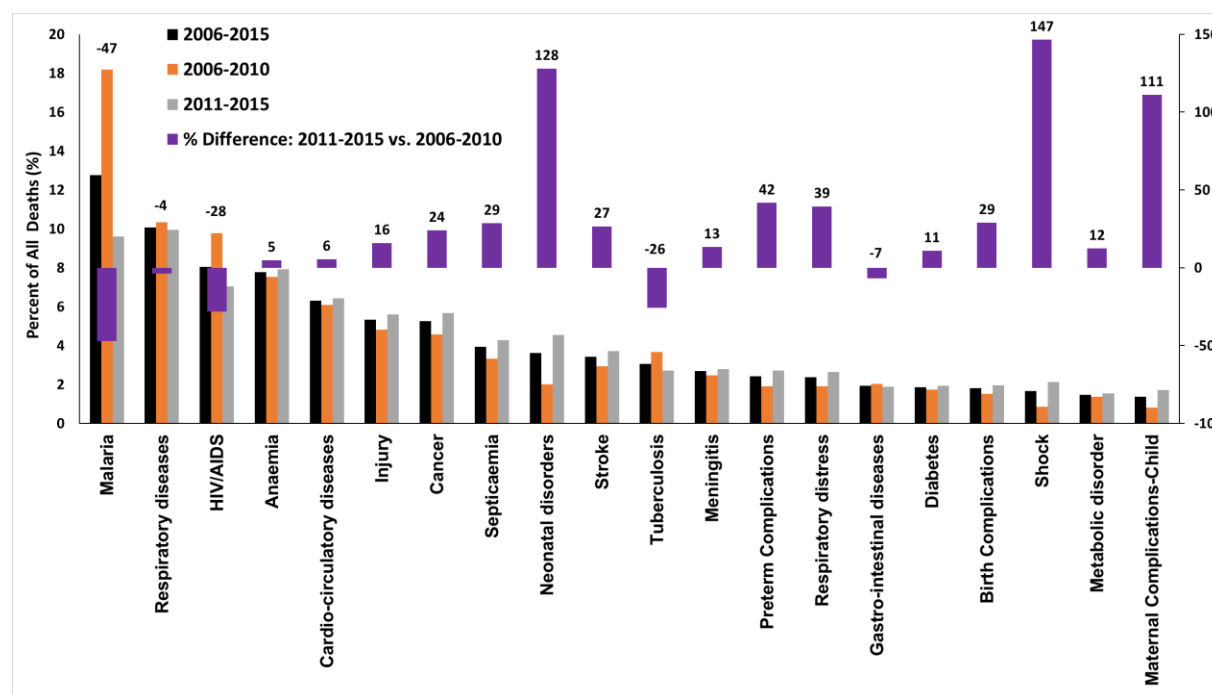
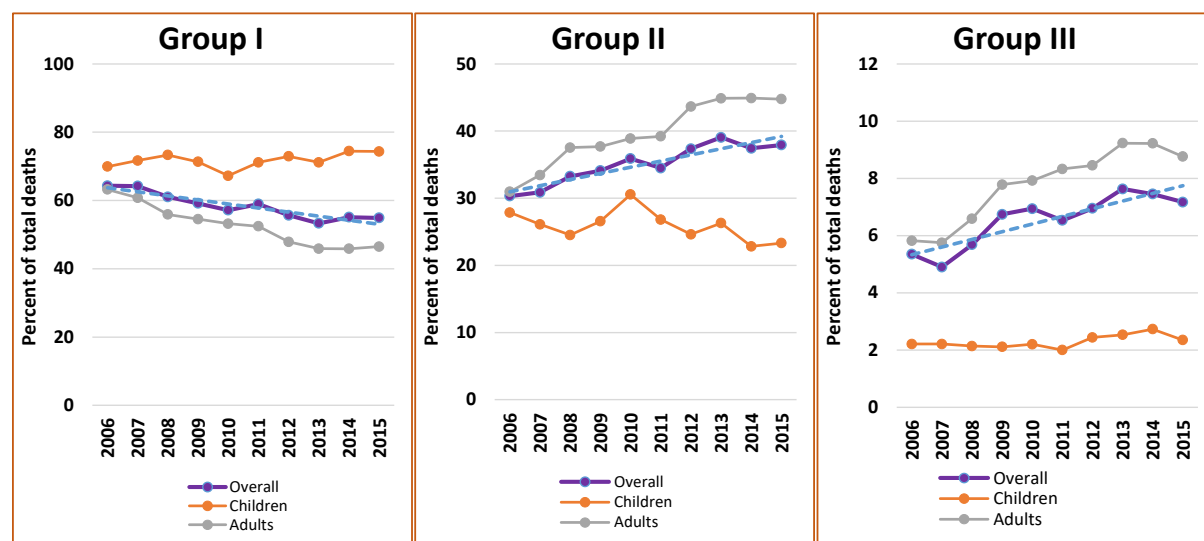


Figure 3.10: Causes of death by Global Burden of Disease categories



Morbidity

The DHIS2 provides data on diagnoses in outpatient departments (ambulant care) and inpatients. These diagnoses are not based on the ICD but may provide some ideas on the leading reasons for consultations among children under 5 years and those aged 5 years and over. These are presented in the subject specific chapters. A few initial observations include:

- Upper respiratory tract infections (URI), acute diarrhoea and pneumonia (non-severe) ranked as top 3 of the leading causes of under-five OPD attendance in 2014
- URI, UTI and pneumonia were the leading causes of OPD in 2018. It is however unlikely that UTI has become so prominent and it is likely that other causes are reported as UTI.
- Among the 5 and older individuals, the three leading causes of OPD attendance were URI, UTI and hypertension.
- The number of hypertension cases in >5 individuals increased by 152% from 2014 to 2018. This may be a true trend or changes in diagnostic practices or recording and reporting.
- The leading cause of deaths are certain infectious and parasitic diseases. However, the contribution of this group to total deaths has declined from 61.5% in 2014 to 41.3% in 2018.

4 REPRODUCTIVE, MATERNAL, NEWBORN, CHILD, ADOLESCENT HEALTH AND NUTRITION

Main points

Fertility and family planning	Total fertility rates remained high but continued a slow decline from 5.2. to 4.9 children per woman, with rural fertility now just below 6 children per woman. There are very large fertility differences between the regions, ranging from 2.8 children in Dar es Salaam to 7.6 in Simiyu.
	Modern contraceptive prevalence rate among married women continued its long-term steady increase during HSSP IV, driven by implants which replaced injections as the most popular method. However, there is still a major unmet need with only just over half of the demand for family planning with modern methods satisfied.
	Teenage childbearing remained high with more than 1 in 5 adolescent girls 15-19 having begun childbearing and another 6% were already pregnant.
Maternal and newborn care	There is no new information on levels and trends in maternal mortality during 2015-2018, as no survey was conducted, and the health facility reporting system of maternal deaths has not yet achieved complete reporting of all maternal deaths.
	Antenatal care coverage improved during HSSP IV, including an increase of women making at least 4 visits (59%) and first trimester visits (but still low at 26%), as well as testing rates for syphilis and anemia and IPT2 coverage, especially in 2018
	Institutional delivery care increased rapidly to 78%, especially in 2017-18, although major regional differences persisted. This was accompanied by increases in C-section rates to 8.0% and in postnatal care attendance (within 24 hours) to 65%. The availability of emergency obstetric care facilities had improved in hospitals, but not in health centres, by 2017. The increase was concentrated in 2017-18.
	Newborn data from DHIS indicate for 2015-2018 a decline of hospital stillbirth rates (from 16 to 12/1000 births in hospitals), intrapartum stillbirth rates (from 6.4 to 5.0/1000), low birthweight (5.5 to 5.0% among health facility births) but no changes in newborn care such as neonatal resuscitation or Kangaroo mother care
	Antenatal care coverage improved during HSSP IV, including an increase of women making at least 4 visits (59%) and first trimester visits (but still low at 26%), as well as testing rates for syphilis and anemia and IPT2 coverage, especially in 2018
	Inequalities in RMNCH coverage are substantial. according to the surveys until 2015/16 coverage was higher in urban areas, in wealthier households and the gaps are hardly reducing. the same was true for the regional differences. During HSSP IV there was a reduction of the regional gap, especially in 2017-2018, with a greater improvement in most of the BRN regions than in other regions.
	Immunization coverage levels among infants are high; pentavalent vaccination (3 doses) and measles remained high during 2015-2018: ranging from 84-90% for penta3 according to DHIS2-based estimates; ranging from 87%-98% for measles among children under 1 year
	PCV and Rotavirus vaccines introduced in 2013 rapidly reached 83% and 94% respectively by 2015. PCV3 increased to 94% in 2018 and Rota2 coverage maintained same level (92% in 2018).
	Three-quarters of regions experienced an increase in Penta3 during HSSP IV. Half of the 26 regions have penta3 coverage below 90%, eight regions below 85% and two just below 80% (Simiyu and Tabora).
Child nutrition	Child underweight declined from 16% to 14% and stunting from 42% to 34% during 2010-2015/16, but large gaps remained between urban and rural children, and between children in the poorest and wealthiest families. There were no new data to assess the trend during HSSP IV
	Breastfeeding practices improved during HSSP IV with more early initiation and more exclusive breastfeeding during the first 6 months of life.
Adolescents	Little change in sexual initiation among adolescents, with one in 8 starting before age 15
	Coverage of interventions for MNH care for adolescent mothers about the same as for older mothers
GBV	Insufficient quality data to ascertain levels and trends with facility data

Reproductive cancers	Modest increase in cervical cancer screening, but half of women who are positive on screening do not receive treatment
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Indicator	Baseline (Year)	Target 2020	Achievement	Comments
Total fertility rate among women 15-49 years	5.2 (TDHS 2015/16 and Census 2012)	5.0 (One Plan II)	4.9 (TMIS, 2017)	Target achieved; TFR refers to 3 year-period before survey
Contraceptive prevalence rate with modern methods (among married women 15-49)	32% (TDHS 2015/16)	45%	No new survey data	CYP increasing in 2018 according to DHIS, most prominently implants which is the leading method
Teenagers who have begun childbearing (under 20)	21.0% (TDHS 2015/16)		20.8% (TMIS 2017)	No change in adolescent fertility, higher than 10 years ago

Maternal mortality per 100,000 live births	556 (TDHS 2015-16)	192		No progress in the past decade; no new population-based data
Maternal deaths per 1000 deliveries in health facilities		-		Recent data from DHIS not available
ANC: first visit before 12 weeks of pregnancy	24% (TDHS 2015/16) 13% (DHIS 2015)	60%	26% (DHIS 2018)	Modest increase but still well-off target
ANC at least 4 visits among pregnant women	51% (TDHS 2015/16) 37% (DHIS 2015)	80%	62% (TMIS 2017) 59% (DHIS 2018)	Steady increase from 2014-2017 followed by major increase in 2017- 2018; target 2020 may be too far
IPT 2 (intermittent preventive therapy)	35% (TDHS 2015/16); 55% (DHIS, 2015)	90%	80% (DHIS 2018) 56% (TMIS 2017)	Major increase, target may be met if the increase continues
Institutional delivery rate	63% (TDHS 2015/16)	80%	78 % (DHIS 2018)	Steep increase between 2017 to 2018 DHIS. Target of 2020 may be met
Skilled Birth Attendants use during childbirth	64% (TDHS 2015-16) 60% (DHIS, 2015)	80%	76 % (DHIS 2018)	A dramatic increase between 2017 and 2018; 2020 goal near
Postnatal care within 48 hours (women)	34% (TDHS 2015-16)	80%	65% (DHIS, 2018)	Rapid increase in PNC use; 2020 target within reach
Postnatal care within 48 hours (Newborns)	43% (TDHS 2015-16)	80%	64.9% (DHIS, 2018)	Rapid increase in PNC use; 2020 target within reach

C- Section Rate	6 % (TDHS 2015/16) 6.3% (DHIS, 2015)	5-15%	8.0% (DHIS, 2018)	2020 goal has been met, but many women still lack CS access
Emergency Obstetrics Services: facilities that can provide EMOC (%)	25% (2015)	70%	15% Health centre; 81% Hospitals (2017 SARA)	Achieved in hospitals but not in health centres

Indicator	Baseline (Year)	Target 2020	Achievement	Comments
DPT3/pentavalent coverage in children under 1 (%)	88% (TDHS 2015/6) (DHIS2, 2015)	90% (survey) 90% (DHIS2)	89% (DHIS 2018)	High coverage, remains near target
Measles vaccination in children under 1 (%)	78% (TDHS 2015/6)	90% (survey) 90% (DHIS2)	96% (DHIS 2018)	Above target and increasing to reach nearly all children

Indicator	Baseline (Year)	Target 2020	Achievement	Comments
Underweight among children under 5 years	16% (TDHS 2010)	11%	13.5% (TDHS 2015/16)	Improvement target not yet achieved
Stunting among children under 5 years	42% (TDHS 2010)	27%	34% (TDHS 2015/16)	Improvement, still on target for 2020
Vitamin A supplementation coverage children 6-59 months (2 doses/year)	61% (TDHS 2010) 51% (HMIS 2014)	75% (TDHS) 65% (HMIS)	41% (TDHS 2016)	Decline since 2010

FAMILY PLANNING AND FERTILITY

Data sources: data on fertility were derived from the national surveys and censuses and provide a picture of the trend up to the TMIS 2017. Fertility rates are presented for the three-year period prior to the survey. Data on family planning demand satisfied are obtained from the surveys as well, but also from the DHIS using the couple years of protection method. This provides an idea of levels and more recent trends of contraceptive use during HSSP IV.

The total fertility rate, the number of children a woman would have at age 50 with current fertility rates, declined during HSSP IV from 5.2 in TDHS 2015/16 to 4.9 in TMIS 2017, slightly below the One Plan II target of 5.0 for 2020 (Figure 4.1). Both urban and rural fertility rates were lower in the TMIS 2017 (3.5 and 5.7 children respectively), compared to TDHS 2015/16. Urban fertility however is still at the same level as 15 years ago.

Total fertility rate varied widely between regions: from below 3.5 in Dar es Salaam, Arusha, Mtwara and Kilimanjaro, to above 6.5 in Katavi, Tabora, Geita, Singida and Simiyu. In half of the regions total fertility was lower in the TMIS 2017 compared to the TDHS 2015/16 especially Arusha, Morogoro, Kagera and Kigoma (Figure 4.2).

Figure 4.1: Total fertility rate, national, urban and rural Tanzania, surveys since 2000 (for the 3 years preceding each survey) and census 2012.

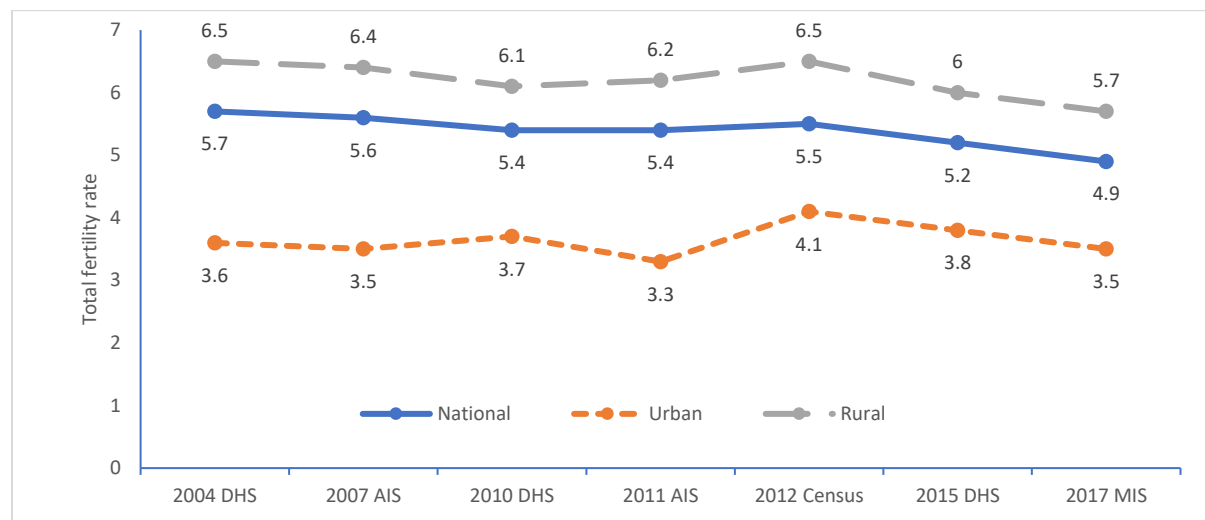
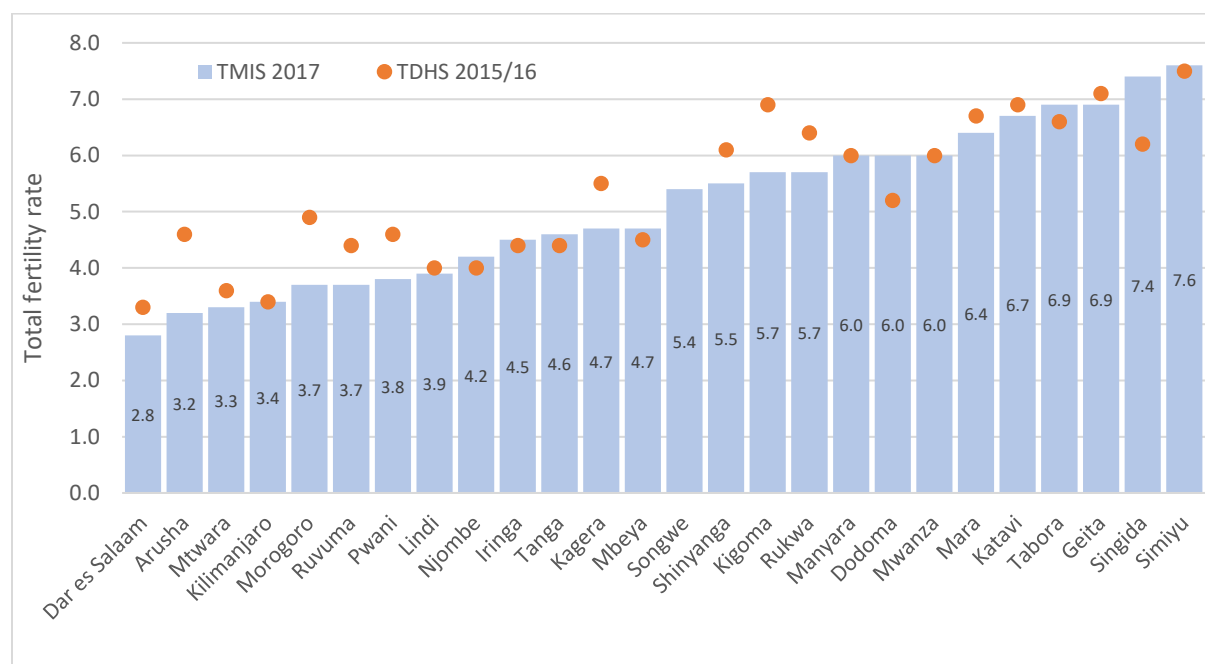


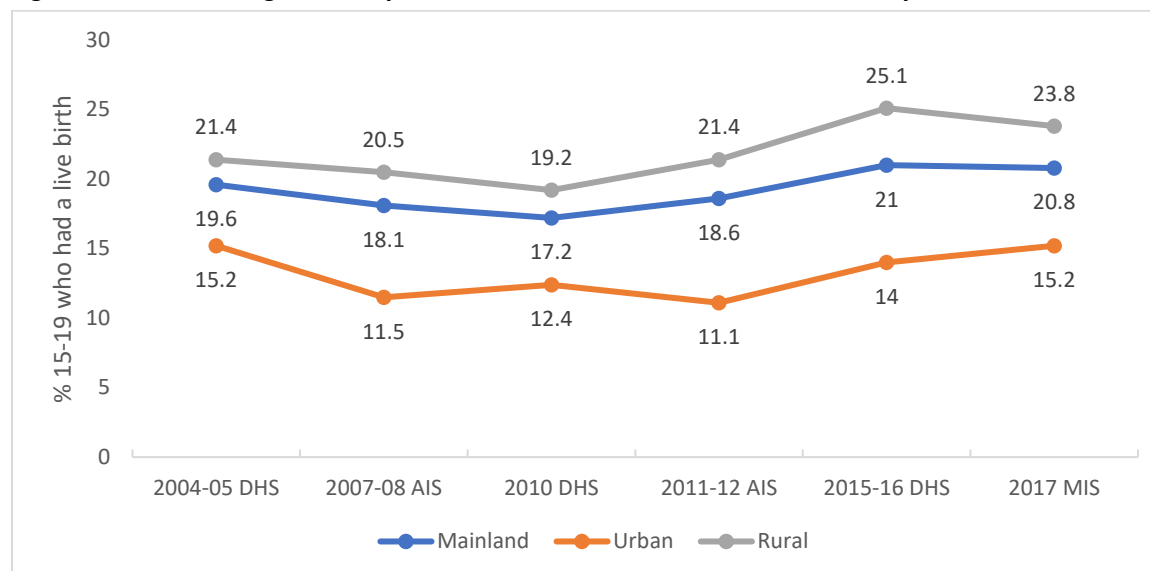
Figure 4.2: Total fertility rate, by region, Tanzania mainland, TDHS 2015/16 and TMIS 2017.



The third HSSP IV indicator concerns teenage childbearing. Overall, 21% of adolescent girls 15-19 years already had a live birth in the TMIS 2017, the same as in the TDHS 2015/16. Rural adolescents have considerably higher adolescent birth rates than urban adolescents (24% and 15% respectively) (Figure 4.3). Urban adolescent birth rates however have increased in the last five years. In addition to those who have given birth, 5.6% of adolescent

girls were pregnant, including 3.5% and 6.8% of urban and rural adolescents respectively. Rural girls marry much earlier than urban girls (18.7 and 20.4 years resp.) and also leave school considerably earlier.

Figure 4.3: Adolescent girls 15-19 years who have had a live birth, national surveys.

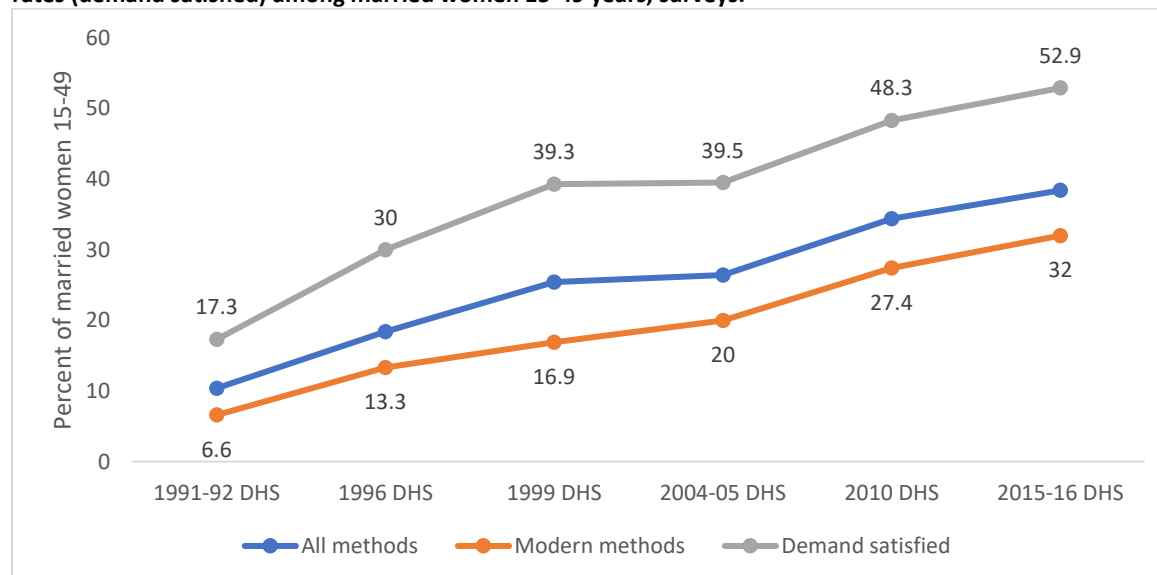


Modern contraceptive use among married women, the main determinant of fertility, increased from 32% in TDHS 2015/16. The demand satisfied for family planning with modern methods increased to 53% (Figure 4.4).

The stagnation of contraceptive prevalence rates among urban and the wealthiest women in the last decade is striking and the urban-rural gap in use of modern contraceptives reduced.

The differences between regions in contraceptive use is large, ranging from 13% in Geita to 51% in Lindi. The average of the top five regions was 50%, the bottom five only 17%.

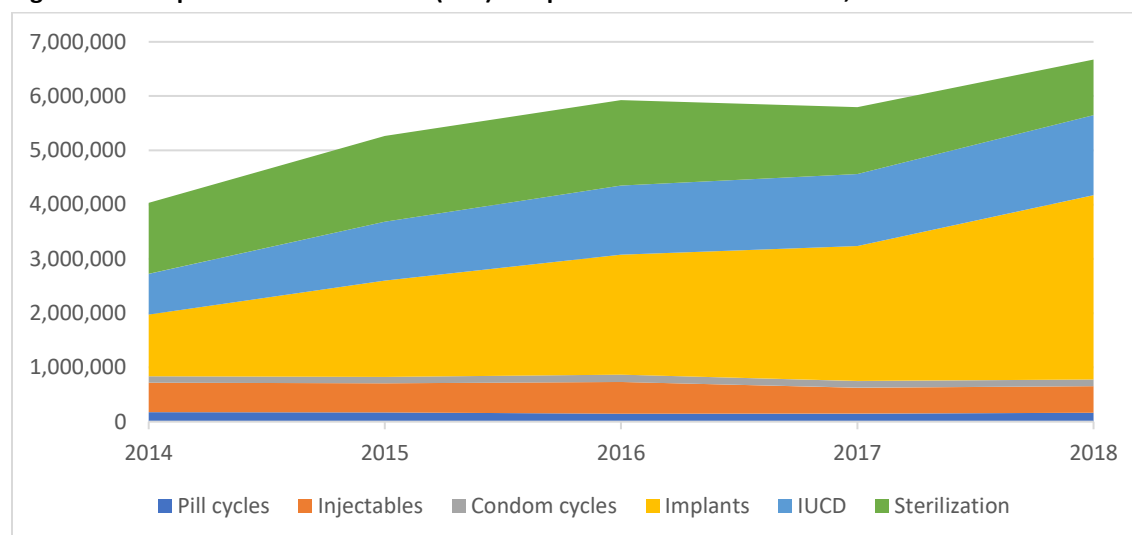
Figure 4.4: Long term trends in contraceptive use (all methods and modern methods) and family planning coverage rates (demand satisfied) among married women 15-49 years, surveys.



The DHIS data by method (including community-based distribution) show a strong increase in contraceptive use, especially in 2018 (Figure 4.5). The number of women receiving implants increased rapidly (nationally, based on an increase in 81% of district councils), and it became the most important method. IUCD use was the only other method that also increased.

The One Plan II target for 2020 of 6.4 million CYP was reached by 2018. The method distribution differs substantially from the TDHS 2015/16 when injectables were the leading method followed by implants, pill and sterilization. Also, the use rate is about 12% higher than in the TDHS 2015/16. The reason for these differences needs further investigation

Figure 4.5: Couple Years of Protection (CYP) computed from the DHIS2 data, 2014-2018.



MATERNAL AND NEWBORN CARE

Data sources: the coverage for the key MNCH indicators was computed from the DHIS2 data by region and council. Completeness of reporting was high, and no adjustments were made for incomplete reporting. Outliers were identified and corrected. For the national level coverage, we used denominators derived from the NBS population projections. For subnational levels, we used a facility data to estimate the numbers of pregnancies, births and eligible children (see Appendix A). Penta1 provided the most suitable and most stable data and was used to obtain the target populations. All results were compared with the TDHS 2015/16 and where feasible the TMIS 2017.

PREGNANCY OUTCOMES

Maternal mortality

Maternal mortality levels and trends are a subject of much debate. The household surveys and census do not suggest a major decline, but the data refer to a period well before HSSP IV. The maternal death surveillance reporting by the RMNCAH program makes an effort to estimate deaths in facilities (and also some from the communities) but the numbers of death suggest that the system still needs to mature before it is capturing all maternal deaths (with less than 2000 maternal deaths per year it can be estimated to have somewhere between 20% and 40% completeness). Trend analysis could not be done because data collected in the previous years (2016

and 2017) are reported to be less reliable (Communication from RCH Manager). The reporting of maternal deaths in DHIS2 appears now less complete than at the time of HSSP III, probably because of fear of reporting.²

The TDHS 2015/16 collected retrospective data about the survival of the siblings of the respondents, which resulted in an estimated 556 maternal deaths per 100,000 live births for the 10 years preceding the survey (2007-2016) (95% confidence interval 446-666). For 2012-2016 maternal mortality was computed as 588 (448-727). This is higher than the maternal mortality from the TDHS 2010 which was 454 per 100,000 live births (353-556) and the census in 2012 with an estimate of 432 for the year preceding the census.

The proportion of deaths among women 15-49 years that are pregnancy related is also taken as an indicator of maternal mortality trends. The proportion was 17% in TDHS 2004/05 and TDHS 2010, 23.5% in the 2012 census and 17% for the 5-year period preceding the survey in TDHS 2015/16. Note however that overall adult female mortality has declined, which is suggestive of a proportional decline in maternal mortality.

A retrospective study of records in 34 public hospitals for the period 2006-2015 found that only 5% of 40,052 deaths of women of childbearing age were maternal deaths. In 2015, the maternal mortality ratio was estimated 58 per 100,000 births but underreporting of maternal deaths is possible and the number of births in the hospitals was not known.³ In this study the major direct causes were eclampsia (34.0%), obstetric haemorrhage (24.6%) and maternal sepsis (16.7%). Indirect causes were anaemia (14.9%) and cardiovascular disorders (14.0%) during 2006-2015.

Stillbirths

Stillbirth is defined as a baby born with no signs of life after 28 weeks of gestation. HSSP IV has no specific target, but the One Plan II has perinatal mortality (stillbirths + first week neonatal deaths) as an indicator (no target). The SDG have no indicator either, but the global action plan has produced a global target of reducing stillbirth to less than 12 per 1,000 births by 2030.⁴

The TDHS 2015/16 reported a perinatal mortality rate of 39 per 1,000 births for the five years preceding the survey. Urban perinatal mortality was even higher (47 per 1,000) than rural (37). The stillbirth rate was 18 per 1,000 live births, but it has to be considered that often stillbirths are underreported in surveys. In any case, perinatal mortality is still high and far from the 2030 global target. Blencowe et al. (2016)⁵ estimated that the stillbirth rate in Tanzania was 22.4 per 1,000 births in 2015.

DHIS2 data shows that stillbirths per 1,000 births in health facilities have declined from 16/ 1,000 births in health facilities in 2015 to 12/1,000 health facility births in 2018.

The regional stillbirth rates range from a low of 6 (Kagera, Kilimanjaro) to 19 per 1,000 (Lindi, Dar es Salaam) in 2018 (Figure 4.6). The trend was downward in most regions. The high level in Dar es Salaam may be a surprise but ties well with the high perinatal and neonatal mortality rates observed in Dar in the TDHS 2015/16. However, the stillbirths captured by DHIS2 maybe an underestimation, as shown in research studies where nearly 25% were not captured in facility registers.⁶ In addition, population stillbirth rates are likely to be higher as home deliveries are not captured in this facility-based statistic.

² Maternal mortality among hospital deliveries was estimated at 160-200 per 100,000 live births in health facilities during 2009-2012, based on HMIS data (Midterm analytical review report, 2013).

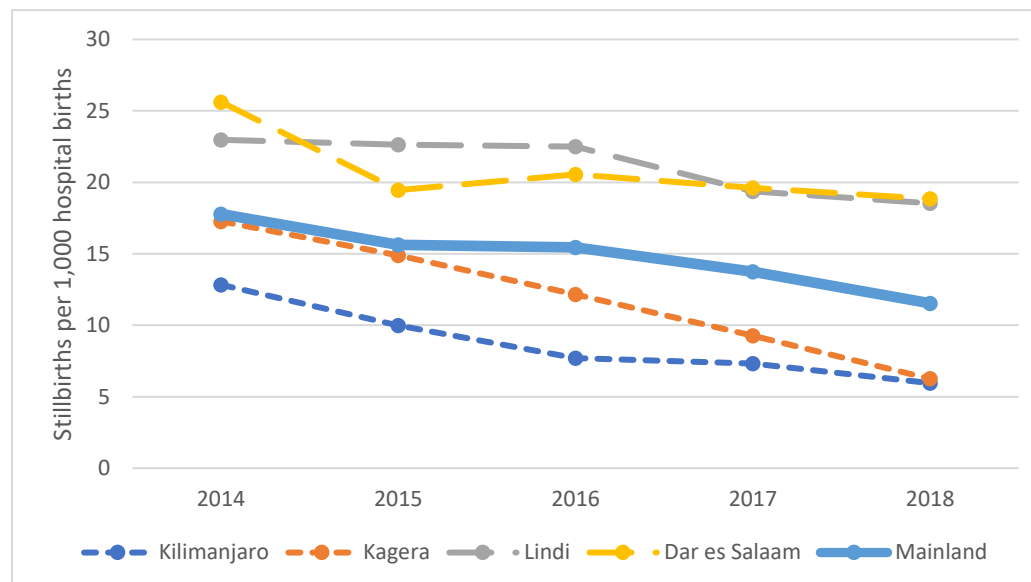
³ Bwana VM, Rumisha SF, Mremi IR, Lyimo EP, Mboera LEG. Patterns and causes of hospital maternal mortality in Tanzania: A 10-year retrospective analysis. *PLoS One*. 2019 Apr 9;14(4):e0214807.

⁴ Every newborn: an action plan to end preventable deaths. Geneva: World Health Organization; 2014.

⁵ Blencowe H, et al (2016). National, regional, and worldwide estimates of stillbirth rates in 2015, with trends from 2000: a systematic analysis. *Lancet Glob Health*. 4(2): e98-e108.

⁶ Maaløe N, et al (2016). Stillbirths and quality of care during labour at the low resource referral hospital of Zanzibar: a case-control study. *BMC Pregnancy Childbirth*. Nov 10; 16(1):351.

Figure 4.6: Stillbirths per 1,000 health facility births, mainland overall, top 2 and bottom 2 regions (in 2018), DHIS data, 2014-2018.



Fresh stillbirth rates are a marker of quality of intra-partum care. The proportion of fresh stillbirths (FSBs) has remained similar throughout 2015-2018: from 41% in 2015 to 43% in 2018. In line with the overall stillbirth rate declined, the mainland intra-partum stillbirth rate also reduced from 6.4 to 5.0 per 1,000 births in 2015 and 2018 respectively. Six regions (Shinyanga, Kagera, Rukwa, Katavi, Geita and Songwe) had proportions of stillbirths that are fresh exceeding 50%. While health facility births are improving, it appears that fresh stillbirths are also coming down, even though levels are still too high which is indicative of challenges in the quality of care during childbirth.

In Tanzania, several studies in the past decade have shown low quality of routine care during childbirth.^{7 8 9} Prediction is poor on which women will end with complications or adverse pregnancy outcomes, thus routine monitoring of 1st and 2nd stage of labour is the only means to detect arising complications. WHO recommends use of partograph in monitoring labour for every woman. Partographs may act as an “early warning system” and help to detect complications early in order to intervene in timely manner. Routine monitoring of labour using partograph is poorly implemented in many facilities in Tanzania. Availability of partographs is not a problem (SARA, 2017), but providers either ignore and do not fill them completely, fill them after delivery, or fill some components while others are ignored missing the opportunity to detect poor progress of labour or foetal complications in the 1st and 2nd stage of labour. In a study by Maaloe et al, (2016), 52% of stillbirths were among women admitted with fetal heart rate present and substandard care during intrapartum period could explain 99% of stillbirths.¹⁰ While the number of women delivering at health facilities has increased, most of these women are not adequately monitored during first stage of labour, and some end up delivering on their own, or present at delivery room to push the baby.⁶ There is a need to address substandard care of routine monitoring during labour, by improving

⁷ Miltenburg AS, Kiritta RF, Meguid T, Sundby J (2018). Quality of care during childbirth in Tanzania: identification of areas that need improvement. *Reproductive Health*. 15:14 DOI 10.1186/s12978-018-0463-1.

⁸ Duysburgh E, Zhang WH, Ye M, Williams A, Massawe S, Sié A, et al. Quality of antenatal and childbirth care in selected rural health facilities in Burkina Faso, Ghana and Tanzania: Similar finding. *Trop Med Int Heal*. 2013;18(5):534–47.

⁹ Nyamtema AS, Urassa DP, Massawe S, Massawe A, Lindmark G, van Roosmalen J. Partogram use in the Dar es Salaam perinatal care study. *Int J Gynecol Obstet*. 2008;100(1):37–40.

¹⁰ Maaløe N, et al (2016). Stillbirths and quality of care during labour at the low resource referral hospital of Zanzibar: a case-control study. *BMC Pregnancy Childbirth*. Nov 10; 16(1):351.

providers skills and accountability, having adequate number of providers and having an enabling environment for provision of care during childbirth to improve survival.

Newborn mortality

Globally, an estimated 44% of under-five deaths occur in neonatal period. In TDHS 2015/16, the proportion of deaths among under-fives occurring in newborn period increased to 37%. Therefore, in order to achieve the 2030 goal of reducing under-five mortality to less than 25 per 1,000 live births and newborn mortality to less than 12 per 1,000 live births efforts to improve newborn survival are needed in Tanzania.

Reliable data on cause of death in the neonatal period are still lacking. It has been estimated that birth asphyxia (intrapartum deaths) is still the leading cause of newborn deaths in Tanzania (33%), followed by preterm births (27.6%) and infections (24%). Addressing asphyxia, preterm/low birth weight and infections is priority to decrease the neonatal mortality Tanzania.

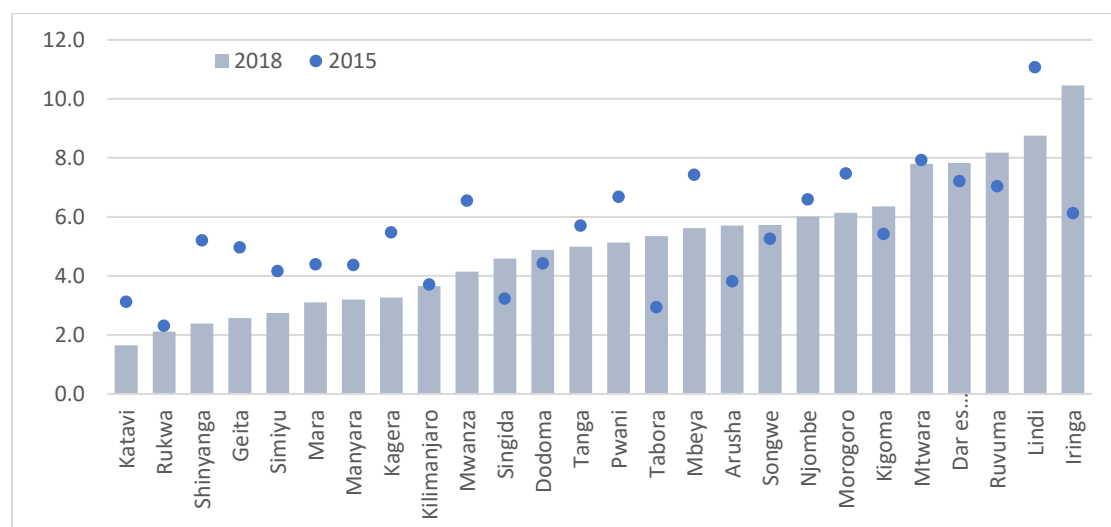
Low birthweight

Low birthweight, defined as less than 2500 grams, among babies born in health facilities declined from 5.5% in 2015, to 5.1% in 2016 and then remained at the same level with 5.2% in 2017 and 5.0% in 2018. A decline 2015-2018 was observed in about two-thirds of the regions (Figure 4.7).

There is major variation between the regions, which may partly be true epidemiological differences and partly be due to reporting. Some of the regions have unlikely low low birthweight rates (below 3.5% among newborns born in health facilities). These include Katavi, Rukwa, Shinyanga, Geita, Simiyu, Mara and Manyara. At the other end, high rates of low birthweight were reported in Iringa (>10%), Lindi, Ruvuma and Dar es Salaam.

The TDHS 2015/16 includes questions on recalled numerical birthweight and relative size at birth. Overall, 68% of mothers were able to recall the birthweight of their babies born in the last five years and 6.9% of those had low birthweight. Some of the regional patterns also appeared in the survey data. This will need further analysis.

Figure 4.7: Percent of newborn babies with low birth weight (less than 2500 grams) by region, DHIS2, 2015 and 2018.



ANTENATAL CARE

In this section, we will analyze trends in pregnant women attending antenatal care (contact coverage) and where possible contents and quality of care using data from DHIS, the household and facility surveys where available. As coverage is increasing, monitoring the quality of care is particularly important. This analysis included the following quality of care related indicators: syphilis testing, HIV testing, anemia testing, received IPT2 and IPT3, and received

mebendazole (for hookworm infections) and iron. Available data shows a gradual increase for most quality indicators between 2014 and 2017, followed by a rapid increase in 2017-2018.

Attendance

In 2018, an estimated 2,283,009 pregnancies occurred, based on the health facility data-based methods. Virtually all women make at least one antenatal care (ANC) visit: coverage 98% in the TDHS 2015/16 and TMIS 2017, and similarly high coverage in the DHIS for 2018 (99%) (Figure 4.8).

Almost two-thirds (59%) of pregnant women made four or more ANC visits. This is a major increase from 37% in 2015 and was also confirmed in TMIS 2017 survey report (62%). The increase was observed in all the 26 regions, reflecting a steady increase in the HSSP IV implementation period and the target of 80% may be reached by 2020 (Figure 4.8). Kilimanjaro, Dar es Salaam, Lindi, Pwani and Mtwara have the highest coverage rates (>70%), while five regions including the new regions of Simiyu and Katavi have coverage below 50%. The absolute gap between the average of the bottom 5 and the top 5 regions grew from 24% to 34%.

Coverage of ANC visit in the first trimester lags behind. Only 26% of women visited before 12 weeks of pregnancy in the DHIS, 2018. This presents a major increase since 2015 when only 13% of women visited in the first 3 months of pregnancy. It is noted that reporting and recording of the duration of pregnancy at the time of the first ANC visit may be error-prone in many instances. The increase in 2017-2018 occurred in all regions, except Katavi. The highest coverage regions for early ANC attendance were Pwani (42%) and Kigoma (41%).

Figure 4.8: Coverage of antenatal care: first visit, four or more visits and timing of the first visit (<12 weeks of pregnancy), DHIS data, 2014-2018, and national surveys.

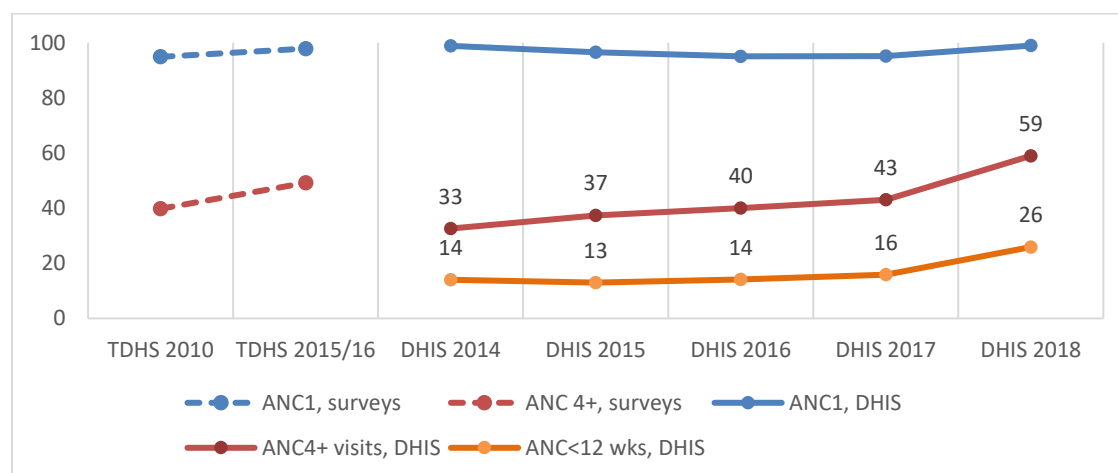
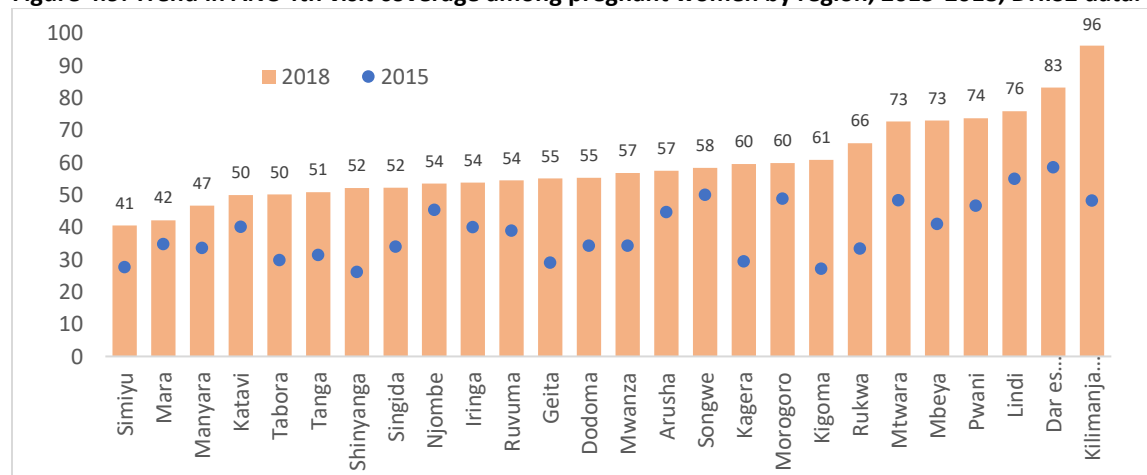


Figure 4.9: Trend in ANC 4th visit coverage among pregnant women by region, 2015-2018, DHIS2 data.



ANC contents: Intermittent Presumptive Treatment of malaria in pregnancy

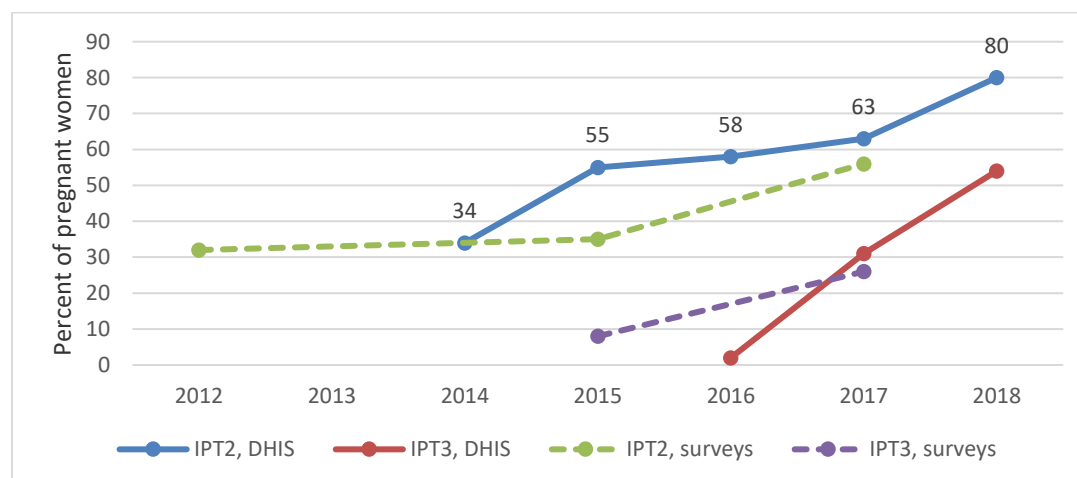
Intermittent preventive therapy (IPT) now aims for three doses of sulphadoxine-pyrimethamine (SP) during pregnancy, but IPT2 has been selected as the HSSP IV indicator. The malaria indicator surveys in 2012 and 2017 indicated that second and third doses of IPT increased from 35% and 8% in 2012 to 55% and 26% in 2017, respectively. The HSSP IV target of 80% coverage with IPT2 however is still far off, according to the survey data.

The DHIS data however indicated 80% of pregnant women received IPT2 and about 60% received IPT3 (Figure 4.10). A steady increase in IPT2 is observed, from 36% in 2014 to 87% in 2018. IPT3 started in 2016 and increased dramatically to 55% in a period of two years.

The increase in IPT2 coverage follows a similar trend noted between 2012 and 2015 using survey data (TMIS and TDHS), which is supportive of the quality of the DHIS data on IPT. The level is higher in the facility data. For instance, in 2015, DHIS coverage was 55% while the TDHS 2015/16 had a IPT2 coverage of 35%. It is possible that women underreport in surveys, or that DHIS overreports.

The increase in IPT2 coverage occurred in all regions. By 2018, the Mbeya, Rukwa, Dodoma, Kilimanjaro and Dar es Salaam had coverage rates exceeding 90%. Coverage were lowest in the northwestern regions of the mainland.

Figure 4.10: Trends in IPT2 and IPT3 coverage (%), according to the DHIS and household surveys, 2012-2018, Tanzania mainland.



ANC contents: pregnant women tested and treated for syphilis

Two-thirds (67%) of pregnant women attending ANC clinic were tested for syphilis (DHIS2). The proportion of pregnant women tested for syphilis increased from 32% in 2015 to 40% in 2017, and a sharp increase was observed in 2017- 2018 (Table 4.1). Testing for syphilis increased in all the regions, however five regions still have syphilis testing coverage below 50% in 2018 (Singida 39%, Katavi 39%, Tabora 40%, Manyara 42%, and Mara 46%)

The percent of tested women who had syphilis infections declined from 2.4% to 1.7% during 2015-2018. Treatment was still inadequate. Among pregnant women who tested positive for syphilis 68% received treatment. This was a significant improvement since 2015 (52%) but still left 32% of women untreated, even after a positive test. Presumably, there are more untreated women among those who did not receive a test at all. This is in contrast to HIV, where more than 90% of HIV-positive pregnant women receive treatment (DHIS2). Reason for low treatment rate for syphilis is not clear but maybe positive women are referred to STI clinic for treatment and are not captured in the RCH registers.

Previous studies in Tanzania have shown low syphilis and Hb screening than HIV during pregnancy. In one study 89% of pregnant women were not checked for syphilis compared to 1% for HIV.¹¹ Another study showed that all the health facilities had HIV testing kits during the study period, but only 20-50% had kits for syphilis testing.¹² The SARA 2017 did not monitor the availability of syphilis tests.

Table 4.1: Syphilis testing, positive results and treatment coverage among pregnant women, DHIS 2014-2018

	Pregnant Mothers Who Tested for Syphilis	Pregnant Mothers With Syphilis Infections	Pregnant Mothers Given Syphilis Treatment
2014	30.1	3.8	40.3
2015	32.2	2.4	52.1
2016	35.8	2.2	57.3
2017	39.7	1.8	62.7
2018	66.5	1.7	68.2

Dual elimination of mother-to-child transmission of HIV and syphilis is a global agenda. The aim is to have less than 50 congenital syphilis cases per 100,000 live births by having 95% antenatal care, 95% syphilis testing, and 95% treatment coverage for syphilis (WHO, 2007). Tanzania is far from the goal.

ANC contents: pregnant women checked for anaemia, deworming and tetanus toxoid

Almost two-thirds of pregnant women attending antenatal clinics had their haemoglobin level checked (Table 4.2). Testing for anaemia increased dramatically from a low of 40% in 2016 to 61% in 2018, and most of the increase occurred in 2018.

The percent of antenatal women with anaemia was low and declining. In 2018, only 1.7% of pregnant women attending antenatal clinics were reported to have anaemia below 8.5 g/dl. These findings are very different from the population based TDHS 2015/16. Among women 15-49 years 11.1% had Hb levels of 7.0-9.9 g/dl (moderate anaemia) and 0.9% had Hb below 7.0 g/dl (severe anaemia). Among pregnant women in the TDHS 30.6% had moderate anaemia and 1.2% had severe anaemia. While the cut-offs are not directly comparable, these differences between DHIS and the survey are very large and deserve further investigation.

Anaemia is a key indirect cause of maternal deaths, but not given priority in testing. The SARA survey (2017) showed that only 31% of surveyed facilities had haemoglobin test, with dispensaries performing the lowest (22%), then health centres (78%) and hospitals (87%).

Table 4.2: Testing for anemia, prevalence of anemia, provision of iron folid acid tables, deworming treatment and TT immunization among pregnant women, DHIS2, 2014-2017.

	Pregnant Mothers Tested for Anaemia - First Visit (%)	ANC Attending Mothers With Anaemia <8.5g/dl (%)	Pregnant Mothers Who had Enough Iron/Folic Tablets (%)	Pregnant Mothers Who Have Had Deworming (Mebendazole / Albendazole) (%)	Pregnant Mothers Who Have Had TT2+ (%)
2014	43.9	2.3	133.6	68.1	60.8
2015	41.0	1.9	163.4	73.5	63.4
2016	39.8	1.7	165.4	74.8	58.8
2017	44.9	1.9	123.5	85.6	67.0
2018	61.1	1.7	221.3	87.9	66.0

¹¹ Katanga J, et al (2015). Screening for Syphilis, HIV, and hemoglobin during pregnancy in Moshi municipality, Tanzania: How is the health system performing. *Science J of Public Health*. 3(1):93-6.

¹² Baker U, et al (2015). Bottlenecks in the implementation of essential screening tests in antenatal care: Syphilis, HIV, and anemia testing in rural Tanzania and Uganda. *International Journal of Gynecology & Obstetrics*. Jun 1; 130 (S1).

The number of women who were reported to have enough iron/folic acid tablets exceeded the number of pregnant women in the DHIS. This is likely because the indicator is reported multiple times for the same pregnancy. The figures are therefore not meaningful, but there does appear to be an increase in 2018 over the preceding years.

Most of the pregnant women (88%) received mebendazole tablets as a strategy to reduce anaemia resulting from hookworm infestations. This proportion increased gradually during HSSP IV.

The second tetanus toxoid injection was given to 66.0% of women, with a modest increase during HSSP IV. Some women may not receive TT injections because they have already received sufficient doses over their lifetime to provide full protection against tetanus.

DELIVERY CARE

This section includes trends in facility deliveries, as well as several indicators of the quality of obstetric and newborn care. It also considers outcomes of deliveries such as stillbirths and low birthweight babies. The main source of recent information is the DHIS2, complemented with survey data to ascertain population levels, verify facility data and consider longer-term trends.

Facility deliveries

More women delivered in health facilities, increasing from just over half of all women (50.2%) in TDHS 2010 to two-thirds (63%) in the TDHS 2015/16 (for the three years preceding the survey). In the TDHS a continued increasing trend was observed from 66% to 71% during 2015-2017, followed by an acceleration in 2018 to 78% coverage.

The two data sources, TDHS-MIS of 2015/16 and DHIS estimates match in the period 2015-2016 for institutional and skilled health providers use, giving confidence trends of use are increasing towards 80% coverage goal. According to the TDHS, only a small percent of deliveries took place in private-for-profit health facilities (2.4%), but almost one in 5 institutional deliveries occurred in NGO facilities.

The skilled birth attendance levels and trends are very similar to the institutional deliveries and are not shown here.

There is considerable regional variation in institutional delivery coverage (Figure 4.12). Over 90% of pregnant women delivered in health facilities in Pwani, Njombe, Mwanza, Kigoma and Ruvuma. Manyara, Simiyu, Geita, Tanga and Mara had the lowest coverage, two-thirds of women delivering in health facilities or below. Most regions registered an increase in births in health facilities between 2015 and 2018.

Figure 4.11: Trends in institutional delivery coverage (% of live births), from surveys TDHS 2010 and TDHS 2015/16 and from DHIS2 (2015-2018)

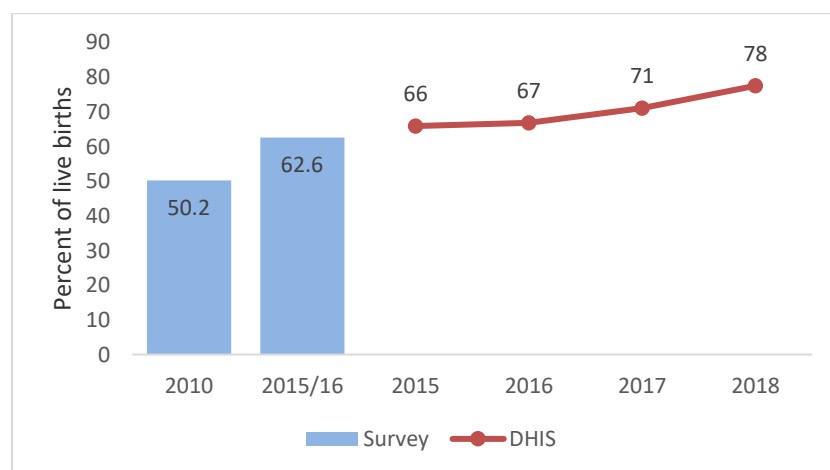
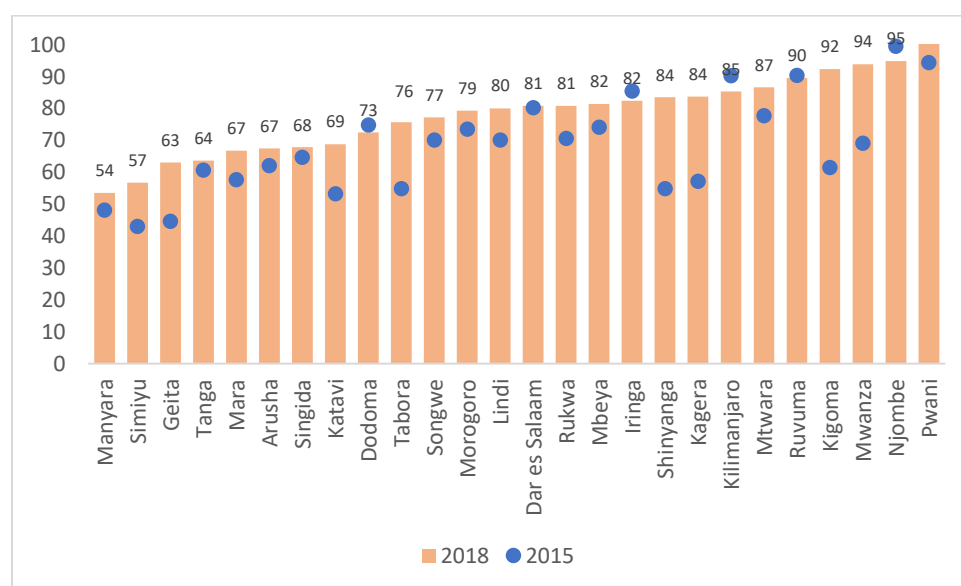
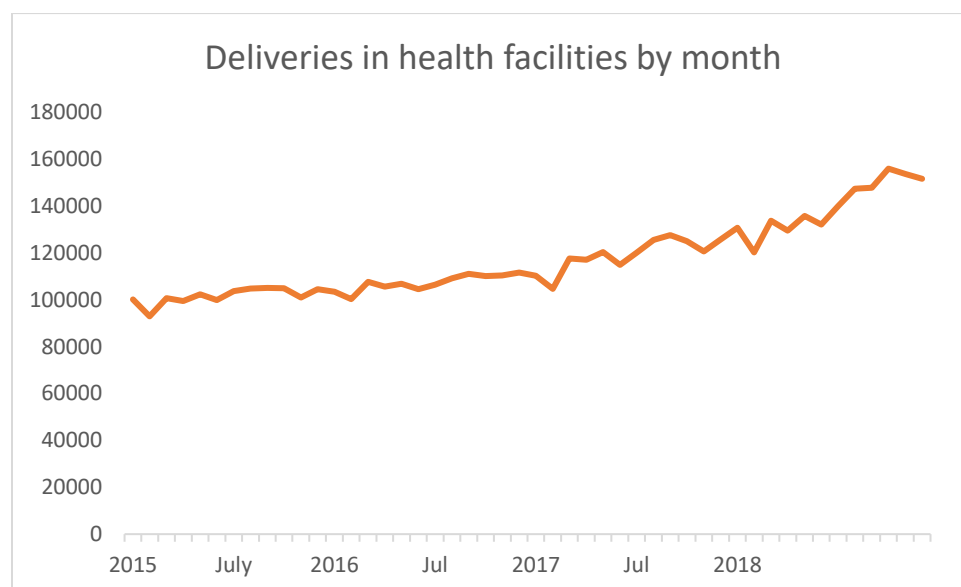


Figure 4.12: Levels and trends in institutional delivery coverage (% of live births), by region 2015 and 2018, DHIS2.



The analysis of the monthly rate of increase of institutional deliveries may provide some insights into the effects of changes in policies, such as the direct financing of health facilities introduced mid 2017. The increase in deliveries was most pronounced in 2017 at a monthly rate of increase of 1.4% throughout the year (same during January to June as for July to December), followed by 2018 (1.3% in the first half and 1.1% per month increase in the second half of 2018).

Figure 4.13: Number of institutional deliveries, by month, mainland, DHIS2, 2015-2018.



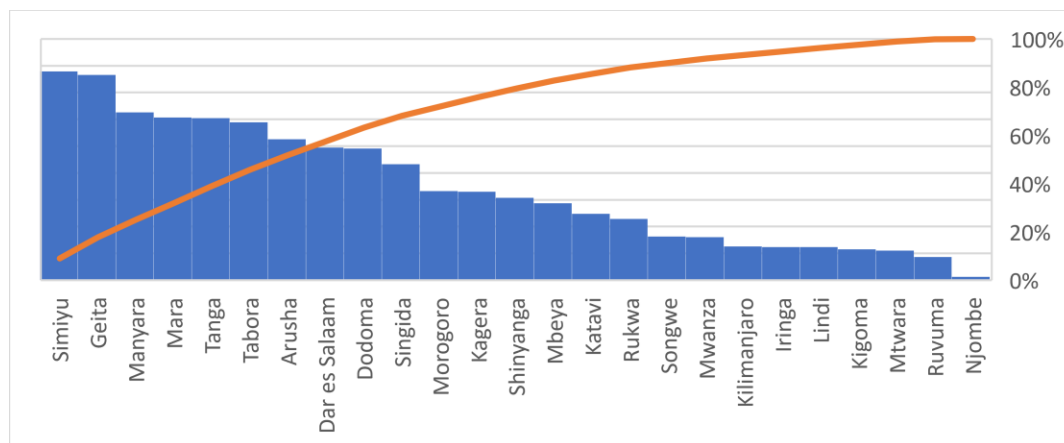
Institutional deliveries: monthly rate of increase (%) over each six-month period, 2015-2018

	2015	2016	2017	2018
Jan - Jul	0.6	0.6	1.4	1.1
Jul - Dec	0	0.6	1.4	1.3

Home deliveries: which regions have the most?

The DHIS2 coverage estimates for institutional deliveries can be compared with the target population of live births / deliveries (derived from the health facility data on pentavalent first vaccination data – Appendix A) by region. The combination of coverage and target population size provides information on where most home deliveries take place and where efforts to promote access and utilization of institutional delivery services need to focus. Figure 4.14 shows that Simiyu and Geita regions had the largest number of home deliveries in 2018, both just under 40,000. Five other regions – Manyara, Mara, Tanga, Tabora, Arusha – also had more than 25,000 home deliveries. The red line indicates the cumulative percent contribution of the number of home deliveries of the regions. This shows that about half of all home deliveries in mainland Tanzania took place in seven regions.

Figure 4.14: Estimated number of live births delivered at home and cumulative percent distribution of these home deliveries by region, DHIS data 2018.



Emergency and essential Obstetric and Newborn Care (EmONC)

It is estimated that 15% of pregnancies will end with serious complications requiring access to facilities and providers trained in EmONC in order to save lives. There are 7 signal functions for obstetric and newborn emergencies for basic EmONC facilities and 9 for comprehensive EmONC facilities.

The aim is that all health centres are ready to provide Comprehensive Emergency Obstetric and Newborn Care (CEmONC), which implies that the facilities should have the capacity of implement nine signal functions including blood transfusion and C-section. By 2018, all health centres have basic EmONC, but C-sections and blood transfusions are mostly not available due to lack of medical equipment and anesthetists. In the Tanzania SARA 2017, 81% of 53 hospitals visited met the criteria for CEmONC, but only 15% of 152 health centres. The C-section rate however increased in most regions and nationally, partly because more women delivered in health facilities. This is an indication that access may have gone up slightly but does not tell much about the quality of care and whether these interventions were emergency-related or not-medically indicated.

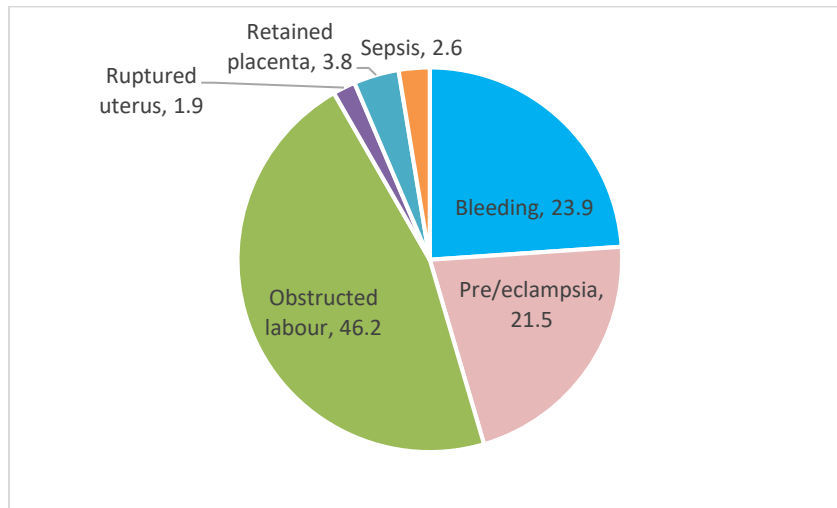
The overall availability of CEmONC services in the country was 5% of all health facilities in 2017 with a slight difference in the availability of CEmONC between rural and urban facilities (4% vs. 7%). However, managing authority variation is noted between the government 3%, NGO/not-for-profit 21%, private-for-profit 9% and faith-based organizations / missionary 11%.

Pre-eclampsia and eclampsia cases treatment

Severe pre-eclampsia and eclampsia is the second leading cause of maternal deaths in Tanzania, accounting for an estimated 13 to 16% of deaths, and the second most commonly reported complication in the DHIS. Obstructed labour and haemorrhage are the two most commonly reported complications (Figure 4.15).

A key intervention for eclampsia is treatment with magnesium sulphate. DHIS2 does not collect data on severe preeclampsia. It collects information on all preeclampsia cases without considering severity (i.e. mild or severe) and eclampsia before and during childbirth. Guidelines for management direct that Magnesium Sulphate should be given to pregnant women with severe preeclampsia and eclampsia. Therefore, calculating the proportion of women given magnesium sulphate in all cases of preeclampsia plus eclampsia will give a lower estimate because of the inflated denominator that includes pre-eclampsia cases. Pre-eclampsia and eclampsia contributed to 21% of the 70,500 obstetric complications recorded in 2018 (DHIS 2)

Figure 4.15: Obstetric complications reported in the DHIS 2018.



Data from DHIS shows that proportion of women with pre-eclampsia or eclampsia who are treated with Mg SO₄ remained similar during 2015-2018: 64%, 60%, 57% and 63% for 2015, 2016, 2017 and 2018 respectively. This implies that still nearly 40% of women with pre-eclampsia do not received treatment. This figure is only indicative of the levels of treatment provided. Not all women with pre-eclampsia require treatment with MgSO₄, in accordance with the national policy.

In 2018, there was considerable regional variation in use of magnesium sulphate, ranging from less than 50% in Kagera and Iringa to over 90% in Arusha, Njombe and Songwe. The quality of the data may however be a challenge, as the denominator use may not always be clear in the health facilities.

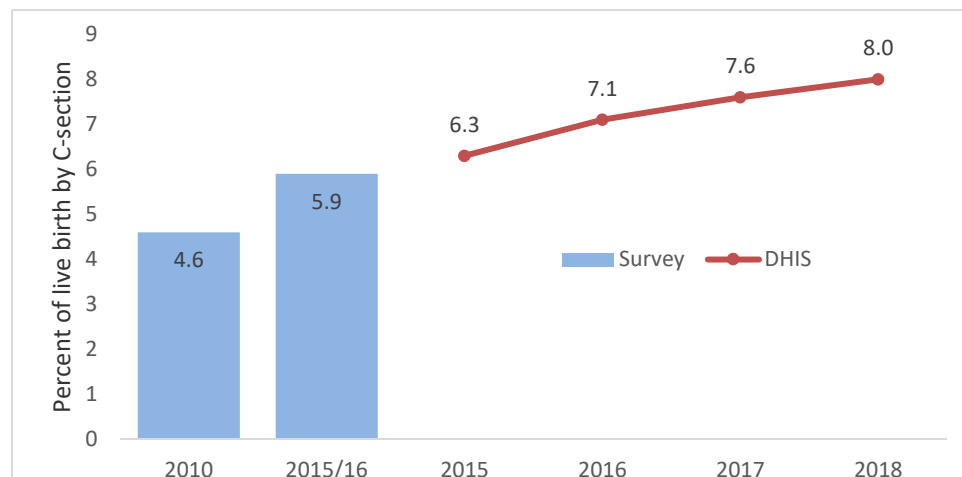
Caesarean Section

C-section is a lifesaving intervention for mother and newborn. The population need of C-sections is difficult to determine and has often been given as in the range of 10-15% of all live births according to WHO. Data from TDHS shows that C-section rates increased from 5% to 6% between 2010 and 2015. Data from DHIS2 shows similar trends with CS increase from 6.3% in 2015 to 8.0% in 2018 (Figure 4.16).

This increase reflects the increase in institutional deliveries. Even though there were considerably more women coming to health facilities, the chances that a woman would get a C-section remained the same. This suggests that the institutions were able to keep up with the increased numbers from the perspective of C-section rates, even though this says little about the quality of services.

The increase in C-section has been observed in all the regions (Figure 4.17). Eight regions however have C-Section rates below 5% (Katavi, Simiyu, Geita, Tabora, Mara, Shinyanga, Kigoma and Rukwa), showing limited access of this service for women who might need it.

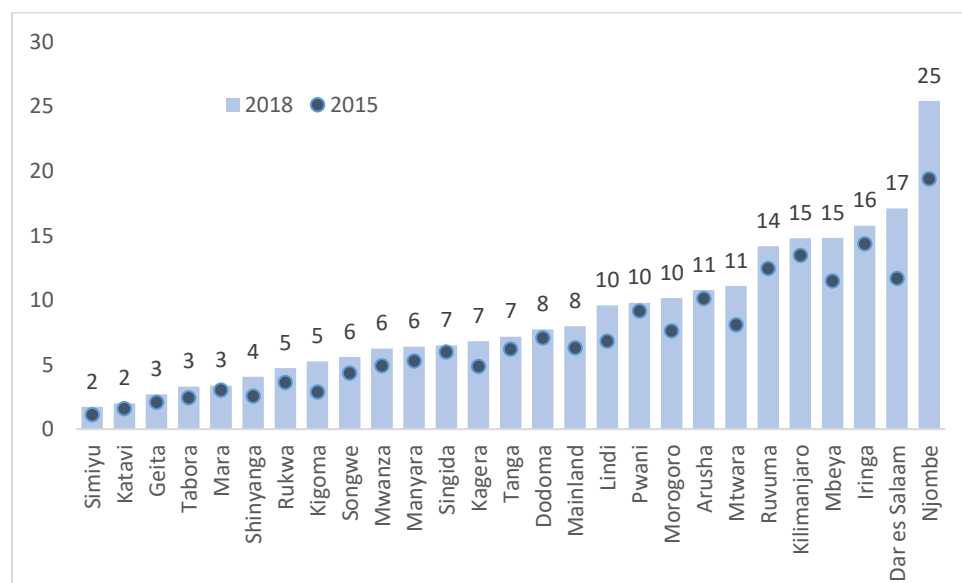
Figure 4.16: Trends in C-section (% of live births), from surveys TDHS 2010 and TDHS 2015/16, and from DHIS2 (2015-2018).



On the other hand, several regions have rates of 15% or higher, which may be indicative of use of elective procedures – i.e. non-medically indicated C-sections, which is common in many parts of the world. These regions include Mbeya, Kilimanjaro, Iringa, Dar es Salaam and Njombe. Njombe region has a very high C-section rate (25%) which requires further investigation.

Studies in Tanzania and elsewhere are increasingly showing that a substantial proportion of C-Section are based on unjustified or inappropriate indications especially in low-risk groups. Proportion of inappropriate indications for C-Section range from 26% - 38% in Tanzanian studies (Maaloe *et al*, 2012; Litorp *et al*, 2013; Nyamtema *et al*, 2016; Dekker *et al*, 2018). Though lifesaving and reduce perinatal mortality and morbidity, C-Section as a surgical procedure is associated with short and long term complications including increased risk of mortality, future risk of ruptured uterus, abnormal placenta position, ectopic pregnancies and preterm births (Nyamtema *et al*, 2016; Biccarrd *et al*, 2018), hence the need for focused C-Section audits and feedback to providers to reduce inappropriate C-sections.

Figure 4.17: C-sections per 100 live births in the population, by region, DHIS2, 2015 and 2018.



Newborn Resuscitation

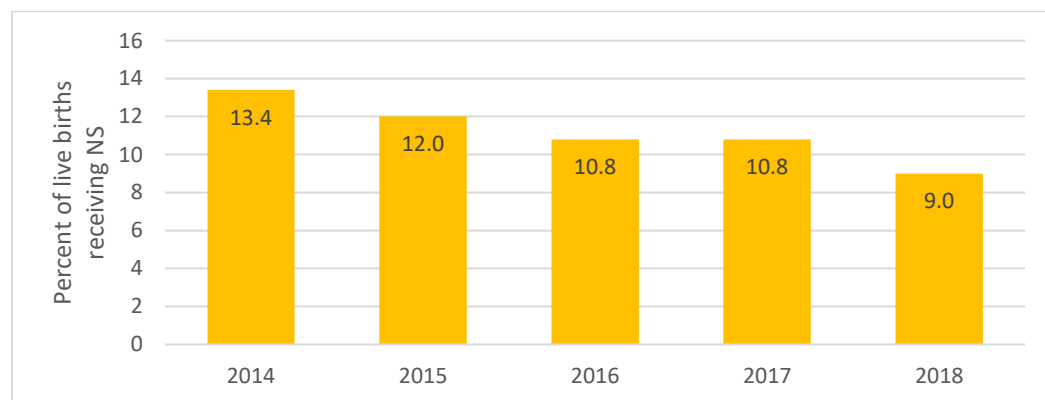
Birth asphyxia which is defined as inability to start or maintain normal breathing, is estimated to be the leading cause of newborn deaths in Tanzania accounts for one third of neonatal deaths.¹³ Newborn resuscitation is a lifesaving intervention for birth asphyxia. It has been estimated that approximately 5%–10% of newborns require some support to adapt to the extra-uterine environment and to establish regular respiration.¹⁴ Newborn Resuscitation should be offered within a minute after birth.

DHIS-2 collects information on newborns who were helped to breathe using suction, simulation and bag & mask. It does not collect information on the need for the intervention, i.e. the number of newborns who were born not breathing or those who failed to maintain breathing thus needs resuscitation. Therefore, the denominator for calculating the proportion of newborns who were given newborn resuscitation is not available. We used health facility live births as a denominator to calculate proportion of newborns who were resuscitated to get trend over time. Therefore, observations presented below should be interpreted with caution.

Tanzania scaled up Helping Babies to Breathe (HBB) program in 15 regions from May 2013 - December 2014, after piloting the program in 8 referral hospitals in 2009 and showed sustained 47% reduction in early neonatal mortality within 24 hours and a 24% reduction in fresh stillbirths after 2 years.¹⁵ The program involved 1-day training of health providers from the hospitals, health centres and dispensaries at these regions working in the labour wards, maternity or neonatal units as well as provision of newborn resuscitation equipment.

According to DHIS-2, the proportion of all newborns who received neonatal resuscitation declined from 12.0% in 2015 to 9.5% in 2018. The reported neonatal resuscitation rates varied greatly by region. In 2018, three regions had rates below 5% (Kilimanjaro, Singida and Geita) and two region had rates above 15% (Njombe and Manyara). The proportion of NRs declined in 16 regions. The decline from 2015 – 2018 was also noted in 8 out of the 15 regions that were part of the national HBB program.¹⁶

Figure 4.18: Percent of newborns who received resuscitation among live births in health facilities, DHIS2, 2014-18.



The SARA 2017 has shown that equipment for neonatal resuscitation is not an issue in Tanzania, because > 90% of health facilities assessed have functional equipment in labour and delivery rooms. Skills and knowledge of providers in newborn resuscitation is a key issue. A study by Arlington et al. showed that there is high attrition in proportion of SBAs trained in newborn resuscitation who are labour or maternity units after training (constitute

¹³ Tanzania newborn situation analysis. UNICEF, 2018. Draft report.

¹⁴ Patel A, Khatib MN, Kurhe K, Bhargava S, Bang A (2017). Impact of neonatal resuscitation trainings on neonatal and perinatal mortality: a systematic review and meta-analysis. *BMJ Paediatr Open*; Nov 16;1(1):e000183.

¹⁵ Msemo G, Massawe A, Mmbando D et al. Newborn mortality and fresh stillbirth rates in Tanzania after helping babies breathe training. *Pediatrics*. 2013 Feb;131(2):e353-60.

¹⁶ Arlington L, Kairuki AK, Isangula KG, et al. Implementation of "Helping Babies Breathe": A 3-Year Experience in Tanzania. *Pediatrics*; 2017, 139(5). pii: e20162132. doi: 10.1542/peds.2016-2132.

68% in the follow-up 4/6 weeks after training and 57% at 4-6 months post training). Further, there is high drop in retention of knowledge and skills (57% of providers could perform well at 4-6 months after training compared to 87% immediate after training). In a qualitative study, midwives indicated that if HBB training is not followed by supportive supervision during actual resuscitation of newborns in the labour ward, then the quality of resuscitation is low. The midwives reported the HBB one day course is too short to impart skills.¹⁷ These studies point to the need of continued training of providers in NR maybe even annually to see improvement over time.

Tanzania is far from its HSSP IV target of reducing neonatal mortality to 16 per 1,000 live births. In 2015, TDHS reported neonatal mortality of 25 per 1,000 live births for the five years preceding the survey. Efforts in improving newborn resuscitation are urgently needed to address asphyxia and ultimately help to reduce preventable newborn deaths.

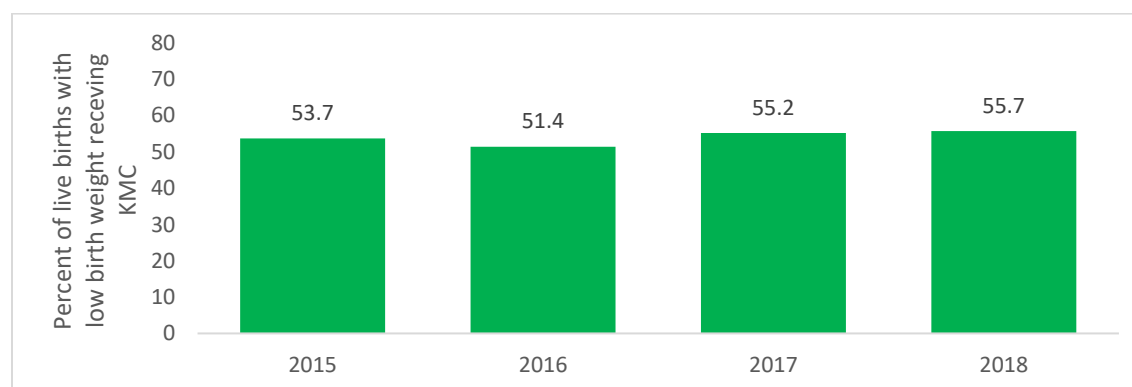
Kangaroo Mother Care

Kangaroo Mother Care (KMC) is defined as early and continuous skin-to-skin contact between newborn and care giver. Benefits of KMC have been demonstrated in stable, preterm and low birth weight (LBW) infants born with birth weight of less than 2000 grams. KMC has been shown to significantly reduce the risk of newborn mortality, reduce risk of hypothermia, reduce hospital stay, and improve breastfeeding and growth.

DHIS-2 collects information on newborns that were born with birth weight (LBW) < 2500 grams and collects information on newborn babies that were given KMC. It does not collect information on eligible newborns for KMC (i.e. birthweight less than 2000 grams).

To obtain an idea of the extent to which KMC is practiced, we computed the ratio of the numbers who received KMC to the reported numbers of newborns with birthweight less than 2500 grams, as reported in the DHIS2 (Figure 4.19). It is likely that the babies with low birthweight included all babies that received KMC, but the aggregate reporting system does not allow us to verify this. Therefore, the results presented below should be interpreted with caution, as the HSSP IV indicator, percent of babies weighing less than 2000 grams who received KMC, cannot be computed from the DHIS-2 data. The percent of newborns with birthweight < 2500 grams who received KMC has not changed much, increased from 53.7% in 2015 to 55.7% in 2018. The SARA survey in 2017 showed that only 42% of the assessed facilities had KMC services for premature and very small babies. LBW/preterm is the second leading cause of newborn deaths (27.6%) in Tanzania. Adaptation and implementation of KMC should be strengthened.

Figure 4.19: Ratio of number of newborns who received kangaroo mother care and the number of newborns with birthweight below 2500 grams in health facilities, DHIS-2, 2014-2018.



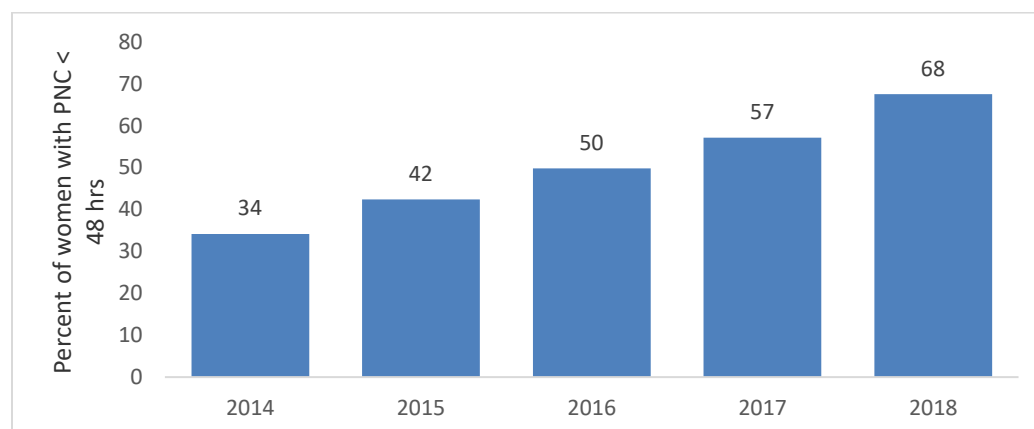
¹⁷ Moshiri R, Ersdal HL, Mdoe P, Kidanto HL, Mbekenga C (2018). Factors affecting effective ventilation during newborn resuscitation: a qualitative study among midwives in rural Tanzania. *Glob Health Action*.; 11(1): 1423862. doi: 10.1080/16549716.2018.1423862.

POSTNATAL CARE AND BREASTFEEDING

About two-thirds of the women (68%), including those who delivered at home, attended postnatal care (PNC) within 48 hours (Figure 4.20). This represents an increase from 42% in DHIS 2015. The PNC coverage figures for 2014-2015 were close to the TDHS 2015/16 which reported 34% PNC coverage within 2 days for live births in the two years preceding the survey.

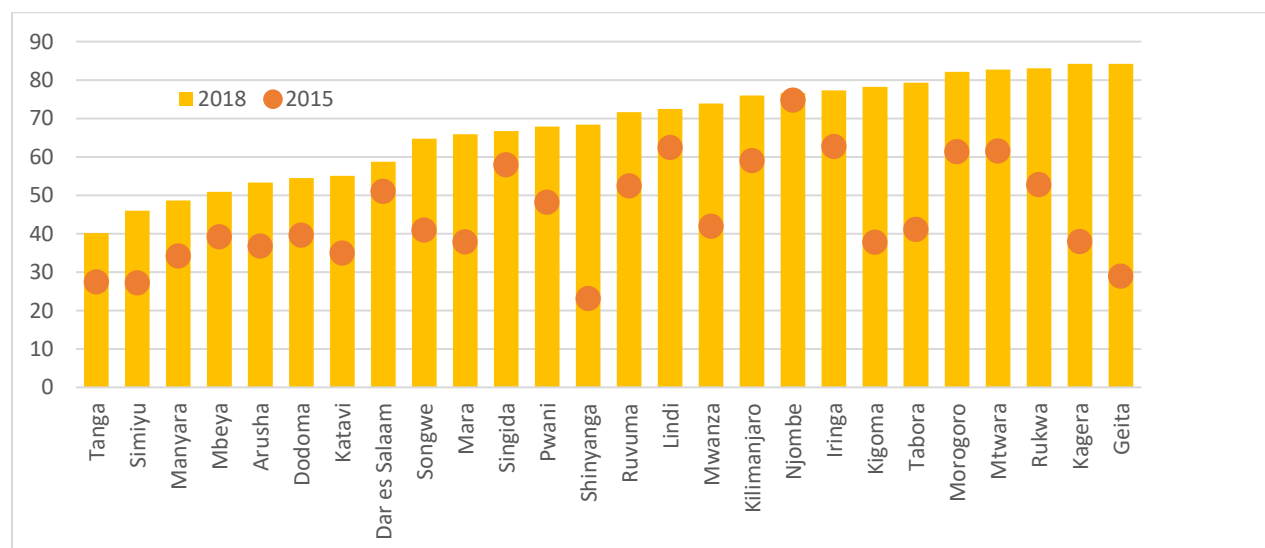
The level and trend were almost exactly the same for newborn PNC attendance, which indicates that the PNC visit is made by the woman and newborn together but does not tell much about the contents received (data not shown). All women and newborns attended for PNC care within 7 days of delivery. The contents of the postnatal care is currently not included in the DHIS-2.

Figure 4.20: Postnatal care visit (% of all live births) for women within 48 hours of delivery, DHIS-2, 2014-2018.



The increase in PNC attendance occurred in all regions, including very large increases in Shinyanga and Geita (Figure 4.21). More than 80% of women attended postnatal care services within 48 hours after delivery in five regions including Geita, Kagera, Rukwa, Mtwara and Morogoro regions. In three regions PNC attendance within 48 hours was less than 50% (Tanga, Manyara and Simiyu). The regional patterns is quite different from ANC or delivery care and the quality of the reported data on PNC visits is an issue for further work.

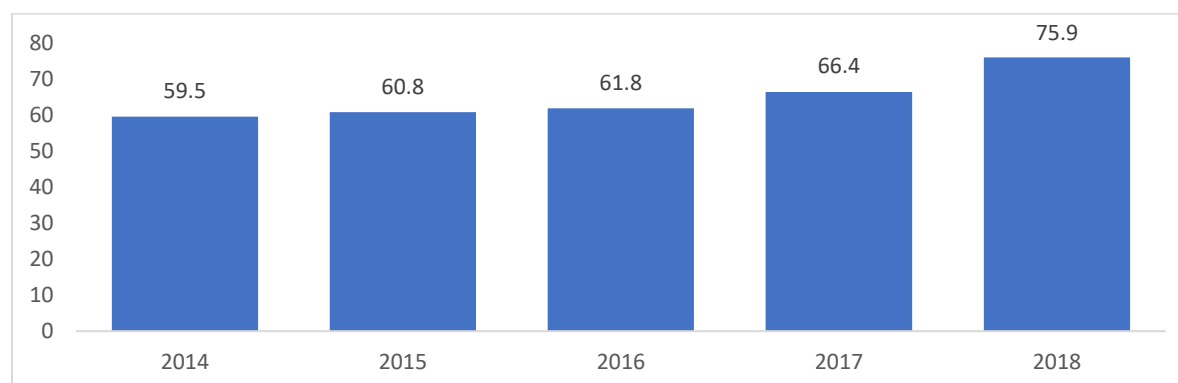
Figure 4.21: Percent of women attending postnatal care within 48 hours, by region, 2015 and 2018.



Breastfeeding is nearly universal in Tanzania (>98% of women). Early initiation of breastfeeding (within 24 hours) is critical and increased from 61% in 2014 to 76% in 2018 according to the DHIS (Figure 4.22). The increase is most

pronounced during 2017 and 2018. These figures are higher than the TDHS 2015/16 when 51% of the respondents said they had initiated breastfeeding in the first 24 hours after delivery.

Figure 4.22: Percent of live births who are breastfed within 1 hour after birth, DHIS-2, 2014-2018.



CHILD IMMUNIZATION

Data source: Vaccination data are collected through the DHIS2 on a monthly basis. In the analysis we used the DPT1 numbers to approximate numbers of eligible children as DPT1 coverage (97%) is close to 100% in the TDHS (added 3% to obtain the target populations). The results were compared with the annual WHO/UNICEF Joint Reporting Form (JRF) numbers. The JRF numbers are consistently higher than the DHIS data, even though the gap is reducing during 2017-2018. A comparison of the JRF and DHIS-based estimates with the survey coverage estimates shows that the DHIS2-based coverage estimates are closer to the survey. The TDHS 2015/16 provides data on coverage of all vaccines among children 12-23 months, as well as by 12 months.

According to DHIS2, 98% of infants received the first dose of pentavalent vaccine in 2018, similar to 2016 and 2017 (Figure 4.23). Nearly nine out of ten infants also completed three doses of pentavalent3 vaccination. Penta3 coverage increased slightly from 85% in 2015 to 89% in 2018 according to DHIS- based estimates. In the TDHS 2015/16, coverage of the third dose of the pentavalent vaccine was 89% among children aged 12-23 months and 87.7% by 12 months of age (comparable to the DHIS2 data which aim at reporting for infants).

The coverage of measles-rubella vaccine was also high according to the DHIS2: 98%, 97% and 98% in 2015, 2016 and 2018 respectively, with a dip in 2017 to 87%. The explanation for this temporary drop is not clear. In the TDHS 2015/16 measles coverage was 86% among children 12-23 months, and 78% by 12 months. It is likely that the DHIS reporting includes quite a few children who have had their first birthday and should be reported separately, which explains the difference between DHIS2 and survey-based coverage statistics for measles vaccination.

A similar phenomenon appears to occur for BCG. Coverage rates for BCG are over 120% in the DHIS2. There are more BCG vaccinations than for instance penta1 vaccination, while the surveys indicate that coverage of both vaccines should be about the same and between 95% and 100%. It is also possible that revaccinations (because of no local reaction to the subcutaneous BCG vaccine) are given frequently and included in the reported numbers of BCG vaccinations.

Pneumococcal and rotavirus vaccines were introduced in Tanzania in 2013, and coverage rates in 2014 were still below 10% (Figure 4.24). The coverage of both vaccines increased dramatically to 83% for PCV third dose and 94% rotavirus second dose according to DHIS data. PCV3 coverage increased steadily to 94% in 2018, while rota2 dropped in 2016 to 89% but remained above 90% in subsequent years. The DHIS2 data show that the coverage of PCV3 and rotavirus 2 in 2018 were high: 90% and 88% respectively.

Figure 4.23: Coverage of Pentavalent and Measles vaccination, infants, Tanzania

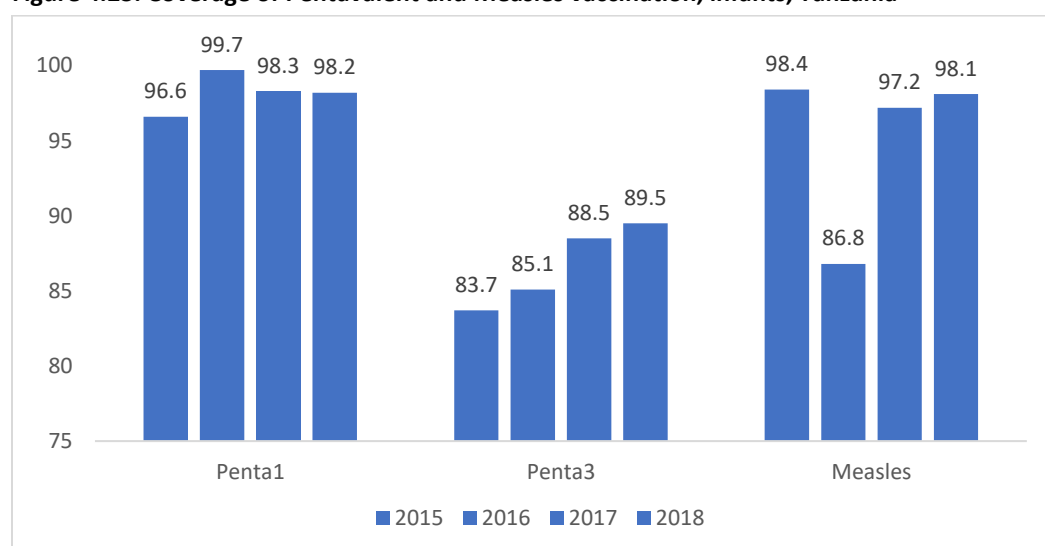
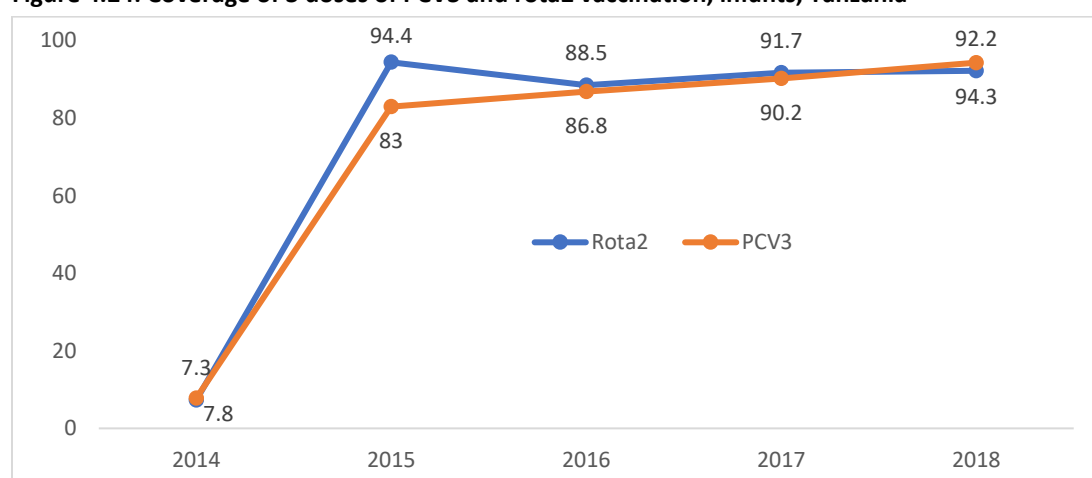


Figure 4.24: Coverage of 3 doses of PCV3 and rota2 vaccination, infants, Tanzania



The DHIS2-based estimates of the coverage of the third dose of pentavalent vaccine among infants ranged from less than 80% in Tabora and Simiyu regions to over 95% in Kigoma, Dar es Salaam, Mtwara and Kagera (Figure 4.25). Three-quarters of the regions experienced an increase during HSSP IV.

Infants not reached with penta3

The DHIS2 coverage estimates for penta3 can be compared with the target population of eligible infants (derived from the penta1 data) by region. The combination of coverage and target population size provides information on where most infants are who have not received three doses of pentavalent vaccine. Figure 4.26 shows that Tabora region had the largest number of infants not receiving penta3 in 2018: over 25,000. Five other regions – Simiyu, Shinyanga, Dodoma, Geita and Mara – also had more than 10,000 infants not receiving penta3. The red line indicates the cumulative percent contribution of the number of unimmunized children in each region. This shows that half of all unimmunized infants were living in 5 regions. It is noted that regions with very small numbers of infants not receiving penta3 were not shown in Figure 4.26 (Dar es Salaam, Kigoma and Mtwara).

Figure 4.25: Coverage of pentavalent vaccine third dose among infants, by region, DHIS2, 2015 and 2018.

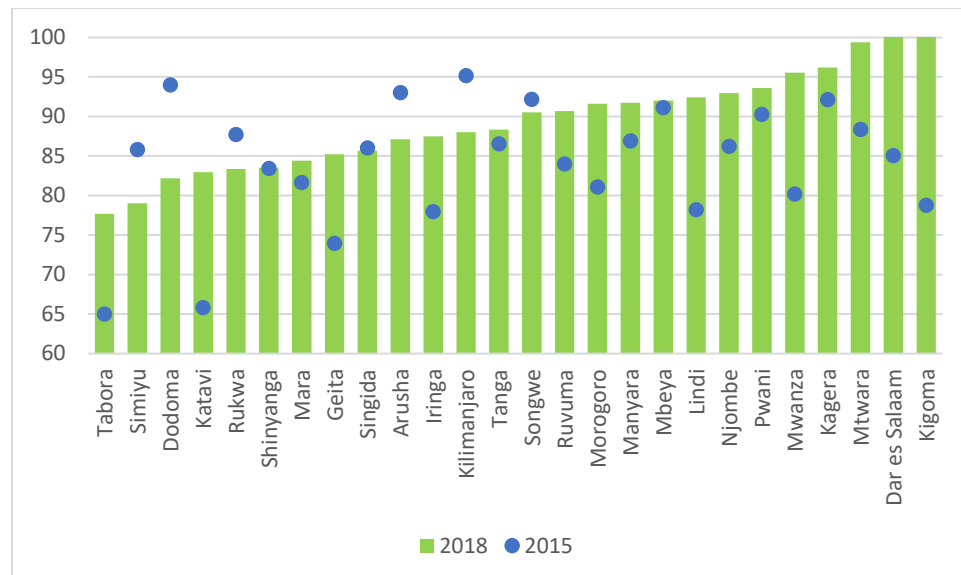
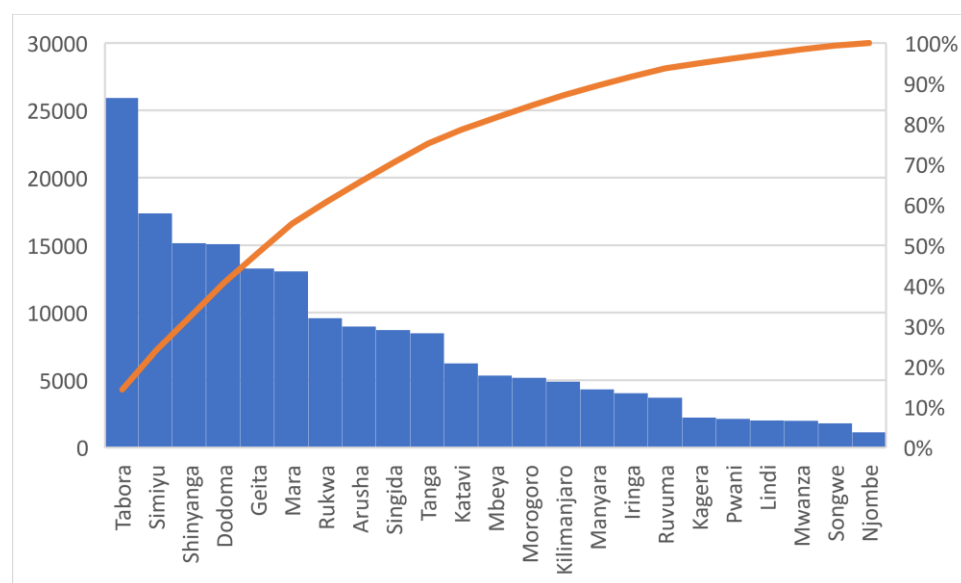


Figure 4.26: Estimated number of infants who did not receive pentavalent third dose by region and cumulative percent distribution of these infants, DHIS data 2018.



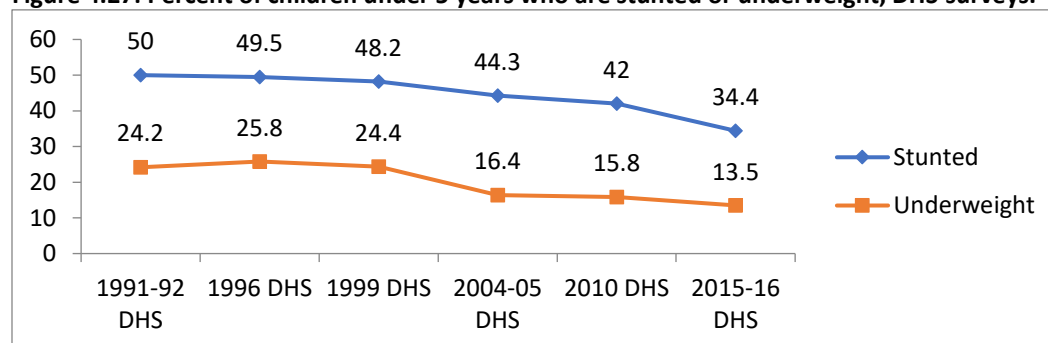
CHILD HEALTH AND NUTRITION

Data sources: the household surveys are the only reliable source of the population prevalence of underweight, stunting and wasting. Therefore, no post 2016 trend can be assessed. The vitamin A supplementation data from the DHIS2 led to inconsistent results and were not used here.

Child growth

The proportion of children under 5 years who are *stunted* – a sign of chronic undernutrition – decreased faster during 2010-2015 than any time since 1990 with a decline of 8% (Figure 4.27). The 2020 target of 27% requires this rate of decline to continue. Also, the proportion of children who are underweight – a measure of both chronic and acute malnutrition – declined from 16.5% to 13.5%, meeting the HSSP III target, and suggesting that the 2020 target for HSSP IV is within reach.

Figure 4.27: Percent of children under 5 years who are stunted or underweight, DHS surveys.

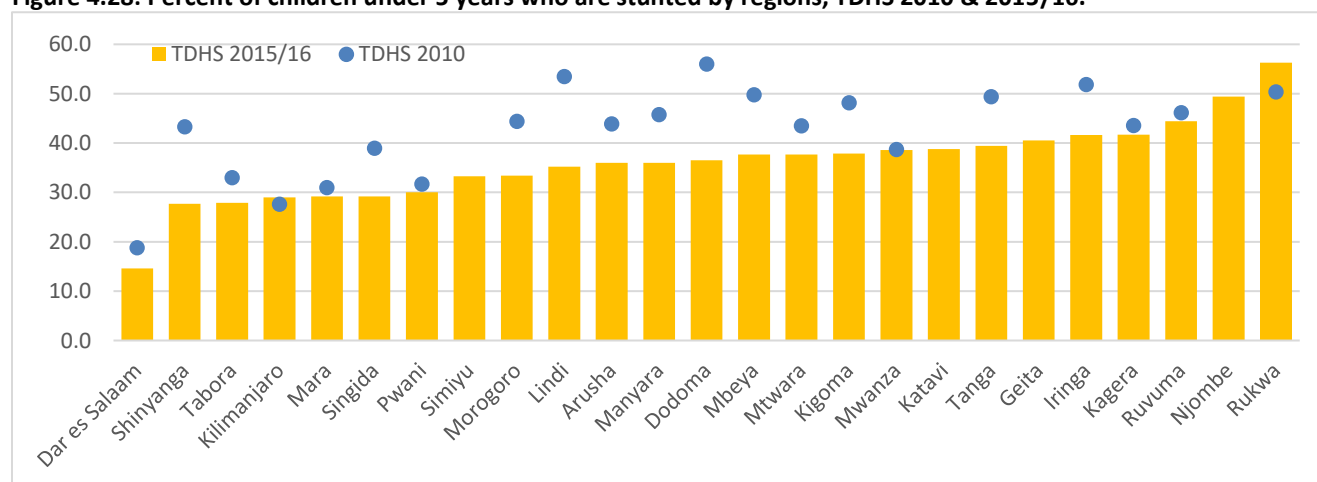


Inequalities in child growth

In terms of stunted growth in children under 5 years there were still very large differences between the poorest and richest in 2015/16: 39.9% and 19.2% in the poorest and richest quintiles respectively. Also, the gap between the poor and rich hardly changed during 2010-2015/16. Also urban – rural differences were large and persisting. Rural children having 13% higher levels of stunting in children under 5 than urban children (38% and 25% respectively). The gap between rural and urban children remained the same during 2010 and 2015/16. In 2010, stunting levels were 45% and 32% among rural and urban children respectively.

At regional levels, stunting levels continued to be lowest in Dar es Salaam (14.5%), followed at a distance by eight regions with stunting prevalences between 28 and 33%. Very high levels of stunting were found in Rukwa region (over 50%) and also Kagera, Iringa and Ruvuma had prevalence over 40% (Figure 4.28). The prevalence of stunting in children under 5 years did not show the same narrowing of the differences between regions during 2010-2015/16 as child mortality. In 2010, the absolute gap between the three lowest prevalence regions (Dar es Salaam, Kilimanjaro, Mara) and the three highest prevalence regions (Dodoma, Lindi, Iringa) was 24%. In 2015/16, this gap between the three lowest prevalence regions (Dar es Salaam, Tabora, Kilimanjaro) and the three highest prevalence regions (Rukwa, Ruvuma, Iringa) was 22%. Dodoma and Lindi stand out with declines of more than 20%.

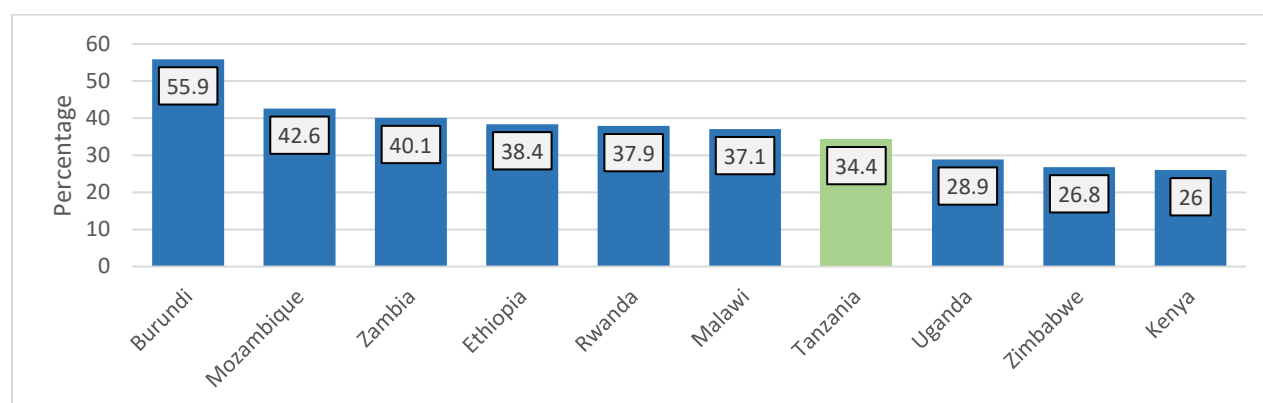
Figure 4.28: Percent of children under 5 years who are stunted by regions, TDHS 2010 & 2015/16.



Comparative analysis

Similar to child mortality, Tanzania takes an intermediate (4th) position among the 10 countries, after Kenya, Zimbabwe and Uganda, according to the most recent survey s (Figure 4.29). In terms of decline in stunting rates between the two most recent surveys, Tanzania observed the third fastest decline among the 10 countries. The annual rate of decline was 1.1% per year in Tanzania, only surpassed by Zimbabwe (2.67%) and Kenya (2.17%).

Figure 4.29: Percentage of children under 5 with stunting, selected eastern and southern African countries, most recent DHS survey.

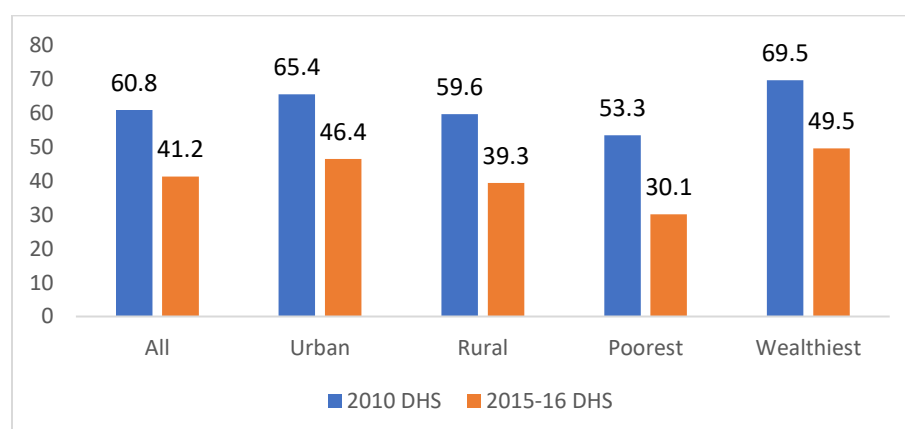


Vitamin A supplementation

Between TDHS 2010 and TDHS 2015/16 the percent of children who received vitamin A supplementation during the 6 months preceding the survey reduced drastically (Figure 4.30). The decline occurred in urban and rural children and was especially large among the poorest children.

DHS2 also gathers vitamin A supplementation data, but our analysis resulted in unlikely high and irregular trends. Therefore, these statistics are not presented here, as the vitamin A supplementation data require special attention in the DHIS recording reporting systems.

Figure 4.30: Percent of children 6-59 months who received vitamin A supplements in the last 6 months, by residence and wealth quintile, TDHS 2010 and 2015/16

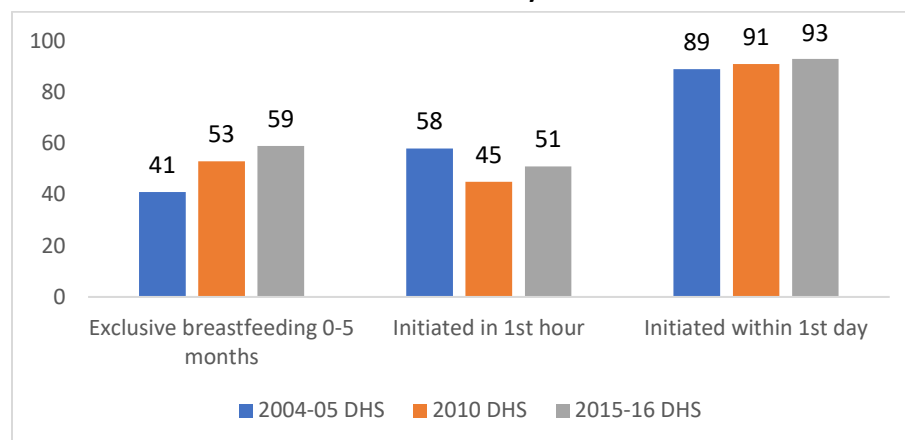


Breastfeeding practices

Exclusive breastfeeding rates among children 0-5 months continued to improve during 2010-2015/16 (HSSP III) reaching 59% compared to 53% in 2010 (Figure 4.31). The median duration of exclusive breastfeeding increased from 2.6 to 3.0 months.

More than 90% of newborns are given breastfeeding on the first day of life. Only 51% however is initiated within the first hour of life as recommended. This however presents an improvement compared to 2010 (but is still lower than in 2004/05).

Figure 4.31: Percent of infants 0-5 months who are exclusively breastfed and newborns whose breastfeeding is initiated within 1 hour of birth and within 1 day.



Several indicators aim to assess childhood illness treatment patterns such as care seeking behaviours. These indicators are not part of the core set of indicators in HSSP IV. According to the TDHS, the percent of children with suspected pneumonia (breathing difficulties with or without cough) who were taken to a health facility was 71% in 2010 and 55% in 2015/16.

Almost 12% of children had diarrhea in the two weeks preceding the TDHS 2010 (15% in 2010). Among those 43% was taken to a health facility (53% in 2010), 45% received ORS packets (44% in 2010), and 56% (63% in 210) received increased fluids or oral rehydration therapy.

The data on children with fever in the last 2 weeks are presented in the malaria section.

ADOLESCENT HEALTH

One Plan II includes eight indicators of adolescent sexual and reproductive health. Some of the indicators are now reported and compiled within DHIS2, while others have to rely on less frequent surveys. The indicators are:

Indicator	Data source	Status
Health facilities with adolescent friendly RH services	Health facility survey	
Sexual debut before age 15 among 15-24-year-old women	Household survey	12% of women and 13% of men 15-24 started before 15 in 2015/16; no improvement over time
New adolescent FP clients receiving condoms	DHIS2	Small increase from 50,000 to 69,000 in 2018, but this is only a small proportion of sexually active adolescents
Adolescents who received post abortion care services	DHIS2	Can only be number as the denominator (those with abortion needing PAC) is unclear
Adolescents under 20 who received ANC1 < 12 weeks	DHIS2	DHIS2 data suggest higher coverage in adolescents, but data quality is unsure
Adolescents under 20 who delivered in health facility	Survey and DHIS2	About 80% and at the same level as older women
Adolescents under 20 who received PNC < 48 hrs	Survey and DHIS2	Almost two-thirds and at the same level as older women
Newborns of adolescents < 20 who received PNC < 48 hrs	Survey and DHIS2	Similar to mothers receiving PNC

The One Plan II indicator on very early initiation of sex can also be obtained from the TDHS 2015/16: 12% of young women and 13% of young men 15-24 years had initiated sex before they were 15 years. Five years earlier in the TDHS 2010, the proportion who had started sex before 15 was the same for women (13%), but lower for men (7%). In general, there is no improvement in this indicator.

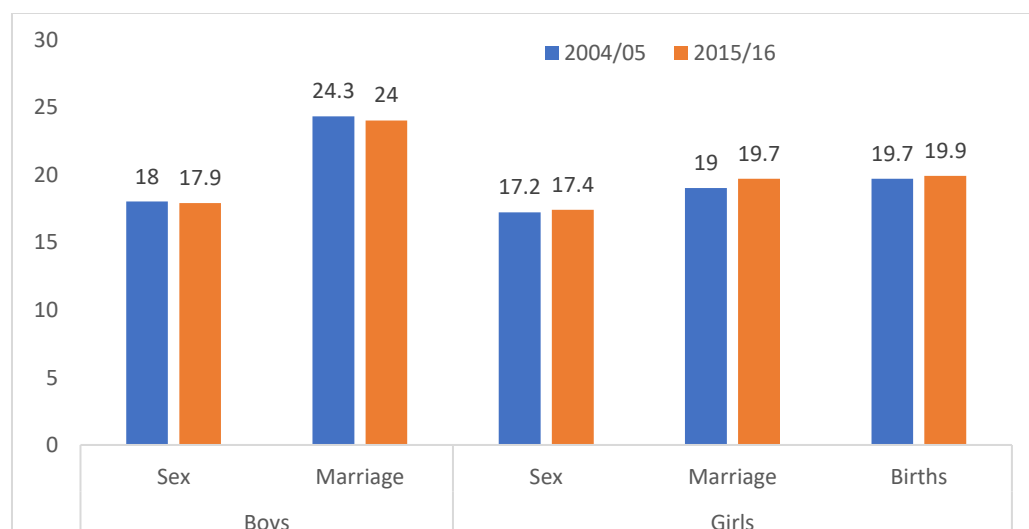
The most recent data on age at first sex, marriage and birth are from the TDHS 2015/16 which is compared to the situation a decade earlier in the TDHS 2004/05 in Figure 4.31. In general, there was very little change over time. The most important change was the increase in age at first marriage among girls from 19.0 to 19.7 years, based on on a life table analysis of data from respondents 15-24 years. The reported age at first sex remained just under 17.5 years for girls and around 18 years for boys. Men marriage about 4 years later than women. The median age at first birth was just under 20 years. There are differences between urban and rural adolescents, by schooling and by household wealth status, with more disadvantaged boys and girls (rural, low education, and poorer households) starting sex earlier and marrying earlier than those who are better-off or longer in school.

One out of every five adolescent girls (21%) already had a live birth in the 2017 (TMIS). Similar figure was reported in 2015 (TDHS). Rural adolescent girls have considerably higher adolescent birth rates compared to those in urban settings, 24% and 15% respectively (TMIS 2017). However, adolescent birth rates were relatively lower in urban compared to rural settings in 2015 (TDHS 2015/16). One major reason for higher birth rate in rural setting is reported to be early marriage compared to urban girls (18.7 and 20.4 years respectively).

One Plan II aims to improve adolescent reproductive health services including strengthening the adolescent health programme, improving its visibility, and developing and implementing a comprehensive strategy for adolescent health. Adolescent girls are those aged 15 to 19 years are a target population.

DHIS2 provides data on adolescent pregnant women attending antenatal clinic before 12 weeks gestation, delivering at health facilities and attending postnatal services. There currently are no population projection data for pregnancies and live births in this specific age group. Here we used data on births by age of the mother in the TDHS 2015/16 to estimate the denominators for the coverage indicators. In the TDHS 2015/16 16.5% of all births occurred in women 15-19 years. This proportion multiplied by the total estimated number of births and pregnancies for mainland Tanzania enables calculation of service coverage.

Figure 4.31: Median age at first sex in years, marriage and birth for girls and boys, TDHS 2004/05 and TDHS 2015/16.



From the DHIS2 data it can be deduced that adolescents attending antenatal clinic before 12 weeks had very high levels of coverage, much higher than at all ages, even though the trend 2015-2018 was downward. By 2018 still 70% of adolescent women attending in the first trimester of pregnancy. It is difficult to judge whether this is a data

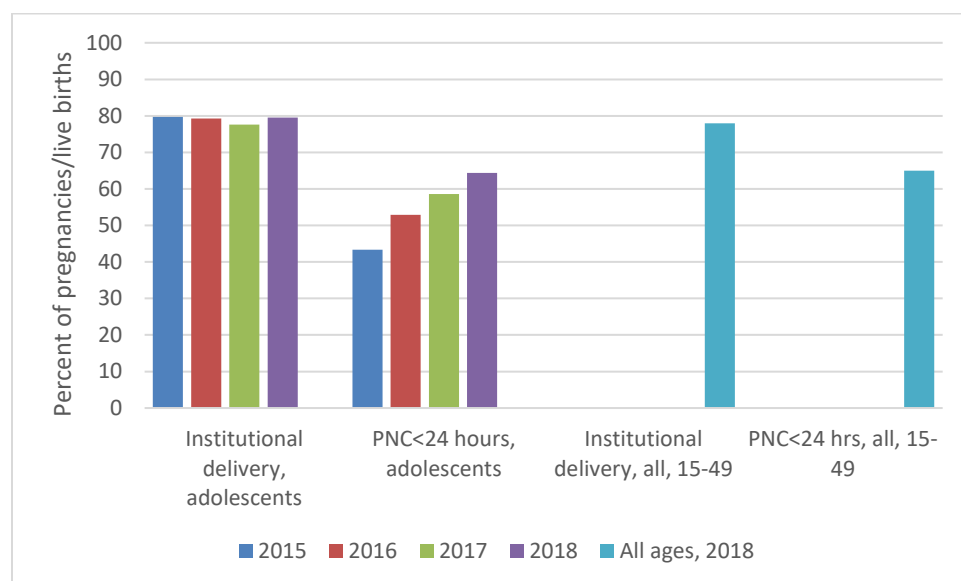
quality issue or true, but the figures suggest inaccurate recording and reporting. Coverage of first ANC visit was 98.5% in the TDHS 2015/16 among women 15-19 years, the same as for all ages.

The coverage of births by institutions is more consistent and at the same level as for all ages, with a coverage of 80% among births to adolescent girls in 2018 (Figure 4.32). Postnatal care within 24 hours was also very similar among adolescent girls compared to all women with deliveries in 2018. The DHIS2 provide no evidence that adolescent girls have lower attendance of pregnancy and delivery care than older women. This is consistent with the patterns observed in the surveys. Interestingly, there was no increase in coverage of deliveries by institutions among 15-19 years, even though overall coverage increased during 2015-2018. This is most likely because institutional delivery coverage was already high among adolescents in 2015 (80%).

In the TDHS 2015/16 coverage of live births by health facilities was 67% among adolescents, compared to 63% among all women, supporting the DHIS2 based findings. The C-section rate was 4.0% among adolescents, compared to 5.9% for all ages.

Postnatal care coverage was the same for women 15-19 and all ages in the TDHS 2015/16 (35% and 34% respectively). The DHIS2 data suggest that PNC coverage among adolescent mothers has increased from 43% to 64% at the same level as it increased for all women. There is no difference between adolescents and older women. Also for PNC for infants there were no differences between adolescents and older women according to the TDHS 2015/16 (45% and 42% coverage for adolescent and all women respectively).

Figure 4.32: Health service coverage among adolescent girls 15-19 years for institutional delivery and postnatal care (within 24 hours), compared with all women 15-49 years, DHIS2 2015-2018, mainland Tanzania.



DHIS2 also collected data on adolescents receiving post-abortion care and condom distribution. The number of adolescent girls receiving post-abortion care declined from 9878 in 2015 to 5558 in 2018 (including 72 girls 10-14 years). Based on an estimated 378,000 pregnancies among adolescents, this would translate into 1.5 abortion for every 100 adolescent pregnancies in 2018.

The number of adolescent family planning clients who received condoms was just under 50,000 during 2015-2017 but increased to 69,121 in 2018.

GENDER-BASED VIOLENCE (GBV) AND VIOLENCE AGAINST CHILDREN (VAC)

One Plan II has 13 indicators on GBV and VAC. The measurement of these indicators is often complex but efforts have been made to include data collection in DHIS2 for several indicators. Nine of the One Plan II indicators are intended to describe the morbidity associated with violence against women and children: two indicators for the

gender disaggregation of GBV and VAC and six indicators aimed to capture the type of exposure to violence by type (sexual, physical and emotional) for both GBV and VAC.

GENDER-BASED VIOLENCE AND VIOLENCE AGAINST CHILDREN	
1	Health facilities with integrated GBV and VAC services
2	Female GBV clients among all GBV
3	Female VAC clients among all VAC clients
4	GBV clients who experienced sexual violence among all GBV
5	VAC clients who experienced sexual violence among all VAC
6	GBV clients who experienced physical violence among all GBV
7	VAC clients who experienced physical violence among all VAC
8	GBV clients who experienced emotional violence among all GBV
9	VAC clients who experienced emotional violence among all VAC
10	GBV and VAC clients counselled among all GBV and VAC clients
11	Female GBV clients tested for pregnancy within 72 hrs among all
12	GBV and VAC clients arriving at health facility within 72 hrs among all
13	Intimate partner violence prevalence in last 12 months

Unfortunately, the health facility reporting has been quite incomplete, and it is difficult to conduct a statistical analysis of current data in DHIS2. By 2018, reporting was much more complete than in the initial years and most regions reported at least some data. Based on these data 49% of all GBV involved women, a rather surprising statistic, given that GBV is mostly directed towards the “weaker sex”. Perhaps health clinic visits associated with male violence were also reported. Physical violence was 38% of all GBV, sexual violence 5%. Much needs to be done if reliable statistics on GBV (and VAC) are to be generated by health facilities, as currently these numbers cannot be trusted.

A ninth indicator – intimate partner violence prevalence –can only be derived from survey data. The TDHS 2015/16 showed that different types of violence were commonly reported by women. Among all women 15-49, 5.9% said they had often experienced physical violence in the last 12 months, 16.9% said sometimes physical violence, and 8.9% had experienced sexual violence. Among ever-married women physical, emotional and sexual violence by their partner was as high as 40.1%, 36.6% and 13.8% respectively. It is likely that health facilities only see a small fraction of these incidents or even if the women come to the health facility, they may not report the violence at all.

The other four indicators aim to assess the implementation and performance of the program. The DHIS data however were not sufficiently complete or accurate to assess the quality of these indicators. The DHIS2 statistics suggest, among the GBV clients who visited a health facility, 27% of GBV clients arrived at a health facility within 72 hours. Also, almost one third (32.5%) of 12,319 women who reported sexual violence were tested for pregnancy with 72 hours.

It will be important to conduct an in-depth assessment of what health workers are recording and what women are reporting in health facilities to improve the data collection on GBV and VAC in health facilities.

REPRODUCTIVE CANCERS

Cancers of the reproductive system are an important public health issue in Tanzania, but data are often lacking. Global estimates suggest that especially cervical cancer is common. One Plan II included 11 indicators on reproductive cancers, two on breast cancer and all others on cervical cancer. These indicators provide considerable details on reproductive cancer control, but perhaps too much detail for overall monitoring of progress. It would also be appropriate to include a prevention indicator, notably HPV vaccination coverage, given the strong evidence of its impact on cervical cancers. The indicators in One Plan II are:

- New FP clients screened for breast cancer
- Screened new FP clients found with suspect breast cancer

- New FP clients screened for cervical cancer with VIA
- Cervical cancer screening among 30-50 years with VIA
- New clients with positive VIA results among new clients screened
- Clients with cervical precancerous lesions treated w/ cryotherapy
- Clients with VIA positive results treated with cryotherapy
- New clients with suspect cancer
- Clients with VIA positive results treated with LEEP
- Clients referred for large lesion among clients with suspect cancer
- Clients referred for suspect cancer among clients w/ suspect cancer

For breast cancer the number of women screened (all ages) increased from 1.46 million in 2015 to 1.96 million in 2018. The percent of those women for whom “problematic results” were reported declined from 0.65% to 0.33% between 2015 and 2018.

The number of women who received screening for cervical cancer increased from 340,000 to 430,000 in 2015 and 2018 respectively. The coverage is low if the number of women screened is compared with the total number of women 30 years and over according to the NBS population projections. In 2015, there were 7,520,436 women 30 years and older, which implies that 4.5% of those women were screened. In 2018, there were over 8 million women and 5.3% of those women were screened. There is no uniform recommendation for screening interval, which is age- and result-dependent. If we assume that every woman in that age group would be screened at least once every five years, the coverage in 2018 was 21%.

In 2015, 1.1% had a positive result and 0.5% a suspect result upon cervical cancer screening. In 2018, 0.8% had positive results and 0.5% had suspect results. The number of women with large lesions increased from 716 to 967 during 2015-2018 and the number of women who received a referral increased from 1060 to 2212.

Among women who were reported as positive 50% received cryotherapy in 2015, This declined to 39% in 2016, and then increased to 48% in 2017 and 54% in 2018, according to the DHIS2 data. Several regions reported less than 100 cases of cryotherapy (Katavi, Lindi, Mtwara, Rukwa, Songwe).

REGIONAL ANALYSIS OF MNCH COVERAGE TRENDS

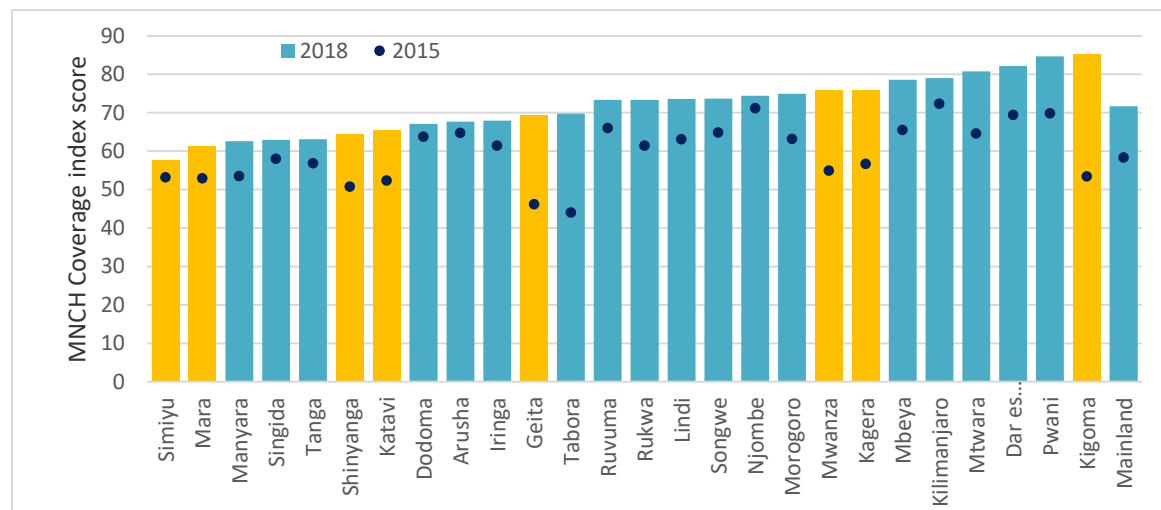
An index can provide a general overview of the differences between regions and the overall trend. Using the Countdown example of the RMNCH composite coverage index, a combined index was computed including six indicators of maternal and child health provides an indication of the regional situation. The coverage index combines ANC visit before 12 weeks, ANC4 or more visits, institutional delivery, IPT2, penta3 vaccination and measles vaccination (unweighted), all based on the DHIS data for 2015-2018.

The national coverage index increased from 58% to 72% during 2015-2018. This is a major increase in a relatively short period of time – 3% per year (Figure 4.33).

By 2018, coverage was highest in Kigoma, followed by Pwani, Dar es Salaam, Mtwara and Kilimanjaro. The first three regions had coverage exceeding 80%. The bottom 5 regions were Simiyu, Mara, Manyara, Singida and Tanga. The gap between the top 5 and the bottom 5 regions is still 20%.

The greatest progress during 2015-2018 was made in Kigoma, followed by Tabora, Geita, Mwanza and Kagera regions. Dodoma, Arusha, Njombe, Simiyu and Singida made the smallest progress among the 26 regions.

Figure 4.33: MNCH coverage by region based on an index including ANC early visit, ANC4 visits, institutional delivery, IPT2, and child immunizations (penta3 and measles), DHIS2, 2015-2018.

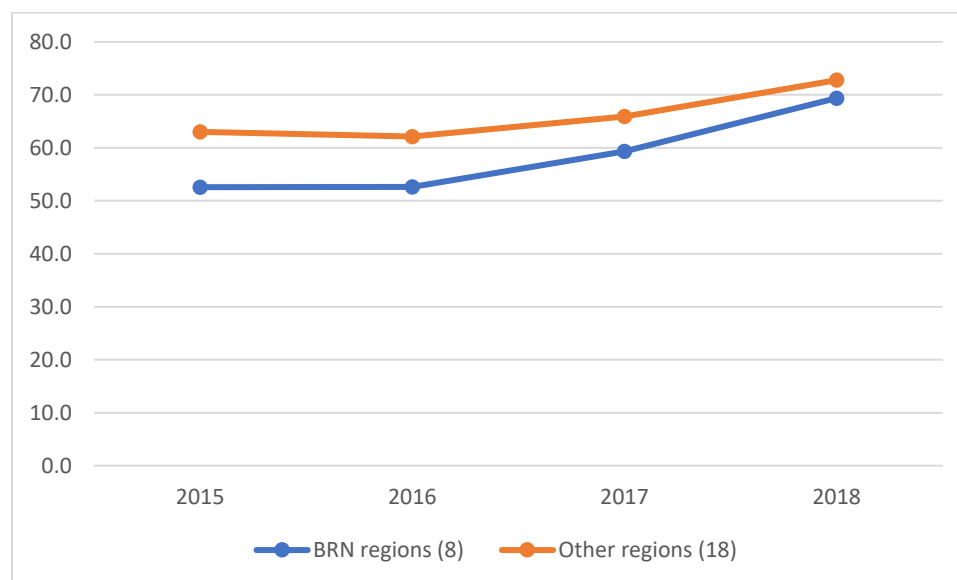


Several of the rapid progressors were part of the Big Results Now districts such as Kigoma, Kagera, Geita and Mwanza. But also some of the poorly performing regions were part of BRN (e.g. Simiyu, Mara).

Overall, however, the average progress was greater in the BRN regions than in the other 18 regions. Figure 4.34 shows the averages for the BRN and other regions during 2015-2018. The gap between the BRN regions and other regions was 10.4% in 2015, 9.5% in 2016, 6.6% in 2017 and 3.4% in 2018. The progress in the BRN regions was strongest in 2017-2018.

As noted above, the drivers of the rapid change in the BRN regions were Kigoma, Kagera, Mwanza and Geita regions. Shinyanga and Katavi improved at the same pace as the national average, but Simiyu and Marea regions only made modest progress and were still lagging by 2018.

Figure 4.34: Average MNH coverage index for BRN regions and for the other 18 regions, DHIS data, 2015-2018.



RMNCH composite coverage index based on survey data

The Countdown RMNCH composite coverage index (CCI) combines 8 indicators on family planning (demand for modern methods satisfied), maternal and newborn care (antenatal care 4 or more visits, skilled birth attendance),

immunization (BCG, pentavalent three doses and measles) and treatment of sick children (for pneumonia and diarrhea), and has been used extensively to ascertain trends in coverage inequalities. The overall CCI increased slightly from 59.6% in TDHS 2010 to 62.3% in TDHS 2015/16. The urban – rural gap did not change between TDHS 2010 and TDHS 2015/16, with a substantial disadvantage for rural children. In the most recent survey urban coverage was 70% compared to 59% for rural areas. The differences were the same in the TDHS 2010. These figures suggest that the relatively high mortality among urban children cannot be explained by lower coverage of essential health services. The same picture emerged for the RMNCH composite coverage index (CCI) by wealth status of the household. There was a gap of more than 25% between the poorest and richest in 2015/16, which reduced only slightly in the most recent survey.

In most regions the coverage of RMNCH interventions increased according to the surveys in 2010 and 2015/16 (Figure 4.35). The inequalities in the coverage of RMNCH interventions by regions were however large based on the CCI which ranged from nearly 80% in Mtwara region to less than 50% in the new regions of Katavi and Geita and in Kigoma. There was little evidence of a narrowing of the gap between the regions: the gap between the top three and bottom three regions was 24% in TDHS 2010 and 26% in TDHS 2015/16.

TANZANIA COMPARED TO OTHER COUNTRIES IN EASTERN AFRICA

According to the most recent survey CCI results, Tanzania took 6th position among the 10 countries, after Malawi, Zimbabwe, Kenya, Zambia and Rwanda (Figure 4.37). Unlike most countries, the trend in the CCI in Tanzania between 2000-2015 was not consistently increasing. It declined in late 2000s and has started to rise again in early 2010s. The overall trend in Tanzania in late 2000s is almost similar to Mozambique; both exhibit a declining trend during that period (Figure 4.38)

Figure 4.35: Composite coverage index in Tanzania mainland, by region, TDHS 2010-2015/16

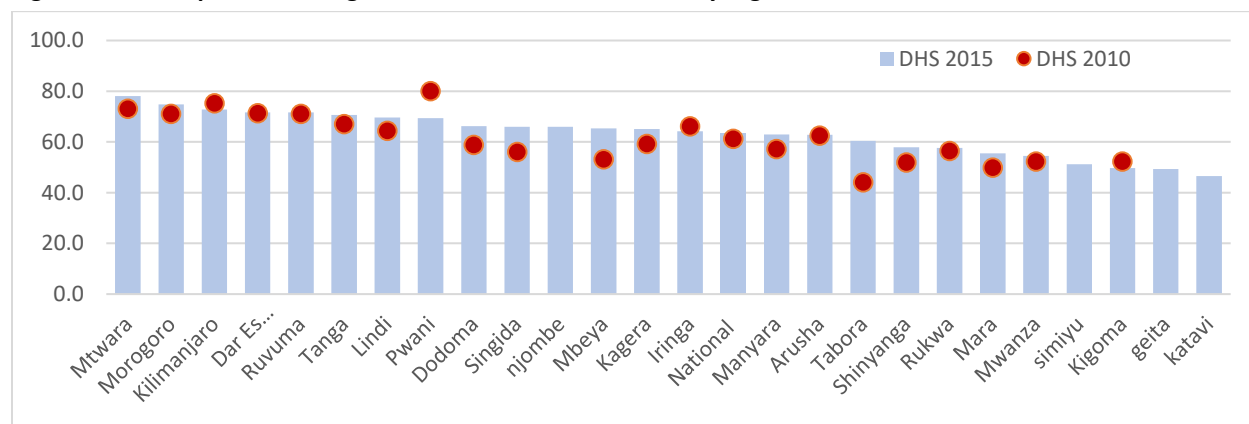


Figure 4.37: RMNCH Composite coverage index (CCI), from the most recent surveys, selected countries in eastern and southern Africa

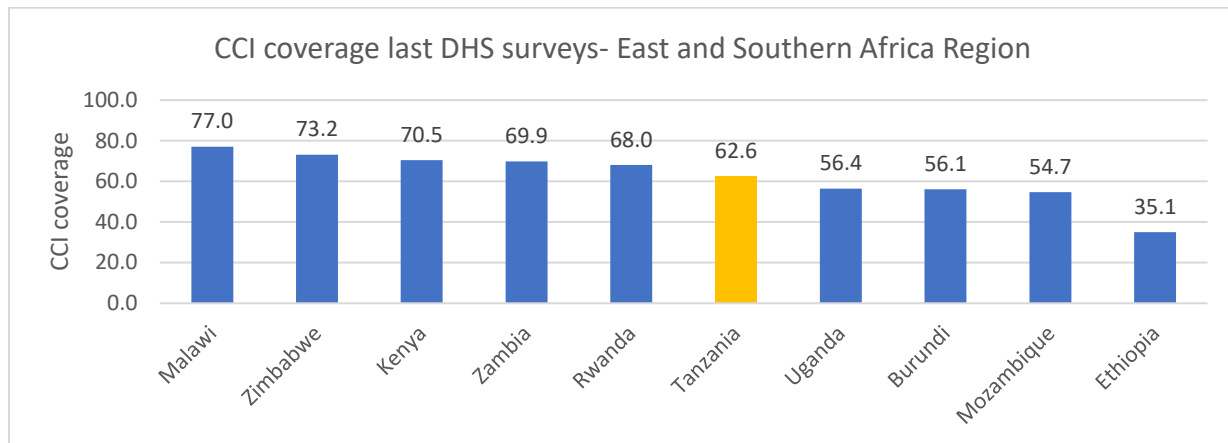
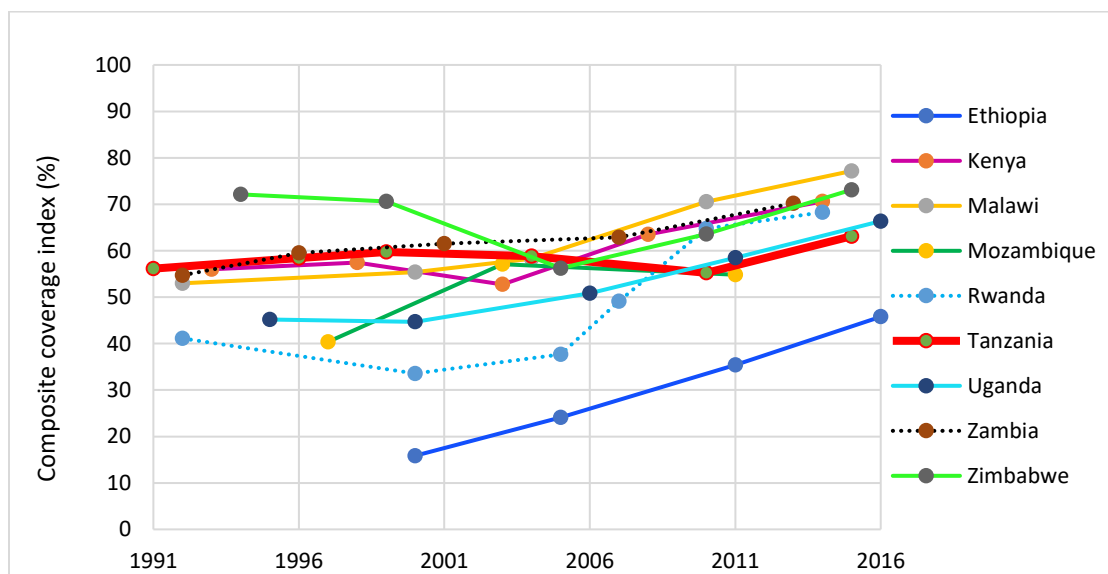


Figure 4.38: Long term trends in the RMCNH composite coverage index (CCI), surveys, selected countries in eastern and southern Africa.



5 COMMUNICABLE DISEASES

MALARIA

Main points

- Survey and facility data indicate a significant decline in malaria incidence, prevalence and mortality which appears to have started well before HSSP IV. The main indicator and 2020 target of parasite prevalence among children 6-59 months below 1% is still far off (7.3% in 2017).
- Malaria diagnostic practices in health facilities improved greatly and 99% of reported cases are now lab-confirmed and very few are based on clinical assessment only, and 43% of children with fever were tested for malaria.
- Coverage of the key preventive intervention with insecticide treated net (ITN) use was still far from the 80% targets. The percent of under-fives and pregnant mothers sleeping under treated mosquito nets dropped to just over 50% by 2017, but IPT2 among pregnant increased to just 80% in 2018 according to DHIS data.

HSSP IV TARGETS & INDICATORS

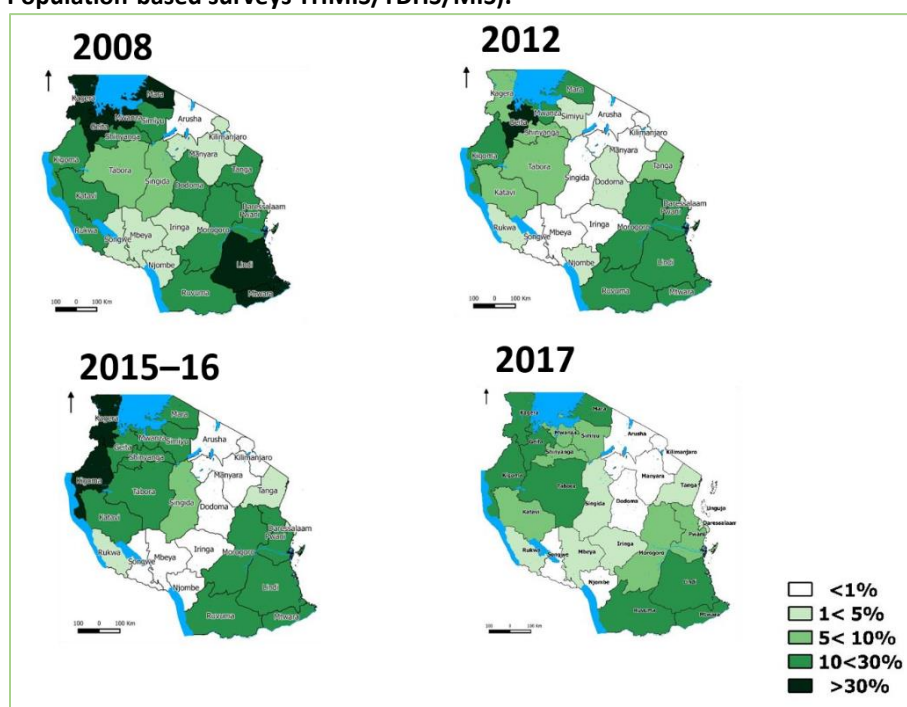
Indicator	Baseline (Year)	Target 2020	Achievement	Comments
Prevalence of malaria parasitemia (6-59 months)	18% (2008 THMIS) 9% (2012 THMIS)	<1% (NMCP)	15% (TDHS 2015/16) 7.3% (TMIS 2017)	Modest decline to 7.3% in 2017
Percent of all malaria cases that are lab confirmed	64% (2014 HMIS)	95% (NMCP)	99% (DHIS 2018)	Target achieved
Children with febrile illness who received a diagnostic test for malaria	25% (THMIS, 2012) 36% (TDHS 2015)	80%	43.4% (TMIS 2017)	Progress, but still far from 2020 target
Mothers who received 2 doses of IPT for malaria during last pregnancy (%)	35% (TDHS 2015) 55% (DHIS2, 2015)	80%	56% (TMIS 2017) 80% (DHIS2, 2018)	Increase during 2012-2017 and 2018 suggests target reached
Vulnerable groups (pregnant women 15-49 years of age, children under 5) sleeping under an ITN the previous night (%)	72% under-5, 75% pregnant women (THMIS 2012); 54% under-5, 54% PW (TDHS 2015/16)	80% for both populations	55% (children) 51% (PW) (TMIS 2017)	Decline since peak in 2011/12, and far from target

Data sources: Data for the malaria indicators were obtained from national surveys in 2012, 2015/16 and 2017. All surveys include collection of blood for malaria parasite testing. DHIS data were used to assess the diagnostic practices in OPD, as well as IPT coverage.

Malaria prevalence and incidence

The population-based surveys show a modest decline in malaria prevalence among children 6-59 months from 2011-12 to 2017. In 2017, parasite prevalence had declined to 7.3% from 9% in 2012. The 2017 TMIS was conducted from October to December 2017, during the peak malaria season. The TDHS 2015/16 was conducted during August 2015-February 2016 and reported a prevalence of 14%. The 2020 target of <1% was still far off.

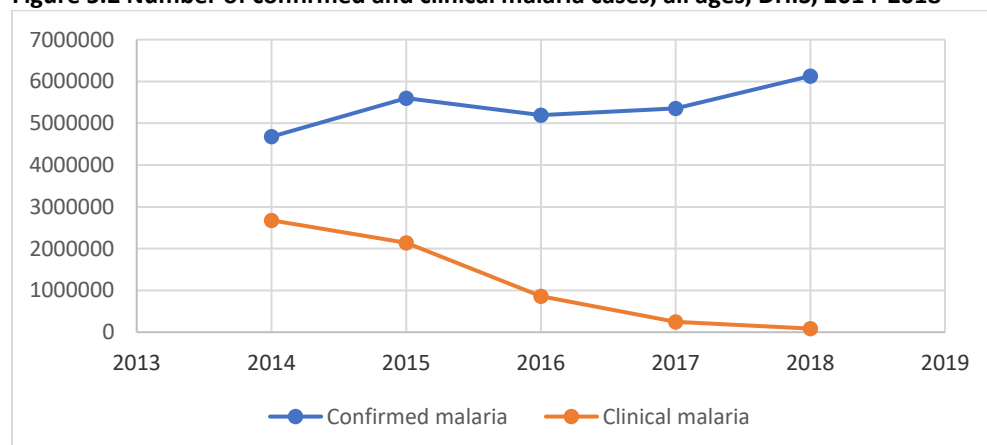
Figure 5.1: Malaria Prevalence in Children 6-59 months by region, Tanzania mainland, 2008-2017 (Source: Population-based surveys THMIS/TDHS/MIS).



Malaria parasite prevalence rates among children declined in virtually all regions during the period 2008-2017 (Figure 5.1). In 2017, the highest malaria prevalences (exceeding 10%) were observed in Geita, Kagera and Mara regions in the Lake Victoria Zone, Southern Zone (Lindi, Mtwara, Ruvuma), and Western Zone (Kigoma 26%). The lowest malaria prevalence were found in the northern Zone (Arusha, Kilimanjaro and Manyara all 0%). Dar es Salaam (1.1%) also had low parasite prevalence rates among children.

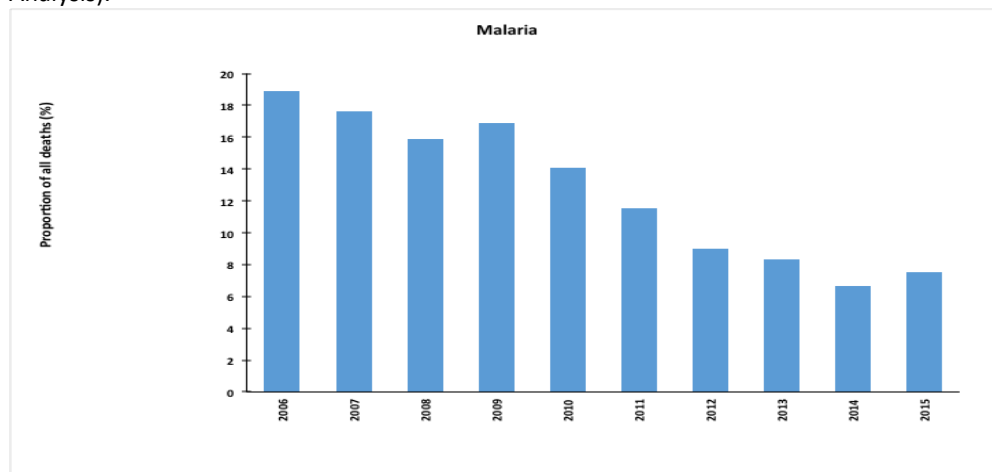
The overwhelming majority of malaria cases were diagnosed by rapid diagnostic test (RDT), and some by blood slide microscope. Figure 5.2 shows that by 2018 almost diagnoses were confirmed by a laboratory test and that the diagnosis of clinical malaria had become rare. The proportion laboratory confirmed malaria increased from 64% in 2014 to 86% in 2016, 96% in 2017 to 99% in 2018.

Figure 5.2 Number of confirmed and clinical malaria cases, all ages, DHIS, 2014-2018



There were no HSSP IV indicators to assess the extent to which malaria contribution to outpatient visits, inpatient admissions and inpatient mortality has been changing over time. The proportion of outpatient visits diagnosed as malaria is often taken as an indicator of population incidence changes, but because the major changes in reporting practices (the shift from predominance of clinical diagnosis to confirmed cases only) the trend can be deceptive and is not presented here. Figure 5.3 presents an illustration of long-term trends in malaria mortality in hospitals. A study of cause of death records in 39 hospitals throughout the country showed that the relative importance of malaria as a cause of death in hospitals had declined from almost 19% in 2006 to about 14% in 2010 and about 6% in 2015.

Figure 5.3: Annual pattern of deaths due to malaria in hospitals of Tanzania, 2006-2015 (source: Hospital Mortality Analysis).¹⁸

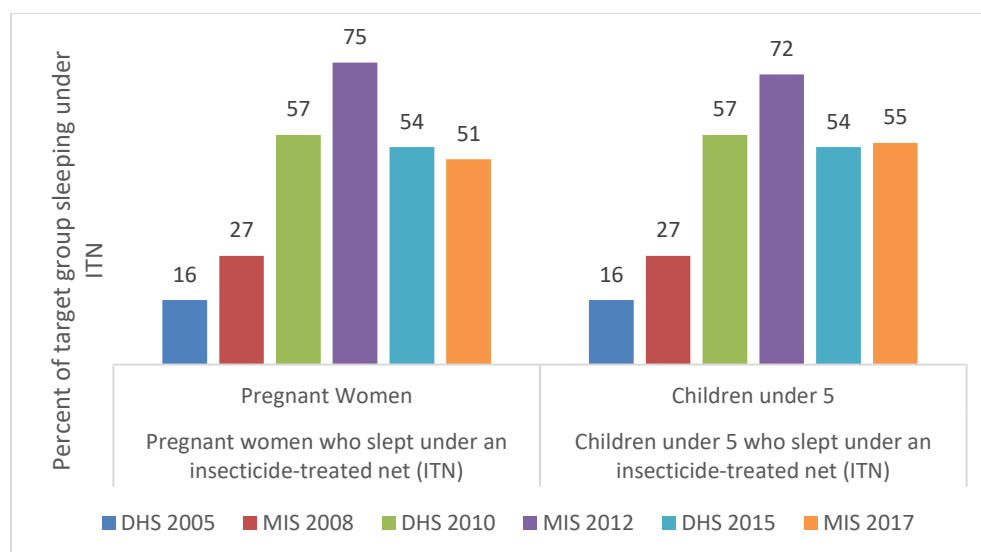


Malaria diagnosis, treatment, preventive therapy

Insecticide-treated nets (ITNs) are a critical preventive intervention for malaria control. Although the percentage of ownership of ITNs and long lasting ITNs (LLITNs) had markedly increased, reaching up to 91.5% for ITNs and 90.4% for LLITNs in 2012, there was a decline in the ownership of ITN to 61.1% in 2017, while 45% of households had at least one LLITN for two persons in TMIS 2017. Both the percentage of population, children and pregnant mothers who are sleeping under insecticide treated mosquito nets dropped from over 70% to 51% in 2012 and 54% in 2017, respectively (Figure 5.4).

Figure 5.4: Trends in ITN use among children under 5 years and pregnant women in Tanzania, national surveys.

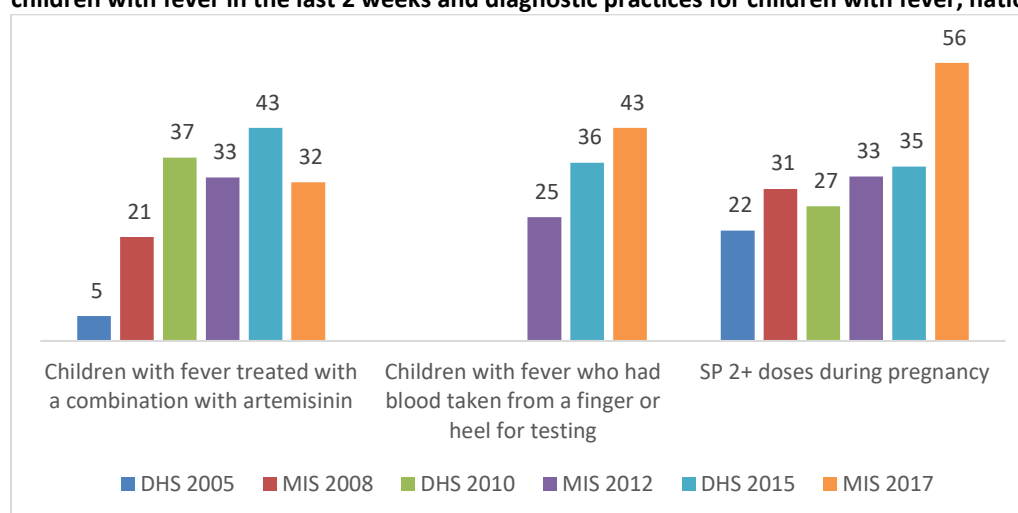
¹⁸ Hospital mortality Patterns and Causes of Death in Tanzania 2006-2015. National Institute for Medical Research, Dar es Salaam, Tanzania and Ministry of Health, Community Development, Gender, Elderly and Children, Dar es Salaam, Tanzania.



Intermittent preventive therapy (IPT) aims for three doses of sulphadoxine-pyrimethamine (SP) during pregnancy. The household surveys indicated that first, second and third doses of IPT increased from 60%, 37% and 8% in 2012 to 83%, 56% and 26% in 2017, respectively (Figure 5.5). The section on antenatal care in this report shows that IPT2 coverage increased considerably in 2018 to 80% according to estimates based on the reported DHIS2 data, which would imply that the HSSP IV target has been reached. The next survey will have to confirm the facility-data based IPT2 coverage estimates, but a significant increase appears certain.

More children with fever were tested for malaria. In TMIS 2012, this was 25%, in TDHS 2015/16 36% and in the TMIS 2017 43%. The percentage of children with malaria who were receiving artemisinin-combination (ACT) therapy (ACT) did not increase during HSSP IV. According to the surveys 32% of children with fever in the last 2 weeks received ACT, which was lower than in the TDHS 2015/16 and at the same level as in the TMIS 2011-/12. The changes in diagnostic practices may have some influence on the trends.

Table 5.5: Selected indicators of malaria preventive and treatment interventions, national surveys 2005-2017: intermittent preventive therapy (two doses of SP) for pregnant women, artemisinin combination therapy for children with fever in the last 2 weeks and diagnostic practices for children with fever, national surveys.



HIV/AIDS

Main points

- HIV prevalence is gradually declining among young people, indicating reduced HIV incidence, but young women 15-24 years still have a considerably higher prevalence than young men (2.4% and 0.6% respectively). There are however still over 1.5 million people living with HIV.
- There has been a major increase in access (facilities providing ART services) and utilization (increase of number of clients accessing HIV care) and an increase of number of people on ART from 689,000 to 1,044,000. Coverage of ART for people living with HIV. ART coverage increased in all regions, and was estimated at 75% among all people living with HIV (47% among children) in 2018. PMTCT interventions are almost universally accessible, utilization rates are high and PMTCT coverage rates were over 90% during HSSP IV, reaching the target, resulting in a decline in HIV positive infants.
- By 2018, PMTCT interventions were almost universally accessible, utilization rates are high and PMTCT coverage rates were over 90% during HSSP IV, reaching the target, resulting in a decline in HIV positive infants.

Data sources: *The most recent AIDS impact survey was conducted in 2016/17 (THIS 2016/17), which provides a wealth of information of the HIV epidemic and the response. The PMTCT and ART data are derived from the health facilities, based on HIV-specific reporting systems (e.g. Counseling and Testing Centers (CTC) for ART).*

HSSP IV TARGETS & INDICATORS

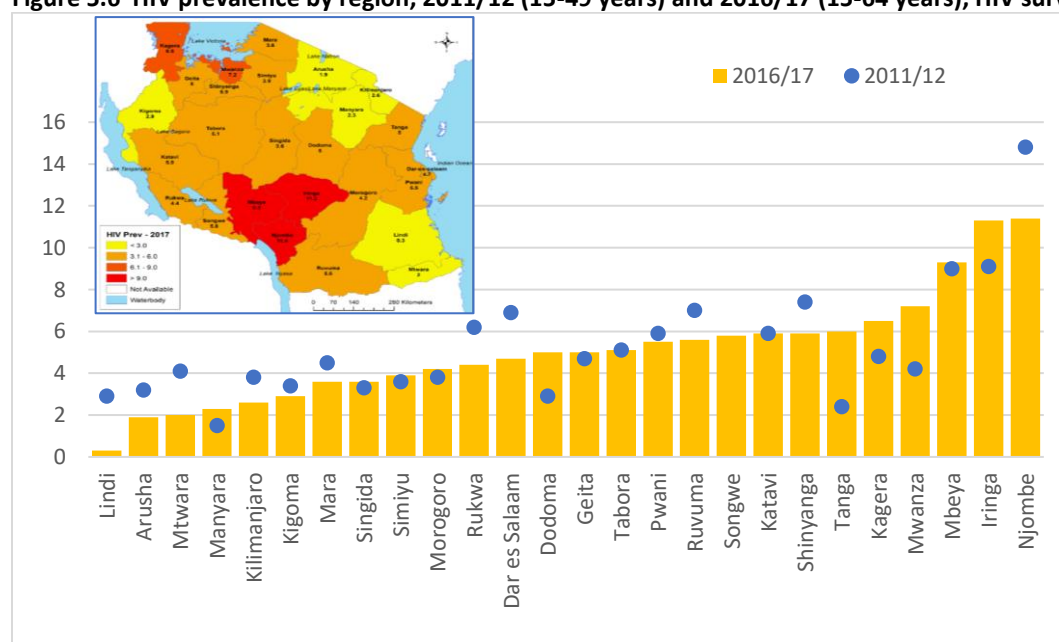
Indicator	Baseline (Year)	Target 2020	Achievement	Comments
HIV prevalence among 15-24 years	15-19: 1.0% 20-24: 3.2% (THMIS 2012)	0.8% and 2.4% by 2017 (NACP)	0.6% and 2.4% (THIS 2016/17, 15-24 yrs)	Targets achieved
HIV positive women receiving ART for PMTCT	65% (NACP, 2012)	90% by 2017 (NACP)	99% (2018)	Target achieved
ART Coverage among eligible persons living with HIV infection (under 5, 5+, by sex)	65% (adults) 25% (children)	95% (adults) 80% (children)	75% of all people living with HIV (NACP, 2018) 47% of children living with HIV (2018)	Eligibility criteria changed during HSSP IV, now based on all people living with HIV

HIV prevalence and incidence

The burden of HIV and AIDS remains high in Tanzania. Based on all data sources, it is estimated by UNAIDS that in 2018, more than 1.5 million Tanzanians (adults and children) are living with HIV. According to THIS 2016/17, the annual incidence was highest in males in aged 35-49 years (0.37%) and in females aged 25-34 years (0.7%). In THIS 2016/17, HIV prevalence among adults aged 15-49 years was 4.8% in Tanzania mainland (and 5.1% for 15-64 years). Prevalence was twice as high among women compared to men (6.4% and 3.1% respectively). In previous surveys, the prevalence rates were 5.3% and 5.8% in 2011/12 and 2007/08 respectively, at ages 15-49 years.

HIV prevalence was markedly lower in the most recent survey than five years earlier in most regions (Figure 5.6) but not everywhere. The larger sampling errors for subnational estimates will have to be kept in mind when assessing trends by region. Njombe, Iringa and Mbeya remained the high prevalence regions in Tanzania mainland, all with HIV prevalence in the range of 9-11%.

Figure 5.6 HIV prevalence by region, 2011/12 (15-49 years) and 2016/17 (15-64 years), HIV surveys.



The HSSP IV (NACP) indicator targets for 2017 was met as HIV prevalence among 15-19 and 20-24 years declined to 0.7% and 2.2% respectively, which was lower than the targets of 0.8% and 2.4% (Figure 5.7). There were however major differences between young women and men. The prevalence among 15-24 years continued to be much higher among women than men (2.4% and 0.6% in 2016/17) and also the decline was stronger for men, increasing the gender gap. The HIV survey in 2016/17 also measured HIV incidence and did not find a single incident case among men 15-24 years, while the incidence was 0.14 per 100 person years for women 15-24 years.

Figure 5.7 HIV prevalence among young people, THIS 2011/12 and 2016/17



ARV therapy coverage

The HSSP IV targets were based on eligible populations (persons with advanced HIV infection), but since then program and indicators focus on reaching all persons living with HIV with ART. Therefore, the focus is here on the trends in the absolute numbers and the situation in 2018.

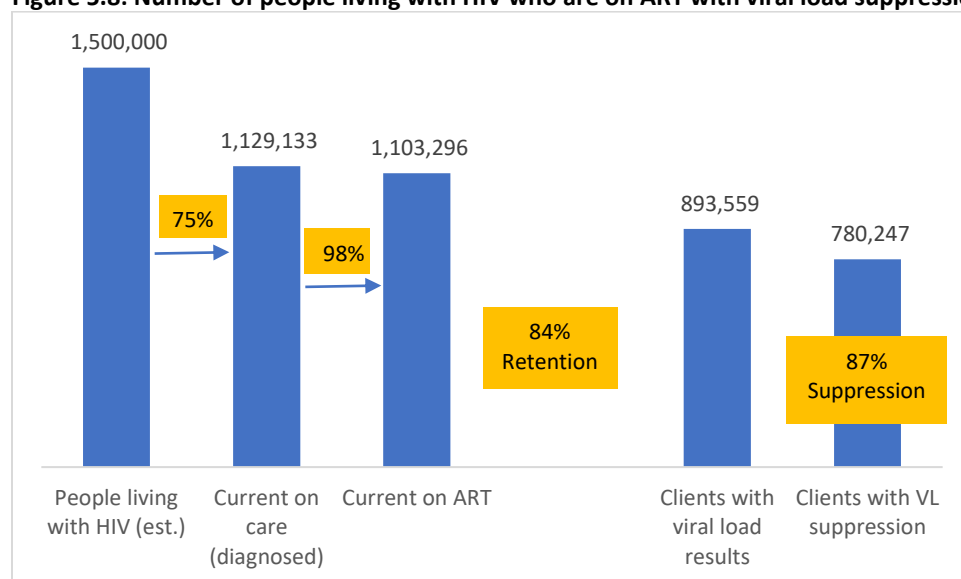
The number of health facilities offering ART services has increased to 6,206 (2103 CTCs and 4103 Option B+ facilities) as of December 2018. The average number of CTC facilities per 10,000 population is 1.2, ranging from 0.48 in Dar es Salaam to 2.8 in Njombe.

As of December 2018, the number of clients who were currently in HIV care was 1,129,133 (Figure 6.8). There has been a strong increase in the number of adult clients currently on ART from 688,773 in 2015 to 1,103,296 in 2018 and a modest increase for children from 51,513 in 2015 to 59,341 in 2018. This corresponds with 74.8% of the estimated 1,508,553 people living with HIV (based on modeling with Spectrum for 2018). Regional coverage ranged from 39% in Kigoma to full coverage in Mbeya (101%).

The number of newly initiating ART patients in 2018 was 269,412, up from 169,231 in 2015. Among those in care 98% initiated treatment, an indicator of good quality of the program. However, the percentage of children currently on treatment is below targets. The PMTCT program reports ART coverage among 120,000 children of 47% in 2018, which is considerably lower than among adults.

The impact of the high levels of coverage of ART is measured by program retention, viral load suppression, survival on treatment and wellbeing of those on treatment. Program retention was estimated at 84%. Among those with HIV viral load testing, viral load suppression rates were as high as 84% by end 2018 according to the program data (Figure 5.8). These data correspond well with the results of THIS 2016/17 where 87.0% of those on treatment were suppressed virologically. The 75%-98%-84% by end 2018 indicates major progress towards the target of 90%-90%-90% by 2020. These figures translate into 61.7% of persons living HIV have viral load suppression in 2018. The THIS 2016/17 data showed that in 2016/17, 51.9% of HIV-positive adults aged 15 years and older, had viral load suppression. Females have higher levels of viral load suppression than males, suggesting better treatment adherence.

Figure 5.8: Number of people living with HIV who are on ART with viral load suppression, NACP, 2018.



Further data that provides insights into non-adherence to treatment and data on the impact of treatment on health, wellbeing and survival are still limited. The longitudinal community cohort studies and other research data should help provide such critical information.

Prevention of mother to child transmission

In 2018, there were a total of 6,596 health facilities that provide PMTCT services, as measured by provision of HIV testing and counseling for PMTCT in RCH settings, an increase of nearly 1,000 reporting health facilities since 2015. Screening rates of pregnant women were over 90% and approaching universal coverage in 2018. HIV prevalence among pregnant women screened at ANC clinics remained the same at 3.1-3.2% during 2015-2018.

Virtually all HIV-positive women initiated ART and the early infant diagnosis HIV positivity rate declined to 3.4% (below the NACP target). There is evidence of a lower ART initiation rate among pregnant women in 2018 (86.9%), compared to the previous years (2015-2017 over 90%). The Spectrum based estimate of PMTCT is still 12.6%, which is thought to be due to some women not being tested and some dropping out of care after testing.

Table 5.1: Trends in selected indicators of PMTCT.

Indicator	2014	2015	2016	2017	2018	2020 target
RCH facilities with PMTCT services	5624	5927	6145	6344	6596	
% pregnant women screened for HIV	91.5%	93.1%	94.9%	98.4%	99.2%	100%
HIV prevalence among pregnant women	3.85%	3.18%	3.21%	3.26%	3.14%	
ARV coverage among HIV+ pregnant women// PMTCT coverage with ARVs	80%	100%	100%	100%	99%	100%
HIV exposed children received ARV prophylaxis	No data	No data	No data	No data	No data	> 90%
HIV exposed children tested for EID at 6-8 weeks (N)	49,148	46,572	47,630	44,089	45,312	
EID Testing rate	59.4	69.8	67.7	55.6	54.5	90%
EID Positive Rate (Lab results 6-8 wks)	6.0%	5.4%	4.9%	4.8%	3.4%	< 5%
Mother to Child HIV Transmission (Final PMTCT using Spectrum)	No data	No data	No data	No data	12.6%	< 5%
ARV coverage among children	No data	No data	No data	No data	47%	60%

Other areas

There are several other major indications of progress of the HIV program in Tanzania:

- The number of clients offered *HIV testing services* increased steadily from 3,568,992 in 2015 to 5,496,534 in 2016 and from 8,218,725 in 2017 to 13,185,562 in 2018. The THIS 2016/17 showed only modest increases in coverage of HIV testing since 2011/12, for instance, 29% of males and 34% of females aged 15 years and older reported having had an HIV test in the 12 months preceding the survey in the mainland, which was 27% and 31% in 2011/12. It appears however that testing coverage increased considerably in 2017/2018, according to the program data.
- The number of males who were newly circumcised almost doubled during 2015-2018 from 484,174 in 2015 to 885,657 in 2018.
- There was more attention for key vulnerable populations, with more than 2,291,061 clients cumulatively enrolled in key vulnerable population services by December 2018.

TUBERCULOSIS AND LEPROSY

Main points

- Tuberculosis (TB) case detection rates in 2018 were well below target (50%). TB notification rates declined until 2015 but increased since from 128 to 140. This is not necessarily due to an increase in TB cases but could be due to improvements in case detection.
- TB treatment success rates are as high as 90% and the target has been achieved.

HSSP III TARGETS & INDICATORS

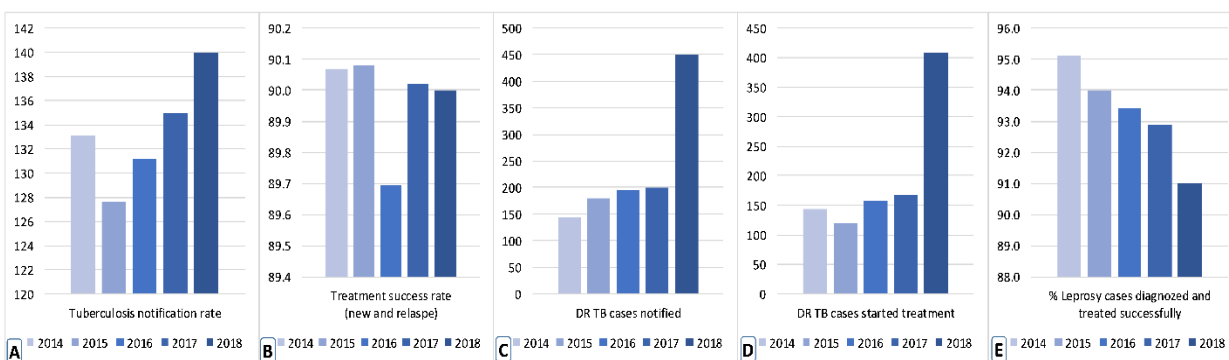
Indicator	Baseline (Year)	Target 2020	Achievement	Comments
TB case detection rate (and TB notification rate)	36% (2014) (notification rate: 128 per 100,000 (2015))	72% case detection rate	50% (NTLP 2018); (notification rate 140/100,000 (NTLP 2018))	Progress but target still well-off;
TB treatment success rate (among smear positive cases)	90% (2013)	>90%	90% (2019)	No changes
Leprosy: disability grade 2 at leprosy diagnosis	13% (2013)	7%	13.1% (NTLP 2018)	No progress
Children among newly detected cases	5% (2013)	<2%	3.8% (NTLP 2018)	Progress towards target

Data sources: the national program has a standardized reporting system of cases and treatment outcomes which forms the basis for the statistics. The first tuberculosis prevalence survey in 2014, however, showed that incidence rates were much higher than previously estimated, which led to major adjustments in the case detection rate.

The case detection rate is computed from the notified cases divided by estimated incident cases. The national 2014 TB prevalence survey resulted in an upward adjustment of the estimated incidence cases and a lowering of the case detection rate to 37% for 2015, but with very large uncertainty (22-78%). Especially, among older people (45 years and over) case detection rates were low. The case detection rate for 2018 was estimated at 50%, well off the 2020 target of 72%.

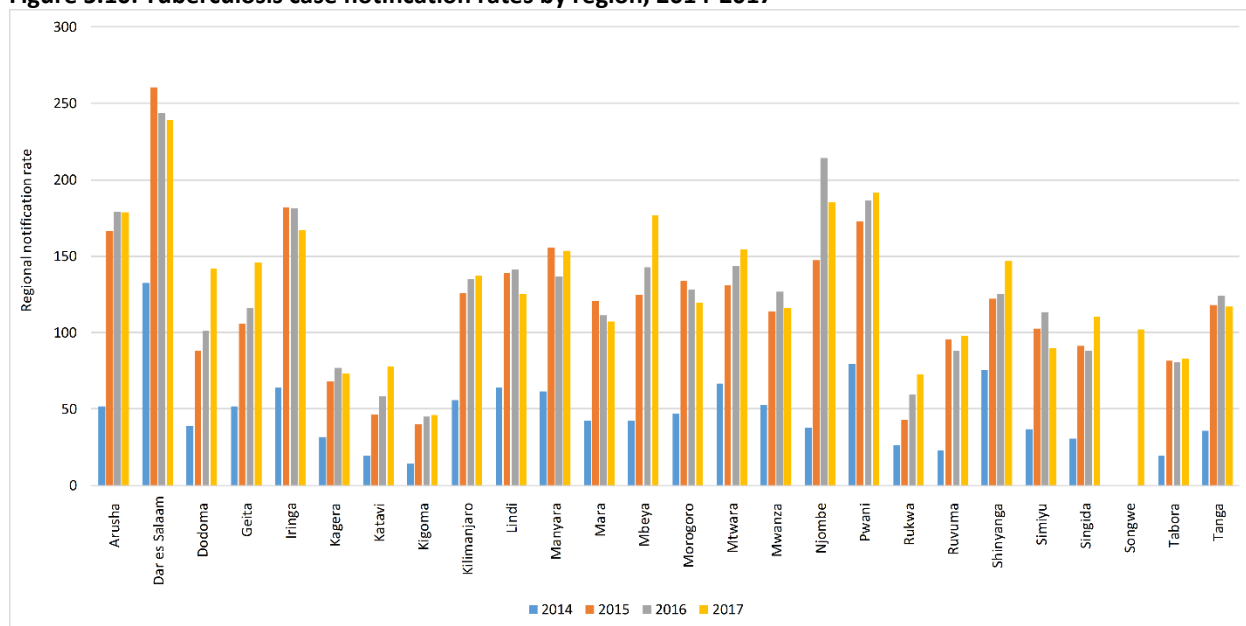
The TB case notification rates decreased gradually during 2005-2015 from 171 to 126 per 100,000 population. After 2015 notification rates went up and reached 140 by 2018 (Figure 5.9, left panel). The increase may be due to better notification or due to an increase in incidence. Given the greater efforts to detect cases, better notification is probably the most likely explanation.

Figure 5.9: Tuberculosis notification rate (per 100,000), treatment success rate (%), drug resistance cases, and percent of leprosy cases diagnosed and treated successfully, 2014-2018



There is marked variability in TB notification rates by region (Figure 5.10). Dar es Salaam region has by far the highest notification rate (just under 250), followed by Pwani, Njombe, Mbeya, Arusha and Iringa regions all over 150. Low notification rates are observed in Kigoma, Rukwa, Kagera, and Katavi. TB case notification rate increased markedly in Arusha, Dodoma, Kagera, Kigoma, Kilimanjaro, Mbeya, Mtwara, Pwani, Shinyanga and Singida. TB case notification rate declined in 2017 in Dar es Salaam, Lindi, Mara, Morogoro, Mwanza and Njombe.

Figure 5.10: Tuberculosis case notification rates by region, 2014-2017

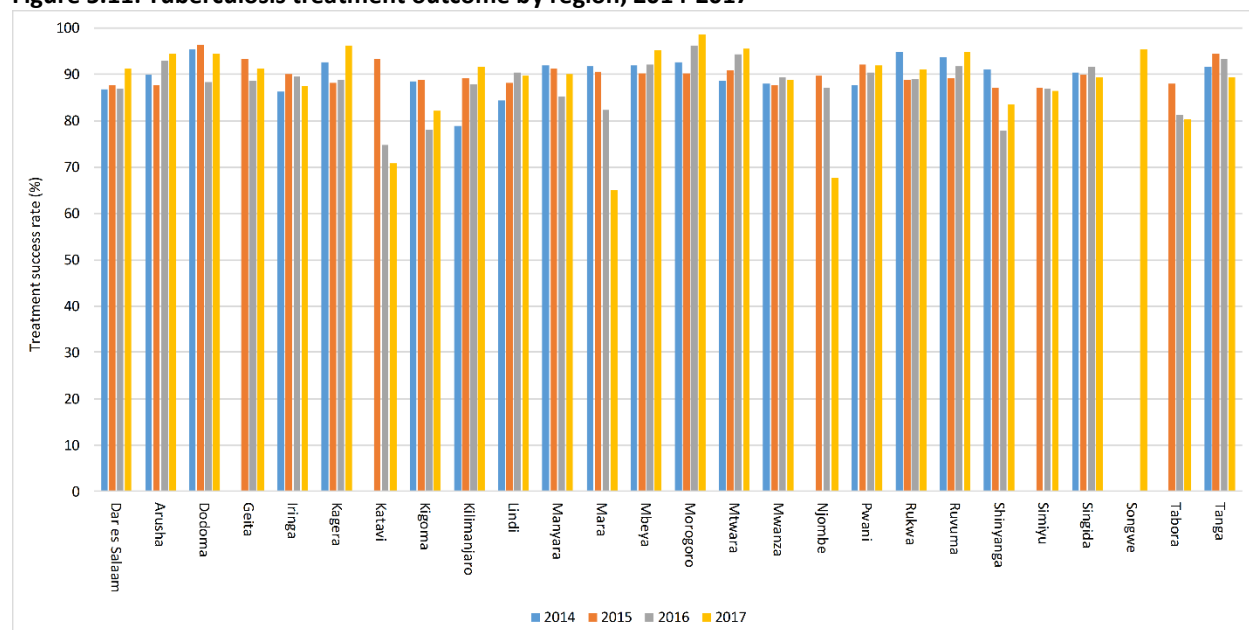


The treatment success rates for pulmonary TB remained at 90% for all years during HSSP IV (Figure 5.9, panel B). There was little variation between the regions (Figure 5.11). Tanzania's performance is among the best in the African region.

Tanzania is considered a low drug-resistant TB (DR-TB) country (1.1% of new cases and 3.1% among retreatment). In 2017, only 167 (20%) were put on treatment out of 830 estimated DR TB. Decentralized services for managing

DRTB are now available countrywide since 2016 (93HF from 1 in Kibong'oto Hospital). Scaled up new rapid molecular technology (Gene-Xpert) from 66 machines in 2014 to 218 by Feb 2019, currently in all zonal, regional and district hospitals. As a result of rapid scale up of Gene Xpert services 449 MDR-TB patients were diagnosed in 2018. DRTB treatment shortened from 20 months to 9 months from January 2018.

Figure 5.11: Tuberculosis treatment outcome by region, 2014-2017



The national programme monitors other indicators related to HIV. The percent of people with TB who were tested for HIV was 88% in 2015, the same as in 2009. In both years just over one-third of those tested were HIV positive. Among the HIV positives, 96% were registered for HIV care, 83% initiated ART, and 97% started Co-trimoxazole Preventive Therapy (CPT). These indicators were all better than in 2009 (75%, 32% and 91% respectively). No data for 2018 were available.

Although Tanzania attained the global target of leprosy elimination ten years ago. It is still one of the 17 countries that notified more 1,000 leprosy cases per year.

OTHER INFECTIOUS DISEASES AND ENVIRONMENTAL INDICATORS

Main points

- Access to improved drinking water and sanitary facilities increased gradually but is likely to fall short of 2020 targets, particularly because of insufficient progress in the rural population where by 2017 51% did not have access to improved drinking water and 76% did not have access to improved sanitary facilities.
- Neglected tropical diseases have no indicator in HSSP IV, but the program data indicate progress in the battle against several NTDs such as trachoma and filariasis, as well as high coverage for preventive mass drug treatment efforts to control schistosomiasis and soil-transmitted helminths.
- The external assessment of the integrated disease surveillance and response program in 2018 indicated that the program capacity had strengthened since 2016, but timely and complete reporting rates remained suboptimal at 80%.

Indicator	Baseline	Achievement	Target (%) 2020	Comments
% Population improved, not shared source of water	55% (TDHS 2011/12) 56% (Census 2012)	60% (TMIS 2017)	70%	Improvement since 2016, but short of target; rural access only 49%
% Population using an improved sanitation facility (not shared)	14% (TMIS 2011/12) 14% (Census 2012)	24% (TMIS 2017)	30%	Improvement

Water and Sanitation

HSSP IV included improved drinking water and sanitary facilities as indicators. The most recent data are from the TDHS 2015/16. The target for 2020 was that 70% of the population should live in households with access to improved drinking water sources. According to the household surveys, the proportion of population (based on the number of people in each type of household) using improved drinking water sources increased from 51% in the TDHS 2010, and 56% in census 2012 to 59% in TDHS 2015/16 and 60% in the TMIS. The increase is gradual, and too slow to reach the HSSP IV target for 2020 (Figure 5.14).

The urban rural differences remained large: in 2015/16 87% of urban and 49.0% of rural population had access to improved drinking water. Furthermore, the increase in the rural areas from 2010 to 2015/16 was smaller than for the urban areas, widening the gap.

Use of improved non-shared toilet facilities has increased from 13% in 2010 to 20% in 2015/16 and further to 24% in TMIS 2017. This was still short of the HSSP IV target for 2020 (30%). There were significant disparities in water and sanitation between rural and urban populations. Only 16% of the rural population has access to improved toilet facilities (not shared), compared to 42% of the urban population in TMIS 2017. The increase in the rural areas since 2011/12 is strong with a doubling of the population with access to improved sanitary facilities.

Figure 5.12: Percent of population with access to improved drinking water source, by urban-rural residence, national surveys, mainland.

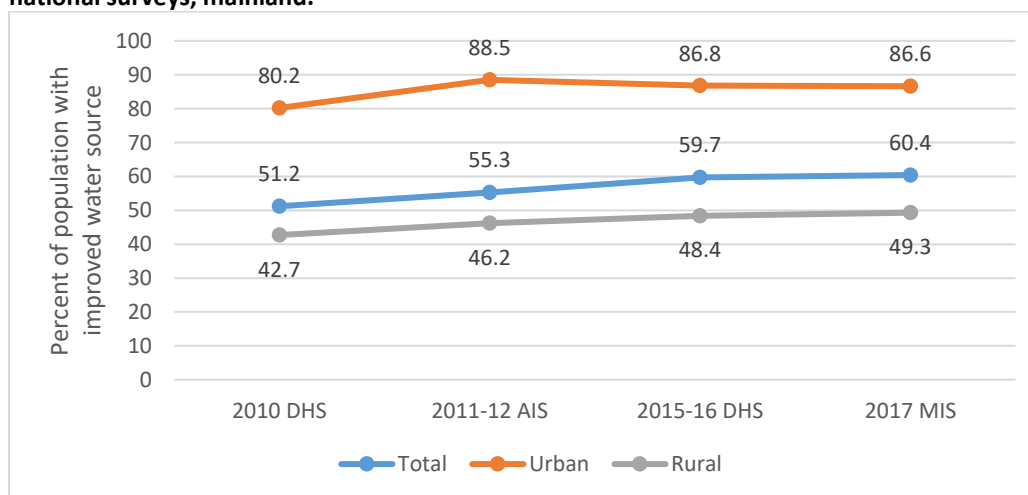
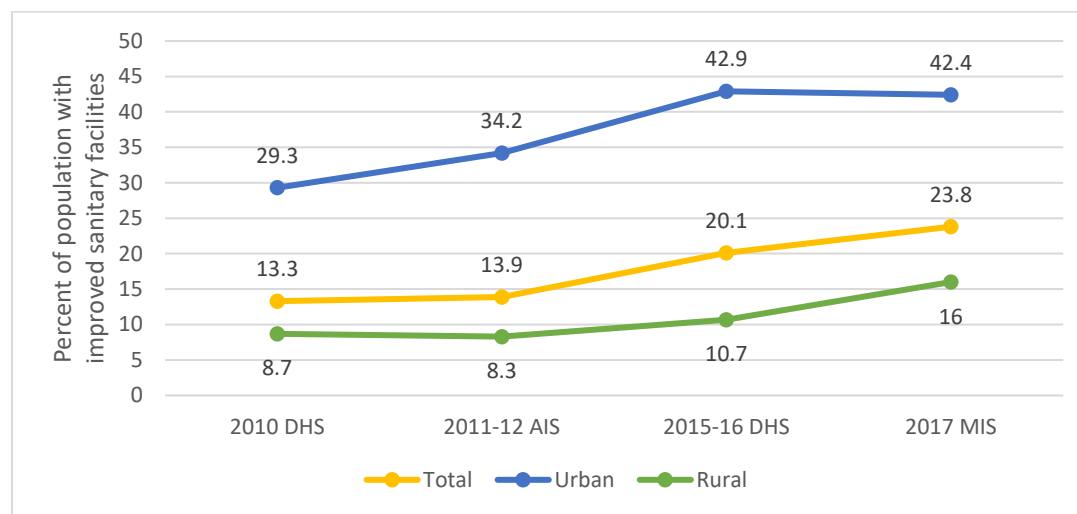


Figure 5.13: Percent of population with access to improved sanitary facilities, by urban-rural residence, national surveys, mainland.



Neglected Tropical Diseases

There were no indicators for neglected tropical diseases (NTDs) in HSSP IV. This section includes a brief summary of the main developments in recent years, as reported by the different programs for NTDs, outbreak diseases and water and sanitation:

- The prevalence of trachoma has declined markedly from 2014 to 2018. Furthermore, number of trachoma endemic districts has declined from 60 in 2013 to 8 districts in 2018. Trachoma mass drug administration (MDA) coverage declined from 2013 to 2016. However, since 2017 the coverage has significantly improved to above 80%.
- The number of lymphatic filariasis endemic districts has declined from 119 districts in 2013 to 24 districts in 2018. Since 2013 the lymphatic filariasis coverage has been above the threshold (range was 70% to 84%).
- Onchocerciasis MDA coverage has improved over the years to 100% in 2018.
- Schistosomiasis MDA using Praziquantel is applied in all 185 councils and has steadily increased from 2013 to 2018.
- Soil transmitted helminthiasis MDA coverage using Albendazole in during 2014-2018 has remained higher than 74%.

Outbreaks

In February 2016, Tanzania conducted the first joint external evaluation (JEE) to assess the country's capacity to prevent, detect, and rapidly respond to public health threats. Tanzania had "Demonstrated Capacities" in three areas, namely:

- Immunization (both vaccine coverage as part of the national programme and national vaccine access and delivery)
- Integration and data analysis in real-time surveillance
- Workforce development (having in place Field Epidemiology Training Programme)

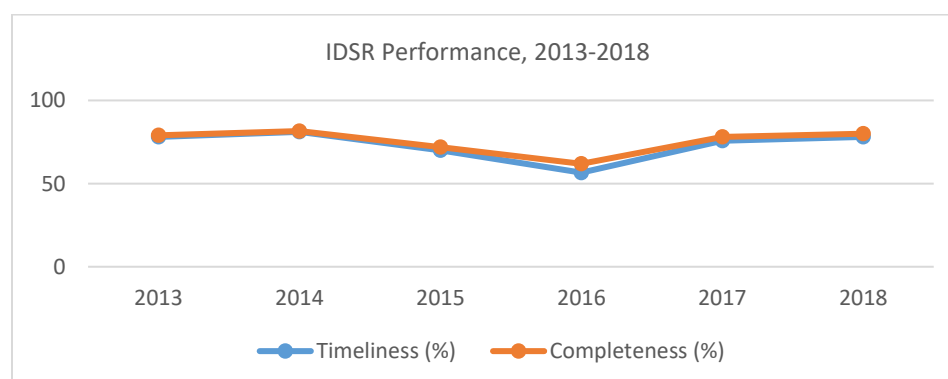
Tanzania had demonstrated "Limited Capacities" on Points of Entry and Preparedness. Tanzania had no capacities in the following in Antimicrobial resistance and emergency response operations. Currently, the country has developed (score level 3) in Antimicrobial resistance, Emergency response operations, Points of Entry, Preparedness. Specimen referral and transport systems has also improved to "Developed capacity". Laboratory testing for detection of priority diseases has been developed to "Demonstrated capacity".

Table 5.2: Tanzania capacity to prevent, detect and rapidly respond to public health threats key indicators, 2016-2018

Capacities	Indicators	Baseline (2016)	Target	Achievement (2018)
Antimicrobial resistance	Antimicrobial resistance detection	1	4	3
	Surveillance of infections caused by AMR-pathogens	1	4	3
	Health care-associated infection (HCAI) prevention and control programmes	3	4	3
	Antimicrobial stewardship activities	1	4	3
Emergency response operations	Capacity to activate emergency operations	2	4	3
	EOC Operating procedures and plans	3	4	3
	Case management procedures are implemented for IHR relevant hazards	2	4	3
Points of entry	Routine capacities are established at points of entry	2	4	3
	Effective public health response at point of entry	2	4	3

Key: Score 1=No capacity; 2= Limited capacity; 3=Developed capacity; 4=Demonstrated capacity; NA= Information not available

Figure 5.14: The percentages of IDSR timeliness and completeness, 2013-2018.



Cholera

The number of cases of cholera has increased from 0 in 2014 to 8821 in 2015, dropping to 4378 in 2018. The number of deaths due to cholera has increased from 0 in 2014 to 91 in 2017 before declining slightly to 74 in 2018. Cholera case fatality rate has remained higher from 2015-2018 than the target: in 2018 it was 2.2% for males and 0.9% for females. The proportion of districts submitting monthly report was 79% in 2013 to 80% in 2018.

Table 5.3: National Cholera control performance at baseline (2012) and subsequent years

Indicator	Baseline (2012)	Achievement (2018)	Target	Remarks
Number of cholera incidence notified	343	4,378	0	Number of cases of cholera has remained high from 2015-18
Case Fatality rate (%)	4.08	1.69	<1	CFR higher than the target
Proportion of districts submitting weekly/monthly surveillance reports to next higher level	79% (2013)	80%	>80%	Completeness is within the target

6 NON-COMMUNICABLE DISEASES AND INJURIES

Main findings

- There is a dramatic increase in obesity (and overweight) in Tanzania, as shown by data from women 15-49 years where obesity prevalence increased from 6% to 10% in just 5 years.
- Obesity and overweight are increasing everywhere in mainland Tanzania, but by 2015/16 obesity was three times higher among urban women than rural women (18% and 6% respectively), and 10 times higher among the wealthiest women compared to the poorest quintile women (21% and 2% respectively).
- There are no new data to assess trends in hypertension or raised blood glucose, but the 2012 STEPS did establish that both risk factors are common among men and women 25-64 years.

Indicator	Baseline	Target (2020)	Achievements	Comments
Obesity and overweight among adults (25-64 years)	Obesity (BMI $\geq$ 30) 2.5% (M) 15.0% (F) (STEPS 2012, 25-64 yr) 6.1% (F) (TDHS 2010, 15-49)	No increase in obesity	10.0% (F, 15-49, TDHS 2015/16)	Obesity has increased strongly
	Overweight or obese (BMI $\geq$ 25) 15.1% (M) 37.1% (F, 25-64, STEPS 2012) 21.3% (F, 15-49, TDHS 2010)	No increase in overweight	28.1% (F, 15-49, TDHS 2016)	Overweight/obese in females increased strongly
Raised blood pressure among adults	25.4% (M), 26.5% (F) (STEPS 2012)	Reduced by 25% Male=19.1% Female=19.5%	NA	
Raised blood glucose among adults 25-64 years	8.0% (M) 10.0% (F) (STEPS 2012)	Reduced by 10%	NA	
Cervical cancer screening among women 30-49 years with VIA	11% (HMIS 2014)			

The chapter on morbidity and mortality shows the increasing importance of NCD as a cause of ill-health in Tanzania. Figure 6.1 shows the percent of all deaths that were due to cardio-circulatory diseases and cancers among hospital deaths during 2011-2015 (part of a 39-hospital record review study). Cardio-circulatory diseases accounted for just over 5% of deaths, while cancers contributed to another 5% of deaths.

The hospital data provide an incomplete picture, as the majority of deaths occur in the community and no cause of death is registered. Global estimates of cause of death patterns by WHO (and IHME) are available and, even though, these are based on limited data, they could help the assessment of the relative importance of NCDs, now and in the future.

Obesity and overweight

Overweight and obesity are major risk factors for a number of chronic diseases, including diabetes, cardiovascular diseases and cancer. Several nationwide surveys provide data on the prevalence of overweight (BMI $\geq$ 25 and less than 30) and obesity (BMI $\geq$ 30) in Tanzania. This includes the STEPS survey in 2012 for women and men 25-64 years

and DHS surveys since 2000 which included body mass index for women 15-49 years. The latter data can be used to assess the trends.

Figure 6.1: Percentage of all deaths accounted to cardio-vascular diseases and cancer, 2011-2015

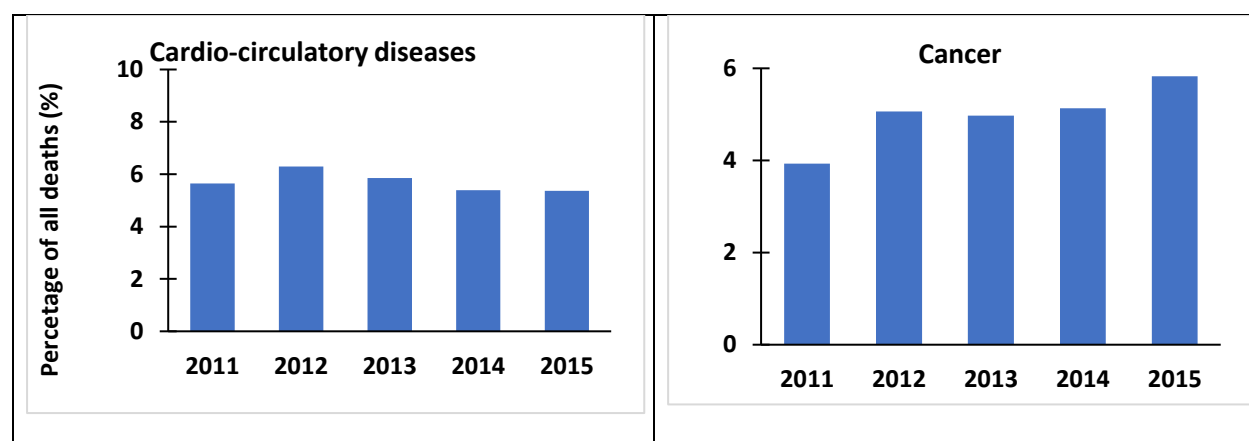
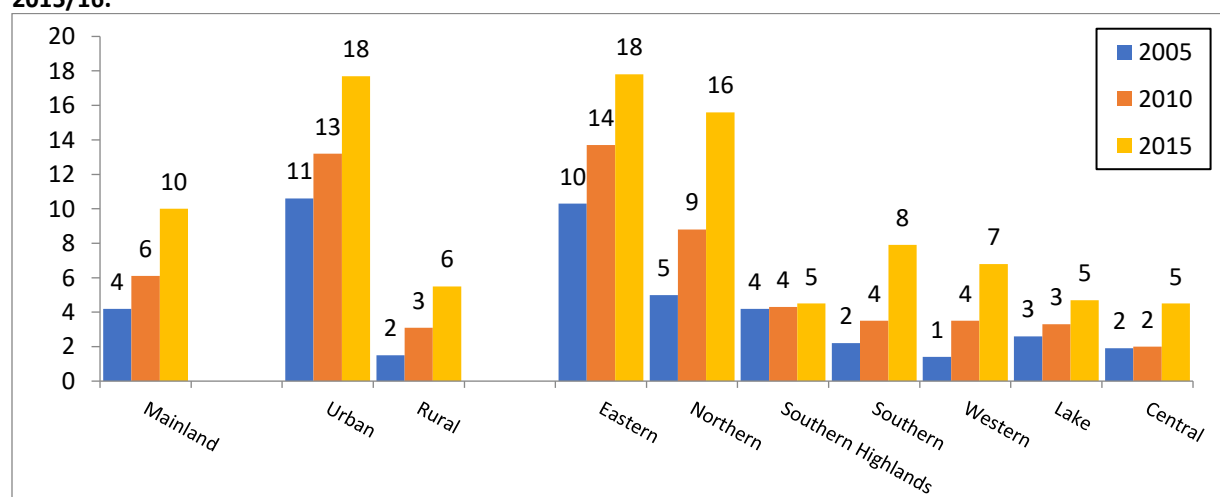


Figure 6.2 shows the dramatic increase in obesity among women 15-49 from 4% in 2005 to 6% in 2010 and 10% in 2015-16. While the increase occurred among urban and rural women, urban obesity is still three times higher among urban women (18%) compared to rural women (6%). There were also marked differences between zones (and regions). Obesity is much more common in Eastern and Northern zones than in the Southern Highlands, Lake and Central zones. The proportion of women 15-49 who are overweight or obese (BMI ≥ 25) shows a similar trend from 21.3% in 2010 to 28.4% in 2015/16, clearly a very rapid increase.

Figure 6.2: Obesity among women 15-49 years (%) by place of residence and zone, TDHS 2004/05, 2010 and 2015/16.



There are very large differences in the prevalence of obesity and underweight by socioeconomic status as measured by wealth quintile. According to the TDHS 2015/16, obesity was only 1.7% among women in the poorest quintile and 3.0% in the second poorest quintile. But among women in the richest quintile it was 21.3%, and in the second richest quintile 11.4%. The percent of women who were underweight (BMI below 18.5) shows the opposite, with 13.3% of women who were underweight in the poorest quintile and 6.6% of women underweight in the richest quintile (Figure 6.3).

Hypertension: important risk factor for cardiovascular diseases. The STEPS survey showed very high prevalence of elevated blood pressure (above 140/90) among men and women 25-64 years (Figure 6.4). Research studies which

are mostly in rural populations reported somewhat lower hypertension prevalence (e.g. 8.2% and 7.7% among women and men respectively in Mwanza region, and 8.5% among women in northeastern Tanzania). There are no trend data to assess whether the HSSP IV targets have been met.

Figure 6.3: Underweight and obesity by wealth quintile among women 15-49 years (%), TDHS 2015/2016

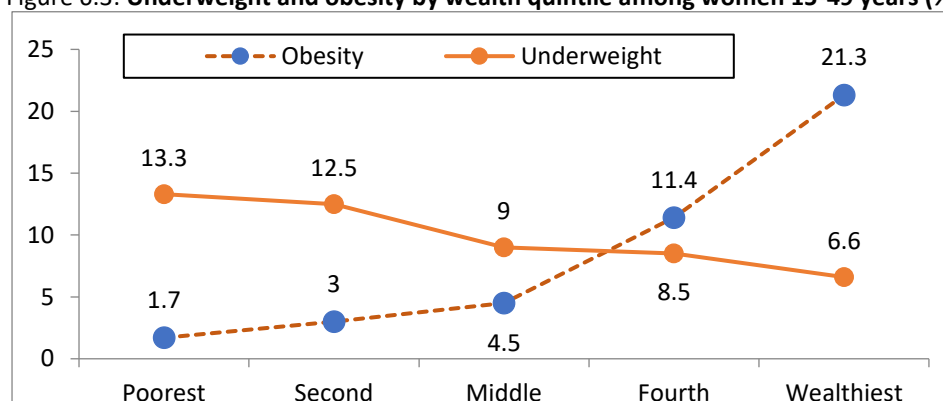
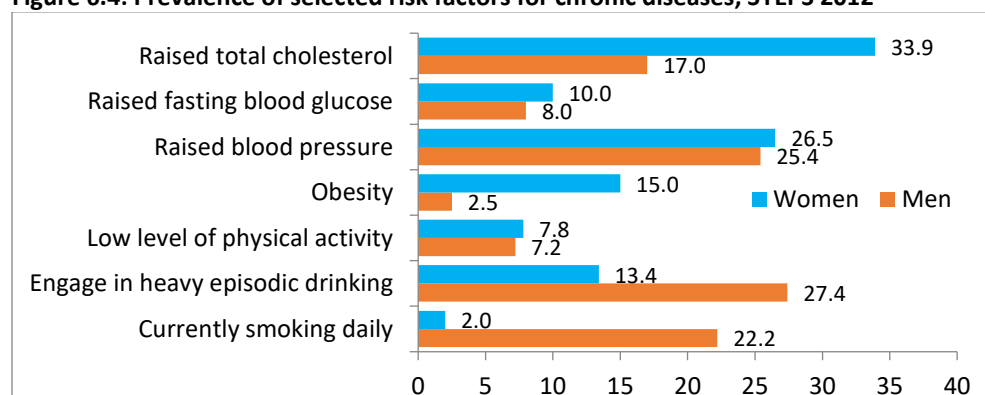


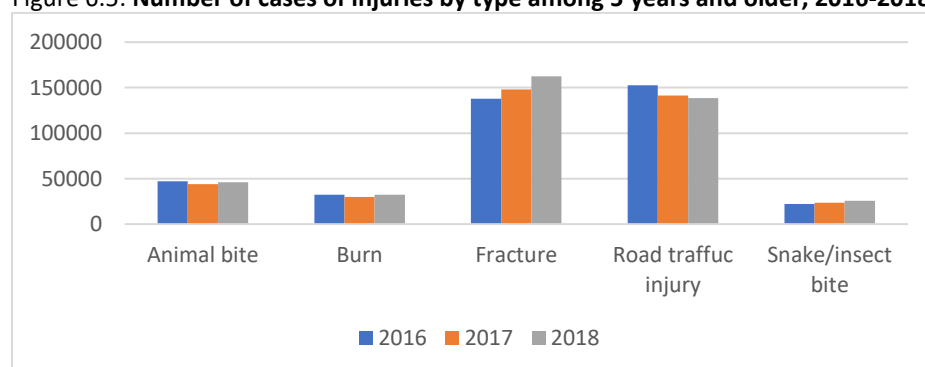
Figure 6.4: Prevalence of selected risk factors for chronic diseases, STEPS 2012



Diabetes: The STEPS 2012 showed that 8% of men and 10% of women 25-64 years had raised blood glucose. There are no trend data to assess progress towards the HSSP IV target.

Injuries: A 39-hospital study showed that during 2011 and 2015 about 5% of deaths in hospital were due to injuries. According to the DHIS data, fractures and road traffic injuries account for the largest number of cases of injuries among persons 5 years and over (Figure 6.5). Animal bites account for the largest number of injuries among <5 years olds.

Figure 6.5: Number of cases of injuries by type among 5 years and older, 2016-2018



7 HEALTH SYSTEMS

HSSP IV has several indicators related to health systems, including governance and financing, infrastructure, health workforce, medicines and commodities and health information system.

GOVERNANCE

HSSP IV Targets & indicators

Indicator	Baseline (Year)	Target 2020	Achievement	Comments
CCHP annual plans approved at first assessment (%)	20% (2014-15)	50%	90.2% (2018)	Target met and exceeded
CCHP implementation reports approved at first assessment (%)	41% (2013/14)	75%	No data	

Tanzania has multiple policies and strategy documents that relate to health and health programmes which can be classified into three categories: overall development plans with a health component, general health plans, and specific health programme plans. Most health sector plans were developed based on Tanzania vision 2025 (1999–2025), the national strategy for growth and reduction of poverty 2010–15 (MKUKUTA II) and the Tanzania Five Year Development Plan (FYDP) 2011–12/2015–16. The first Tanzania national health policy was released in 1990 and was revised in 2007. The fourth Health Sector Strategic Plan 2015/2016–2019/2020 (HSSP IV) and the Primary Health Services Development Programme 2007–17 (MMAM or PHSDP) interpret the national health policy with clear strategies, goals and plans to achieve the stated goals. In addition, there are many health programmes which are guided by five or more-year plans. Some are strongly linked to HSSP III, others are not. Examples of such plans are the National road map strategic plan to accelerate reduction of maternal and new-born and child deaths (One plan II) (2015/16–2019/20), the National Malaria Control plan 2013–18 and the National TB and leprosy programme plan 2015/16–2019–20

During HSSP IV several important initiatives took place. In July 2017, the DHFF – Direct Health Facility Financing became operational, with health facilities receiving and managing funds. By 2019, 547 health centres and 4816 dispensaries received and managed funding; all health facilities are preparing plans; and all have bank accounts (up from 35% since 2015). CCHP guidelines were revised and promoted to strengthen evidence-based planning.

Results based financing started in Shinyanga in 2016, and by end 2018 eight regions were implementing RBF, in which 25% is paid to the health workers and 75% to facility (1656 facilities engaged).

There was increased use of ICT to develop planning, budgeting, reporting tools: web-based PlanRep to be used by all councils to develop council health plans but the integration with DHIS2, Epicor and FFARs is still ongoing. The CCHP approval rate at first assessment increased from 20% in 2015, 90.2% in 2018, far exceeding the 2020 target of 50%. The proportion of facilities with functional HFGC (health facility governing committees) increased from 26 to 79%.

HEALTH FINANCING

Main findings

- The share of the government budget allocated to health is falling, especially in 2018/19.
- Total health expenditure has been stable since 2009 at US\$ 35 per capita, which does not suffice for basic health services for all.
- Health insurance coverage is increasing slightly but remains low.

Indicator	Baseline (Year)	Target 2020	Achievement	Comments
General government expenditure on health as % of total government expenditure	9.1% (PER 2014); 10.3% excluding debt relief etc.	10.0%	10.0% in 2017/18 8.9% for 2018/19	Achievement excludes debt relief etc.
Insurance coverage/enrollment in CHF/THIKA/NHIF/NSSF-CHIB/ CHIF	19% (NSSF, 2013)	50%	9.0% of women and 9.5% of men health insurance (TDHS 21015/16); includes 4.5% through community-based insurance	Enrolment target not met; coverage still very low

Data sources: The primary data sources are the annual public expenditure review (PER) and National Health Accounts (NHA) for which the last was conducted in 2015/16. The NHA therefore will not provide much insight into the trends during HSSP IV. The PER focuses on government budget, but only includes external funding that comes through the national budget. This brief analysis relies on the WHO expenditure data base and recent analyses by UNICEF and SIKIKA of the health budget.

General government expenditure on health

According to the Integrated Health Financing Management Information System, the proportion of the government budget allocated to health has been declining gradually during HSSP IV just above 10% in 2014/15 and 2015/16 to 8.9% in 2018/19.^{19 20} These figures exclude the consolidated funding sources.²¹ For FY 2018/2019, the Government of Tanzania allocated TZS 2,054 billion for the health sector, down from TZS 2,222 billion in 2017/18.

Figure 7.1 shows the trend over time, both including and excluding consolidated funding sources.²² The general government expenditure on health has hovered around 10% for many years but dropped in 2018/19. The trends inclusive of debt repayments shows a strong downward trend since 2014/15, suggesting the increasing burden of such payments on the budget.

¹⁹ UNICEF. Health budget brief 2018. Tanzania.

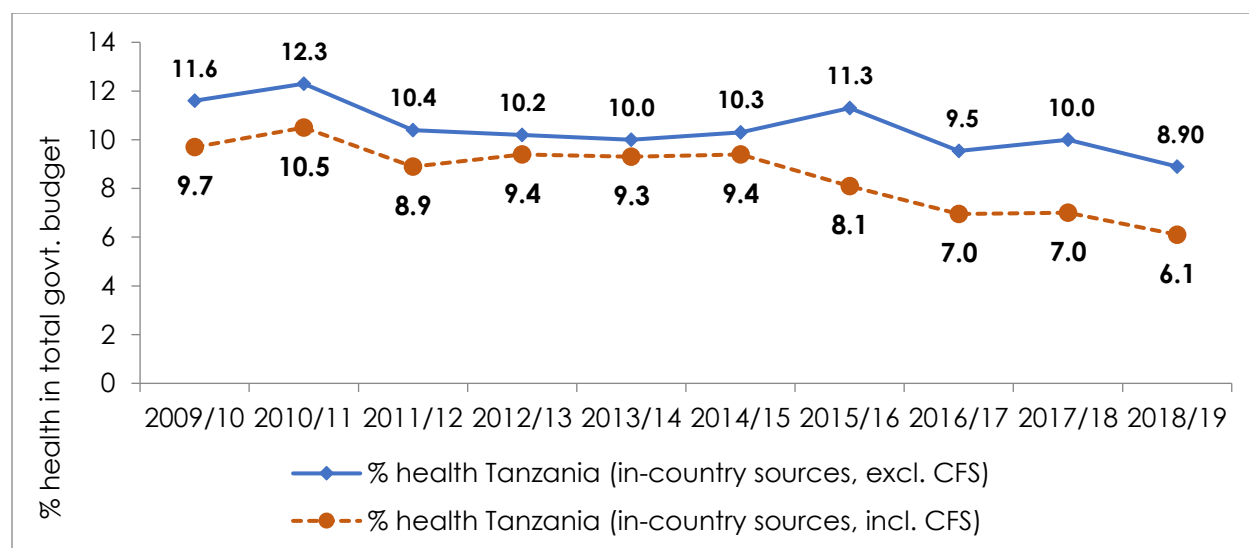
²⁰ SIKIKA. Analysis of the government of Tanzania budget allocation to the health sector for fiscal year 2018/19.

²¹ Consolidated funds services, which includes mandatory debt repayments, government contribution to pension funds, and other non-discretionary expenditures. SIKIKA

²² From SIKIKA report. The estimates includes all on-budget funding for Ministry of Health, Community Development, Gender, Elderly and Children (MOHCDGEC), Tanzania Commission for AIDS (TACAIDS), President Office, Local Government Authority (PORALG)-Health, allocations to Regions and Local Government Authorities (LGAs), and the government contributions to the National Health Insurance Fund.

The domestic budget allocation for FY 2018/19 was TZS 1736.1 billion, which is equal to 85% of the total budget, up from 75% in 2015/16, indicating that Tanzania became less dependent on external sources.

Figure 7.1: Percentage of Tanzania National Budget Allocation to health:



Source: MOFP, 2008-2017; MOFP, 2017; MOFP, 2018. Note: Values are inclusive of on-budget external support

Total health expenditure per capita

Figure 7.2 shows the trends in total health expenditure per capita in Tanzania, in constant US\$ 2016, based on WHO's expenditure database. The total health expenditure (THE) per capita has remained around US\$35 since 2008. This figure includes all sources including private provision of health and out-of-pocket payments. The WHO high level task force estimated health financing requirements for essential services is US\$44 per capita.

Figure 7.2: Per capita expenditure on health at 2016 constant average exchange rate (US\$) (Source: WHO, Health Expenditure database).

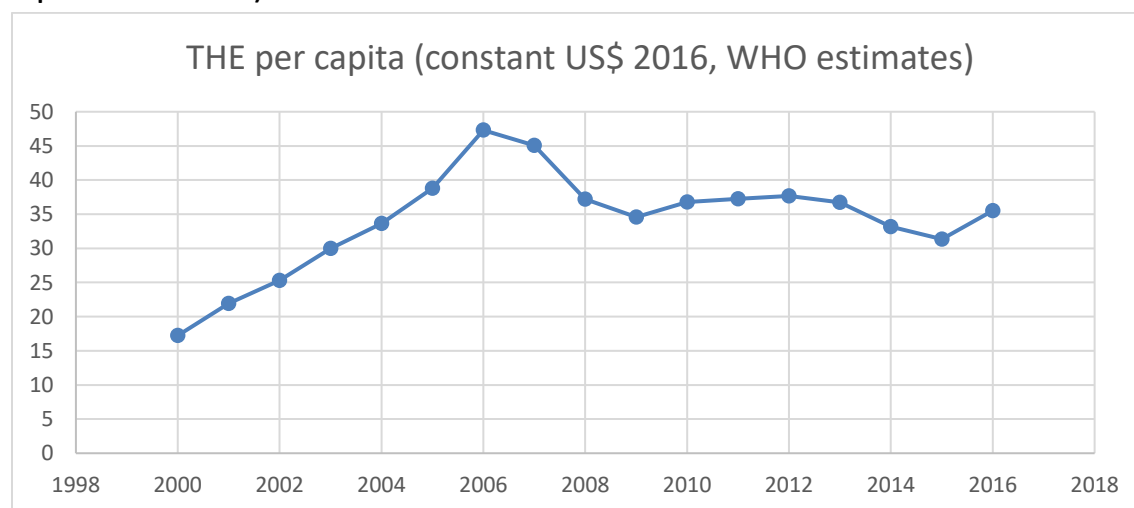
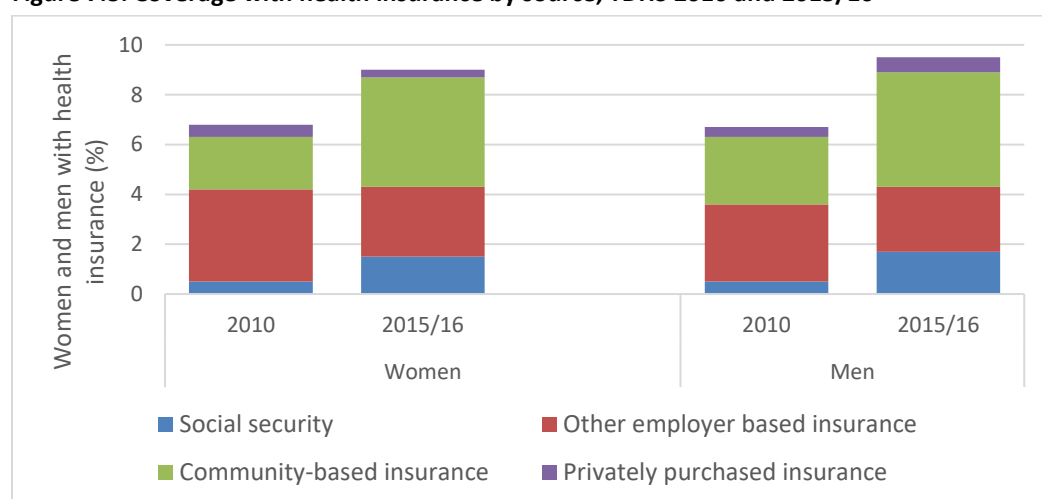


Figure 7.3: Coverage with health insurance by source, TDHS 2010 and 2015/16



As of 2016, a total of 3,528,449 and 9,333,978 beneficiaries were registered within National Hospital Insurance Fund (NHIF) and CHF data base respectively. Combining information from private and other schemes the coverage reaches 28%, slightly below the government target of 30% by the year 2015.

The TDHS 2015/16 results suggest much lower coverage (Figure 7.3). The percent of women with community-based health insurance increased from 2.1% to 4.4% and for men from 2.7% to 4.6%. The HSSP target of 80% coverage with community-based health insurance was by far not met. Overall only 9.0% of women and 9.5% of men have health insurance, and this represented only a small increase since 2010 when just under 7% of women and men had a form of health insurance.

It is noted that these insurance coverage figures are not a good indication of what kind of services people can receive based on their insurance package, or what the level of catastrophic expenses is at the household and individual levels.

HEALTH WORKFORCE

Main findings:

- The total human resource for health requirement is 208,595 for 7,397 health facilities; Currently the available workforce is 95,827, equivalent of 46% of the requirement. Of the total, 95,827 health workers, 45.7% are in urban and 54.3% in rural areas
- The number of nurse/midwives per 10,000 was 5 in 2014, rose to 7 in 2016, 6.5 in 2017 and dropped slightly to 6.2 in 2018. The number of physicians / clinicians (including AMO) increased only slightly from 0.78 in 2011 to 0.88 in 2018
- The distribution of core health professionals (physicians, AMO, clinical officer, nurses) by region in 2018 was highly variables with the top 5 regions having more than three times higher densities than the bottom 5 regions (11.5 and 3.5 core health professionals per 10,000 population respectively).

Indicator HSSP IV	Baseline (Year)	Target 2020	Achievement	Comments
Medical Officer/ Assistant Medical Officer per 10,000	MO=0.4 (2011) AMO=0.4 AMO+MO=0.8	NA	MO=0.61 / 1,000 population AMO=0.27 AMO+MO=0.88 (2018)	Increased density medical doctors
Nurse midwives per 10,000	4.0 (2011) 5.0 (2014)	7.0	6.2 (2018) 4.7	Increased yet below the target

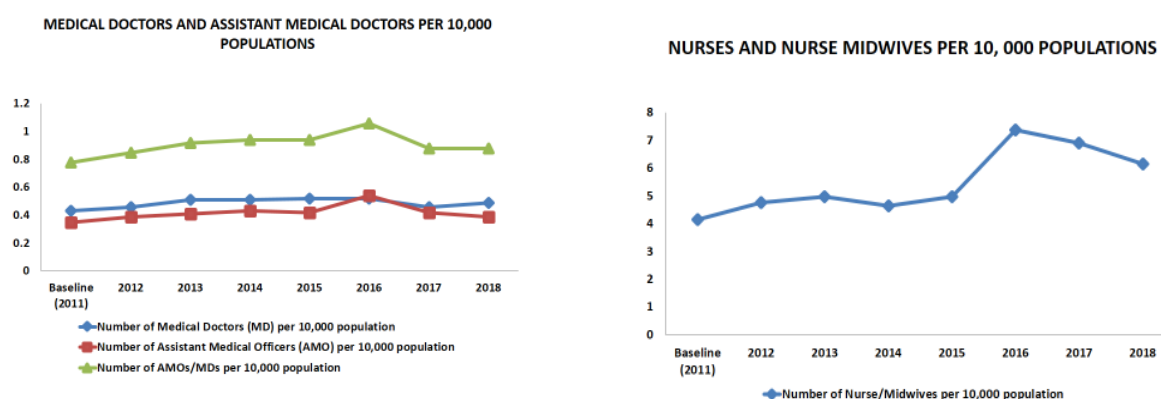
The total human resources for health requirement is 208,595 for 7,397 health facilities, according to government computations. The total health workforce was 95,827 by December 2018. In 2017, the total workforce was 90,873, and increase of more than 5% in one year. The distribution was 43,774 urban (46% of total), 52,053 rural (54%); the gap with required workforce is greater in rural areas (32,000 and 80,000 respectively). According to the UN Population Division about 32% of the population of Tanzania lives in urban settings. Using this urbanization statistics, it can be estimated that urban areas have 1.8 times more health workers (all cadres) than rural areas.

The core health professionals in this analysis focused on medical doctors, assistant medical officers (AMO), clinical officers (CO) and nurses (including nursing officers, assistant nursing officers and (enrolled) nurses). There were 34,120 core health professionals in 2018. This includes the number of core health professionals from the 184 councils (75.0% of the total), the regional referral hospitals (15.6%) and the zonal and national referral hospitals (the remaining 9.4% of health workers).

In 2018, about one in seven mainland core health professionals practice Dar es Salaam (13.9%), which is possibly an underestimate as Dar es Salaam has a larger private sector which may not be captured completely in government statistics on human resources. More than one-third of medical doctors were in Dar es Salaam region (37.7% of all MDs in mainland Tanzania), which is partly due to the concentration of large referral facilities in the region and partly due to the attraction of the city.

The density of medical doctors and AMOs did not increase much during HSSP IV (Figure 7.4). The numbers increased but merely kept up with population growth. By 2018 there were 0.61 medical doctors per 10,000 population and 0.27 AMOs, totalling just under 0.9 per 10,00 population. This was about the same level as in 2015.

Figure 7.4: Trends in medical doctors, Assistant Medical Officer and nurses per 10,000 population, 2011-2018.



Note: Figures obtained directly from Ministry of Health.

Based on the data by region there were 24,981 nurses working in mainland Tanzania in 2018. This included 2,685 nursing officers, 7,048 assistant nursing officers and 15,158 nurses. The number of nurses / nurse-midwives, including nursing officers, assistant nursing officers and (enrolled) nurses, was 4.7 per 10,000 population.²³ The skills mix was computed as the number of nurses per clinician, including medical doctors, AMO and clinical officers. For mainland as a whole there were 2.7 nurses per clinician in 2018.

PO-RALG received recruitment permits for 6,180 skilled health workers. About 3,230 health worker posts were allocated including 327 medical officers, 402 clinical officers, 297 assistant nursing officers, 1,298 nurse II, 24 radio

²³ This is lower than the 6.2 per 10,000 in the Ministry of Health HRHIS and needs further checking with the program.

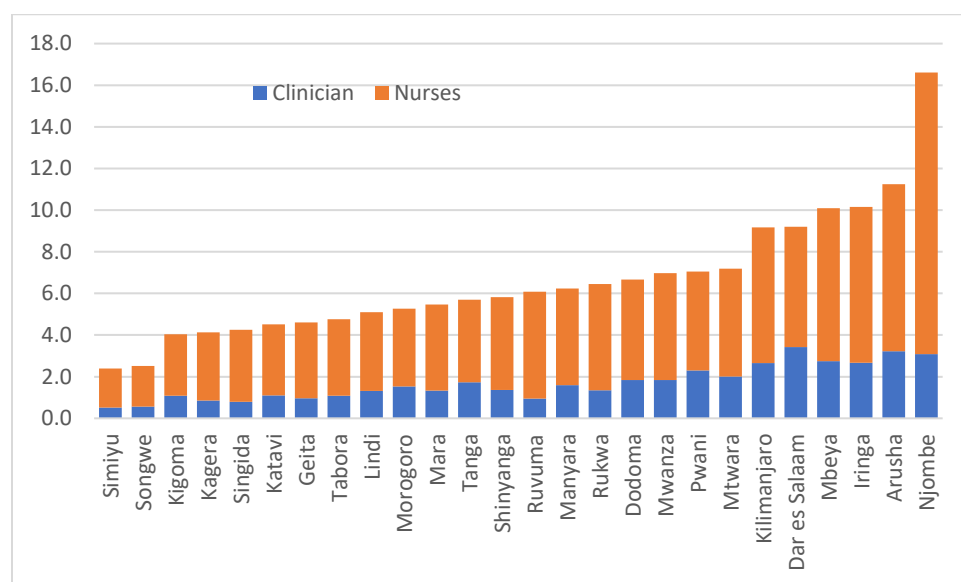
technologists, 239 laboratory technicians, 108 assistant lab technicians, 217 pharmacy technologists, 118 pharmacy technologists' assistants and 200 medical attendants.

However, some health workers not willing to work in rural areas and therefore they do not report: by July 2018, 92% of all health workers reported. Moreover, some cadres such as dental surgeons, biomedical engineers, physiotherapists, mortuary attendants are not in sufficient numbers in the market. Several arrangements for induction courses and clinical attachment for the newly employed workers are in place.

There are large differences between the regions in terms of health worker density (Figure 7.5). Njombe region had by far the highest density with more than 16 health workers per 10,000 population. It is notable that Njombe is also the region with the highest C-section rate. Arusha, Iringa and Mbeya regions also have health workforce densities of just over 10 per 10,000 population and are followed by Dar es Salaam and Kilimanjaro. In the latter two regions, undercounting of health workers is possible and densities may be higher than shown here.

At the lower end, Simiyu and Songwe have severe shortages of core health professionals with just over two health workers per 10,000. Also Kigoma, Kagera, Singida, Katavi and Geita have low densities. The average for the bottom 5 regions is 3.5 core health professionals per 10,000 population, compared to 11.5 for the top 5 regions, with Njombe as a exceptionally high health worker density region.. The predominance of new regions is obvious, and investments are required to increase numbers of health workers. At the same time the low density in Kigoma does not strike well with the high levels of coverage that have been observed in the DHIS2. This may be true, but further examination of the quality of both health workforce and DHIS2 on coverage is required.

Figure 7.5: Number of core health professionals (clinicians and nurses) per 10,000 population by region, HRH database 2018.



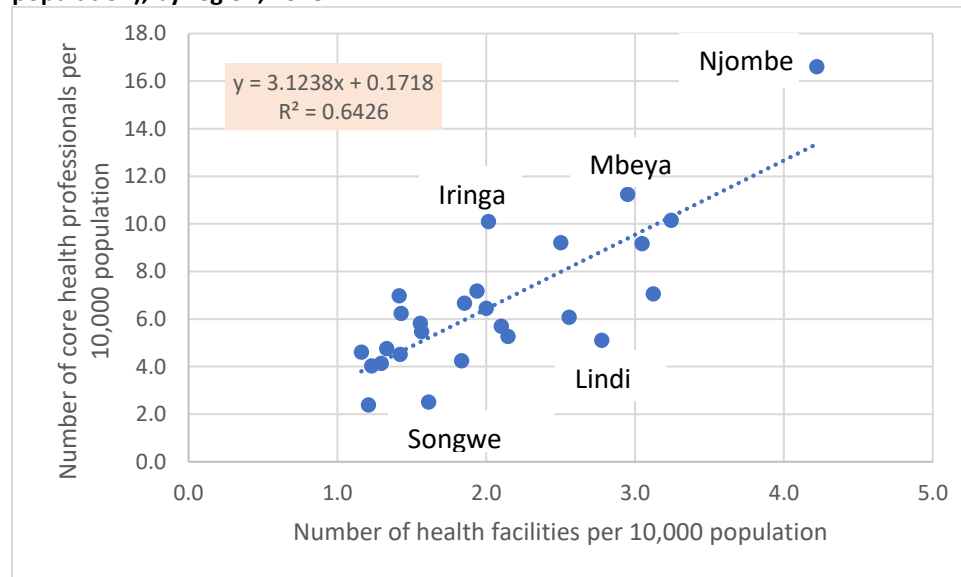
There was a small decline in the number of health facilities without clinicians and nurses: 498 without such workers at baseline, down to 475 HF with at least clinicians and nurses

The number of health training institutions has increased. A total of 158 health training institutions have registration with National Council for Technical Education, out of 190 in total. 58 are private.

As expected, the core health worker density is strongly correlated with the density of health facilities in the region. (Figure 7.6). The more health facilities per 10,000 population, the more health workers. Njombe, Mbeya and Iringa stand out as having relatively more health workers than expected based on the number of health facilities per 10,000

population. This may be due to having relatively more larger health facilities or to better staffing of health facilities than in other regions. At the other end Lindi and Songwe have lower health worker density than expected based on the facility density. This may be because they have more smaller facilities or because there are fewer health workers in the facilities than in other regions.

Figure 7.6: Density of core health professionals (per 10,000 population) by density of health facilities (per 10,000 population), by region, 2018.



INFRASTRUCTURE, SERVICE UTILIZATION AND QUALITY OF CARE

Main points

- The number of health facilities increased to 2.1 per 10,000 population by 2018, while there was an important effort to rehabilitate health centres. The ambitious targets for health facilities in villages, wards and councils are however still far away.
- OPD service utilization increased slowly but remained low at 1 visit per person per year, while hospital admission rates fell from 3.8 to 3.3 per 100 persons per year during HSSP IV.
- The availability of basic amenities and tracer medicines improved, and the star-rating assessment of all health facilities showed better results in 2017/18 than in 2015/16 in all regions, suggesting improved quality of care.
- There is a slight increase in health facilities providing EmNOC services as well as health workers to provide services in these facilities, but the HSSP IV targets for 2020 are not likely to be met.

Indicator	Baseline (Year)	Target 2020	Achievement	Comments
Number of outpatient visits per capita	0.92 (DHIS2 2015)		1.06 (DHIS 2017)	Gradual increase to 2017; 2018 not show due to data issue
Health facilities without any stock-out of 10 tracer medicines including 1 vaccine	86.6% (DHIS2 2014)		95.9% (DHIS2 2018)	Availability is good and improved over time
Emergency Obstetric Services: facilities that can provide EmONC (%)	25% of dispensaries and HC (2015 EmONC assessment)	BEMOC – 70% of all HC and dispensaries CEMOC – all hospitals	BEMOC – 20% of dispensaries and 39% of HC; CEMOC - 81% of hospitals, 17% of HCs (SARA, 2017)	Targets for 2020 not likely to be met at current level of increase
Facilities with 3-star rating or higher (%)	2.0% (Star rating assessment 2015/16)	50%	18.89% (Star rating assessment 2017/18)	Major progress in overall rating but still far from target

Data sources: the DHIS data on number of health facilities and availability are derived from the DHIS. Additional data on the status of health facilities and availability of medicines, commodities and diagnostics were derived from SARA health facility assessments in 2015 and 2017, based on a sample of health facilities, and the star rating assessments conducted in 2015/16 and 2017/18, based on all government facilities.

General service access

HSSP IV did not have specific targets for facility density and distribution, but national targets have been set in other government documents: for all 12,545 villages to have a dispensary, for all 4,220 wards to have a health centre and for each council to have a hospital. By 2018, 53% had dispensaries (38% public and 15% private or faith-based organization), and 16% of wards had health centres (12% public and 4% private/FBO). There were 70 councils with hospitals out of 184 councils (38%). Between 2015 and 2018, 304 health centres were rehabilitated (or constructed). In addition, the construction of 67 district hospitals started in January 2019.

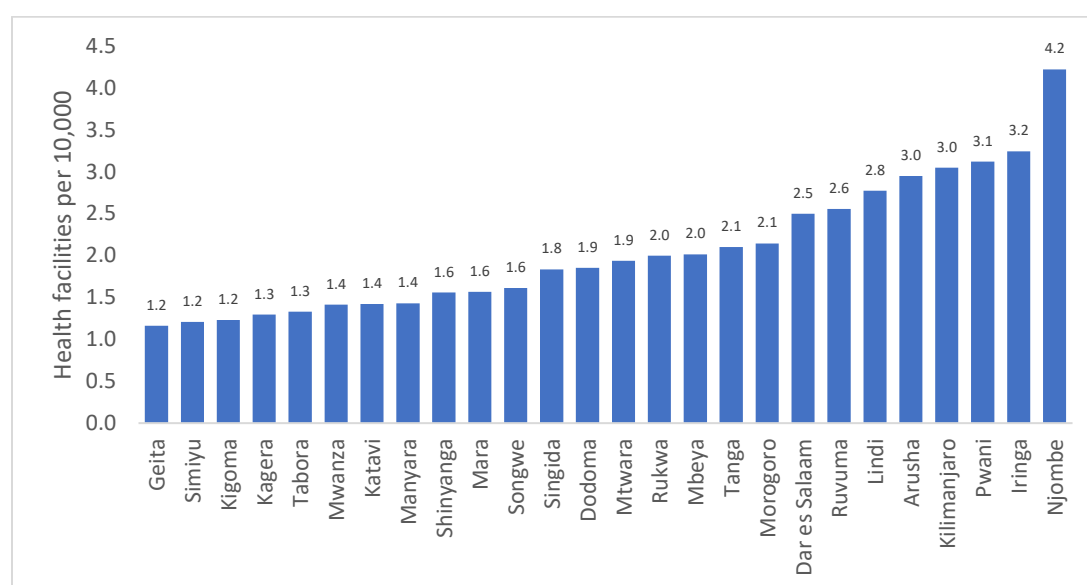
According to the DHIS there were 11,251 health facilities, which translates into 2.1 facilities per 10,000 population for the mainland. The majority of these facilities were dispensaries (61%) (Table 6.1). One in six facilities was private-for-profit (17.4%) and about 1 in 11 were owned by a faith-based organization (8.9%).

Table 6.1: Number, percent distribution and density per 100,000 population, mainland, 2018 (DHIS data).

	Number	Percent	Density per 100,000
Hospitals	295	2.6	0.6
Health centres	796	7.1	1.5
Dispensaries	6,874	61.1	13.1
FBO	1,002	8.9	1.9
Private	1,961	17.4	3.7
Other	323	2.9	0.6
Mainland	11,251	100.0	21.4
Population 2018	52,619,314		

There were however marked regional differences in the distribution of health facilities with considerably higher densities in southern/eastern regions than in northern/eastern regions (Figure 7.7). Njombe region had by far the highest facility density (4.2 facilities per 10,000 population), including the highest density of hospitals as well as health centres. There were four other regions with densities exceeding 3.0 facilities per 10,000 population: Iringa, Pwani, Kilimanjaro and Arusha (all in the range of 3.0-3.2 facilities per 10,000). The five regions with the lowest densities were Geita, Simiyu, Kigoma, Kagera and Tabora (1.2-1.3).

Figure 7.7: Health facilities per 10,000 population by region, DHIS, 2018.



Service utilization

The number of outpatient visits per person per year increased from 0.93 in 2015 to 1.06 visits per person per year during 2015 to 2017 (Figure 7.8). About one-third of the 54 million visits in 2017 were re-visits. In 2018, however, there was a decline in outpatient attendance to 0.85, starting in March 2018. It is not clear if this was a true drop as there was an important and inexplicable change in the reporting of new and re-visits (50% were revisits) which is likely to point to a major data quality issue. The OPD visit data in DHIS2 show inconsistent results from March 2018 which appears to be due to a reporting issue within the system.

The hospital admission rates was 3.82 admissions (new and re-admissions) per 100 persons in 2015 (Figure 7.8). By 2018, this figure had gradually dropped to 3.25 per 100 persons in 2018. It is not clear what is causing the drop, which appear quite regular during 2015-2018 with small decreases every year.

There is an improvement in availability of basic amenities in health facilities during the last 2 years, based on SARA facility assessments in 2015 and 2017 (Figure 7.9). The 2017 SARA report shows that 74% of the facilities had a source of power (electricity grid, functional generator with fuel or solar) on the day of the assessment; 68% had sanitation facilities. The item with the lowest availability was emergency transportation. This was available in only 10 percent of health facilities

Figure 7.8: Number of OPD visits per person year and number of hospital admissions per 100 person years, mainland, 2014-2018.

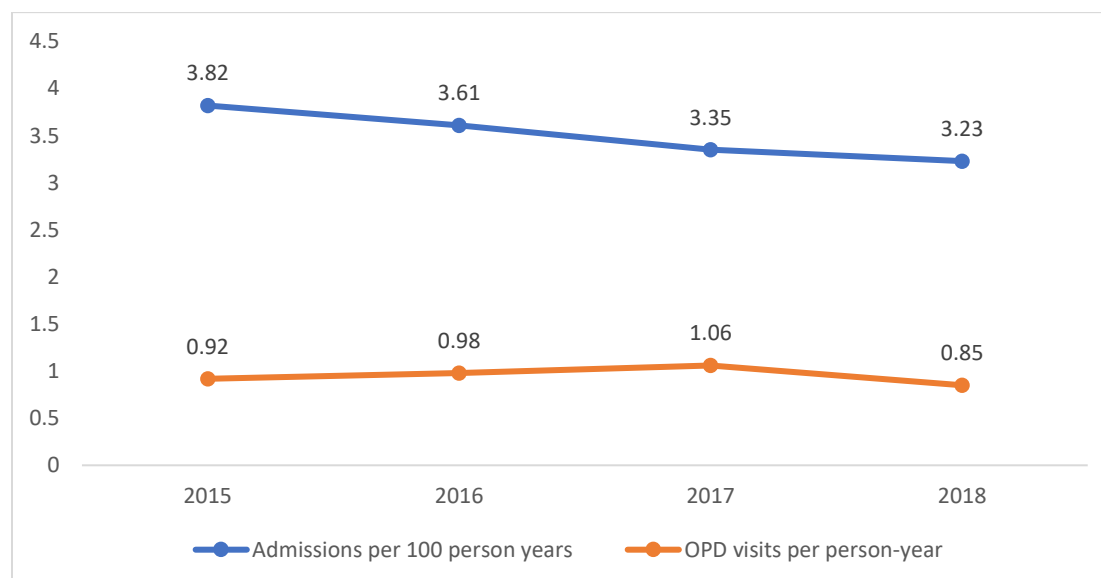
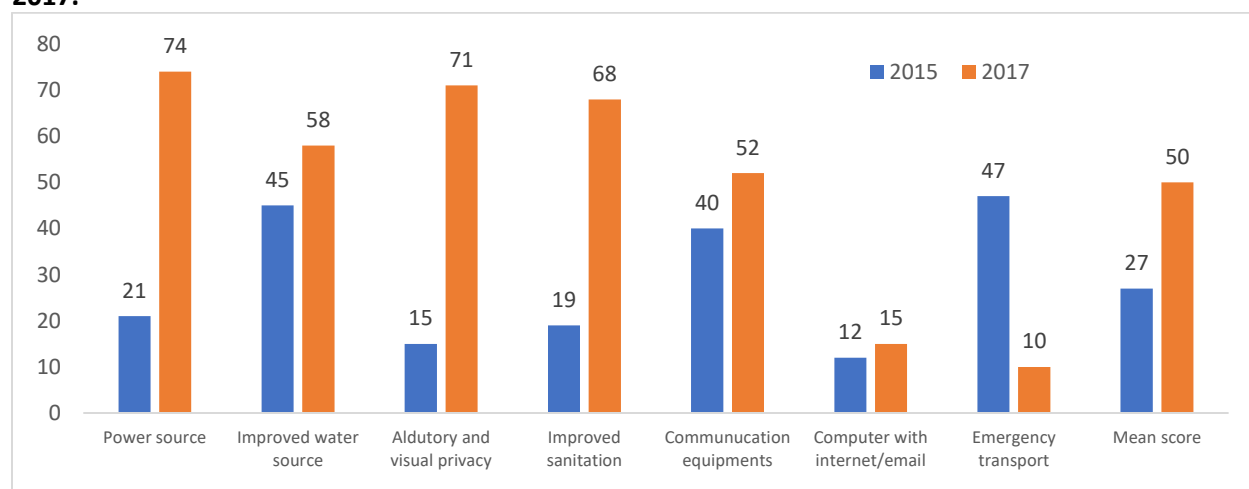


Figure 7.9: Percentage of basic amenities in health facilities, SARA health facility surveys in 2015 and 2017.



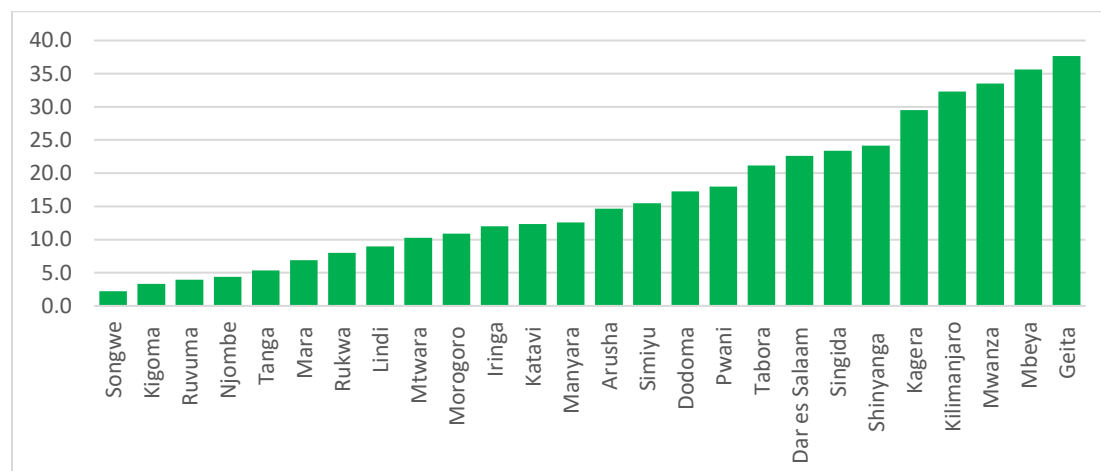
Star rating assessment

The star rating assessments in 2015/16 and 2017/18 assessed the quality of services in 6,993 and 7,289 health facilities respectively. The indicator target is 50% of all health facilities to have three stars or more by 2020. In 2015/16 only 2% of all facilities were rated as three or more stars, with only three regions exceeding 3% (Arusha, Kilimanjaro and Dar es Salaam). In 2017/18 a major improvement was recorded with 18.8% of all health facilities having three stars or more, even though this is still far from the 2020 target.

There was wide diversity in the regional increases in terms of percent of health facilities with at least three-star ratings (Figure 7.10). Geita, Mbeya, Mwanza, Kilimanjaro and Kagera all recorded improvements of 30% or more. At

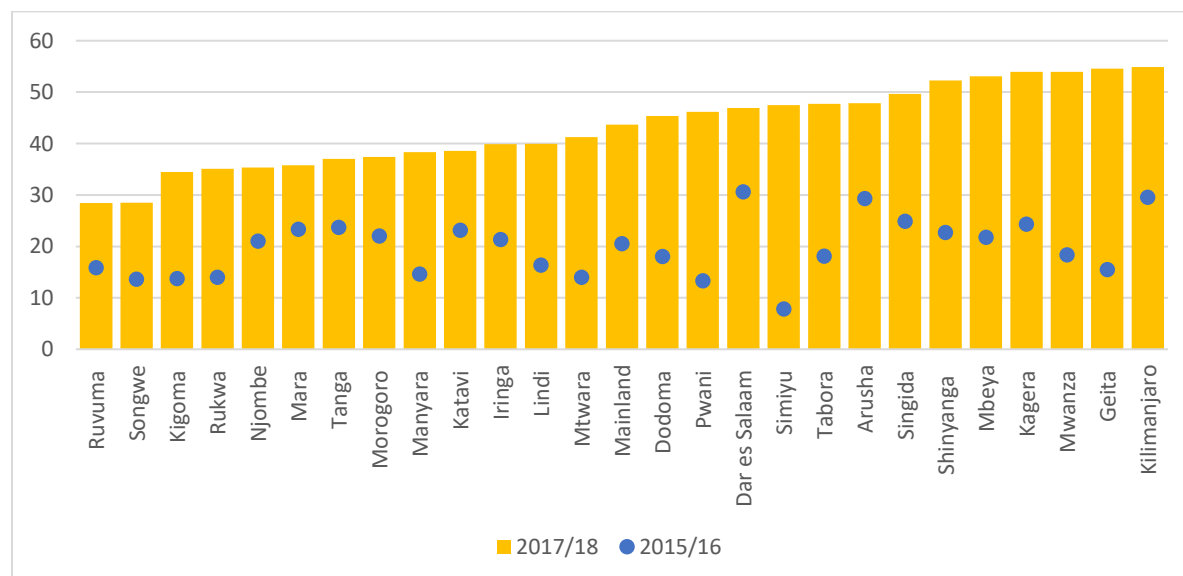
the other end, several regions had increases less than 10% including Lindi, Rukwa, Tanga, Ruvuma, Kigoma and Songwe.

Figure 7.10: **Absolute increase in percent of facilities with 3 or more stars between 2015/16 and 2017/18**



To capture changes in the full distribution (e.g. also including improvements from no star to two stars), an overall score was computed based on the ratings of the individual facilities where 100% implies that all health facilities have a 4-star score or higher.²⁴ All regions observed major increases which resulted in a doubling of the mainland score (Figure 7.11). The best performing regions were Kilimanjaro, Geita, Mwanza, Kagera and Mbeya. The poorest performing regions were Ruvuma, Songwe, Kigoma, Rukwa and Njombe.

Figure 7.11: **Star rating assessment scores by region, 2015/16 and 2017/18 (100% = 4 stars).**



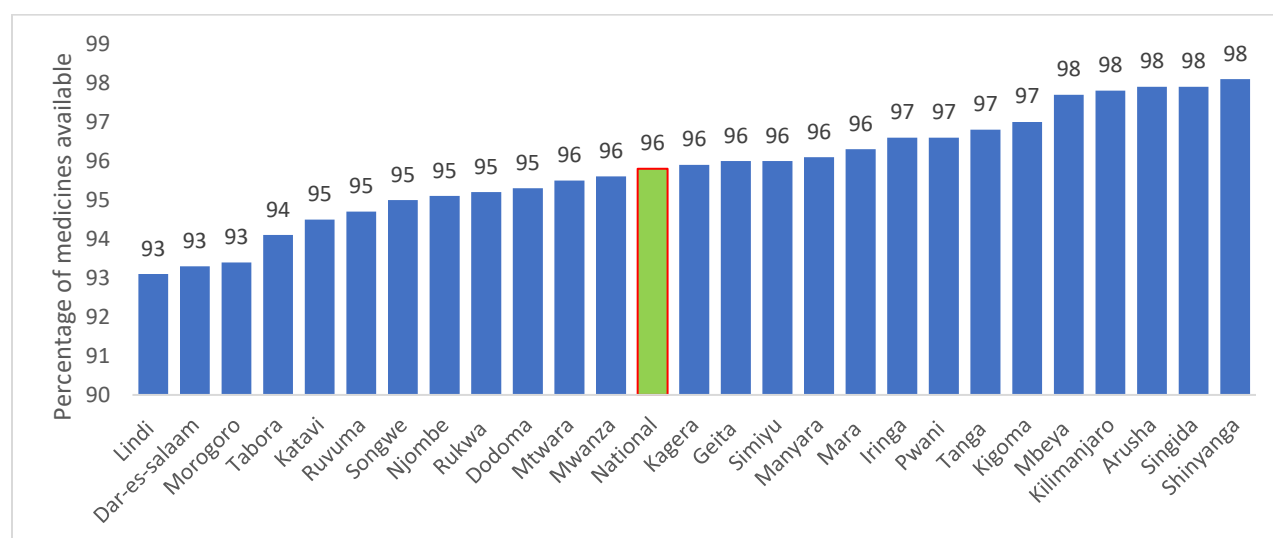
²⁴ The index was computed as the total number of stars obtained in a region divided by a maximum of 4 stars for all facilities (no facility was rated 5 stars).

Availability of tracer medicines

The essential medicines availability is tracked in DHIS2 through 10 tracer items and essential medicines for acute infectious diseases, pain relief, non-communicable diseases and one vaccine including: disposable syringe and needles; Oral Rehydration Salts; Albendazole / Mebendazole Oral; Amoxicillin/ Cotrimoxazole tablets; Artemether / Lumefantrine Oral (ALU); Depo – Provera; Malaria RDT/Supplies for Malaria Microscopy; Normal Saline/Dextrose 5%/Dextrose Saline Iv Solution; Penta Valent vaccine; Ergometrine/Oxytocin Injectable/Misoprostol.

The availability of tracer medicines was generally high and increasing during HSSP IV: 88.3%, 82.2%, 91.6% and 95.9% in 2015, 2016, 2017 and 2018 respectively. The improvement is observed in all regions (Figure 7.12). The five best performing regions in 2018 were Shinyanga, Singida, Arusha, Kilimanjaro and Mbeya. The variation between regions is small, with Lindi and Dar es Salaam only 5% below the best performing regions.

Figure 7.12: Availability of tracer medicines, DHIS 2018.



The SARA 2017, conducted in 592 health facilities, provides an overview of the readiness of a wide range of services, based on a series of items that included availability of guidelines, trained staff, equipment, medicines and diagnostics. The findings show major gaps in the availability.

- General service readiness: basic amenities (7 items, 50% average availability, 4% had all), basic equipment (6 items, 82% mean availability, 32% had all items) and standard precautions for infection control (8 items, mean availability 52%, 10% had all items) were inadequate in almost half of the health facilities.
- Medicines and diagnostics: none of the facilities had all 14 tracer medicines in stock while the average availability was only 38%, and only 10% of facilities had all 8 tracer diagnostics (mean availability 52%). This finding contrasts with the DHIS reports which indicate much higher availability of medicines and vaccines.

Specific service readiness: the results from the assessment of the availability of specific items for all programs (ANC, PMTCT, Immunization, IMCI, STI, TB, NCD control etc.) all showed major deficiencies. The highest mean availability of items scores were HIV counseling and testing (76% of 5 items), immunization (76% of 18 items), malaria diagnosis and treatment (72% of 9 items) and cervical cancer screening (71% of 4 items).

However, if the availability of all items are considered (a facility must have all items to score positively) all services scored low, with the highest scores observed for cervical cancer screening (38% of facilities had all 4 items), ANC (35% of facilities had all 7 items), HIV counseling and testing (33%), adolescent health services (13% of 6 items) and malaria control (13%).

HEALTH INFORMATION SYSTEM

Main points

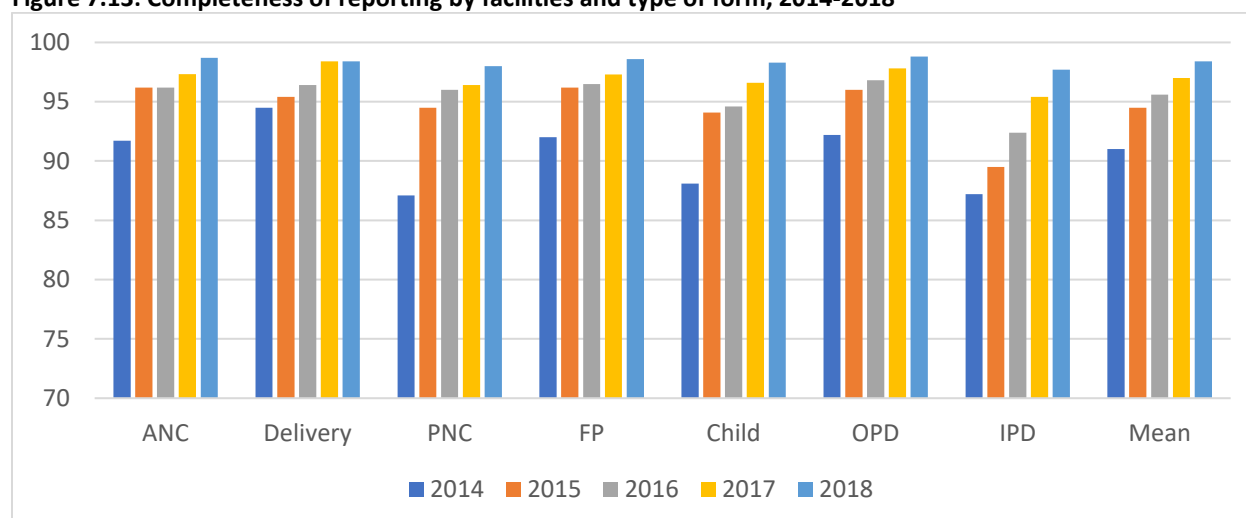
- This analytical report benefitted from the efforts to strengthen Tanzania's health information system, including the DHIS2 health facility information, household surveys, and health system data.
- Completeness of reporting is very good, and accuracy of the reported data allows reliable computation of service statistics. The annual verification of reported data in the context of the Health Basket Fund and RBF shows good correspondence between facility registers and DHIS, though another more detailed assessment showed severe shortages of tally sheets and registers, leading to more errors. In general, however, this does not appear to lead to major systematic over- or under-reporting.
- Several areas need attention in the coming years, including maintenance of the strong support of the University of Dar Salaam (digital management of the DHIS), rationalization of the contents in DHIS2 (and data collection in facilities), further integration of all programs with DHIS2, improvement of the quality of reported data through feedback and regular data quality assessment, and further development of accurate council level target populations for key indicators.

Indicator	Baseline (Year)	Target 2020	Achievement	Comments
Completeness of reporting in DHIS	90% (2014)	95%	98% (DHIS, 2018)	Increased over time, and target met

Data quality of facility reports

The completeness of reporting with DHIS2 is very good (Figure 7.13). The main completeness of reporting for seven forms (family planning, antenatal care, delivery care, postnatal care, child, OPD and IPD) increased to 98% by 2018. Very few regions or councils have reporting rates below 90%. The number of councils with reporting rates below 90% decreased from 30 in 2015 to 3 in 2018.

Figure 7.13: Completeness of reporting by facilities and type of form, 2014-2018



The quality of reported data was assessed in three ways: the occurrence of extreme outliers at national, regional and council levels, consistency of the data within DHIS2 (e.g. first and third dose of pentavalent vaccine, and first

ANC visit and first dose of pentavalent vaccine), consistency between the IVB immunization reporting system and the DHIS2, and plausibility of estimates of coverage. In general, the quality of the reported data was considered good, at national, regional and council levels. A separate report on the data quality is available.

An independent data verification survey of 115 health facilities in 11 districts showed major gaps in availability of specific registers (14% of facilities had none) and tally sheets (24% had none), especially in private facilities in hospitals.²⁵ Important differences between tally sheets and registers, and between register and DHIS2 reporting were observed in most service areas, except reproductive and child health where the differences were small. The trend in availability and quality of data was positive during HSSP IV.

The annual verification of DHIS reporting as part of the Independent Verification Report of Health Basket Fund (HBF) and Result Based Financing (RBF) by the Internal Auditor General Division (IAGD) show more positive results. For instance, in 90 health facilities surveys early 2018 the differences between the numbers in the facility's register and the DHIS2 for 2017 were minimal overall for ANC4, IPT2, iron-folic acid supplementation, institutional delivery, and modern family planning. Only for vitamin A supplementation the differences were substantial in 2017. The annual verification for the preceding years showed similar results, with good correspondence between registers and DHIS data, except vitamin A supplementation in 2016 and family planning in 2015 and 2016 (about one-tenth difference).

Target populations / denominators

To assess population coverage and service utilization an estimate of the target population or denominator of the indicator is needed. The national population projections are generally used, based on the projections of NBS 2012-2023. The national level projection provides plausible results (consistent with for instance survey-based statistics of population coverage). At the regional and council levels, however, the results are often problematic (i.e. well of an expected value) and for an important part this may be due to the population denominators. This is discussed in the section on Data and Methods of this report. In this report the DHIS data were adjusted for incomplete reporting and the denominators were obtained from the health facility data themselves using a method described elsewhere.²⁶

Health facility reporting system – DHIS2

The DHIS2 was introduced in 2014 and has matured in the subsequent years. The following areas need special attention:

- An increasing number of programs are now integrated into the DHIS2. The following systems are not integrated: HIV (CTC system), TB (uses another DHIS2 based system with individual records, will be integrated), immunization (still relying on separate data collection for joint WHO/UNICEF reporting form), IDSR, and HRHIS. Further integration (or interoperability) will be needed.
- DHIS2 has (too) many indicators and is the basis for a very large number of dashboards or scorecards. A rationalization will be needed to prevent the overburdening the health worker data collection and the system itself. The extent to which the data are reliable and useful for the specific topic, the use of the data and the data collection burden on health workers should be taken into account.
- A Tanzania National Health Data Portal was developed to share aggregated data from DHIS2. The access to the DHIS2 data is provided on a case by case basis, but it is recommended to have a system of issuing password access to provide wide access to the data for bonafide users.
- The use of scorecards at local and national levels increased rapidly, made possible by DHIS2, and supported by the highest political levels in government and often produced on a quarterly basis. The quality of the statistics

²⁵ Mboera, L.E.G., Rumisha, S.F., Lyimo, E.P., Mremi, I.R., Tungu, P.K., Mwingira, V., Mbata, D., Malekia, S., Msuya, M. & Joachim, C. (2018) *Routine Health Management Information System Data Verification in Tanzania*. National Institute for Medical Research, Dar es Salaam, Tanzania and Ministry of Health, Community Development, Gender, Elderly and Children, Dodoma, Tanzania.

²⁶ Maina I. et al. Bulletin of the WHO 2017.

presented on the cards was a challenge that needs to be addressed. Further work is needed to improve their accuracy and utility for health action.

- The strong technical support by the University of Dar es Salaam team of 11 staff including systems analyst and developers is essential and has paid off. It is important that this is maintained to support the ministry.
- Target setting for HSSP can be improved, by conducting a revision one year after the implementation of the plan has started. This is because new and better data often become available as time progresses.
- An important improvement was the introduction of reporting of data on each death in health facilities, with age, sex and cause of death. Unfortunately, the cause of death reporting is still poor, but this does present a first step forward. Morbidity and cause of death reporting by health facilities is still quite poor and it is difficult to reliably ascertain trends. Maternal mortality trends in health facilities cannot be monitored because of inconsistent reporting by facilities which may also be related with fear of sanctions. Maternal (and perinatal) death surveillance and response urgently needs to tackle this.

Other data sources

The national surveys are an important source of data. The TDHS 2015/16 was of high quality and provides baseline data for many HSSP IV indicators. A final evaluation will only be possible after the next TDHS is conducted, but the HIV and the malaria surveys in 2016 and 2017 provided important information for the disease programs. A regular high-quality survey system, with at least a DHS once every 5 years, is the backbone of the country health information system.

Health system data are still weak. The integration of the health infrastructure data into DHIS has been successful, but the financing and work force data are not integrated into the DHIS. The financing data – with the most recent NHA exercise conducted in 2014 – need to be strengthened, as for instance the data from a more recent NHA could not be obtained. The health workforce data remain suboptimal in spite of efforts to improve the human resource health information system, as it is not possible to ascertain trends.

There are multiple investments in strengthening the civil registration and vital statistics system in Tanzania. From the statistical perspective there is no well-functioning birth and death registration system that would be able to provide statistics on mortality, fertility and causes of death. The current efforts led by RITU are encouraging, but it will take many years before a civil registration system will be able to produce reliable statistics.

The sample registration system run by Ifakara Health Institute (SAVVY) was very successful in producing vital statistics for this national sample of 23 districts. During HSSP III however the main funder withdrew its commitments and the SAVVY system regrettably collapsed. At present, the only remaining well-established Health & Demographic Surveillance site is the NIMR site in Kisesa, Magu district which has been operational since 1994. It will be important to re-establish a sample registration system, which can help the strengthening of the civil registration and vital statistics system as well as the monitoring of health services (general and specific such as impact of HIV).

National health information system

- The monitoring and evaluation strengthening plan (MESI) has been a good basis for the roll-out of DHIS, especially during HSSP III, but will need more coordinated investments to continue strengthening the DHIS. There are multiple parallel investments in data quality, scorecards, indicators etc., leading to fragmentation and duplication, which need to be brought under one strong government-led plan, supported by Tanzania's academic and public health institutions on the technical side and by development partners.
- The digital health investment plan provides important components for the overall strengthening of the health information system, but also focuses largely on the health facility generated information. The coordination between the different plans needs to be strengthened to maximize the impact and sustainability of the investments. The same applies to the major health programs which need to be better integrated in the overall system.
- DHIS2 is an important step towards digitization of the health data and information, starting at the district level. Several programs have made progress in clinic-based digital records, including electronic registers or

individual health records (e.g. HIV, TB). One national system for electronic health records would be the next step but should be implemented gradually with extensive time for piloting and testing.

- Tanzania needs an integrated health information system with a strong subnational focus but includes all data sources and all programs. This includes health surveys, CRVS, administrative and program data, as well as health facility-based data. In addition, information from other sectors should be included when relevant.

Appendix A: Data quality assessment and adjustment of health facility data, 2014-2018

Introduction

The Ministry of Health of Tanzania has been operating a paper-based reporting system until 2013. The data generated by the health facilities for the estimation of coverage of selected indicators was found to be of reasonable quality and was used extensively in the analytical report for the midterm review of HSSP III in 2013.²⁷ The report was accompanied by a set of 21 regional health statistical profiles, which included the survey statistics, health-facility data derived coverage estimates and health system data, including indexes for health system strength and intervention coverage with rankings of regions.²⁸

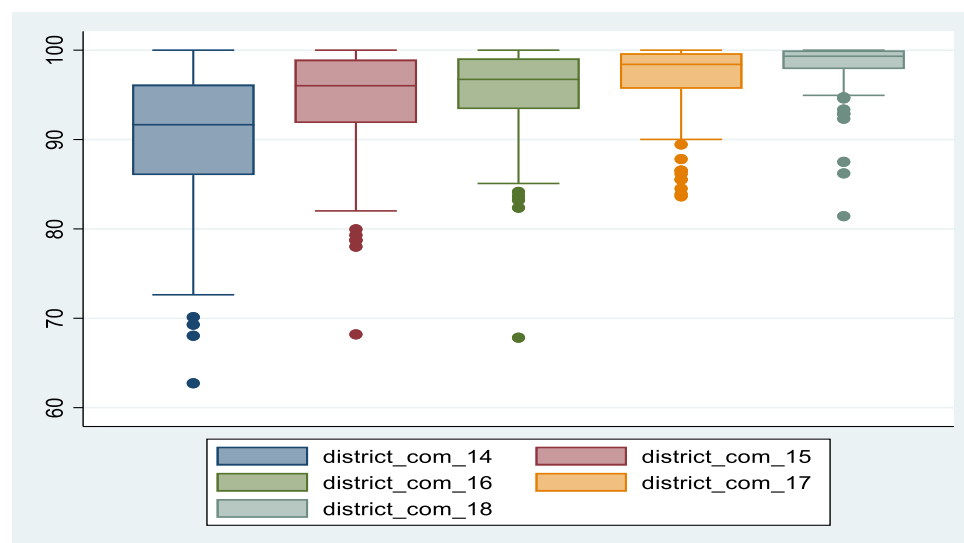
The DHIS2 became fully operational in 2014 and allowed further analyses of the health facility data. The number of indicators in DHIS increased dramatically during the period 2014-2018. Not all indicators appear to generate useful information which will be discussed in greater detail.

Completeness of reporting

The first step is to assess the completeness of reporting by health facilities during 2014-2018. The completeness of reporting with DHIS2 is very good (see also section 8.4 of this report). The mainland completeness of reporting for seven forms (family planning, antenatal care, delivery care, postnatal care, child, OPD and IPD) increased from 90.4% in 2014 and 94.5% in 2014 to 98.4% by 2018.

Very few regions or councils have reporting rates below 90% from 2015. The proportion of councils with reporting rates below 90% decreased from 41% in 2014, to 16% in 2015, 13% in 2016, 5% in 2017 and 1.6% in 2018 (three councils). Figure A.1 shows the distribution of completeness rates by districts/councils. By 2018, all regions had reporting rates over 95%.

Figure A.1: Box plot of reporting completeness (average rate for seven forms) by district/council, DHIS, 2014-2018, mainland Tanzania.



The assessment of trends can be influenced by increasing reporting rates over time. The main issue is the extent to which the non-reporting health facilities are still providing services. For instance, antenatal care completeness of

²⁷ Mboera LEG, Ipuge Y, Kumalija CJ, Rubona J, Perera S, Masanja H, Boerma T. Midterm review of national health plans: an example from the United Republic of Tanzania. Bulletin of the World Health Organization 2015; 93: 271-278.

²⁸ Kumalija CJ, Perera S, Masanja H, Rubona J, Ipuge Y, Mboera L, Hosseinpoor AR, Boerma T. [Regional Differences in Intervention Coverage and Health System Strength in Tanzania](#). PLoS One. 2015 Nov 4;10(11):e0142066. doi: 10.1371/journal.pone.0142066

reporting for antenatal care increased from 91.7% to 98.7% during 2014-2018. If the reporting completeness is ignored this implies that all non-reporting facilities are assumed to provide no services at all. If however non-reporting facilities provided some ANC, the 2014 ANC number is a greater underestimate of the true number than in 2018. It is possible to adjust for this bias by assuming an adjustment factor for the non-reporting facilities:

- zero if no service was provided at all at the non-reporting facilities
- 0.25: some services
- 0.5 half as much as the reporting facilities
- 0.75 nearly the same as the reporting facilities
- the same as the reporting facilities.²⁹

For mainland we assumed an adjustment factor of 0.25 – only some services were provided in the non-reporting facilities. Because reporting rates are high, the impact on the overall trends is small.

Extreme outliers

The extreme outliers should be picked up in DHIS2 reporting system and corrected. It is however important to check if there are no more major outliers that can affect the results. This is done by considering the time series, as we expect some consistency over time within the same council or district. The expected number of events (vaccinations, antenatal and delivery care, OPD, IPD etc.) can be derived by computing the median or mean for the 5 years period 2014-2018: this refers to the year 2016. The expected numbers for the subsequent / preceding years will be computed using an annual growth rate for the number of births/eligible children/ pregnancy. If fertility is kept constant, this growth rate is determined by the population growth in the past: the increase in the number of women in childbearing ages. Here we used a growth rate of 3.5%: every year the target population increases by 3.5%.

We assessed the outliers for councils at the 50% level – i.e. the annual value differed more than 50% from the expected value based on the time trend derived from all values 2014-2018. There were very few outliers at the 50% level in all years, and none were so large which could affect statistics. No corrections were made.

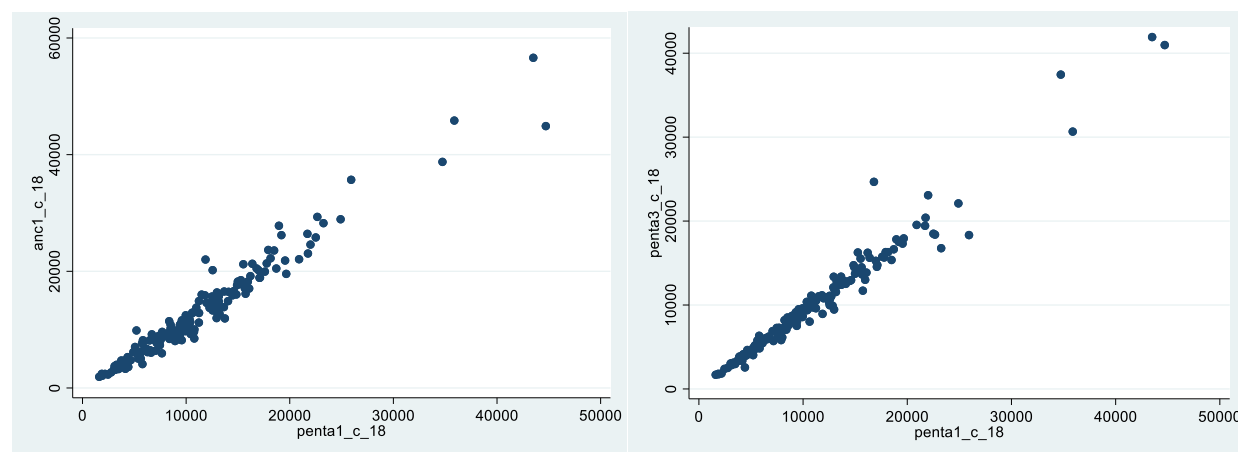
Internal consistency

ANC first visit and first pentavalent vaccination (or BCG) should close. The expected difference is that there are more pregnancies than children eligible for vaccination: Abortions (put at 8%), stillbirths (3%) and neonatal deaths (3%) should be subtracted from pregnancies to get to eligible children, but multiple births (2%) should be added. Therefore, we expect the ANC1 / penta1 numbers ratio to be equal to $1 + (.08 + .03 + .03 - .02) = 1.12$, if the ANC1 and Penta1 coverage rates are the same. The TDHS 2015/16 shows that the coverage of ANC1 and penta1 was similar in all regions and nationally. The ratio ANC1/ penta1 numbers was 1.23 for 2014 (suggesting ANC1 too high or penta1 too low) but in all subsequent years the ratio was as expected near 1.12: 1.11 (2015), 1.08 (2016), 1.09 (2017) and 1.12 (2018) (Figure A.2).

Penta1 can be compared to penta3 vaccination. The expected ratio is derived from the most recent household survey which was 1.09 in the TDHS 2015/16. The ratio was 1.14, 1.16, 1.13, 1.11 and 1.10 for each year of 2014-2018. In 2014-16 there may have been some underreporting of penta1 or overreporting of penta3, but 2017 and 2018 are as expected. The scatter plots also show that with a few exceptions there is good consistency between ANC1, penta1 and penta3 reported numbers in 2018 (Figure A.2).

²⁹ Maina I, Wanjala P, Soti D, Kipruto H, Droiti B, Boerma T. Using health-facility data to assess subnational coverage of maternal and child health indicators, Kenya. *Bull World Health Organ.* 2017, 95(10):683-694.

Figure A.2: Scatter plots of reported numbers of penta1 by ANC1 (left) and penta3 by penta1 (right) for 184 councils, Tanzania mainland, 2018.



Denominators: official projections

To assess the coverage of interventions a population denominator or target population is needed, such as total population in need of the service, live births, pregnancies, children eligible for immunization. The most recent census was conducted in 2012. The NBS population projections provide the overall mid-year population and are also used to obtain an estimate of the number of live births. The NBS provided total population projections for each year, as well as an estimated number of births for 2018 only. We computed the crude birth rate for 2018 and applied the same rate to every year preceding 2018 to obtain the number of live births.

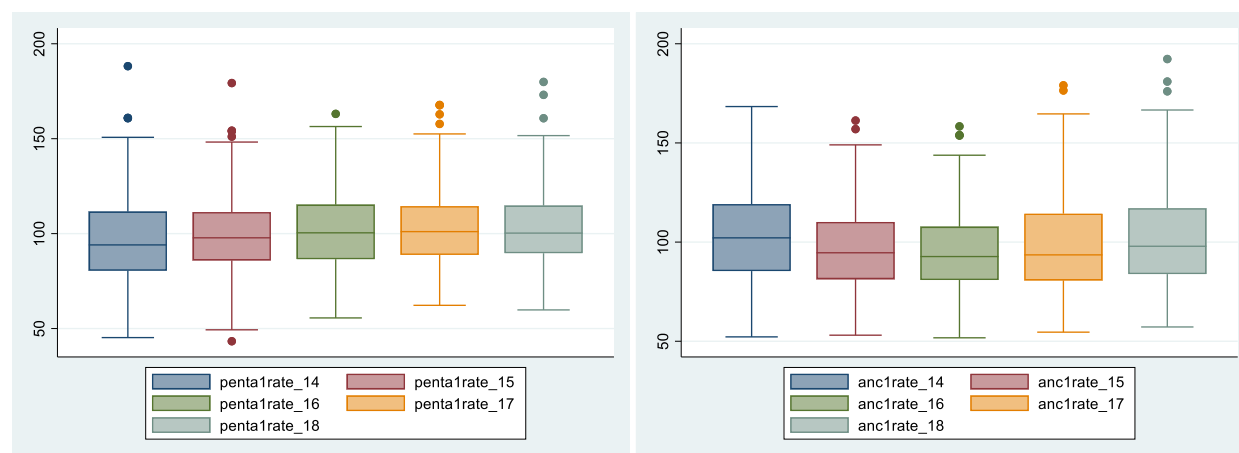
For 2018, NBS projected 2,009,848 births for mainland Tanzania, up from 1,881,453 in 2015. Using these NBS projections to estimate the number of pregnant women and the number of infants eligible for immunization, the national coverage in 2018 for first ANC visit is and for first pentavalent dose vaccination is close to what we expect on the basis of the TDHS 2010 and 2015/16.³⁰

The projections for the subnational levels however appear to be more challenging for the assessment of coverage statistics (Figure 2.2 in main report). Almost every pregnant woman in Tanzania makes at least one ANC visit (97% according to TDHS, over 90% in all regions), and almost every child gets Penta1 vaccination (97% according to TDHS, over 90% in all regions except Katavi 87%). Based on the DHIS reported numbers and the population projection from NBS 6 regions have more than 110% ANC1 coverage in 2018, Pwani even 130% and Rukwa consistently 140% or higher (left panel below). The projected target populations may be too low and not suitable for the coverage estimation from DHIS. At the lower end there are 7 regions with ANC1 coverage below 90%, most prominently Kilimanjaro with about 70% ANC1 coverage (right panel below). The projected target populations are likely much too high. The picture for Penta1 immunization is the same as for ANC. If we consider the council level there are many regions with very implausible coverage levels, meaning using the census projections to obtain the target population is not satisfactory for RMNCH coverage assessment.

The assessment by council shows the very wide spread of coverage rates in the councils (Figure A.3). While it is inevitable that there will be councils with coverage exceeding 100% in some years, the spread is far too wide. This suggests systematic errors in the size of the target populations based on the population projections. This is not surprising, given the long interval since the census and the high mobility of the Tanzanian population. It is however a problem for the management of health services and the computation of local statistics. Therefore, it is useful to also explore other approaches such as the use of health facility data for high coverage interventions such as first antenatal visit or first vaccination to estimate the target population.

³⁰ The modest increase in ANC1 and penta1 over time may be due to improved reporting in DHIS2 or overestimation of the target population in 2015-2016.

Figure A.3: Penta1 and ANC1 coverage in 184 councils, based on DHIS reported data and NBS projection derived target populations, 2014-2018.



Estimating specific target populations

To obtain specific target populations from the overall population projections a set of assumed parameters were applied to the NBS population projections.

Live births: to compute the number of live births the total population was multiplied by the crude birth rate as provided by the NBS. The NBS projections used the following CBR: 3.89, 3.85, 3.82, 3.78 and 3.74 per 100 population for 2014, 2015, 2016, 2017, and 2018 respectively. Note that the TDHS 2015/16 CBR was 3.55 per 100 population for the period 2014-2016.

Births: we assumed the stillbirth rate to be 2%, based on global estimates, and added this to the live births to obtain all birth.

Deliveries: we assumed that 2% of births were multiple births, based on earlier analyses of the TDHS 2010 data, published elsewhere. We subtracted 2% from the births to obtain deliveries.

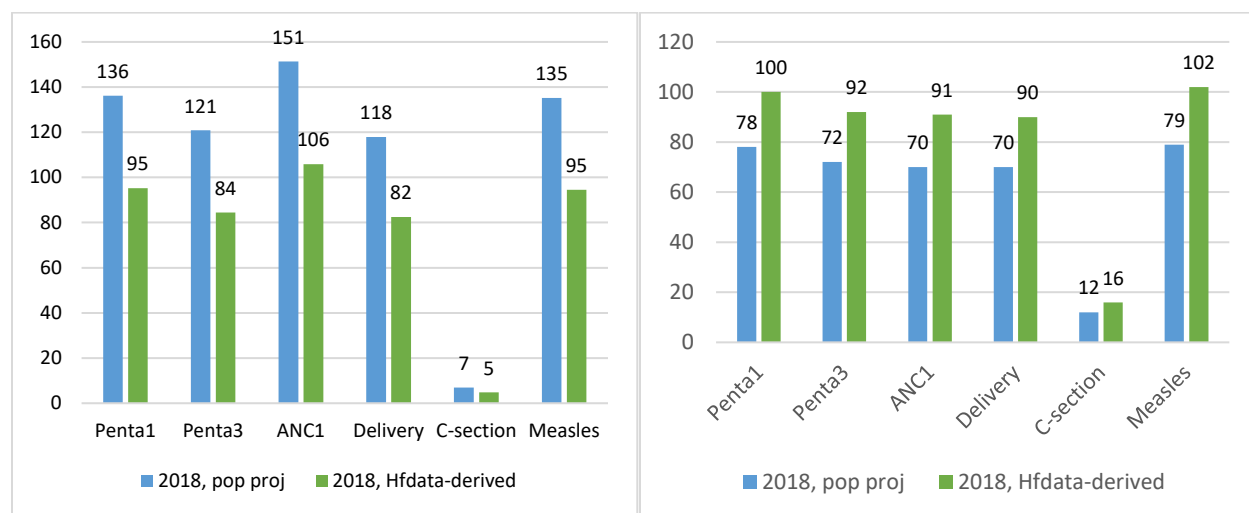
Pregnancies: to compute the number of pregnancies as denominator for the antenatal care and other indicators we excluded very early abortions (e.g. before 8 weeks) and assumed an abortion rate of 8%. This number was added to the births.

Infants: to compute the number of infants eligible for immunization at 6 weeks of age (the recommended time for the first pentavalent vaccination) we subtracted 3% from the number of live births. This is based on the neonatal mortality rate observed in the TDHS 2015/16.

Health facility-based denominators

Because nearly all pregnant women make an ANC visit and nearly all children are immunized at least once, we can also use the reported numbers in DHIS for the estimation of coverage of for example institutional delivery rate. We added a small proportion (3%) to take into account those that never use ANC or immunization (penta1) to the reported numbers by council and region. This leads to better estimates of the coverage for the MTR report (Figure 2.3 in main report). The example of Rukwa region for 2018 is given below in the left panel, Kilimanjaro in the right panel. While the penta1 based denominators are not perfect, it gives much better reflection of coverage.

Figure A.4: Coverage based on DHIS 2, with population projections and with health facility data derived target populations, 2018 (Rukwa left panel, Kilimanjaro right panel).



If we check the totals for the mainland based on the facility data, the results are very close to the official population projections (the official projections are used to obtain national coverage estimate for the assessment of HSSP IV throughout the report). Based on the facility data the denominators are as follows:

	INFANTS	LIVE BIRTHS	PREGNANCIES
2014	1,755,512	1,809,807	1,988,798
2015	1,821,580	1,877,918	2,063,646
2016	1,887,648	1,946,029	2,138,493
2017	1,953,715	2,014,140	2,213,340
2018	2,019,783	2,082,251	2,288,187