FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

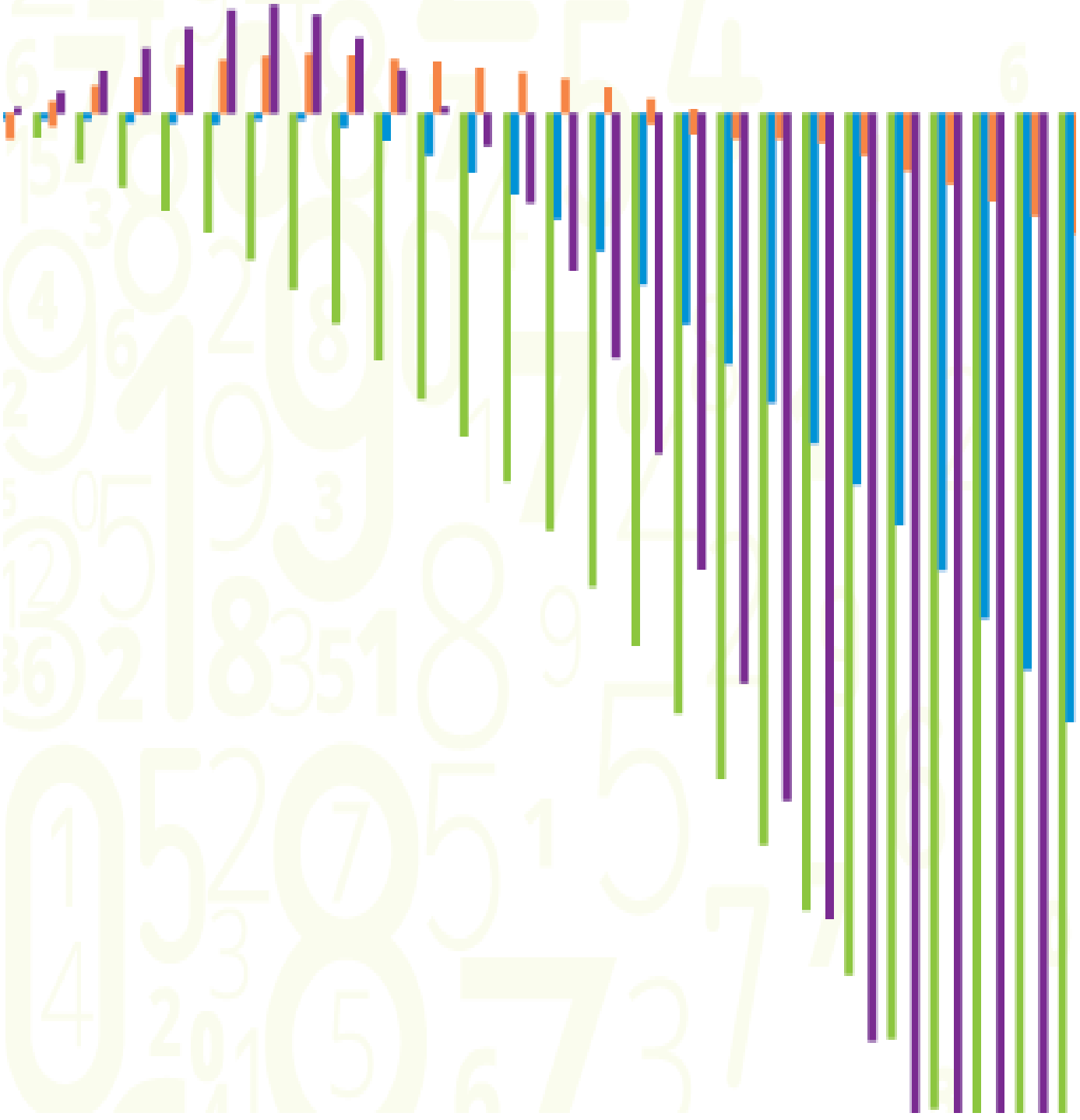
MINISTRY OF HEALTH

STATE OF INEQUALITY IN ETHIOPIAN HEALTH SECTOR

EFY 2008 (2016/17)

Addis Ababa, Ethiopia

STATE OF INEQUALITY IN ETHIOPIA



ANALYSIS OF DATA FROM A NATIONALLY REPRESENTATIVE SURVEY

WHAT DO WE KNOW? WHAT COULD BE DONE?

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LIST OF ABBREVIATIONS

ANC Antenatalcare

CPRContraceptive Prevalence Rate

EDHSEthiopian Demographic and Health Survey

HBVHepatitis Type B

HEAT Health Equity Analysis Toolkit

HIBHaemophilus Influenza Type B

HIVHuman Immuno Deficiency Virus

HMISHealth Management Information System

ICCMIntegrated Community Case Management

ICUIntensive Care Unit

IMNCIIntegrated Managament of Neonatal and Childhood Illnesses

IRSIndoor Residual Spray

ITNInsecticide Treated Nets

PMTCTPrevention of Mother to Child Transmission

PNCPostnatal care

RMNCHReproductive Maternal Newborn and Child Health

RRSSRegions Requiring Special Support

SPSSStatistical Package for Social Sciences

TB Tuberculosis

WHO World Health Organization

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FOREWORD

I am pleased to praise the report writing team that sought the inequality in health service delivery in Ethiopia inorder to present the evidence base for more significant, reactive and equitable services that meet people's hope and take action sufficient to their needs.

The inequalities in the health status of people between and within regional states have been a cause for concern for health managers and providers over time.

When we compare the key health indicators in Ethiopia, for example those related to the Millenium Development Goals, we are struck with the unfairdelivery of health, within regions, across regions, and population subgroups , e.g. rich and poor, men and women. Further, there are differences between urban and rural areas in coverage of key health services such as skilled attendance at birth, immunization, and diagnosis and treatment of common diseases. These inequities can be avoided through the adoption and implementation of relevant health and development policies.

The results of this study are enlightening and revealing. Communities had clear perceptions of health and service delivery. They included the physical, mental, emotional, spiritual, socialand economic well-being in their definition of health and underlined the necessity of our healthservices to be more responsive to all of the health needs of the community and not only to focuson some of them. These findings are worthy of our attention.

The respondents in this study also identified areas in which their participation could improvethe overall governance of the health delivery systems. There is evidence that governanceand accountability issues, if properly addressed, would contribute to ensuring the achievementof positive outcomes of the different health interventions.

I hope that the results of this study will be discussed with all national stakeholders so thatpolicies and strategies are developed to respond appropriately to our people's needs. This willlead us towards universal coverage and the attainment of the highest level of health that ourcountry and populations can afford.

Noah Elias
Director of Policy and Planning Dircetorate

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EXECUTIVE SUMMARY

"The highest attainable standard of health is a fundamental right of every human being. . . "(World Health Organization Constitution)

BACKGROUND

This State of Inequality report forms the basis of systematic monitoring of inequalities and its reduction in the context of Ethiopian health system. In this report we have attempted to show the influence of the various socio-economic and demographic dimensions in "explaining" and visualizing the state of inequalities in Ethiopia, and highlighted themost likely avoidable differences in health status among Ethiopians.

Since early 1990s, Ethiopia has achieved a significant reduction in preventable mortality and scale-up of life saving services coverage. Remarkable progress has been achieved in reduction of communicable and non-communicable diseases;and the country has also managed to improve access and utilization of basic.However, these improvements at national level are overweighed by inequalities in service utilization and mortality and morbidity rates among various socio-economic and demographic segments of the Ethiopia population.

APPROACHES

The study is primarily based on data from 2000, 2005, 2011 and 2014 EDHS. Health indictors, such as those related to new born and child health interventions, child mortality, malnutrition, maternal health interventions, reproductive health interventions, and disease burden, disaggregated by demographic socio-economic status were selected. In addition to this, routine health management information system data of EFY 2008 was used to uncover geographic inequalities in service uptake among different segments of the population.

Extracted data were checked for data quality. Ratio, difference and relative concentration index inequality measures were applied to assess and visualize inequalities on various indicators by given dimensions.

World Health Organization (WHO) Health Equity Assessment Toolkit (HEAT) and Demographic and Health Survey (DHS) STAT-compiler tools are used. Statistical Package for Social Sciences (SPSS), R, arc-GIS and Open-JUMP statistical packages

were utilized for data analysis and presentations. The results are presented in the form of tables, graphs and summary statistics.

CHILD HEALTH

Children are a vulnerable segment of the population. Their health status is very sensitive to changes in living conditions. Moreover, their status is used as an indicator of the health status of the entire population.

The results corroborate statistically significant levels of inequalities in child health interventions by economic status, level of education, place of residence and sex characteristics. Thus, children were seriously disadvantaged in terms of the above characteristics. Specifically, the magnitude of inequality in child health interventions were observed to be affected significantly by economic status and mother's education level, i.e., children from households in poorest and poorer subgroups, and children from mothers with no formal education categories had lower levels of health service coverage than other groups in those categories. Within the disadvantaged socio-economic groups, no or little inequalities by sex or place of residence were observed in child health interventions. The results revealed significant variations in all newborn and child health interventions among regions due to cultural diversities and the state of development.

Overall, coverage of pentavalent-3, measles vaccine and full immunization increased with rising economic status and economic level. Children whose parents were the poorest and only had non-formal education typically experienced lower levels of interventions than children in richest and secondary or above education subgroups. Children from richest quintile were 2.44 times more likely to receive pentavalent immunization as compared to children in poorest quintile. The gap in measles immunization coverage between children of most-and-least educated mothers was substantial. Coverage of measles immunization among children whose parents had secondary and/or above education exceeded the coverage among the children of parents with no education by 39.52 percentage points.

Prevalence of stunting was lower among the children with the highest level of maternal education. That is, children of women with no formal education tended to have the highest prevalence of stunting. In all surveys, the absolute difference in stunting prevalence between children of mothers with secondary or higher education subgroup and the no formal education subgroup was at least 30 percentage points.

The results also corroborated that all types of child mortality were significantlly associated with mothers education level and place of residence. Overall, all types of child mortality were higher among children of mothers with no formal education and those who reside in rural areas. For instance, differences of about 43.0, 36.7 and 31.9 deaths per 1000 live births were found in under-five child mortality between rural and urban areas in EDHS 2000, 2005 and 2011 respectively.

MATERNAL HEALTH

The United Nations Populations Fund (UNFP) maternal mortality in-depth Analysis showed that regional disparity exists in maternal mortality burden, the highest being in Somali (743) and Afar (717).Addis Ababa estimated to carry the lowest maternal mortality burden (234).

Modern contraception use coverage was higher among women living in urban areas than rural areas. As per the mini-DHS 2014 report the absolute difference of contraception use coverage between urban and rural areas was 18.4%, which shows a reduction in inequality when compared to the previous years. Modern contraception use coverage also varies by region; and the inequality among regions does not get narrowed when compared to previous years. Women with education are 1.7 times more likely than uneducated ones to get modern contraception use, while women from the richest quintile are 2 times more likely than women from the poorest quintile to get modern contraception in same year. Modern contraception use inequality by education and economic status doesn't get narrowed when compared with previous years.

ANC-1 and ANC-4 coverage was higher among women living in urban areas than rural areas. As per the Mini-DHS 2014 report the absolute difference of ANC-1 coverage and ANC-4+ coverage between urban and rural areas were 45.5% and 39.2%, respectively. The analysis also revealed that the inequality of antenatal care service utilization between urban and rural women don't get reduced when compared to the previous years. Regional variation exists in both ANC1 and ANC4 and the inequality among region doesn't get narrowed when compared to previous year. Women with education are 5.3 times more likely than uneducated ones to have made four or more visits in 2011. Likewise, women from the richest quintile are 5.5 times more likely than women from the poorest quintile to have made four or more visits.

Skilled delivery service coverage was higher among women living in urban areas than

rural areas. As per the Mini-DHS 2014 report the absolute difference of skilled delivery service coverage between urban and rural areas was 49.3%, which is higher when compared to the previous years. Skilled delivery service coverage also varies by region and the inequality among region doesn't get narrowed when compared to previous years. Women with education are 9.3 times more likely than uneducated ones to get skilled delivery service in 2014. Likewise, women from the richest quintile are 8.1 times more likely than women from the poorest quintile to get skilled delivery service in same year. And skilled delivery service coverage inequality by education and economic status doesn't get narrowed when compared with previous years.

Postnatal care visit coverage was higher among women living in urban areas than rural areas. As per the mini-DHS 2014 report urban mothers were six times most likely to have received postnatal checkup. This inequality was less compared to the previous years. Postnatal care service also varies by region and the inequality among region doesn't get narrowed. Women with education are 6 times more likely than uneducated ones to get postnatal checkup service in 2014. Likewise, women from the richest quintile are 11.7 times more likely than women from the poorest quintile to get postnatal care visits; and postnatal care service use inequality by economic status does not get narrowed when compared to 2011, but inequality by education status was reduced when compared to 2011.

DISEASE PREVENTION AND CONTROL

According to Health Management Information System (HMIS) data of 2013, the magnitude of inequality between pediatrics (children less than 15 years of old) and adult (greater than 15 years of old) in Tuberculosis (TB) detection appeared to be significant and increased throughout the period despite little or no overall improvement observed in 2013. Addis Ababa, Tigray, Afar, Harari and Amhara regions showed TB case detection rate of below the national average which yields that people more than 15 years of age were receiving better TB detection services as compared to children less than 15 years of age. The magnitude of inequality was highest in Somali and Gambella regions.

The magnitude of inequality in Human Immune Deficiency Virus (HIV) prevalence appeared to be associated with place of residence. For instance, in EDHS 2011, HIV prevalence in urban was 4.2% while only 0.6% in rural. The gap in HIV prevalence between the most and least educated women

was substantial. In 2011, the prevalence of HIV in women with secondary or above education (3.1%) exceeded the prevalence of HIV inwomen with no formal education (1.1%).

The extent of inequality in HIV prevalence varies across regions: highest in Gambella (6.5%) and lowest in SNNPR (0.9%). The magnitude of inequality ranges from 0.1 to 5 percentage points above from the national average; highest difference observed in Gambella (5.0), Addis Ababa (3.7) and Dire Dawa (2.5) above from the ?national average.

In general, interventions to control malaria epidemics appeared to be positively associated with place of residence and economic status. In EDHS 2005, the percentage of households with at least one Insecticide Treated Nets (ITN) and/or Indoor Residual Spray (IRS) in the past 12 months preceding the survey differedbetween urban to rural: 5.4 in urban and 3.1 in rural areas; yielding a 2.3 percentage point difference.Poorest subgroups typically experienced lower levels of ITN and IRS utilization than richest subgroups. In EDHS 2005, the percentage of households in the poorest subgroup with at least one ITN and/or IRS in the past 12 months preceding the survey was only 2.9 while households in the richest subgroup was 5.5. As expected, coverage of this intervention varied from region to region. In EDHS 2005, except Amhara, Oromiya and Harari regions, the coverage was above the national average; highest in Gambella, and lowest in Amhara. Amhara, Oromiya and Harari were at least 1.5 percentage points below the national average.

CONCLUSIONS

This report corroborate that considerable inequality exist regarding access to key health interventions but that the level of inequalities and their development over time differs across different subgroups. The results are revealing and provide valuable insights that could help the health systems' responsiveness and effectiveness towards achieving strategies on quality and equity transformation agenda in the Health Sector Transformation Plan (HSTP).

The result indicates that socio-economic and demographic characteristics of the population influence the delivery of healthcare and outcomes. The report provides useful insights on trends of health related inequalities for the past few successive years in Ethiopia. This implies that it is worth investigating why

inequalities are higher in one subgroup than in another.

Difference and ratio statistics from households confirms place of residence and sex differentials in Reproductive, Maternal, Newborn and Child health (RMNCH) interventions. Furthermore, relative concentration index inequality measure also revealed that a noticeable difference exist in economic, education and region inequality dimensions. However, the mean level of inequality varies in all measurements.

RECOMMENDATIONS

It is recommended that priority programs and strategies should be reviewed as part of the second phase of HSTP implementation and new ones designed to effectively address health related inequality in Ethiopia. We believe that such programs should address region-specific disparities to make the effort more innovative and effective.

Since equity is one of focus areas of the newly designed HSTP, continuous flow of quality information should be in place to track progresses regarding the key transformation agenda. In this regard, HMIS should be revised to incorporate inequality monitoring dimensions of the health indicators.

The findings of the review also point towards focusing on health infrastructure development in rural areas to improve the access to essential health services and, thereby, reduce the inequity between rural and urban populations.

Encouraging mothers' education can have a considerable influence on reducing inequalities of service utilization across subgroups. Improving female education starting from the childhood, particularly in rural areas and in less advantaged regions can help in improving the health equality across the nation.

Similarly, bringing in innovative improvements in the Health Extensions Program and the Health Care Financing and making them more effective can contribute to addressing health related inequalities.

1. BACKGROUND

Ethiopia has demonstrated remarkable progress in expanding access to health care thatresulted in dramatic improvements in critical health indicators. The gains have been a resultof improvements in health status amongst disadvantaged groups, particularly those living in rural areas.

Despite this progress, substantial inequalities still exist in health outcomes based on differences in economic status, education, place of residence and sex. According to WHO state of inequality report, Ethiopia was among the countries with the highest levels of within-country economic-related inequality in RMNCH coverage.

The health sector development program (HSDP) was focused on improving coverage of essential health services over the past two decades. Basing on the achievements during HSDP, provision of quality and equitable health services at all levels of the system has been set the focus areas of HSTP. In line with this, the health system was reoriented to continuously assess who amongst the community members are not reached and why they are missed. Otherwise,the health inequity continuously perpetuates a cycle of poverty and will make our country's ambition of eradicating extreme poverty and achieving a middle-income country status very challenging.

Health inequities involve inequality with respect to health determinants, access to the resources needed to improve and maintain health or health outcomes. As RMNCH remains an important priority for the health related aspects of sustainable development and potential areas where inequality exists, measuring and monitoring accessibility and utilization of RMNCH interventions has been given a focus.

Inequality monitoringreveals whether countries have narrowed or widened the gap between the advantaged and the disadvantaged.

Identifying and understanding inequalities helps to pinpoint the key drivers of inequity and, in turn, informs targeted action to improve the situation of the disadvantaged. Efforts to achieve equity and reduce inequalities are warranted not only for the sake of social justice and human rights, but also because of the concomitant social, political and economic benefits.

Hence, this report tries to assess the situation of health inequality by economic status, education, place of residence and sex using Ethiopian demographic health surveys. The findings will also be used as baseline for subsequent monitoring of inequality.

2. MONITORING THE STATE OF INEQUALITY

Authors applied the following methods to develop this report.

2.1. DESIGN

A cross-sectional study design was applied on Ethiopian Demographic and Health Survey (EDHS) data of 2000, 2005, 2011 and 2014. A secondary data analysis technique was used to assess inequalities on selected indicators.

2.2. DATA SOURCES

The study primarily relied on EDHS datasets that compiles data on health indicators that describe individual experience of health interms of mortality and socioeconomic data elements. So far, four EDHS were conducted in Ethiopia by which the recent one was in 2014 small scale survey.

The data were originally collected by Macro International United states of America and Central Statistical Agency Ethiopia. Data for this study was downloaded from the MEASURE DHS database. The data was secondary; therefore detailed information about the data collection procedures is contained in the EDHSreports which are available on the web platform of the data originators.

These surveys provide all the data required for health inequality monitoring data about multiple health indicators, as well as data that allow disaggregation of health data according to a given dimension of inequality. Thus, relevant environmental, socio-economic and health characteristic data were extracted from the datasets.

In addition to this, routine health management information system data of EFY 2008 was used to uncover geographic inequalities in service uptake among different segments of the population.

2.3. HEALTH INDICATOR DATA

List of indicators were selected to explore the state of inequality in health service delivery in Ethiopia. Indicators were composed of new born and child health interventions, child mortality, malnutrition, maternal health interventions, reproductive health interventions, and disease burden (Table 1).

Table 1. List of Indicators used in this report

Category	Indicators
Newborn and child health interventions	Pentavalent-3 immunization coverage
	Measles immunization coverage
	Fully immunization coverage
	Under-five children who slept under ITN
Child mortality	Neonatal mortality rate
	Infant mortality rate
	Under-five child mortality rate
Child malnutrition	Under-five children Stunting prevalence
	Under-five children wasting prevalence
Maternal and Reproductive health interventions	Contraceptive prevalence - Modern
	Demand of Family planning Satisfied
	Antenatal care
	Births attended by skilled health personnel
	Postnatal care
Maternal mortality	Maternal mortality ratio
Burden of diseases	TB case detection
	HIV prevalence
	Distribution of ITN/ Malaria
Environmental health & sanitation	Source of water drinking
	Type of toilet/latrine facility

2.4. DIMENSIONS OF INEQUALITY

Inequality data and statistics give us an important insight into the state of national economy and the health status of our scociety. To this end, selection of appropraite stratifiers is essential to visualize level of disparity from different angles.

Data on economic status, education level, place of residence and sex are used to categorize populations according to dimensions of inequality. These four dimensions of inequality represent common sources of discrimination, and can be widely applied to populations in low- and middle-income countries.

The wealth index is a composite measure of a household's cumulative living standard. The wealth index is calculated using easy-to-collect data on a household's ownership of selected assets, such as televisions and bicycles; materials used for housing construction; and types of water access and sanitation facilities. Generated with a statistical procedure known as principal components analysis, the wealth index places individual households on a continuous scale of relative wealth. DHS separates all interviewed households into five wealth quintiles to compare the influence of wealth on various population, health and nutrition indicators.

Education is a key background indicator in the DHS that helps contextualize a country's health and development situation. The DHS collects data on the highest level of education for all respondents and all household members. Thus, health indicators can be compared to educational levels, often revealing a strong association between education and improved health, higher levels of knowledge, and increased levels of empowerment of women. Three subgroups are specified: no education, primary school education and secondary school or higher education. Place of residence (rural or urban) and sex (female or male) each consist of two subgroups.Since 1995, Ethiopia is constitutionally formed by a federation of nine ethnically based regional states and two chartered cities. Regional states are first level administrative divisions in Ethiopia (Tigray, Afar, Amhara, Oromoia, Somali, Benishangul-gumuz , South Nations, Nationalities and Peoples' Region, Gambella, Harari, Addis Ababa and Dire Dawa).

2.5. SAMPLING TECHNIQUES

The DHS program provides household-level data on health, healthcare utilization and ownership of assets for about 60 low and middle income countries in three subsequent periods. The data are based on nationally representative surveys. In most countries, between 5,000 and 10,000 women aged 15 to 49 years were interviewed. The sample for the EDHS was designed to provide population and health indicators at the national (urban and rural) and regional levels. Administratively, regions in Ethiopia are divided into zones, and zones, into administrative units called Weredas. Each

Wereda is further subdivided into the lowest administrative unit, called Kebele. During the 2007 census each Kebele was subdivided into census enumeration areas (EAs), which were convenient for the implementation of the census. The sample was selected using a stratified, two-stage cluster design and EAs were the sampling units for the first stage.

In EDHS 2000, using systematic sampling with probabilities proportional to size, 539 EAs —138 in urban areas and 401 in rural areas—were selected initially. 14,642 households selected, 15,367 women age 15-49, and 2,607 men age 15-59 included in the survey. In EDHS 2005, a representative probability sample of 14,645 households was selected. .

In EDHS 2011, sample included 624 EAs, 187 in urban areas and 437 in rural areas. A representative sample of 17,817 households was selected for the 2011 EDHS. In 2014 Mini-DHS, a stratified national sample of about 9,150 private households was included.

2.6. DATA PROCESSING AND ANALYSIS

Extracted data were checked for data quality. Prior to analyzing, data disaggregation was conducted.

Disaggregated data easily show the level of health inequality in each subgroup of a given dimension/strata of inequality in Ethiopia. Ratio, difference and relative concentration index inequality measures were applied to assess and visualize differences of various indicators across given dimensions. WHO Health Equity Assessment Toolkit (HEAT) and DHS STAT-compiler tools are used. SPSS, R, ARC-GIS and Open-JUMP statistical packages wereutilized for data analysis and presentations. The results are presented in the form of tables, graphs and summary statistics.

Overall analysis of data on a nationally representative survey and routine HMIS was carried out and results were presented in two sections respectively.

2.7. INEQUALITY MEASURES

Inequality measures are used to represent the degree of inequality in a health indicator across population subgroups. Absolute inequality, Relative inequality and Relative concentration index and Absolute excess change inequality measures are used in this report.

Difference and ratio are simple measures of inequality, expressing inequalities between two population subgroups. Difference is a measure of absolute inequality that measures level of health intervention coverage in most-disadvantaged subgroup is subtracted

from health intervention coverage in the most-advantaged subgroup or vice versa for child mortality and malnutrition indicators.

Ratio is a measure of relative inequality that measures level of health intervention in the most-advantaged subgroup is divided from health intervention coverage in the most-disadvantaged subgroup or vice versa for child mortality and malnutrition indicators.

Relative concentration index is a measure of relative inequality that indicates the extent to which a health indicator is concentrated among the disadvantaged or the advantaged given that the inequality dimension has more than two subgroups or categories. Concentration index has a negative value when the health indicator is concentrated among the disadvantaged. Concentration index has a positive value when the health indicator is concentrated among the advantaged.

The absolute excess change summary measure can be used to answer questions such as: how much faster (or slower) was the change in the health indicator in the most-disadvantaged group compared with the most-advantaged group? This summary measure is applied to compare the change in a health indicator over time between two subgroups, building on the absolute change experienced by each of the two subgroups. Absolute change shows how coverage in a single subgroup has changed over time.

3. THE STATE OF INEQUALITY IN ETHIOPIA

SECTION I: ANALYSIS OF DATA ON A NATIONALLY REPRESENTATIVE SURVEY (DHS)

3.1. SOCIODEMOGRAPHIC INFORMATION (DHS 2011)

PLACE OF RESIDENCE, SEX AND AGE

The majority of the repondents, 83.0%, were from rural areas of the country. The mean age was 29.04 (±6.6). The age structure of the household population in Ethiopia is typical of a society with a youngpopulation; 0-4 years (15.4%), 5-14 years (31.1%) and, 15 years and greater (53.5%). The population pyramid in Figure 1 shows the sex and age distribution of thepopulation. The pyramidal age structure reflects the large number of children under age 15. Childrenunder age 15 account for nearly half (47 percent) of the total population, a feature of populations withhigh fertility levels, while only about 4 percent of Ethiopians are over age 65. This populationdistribution is similar to that observed in the 2000 and 2005 surveys.Overall sex ratio of 95 males per 100 females. The sex ratio is higher in rural areas (97 males per 100 females) than in urban areas (86 males per 100 females).

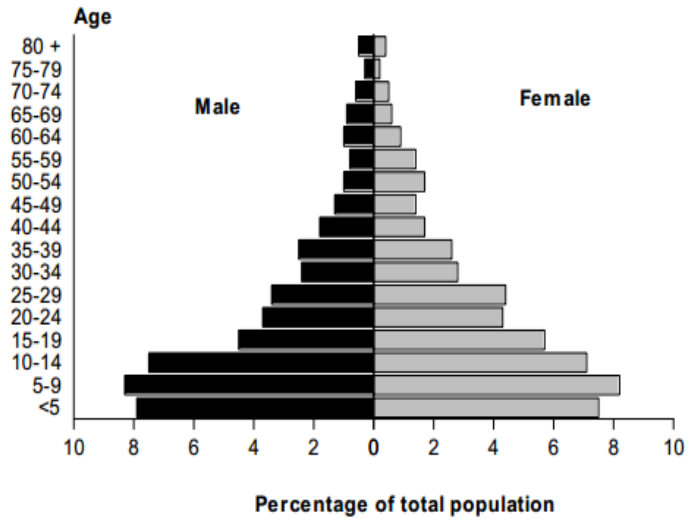

Figure 1. Population pyramid EDHS 2011

EDUCATION

More than half of the respondents (50.8%) had non-formal education, while 4.0% and 11.2% achieved primary and, secondary and above education respectively. Of the men respondents, 29.5% had non-formal education; primary education (5.9%) and secondary and above (17.4%). More males (23.3%) than females (15.2%) had ever attended school.

MARITAL STATUS

The proportion of respondents currently married was 58.1%.. The rest belonged to the following categories; never married (27.1%), widowed (3.2%), divorced (5.3%),

separated (2.1%). Among married respondents, majority of them (78.2%) were aged 30-39 years, while 77.0% of the proportion never married were aged 15-19 years.Median age at first marraige was 17.1 years. Of the male respondents, 43.6% were married.

OCCUPATION

42.2% (women) and 5.3% (men) were not working for the last 12 months preceding the survey.

The analysis showed that 46 percent of working women 15-49 and 74 percent of working men 15-59 were in agricultural occupations, a drop from the 52 percent and 84percent, respectively, reported in 2005. Sales and services accounted for 33 percent of currentemployment for women and 10 percent for men. Thirteen percent of employed women and 7 percentof employed men work in skilled manual labour.

3.2. NEW BORN AND CHILD HEALTH INTERVENTIONS

The achievements in child health are mostly attributable to large scale implementationof promotive, preventive and curative primary health care interventions alongside apositive trend of socioeconomic changes. These include: IMNCI/ICCM (currently beingprovided in more than 2500 health centers and 12,000 health posts); prevention andmanagement of malaria (with 65% of under 5 children sleeping under insecticide treatednets (ITN) with indoor residual spray (IRS) reaching 47% of houses in endemic areas in2011); community based nutrition programs and establishment of Neonatal IntensiveCare Units. Notwithstanding current improvements, coverage of some other essentialinterventions such as proper case management of acute respiratory illness (ARI) anddiarrhea have been low. In the 2011 EDHS, only 27% of children under age of five withsymptoms of ARI sought counseling from a health care facility or provider. Similarly,one-fourth of children with fever and 32% with diarrhea sought care from a health carefacility or provider.

The dramatic increase in immunization coverage has also significantly decreasedfatalities associated with vaccine preventable diseases. Currently, Ethiopia is providing10 antigens targeting major killer diseases during childhood. Four new

vaccines (PCV, Rota, HBV and Hib) were introduced since 2007 in addition to the already existingsix traditional antigens. The introduction of these new vaccines coupled with ICCMprograms and expansion of the Health Extension Programme is expected to furtherlower childhood morbidity and mortality due to pneumonia and diarrhea.

Availing newborn corners at health centers, establishing neonatal intensive care unitsin hospitals and more recently, the expansion of community based newborn care byhealth extension workers (HEWs) is ongoing and expected to contribute to a decreasein neonatal mortality. However, there is still a gap in availing quality health services for newborns in many facilities. Neonatal ICUs are also ill equipped and have yet to expand.

The limited competency of midwives, doctors and anaesthetics in the provision ofemergency obstetrics and new born care (EmONC) services, lack of a separate newborncorner, absence of a neonatal unit in some health facilities; and low coverage of skilleddelivery and newborn care are some of the challenges.

According to draft analysis of the Ethiopia Service Provision Assessment plus (ESPA+),62% of facilities provide all three basic child health services (outpatient curative care,child vaccination and child growth monitoring.

PENTAVALENT IMMUNIZATION COVERAGE

Overall, pentavalent immunization coverage was lower in children from poorest households. Analysis showed that pentavalent immunization coverage tended to increase with rising economic status. Children from richest quintile were 2.44 times more likely to receive pentavalent immunization as compared to children in poorest quintile (Figure 2). Only 26.0% of children received pentavalent immunization in the poorest quintile, whereas for children in richest quintile, more than half of children (61.5%) received the vaccination. There was an absolute difference in coverage of 41.11 percentage points between children from mothers with no formal education and, mothers who had achieved secondary and above education. 79.2% of children in secondary and above education subgroup received pentavalent immunization, whereas only 31.2% of children from mothers with non formal education received the vaccination. pentavalent immunization coverage in urban subgroup was 1.88 times that in rural subgroup. 60.5% of children who reside in urban received pentavalent immunization.

Substantial differences in pentavalent immunization were observed between regions. For example in DHS 2011, the absolute difference between the highest performing and lowest performing regions was 65 percentage points. Pentavalent immunization coverage was higher in Addis ababa and lower in Afar regions. In Afar, Somali, Oromiya and Gambella regions immunization coverage was 26.2, 9.7, 11.2 and 8.9 percentage points below the national average respectively (Figure 3).

MEASLES IMMUNIZATION COVERAGE

Overall, measles immunization coverage was lower in children from poorest households. Measles immunization coverage tended to increase with rising economic status. Ethiopia achieved coverage of 45.3% in the poorest quintile, whereas the richest quintile, reported coverage of 79.7% (Figure 2). Measles immunization coverage tended to be lowest in women with no formal education, although an increament was observed across education levels. The gap in measles immunization coverage between most-and-least educated women was substantial. Coverage of measles immunization in secondary and/or above education subgroup exceeded the coverage in the no education subgroup by 39.52 percentage points. Measles immunization coverage among women in the highest education category was atleast 1.79 times greater than that among women in no formal education category.

Large scale sex-related inequality in measle immunization coverage is not observed that had a difference of less than 1 percentage point between measles immunization coverage in girls and boys.

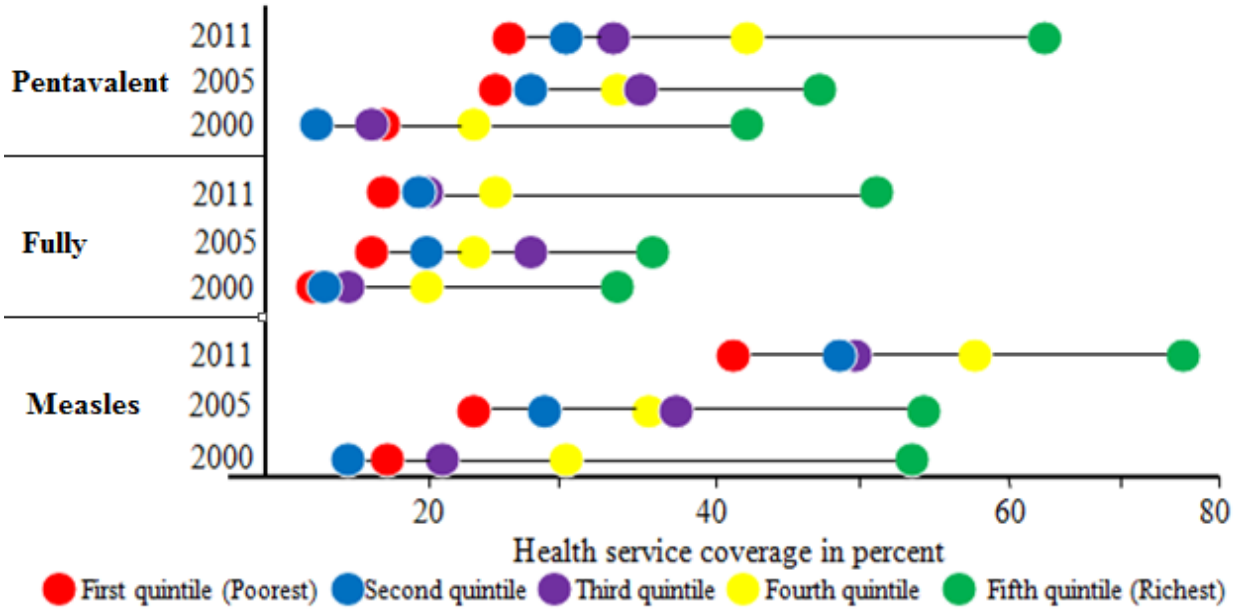

Figure 2. Absolute difference in Pentavalent, Measles, and Fully immunizations coverage among one-year-olds by economic status in Ethiopia (DHS 2000 - 2011)

The magnitude of inequality in measles immunization appeared to be associated with the national level of usage. For example, Afar, Oromiya, Somali and Gambella regions achieved measles immunization coverage of less than the national average; among them, the highest variation was observed in Afar (-25.4) and Somali regions (-16.2)(Figure 3).

FULLY IMMUNIZATION COVERAGE

There was no-little difference in fully immunization coverage between boys and girls. Fully immnunization coverage had a tendency to increase with rising economic status and level of education. Absolute difference of 33.85 and 36.86 percentage points were observed between poorest and richest quintiles, and secondar and/or above and no formal education subgroups respectively. Fully immunization coverage to children from households among urban areas were 2.34 times greater than to children from households among rural areas (Figure 2).

Regarding regional variation, half or more regions achieved full immunization coverage below the national average, highest in Afar (-15.7), Gambella (-8.8) and Oromiya (-8.7); the difference between highest and lowest performing regions was 70.1 percentage points (Figure 3).

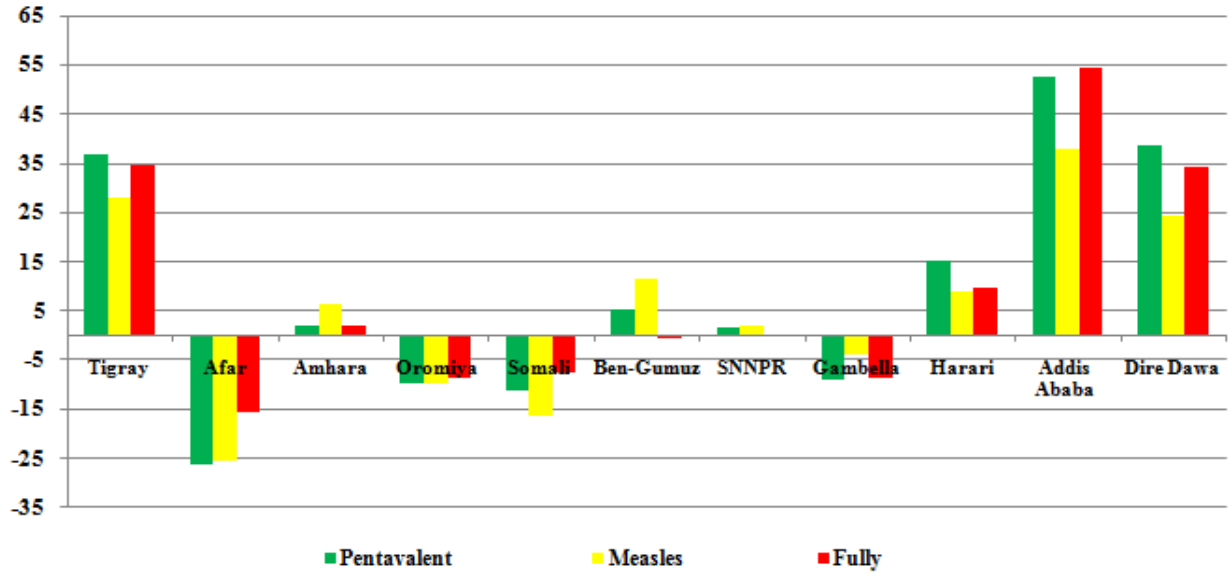

Figure 3: Percentage of the difference from the national average of pentavalent, measles and fully immunization (DHS 2011)

UNDER-FIVE CHILDREN WHO SLEPT UNDER ITN

The proportion of children aged 0-59 months who slept under ITN increased with increased level of education. The use of ITN tended to be lowest in women with no formal education and generally increased across education levels. The proportion of ITN utilization in the secondary or higher subgroup exceeded the proportion in the no formal education subgroup by over 4.9 percentage points (Figure 4).

The gap in proportion of children aged 0-59 months who slept under ITN between urban and rural was substantial. Of the total children aged 0-59 months included in the survey who slept under ITN, 3.6% of them were from urban while only 1.3% were from rural areas of the country. Proportion of ITN utilization among children aged 0-59 months in urban subgroup was 2.6 times greater than that among children aged 0-59 months in rural subgroup (Figure 4).

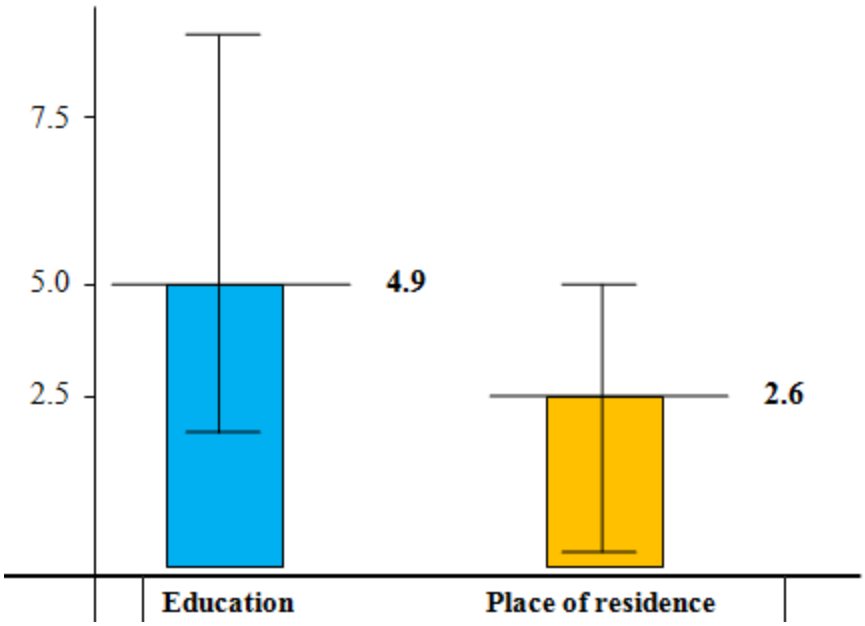

Figure 4. Absolute difference in proportion of children aged 0-59 months who slept under ITN by Education and Place of residence in Ethiopia (DHS 2005)

Large economic and sex related inequalities were not observed to utilization of ITN among children aged 0-59 months. Sex and economic status, for example, had a difference of less than 0.1 and 1.5percentage point between ITN utilization among children aged 0-59 months in boys and girls, and poorest and richest quintiles respectively.

3.3. CHILD MORTALITY

NEONATAL MORTALITY RATE

The neonatal mortality rate was higher in women with no formal education as compared to women with secondary or higher education level in Ethiopia. The neontal mortality rate in no formal education subgroup was 61, 41 and 46 neontal deaths per 1000 live births in DHS 2000, 2005 and 2011 respectively.

The magnitude of the difference in neonatal mortality rates between women with no formal education and secondary or higher education subgroups varied. A difference of about 37, 20 and 24 deaths per 1000 live

births reported in DHS 2000, 2005 and 2011 respectively.

As expected, major difference was observed in neonatal mortality between boys and girls. The neonatal mortality rate in boys subgroup was higher as compared to girls. A difference of about 18, 14 and 16 deaths per 1000 live births observed in DHS 2000, 2005 and 2011 respectively. Except Benishangul-gumuz (62 deaths per 1000 live births) and Amhara (54 deaths per 1000 live births) regions, no-or-little-difference was observed in neonatal mortality rate between regions (Figure 5).

INFANT MORTALITY RATE

Infant mortality rate was observed to be affected by education. place of residence and sex inequality dimensions. On the contrary, no-or-very-low-economic-status, place of residence and sex inequalitieswere observed in infant mortality rates.

The infant mortality rate tended to be highest in women with no formal education, and generally increased linearlly across education levels. This pattern was evident in place of residence and sex inequality dimensions. Infant mortality rate in women with no formal education subgroup exceeded the mortality rate in women with secondary or higher education subgroup by over 54.9, 45.2 and 46.9 percentage points in DHS 2000, 2005 and 2011 respectively. In DHS 2011, infant mortality rate in the lowest education category was atleast 2.4 times greater than that among women with secondary or higher education.

The extent of inequality in infant mortality rate between regions was noticable; highest in Benishangul-gumuz (101 deaths per 1000 live births) and lowest in Dire Dawa (60 deaths per 1000 live births). The magnitude of inequality ranges from 1 to 42 percentage points above from the national average; highest difference observed in Beneinshangul-gumuz (-42), SNNPR (-19), Amhara and Gambella (-17) above from the national average(Figure 5).

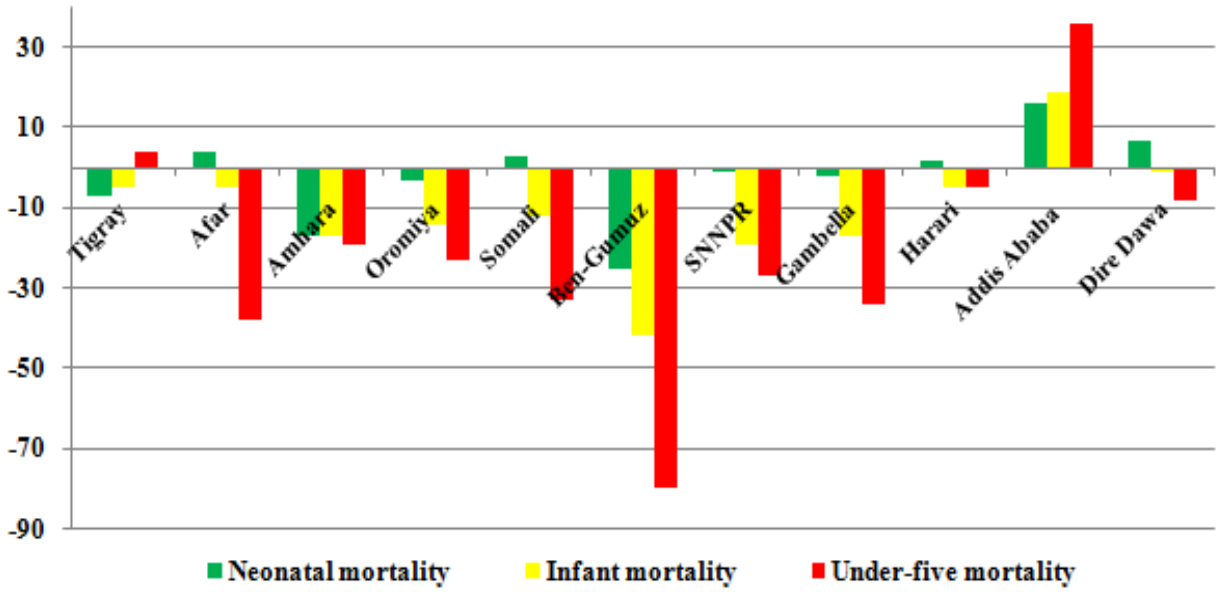

Figure 5: Percentage of the difference from the national average of neonatal, infant and under-five child mortality rate (DHS 2011)

UNDER-FIVE CHILD MORTALITY RATE

The under-five mortality rate was higher in rural areas than in urban areas. The under-five mortality rate in rural areas was about 192, 135 and 114 deaths per 1000 live births in DHS 2000, 2005 and 2011 respectively. In urban areas, the under-five mortality rate was about 149, 98 and 83 deaths per 1000 live births for same period. A difference of about 43.0, 36.7 and 31.9 deaths per 1000 live births were examined in DHS 2000, 2005 and 2011 respectively (Figure 6).

The magnitude of the difference in under-five mortality rates across education levelswas substantial. Under-five mortality was higher with women with no formal education as compared to women with secondary or higher education level. Generally, a difference of about 107.2, 84.5 and 83.3 deaths per 1000 live births were examined in DHS 2000, 2005 and 2011 respectively (Figure 6). No-or-little-economic-status-and-sex-inequality was observed in under-five mortality rates. Under-five mortality rate was highest in Benishangul-gumuz (169 deaths per 1000 live births) and lowest in Tigray (85 deaths per 1000 live births) in DHS 2011. Additionally, the level of inequality in under-five mortality rate varied from region to region; highest difference observed in Benishangul-gumuz (-80), Afar (-38), Gambella (-34) and Somali (-33) regions (Figure 5).

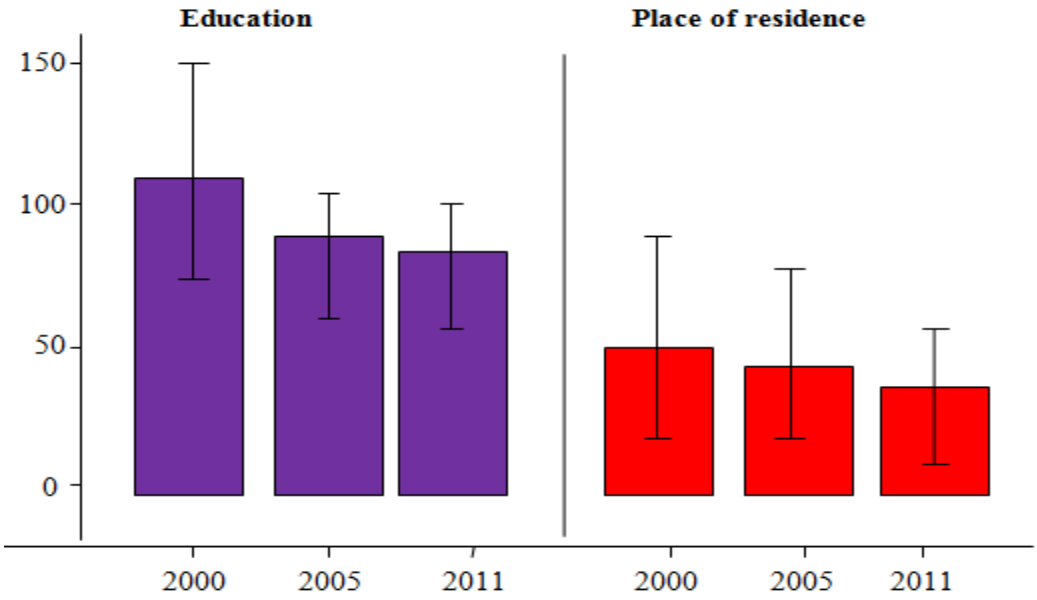

Figure 6. Absolute inequality in under-five mortality by education and place of residence in Ethiopia (DHS 2011)

3.4. CHILD MALNUTRITION

STUNTING AND WASTING PREVALENCE IN CHILDREN AGED < 5 YEARS

Stunting prevalence in children was lower among the category with the highest level of maternal education. That is, children from women with no formal education tended to have the highest prevalence of stunting. For instance, in DHS 2011, 18.9% of children aged less than 5 years in the secondary or higher subgroup were stunted while almost half of (46.7%) children aged less than 5 years in the no formal education subgroup were stunted. In all surveys, the absolute difference in stunting prevalence between the secondary or higher subgroup and the no formal education subgroup was at least 30 percentage points.

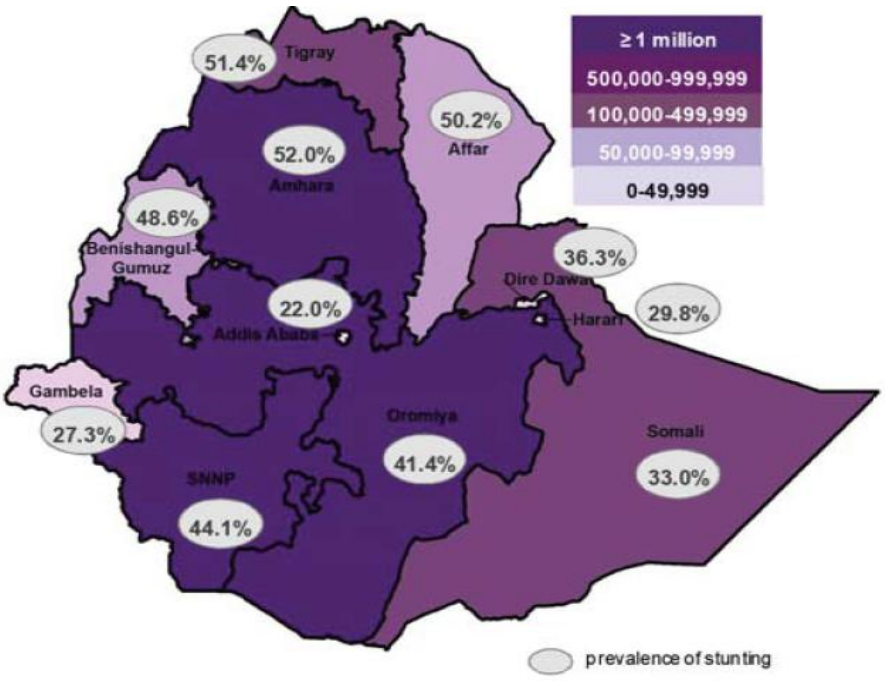

Figure 7: Inequality in stunting prevalence among children less than 5 years by region

Nearly comparable amount of inequality was observed in wasting prevalence in children aged less than 5 years stratified by economic status and place of residence.

When disaggregated by economic status place of residence, stunting prevalence in children less than 5 years differed greatly between rural and urban. The prevalence of stunting for children less than 5 years old to be atleast 11.6 percentage points higher in urban than in rural areas of the country throught all surveys; higher in DHS 2011 (14.9 percentage points) and lowest in DHS 2000 (11.2 percentage points).

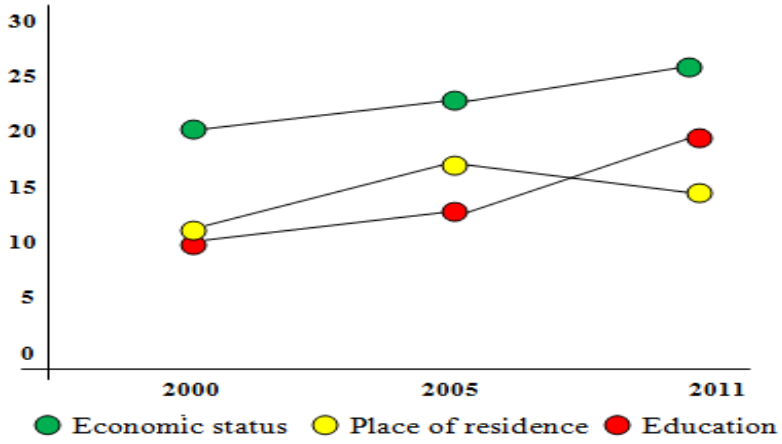

Figure 8: Trend of absolute diffrence, Stunting prevalence by Economic status, place of residence and education

Regarding wasting prevalence, higher differences were observed on economic status and education stratifiers. Wasting prevalence in children aged less than 5 years in poorest quintile was 1.4, 1.8 and 2.5 times greater than that of children in the richest quintile in DHS 2000, 2005 and 2011 respectively.Similarly, when disaggregated by education, wasting prevalence in children aged less than 5 years in the no formal education category was 1.7, 3.0 and 2.9 times more than that of children in the secondary or higher education category in DHS 2000, 2005 and 2011 respectively. In this regard, no-or-very-little diffrence was observed on stunting and wasting prevalence in children aged less than 5 years when disaggregated by sex.

3.5. MATERNAL AND REPRODCUTIVE HEALTH INTERVENTIONS

With the aim of reducing maternal morbidity and mortality, set of high impact interventions were being implemented.

These interventions include universal access to family planning information and services, scale up postpartum family planning service to all weredas, strengthen adolescent and youth focused reproductive health services, universal access to essential high impact maternal, neonatal and child health services, scale up respectful maternity care in all health facilities, eliminate obstetric fistula and clear all backlog cases of fistula and pelvic organ prolapsed, enhance implementation of routine immunization improvement initiative. The accessibility and utilization of the interventions differs by different characteristics. And this paper tries to analyze the state of inequality in maternal health service utilization among different sub group populations using selected indicators.

MATERNAL MORTALITY RATIO

As per DHS 2011, the maternal mortality ratio, 676 per 100,000 live births, is unacceptably high. The indicator value doesn't show decrement when compared with 673 per 100,000 live births in 2005. The United Nations Population Fund (UNFP) maternal mortality in-depth Analysis of the EDHS 2000-2011, showed that regional disparity exists in maternal mortality burden. Based on the report, five out of the 11 regions estimated to have higher maternal mortality burden than the national average; the highest being in Somali (743) and Afar (717).Addis Ababa estimated to carry the lowest maternal mortality burden (234). There is a 3 times higher MMR between Addis Ababa and Somali regions.

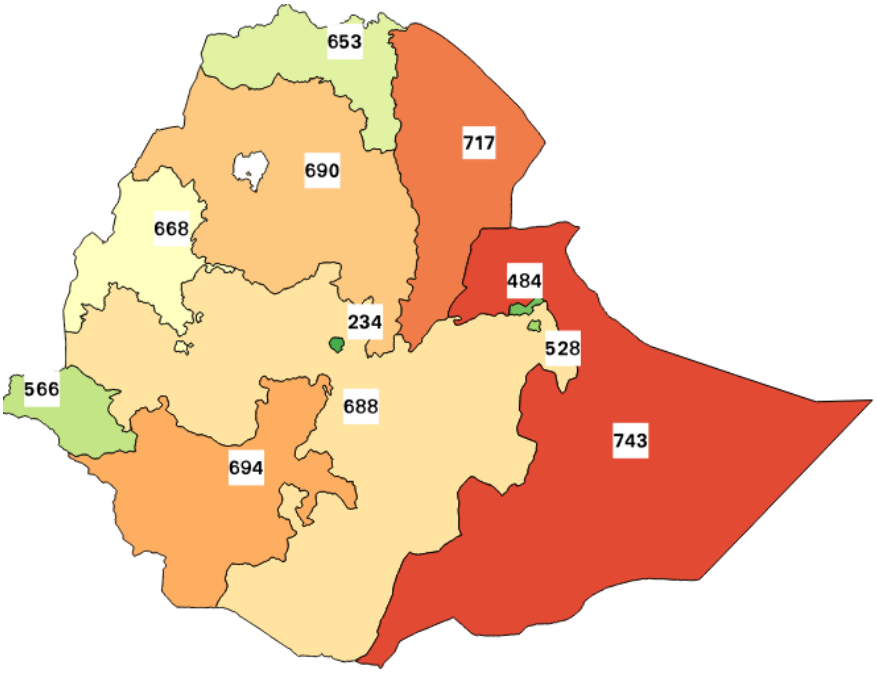

Figure 9: Regional disparity in MMR

MODERN CONTRACEPTIVE USE

Family planning provides with potential benefits on maternal and health outcomes, educational advances, economic development and women's empowerment. In line with this, rigorous and intensified efforts to increase accessibility and utilization of family planning services have been carried out over years. As a result, modern contraceptive use among currently married women increased seven-fold, from 6.3% in DHS 2000 to 40.4% in DHS 2014.

Following the contraception use increment, planned childbearing improved and fertility rate decreased. But family planning service utilization differs among different subgroups of economic status, education, region and place of residence. Regional variation in modern contraception use was noticeable from EDHS 2000, 2005, 2011 and 2014. The absolute difference between regions increased progressively over the period 2000 through 2014 (Figure 10). High modern CPR was observed inurban regions, (Addis Ababa, Dire Dawa and Harari) in all surveys carried out. Addis Ababa had 14.8 times higher modern CPR than Afar in 2014; this disparity used to be 14.2 times between Addis Ababa and Somalia in EDHS 2000. The absolute difference in modern CPR between pastoralist and agrarian regions increased linearly from 2.7 in 2000 to 7.9 in

2011 and 19.5 in 2014. However, the absolute inequality between agrarian and urban regions showed tremendous reduction from 15.3 in 2000 to 5.6 in 2014.

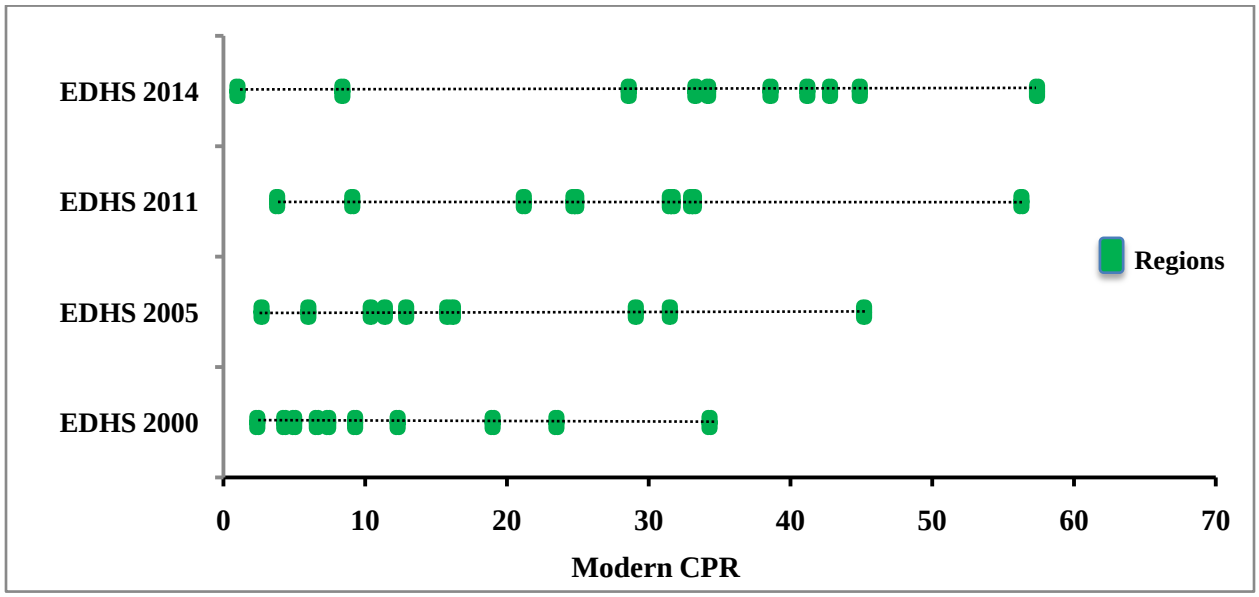

Figure 10: Differences in modern contraceptive use by region (DHS 2000 - 2014)

As per DHS reports, urban women were more likely utilized family planning services as compared with rural counterparts. The modern contraception use disparity between rural and urban places doesn't get narrowed over years (25% in 2000 to 26.9% in 2011), despite of observed increment in both subgroups. In contrary, the absolute inequality between the urban and rural residences was significantly narrowed to 18.4 in 2014.

As expected, the absolute difference in modern contraception use between the richest and the poorest subgroups had been high and don't get narrowed i.e. 32.3% in 2005 and 32.8% in 2014 (Figure 11). The absolute difference inmodern CPR between women with no formal education and secondary school or above was decreased from 40.2% in 2000 to 29.1% in 2014.

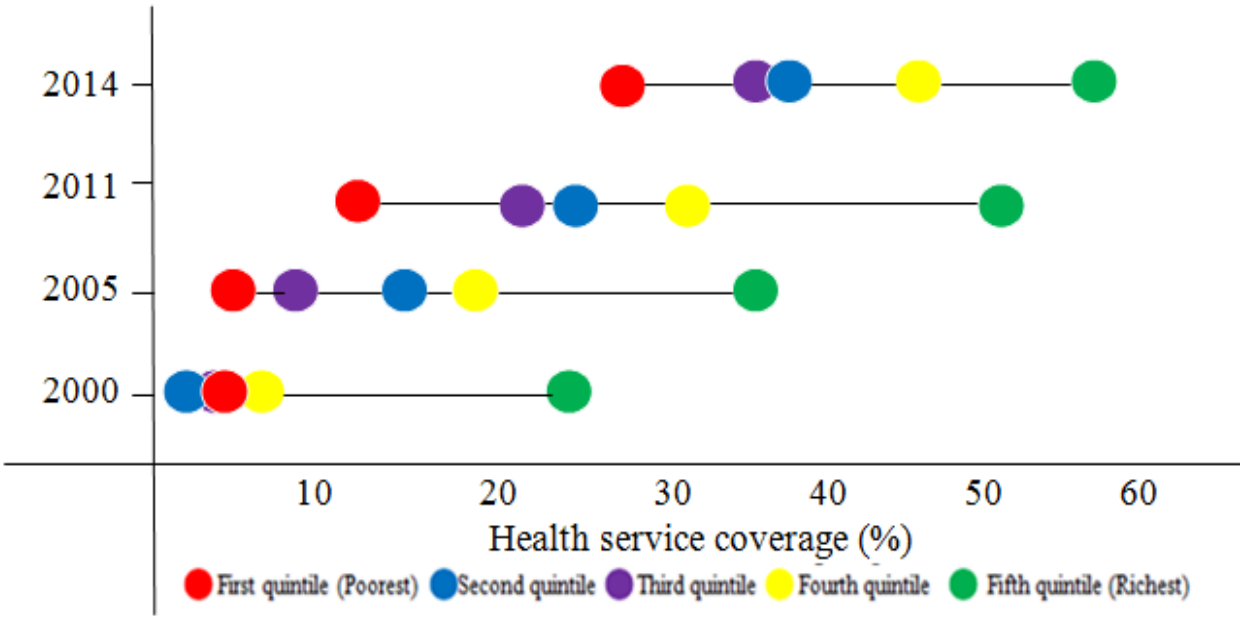

Figure 11: Differences in modern contraceptive use by economic status (DHS 2000 - 2011)

The extent of inequality in modern contraceptive use practice across the different subgroups of economic status and education was decreasing over time. And the disparity in modern contraceptive use among subgroups dramatically decreased in 2011 when compared to 2000. But, the modern contraceptive use was concentrated among the advantaged population subgroups i.e segments of population in richest, and secondary or above categories (Figure 12).

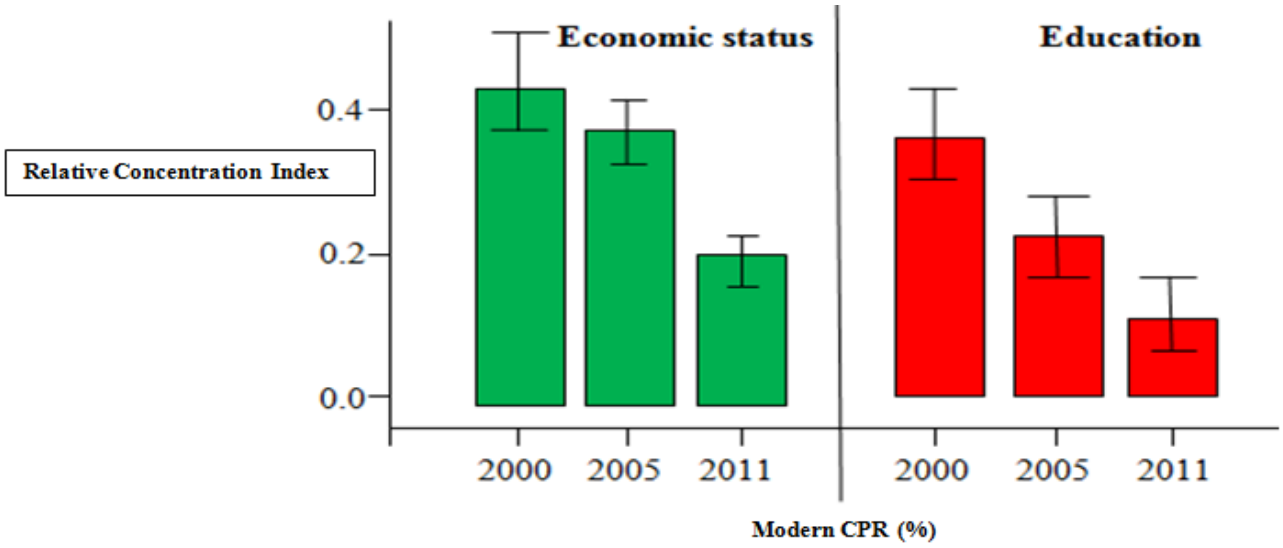

Figure 12: Trend of reduction in contraception use disparity in modern contraceptive use (DHS 2000 - 2011)

UNMET NEED FOR FAMILY PLANNING

The unmet need for family planning among the lowest wealth quintile had been higher than the unmet need of women in the highest wealth quintile in all DHS. The absolute difference of the unmet need between the wealthiest and the poorest hadpersistently increased from 8.2% in 2000 to 16.9% in 2011.

The unmet need for family planning among women aged 15-19 years had been higher than unmet need of any other age group in 2011. The unmet need for the specified age group was not in the top three in 2000 and 2005. The absolute difference of unmet need between age group 15-19 and 45-49 gets narrower over time and decreased from 19.5% in 2000 to 17.6% in 2011.

The unmet need for family planning among women with no formal education was higher than women with secondary or above school in both 2005 and 2011. The absolute difference between women with no formal education and secondary or above increased from 0.7% in 2005 to 7.9% to 2011. This used to be the reverse in 2000; unmet need for secondary or above was 7% points higher than the unmet need for women in no formal education subgroup.

ANTENATAL CARE

According to mini EDHS 201, national ANC-first coverage doubled from 28.1% in 2005 to 58.5%. In same year the percentage of pregnant women who get at least four ANC visits increased by 62% (12.2% to 32.1%). In this regard, there exist variation in ANC service utilization by place of residence, economic status, education and region.

EDHS showed that ANC first and fourth or above coverages were higher among women in urban subgroup. As per the Mini-DHS 2014 report the absolute difference of ANC-first coverage and ANC-fourth plus coverage between urban and rural areas were 45.5% and 39.2%, respectively. In 2011 EDHS, this difference used to be 48.8%between ANC first and fourth visits. This evidenced that inequality of ANC service utilization between urban and rural did not reduced as compared to previous years.

The magnitude of ANC coverage also varied from region to region and never gets narrowed as evidenced in EDHS 2014. The absolute difference between the high performing and least performing regions in ANC first coverage was at least 75%; and this gap used to be less in the previous years (Figure 13).

In accordance to this, ANC-four or plus coverage ranged was highest in Addis Ababa (86.4%) and lowest in Somali (7.0%) according to EDHS 2011. Somali, Afar and Amhara regions were far below the national coverage; among Regions Requiring Special Support (RRSS) only Gambella was above the national coverage. Except Amhara (6.7%), all Agrarian regions performed above the national coverage, for instance Tigray region was far above from the national coverage, 21.7 percentage points.

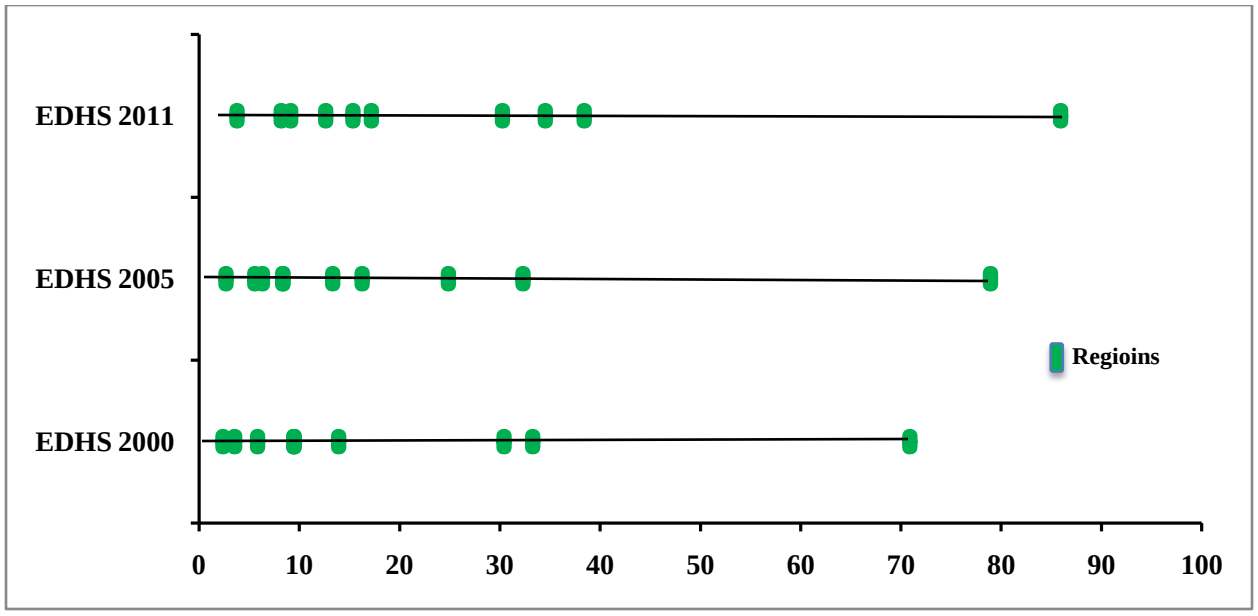

Figure 13: Disparity in ANC 4 coverageby place of residence and region (DHS 2000 - 2005)

Women with at least primary education were more likely to receive ANC four or more visits as compared to women with no formal education. For instance, in DHS 2011 report, 64.8% of mothers with secondary or above education category received ANC four services. In contrary, only 12.2% of mothers with no formal education received ANC four services, indicating paramount inequality. Likewise, likelihood of receiving four or more antenatal care services was higher as economic status of women rises. In 2011, women in the richest quintile were at least 5.5 times more likely to receive ANC four or more services when compared to women in poorest quintile (Figure 14).

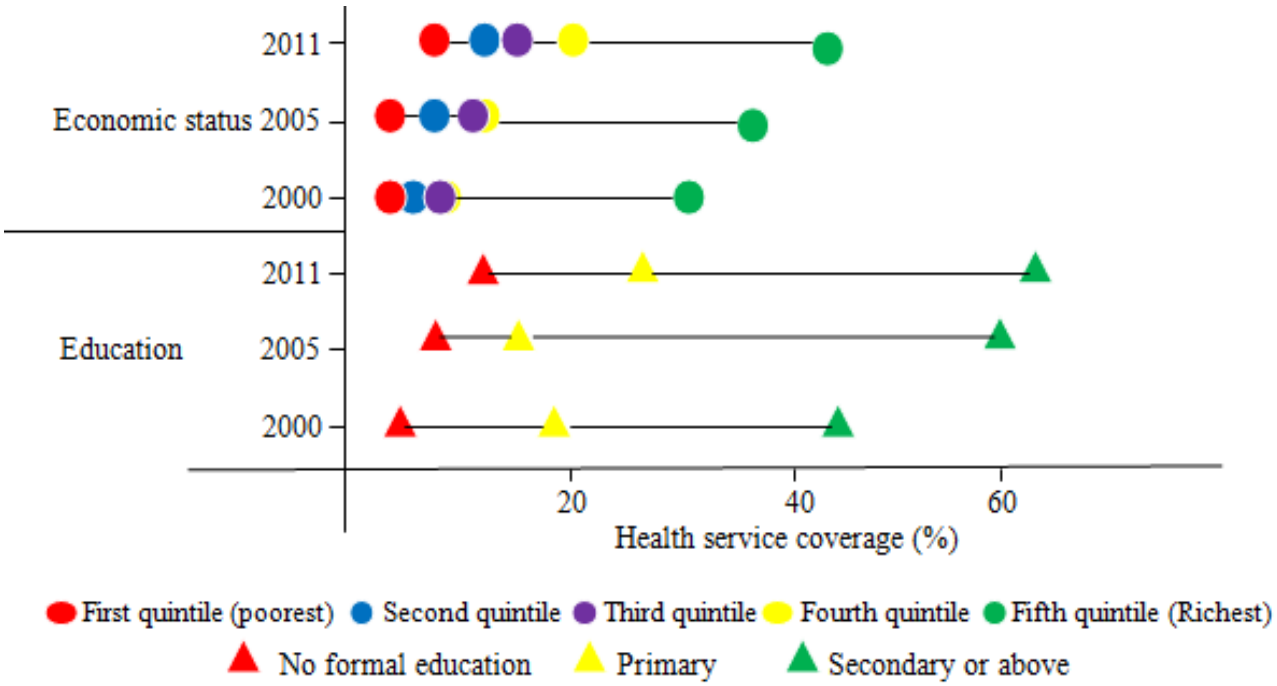

Figure 14: Disparity in ANC 4 coverage by economic status and education (DHS 2000 - 2005)

Urban to RRSS relative inequality stayed stagnant between 2011 (1.9) and 2014 (1.8) periods. On the other hand, agrarian to RRSS regions relative inequality increased from 1.2 in 2011 to 1.4 in 2014. However, an improvement was observed in urban to agrarian regions relative inequality from 1.5 in 2011 to 1.3 in 2014.

EDHS 2011, showed that extent of inequality across different subgroups of economic status and education decreased over time, though not statistically significant. The disadvantaged segments of the population were disproportionately getting use of antenatal care services when compared to advantage ones (Figure 15).

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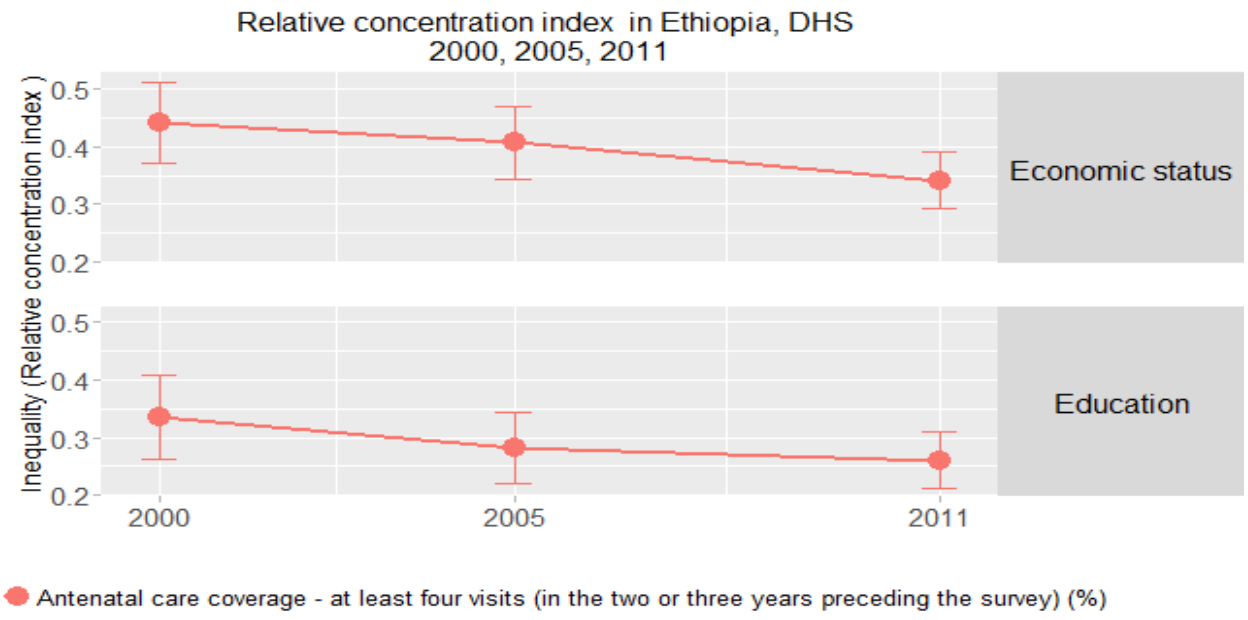
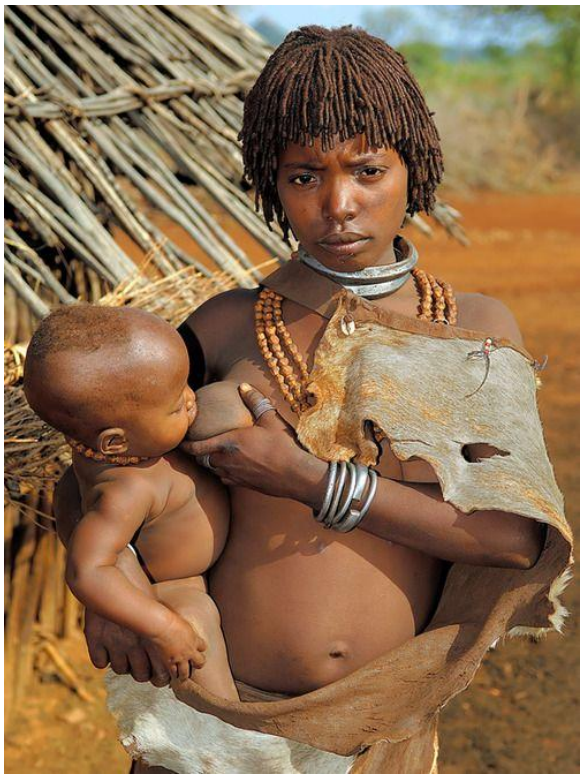


Figure 15: Trend in Antenatal care coverage disparity

DELIVERIES ATTENDED BY SKILL BIRTH ATTENDANTS



As per DHS report, the national coverage for skilled delivery has been improved from 5.6% in 2000 to 15.5% in 2014.It almost doubled in the years between 2005 and 2011 and increased by 50% between 2011 and 2014.

As depicted in Figure 16, place of residence affects the skilled delivery care service coverage by which women who reside in urban were the advantaged ones. The absolute difference of skilled health personnel assisted delivery coverage between rural and urban areas was increasing linearly over the last years (33.3% in 2000, 44.8% in 2005, 50.7% in 2011 and 49.3% in 2014).

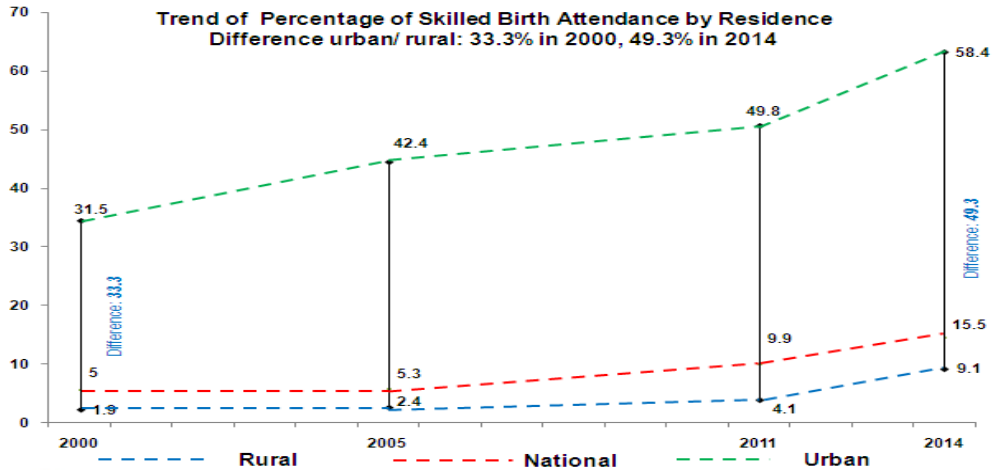


Figure 16: Trend of Skill birth delivery by place of residence (DHS 2000 - 2014)

The magnitude in skilled delivery also varied across regions of Ethiopia; Addis Ababa region registered high coverage for consecutive years 72.2% in 2000, 80.1% in 2005, 83.3% in 2011 and 86.1% in 2014. On the other hand, mini EDHS 2014 reported that SNNPR (11.7%), Amhara (11.7%) and Oromia (13.1%) regions joined other RRSS regions (Afar (10%), Somali (15.3%) and Benishangul Gumuz (16.3%)) with the least proportion of women delivering with skilled personnel.Whereas Addis Ababa, Dire Dawa and Harari regions are far above from the national coverage deviating with 70.6, 43.7 and 30 percentage points from the national average respectively. Gambella from RRSS regions and Tigray from agrarian regions have achieved 13.6 and 10.7 percentage points above the national coverage respectively.

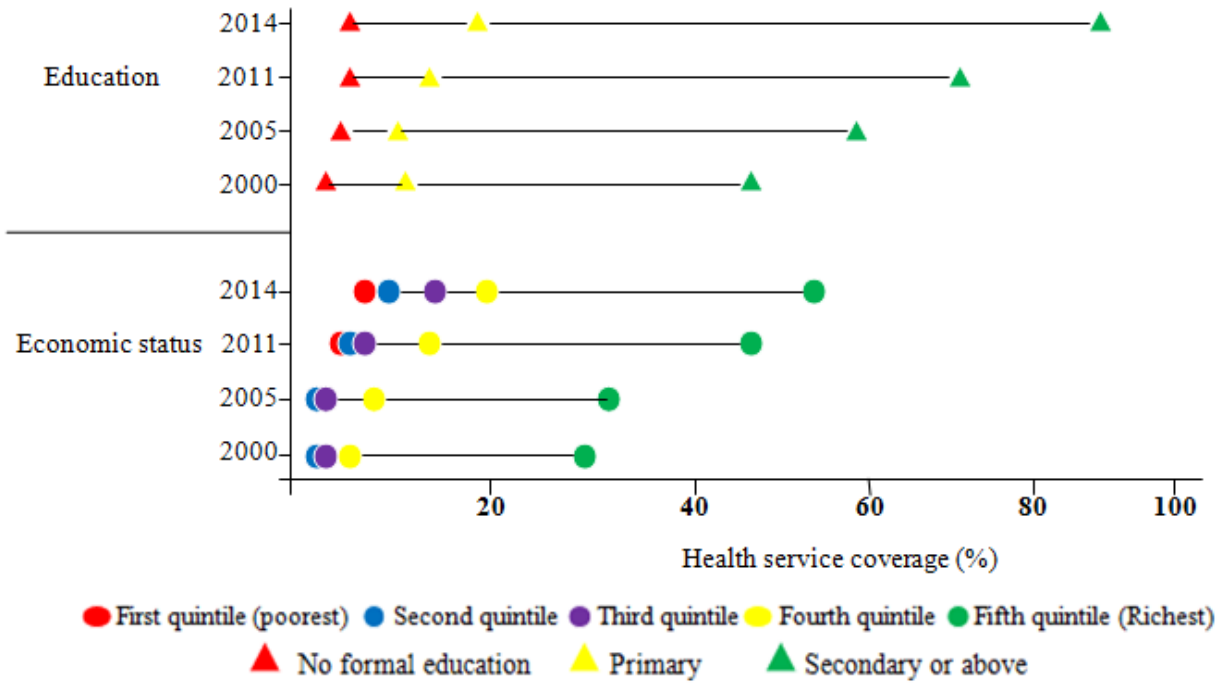


Figure 17: Trend of Percentage of skilled birth attendance by place of residence and education (DHS 2000 - 2014)

The absolute difference in skilled delivery service utilization between top and bottom wealth quintileskept increasing between 2000 and 2014 (25.9 in 2005, 43.9 in 2011 and 51.1 in 2014) (Figure 17).But extent of inequality between all subgroups of economic status decreased over time, though not statistically significant (RCI overlap observed in all years) (Figure 17). The relative concentration index value showed that the disadvantaged segments (poorest quintile) of the population were disproportionately getting use of skilled delivery services when compared to advantage ones (richest quintile).

The level of inequality in skilled delivery services appeared to be increasing across education levels. The absolute difference in skilled delivery service between women with no formal education and secondary or above education subgroups increased from 42.5 in 2000 to 72.5 in 2014 (figure 10). But the extent of inequality across subgroups of education decreased over time, though not statistically significant (RCI overlap observed in all years) (Figure 18). The relative concentration index value showed that the disadvantaged segments (women with no formal education) of the population are disproportionately getting use of skilled delivery services when compared to

advantaged ones (women with secondary or above education).

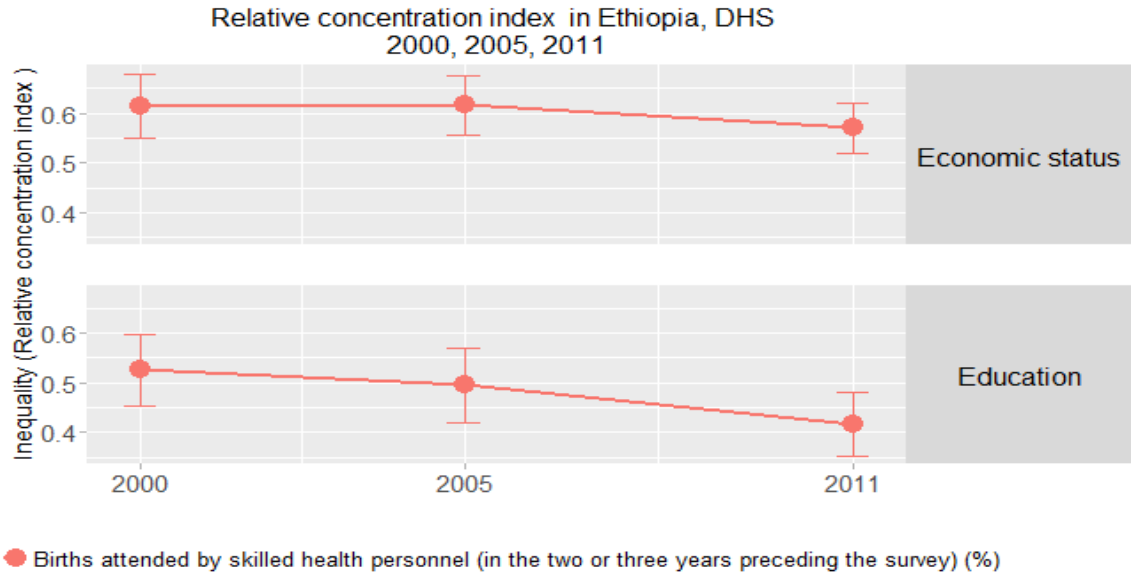


Figure 18: Inequality (relative concentration index) in skilled birth attendance by economic status and education (DHS 2000 - 2011)

POSTNATAL CARE

According to EDHS, postnatal care within 2 days coverage has increased from 7% in 2011 to 12% in 2014 despite variations exist by place of residence, economic status, education and region.

Women who reside in urban were at least 6 times more likely to have received postnatal checkup in the first two days after childbirth in 2014. The relative ratio of inequality between urban and rural women used to be about 12 in 2011. This showed that the inequality of postnatal care services utilization between urban and rural has reduced.

The postnatal care within two days after birth coverage varied from region to region, lowest in Somali and highest in Addis Ababa. As per DHS 2014, the postnatal care coverage in Addis Ababa, Dire Dawa and Harar were more than 3 times higher than the national coverage. In the same year, the coverage was higher than the national average in Tigray, Benishangul-gumuz and Gambela regions. On the contrary, Afar, Amhara, Oromia, Somali and SNNPR regions are below the national average. The absolute difference between Addis Ababa and Somali increased linearly from 42.7% in 20011 to 66.4% in 2014.

The analysis evidenced that women with secondary or above education were more likely to receive PNC services within two days after child birth as compared to women with no formal education. In 2014 report, almost half (48.8%) of mothers with secondary or above education received PNC while only 8% of mothers with no formal education received the service, indicating substantial inequality. Similarly, likelihood of receiving PNC services was higher as the economic status of women rises. For instance, in 2014, women from the richest quintile wereat least 11.7 times more likely to receive PNC services as compared to women in the poorest quintile.

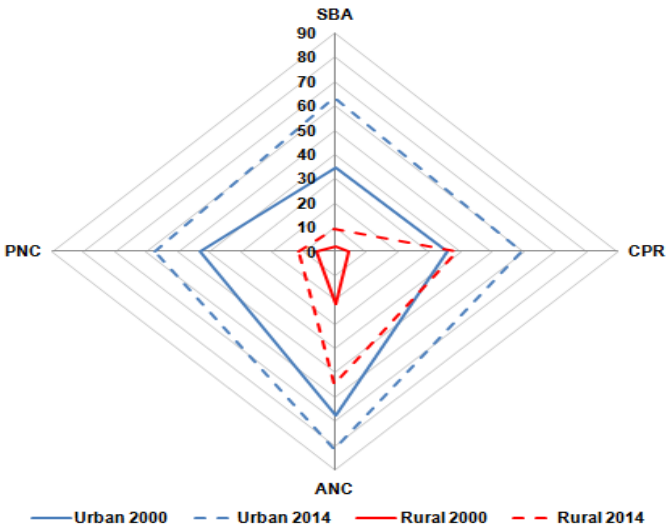


Figure 19: Maternal health services by place of residence (DHS 2000 -2014)

3.6. BURDEN OF DISEASES

TUBERCLUOSIS (HMIS DATA)

According to WHO's 2014 Global TB report, Ethiopia has achieved all the three targets set for tuberculosis prevention and control. Mortality and prevalence due to Tuberculosis has declined by more than 50% and incidence rate is falling significantly. The decline in mortality was profound from 2005 onwards partly due to TB/HIV collaborative activities, including the initiation of ART services for free.

The rise in prevalence coupled with low detection of MDR TB cases is huge concern

to the health sector given the socioeconomic impact it may have if not curbed in a timely manner.

Hence, Tuberculosis is still among the major communicable diseases with huge publichealth significance. Detecting and curing tuberculosis are among the key healthinterventions for addressing poverty and inequality.

The magnitude of inequality between pediatrics (children less than 15 years of old) and adult (greater than 15 years of old) in TB detection appeared to be significant and increased throughout the period despite little-or-no improvement observed in 2013.

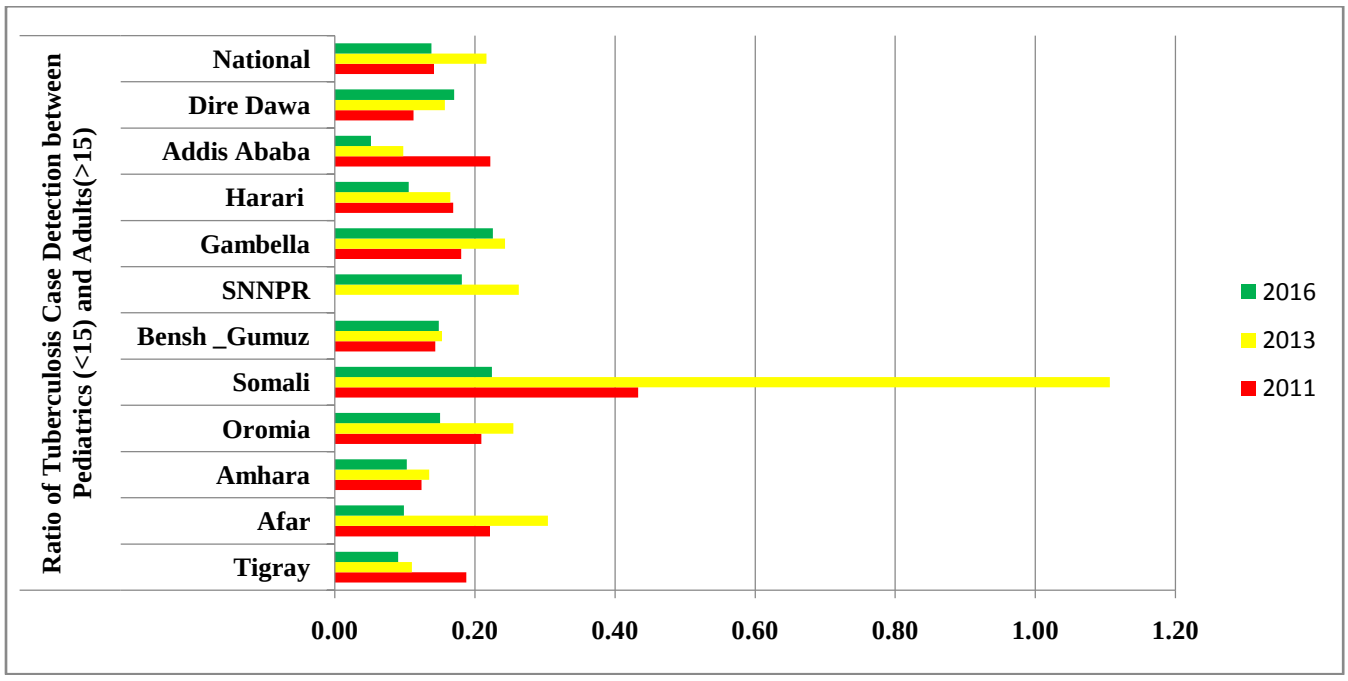


Figure 20: TB case detection inequality and trend between pediatrics and adult (HMIS 2011 - 2016)

Addis Ababa, Tigray, Afar, Harari and Amhara regions showed TB case detection rate of below the national average which yields that peoples greater than 15 years of old were receiving better TB detection services as compared to children less than 15 years of age (Figure 21). The magnitude of inequality was highest in Somali and Gambella regions.

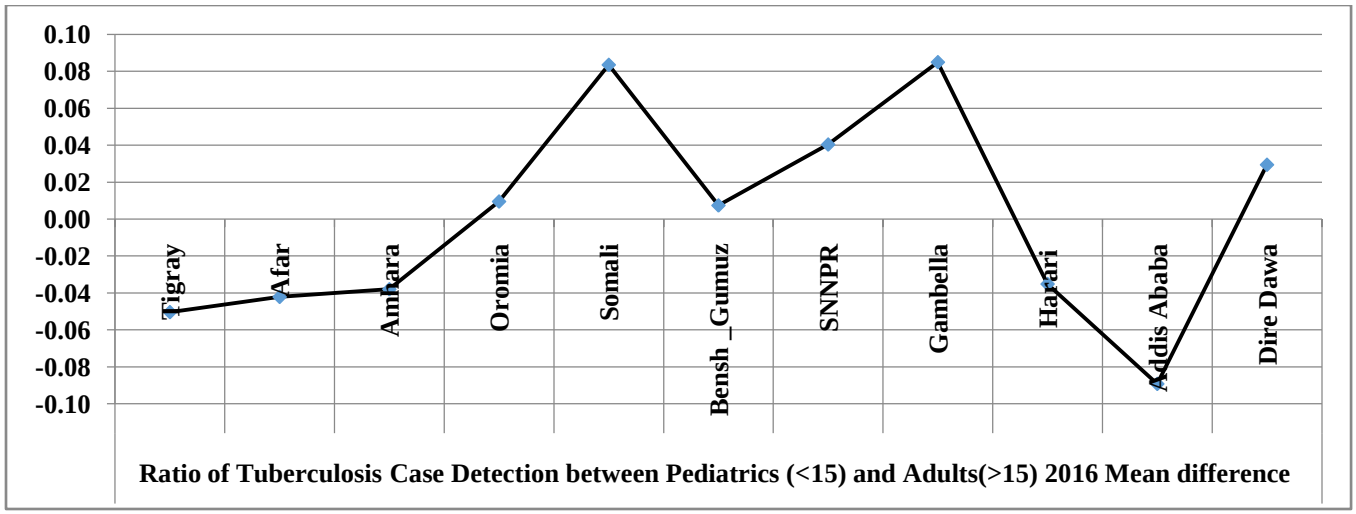


Figure 21: Relative mean-difference in TB case detection between pediatrics and adult (HMIS 2016)

HIV/AIDS

Ethiopia has achieved the MDG target of halting and reversing the epidemic well ahead of time by reducing HIV new infection by 90% and mortality by more than 50% among adults in the last decade. According to UNAIDS report 2013, Ethiopia is one of the few sub-Saharan African countries with a"rapid decline"of HIV burden, with a reduction by 50% of new HIV infections among children between 2009 and 2012. HIV prevalence decreased tremendously for the last few years. Though, socio-demographic and economic differences were noticeable throughout the periods. For instance, in EDHS 2014, adult HIV prevalence was estimated 1.2% (0.8% in males and 1.6% in females), and incidence of 0.03%.

The magnitude of inequality in HIV prevalence appeared to be associated with place of residence. For instance, in EDHS 2011, HIV prevalence in urban was 4.2% while only 0.6% in rural. The gap in HIV prevalence between the most-and-least educated women was substantial. In 2011, the prevalence of HIV in women with secondary or above education (3.1%) exceeded the prevalence of HIV inwomen with no formal education (1.1%) subgroup. No-or-little difference was observed between women with no formal education and primary education categories. Overall, HIV prevalence increased with rising economic status, lowest in poorest (0.3%) and highest in richest subgroups (3.9%).

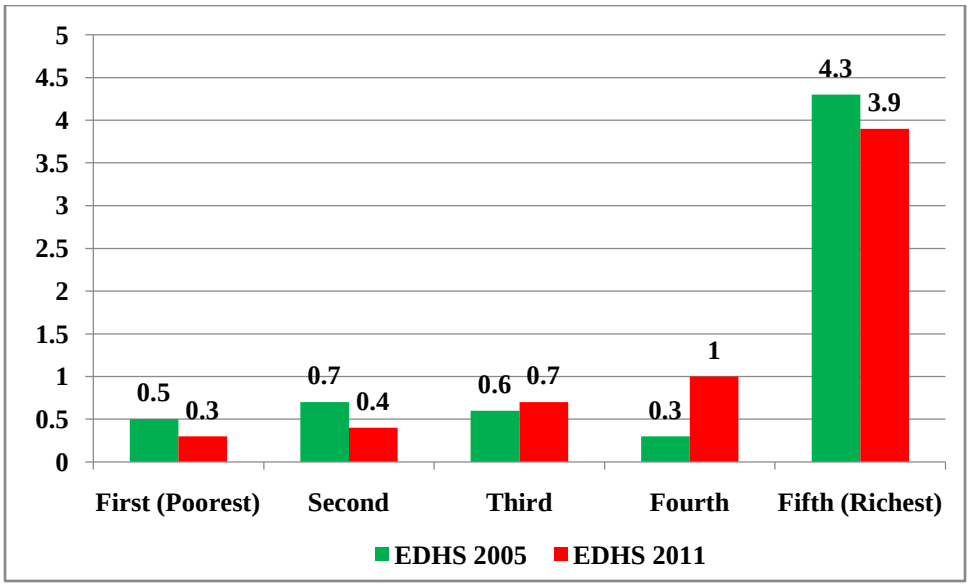


Figure 22: HIV prevalence by economic status (DHS 2005 - 2011)

The extent of inequality in HIV prevalence varies across regions; highest in Gambella (6.5%) and lowest in SNNPR (0.9%) region. The magnitude of inequality ranges from 0.1 to 5 percentage points above from the national average; highest difference observed in Gambella (5), Addis Ababa (3.7) and Dire Dawa (2.5) above from the national average (Figure 23).

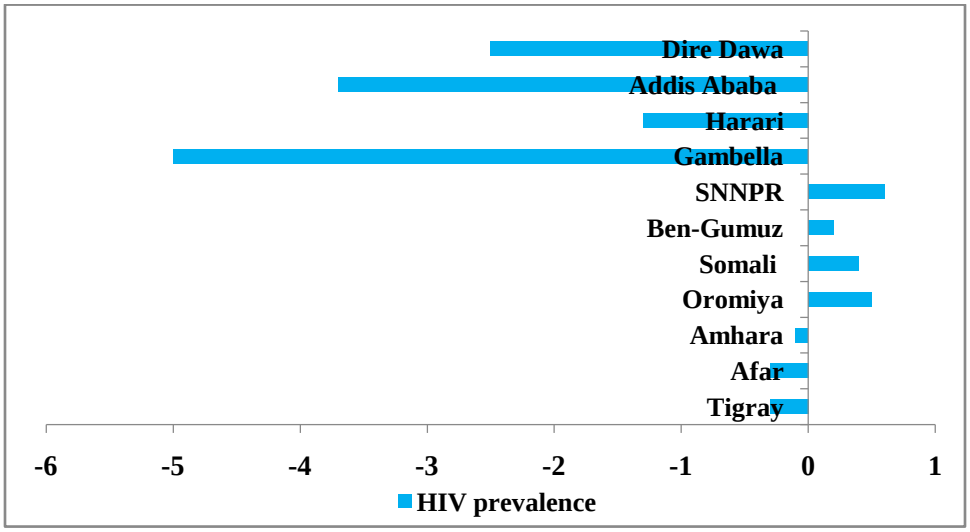


Figure 23: Absolute difference from the national average in HIV prevalence by region (DHS 2011)

MALARIA

Ethiopia has shown a remarkable progress in achieving malaria related MDG targets evidenced by reduced prevalence and death rates associated with malaria as well as anincrease in the proportion of population in malaria prone areas using effective malaria prevention and treatment measures. As a result, no major epidemics were reported in the country since 2003/2004.Although in line with HIV and TB indicators, remarkable differences were observed on malaria interventions by different inequality measures. In EDHS 2005, the percentage of households with at least one ITN and/or IRS in the past 12 months preceding the survey differs from urban to rural; 5.4 in urban and 3.1 in rural areas; yielding a 2.3 percentage point difference. The percentage of households with at least one ITN and/or IRS in the past 12 months preceding the survey increased with rising economic status. Poorest subgroups typically experienced lower levels of ITN and IRS utilization than richest subgroups. In EDHS 2005, the percentage of households in the poorest subgroup with at least one ITN and/or IRS in the past 12 months preceding the survey was only 2.9 while households in the richest subgroup was 5.5; and it was observed increased level of intervention utilization as economic levels increase. The coverage of this intervention varied from region to region. In EDHS 2005, except Amhara, Oromiya and Harari regions, the coverage was above the national average; highest in Gambella, and lowest in Amhara. Amhara, Oromiya and Harari were atleast 1.5 percentage points below the national average.

3.7. ENVIORNMENTAL HEALTH AND SANITATION

SOURCE OF WATER FOR DRINKING

Availability of improved source of water for drinking was higher in household that reside in urban areas than in rural areas. In EDHS 2011, 94.5 percent of households found in urban areas had improved source of water

for drinking whereas, only 41.7 percent of households found in rural areas had the facility. More than half (50.4%) of households found in urban areas had improved water on the premises while only 1.3 percent of households had the facility available on the premises. 62.4 percent of households found in rural areas took more than 30 minutes round trip to the nearby improved source of water for drinking. On the contrary, only 1.3 percent of households in urban areas took similar time to access the service. Only 6.3 and 1.0 percent of households found in urban and rural areas had a place for washing hand. Among them, 64.7 and 8.9 of the households used soap and water in urban and rural areas respectively.

TYPE OF TOILET/ LATRINE FACILITY

In EDHS 2011, 14.1 percent of households found in urban areas had improved and non-shared toilet facilities while only 6.6 percent of households found in rural areas had the facility.

SECTION II: ANALYSIS OF DATA ON ROUTINE HEALTH MANAGEMENT INFORMATION SYSTEM (HMIS EFY 2008)

3.8. MATERNAL HEALTH INDICATORS

CONTRACEPTIVE ACCEPTANCE RATE

In EFY 2008, nationally 71 percent of women of reproductive age are using a family planning service. Likewise EDHS, utilization of the service differs between regions. Lowest contraceptive acceptance rate (8.6%) was observed in Somali region whereas the highest (92.7%) was recorded in Amhara region(Figure 24).

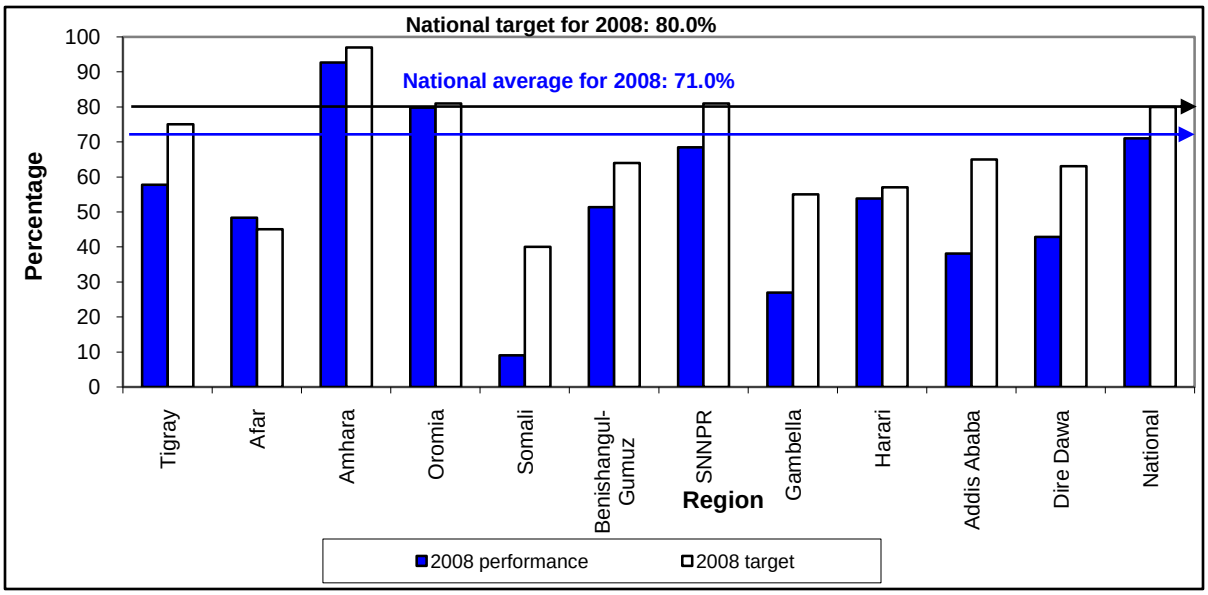


Figure 24: Contraceptive acceptance rate by region (HMIS EFY 2008)

Contraception use varied greatly by weredas within a region. The highest dispersion of weredas contraceptive acceptance rate around the regional mean was observed in Amhara region and the lowest dispersion was in Tigray region. This explains that presence of high disparity in contraception use among weredas in Amhara region and low disparity among weredas in Tigray region. Of regions requiring special support, high dispersion of weredas CAR around the regional average was observed in Benishangul-gumuz region. In Benishangul-gumuz region, the ratio of CAR between median of weredas below half of regional median and median ofweredas above half of regional median was higher than other special support requiring regions.

Table 2: Descriptive statistics of maternal indicators of weredas disaggregated by region

Regions	CAR			ANC 4+			SBA			PNC		
Regions	**Mean**	**SD**	**Interquartile Range**	**Mean**	**SD**	**Interquartile Range**	**Mean**	**SD**	**Interquartile Range**	**Mean**	**SD**	**Interquartile Range**
Tigray	50.4	12.8	15.8	58.8	19.3	26	50.1	17.5	24	66.7	25.6	35.4
Afar	33.3	25.3	28.9	46.6	26.3	46	24.6	17.9	16	30.5	25.2	29.3
Amhara	94.7	76.6	35.8	67.5	30.6	33	57.7	24.4	38	71.5	30.5	40.2
Oromia	70.5	34	38.3	69.8	31.5	28	66.8	31.7	28	98.8	48	36.4
Somali	10.6	13.1	10.3	43.09	44.07	34	44.4	16.3	22	32.2	26.5	32.6
Benishangul-gumuz	49.2	30	32.9	42.5	17	23	36.11	18.2	26	67.4	32.4	39.6

SNNPR	65.1	24.3	32.7	79.9	24.1	31	64.8	27.4	38	72.7	25.6	35.3
Gambella	18.3	16.2	26.6	15.6	17.4	18	18.2	13.5	18	25.4	17.8	34.9
Harari	46.3	27.5	44.2	65.4	63.4	55	112.6	142	171	90.4	121.1	68.5
Addis Ababa	35.4	13	17.1	113	52.9	60	84.6	33.6	44	89.5	35.3	55.6
Dire Dawa	34.1	21.6	41.7	36.9	21.2	36	36.6	26.3	50	46.2	37.7	40.5

The contraceptive acceptance rate was higher in urban as compared to rural areas of the country. Urban women were found to be more likely to get family planning service during EFY 2008. The results revealed that women who reside in urban areas utilized any method of family planning services at least 3.2 times higher than women who reside in pastoralist weredas (p-value=0.000).And, though not statistically significant, women who reside in urban weredas was also 1.24 times higher than women who reside in urban weredas' (p-value=0.086). On the other hand, women who reside in agrarian weredasutilized anykind of family planning service at least 2.5 times (p-value=0.000) than their counterparts who reside in the pastoralist weredas.

Table 3: Analysis of variance ofCAR coverage by woreda category

Woreda Category	**N**	**Mean**	**Standard Deviation**
Urban	101	83.5	71.8
Pastoralist	101	26.4	18.6
Agrarian	586	67.3	41.4
	788		
		Mean Difference	**P-value**
Urban-Pastoralist		57.1	0.000
Urban - Agrarian		16.2	0.086
Agrarian-Pastoralist		40.8	0.000

ANTENATAL CARE 4+

Of the estimated pregnant mothers, only 76 percent of them have made at least four antenatal care visits during the EFY 2008. As expected, the coverage varied from region to region. Lowest antenatal care-four coverage (14.4%) was observed in Gambella region whereas the highest antenatal care-four coverage (100%) was recorded in Addis Ababa.

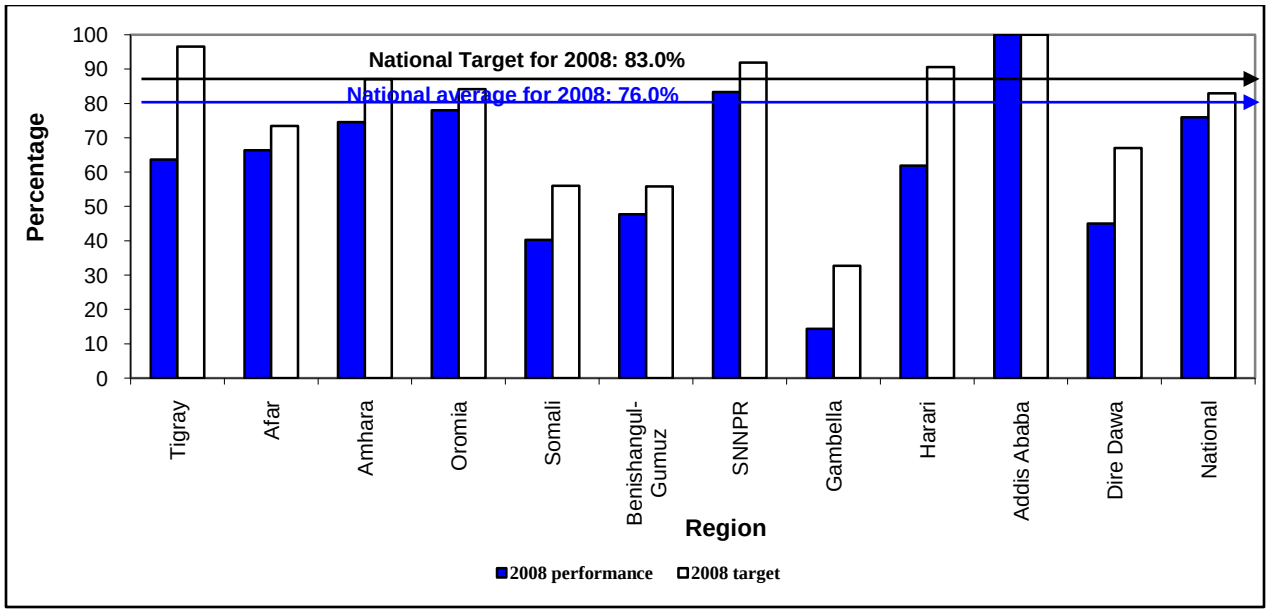


Figure 25: Antenatal care-four coverage by region (HMIS EFY 2008)

The proportion of women getting at least four antenatal care visits varies among weredas within a region. The highest dispersion of weredas ANC4 coverage around the regional mean was observed in Harari region and the lowest dispersion around the regional mean in Benishangul-gumuz . This shows presence of high disparity in antenatal care service use at least four visits among weredas in Harari region and low disparity among in Benishangul-gumuz. For Benishangul-gumuz region, the difference of median of weredas below half of regional median and median of weredas above half of regional median was higher than other special support requiring regions.

The antenatal care fourth coverage varies across woreda category. Those who live in agrarian weredas were found to be more likely to made at least four antenatal care visits during the 2008 EFY. As shown in the Table 4, agrarian weredas antenatal care-four coverage was 1.3 times higher than pastoralist weredas (p-value=0.000).And, though not statistically significant, agrarian weredas antenatal care-four coverage was also 1.1 times higher than urban weredas' SBA (p-value=0.755). Likewise, there was no statistically significant difference in antenatal care-four coverage between urban weredas and agrarian weredas.

Table 4: Analysis of variance of ANC 4+ by woreda category

Woreda Category	N	Mean	Standard Deviation
Urban	100	64.1	54.1
Pastoralist	99	52.2	37.3
Agrarian	588	69.1	27.2
	787		
		Mean Difference	**P-value**
Urban-Pastoralist		11.9	0.2
Urban - Agrarian		-4.9	0.755
Agrarian-Pastoralist		16.8	0.000

BIRTHS ATTENDED BY SKILLED BIRTH ATTENDANT

Nationally, 72 percent of the estimated pregnant mothers receiveddelivery assistance from skilled health personnel during EFY 2008. And the proportion of deliveries assisted by skilled health personnel varied by region. The lowest skilled birth attendant coverage (24.6%) was observed in Somali region where as the highest skilled birth attendant coverage (100%) was recorded in Harari and Addis Ababa.

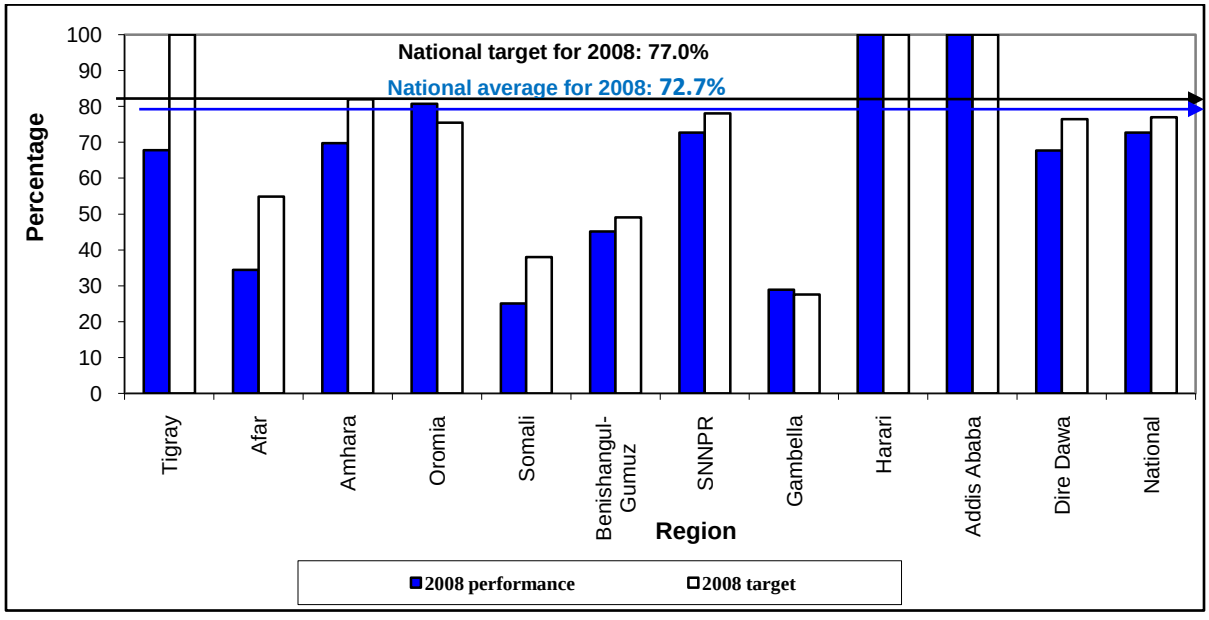


Figure 26: skilled birth delivery service coverage by region (HMIS EFY 2008)

The proportion of pregnant women get delivery assistance from skilled health personnel varied among weredas within a region. The highest dispersion of weredas' SBA coverage around the regional mean was observed in Harari region, showing

presence of high disparity in skilled birth attendance use among weredas in the region. And the lowest dispersion around the regional mean observed in Benishangul-gumuz, showing low disparity in skilled birth attendace use among weredas. For Benishangul-gumuz region, the difference of median of weredas below half of regional median and median of weredas above half of regional median was higher than other special support requiring regions.

The skilled delivery service coverage varied across wereda category. Those who live in agrarian weredas were found to be more likely to get delivery assistance from skilled health personnel during EFY 2008. In this regard, agrarian weredas skilled birth attendant coverage was 1.8 times higher than pastoralist weredas (p-value=0.000).And, though not statistically significant, agrarian weredas skilled birth attendant coverage was also 1.11 times higher than urban weredas' SBA (p-value=0.464). On the other hand, urban weredas skilled birth attendant coverage was 1.6 times (p-value=0.001) than the pastoralist weredas.

Table 5: Descriptive statistics for weredas' SBA disaggregated by region

Woreda Category	N	Mean	Standard Deviation
Urban	98	54.8	46.9
Pastoralist	99	34.6	21.6
Agrarian	589	61.3	31.8
	786		
		Mean Difference	**P-value**
Urban-Pastoralist		20.1	0.001
Urban - Agrarian		-6.5	0.464
Agrarian-Pastoralist		26.6	0.000

EARLY POSTNATAL COVERAGE

Nationally, in 2008 EFY, early postnatal coverage reached 89 percent. However, regional variation was observed in postnatal care service utilization. The lowest early postnatal care coverage (33.2%) was observed in Gambella region where as the highest early postnatal care coverage (100%) was recorded in Oromia, Harari and Addis Ababa.

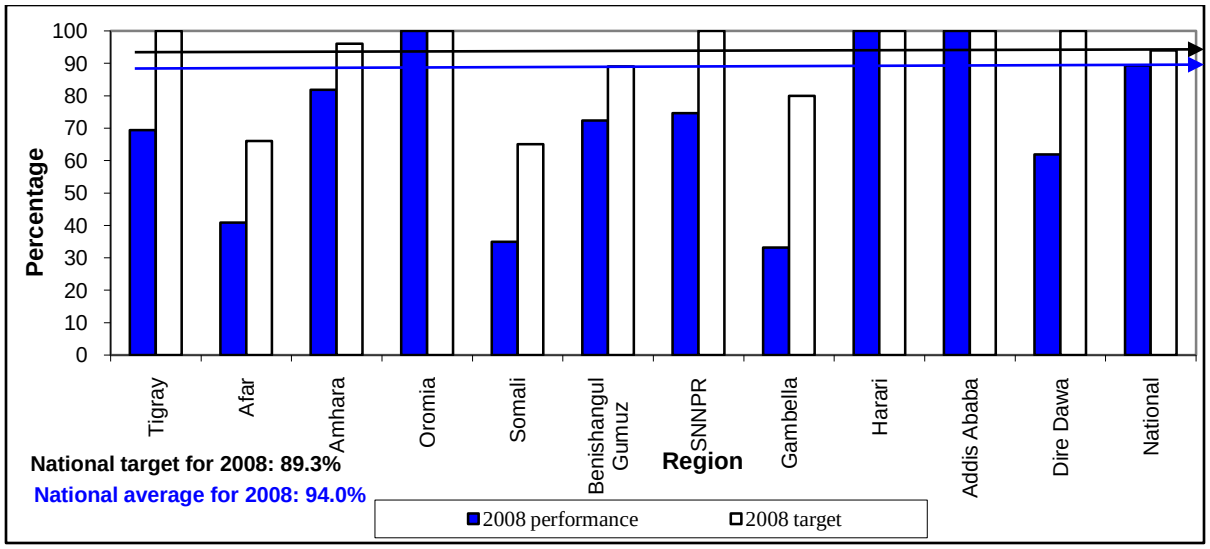


Figure 27: PNC coverage by region (HMIS EFY 2008)

The percentage of women who get early postnatal care service varies among weredas within a region. The highest dispersion of weredas' early PNC coverage around the regional mean wasobserved in Harari region and the lowest dispersion around the regional mean in Gambela. This shows presence of high disparity in early postnatal care service use among weredas in Harari region and low disparity among weredas in Gambela. Of the special support requiring regions, the highest difference between median of weredas below half of regional median and median of weredas above half of regional median was observed in Benishangul-gumuz regions.

The early postnatal care coverage varies across woreda category. Those who live in agrarian weredas were found to be more likely to get postnatal care services during2008 EFY. This analysis uncovered that agrarian weredas early postnatal care coverage was 1.5 times higher than pastoralist weredas (p-value=0.000) and was 1.3 times higher than urban weredas (p-value=0.008).On the other hand, there was no statistically significant difference in early postnatal care coverage between urban weredas and pastoralist weredas.

Table 5: Analysis of variance of early postnatal care coverage by woreda category

Woreda Category	N	Mean	Standard Deviation
Urban	99	62.9	59.7
Pastoralist	97	54.8	39.9
Agrarian	588	81.9	40.2
	784		
		Mean Difference	**P-value**
Urban-Pastoralist		8.1	0.603
Urban - Agrarian		-19.1	0.008
Agrarian-Pastoralist		27.1	0.000

3.9. CHILD HEALTH INDICATORS

EXPANDED PROGRAM OF IMMUNIZATION

Nationally, in 2008 EFY, the penta-3, measles and full immunization coverage has reached 97.6%, 94.3% and 90.9%, respectively. And the immunization coverage varies by region. The lowest penta-3 coverage (75.6%) was observed in Somali region where as the highest penta-3 coverage (100%) was recorded in Oromia, Hareri and Addis Ababa. Both measles and full immunization coverage was lowest in Gambella region and the highest coverage on both indicators was observed in Addis Ababa.

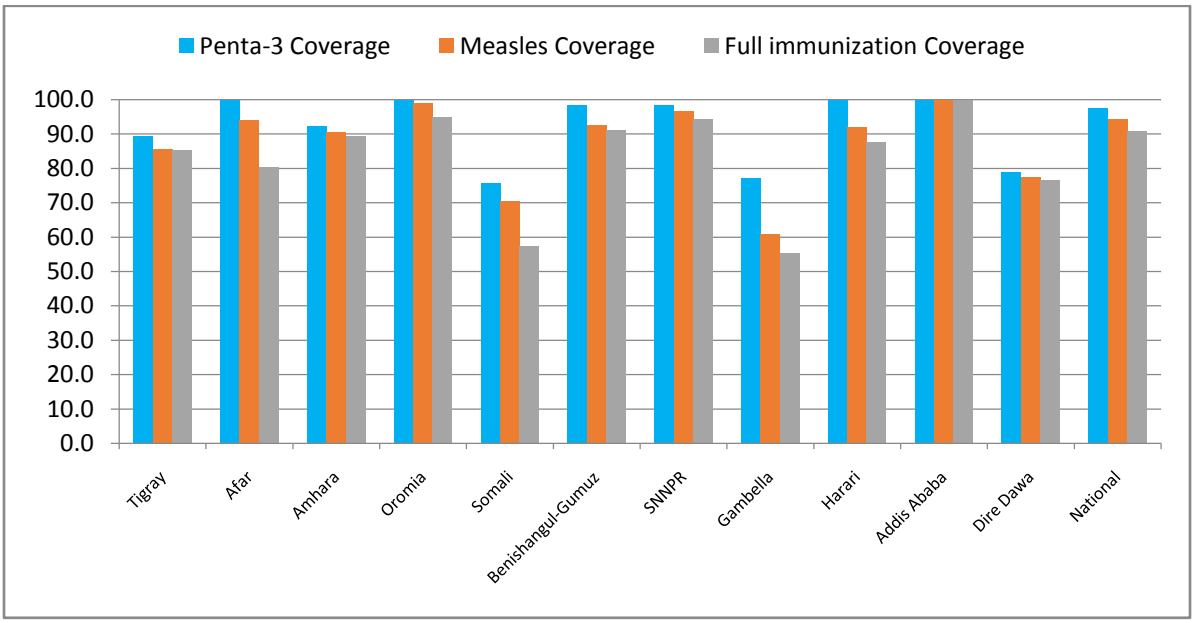


Figure 28: Immunization coverage by region (HMIS EFY 2008)

The percentage of surviving infants who received pentavalent third dose, measles and full immunization varies among weredas within a region. The highest dispersion of woredas' penta-3, measles and full immunization coverage around the regional mean wereobserved in Harari region and the lowest dispersion for all the three indicators around the regional mean were observed in SNNPR. This shows presence of high disparity in all the three EPI indicators among woredas in Harari region and low disparity among woredas in SNNPR. Of the special support requiring regions, the highest difference in penta-3 coverage between median of woredas below half of regional median and median of woredas above half of regional median was observed in Somali regions.

Table 6: Descriptive statistics of child health indicators of weredas disaggregated by region

	Penta 3 Coverage			**Measles Coverage**			**Full immunization Coverage**		
Regions	**Mean**	**SD**	**Interquartile Range**	**Mean**	**SD**	**Interquartile Range**	**Mean**	**SD**	**Interquartile Range**
Tigray	82.1	21.1	33	79.9	19.7	29.5	80	19.7	29.5
Afar	70.6	31.7	39.2	65.3	29.9	35.8	65.4	29.9	35.9
Amhara	85.5	23.1	20.4	84.5	23.5	22.8	84.5	23.6	22.8
Oromia	92.8	36.1	15.4	90.7	36.2	13.9	90.7	36.2	14
Somali	63	36.8	47.9	57.5	35.5	45.6	57.5	35.6	45.6
Benishangul-Gumuz	94.5	30.9	29.8	89.6	26.3	29.1	89.6	26.2	29.1
SNNPR	93.5	18.8	12.8	91.6	19	13.4	91.6	19	13.4
Gambella	75.8	34.7	41.6	65.3	36.1	20.7	65.3	36.1	20.7
Harari	108	75.5	64.7	95.3	74.3	61.1	95.3	74.3	61.2
Addis Ababa	123	45.5	83.1	112.9	37.1	69.3	112.8	37.1	69.3
Dire Dawa	72.6	29.9	53.4	73.6	31.5	58.8	73.6	31.5	58.8

The percentage of surviving infants that received immunization services varies across woreda category. Those who live in agrarian woredas were found to be more likely to receive all the three indicators during the 2008 EFY. This analysis uncovered that agrarian woredas penta-3 coverage was 1.5 times higher than pastoralist woredas (p-value=0.000) and was 1.3 times higher than urban woredas (p-value=0.008). Likewise, agrarian woredas measles coverage was 1.14 times higher than pastoralist woredas (p-value=0.002) and 1.12 times higher than urban woredas. On the other hand, there was no statistically significant difference in penta-three and measles coverage between urban woredas and pastoralist woredas.

Table 7: Analysis of variance of child health indicators by woreda category

	Penta-3 Coverage			Measles Coverage			Full immunization Coverage		
Woreda Category	N	Mean	Standard Deviation	N	Mean	Standard Deviation	N	Mean	Standard Deviation
Urban	99	62.9	59.7	99	78.4	60.1	99	76.7	53.4
Pastoralist	100	54.8	39.9	100	76.6	29.3	100	69.3	32.3
Agrarian	589	81.9	40.2	589	87.7	24.9	589	85.5	24.7
	788			788					
	Ratio	**Mean Difference**	**P-value**	**Ratio**	**Mean Difference**	**P-value**	**Ratio**	**Mean Difference**	**P-value**
Urban-Pastoralist		8.1	0.603		1.7	0.99		7.4	0.557
Urban - Agrarian		-19.1	0.008		-9.4	0.002		-8.7	0.305
Agrarian-Pastoralist		27.1	0.000		11.1	0.002		16.1	0

3.10. OUTPATIENT ATTENDANCE

The extent of inequality in health service utilization differs by sex between female and male differs across regions. According to HMIS data of 2016, except Somali in all regions found in pastoralist cluster, females were observed to be the disadvantaged subgroup. In these regions for every one female two additional males received health services though, equal number of health service attendants were expected. A trend of slight increment wasobserved in all regions between 2011 and 2016; highest in pastoralist regions.

3.11. HEALTH FACILITY UTILITY

Currently a total of 3,752 health facilities (health center and hospital) are functional in Ethiopia. Among them, 46% and 59% had an access to telephone and radio respectively. For every ten health facilities, at least eight of them implemented electronic HMIS.

Only 29% of the health facilities have an internet access.Overall, health facilities found in urban and agrarian regions have better access to internet as compared to regions found in pastoralist cluster; highest in Harari (50%), Dire Dawa (47%) and Tigray (20%). Gambella (3%) and

Benishangul-gumuz (5%) regions have the least access to internet services.

At least 66% of the health facilities have electricity supply. Overall health facilities found in urban and agrarian regions have better access to electricity as compared to health facilities found in pastoralist regions. For instance, for every ten health facilities found in urban and agrarian regions at least six of them have electricity access whereas at most four of health facilities in pastoralist regions have same service.

More than 3,414 health facilities have a basic sanitation while 77% of them have access to improved water supply. No-or-little variation exists in water supply in health facilities across regions as more than half of the health facilities in all regions except Afar have a water supply.

4. LIMITATIONS

The data is secondary and as such the shortcomings of outcome of such data cannot be completely ruled out from our study. Also, information on events that occur in the past may be susceptible to errors as a result of recall bias or memory lapses. For instance, in this study, information were sought from mothers on years of preceding birth interval, age at death of child, age at first birth, immunization, older mothers may not remember the exact date particularly, if the event happened a long time ago. In addition to aforementioned limitations, the authors were unable to access data for certain weredas on some indicators.

Despite these limitations, the report writing team put appropriate mechanisms in place to ensure accurate and reliable data for analysis.

In this regard, no recent DHS dataset was available during the study period. Furthermore, the authors could not find data on some indicators, if we do,it was in only one surveysuch as TB malaria, and as a result we have used data from routine HMIS. Thus, the authors cannot visualize trend on those indicators for the last consecutive years.