Inequalities in women's and girls' health opportunities and outcomes:
A report from sub-Saharan Africa

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Abbreviations

BMI	Body Mass Index
Congo DR	Democratic Republic of Congo
Congo/Congo Rep.	Congo Republic
DHS	Demographic Health Surveys
D-index	Dissimilarity Index
HEP	Health Extension Program
HEWs	Health Extension Workers
HIV	Human Immunodeficiency Virus
HOI	Human Opportunity Index
IMR	Infant Mortality Rate
IPTp	Intermittent Preventive Treatment of malaria in Pregnancy
ISGlobal	Barcelona Institute for Global Health
LMICs	Low and Middle Income Countries
MDGs	Millennium Development Goals
MMR	Maternal Mortality Ratio
PCA	Principal Component Analysis
R^2	Correlation Coefficient
RMNCAH	Reproductive, Maternal, Newborn, Child and Adolescent Health
SDGs	Sustainable Development Goals
SP	Sulfadoxine-Pyrimethamine
SSA	Sub-Saharan Africa / Sub-Saharan African
UHC	Universal Health Coverage
UN	United Nations
USAID	United States Agency for International Development
WBG	World Bank Group
WHO	World Health Organization

Executive summary

The Millennium Development Goal (MDG) 5 (to improve maternal health) was not achieved by the majority of the sub-Saharan African (SSA) countries. Women in SSA account for two thirds (201,000 deaths in 2015) of total maternal deaths globally. Despite progress for all essential maternal, newborn, and child health interventions between 1990-2015 in SSA, substantial disparity remains in coverage levels of interventions among and within countries. As a result, the most vulnerable women are not accessing essential health care services and undergo their pregnancies and childbirths outside the health system. The Sustainable Development Goals (SDGs) offer a new opportunity to address these inequalities. New tools and knowledge are needed to put equity at the heart of all strategies, a pre-requisite to achieve the common set of goals and targets set out by the SDGs, such as the reduction of the maternal mortality ratio (MMR) to less than 70 deaths per 100,000 live births by 2030.

The report uses the most recent data available to analyse 15 opportunities for women of reproductive age (15-49), including two subgroups: pregnant women and older adolescent girls (15-19), within and across 29 SSA countries. The introduction of new metrics, such as the Human Opportunity Index (HOI), a composite indicator that determines how many opportunities are available (the coverage rate), and how equitably those opportunities are distributed across circumstance groups (sets of individuals with the same characteristics), allows new understanding of the constraints and opportunities to achieving equity in perinatal and reproductive health. The HOI allows simultaneous consideration of different health determinants to assess the magnitude and sources of inequality for different indicators and, thus identify which circumstances are generating the highest inequalities both at a country level and across the SSA region.

Results reveal that overall reproductive and maternal health opportunities for women and girls are scarce – half of women and girls are not receiving the most essential interventions, and these are unequally distributed both at country level and across countries. Importantly, the most unevenly distributed opportunities were "maternity care package", "delivery attended by skilled personnel" and "school attendance" while "not having anaemia" and "exclusive breastfeeding" are more equally available. Generally, wealth and related circumstances such as education and area of residence are the main sources of inequality for women of reproductive age. For the adolescent subgroup early marriage appears to be the main contributor to poor maternal and reproductive health opportunities.

In the SSA context of low coverage and high inequalities, universal health coverage (UHC) strategies are the core mechanism to ensure effective and equitable provision of essential health care and reach "every woman, everywhere". As governments and other members of the Reproductive, Maternal, Newborn, Child and Adolescent Health (RM-NCAH) community mobilise efforts for the SDG period, the descriptions of inequality of opportunity in this report may be relevant for setting broad strategic priorities in public health policy, including those outside the health sector, and for identifying opportunities, the largest inequality gaps and the most underserved groups.

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Chapter 1.
Introduction

1.1
Context setting

Sub-Saharan Africa (SSA) is home to more than 500 million women who account for about half of the continent's population and 14 percent of the female population worldwide[1]. About 47 percent of them are of reproductive age, defined as between 15 and 49 years. Despite the significant advancements that have been made on many of the Millennium Development Goals (MDGs) targets during the 1990-2015 period, a high proportion of SSA women face a wide range of problems and constraints in their daily lives, originating from their lower status than men in all spheres of life – i.e. family, community, labour market, religion or politics. This pervasive gender inequality in the region results in women being more likely to live in poverty and suffer ill health throughout their life cycles. As a consequence, African women carry an excessive share of the global burden of disease and death, particularly as it relates to maternal and reproductive health[2].

Despite progress during the MDGs period, in 2015, the maternal mortality ratio (MMR) in SSA was estimated at 546 maternal deaths per 100,000 live births, accounting for two-thirds (201,000) of the total maternal deaths worldwide (303,000)[3]. The fifth MDG set by the global development community in 2000 for improvement of maternal health, with the specific target of reducing MMR by 75 percent in each country between 1990 and 2015, has not been achieved by the majority of low and middle income countries (LMICs). In SSA, only four countries, Eritrea, Equatorial Guinea, Cabo Verde and Rwanda, reached the 75 percent MMR reduction, while others reduced the ratio by over 60 percent (e.g. Mozambique, Angola and Ethiopia)[4]. Despite an overall improvement in maternal survival and a 45 percent decline in MMR worldwide since 1990, SSA women continue to bear an unacceptable health burden[4]. Among the reasons for the reduction of maternal mortality in SSA are the investments made by some countries in quality maternity services accessible to the population[2]. However, as in other regions, in SSA, universal access of essential services and interventions is not a reality, and maternal health related services are not an exception[3]. As a result, millions of women are not accessing services, and undergo their pregnancies and childbirths outside the health system.

Moreover, the second target of MDG5 – universal access to contraceptive methods – remains an important challenge for women of reproductive age in SSA. Despite the fact that the proportion of women of reproductive age using contraceptives more than doubled during the MDGs period, contraceptive use is still low and insufficient[4]. In SSA, one in four married or in-union women of reproductive age who wanted to delay or avoid pregnancy were not using any contraceptive method in 2015[2]. Given current trends, the prevalence of unwanted pregnancies in SSA is predicted to further increase over the next few decades as a result of a combination of early sexual activity and low use of contraceptive methods[2].

The recently agreed development agenda, the Sustainable Development Goals (SDGs), includes new and ambitious targets for maternal and reproductive health including ending preventable maternal mortality by reducing the global MMR to less than 70 per 100,000 live births by 2030 (target 3.1 of SDG3)[4]. Achieving universal coverage of essential maternal and reproductive health interventions should be the ultimate goal for all countries in the SDG era (SDG target 3.8). However, this is challenging in the short term given the low coverage rates in most SSA countries and the inequality gaps. Notably, one of the criticisms of the MDGs has been that the targets set in terms of average outcomes might have encouraged efforts in some countries to improve indicators by focusing on easier to reach segments of the population rather than those most in need[6]. As a result, large and avoidable disparities remain in coverage of health interventions for mothers, children and adolescents both across and within countries[7,8]. Inequity, unjust and avoidable inequalities, persists in maternal and reproductive health indicators and outcomes, posing a serious threat to the achievement of the agreed SDG targets.

Box 1. Progress from MDGs to SDGs

MDGs	Baseline after MDGs	SDGs goals	Targets	By 2030
MDG4: Reduce child mortality **MDG5:** Improve maternal health	Global MMR was 216 deaths per 100,000 live births in 2015. Global under-five mortality rate was 43 deaths per 1,000 live births. The neonatal mortality rate was 19 deaths per 1,000 live births in 2015. Approximately three in four women of reproductive age who were married or in union satisfied their need for family planning by using modern contraceptive methods in 2015.	**SDG3:** Good health and well-being	3.1	Reduce the global MMR to less than 70 per 100,000 live births.
			3.2	End preventable deaths of newborns and children under five years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-five mortality to at least as low as 25 per 1,000 live births.
			3.7	Ensure universal access to sexual and reproductive health-care services, including family planning, information and education, and the integration of reproductive health into national strategies and programmes.
			3.8	Achieve universal health coverage (UHC), including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.

box continues next page

Box 1. Progress from MDGs to SDGs (continued)

MDG2: Achieve Universal Primary Education	Globally, two thirds of the adults (aged 15 and over) who were illiterate were women in 2013. One in ten girls was out of school, compared to one in 12 boys. Children from the poorest 20 percent of households are nearly four times more likely to be out of school than their richest peers. Out-of-school rates are also higher in rural areas. Completion rates for primary education in both developed and developing regions exceeded 90 percent in 2013. At the lower secondary level, the gap was at nearly 20 percentage points in 2013 (91 percent for developed regions and 72 percent for developing regions).	**SDG4:** Quality education	**4.5**	Eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations.
			4.6	Ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy.
			4.7	Ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.
MDG3: Promote gender equality and empower women	In 63 countries, the legal age of marriage is lower for women than for men. Globally, the proportion of women aged between 20 and 24 who reported that they were married before their eighteenth birthday was 26 percent in 2015. Twenty-one percent of girls and women aged between 15 and 49 experienced physical and/or sexual violence at the hands of an intimate partner in the previous 12 months.	**SDG5:** Gender equality	**5.1**	End all forms of discrimination against all women and girls everywhere.
			5.3	Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation.
			5.6	Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences.
MDG1: Eradicate extreme poverty and hunger	Between 2007 and 2012, 56 of 94 countries with data available increased the income of the poorest 40 percent of the population more rapidly than its national average	**SDG10:** Reduced inequalities	**10.2**	Empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion, economic or other status.
			10.3	Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard.

Source: United Nations. SDGs. Sustainable Development Knowledge Platform [Internet]. 2016. Available from: https://sustainabledevelopment.un.org/sdgs

Given this context, this report focuses on the analysis of maternal and reproductive health inequalities among women of reproductive age in SSA. It pays special attention to older adolescent girls – those between 15 and 19 years old –, a neglected population subgroup in terms of visibility and resources channelled to address their specific needs, calling for an in-depth examination of their health and reproductive issues (see Chapters 3 and 4).

1.2
Inequality of opportunity

Access to maternal and reproductive health services is unequally distributed among women in SSA countries, as is typically the case when coverage of a service falls far short of universal access. Scarcity by its very nature produces inequality between those who have access (and better outcomes as a result) and those who do not, which is often manifested as systematic and persistent gaps between individuals belonging to different socio-economic groups. Large gaps exist in coverage and access to quality maternal health services between the poorest and richest households, and between rural and urban areas. In SSA only 56 percent of births are attended by skilled health personnel in rural areas, compared with 87 percent in urban areas[4]. When services are scarce, typically, an individual's chances of accessing them are influenced by their circumstances, namely the economic and social attributes of the individual and the family. This in turn produces inequalities in access to services (and to outcomes linked to those services) between groups differentiated by characteristics such as geographic location, wealth status, education levels, family structure, depending on the country and the type of health service or outcome. These characteristics can be seen as the social determinants of health status, which act by influencing the physical environment (including the availability of services) and behavioural factors that matter for use of services or adoption of practices.

In most societies there is broad consensus around the notion that granting access to a basic set of goods and services to every individual, regardless of the circumstances s/he was born into, is fundamental to building a just society and fostering economic and social development. However, in most LMICs, including those in SSA, the goal of universal and equal access to basic goods and services remains distant—a person's circumstances still matter a great deal in determining his/her opportunities. Finally, a distinction between children and adults' opportunities can be made since the opportunities of an adult could be "affected" by his/her own decisions (Box 2).

Box 2. Opportunities

The World Bank Group (WBG) has published several human opportunity reports since 2009 to document unequal access to basic goods and services such as education, health services, safe water, sanitation and nutrition in different countries and regions around the world[9]. Opportunities in this context are understood as the minimum set of essential goods and services that enable individuals to realise their human potential. The concept of equality of opportunity, first formalised by the economist John Roemer in 1993 and 1998[10,11], requires that individuals' opportunities are independent of their life circumstances. These circumstances are the characteristics that an individual is born into and has no influence over such as race, religion, gender, place of birth, or the wealth and education of one's parents. Most of the previous WBG reports were focused on children's opportunities to access basic goods and services in education, health and infrastructure[12] – where individual effort and choice do not matter as these are considered irrelevant for children. Whilst most societies can agree on a set of basic goods and services that constitute a minimum level of opportunities for children, consensus around what could be considered opportunities for adults is less clear, because choices made by adults play some role in accessing basic services. Access to basic services, such as higher education or having a delivery attended by skilled personnel, is no doubt influenced by an individual's own decisions, which is an argument against considering these as "opportunities" in the strict sense. However, there is a strong argument for going beyond this strict view and considering certain types of essential services or indicators of well-being as opportunities even for adults, and particularly for women. This is because the choices made by most women in LMICs – e.g. whether they should go to a hospital to deliver a baby, access pre-natal care or use family planning methods – are affected by external factors on which they have almost no influence. These include family, economic and social status, or location – circumstances that can effectively constrain the choices available to women in making these decisions. This argument is even more salient when it comes to health indicators such as anaemia and malnutrition, which are even more likely to be influenced by constraints imposed by life circumstances. As mentioned earlier, because women are a particularly vulnerable group in many situations, it is even harder for them to exercise free choice to access opportunities that are essential for their well-being.

A major focus of this report is the extent of inequalities associated with life circumstances for SSA women in reproductive and maternal health that they have no control over. Following the rationale described above (see Box 2), opportunities here will be interpreted as a "desirable situation" for a woman in terms of her reproductive and maternal health status. Thus, opportunities will refer to both health outcomes (such as being well-nourished), and the use and knowledge of essential maternal and reproductive health services (such as antenatal care, deliveries attended by skilled personnel, and family planning). This is clearly an expansive view of opportunities as it ignores the role of personal effort or decision-making by a woman in accessing these services or adopting healthy practices

(in diet, for instance) and instead considers a lack of any of these "desirable situations" to be an absence of opportunity.

The expansive view of what qualifies as opportunities has the disadvantage of ignoring the role of individual responsibility. However, this criticism is less relevant for the purposes of this report, which focuses on quantifying how opportunities are distributed by circumstances, as opposed to finding causal explanations for these inequalities. Accordingly, the findings of this report should be interpreted as a description of the extent to which women's opportunities, in maternal and reproductive health are differentiated by life circumstances, and not as causal relationships pointing to the underlying reasons for these inequities, some of which could very well relate to individual behavioural patterns driven by intrinsic preferences and cultural norms.

Whilst other studies have analysed maternal and reproductive health inequalities in the past, showing that almost all indicators are unequally distributed among population groups – with different wealth characteristics, areas of residence or educational levels[13] –, this report aims to go one step further by considering all such health determinants simultaneously, to assess the magnitude and sources of inequality for different indicators of access to health care and health outcomes. Following the SDGs trend, and aligned with the SDG framework that advocates for strengthened stakeholder engagement and keeping pace with policy developments from an inter-sectorial perspective, we include many different factors in the same analysis to account for all possible inequalities. This is done using the Human Opportunity Index (HOI), a methodology developed by the WBG.

The HOI is a measure of the coverage rate of an opportunity, discounted by inequality in its distribution across circumstance groups – sets of individuals with the same circumstances. It summarises two elements in a composite indicator: how many opportunities are available (the coverage rate), and how equitably those opportunities are distributed. If the coverage rate is close to the HOI, the distribution of the opportunities is equitable; when the HOI is lower than the coverage rate, the gap between them suggests inequality[9]. Interestingly, this methodology allows us to disaggregate the HOI into the marginal contribution (or weight) of each circumstance to the inequality of opportunity, meaning that data become available about which circumstances generate the highest inequalities between groups of individuals.

The HOI is comparable across countries and indicators, and allows for the contributions or weights of different characteristics to be quantified. This report uses recent Demographic Health Surveys (DHS) data (year 2010 or later) to cover around 79 percent of the SSA population, allowing for comparisons across countries and analyses for the region as a whole.

A more detailed discussion of the concepts underlying the HOI can be found in Chapter 2, methodological section.

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Chapter 2.
Methodology

2.1
The Human Opportunity Index

The Human Opportunity Index (HOI) is an aggregate measure that summarises the equitable availability of services. The endowment is the percentage of a population with access to a health service or with a health outcome that is necessary to progress in life. Unlike standard indices, such as coverage rate, to capture access to a particular service, the HOI also takes into account the (in) equitable access to the service among different groups of the population. The HOI is best understood as a coverage rate discounted for inequality of access. The HOI was developed by the World Bank Group (WBG) with external researchers and first presented in 2009 (Barros et al. 2009)[1].

The simplest way to express the HOI *(H)* for a particular opportunity is to take the average coverage rate for this opportunity *($\bar{C}$)* and apply a discount *(P)* due to inequality in coverage between population groups with different circumstances:

$$H = \bar{C} - P \quad (1)$$

Alternatively, the HOI can be expressed as:

$$H = \bar{C}\left(1 - \frac{P}{\bar{C}}\right) = \bar{C}\left(1 - D\right) \quad (2)$$

Notice that from equation (2), the HOI is equal to the average coverage rate (*H* equals $\bar{C}$) if access to the opportunity is independent of the circumstances (that is *D*=0). D is usually referred to as the dissimilarity index (D-index), and can be interpreted as the share of the total number of opportunities (that is, places available in a service) that needs to be reallocated between circumstance groups to ensure equality of opportunities. *P* is the penalty that the coverage *($\bar{C}$)* suffers due to inequality and it depends on the D-index *(D)* and on the coverage *($\bar{C}$)*. For each circumstance group *k, D* can be computed as follows:

$$D = \frac{1}{2\bar{C}}\sum_{k=1}^{m} a_k \left| \bar{C} - C_k \right| \quad (3)$$

where *k* is a group with a specific set of circumstances, C_k the coverage rate of group *k*, a_k the share of group *k* in total population; and *m* the number of groups defined by circumstances.

When analysing household survey data, the procedure consists of running a logistic regression model to estimate, at an individual level, the relationship between the access to a particular opportunity (binary dependent variable) and the circumstances of an individual (independent variables), on the full sample for which the HOI measure will be constructed. The estimated coefficients of the regression are used to obtain for each individual his/her predicted probability of access to the opportunity, which is then used to estimate the D-index, the coverage rate

and the HOI[1]. Detailed information regarding construction, properties and limitations of the HOI has been described elsewhere[1].

2.2
Shapley decomposition

The Shapley decomposition is the decomposition of the D-index according to the Shapley value concept, first described by Shorrocks in 2012[2]. The Shapley decomposition estimates the relative contribution of each circumstance to the inequality index so that the contributions add up to the value of the D-index, when it is computed with all the available circumstances in the data[3].

The D-index can change according to the set of circumstances used to define groups. In particular, it can only increase or remain constant when more circumstances are added to any existing set of circumstances. This in turn implies that the measured D-index is always a lower limit of the actual inequality that would be estimated if one were to use the set of all relevant circumstance variables. This property also allows defining the contribution of each circumstance to inequality as the increase in D-index due to the addition of a circumstance, or the marginal value added by a "new" circumstance to the D-index. Circumstances that add higher marginal value (in terms of the Shapley values) to the D-index are interpreted as "contributing" a larger share of the inequality between groups[3]. Detailed information regarding construction, properties and limitations of the Shapley decomposition and Shapley value has been described elsewhere[1,4].

2.3
Study population

The study population is comprised of women of reproductive age, between 15 and 49 years old. Three subgroups of this population are used to analyse certain indicators (Table 2.2) that are only relevant for a specific subgroup, taking into account the data available from the data sources (i.e. the Demographic Health Surveys (DHS)):

- Older adolescent girls between 15 and 19 years old, for whom the indicators of interest are those related to reproductive health and educational attainment.

- Women who had children in the last few years (five or two years, depending on the indicator) before the interview, for whom indicators related to pregnancy and infants' health are analysed.

- Women who had a child within six months of the survey, used for the analysis of exclusive breastfeeding.

The analysis of "met need for family planning" is done for two non-overlapping subgroups: older adolescents (15 to 19 years) and women of reproductive age (20 to 49 years)[I]. Importantly, while it would have been relevant to analyse some of the indicators among younger adolescent girls between 10 and 14 years old, there is no data source. In fact, almost all studies on reproductive health among younger adolescent girls are conducted using data from retrospective questions addressed to adult women and older adolescent girls. The lack of information among this particular age group is one of the existing knowledge gaps for which it is necessary to generate reliable and timely data. Breaking the data gap to break the gender gap is highlighted in the new agenda of the Sustainable Development Goals (SDGs) era.

2.4
Data sources and country inclusion criteria

Table 2.1 List of countries and DHS surveys

	Country	Survey year	African UN region		Country	Survey year	African UN region
1	Benin	2011-2012	Western	16	Malawi	2010	Eastern
2	Burkina Faso	2010	Western	17	Mali	2012-2013	Western
3	Burundi	2010	Eastern	18	Mozambique	2011	Eastern
4	Cameroon	2011	Central	19	Namibia	2013	Southern
5	Comoros	2012	Eastern	20	Niger	2012	Western
6	Congo Rep.	2011-2012	Central	21	Nigeria	2013	Western
7	Congo DR	2013-2014	Central	22	Rwanda	2014-2015	Eastern
8	Côte d'Ivoire	2011-2012	Western	23	Senegal	2014	Western
9	Ethiopia	2011	Eastern	24	Sierra Leone	2013	Western
10	Gabon	2012	Central	25	Tanzania	2010	Eastern
11	The Gambia	2013	Western	26	Togo	2013-2014	Western
12	Ghana	2014	Western	27	Uganda	2011	Eastern
13	Guinea	2012	Western	28	Zambia	2013-2014	Eastern
14	Kenya	2014	Eastern	29	Zimbabwe	2010-2011	Eastern
15	Liberia	2013	Western				

Note: Congo DR = Congo Democratic Republic, Congo Rep. = Congo Republic, UN = United Nations. Research undertaken in March 2016.

[I]For more information, see baseline populations in Table 2.2.

The data source for this study is the DHS financed by United States Agency for International Development (USAID)[5]. The DHS are community level, household surveys carried out in developing countries, including 33 sub-Saharan African (SSA) countries. They contain hundreds of questions related to household characteristics and household members, women of reproductive age and their children and men of reproductive age. The questionnaires administered to women of reproductive age provide useful information about maternal and reproductive health that makes the DHS the ideal data source for this report. The high degree of consistency in DHS questionnaires and sampling methodology across countries also make it particularly suitable for a multi-country study, as it allows for cross-country comparisons and/or aggregations of results.

The countries included in the analysis were those having at least one available standard and complete DHS conducted between 2010 and 2015. The most recent dataset of each country was selected for the study (see Table 2.1 and Figure 2.1).

Figure 2.1 Map of the countries included in the analysis
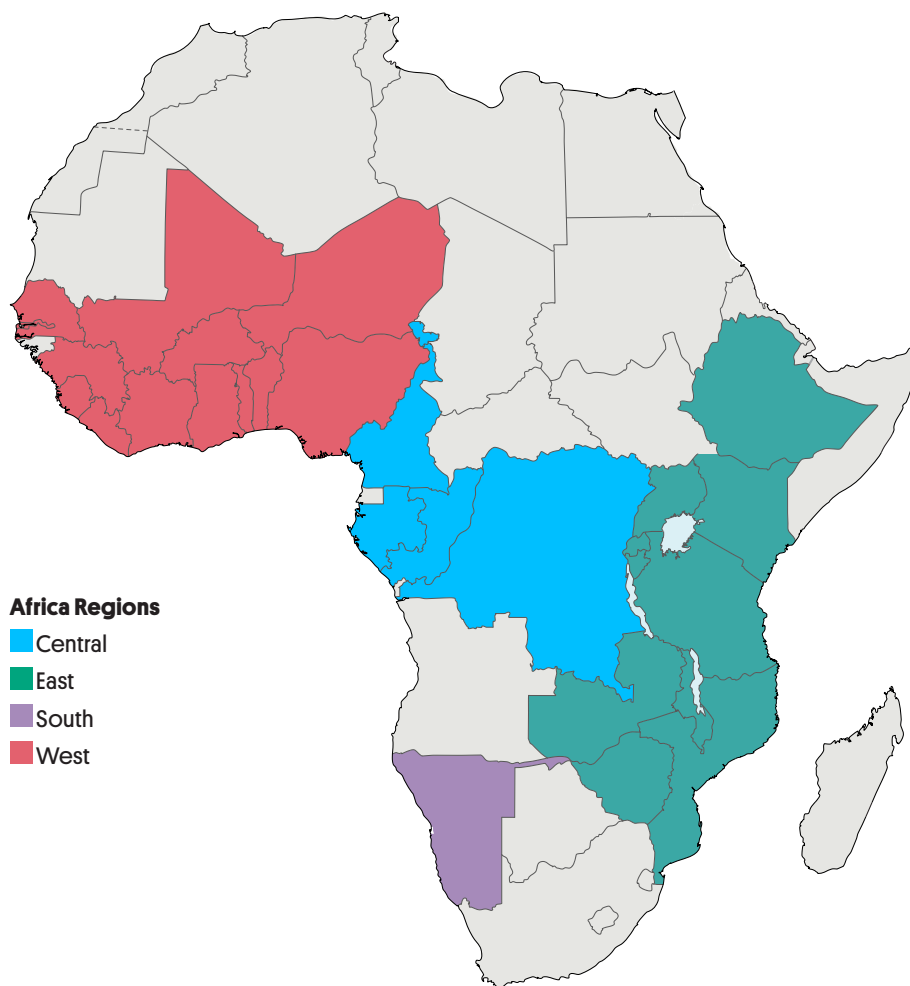
2.5
Selecting and defining opportunities

This report focuses on the study of health opportunities for women of reproductive age. The final selected indicators include health outcomes and the use or knowledge of certain health services (Table 2.2). Although most of these indicators can be influenced by individuals' decisions, following the reasoning previously explained, in this report they will be treated as health opportunities for women.

Health is only one dimension of women's needs, but it becomes particularly salient during their reproductive age due to the elevated risk of death that they face[6] (see also Chapter 1). The opportunities selected for this study can be interpreted as a necessary and minimum set of conditions to be met for a woman during her reproductive years from the perspective of her own and her children's well-being. These include a number of variables measuring access to specific health services, as well as two "outcome" variables related to anaemia and adequate body mass index (BMI) that represent key aspects of maternal health associated with lower risks of mortality. For the specific study of older adolescents, education has also been selected as an opportunity because it is linked to adolescents' reproductive health, early marriages and high-risk pregnancies[7,8]. Table 2.2 provides the list of the opportunities and the baseline population analysed in each case.

Table 2.2 List of opportunities and baseline population for whom they have been analysed

Opportunity	Description
Not having anaemia	Women without anaemia **Baseline population**: all women of reproductive age (15-49)
Having the recommended BMI	Women with a BMI between 18.5 and 24.99 **Baseline population**: all women of reproductive age (15-49)
Met need for family planning	Women currently using contraceptive methods **Baseline population**: women of reproductive age (20-49) or older adolescent girls (15-19) with a need for family planning
Knowledge of a place where to get an HIV test	Women who know where to get an HIV test **Baseline population**: all women of reproductive age (15-49)
Four antenatal care visits attended by skilled personnel	Women who received at least four antenatal care visits attended by skilled personnel **Baseline population**: all women with newborns in the five years preceding the interview date
Delivery attended by a skilled attendant	Women who had a delivery attended by a doctor, nurse, midwife or auxiliary midwife **Baseline population**: all women with newborns in the five years preceding the interview date
Mother's checkup after delivery	Women who had a checkup after delivery **Baseline population**: all women with newborns in the two/five years preceding the interview date

table continues next page

Table 2.2 List of opportunities and baseline population for whom they have been analysed (continued)

Maternity care package	Women who attended at least four antenatal care visits, had a delivery attended by skilled personnel AND had a checkup after delivery **Baseline population:** all women with newborns in the five years preceding the interview date
Malaria prophylaxis during pregnancy	Women who took at least one dose of IPTp (SP) **Baseline population:** all women with newborns in the five years prior to interview and received at least one antenatal care visit
Being offered an HIV test during antenatal care	Women who were offered an HIV test during antenatal care visits **Base population:** all women with newborns in the two years prior to interview and received at least one antenatal care visit
Infant checkup within two months after delivery	Women whose last child had a checkup within two months after delivery **Base population:** all women with newborns in the two/five years prior to the interview date and the child survived
Six months of exclusive breastfeeding	Women who are breastfeeding and are not giving the children any other type of food or beverage **Base population:** all women with newborns in the six months prior to the interview date and the child survived
Having never been pregnant	Women who have never had a child, a stillbirth or an abortion, and are not currently pregnant **Base population:** Older adolescent girls (15-19)
Currently attending school	Women who are currently attending school (or university) **Base population:** Older adolescent girls (15-19)

Note: HIV = Human Immunodeficiency Virus, IPTp = Intermittent Preventive Treatment of malaria in Pregnancy, SP = Sulfadoxine-Pyrimethamine.

Notably, seven of the 13 opportunities are related to the health indicators listed in the recommendations of the World Health Organization (WHO) Commission on Information and Accountability for Women's and Children's Health. "Met need for family planning", "antenatal care coverage with at least four visits during pregnancy", "deliveries attended by skilled personnel", "postnatal care visits" for mothers and newborns after delivery, and "six months of exclusive breastfeeding" are some of the reproductive and maternal health indicators used by the WHO to monitor progress on maternal and child health, and are used by other organisations and ongoing initiatives as well[9,10]. While "postnatal checkups" for mothers and newborns indicators are recommended within hours after delivery, this report will use a different time period for each indicator – two months for infant checkups and undetermined for mothers – because of the number of missing values for the recommended indicators in some of the datasets.

The definition of all opportunities is the same across countries to allow comparisons. In general, DHS interviewers ask questions to all women who meet the criteria for a given question. In a few cases only, the baseline population is not the same because of the country-specific characteristics of the surveys[II].

[II]For example, all women who had a childbirth in the last five years answered questions regarding pregnancy, but for some countries and indicators, DHS program selected women who had their child during the last two years before the survey instead of five years, or randomly asked certain questions to a half or a third of the sample.

The composite HOI – an essential maternity care package

A "composite HOI" that reflects access to multiple services for pregnant women has been defined, recognizing that none of these services are substitutes for each other, and underscoring that having access to all of them is critical for maternal health. Since the three key stages of pregnancy are the gestation months, the childbirth and the postpartum period, the three opportunities related to these stages constitute an essential maternity care package. For this analysis, "opportunity" refers to a woman attending at least four antenatal care visits, having a delivery attended by skilled personnel, and having a checkup after delivery. The calculation of the HOI then follows the methodology described earlier. The interpretation of this composite HOI is intuitive: it reflects the extent to which women who had a newborn were covered by an essential maternity care package. The package that has been considered is not the ideal, because a woman's checkup should be within hours after delivery, but it can be interpreted as meeting a minimum standard.

2.6
Defining a set of circumstances

Circumstances can be defined as the exogenous characteristics of women that, in absence of inequalities, should not be associated with having access to a service or having a particular health outcome (opportunities); contrarily, circumstances and opportunities are associated in the presence of inequalities. Some of the characteristics selected for this analysis such as education level, occupation and marital status can present the problem that they may be influenced by individual behaviour rather than being circumstances that are pre-determined at birth. For the purpose of this analysis, we favour this inclusive definition over a strict interpretation of circumstances for two main reasons. First, we are interested in seeing how access to opportunities varies by characteristics that differentiate groups of women – which is more important for policymaking purposes than finding differences in access by birth circumstances only. Second, characteristics like occupation and education are key contributors to the socio-economic situation of a woman of reproductive age, are extremely difficult to change and therefore exogenous for most practical purposes to a woman (or adolescent girl) at that point of time. Therefore, in assessing inequalities across groups, it seems important to take these characteristics into account, even though they do not conform to the standard definition of circumstances. In the rest of this report, these characteristics will be often referred to as circumstances to be consistent with how inequality of opportunities is typically presented. However, they must be understood as characteristics that are essentially beyond the control of a woman of reproductive age (or an older adolescent girl), rather than as circumstances determined purely at birth.

Table 2.3 List of circumstances

	Women of reproductive age	**Pregnant women**	**Older adolescent girls**
Women's characteristics	Age	Age at delivery	-
	Marital status	Marital status	Marital status
	Number of children	Number of children	-
Household head characteristics	Sex of the household head	Sex of the household head	Sex of the household head
Socio-cultural background	Religion	Religion	Religion
	Educational level	Educational level	-
	-	-	Occupational status
Location	Area (urban/rural)	Area (urban/rural)	Area (urban/rural)
Household status	Wealth index (quintiles)	Wealth index (quintiles)	Wealth index (quintiles)

Note: The set of circumstances for Niger and Tanzania does not include religion, and the one for Mali and Senegal does not include occupational status, because these data were not available.

The circumstances that matter for women's health opportunities could be slightly different across countries, but a common set is selected to allow cross-country comparisons. The list of selected circumstances can be categorised into five groups: women's characteristics, socio-cultural background, household head characteristics, location and household status. Table 2.3 shows the complete list of circumstances. The codification of each variable (circumstance) is detailed in the Appendix A. The majority of the circumstances are used in the analysis of all women of reproductive age, but age is substituted by age at delivery for the analysis of maternity related opportunities. The reason for this change is the fact that age at delivery could condition certain aspects of maternity while age at the moment of the interview does not have any relationship with the time of pregnancy. For the analysis of adolescents' opportunities, the list varies because education is considered an opportunity, age is taken into account in the selection of the group (age 15-19) and the inclusion of the number of children does not make sense when analysing whether adolescents have ever been pregnant. In the analysis of women of reproductive age, occupation of the woman appears to be highly correlated with wealth index and thus does not contribute significantly to the D-index and the HOI. Hence, occupation has been excluded from the analysis for women of reproductive age. But in the case of adolescents, occupation has been included as a circumstance because it is less correlated with wealth and could matter for the likelihood of older adolescent girls going to school, having more children or having their family planning needs met.

Additionally, other identified circumstances relevant for women and girls' health opportunities in the SSA region and thus potentially included in the analysis are

domestic violence and migration status. With a 36.6 percent prevalence, Africa ranks among the worst affected regions for intimate partner violence, the type of violence against women for which more data are available[III]. For combined intimate partner and non-partner sexual violence among all women of 15 years or older, estimated prevalence rate is 45.6 percent[11]. Migration has a complex effect on health, and women migrants may face adverse health conditions, such as poorer pregnancy outcomes and perinatal health indicators, or higher risk of sexually transmitted diseases, including HIV, resulting from voluntary and forced migration[12]. However, these factors were not included because of lack of data related to domestic violence in a third of the countries in this study, and the inclusion of migration questions in only three of these countries[5].

As mentioned earlier, the list of circumstances selected for constructing the HOI for an opportunity matters a great deal for the measure. Given this, all results that follow in the next chapters are subject to the limitation that the HOI is estimated for a specified list of circumstances and therefore subject to change if this list changes. However, while the HOI for an opportunity is not unique and depends on the number of circumstances considered, it cannot be higher if more circumstances are added to the existing set. In other words, the measure of the HOI used in this report will represent an upper boundary to the "true" HOI that would consider all circumstance groups (and a lower limit of the true D-index). Notably, the estimates always carry an error that could cause misleading comparisons between country HOIs, being a minor limitation to the analysis[13].

Having a common set of circumstances for a given opportunity across all countries also implies that certain circumstances important for inequality in a particular country are absent from the list. This could lead to the HOI (D-index) estimated for that country to be over-(under) estimated and not reflect the "true" inequality of opportunity in a specific country. Given this potential issue, the results throughout this report should be interpreted as the upper and lower boundaries of the HOI and D-index, respectively, for an opportunity in any particular country, computed for a set of circumstances common to all countries. Country-specificity is sacrificed to enable comparability of results across countries.

Finally, it is important to take into account that all potential interactions between circumstances have been excluded from the analysis. The simplified specification is essential for the analysis to be tractable, and implies that the HOI (D-index) should be interpreted as the upper (lower) boundary of what the estimates would be if interactions were included.

[III]Based on aggregated data from: Botswana, Cameroon, Democratic Republic of Congo, Ethiopia, Kenya, Lesotho, Liberia, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia and Zimbabwe.

2.7
Data management

The country-level analyses were weighted using the sample weights available in the DHS programme datasets. These sample weights are expansion factors applied to adjust for differences in probability of selection across observations in the sample[14]. However, these country specific sample weights cannot be applied to the cross-country analysis when all study countries are pooled. An adjustment to the country specific sample weights needs to be performed to make country samples representative of women's population in each country. Thus, more weight is given to those women belonging to a more populous country than those residing in smaller ones. The recalibration of the sample weights was performed by dividing each weight in a particular survey by the sum of the original sample weights and multiplying the result by the total number of women of reproductive age in the country[15]. No other data treatment has been applied to the data analysis.

Figure 2.2 Summary of opportunities, circumstances and groups of women included in the analysis

Women of reproductive age

	Pregnant women	**Older adolescent girls**	
■ Not having anaemia ■ BMI between 18.5 and 24.99 ■ Met need for familiy planning ■ Knowledge of where to get an HIV test	■ **Four** antenatal care visits ■ Delivery attended by skilled personnel ■ Postnatal checkup ■ Maternity care package ■ Malaria prophylaxis during pregnancy ■ HIV test offered during pregnancy ■ Infant checkup after delivery ■ Six months of exclusive breastfeeding	■ Met need for family planning ■ Having never been pregnant ■ Currently attending school	**Opportunities**
■ Age ■ Marital status ■ Number of children ■ Sex of the household head ■ Religion ■ Education level ■ Area ■ Wealth index	■ Age at delivery ■ Marital status ■ Number of children ■ Sex of the household head ■ Religion ■ Educational level ■ Area ■ Wealth index	■ Marital status ■ Sex of the household head ■ Religion ■ Area ■ Wealth index ■ Occupational status	**Circumstances**

Note: Women of reproductive age = 15-49 years old, except for met need for family planning (20-49 years old). Pregnant women = newborns born two/five years or six months prior to the interview date. Older adolescents = 15-19 years old.

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Chapter 3.
What is the state of health inequalities of women of reproductive age?

3.1
HOIs by country and multi-country pooled averages

This section presents findings from the analysis of women's health opportunities in 29 sub-Saharan Africa (SSA) countries using the most recently available Demographic Health Survey (DHS) data. The results are disaggregated by three subgroups of women: women of reproductive age (15-49), pregnant women and older adolescent girls (15-19).

3.1.1
Women of reproductive age (15-49 years old)

Opportunities

- Not having anaemia
- BMI between 18.5 and 24.99
- Met need for familiy planning
- Knowledge of where to get an HIV test

Context

Estimates suggest that at present about 26 percent of women of reproductive age – 225 million women – have an unmet need for family planning worldwide[1,2]. In low and middle income countries (LMICs), the number increases to 56 percent of the female population. However, in SSA, the percentage is 40 percent because of the desired big family sizes in the region[3]. Universal access to family planning would improve maternal health and survival by decreasing maternal deaths, including those attributable to unsafe abortions (eight percent) associated with unwanted pregnancies and the reduction of human immunodeficiency virus (HIV) transmission[2].

Behavioural, socio-economic and structural factors – those related to society structure and gender roles – make women in general more vulnerable to HIV infection[4]. In SSA, women account for 58 percent of the total population living with HIV. The disease disproportionally affects young women and adolescents. Every year, there are 380,000 new HIV infections among young women (10-24 years old). Fifteen percent of women aged 15 years and older living with HIV belong to the youth group (15-24 years old), and 80 percent of them live in SSA, where women become HIV infected, on average, five to seven years earlier than men. Regarding HIV knowledge in SSA, only 26 percent of adolescent girls have comprehensive knowledge about the disease, while among boys the percentage is 36 percent[5].

Additionally, two indicators relating to general women's health outcomes were analysed for all women of reproductive age. Nutritional status is among the prin-

cipal causes of morbidity and mortality in SSA[6]. Thus, not having any type or level of anaemia was considered as an opportunity for African women. It is estimated that about 468 million women aged 15-49 years worldwide are anaemic and between 48 percent and 57 percent of them live in Africa. Anaemia is an important health indicator for women because it can be produced by multiple causes, from poor nutrition, hormonal disorders or cancer, to malaria. Anaemia is associated with fatigue, increased susceptibility to infections, anaemia in pregnancy and postpartum haemorrhage, the latter being one of the principal causes of maternal mortality[7,8]. Therefore, not being anaemic constitutes a necessary condition for the well-being of women.

The second indicator related to women's general health and nutrition analysed is body mass index (BMI), which is calculated using the height and weight of the individual (*weight/(height x height)*). The recommended BMI values for an adult are between 18.5 and 24.99, where women with values lower than 18.5 are considered underweight and those above 24.99 are considered overweight[9]. Under nutrition is a persistent problem in LMICs, where nearly two percent of women have been recently assessed to have a BMI lower than 16[10]. Malnutrition can lead to fatigue and susceptibility to infections, and malnourished women are more likely to give birth to a newborn who has low birth weight, is more susceptible to diseases, and thus, has a higher probability of dying prematurely[11].

Box 3. How to interpret the HOI
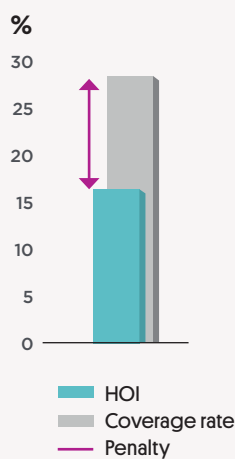
The Human Opportunity Index **(HOI)** is the difference between the coverage rate and a penalty due to inequality:

HOI = Coverage - Penalty

The **penalty** comes from the dissimilarity index (D-index, the measure of inequality, see Chapter 2), but it also depends on the coverage rate of the opportunity:

Penalty = D-index · Coverage

The gap between the grey bar and the blue bar reflects the reduction that the coverage rate suffers due to inequality (D-index), but taking into account that the penalty is also correlated with the coverage rate. Thus, when the coverage rate increases, the penalty due to inequality increases too; therefore in those opportunities where the coverage rate is high, **for the same D-indices** the penalties will be higher than for those opportunities with poor coverage rates.

Findings for reproductive health opportunities

Note: In order to avoid overlap with older adolescent girls' analysis results (15 to 19 year old), the analysis of "met need for family planning" is restricted to women between 20 and 49 years old.

▪ Results from the two opportunities for reproductive health analysed vary significantly across countries. This is especially remarkable with regard to the level of "knowledge of where to get tested for HIV", which has an almost 80 percent difference in the HOI between the best (Rwanda) and the worst performing country (Mali).

Figure 3.1 HOI for access to reproductive health

a. Met need for family planning

Coverage [%]
HOI [%]
Pooled average HOI [%]

b. Knowledge of where to get an HIV test
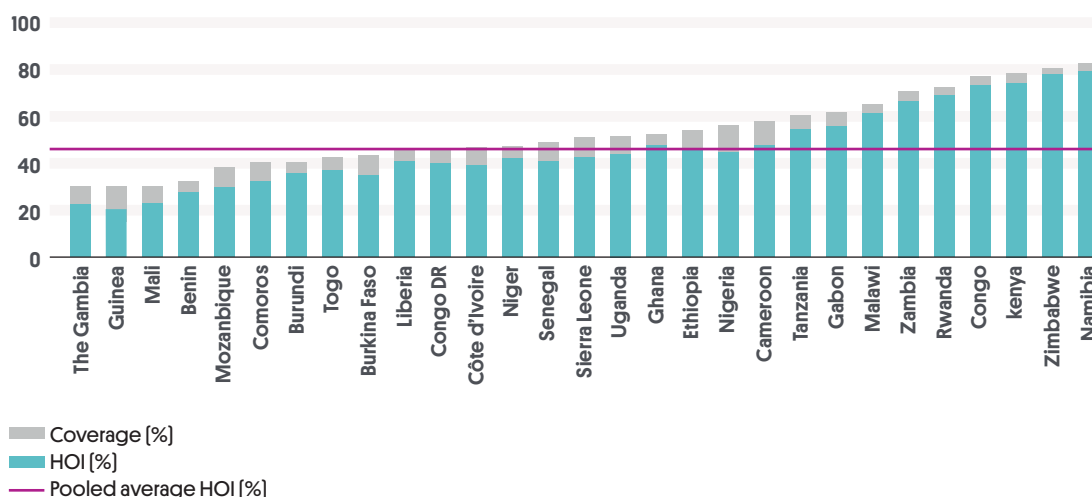
Coverage [%]
HOI [%]
Pooled average HOI [%]
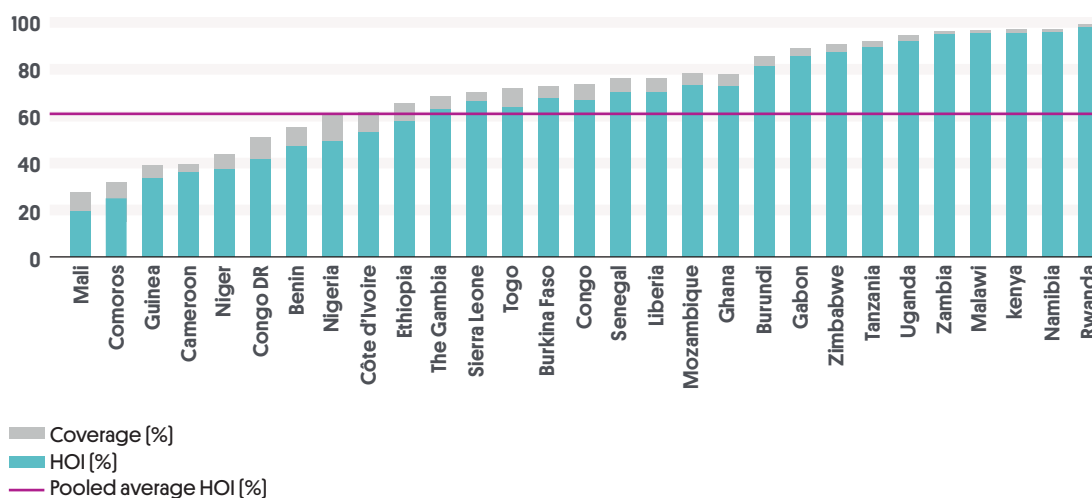
- The HOI for "met need for family planning" ranges between 20 (Guinea) and 78 (Namibia) with a multi-country pooled HOI of 46 (Figure 3.1). Notably, half of the countries rank below the average.

- The HOIs of family planning for adult women between 20 and 49 years old are on average higher than those for older adolescent girls (Figure 3.2). To compute the HOI for older adolescent girls, six circumstances were used, while the model for adult women used eight circumstances[IV]. However, this is not necessarily the source of difference. Since the D-index (and therefore, the HOI) is sensitive to the number of circumstances selected for its calculation, adding a new circumstance always increases the D-index and lowers the HOI. Therefore, should the model for adolescent girls include two additional circumstances, similar to the model for adult women, their HOI would be even lower than it currently is.

Figure 3.2 Comparison between "met need for family planning" for older adolescent girls (15-19 years) and women of reproductive age (20-49 years)

—— 45° line
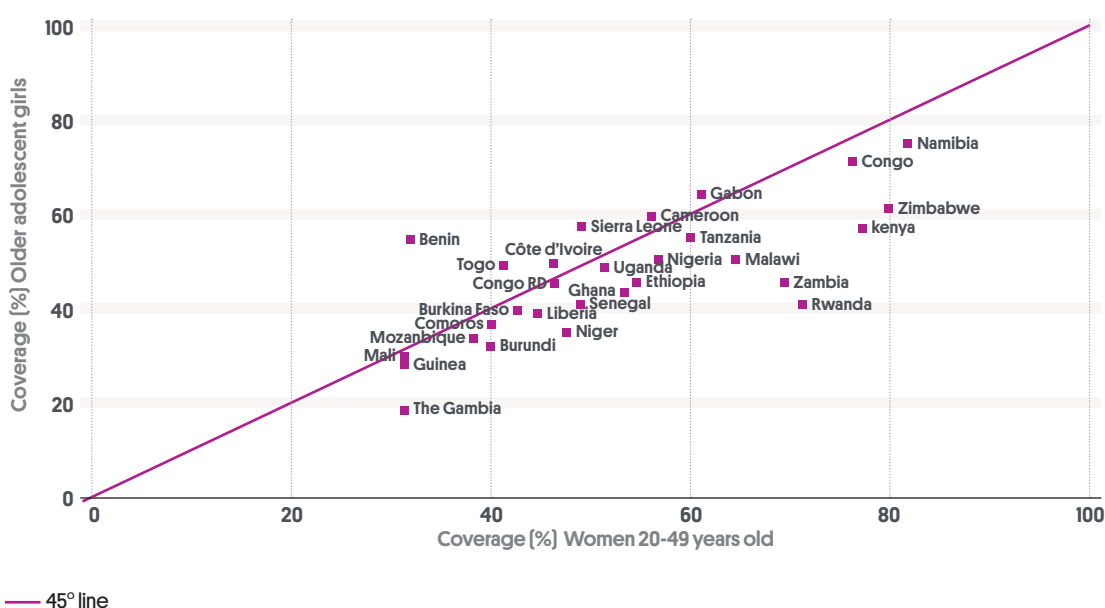
- Both the coverage rates and HOIs for "knowledge of where to get an HIV test" seem to have a gradual gradient. The HOIs for this opportunity seem to be highly correlated with HIV prevalence rates in the countries. Thus, countries with the highest HIV prevalence rates in the SSA region (i.e. Zimbabwe, Tanzania, Uganda, Zambia, Malawi, Kenya and Namibia, with the exception of Mozambique), also have the highest HOIs for the knowledge of where to get tested. Encouragingly, the inequality across women for this opportunity is low, suggesting that the policy to test for HIV status appears to be more equitable.

[IV]Older adolescent girls circumstances: wealth index, region of residence, marital status, occupational status, religion and sex of the household head.
Women between 20 and 49 years old circumstances: wealth index, region of residence, marital status, educational attainment, religion, sex of the household head, number of children and age.

Findings for women's general health

- In terms of coverage rates, overall women's health outcomes examined – measured by the HOI of "not having anaemia" and "having the recommended BMI"[v] – are poor in SSA, for both indicators, although penalties for inequalities seem to be lower than for reproductive health opportunities (Figure 3.3).

- Differences across countries are less marked than for other indicators.

- The multi-country pooled HOI for "not having anaemia" and "having the recommended BMI" is in both cases slightly more than 60. For anaemia, the values range between 37 (Gabon) and almost 81 (Ethiopia), and for BMI, between 41 (Gabon) and 74 (Burundi).

- Many women are anaemic (multi-country pooled prevalence of anaemia: 35 percent) and the rates are similar across most countries for which the data were available. Similarly, in almost every country, two out of three women have BMI within the recommended range, and there is little variation across countries. Notably, six of the 29 SSA countries selected do not have available data about anaemia levels.

- There is no correlation between levels of anaemia and BMI within countries except for Gabon, which has the lowest HOI for both, and Burundi and Rwanda, with some of the highest HOIs for both opportunities. For example, Namibia has an HOI of almost 75 for anaemia, but for the recommended BMI the HOI is less than 50, one of the lowest.

- There does not appear to be any geographical or income pattern in the distribution of anaemia and BMI. However, five out of the six countries with the highest HOI for not having anaemia are also the ones with the lowest incidences of malaria in SSA. Zimbabwe, Namibia, Burundi, Rwanda and Ethiopia have less than 17,000 new cases of malaria reported each year per 100,000 people[12].

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[v]For most countries, data on these two opportunities were collected for a randomly selected half or a third of the sample of all women interviewed in the country. However, the results generalise to the whole population of adult women.

Figure 3.3 HOI for general women's health

a. Not having anaemia

Coverage [%]
HOI [%]
Pooled average HOI [%]

b. Having the recommended BMI
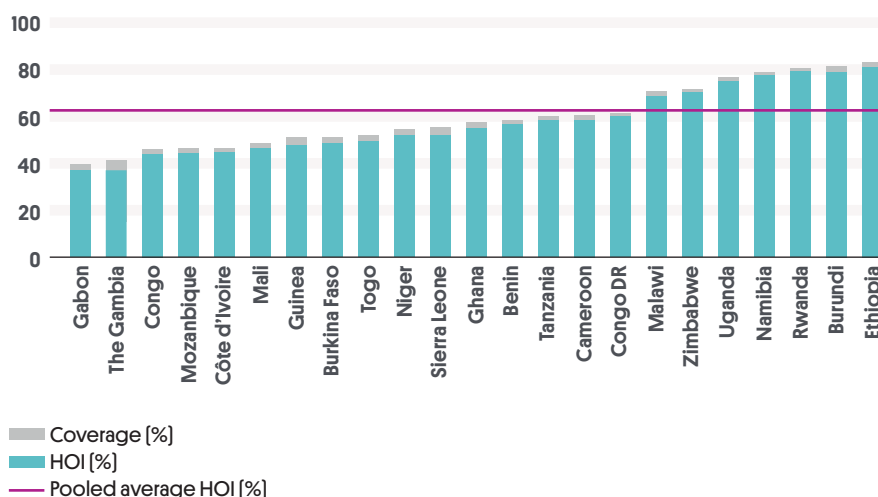
Coverage [%]
HOI [%]
Pooled average HOI [%]
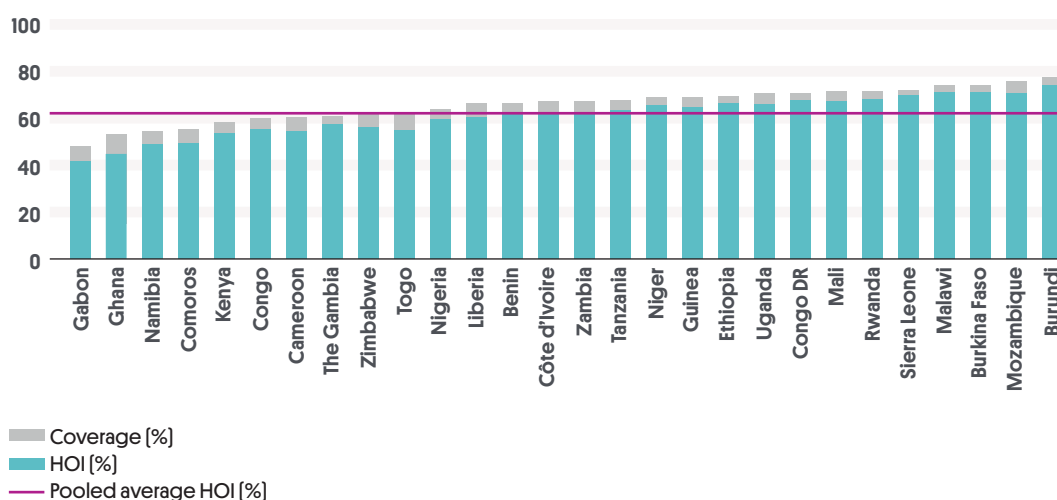
Conclusions

- Differences across countries also exist for reproductive health opportunities and outcomes.

- "Met need for family planning" shows slightly higher HOIs among women aged 20 years or older (multi-country HOI: 46 percent) than among adolescent girls (multi-country HOI: 40 percent).

- "Knowledge of a place where to be tested for HIV" follows a pattern related to HIV prevalence rate. Penalties for inequalities decrease as coverage of the opportunity increases.

- Opportunities for "not having anaemia" and "having the recommended BMI" exhibit significantly lower inequality among SSA women.

- In those countries where malaria is less prevalent, anaemia prevalence is low, which leads to a high HOI of "not having anaemia". The results could be due to the fact that malaria is one of the most important causes of anaemia in endemic areas.

- One in three women in most SSA countries does not have the recommended BMI meaning that they could be either undernourished or obese. Therefore, the countries that under perform in terms of BMI are not only those where a sizeable share of the population may be stunted, they might also have poor nutritional habits that lead to obesity.

3.1.2
Pregnant women

Opportunities

- **Four** antenatal care visits
- Delivery attended by skilled personnel
- Postnatal checkup
- Maternity care package
- Malaria prophylaxis during pregnancy
- HIV test offered during pregnancy
- Infant checkup after delivery
- Six months of exclusive breastfeeding

Context

Good quality maternity care is crucial for the survival and health of both the mother and the newborn child. However, in regions such as SSA the proportion of births attended by skilled health personnel – i.e. doctors, nurses and midwives – is still very low, 52 percent[13]. Of note, in November 2016 the World Health Organization (WHO) launched the new antenatal care guidelines where the recommended minimum number of antenatal care visits increased from four to eight[14]. However, in this report we used the indicator of four antenatal visits given the low antenatal care coverage in SSA. Since 1990, the utilization of the recommended four antenatal care visits has remained low at 47 percent to 49 percent in 2015, in SSA[13]. Thus, highlighting the need to speed the efforts to achieve the full life-saving potential of antenatal care for women and newborns.

In SSA, infectious diseases contribute to the burden of maternal and perinatal deaths[15]. HIV and malaria are known to be two relevant infectious diseases particularly during reproductive age and pregnancy. Globally, 85 percent of pregnant women living with HIV live in SSA[5]. HIV prevention and treatment during pregnancy protects against transmission of the disease to the newborn during gestation or delivery. In the 21 countries with the highest HIV rates, all in the SSA region, the number of women in need of mother-to-child transmission prevention procedures for HIV is 1.3 million. In 2013, half of women in LMICs were not tested for HIV during pregnancy, a health procedure that is essential in these settings, and therefore, they were not able to access HIV treatment and care in case of need[5].

Regarding malaria infection, in high transmissions areas, the risk of low birth weight doubles when there is placental malaria and up to five percent of the neonates can be born with congenital disease. Further, pregnant women infected with malaria more frequently show higher parasitaemia, severe anaemia, hypoglycaemia and acute pulmonary oedema[16]. In SSA, 10,000 pregnant women and 200,000 of their infants die every year due to malaria infection during pregnancy[17]. Intermittent Preventive Treatment of malaria in Pregnancy (IPTp) with sulfadoxine-pyrimethamine (SP) is considered one of the most cost-effective interventions to prevent these deaths[18]. Since 2014, the WHO has recommended the intake of three doses of SP as IPTp for all women living in moderate to high transmission areas, at each scheduled antenatal care visit, starting in the second trimester of gestation[19]. It is estimated that in the African countries that adopted this policy, 52 percent of pregnant women received at least one dose of SP in 2014, 40 percent received two or more doses and only 17 percent received three or more doses[20].

Neonatal care, strictly speaking, is not an opportunity specific to women. However, neonatal health is inextricably linked to maternal health, and therefore it is worth including this component in the analysis. Newborn health was not specifically addressed in the Millennium Development Goal (MDG) framework. Over that period, progress in the rate of child survival among children aged one to 59 months outpaced advances in reducing neonatal mortality; as a result, neonatal deaths now represent a larger share (45 percent) of all under-five deaths globally, resulting in 2.7 million deaths each year[21]. More than 80 percent of all newborn deaths result from three preventable and treatable conditions – complications due to prematurity, intrapartum-related deaths (including birth asphyxia) and neonatal infections. Cost-effective, proven interventions exist to prevent and treat each main cause. Improving effective coverage of care around the time of birth – the most risky period for mothers and their newborns – requires educated and equipped health workers, and availability of essential commodities[22]. The WHO recommends that women who have delivered in a health facility should receive postnatal care for at least 24 hours after birth. If a birth is at home, the first postnatal contact should be as early as possible within 24 hours of birth[23]. Postnatal care offers an opportunity to provide a number of interventions including counselling on exclusive breastfeeding, birth spacing and contraceptive methods, and

educating women on the benefits to their own and their newborn's health of doing so. The WHO recommends three additional postnatal care contacts on day three, between days seven and 14 after birth and six weeks after birth. Newborn health has been given more prominence in the Sustainable Development Goals (SDGs) targets (target 3.2: by 2030, end preventable deaths of newborns and children under five years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-five mortality to at least as low as 25 per 1,000 live births)[24]. In 2015, the global neonatal mortality rate, that is, the likelihood of dying in the first 28 days of life, was 19 deaths per 1,000 live births[13].

Findings for maternity care

In this section, the availability of each intervention was assessed individually, first "four antenatal care visits", "delivery attended by skilled personnel" and "postnatal women's checkup", after which the joint availability of the minimum maternity care package, which is labelled as the "Composite HOI", is examined. Results show that:

- Maternity care has generally low coverage and is unequally distributed in SSA. On average, for each one of the three individual opportunities, only 35 to 40 percent of women in the SSA region can claim to have access.

- As has been the pattern for most of the opportunities examined thus far, there is substantial country heterogeneity: coverage ranges between 80 to below 20 percent for the three opportunities.

- These opportunities also vary widely within countries, without any clear trend, reflecting that performing better in one of the opportunities does not mean that the performance is also good in the others. For example, "delivery attended by skilled personnel" and "four antenatal care visits" score very low in Burkina Faso (HOIs: 18 percent and nine percent, respectively), but the country performs very well on "postnatal checkups" (HOI: 81 percent).

- The HOI of "delivery attended by skilled personnel" for women that delivered at home is much lower than for those delivering in a health facility, when the sample is split by location of delivery (Figure 3.5). The highest HOI of "delivery attended by skilled personnel" for deliveries at home is 23 (Comoros), and in some countries it is virtually zero, which suggests that few women receive services from trained health personnel when delivery takes place at home. By contrast, for women who gave birth in a health facility, three quarters of the countries have a HOI of "delivery attended by skilled personnel" higher than 90.

Figure 3.4 HOI for maternity care

a. Four antenatal care visits

Legend:
- Coverage [%]
- HOI [%]
- Pooled average HOI [%]

b. Delivery attended by skilled personnel

Legend:
- Coverage [%]
- HOI [%]
- Pooled average HOI [%]
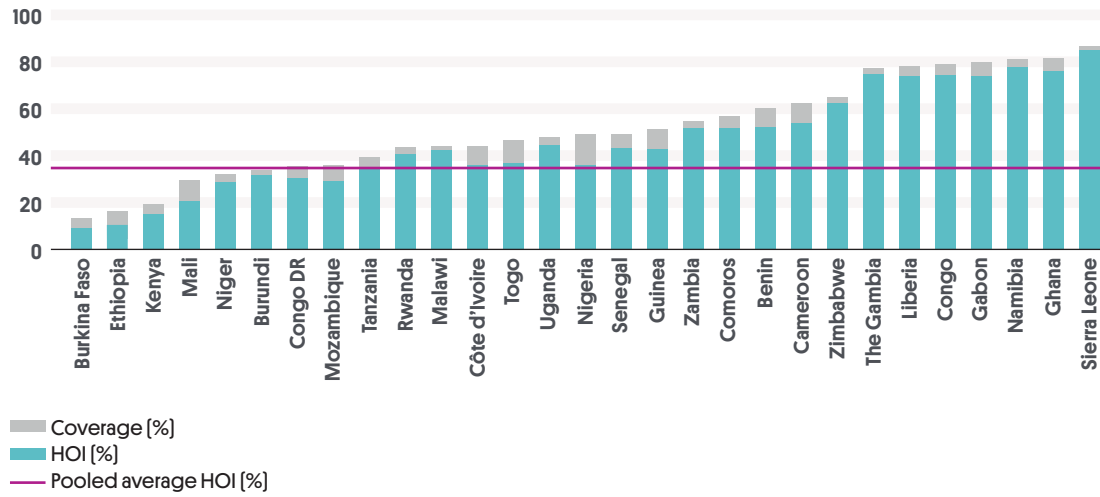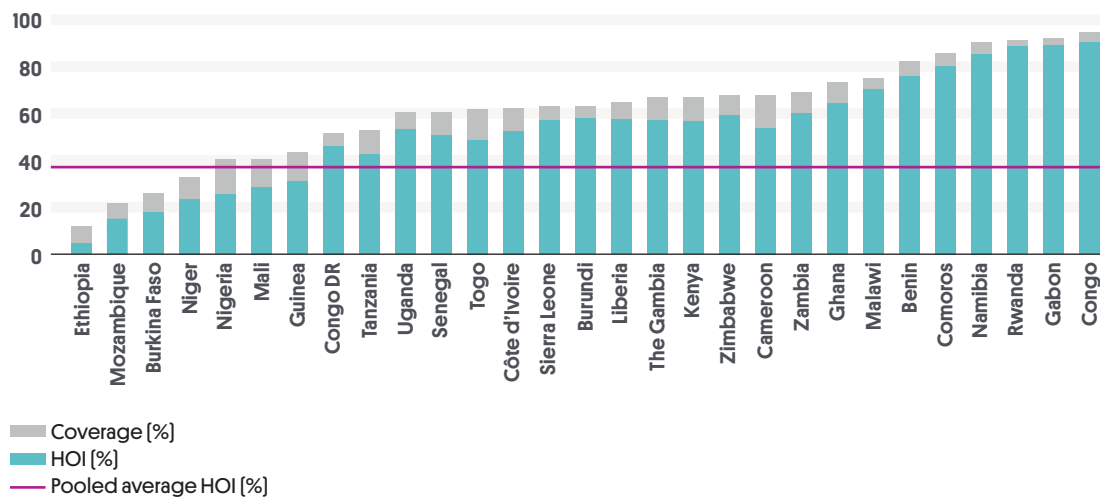
figure continues next page

Figure 3.4 HOI for maternity care (continued)

c. Postnatal checkup

- Coverage (%)
- HOI (%)
- Pooled average HOI (%)
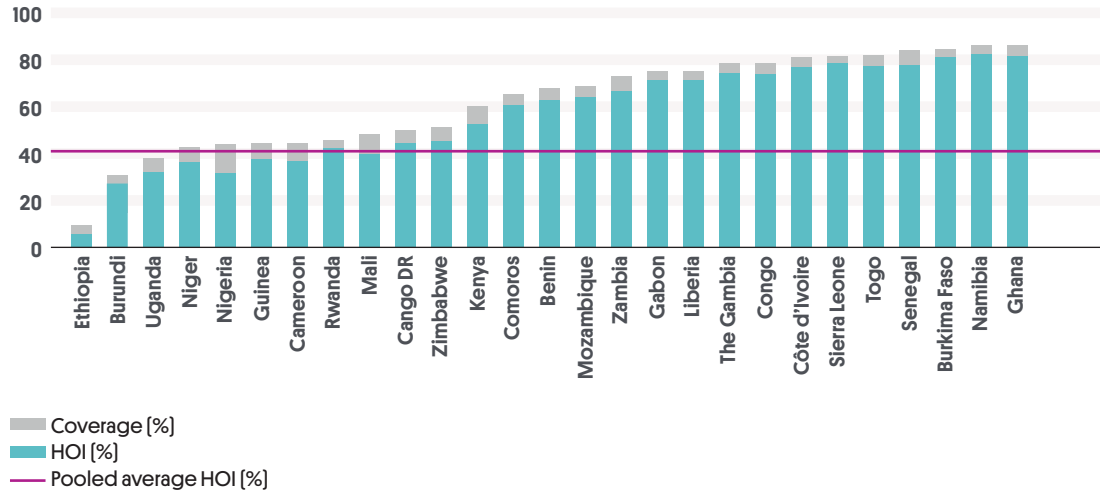
Figure 3.5 HOI for "delivery attended by skilled personnel" by place of delivery

- Delivery in a health facility
- Delivery at home
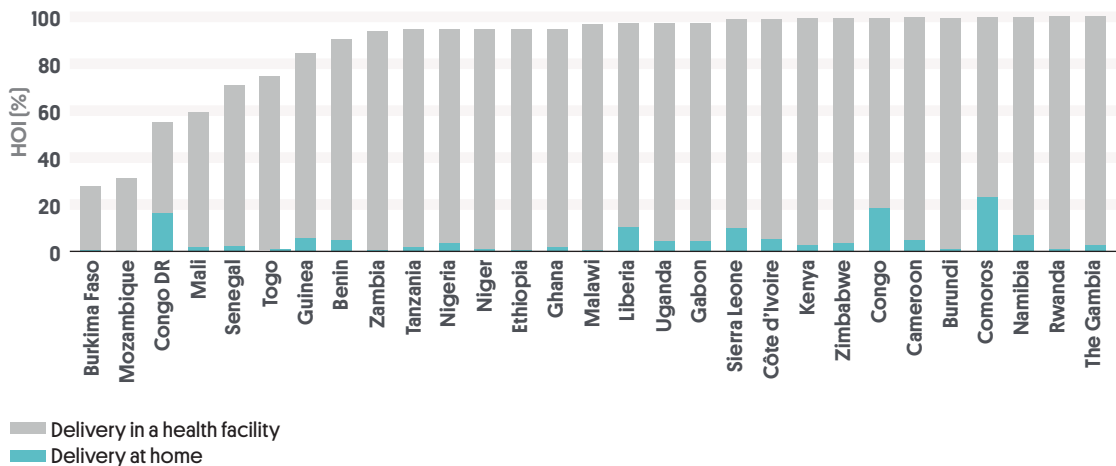
Findings for the minimum maternity care package (Composite HOI)

This section revisits the opportunities for perinatal care, but unlike the previous section, which looked at individual opportunities, it assesses how SSA countries perform when the opportunity of interest is a minimum package of essential maternity care ("four antenatal care visits", "delivery attended by skilled personnel" and "postnatal checkup" regardless of time since delivery). Although the package does not include all services that women need, for example, checkup for women within hours after delivery is not included given data unavailability, it largely covers extent of the basic interventions necessary to avoid high risk situations for mothers.

- In general coverage is very low, as the multi-country pooled composite HOI (16) reveals. Despite this low average, ten countries have values below this value, meaning that the availability of the package of services is almost inexistent in one out of three countries. In all countries, there is substantial inequality of access to the package of services (Figure 3.6).

Figure 3.6 Composite HOI for maternal care

Coverage [%]
HOI [%]
Pooled average HOI [%]
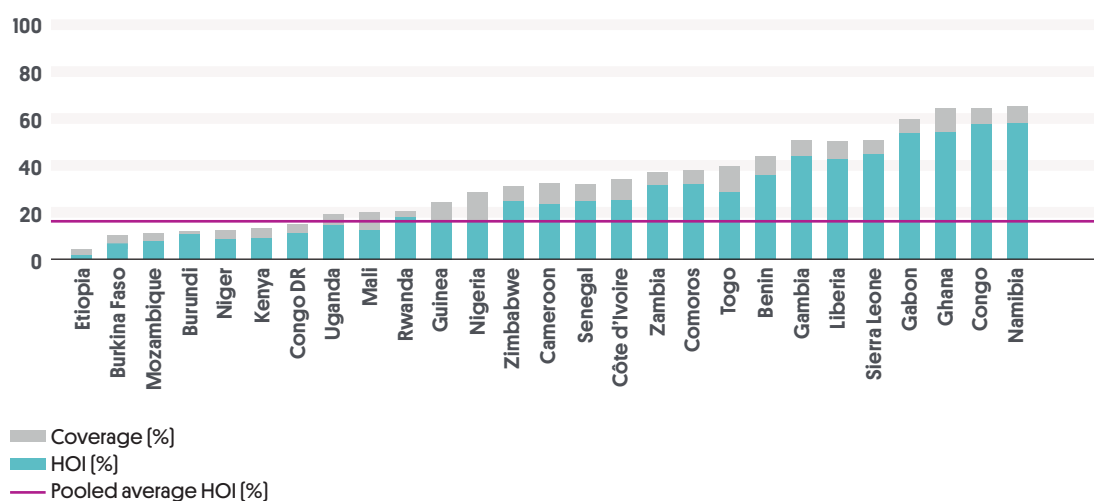
- Differences across countries are large, ranging from moderate to no provision of the package (Ethiopia has a HOI near 0) to a HOI around 60 (Namibia).

- To further assess whether this essential maternal care package could have an impact on maternal and infant health, infant mortality rate (IMR)[VI] and maternal mortality ratio (MMR)[VII] have been correlated using the D-index of the composite HOI for each country and survey year (Figure 3.7). The correlations show how different infant or maternal mortality are between countries, depending on differences in inequality of opportunity. The higher the infant (or maternal) mortality is, the higher the inequality of access to the essential maternity care package (D-index) is in the country.

- The correlations appear to be significantly strong, especially in the case of IMR, suggesting that countries with higher inequality of the maternity care package also tend to have higher IMR and MMR. Ethiopia and Sierra Leone are outlier countries that make the correlation weaker. In both cases, the special situation of the countries regarding their health systems could explain these results (Box 4).

[VI]Infant mortality rate is the number of infants dying before reaching one year of age, per 1,000 live births in a given year.

[VII]Maternal mortality ratio is the number of women who die from pregnancy-related causes while pregnant or within 42 days of pregnancy termination per 100,000 live births.

Box 4. Country cases: Ethiopia and Sierra Leone

Ethiopia: The Ethiopian government launched the Health Extension Plan (HEP) in order to provide basic health prevention services and treatment to rural communities. The HEP was operative between 2004 and 2005 when the first Health Extension Workers (HEWs) graduated[25,26]. HEWs are trained during a year and then, they spread the adequate health messages to their communities to engage people in good health and hygiene practices. The indicators analysed regarding pregnancy are always constructed for antenatal care visits and deliveries attended by skilled personnel, thus all individuals attended by HEWs are counted as a "not skilled attended" case. Consequently, Ethiopia stands always at the bottom of the graphs with the lowest HOI for maternity care indicators. For this same reason, it can be observed that the inequalities in the indicators for Ethiopia are the highest in the group of countries analysed. Rural communities are the ones with the most important presence of HEWs, while in cities and among the wealthier groups of women, the conventional medical system is easier to access.

Sierra Leone: Since the end of the Civil War in 2002, and despite political instability, Sierra Leone moved to process of peace and regeneration of the country. The war caused important damages in infrastructures, high death rates, migration of health personnel and the collapse of services, all of these issues that the government has worked to rebuild since then[27,28]. Despite being the country with the highest mortality rates in SSA, Sierra Leone is not among the regions with the biggest inequalities in maternal health. In fact, other studies found that, for example, concentration of nurses and midwives is similar between rural and urban areas, in contrast with other countries where the health workforce is concentrated in urban settings[29]. This fact could be caused by the general poverty situation in which the country was found after the end of the war, and the rebuilding process would have been quite similar in different regions, either rural or urban.

Finally, although it is not observed in these results, the obstacles that pregnant women face in Sierra Leone under normal circumstances – owing to access barriers and the limitations of the weakest health systems in SSA – have significantly increased since the start of the Ebola outbreak (2014-2016). The breakdown of weak public health systems triggered by the epidemic has contributed to making medical resources scarcer and services (e.g. emergency maternity care, family planning, immunisation programmes or prevention of malaria) less available or halted, which could eliminate the gains achieved by the country, resulting in much higher maternal, newborn and child mortality rates[30].

Figure 3.7 Correlations between the D-index of the maternity care package and IMR or MMR
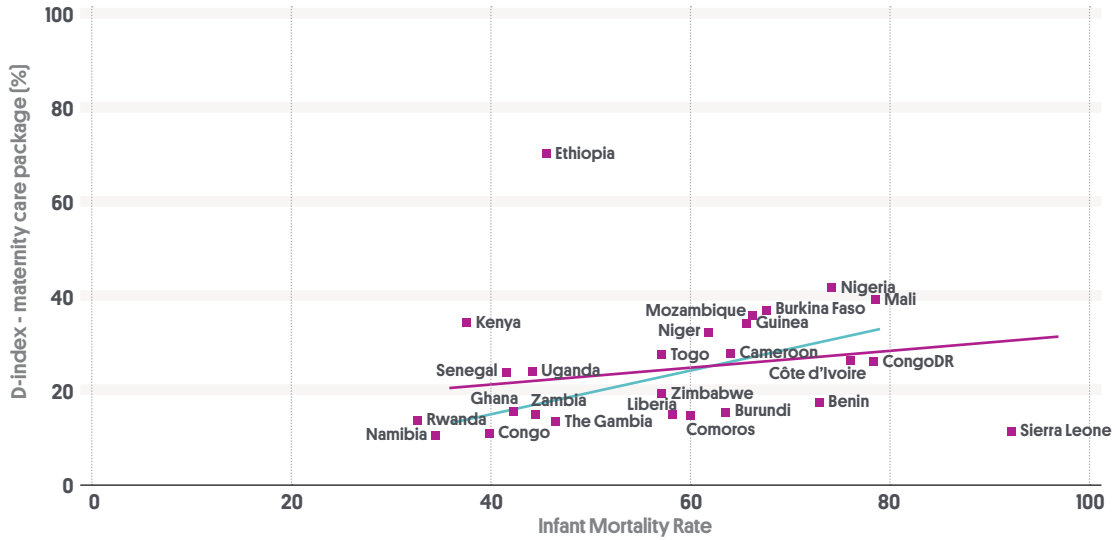
Linear prediction (all countries) — R²=0.05
Linear prediction (whithout Ethiopia and Sierra Leone) — R² (without Ethiopia and Sierra Leone)=0.37
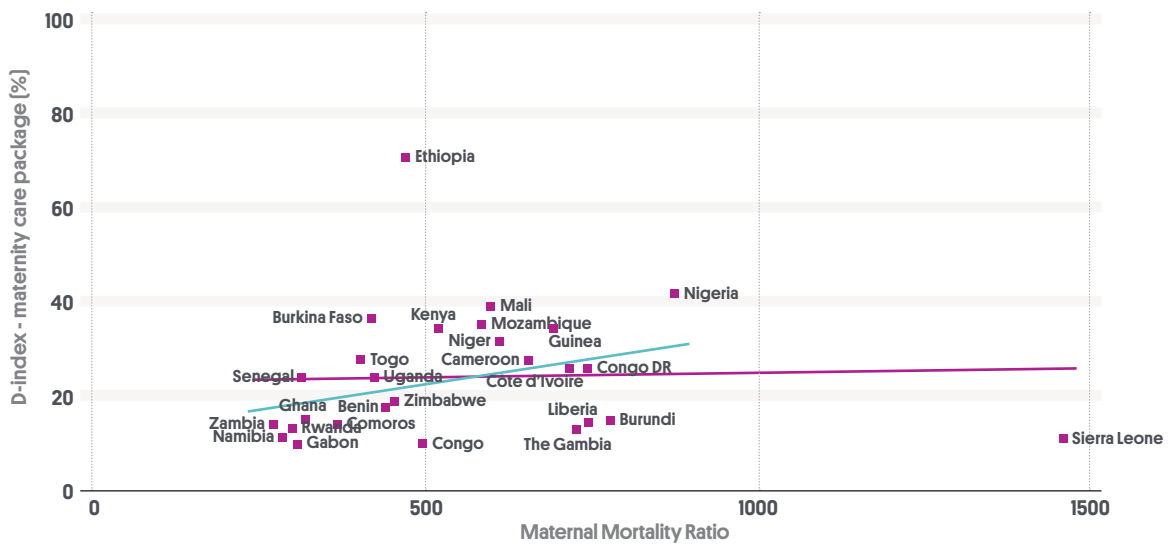
Linear prediction (all countries) — R²<0.001
Linear prediction (whithout Ethiopia and Sierra Leone) — R² (without Ethiopia and Sierra Leone)=0.17

Note: R²= Correlation Coefficient

Findings for malaria and HIV

- Offering HIV testing during antenatal care has a multi-country pooled HOI of nearly 60, and follows a similar pattern to the previous opportunity examined, regarding women's level of knowledge on a place to get tested for HIV. HIV testing coverage during pregnancy is substantially higher and relatively equal for women in countries with high HIV incidence.

- HOI scores for "malaria prophylaxis" vary greatly between countries, ranging from virtually zero in Burundi, to more than 90 in The Gambia and Zambia, with a multi-country pooled HOI of 43. The low scores for Burundi could be explained by the implementation of the WHO recommendations on malaria prophylaxis previously mentioned[19]. Burundi and Ethiopia are the only SSA countries included in this report that decided not to implement the recommendation, and Rwanda decided to stop recommending SP in 2008; in all cases the reason was the low incidence of malaria rates in the countries. Ethiopia and Rwanda do not have available information on IPTp in the DHS survey questionnaires and therefore were not included.

Figure 3.8 HOI for malaria and HIV indicators

a. Malaria prophylaxis

Coverage [%]
HOI [%]
Pooled average HOI [%]

b. HIV test offered during pregnancy

Legend:
Coverage [%]
HOI [%]
Pooled average HOI [%]
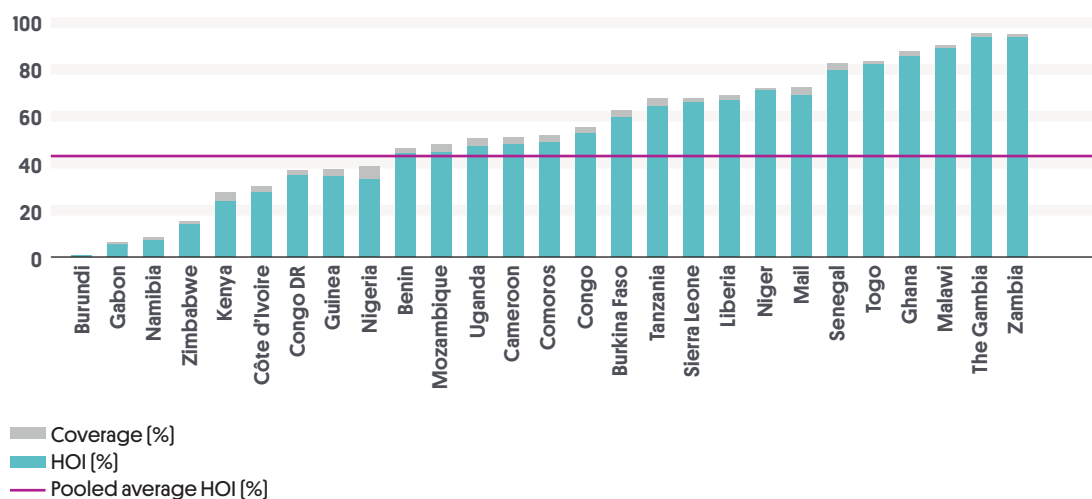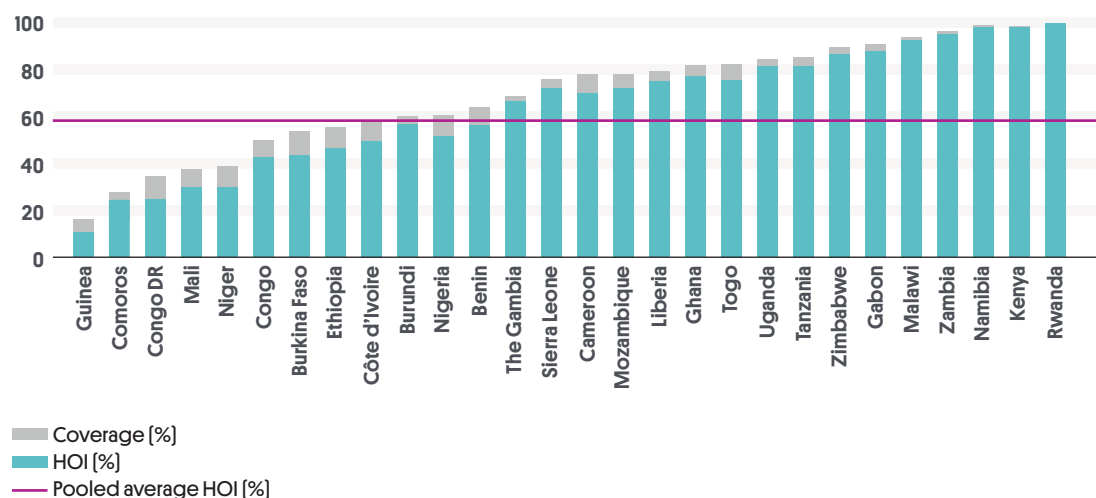
Findings for infant care

The WHO recommends using the "newborn checkup within two days after birth" as a relevant indicator[31]. However, available data in SSA countries on this intervention is scarce due to a number of reasons including: weak information systems or poorly kept records, survey respondents' inability to recall information, very low number of women attending the newborn checkup within two days after delivery or large number of women that deliver at home. As a result, this indicator had many missing values and could not be included. This is a limitation of the analysis, since this information would be relevant, especially in the current context of neonatal mortality accounting for 45 percent of the under-five child deaths globally[21].

Notably, after two months, an infant – or a child of less than one year of age – is no longer a newborn. This is relevant because newborn checkups immediately after delivery are intended to prevent or address the causes of neonatal mortality – that currently account for nearly half of child mortality[32] – and to educate and counsel women on practices beneficial to both the mother and the newborn, such as breastfeeding, birth spacing or immunisation. Thus, the indicator "infant checkup within two months after delivery" has been used as an alternative indicator to the "newborn checkup within two days after birth" in the absence of information regarding neonates. Although "infant checkup after two months" is not a standard indicator, it conveys a measure of action taken to improve infant care by the mother.

- "Infant checkup after delivery" reveals high inequalities among countries ranging from Ethiopia (three) to Burkina Faso (81) in HOI. The multi-country pooled HOI is only 32.

- In general, West African countries appear to outperform the rest (East, Central and Southern African countries), because they are above the multi-country pooled HOI (green line) with only a few exceptions.

- Looking at individual countries, Ethiopia is among the worst performing in both cases, while Ghana, Burkina Faso and Senegal have among the highest HOI scores for these two opportunities.

Figure 3.9 HOI for infant care

a. Infant checkup within two months after delivery

Coverage [%]
HOI [%]
Pooled average HOI [%]

b. Six months of exclusive breastfeeding

Coverage [%]
HOI [%]
Pooled average HOI [%]
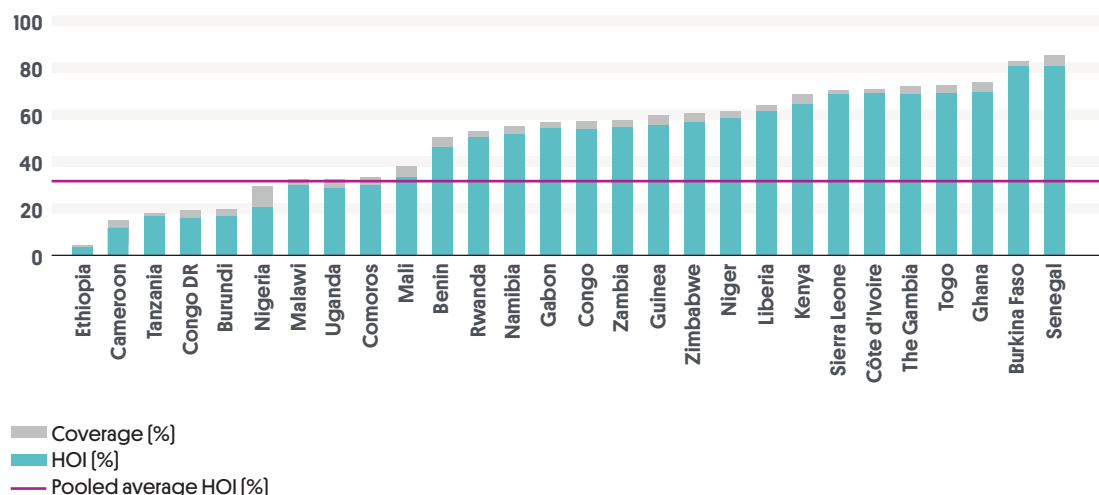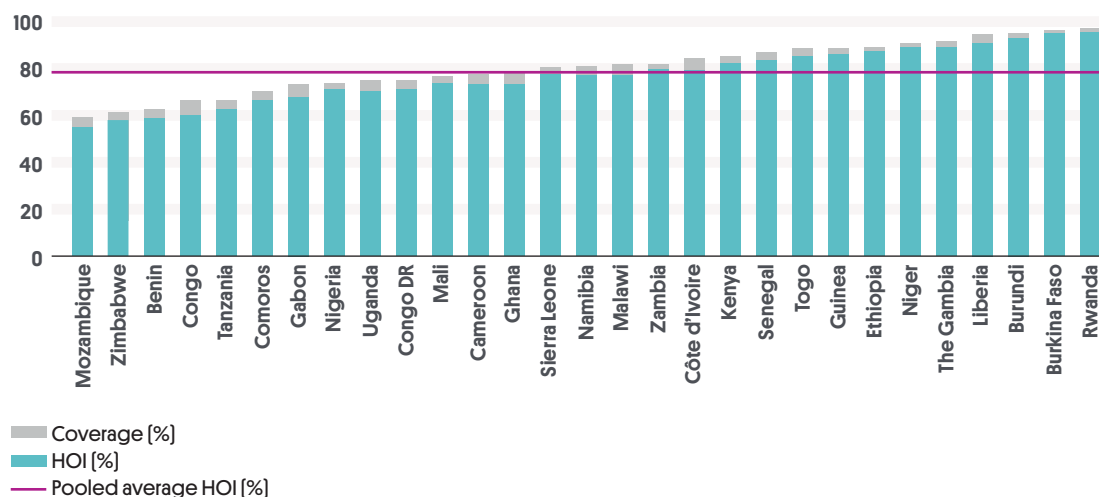
- In stark contrast, SSA countries overall do very well with the opportunity "six months of exclusive breastfeeding". The weighted HOI is around 80, which is the highest obtained among all opportunities examined in this study. Mozambique, the country that ranks lowest has an HOI above 50 percent, and the highest, Rwanda, has an HOI over 95.

- There is very little inequality in breastfeeding within countries. The most important inequality that can be observed is between regions. East African countries appear to be in general below the multi-country pooled HOI (80 percent).

- The negative correlation between HIV prevalence and the HOI for "exclusive breastfeeding" may be explained by the initial recommendation that HIV-infected mothers should not breastfeed to avoid the risk of transmitting the virus to their newborns. Currently, all lactating women should receive antiretroviral treatment, and thus breastfeeding is recommended at least up to six months of age, even if the mother is HIV positive[33]. However, in some settings exclusive breastfeeding might not be fully implemented, and the population remains cautious. This hypothesis would need to be tested with disaggregated data by HIV status of the women.

Figure 3.10 Correlation between HIV prevalence and the HOI for "six months of exclusive breastfeeding"

Linear prediction (all countries) $R^2=0.18$
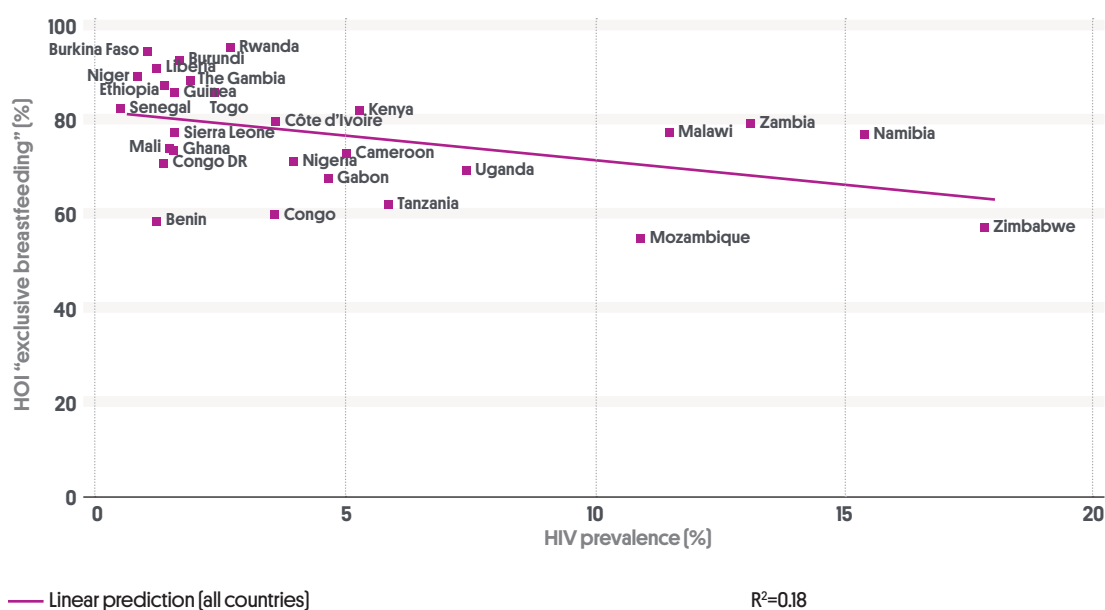
Conclusions

- Maternity care is inadequate and is characterised by large inequalities within and across countries. These results also indicate that the high rate of home deliveries may be the reason why most births are not attended by skilled personnel.

- Although the package analysed is the minimum essential to avoid high risks during pregnancy, it is still unavailable for many women and is very unevenly distributed among the population of women in SSA countries.

- These results suggest the possibility that improving access to this essential set of services for maternity care could lead to reductions in IMR and MMR.

- The HOIs of "malaria prophylaxis during pregnancy" vary greatly between the countries. This could be caused by differences in antenatal care clinic attendance (because attending once might not be enough, especially when the visit occurs in the first trimester), uncertainty among health workers about SP administration and/or stock outs of SP at the health facility level, among other reasons[34].

- Regarding HIV testing, high burden countries outperform the rest in terms of coverage and HOI. In countries where HIV prevalence is lower than five, results are significantly worse than in high prevalence countries. Therefore, actions leading to expanding this essential health service to offer HIV testing before and during pregnancy should be encouraged.

- Infant care indicators vary widely between countries and reveal disparate results. On the one hand, the "infant checkup after delivery" shows inequalities among and within countries, with low HOIs. Importantly, the high neonatal mortality rates could be reduced with newborn checkups within hours after delivery. However, there is no data available for this crucial indicator, highlighting the need for improving health information systems as a prerequisite to addressing the causes of newborn mortality and morbidity. On the other hand, "six months of exclusive breastfeeding" is a good example of an extended practice with low inequalities throughout SSA countries.

3.1.3
Older adolescent girls (15-19 years old)

Older adolescent girls

- Met need for family planning
- Having never been pregnant
- Currently attending school

Context

In SSA, there are more than one billion people, and 23 percent of them are adolescents between ten and 19 years old[21]. Older adolescents – those between 15 and 19 years old – represent 11 percent of the SSA population. Half of these are girls, and 11 million are sexually active and want to delay childbirth for at least two years on average[21,35]. A third of these adolescent girls (3.6 million) are using a modern contraceptive method to avoid pregnancy, but the rest currently face an unmet need for contraception[35]. This unmet need is always higher among adolescents than among other women of reproductive age (60 percent and 26 percent, respectively)[1]. As a result, in SSA, almost half of pregnancies among older adolescents are unwanted, and half of them end in abortion in countries where abortion is illegal and usually performed under unsafe conditions. It is estimated that if

all the adolescent girls in SSA who needed contraceptives used them, unintended pregnancies would drop by 2.7 million per year[35].

The fertility rate among older adolescent girls has not undergone important variations during the MDGs period. SSA is the region that has made the least progress – a four percent reduction between 2000 and 2015 –, and is currently at 102 births per 1,000 adolescent girls[13,36]. Pregnancies during adolescence are life-threatening events, due to a greater probability of high-risk pregnancy at this age[37]. Gestation and labour complications are among the leading causes of maternal death among older adolescent girls in LMICs. Further, newborns of adolescent mothers face major health risks compared to those born to older women[1]. Therefore improving adolescents' access to sexual and reproductive health information and services is key. However, in 2015, less than half of women (15 to 49 years of age) in SSA who were married or in union satisfied their need for family planning by using modern contraceptive methods. Notably, child marriage is an important driver of adolescent pregnancy in SSA, where 90 percent of adolescents who give birth are married[38]. Adolescent pregnancy has strong negative effects on future educational and professional opportunities for girls, helping to perpetuate the cycle of poverty and ill health[1].

Education is tightly linked to adolescents' current and future reproductive health outcomes, and this is the reason why education has been considered an opportunity[39]. Although the gender gap in educational attainment has narrowed since 1990, currently 68 percent of older adolescent girls from LMICs have completed seven or more years of education. This proportion is remarkably lower for Africa (51 percent) compared to other world regions (Latin America 82 percent, Asia 72 percent)[1].

Finally, preventing unintended pregnancy and reducing adolescent childbearing through universal access to sexual and reproductive health-care services are critical to advance the health of women, children and adolescents, a precondition to achieve the SDGs. Three of the goals— SDG3, SDG4 and SDG5, related to health, education and gender equality, respectively — depend largely on improvements in adolescents' living conditions. However, adolescents have only been recently included in the global agenda as a separate group of individuals with specific needs[40].

Findings

- Across SSA, data show that from the entire older adolescent girls' sample, only half of them attend school. Thirty-eight percent work and attend school at the same time. Twenty-three percent of older adolescent girls included in the study have been pregnant at some stage; of these, roughly 79 percent have been married or in a union, half are working and only eight percent are attending school.

- In general, the coverage of the three opportunities analysed for older adolescent girls is low, below 40 percent in two of the opportunities, while the penalties for inequalities are very high, meaning that there are important differences in cov-

erage rates between groups of adolescents with different characteristics, such as differences between urban-rural residents and between married and unmarried girls, among others.

Figure 3.11 HOI for access to reproductive health and education for older adolescent girls

a. Met need for family planning

Coverage [%]
HOI [%]
Pooled average HOI [%]

b. Currently attending school

Coverage [%]
HOI [%]
Pooled average HOI [%]
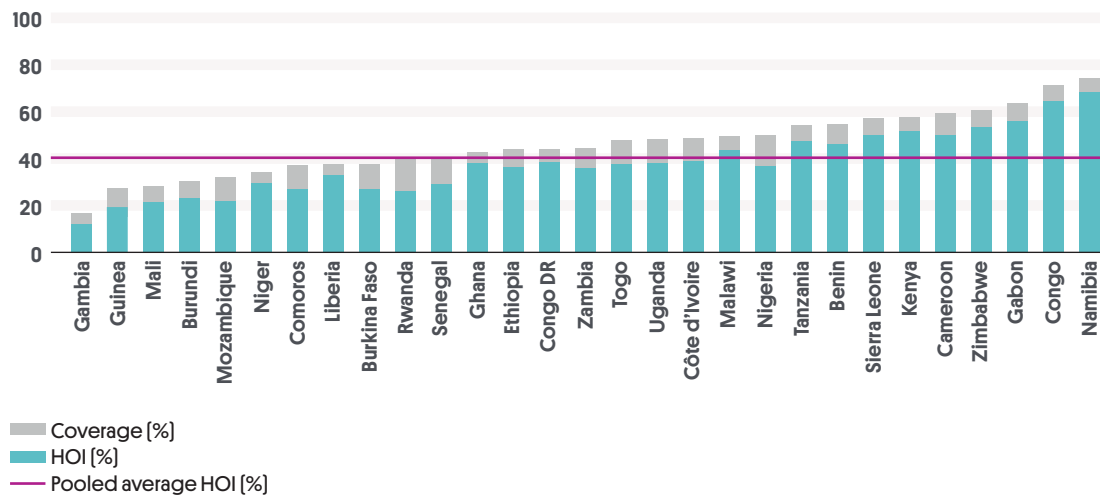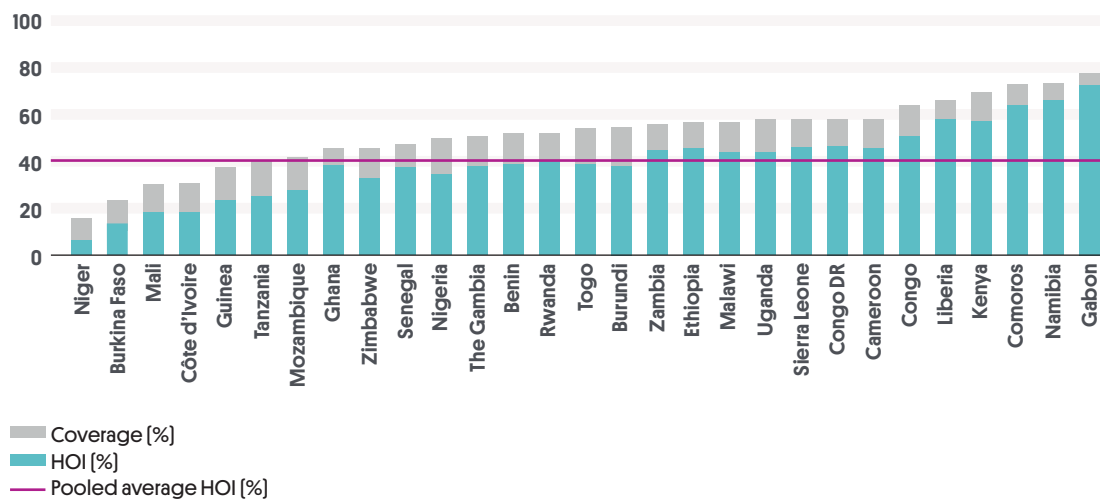
figure continues next page

Figure 3.11 HOI for access to reproductive health and education for older adolescent girls (continued)

c. Having never been pregnant

- Coverage [%]
- HOI [%]
- Pooled average HOI [%]
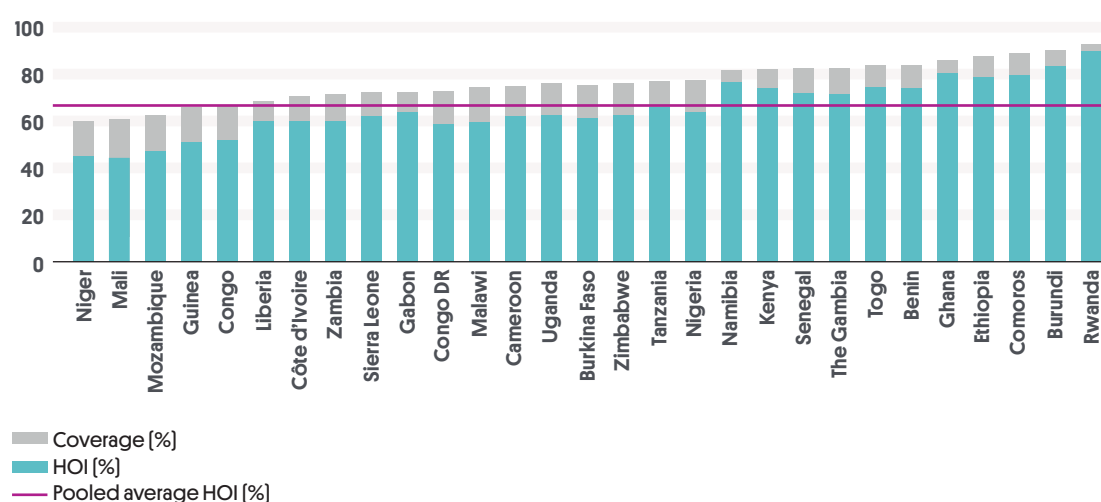
- The HOI for the three indicators varies greatly across countries. The HOI for "met need for family planning" ranges from 12 (The Gambia) to 68 (Namibia), with a multi-country pooled HOI of 40. The multi-country HOI for "currently attending school" is 40, but the differences across countries are wider, ranging from six (Niger) to 72 (Gabon). The HOI for "having never been pregnant" is generally higher than the HOI of other indicators for all countries, with a multi-country pooled HOI of almost 70 and ranging from 44 (Mali) to 90 (Rwanda).

- Cameroon, Kenya, Gabon, Rwanda, Congo and Namibia are among the top performing countries in terms of HOI for "met need for family planning" and "school attendance". They also have some of the best scores with regard to adolescent girls avoiding pregnancies. In contrast, the HOIs for Guinea, Mozambique, Niger and Mali are among the lowest ranked for the three opportunities examined.

- Regionally, results also show that Sahel adolescents suffer larger disadvantages than adolescents from other regions. The countries included in this study belonging to the Sahel region are Senegal, Mali, Burkina Faso, and Niger. With the exception of Senegal in adolescent pregnancy, Sahel countries are always below the multi-country pooled HOI for the three opportunities analysed.

Conclusions

- Important inequalities exist between adolescents with different life circumstances, since the coverage rates show important decreases due to inequalities when computing the HOIs.

- In some SSA countries, high proportions of adolescents avoid pregnancy, but regionally (in the multi-country pooled analysis of the 29 SSA analysed) about three in ten of older adolescent girls become pregnant at a very early age.

3.2
Comparing HOIs among groups of countries

The previous section of this chapter has focused on analysing access to opportunities for SSA women at a country level and at a regional level – with the multi-country pooled HOIs –, while in this section we describe the comparisons studied between different sets of countries grouped by the United Nations (UN) region and HIV prevalence. For completeness of results, the comparisons will be made between both weighted and unweighted average country groups' HOIs. The weighted averages (multi-country pooled HOIs) show the results of the African regions populations taking into account the women's population of each country. For example, in West Africa, individuals from Nigeria have higher weight than the ones from other countries because Nigeria is the most populated country of the region. On the other hand, unweighted average HOIs are useful to see the simple mean HOI of a group of countries without losing the "effect" of small countries, which do not have an impact on weighted averages. As presented in the chapter, both types of comparison display quite similar trends, showing that the HOIs of the countries inside a group are very similar and the average does not change much when weighting.

3.2.1
Comparing African regions

In the analysis of the HOIs by country, some geographical patterns have been detected and thus, have already been explained in the previous sections. In order to verify whether these differences between country regions are real, the average HOIs (weighted and unweighted) have been computed for Central, Eastern and Western Africa. The comparison with Southern Africa would have been meaningless because there is only one Southern African country included in the study (Namibia). The countries were classified as Western, Eastern or Central, following the UN classification (Table 2.1, Chapter 2). A non-parametric test – Wilcoxon rank sum test[VIII] – is needed to check for these differences but it can only be applied to the unweighted sample because it does not work with weights. In Figure 3.12, small violet squares mark the indicators where at least two of the regions show significant differences with a confidence level of 90 percent.

Women of reproductive age

- East Africa is the region with the highest HOI for the "knowledge of a place where to get an HIV test", which is consistent with the fact that the majority of the countries with high HIV prevalence in Africa are in the Southern and Eastern regions.

- For "met need for family planning", West Africa has a lower HOI than the other regions. In the weighted analysis, HIV differences are still clear, while family planning seems to reduce the differences between West Africa and Eastern and Central regions.

[VIII]Wilcoxon rank sum test is only applicable to pairs of samples, therefore in this analysis the test has been applied to each pair of regions to compare (West-East, East-Central and Central-West).

Figure 3.12 Average HOIs for women of reproductive age and pregnant women's opportunities by African region
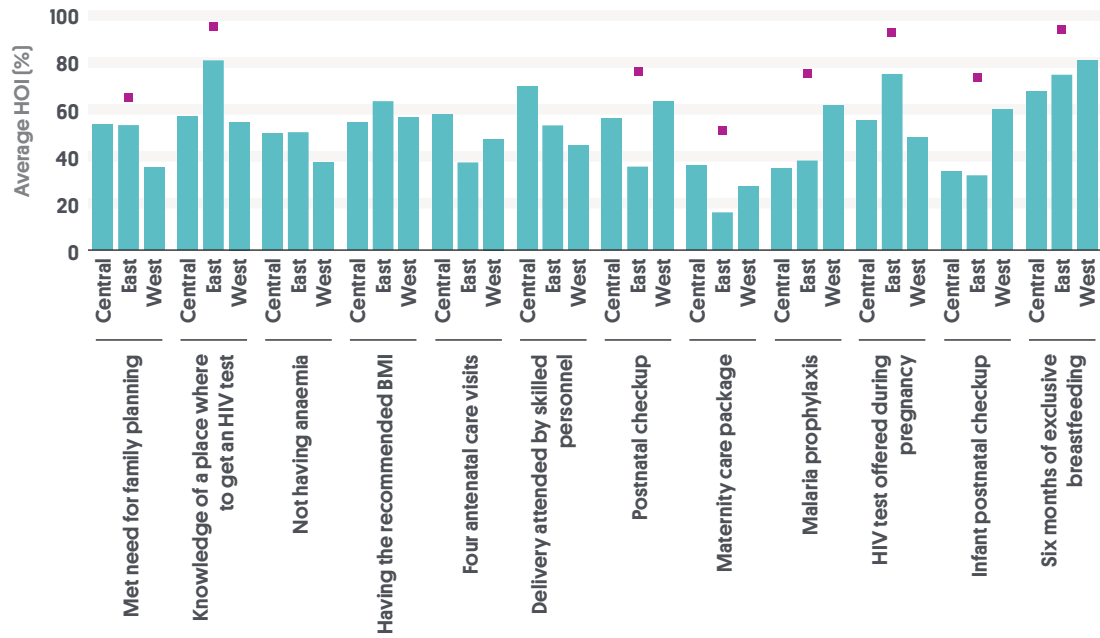
a. Unweighted

Note: ▪ = significant differences with a confidence level of 90 percent.

b. Weighted
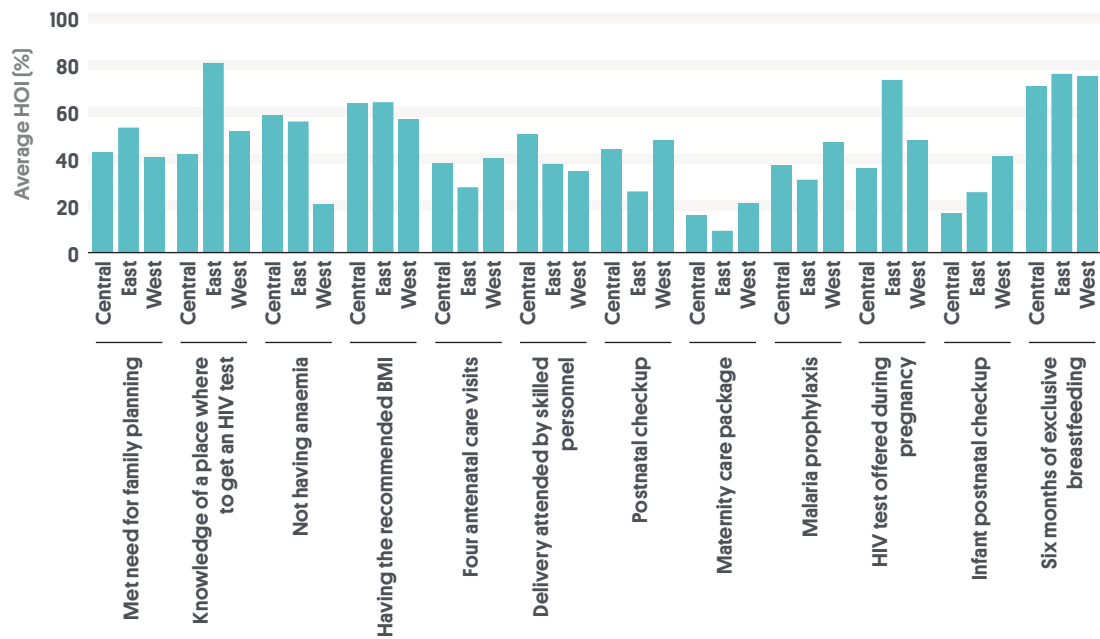
Note: ▪ = significant differences with a confidence level of 90 percent.

- "Not having anaemia" and "having the recommended BMI" do not appear to bear significant differences between regions in the unweighted analysis. However, it is remarkable that the opportunity "not having anaemia" shows large differences in terms of HOIs between West Africa in comparison with East and Central Africa in the weighted analysis.

Pregnant women

- In the unweighted analysis, "postnatal checkup", "malaria prophylaxis during pregnancy", "HIV test offered during pregnancy", "infant checkup", "exclusive breastfeeding" and the "maternity care package", all show significant differences between African regions.

- West Africa outperforms the other regions in "postnatal checkup", "malaria prophylaxis" and infant opportunities, while East Africa fares better in "HIV test offered during pregnancy". Central Africa has high HOIs for the rest of the indicators, but the power of the comparisons is low because there are only four Central African countries included in the analysis in comparison with the 11 and 13 countries of the two other regions.

- Although the results do not vary significantly in the weighted analysis, in general, it can be seen that average HOIs are lower than the ones obtained in the unweighted analysis.

Older adolescent girls

- The differences in the unweighted analysis are not large, although they are significant for the "met need for family planning" and the "school attendance".

- In general, Central Africa outperforms the other African regions.

- The results from the weighted analysis are very similar to the previous ones. The only exception is the "met need for family planning" that seems to have fewer differences between regions, meaning that accounting for country populations, people from all over SSA regions show the same HOI for this indicator.

Figure 3.13 Average HOIs for older adolescent girls' indicators by African region

a. Unweighted

b. Weighted
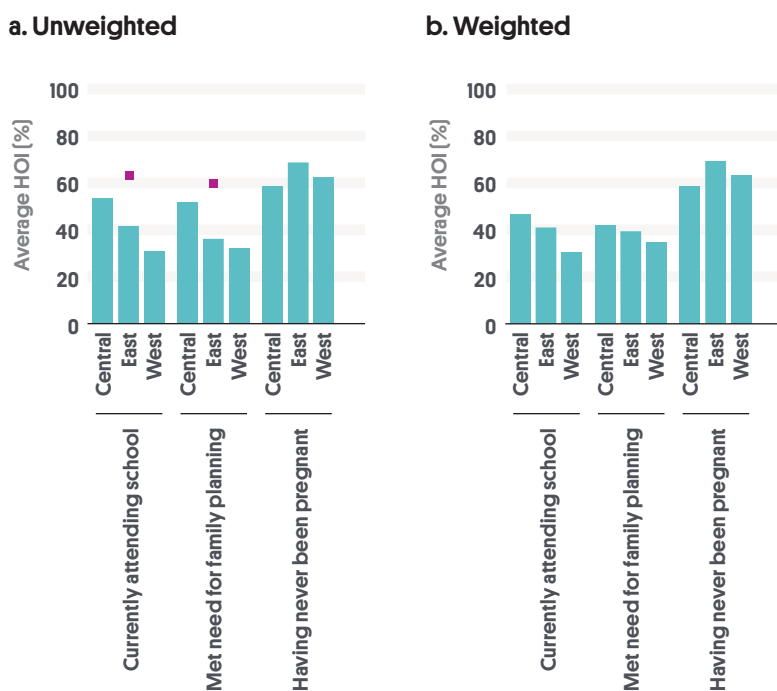
Note: ■ = significant differences with a confidence level of 90 percent.

3.2.2
Comparing SSA countries with different HIV prevalence

Both indicators related to HIV analysed in this report – "knowledge of a place where to be tested" and "having been offered an HIV test during pregnancy" – showed a clear trend where high HIV prevalence countries outperform in general the rest of the SSA countries in access to these HIV services. To highlight the differences between HOIs, the weighted and unweighted analyses between the countries that have an HIV prevalence of more than five and the ones with prevalence equal or lower than five have been computed. Higher HIV prevalence countries included are Kenya, Malawi, Mozambique, Namibia, Tanzania, Uganda, Zambia and Zimbabwe. The HIV prevalence rates of all countries for the corresponding survey year are listed in Appendix A.

- Both indicators related to HIV show higher HOIs – both in weighted and unweighted analyses – for the group of countries with HIV prevalence higher than five.

- The HOIs tend to be lower in the weighted analyses than in the unweighted ones.

- Undoubtedly, it can be stated that in countries where HIV is a major public health problem with more than five percent of the population infected, knowledge and access to HIV services is considerably better than in other SSA countries. Despite the HIV prevalence being lower in the rest of the countries included in the

analyses, it is not insignificant. If these countries do not spread HIV awareness and prevention among the population, there is the possibility of an increase of HIV prevalence in the future.

Figure 3.14 Average HOIs by HIV prevalence regions

Knowledge of where to get an HIV test
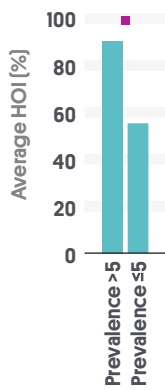
a. Unweighted **b. Weighted**
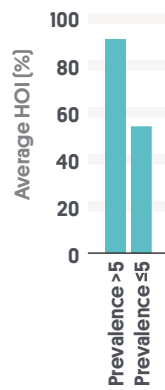
HIV test offered during pregnancy

a. Unweighted **b. Weighted**
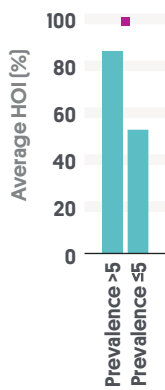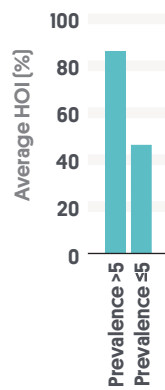
Note: ■ = significant differences with a confidence level of 90 percent.

Key messages

- On average, there are fewer inequalities both at country level and across countries for the opportunities "not having anaemia" and "having the recommended BMI" than for reproductive and maternal opportunities analysed (e.g. "met need for family planning", HIV-related opportunities and maternity care opportunities).

  - Reproductive health needs are related more to service provision, which bear higher inequalities than health outcomes.

  - Anaemia and BMI are indicators of general health and are more evenly distributed within the country populations.

- The maternity care package ("four antenatal care visits", "delivery attended by skilled personnel" and "postnatal checkup") has very low coverage with large inequalities.

  - Individually, each of these indicators also has high inequalities, although the most unequal is "delivery attended by skilled personnel".

  - The low HOIs obtained for "delivery attended by skilled personnel" are mainly due to home births.

- "Exclusive breastfeeding" has a good coverage in SSA with low inequalities within and across countries.

- Older adolescent girls have poorer reproductive health opportunities than older subgroups of women of reproductive age.

  - On average, "met need for family planning" has lower coverage and higher inequalities among adolescents than women older than 20 years.

- No general geographical pattern has been detected for maternal and reproductive health opportunities distribution in SSA.

  - Specific opportunities display particular patterns, but there is no general trend across indicators.

- High HIV prevalence countries show lower inequalities and higher coverage rates of HIV-related opportunities than low HIV prevalence countries, suggesting that progress is possible when interventions are prioritised and sufficiently funded.

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Chapter 4.
What explains inequalities in health for women of reproductive age?

This chapter describes the specific circumstances and to what extent they contribute to inequality of opportunities from different perspectives. Firstly, the contributions of different circumstances to inequality at country level are examined through the simple averages of the decomposition results (see specific country results in Appendix A). An additional analysis is performed dividing countries into two groups by human immunodeficiency virus (HIV) prevalence, to examine the differences in circumstances' contributions for the HIV-related opportunities. Secondly, a multi-country approach is presented through a multi-country pooled data analysis of the Human Opportunity Index (HOI) decompositions. These results thus complement the country level analyses of circumstances by providing insights on how maternal and reproductive health services and outcomes among sub-Saharan African (SSA) women are associated with differences in their individual and household characteristics, when women from all countries are considered as a single group. Finally, a more in-depth analysis is presented to examine which circumstances drive inequality of opportunities among the older adolescent girls' subgroup.

4.1
Explaining inequality at country level

This section addresses how different circumstances contribute to inequality of opportunity in maternal and reproductive health indicators and outcomes at country level. The results of the analysis are summarised by showing the unweighted average contribution (simple mean) of each circumstance across all countries to the dissimilarity index (D-index) for each opportunity. In other words, the results show the contribution of each circumstance to the inequality of a certain health opportunity, averaged across all countries, where every country is treated equally, regardless of its share in the population of women.

Presenting the averages rather than single country results enables us to highlight key patterns in how circumstances matter for inequality of different opportunities. This would be difficult if more disaggregated country-level information was shown, given the large number of decompositions included (29 countries, 15 opportunities, and multiple circumstances)[IX]. Another important consideration to take into account: Shapley decomposition results show the relative contribution of each circumstance to the D-index[X] for an opportunity, but not the "absolute amount of inequality" that each circumstance is generating. For example, in the case of opportunities with a low D-index, a circumstance that may significantly contribute to the D-index could be responsible for a very small "amount of inequality" in terms of magnitude. Figure 4.1 shows the differences across opportunities in a graph that displays the unweighted average D-index for all countries. The average D-index shows that there are large differences in the D-index across opportunities, meaning that the magnitude of inequality is not the same for the different indicators analysed. This is relevant for interpreting the results on the

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[IX]Decomposition results for all countries are accessible to interested readers in Appendix A.

[X]Using the definition explained earlier, the D-index measures inequality between groups differentiated by circumstances.

relative contributions of circumstances to inequality of opportunity, since the same percentage contribution of a circumstance to inequality would have different implications for different opportunities.

Notably, the most unevenly distributed health opportunities are (Figure 4.1): "currently attending school" (D-index: 26 percent) – that applies exclusively to the older adolescents group –, "maternity care package" that includes "four antenatal care visits", "delivery attended by skilled personnel" and "postnatal checkup" (D-index: 25 percent), "met need for family planning" (older adolescents group) (D-index: 19 percent) and "delivery attended by skilled personnel" (D-index: 17 percent).

Figure 4.1 Average D-index by opportunity (unweighted)
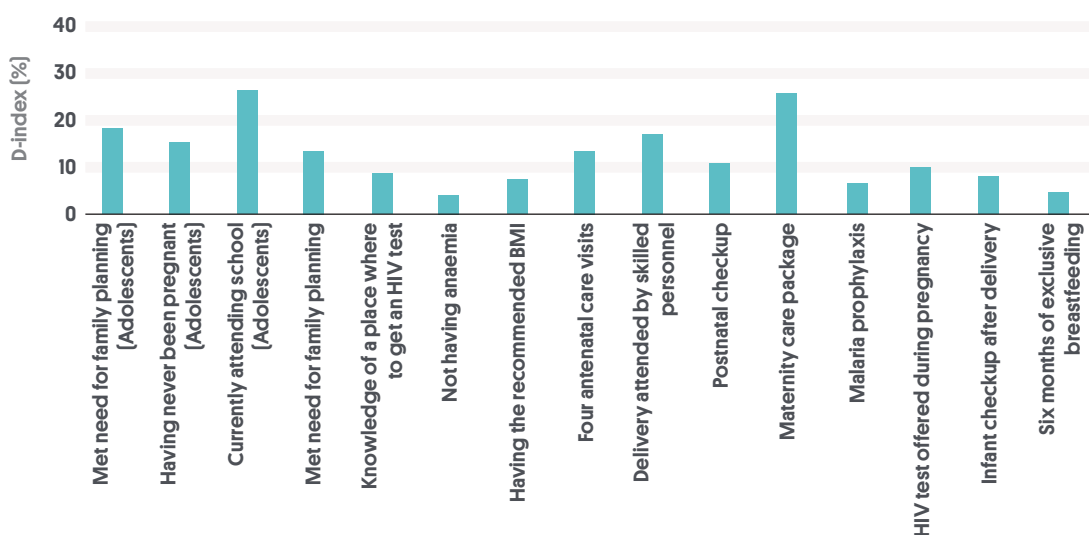
Note: The average D-indices (inequality) for the group of countries are calculated as the unweighted or simple average of the D-indexes for each country.

Box 5. D-index: country cases

To demonstrate the average D-indices with some examples, a selection of countries and opportunities with their D-index is presented, which in some cases are far from the average D-index. The different results displayed highlight the importance of focusing also on the particular results of each country to take into account their specific features.

| Country	D-index (%)				
	Average D-index	Example 1		Example 2	
Currently attending school	26	Gabon	10	Niger	62
Not having anaemia	3	Zimbabwe	2	The Gambia	11
Delivery attended by skilled personnel	17	Rwanda	3	Nigeria	37

4.1.1
Women of reproductive age (15-49 years old) and pregnant women

- Country level inequalities are largely explained by differences in household wealth (i.e. which quintile of wealth in a country women belong to), educational level and area of residence (urban/rural) (Figure 4.2). In most countries, a pattern is observed where women who are more educated, living in urban areas and in relatively wealthier households have an advantage for almost all indicators. The only exception to this situation is for the body mass index (BMI); the wealthiest and most educated women are the ones with inadequate BMIs, mostly being overweight.

- A similar trend is observed for opportunities with the highest levels of inequality (i.e. "maternity care package" and "delivery attended by skilled personnel"), where household wealth, area of residence and the woman's educational level are the most significant contributors to inequality, in respective order of importance (Figure 4.2).

- Marital status is one of the most significant contributors to inequality for some health indicators and outcomes: "malaria prophylaxis during pregnancy", "met need for family planning", "not having anaemia" and "exclusive breastfeeding". Single women have a significant advantage over married women in some health indicators such as "not having anaemia" or "met need for family planning", whereas married women have better malaria prophylaxis during pregnancy uptake. Overall inequality is high only for "met need for family planning" and quite low for the other mentioned indicators (Figure 4.1), suggesting that marital status contributes to a significant share of inequality only in the case of access to family planning.

- Certain circumstances stand out for specific indicators. In general, sex of the household head, number of children, age and religion are not significant contrib-

utors to inequality. For example, age does not seem to be a major driver of inequalities in health for women of reproductive age except in the case of "having the recommended BMI", where older women tend to have poorer BMI scores. The low level of overall inequality for this indicator (Figure 4.1) suggests that the differences in BMI attributable to age are not large. However, averages can conceal significant variations between different countries (Box 6).

Figure 4.2 Women of reproductive age and pregnant women: circumstances' contributions to the D-index

a. Met need for family planning

b. Knowledge of where to get an HIV test

c. Not having anaemia

d. Having the recommended BMI
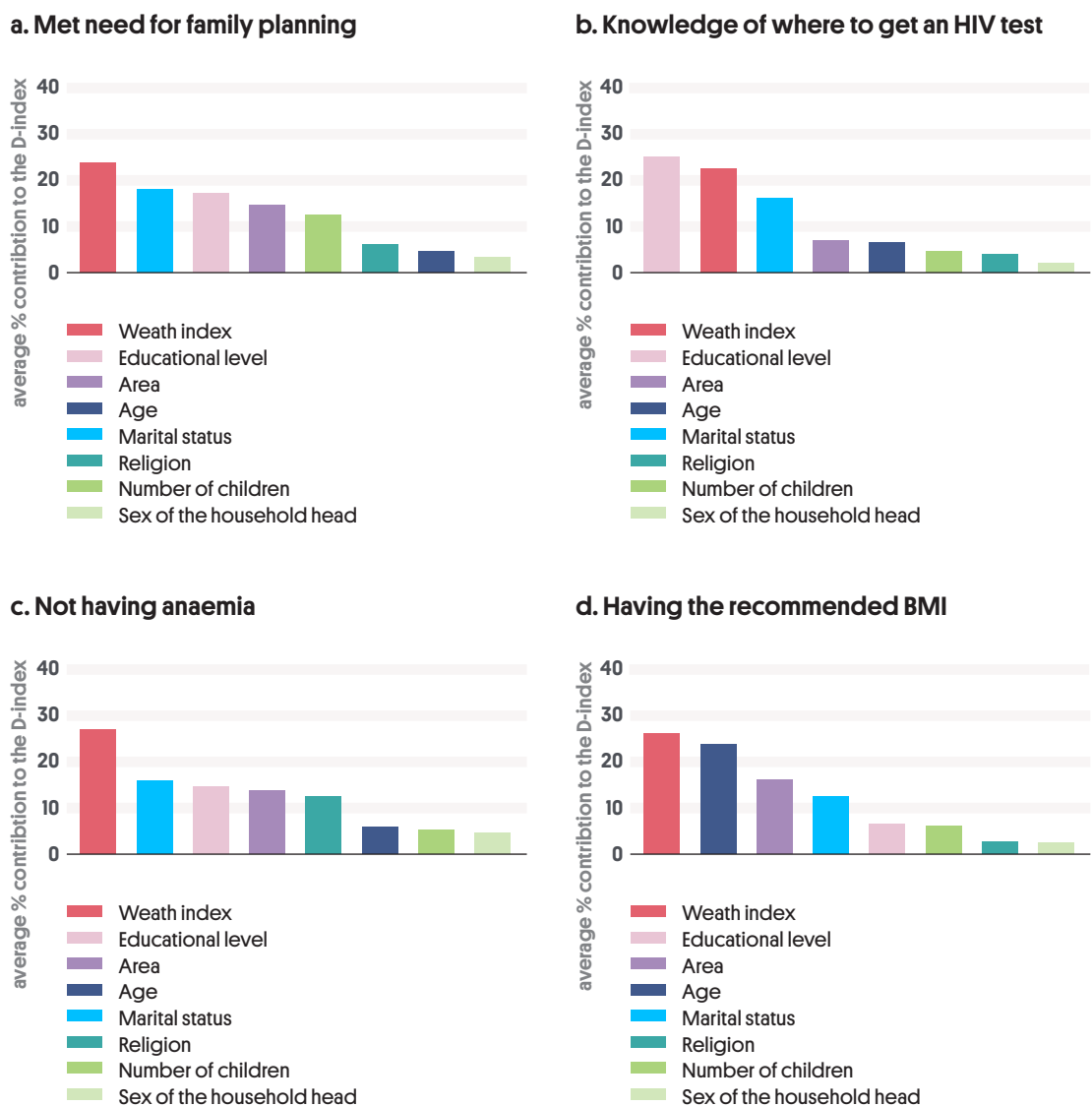
figure continues next page

Figure 4.2 Women of reproductive age and pregnant women: circumstances' contributions to the D-index (continued)

e. Four entenatal care visits
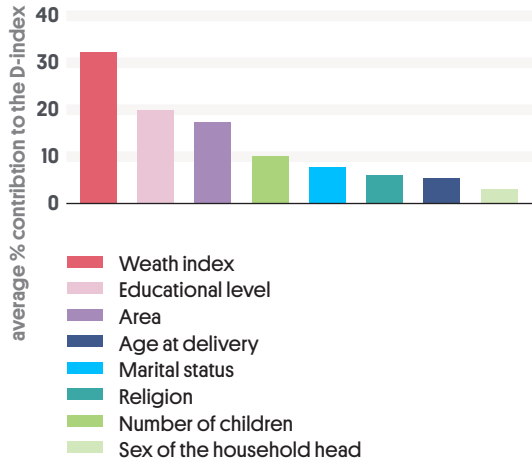
f. Delivery attended by skilled personnel
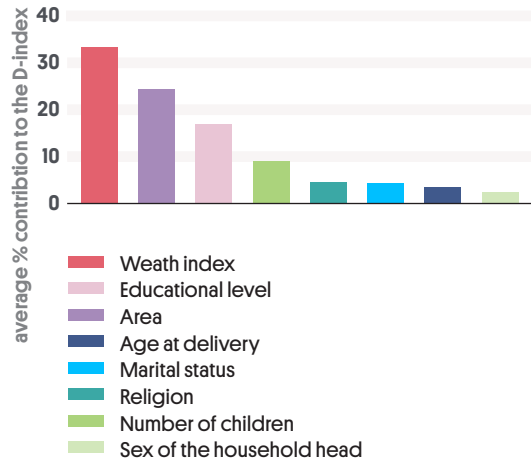
g. Postnatal checkup
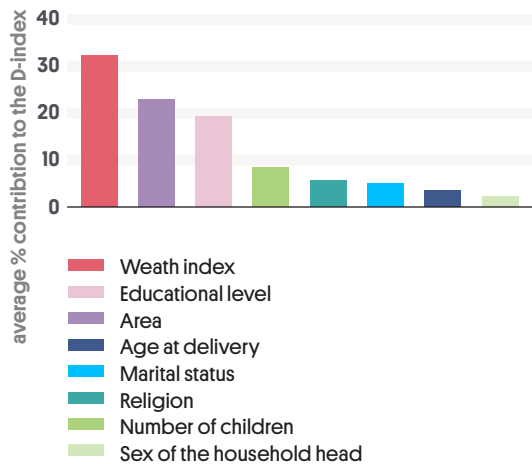
h. Maternity care package
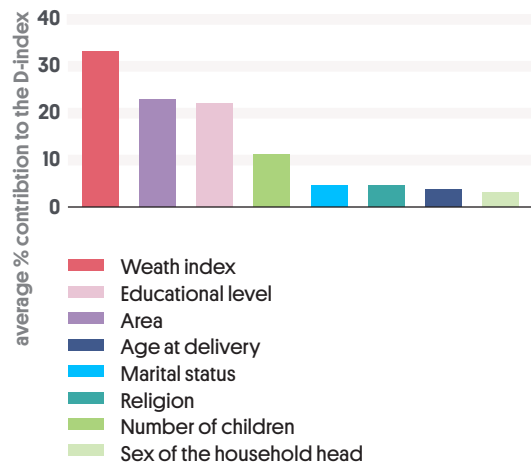
i. Malaria prophylaxis

j. HIV test offered during pregnancy

Figure 4.2 Women of reproductive age and pregnant women: circumstances' contributions to the D-index (continued)

k. Infant checkup within two months after delivery
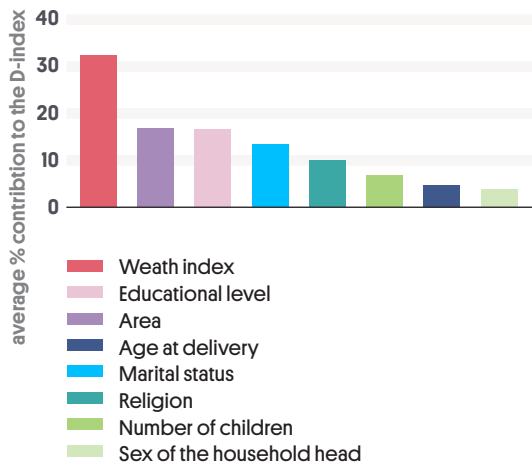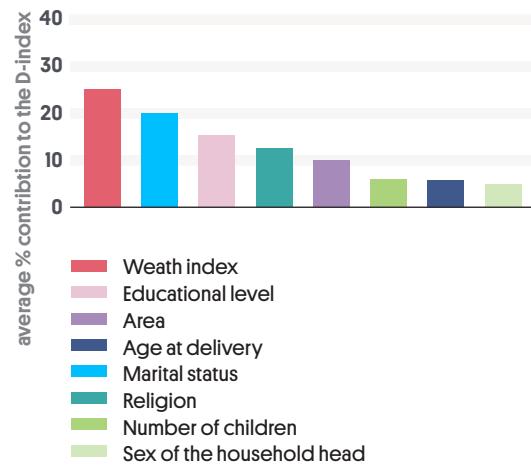
average % contribtion to the D-index

- Weath index
- Educational level
- Area
- Age at delivery
- Marital status
- Religion
- Number of children
- Sex of the household head

l. Six months of exclusive breastfeeding

average % contribtion to the D-index

- Weath index
- Educational level
- Area
- Age at delivery
- Marital status
- Religion
- Number of children
- Sex of the household head

Note: The average contributions of circumstances to inequality of opportunity for the group of countries are calculated as the unweighted or simple averages (across all countries) of Shapley decompositions of the D-index for that opportunity.

Box 6. Women of reproductive age and pregnant women's opportunities: country cases

To illustrate with examples the average results previously presented, below is a selection of countries and opportunities that follow the average trend or, in contrast, show very distant results from the average. The variability of the results indicates the need to review the results of each country to take into account their specific features (see Appendix A).

- *Not having anaemia*: this opportunity shows significantly different results across countries. For example, Ethiopia and The Gambia do not share any similarity.
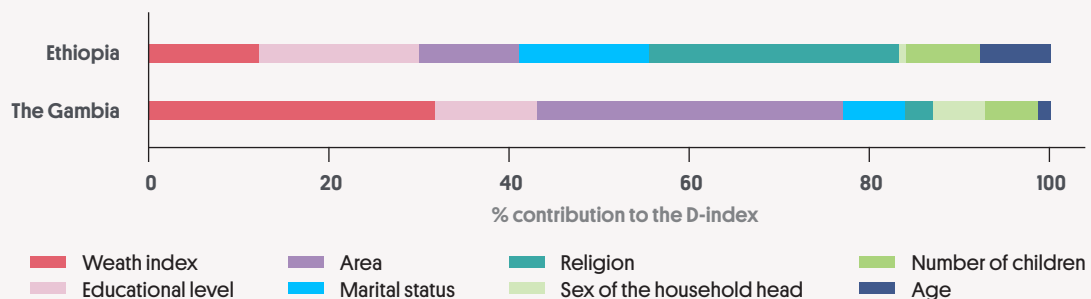
% contribution to the D-index

- Weath index
- Educational level
- Area
- Marital status
- Religion
- Sex of the household head
- Number of children
- Age

box continues next page

69

Box 6. Women of reproductive age and pregnant women's opportunities: country cases (continued)

- *Met need for family planning*: while Uganda seems to represent the average results obtained for SSA quite well, Ghana shows different contributors to inequality; marital status being the main one.

% contribution to the D-index

Weath index	Area	Religion	Number of children
Educational level	Marital status	Sex of the household head	Age
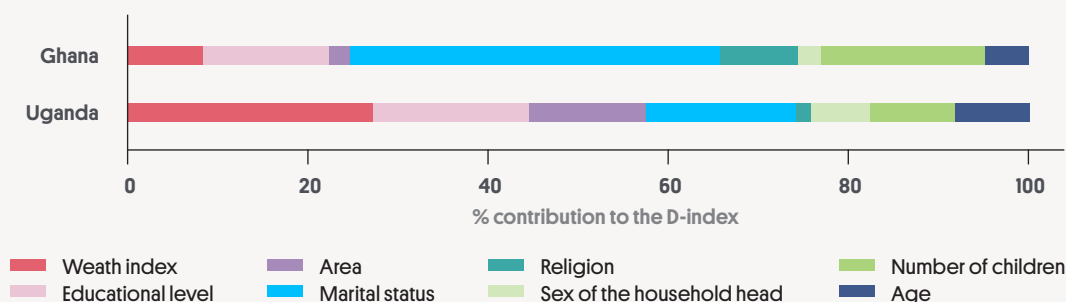
- *Maternity care package*: this opportunity shows quite homogenous results across countries. Zambia's results reflect the regional average of the 29 SSA countries analysed, whereas Rwanda is the most notable exception with the number of children being the main contributor to inequality.

% contribution to the D-index

Weath index	Area	Religion	Number of children
Educational level	Marital status	Sex of the household head	Age at delivery
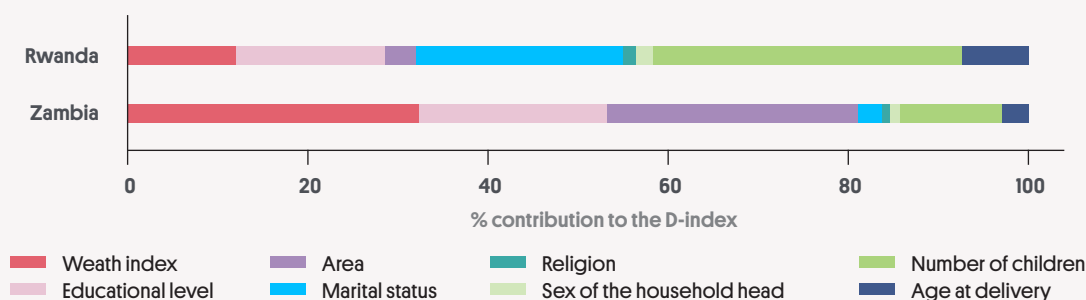
- *Malaria prophylaxis during pregnancy*: Nigeria is a country that in many cases is an outlier because of the important contribution of religion to inequality. Intermittent Preventive Treatment of malaria in Pregnancy (IPTp) is an example. While religion is not relevant for Mali's inequality, for Nigeria it is the main contributor to the D-index.

% contribution to the D-index

Weath index	Area	Religion	Number of children
Educational level	Marital status	Sex of the household head	Age at delivery
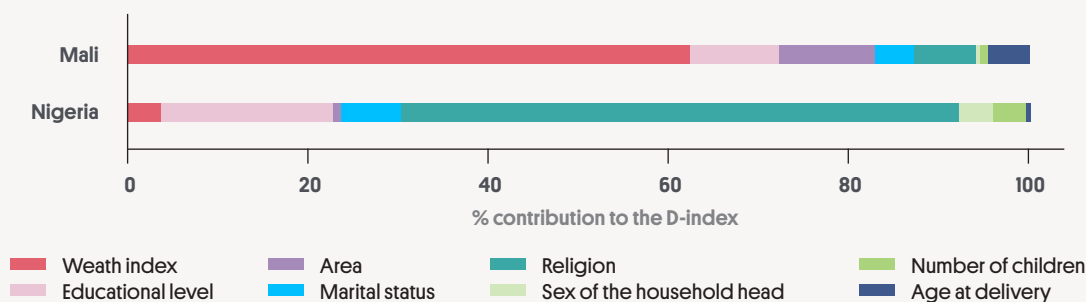
4.1.2
Older adolescent girls (15-19 years old)

- The opportunities analysed for this age subset are among the most unevenly distributed health opportunities of the report (Figure 4.1): "currently attending school" (D-index: 26 percent), "met need for family planning" (D-index: 19 percent) and "having never been pregnant" (D-index: 15 percent).

- In general, the main drivers of inequality for the older adolescent group (Figure 4.3) are: marital status, which ranks first for all the opportunities examined (40 percent, 39 percent and 69 percent of the D-index), followed by wealth index, occupation and area of residence.

- The main circumstance contributing to inequality in the case of older adolescent girls' pregnancies, i.e. the "having never been pregnant" opportunity, arises from marital status (i.e. being married) that accounts for as much as 70 percent of the D-index (Figure 4.3). Adolescent pregnancies are more prevalent among married adolescent girls than among those who are unmarried.

- Occupation is an especially relevant driver of inequality with regard to school attendance (28 percent of the overall D-index for "currently attending school"). Among older adolescent girls who are employed, school enrolment rate is lower than for girls who are not working.

A more in-depth analysis of older adolescent girls with regard to marital status is presented at the end of this chapter.

Figure 4.3 Older adolescent girls' opportunities: circumstances' contributions to the D-index

a. Currently attending school

b. Met need for family planning

figure continues next page

71
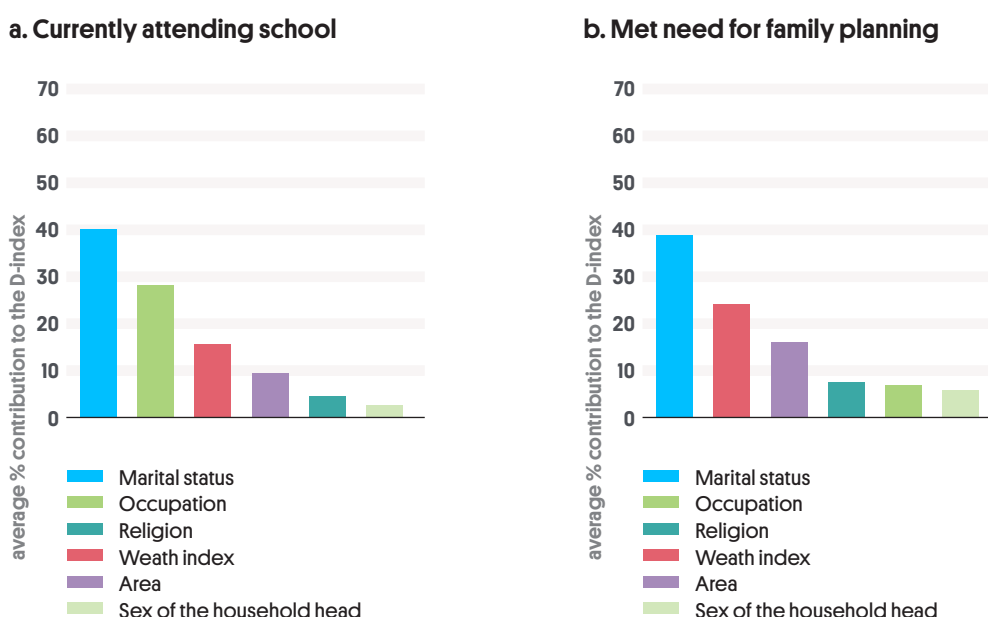
Figure 4.3 Older adolescent girls' opportunities: circumstances' contributions to the D-index (continued)

c. Having never been pregnant
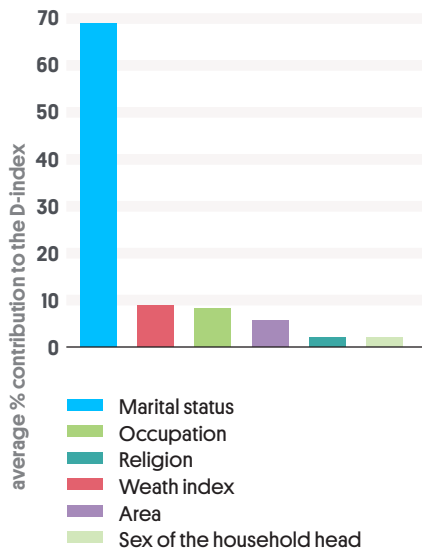
Note: The average contributions of circumstances to inequality of opportunity for the group of countries are calculated as the unweighted or simple averages (across all countries) of Shapley decompositions of the D-index for that opportunity.

Box 7. Older adolescent girls' opportunities: country cases

▪ *School attendance*: while for Zimbabwe marital status is the most important contributor to the inequality (D-index) followed by occupational status, Benin shows the inverse, with occupation as the main source of inequality.
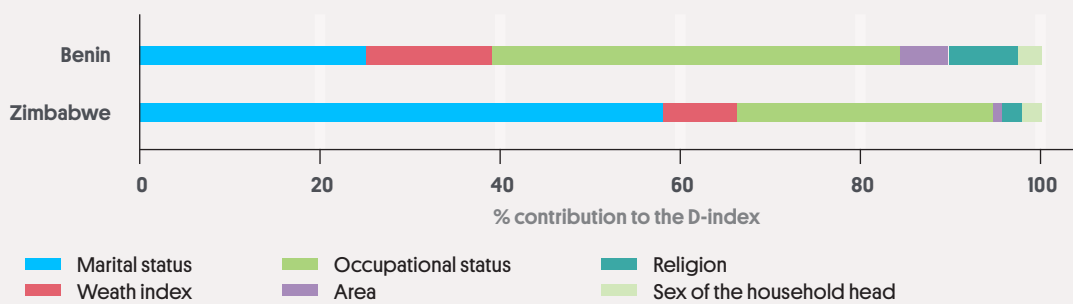
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Box 7. Older adolescent girls' opportunities: country cases (continued)

▪ *Having never been pregnant*: in both examples marital status stands for the main contributor to the D-index. In the case of Togo occupational status also seems to contribute significantly to inequality, while in Malawi its contribution is minor.
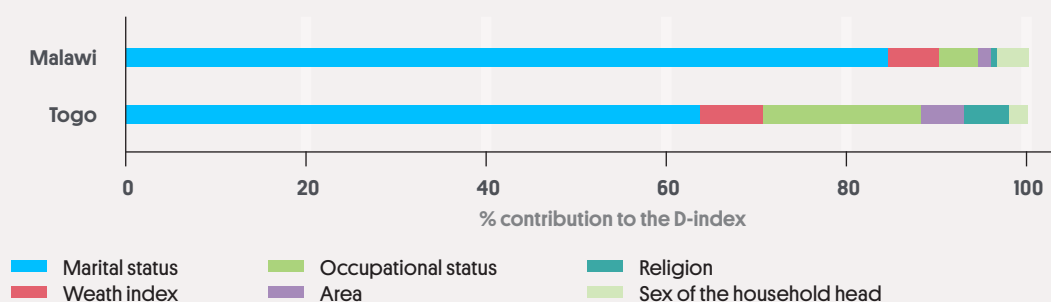
% contribution to the D-index

- Marital status
- Weath index
- Occupational status
- Area
- Religion
- Sex of the household head

The variability of the results indicates the need to review the results of each country to take into account their specific features (see Appendix A).

4.1.3
HIV-related indicators

HIV-related indicators have been further analysed in order to ascertain possible differences for inequality in countries with different HIV prevalence rates. Thus, the study sample has been divided into countries with high HIV prevalence (those with an HIV prevalence rate of more than five percent of the population infected) and low prevalence (countries below or at the five percent threshold) (Figure 4.4), which might in turn have implications for the design of public health policies and programmes in countries with different epidemic settings.

Knowledge of where to get an HIV test

▪ Education is a key contributor to inequality in high and low HIV prevalence countries, with D-index values of 25 percent.

▪ In high prevalence countries, the relative contribution of marital status is much higher (24 percent) than for low prevalence countries (14 percent). Further research would be needed to understand why marital status is more important than other circumstances (i.e. wealth, area of residence and other factors) in explaining differences in knowledge of where to get an HIV test (married women have better opportunities than those who are unmarried), and why this is so different as compared to low prevalence countries.

▪ Household wealth status and area of residence (urban/rural) contribute less to inequality in high prevalence countries – 14 percent and eight percent of the D-index compared to 24 percent and 18 percent of the D-index, respectively – than in low prevalence countries.

HIV test offered during pregnancy

■ The circumstances that most contribute to inequality are similar across high and low HIV-prevalence countries. Women's wealth, area of residence and education, are the main drivers for both groups of countries, albeit with some differences in the order of importance.

Figure 4.4 HIV prevalence country groups: circumstances' contributions to the D-index

Knowledge of where to get an HIV test

a. HIV prevalence ≤ 5
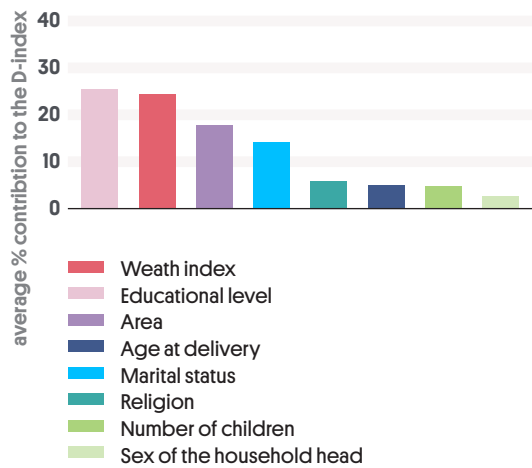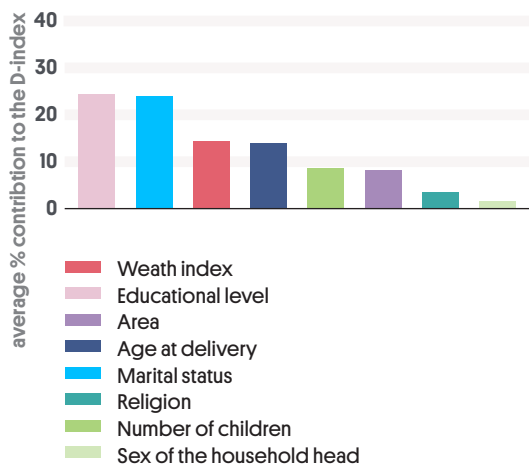
b. HIV prevalence > 5

HIV test offered during pregnancy

a. HIV prevalence ≤ 5
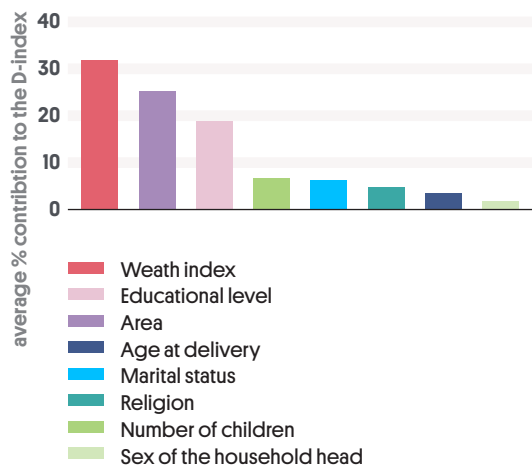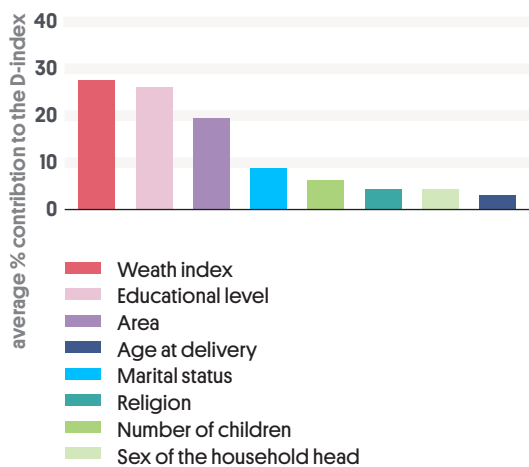
b. HIV prevalence > 5

Note: The average contributions of circumstances to inequality of opportunity for the group of countries are calculated as the unweighted or simple averages (across all countries) of Shapley decompositions of the D-index for that opportunity.

Conclusions

- Overall, for SSA women of reproductive age (15-49 years old), wealth, area of residence (rural/urban) and the women's educational level are the leading contributors to inequality in maternal and reproductive health indicators, including those with the highest levels of inequality such as access to a basic maternity care package and having the delivery attended by skilled personnel.

- Marital status is the main contributor to inequalities for older adolescent girls (15-19 years old), as well as for several opportunities for adult women, most notably, access to family planning services and malaria prophylaxis uptake. Married adolescents have fewer opportunities for reproductive health and education opportunities. However, for adult women marital status can contribute positively for some indicators ("malaria prophylaxis during pregnancy") and negatively for others ("met need for family planning").

- Other circumstances (i.e. number of children, age, sex of the household head and religion) are of marginal importance. However, there are significant differences across countries underlying the averages. For example, in Nigeria, religion stands out as the main contributor to inequality in "malaria prophylaxis during pregnancy".

4.2
Explaining inequalities across countries: a multi-country pooled analysis

This section describes the sources of inequalities among the population of women of reproductive age in SSA from a different angle. The analyses performed include all country samples in the same pool, all weighted by each country's share of women's population to the total. The results are subject to the caveat that the estimated contributions of circumstances could be affected by the presence of country-specific factors, correlated with the observed circumstances. Those could be unobservable but systematically present in some countries. For example, religion in a subset of countries could be geographically distributed in a way that results in a confounding factor.

While the above limitation calls for caution in interpreting results, the findings are still instructive. The results are best seen as providing a picture of how maternal and reproductive health services and outcomes among SSA women are associated with differences in their characteristics, when women from all countries are considered as a single group.

In performing the pooled analysis, the circumstances measured by the wealth index also have to be interpreted with caution. The wealth quintiles for the pooled analysis remain the same as those defined for each country analysis. This fact

implies that wealth in the multi-country pooled analyses indicates the relative wealth position (in terms of quintile) of an individual woman in her country[XI].

Finally, as in the previous section, the D-indices of all opportunities have to be taken into account before interpreting the results because Shapley decomposition results are relative contributions to the inequality. For this analysis, the D-indices used are those computed from the multi-country weighted analysis pooling all samples included in the report (Figure 4.5).

Although results do not differ significantly from the country level D-indices (Figure 4.1), some features merit attention. First, there is a marked reduction in the D-index (inequality) of "six months of exclusive breastfeeding" opportunity that results in it scoring the lowest inequality across SSA. Second, there is a significant increase in the D-index (inequality) of the "infant checkup after delivery" and "maternity care package" opportunities. This last one shows a D-index above 30 percent.

Figure 4.5 Average D-index by opportunity (multi-country pooled analysis)
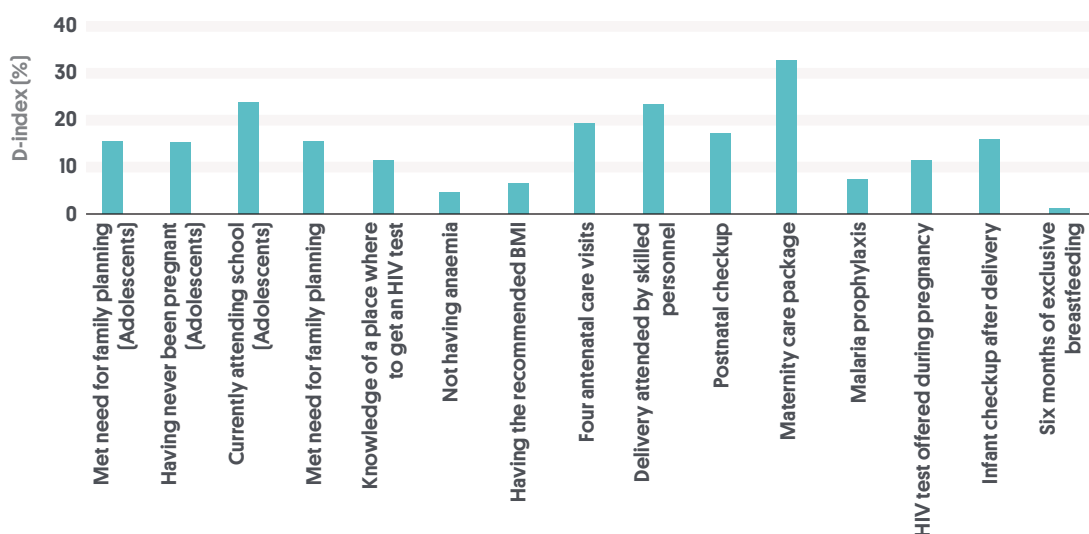
Note: The average D-indices (inequality) for the group of countries are calculated pooling all country samples and weighting them taking into account the number of women between 15 and 49 years old of each country.

[XI]The principal component analysis (PCA) used by the Demographic Health Surveys (DHS) programme to calculate the wealth index assigns a different number to each individual depending on the distribution of assets in the sample[10]. In other words, a person from Gabon could be as wealthy as another from Zimbabwe, but this methodology does not assign them the same wealth index value. By generating wealth quintiles, a country's population is classified into a relative wealth scale. In the multi-country pooled analysis, the wealth quintiles have been left unchanged, which means that wealth as a circumstance has to be understood as the relative wealth position of the household (that the woman belongs to) in her country rather than the value of assets owned by the household.

4.2.1
Women of reproductive age (15-49 years old) and pregnant women

- As previously observed for the country level analysis, wealth, education and area of residence (urban/rural) are the most important contributors to inequality for the majority of the opportunities for the subgroup of women of reproductive age and pregnant women examined (Figure 4.6).

- In general, the contributions of religion and number of children to inequality tend to be high in the pooled analysis (Figure 4.6). Possible explanations could be that these two circumstances are correlated with country-specific factors, since they appear more concentrated in some countries than in others or the contribution of these two factors to inequality actually reflect, at least in part, the effects of other circumstances that are country-specific but unobservable in the analysis.

- Religion accounts for a large share of inequality in the indicators of "not having anaemia" and "malaria prophylaxis during pregnancy" (Figure 4.6). However, since average D-index is very low in both cases (see Figure 4.5), the actual amount of inequality attributable to religion is quite small.

Box 8. The role of religion in women's health indicators' inequalities

Religion is not a typical sociodemographic characteristic included in the studies on anaemia or prevention of malaria infection in pregnancy in the SSA region. Therefore, there is scant evidence available regarding the contribution of religion to health inequalities. However, many studies conducted in India and South-East Asia highlighted religion as a possible risk factor for anaemia and found significant differences in religion between groups of the population with and without anaemia[1–4]. Regarding IPTp uptake, few studies use religion as a covariate in the analysis of the uptake of malaria prophylaxis among pregnant women. In general, the scarce evidence available did not find a statistically significant relationship between religion and IPTp coverage[5–7]. In contrast, a systematic review of the literature showed that beliefs and religious practices are barriers to access, delivery and use of preventive interventions against malaria during pregnancy[8].

A possible explanation of the relevance of religion for anaemia and malaria indicators may be the geographical and country distribution of religious groups in malaria endemic countries overlapped with other unobservable factors. Some countries such as Guinea, Sierra Leone or The Gambia are mostly Muslim, while in others such as, Zambia, Cameroon, Congo or Malawi, Muslim religion is less prominent. In the majority of the SSA countries, there are also communities and regions where animism predominates. Another plausible explanation that could explain the high contribution of religion to inequality in these health indicators is the geographical distribution of

box continues next page

Box 8. The role of religion in women's health indicators' inequalities (continued)

religious groups within countries where more than one religion is prevalent. In Nigeria, for example, Christian communities are placed mostly in the southern region, while most Muslims live in the north[9]. This regional distribution of religious groups combined with other factors – such as different climates, altitudes, types of crops and nutritional habits, or different malaria incidence/prevalence – could explain differences in anaemia prevalence and use of malaria preventive strategies across countries with different religions.

In some cases, these relationships may be due to chance, while in others, particular religious practices and beliefs might explain the results. More in depth analysis at country level is needed to understand the role religion is playing, not only regarding anaemia prevalence and malaria prophylaxis coverage, but also with respect to other health opportunities (e.g. maternity care indicators, family planning, etc.).

Figure 4.6 Multi-country pooled analysis for women of reproductive age and pregnant women: circumstances' contributions to the D-index
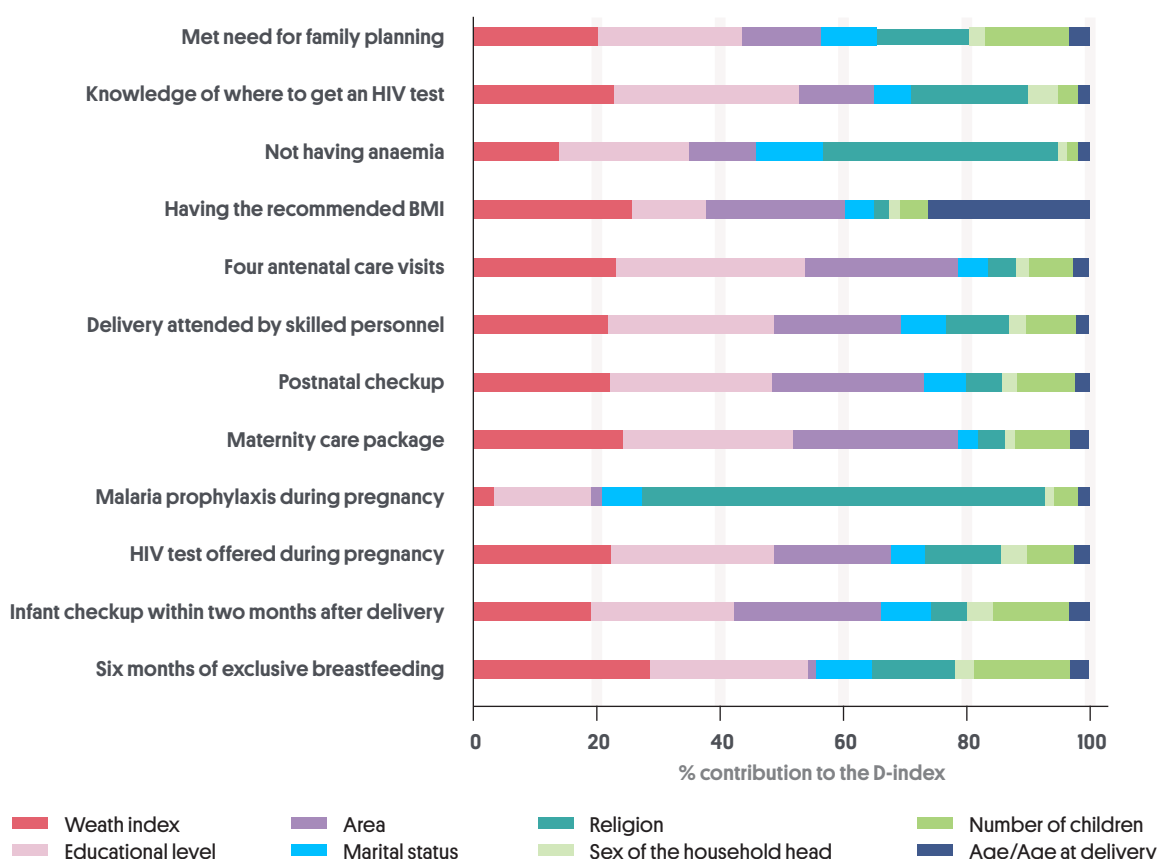
Note: The average contributions of circumstances to inequality of opportunity for the group of countries are calculated pooling all country samples and weighting them taking into account the number of women between 15 and 49 years old of each country.

4.2.2
Older adolescent girls (15-19 years old)

▪ The results obtained from the pooled analysis for the older adolescent girls group are similar to those previously observed for the country level analysis, with the most significant variation from the earlier results being the greater role of religion as a contributor to inequality (Figure 4.7). This finding could be related to certain religions being concentrated in a few countries, where unobserved country-specific factors likely affect access to services and outcomes in maternal and reproductive health for this subset of girls.

Figure 4.7 **Multi-country pooled analysis for older adolescent girls: circumstances' contributions to the D-index**
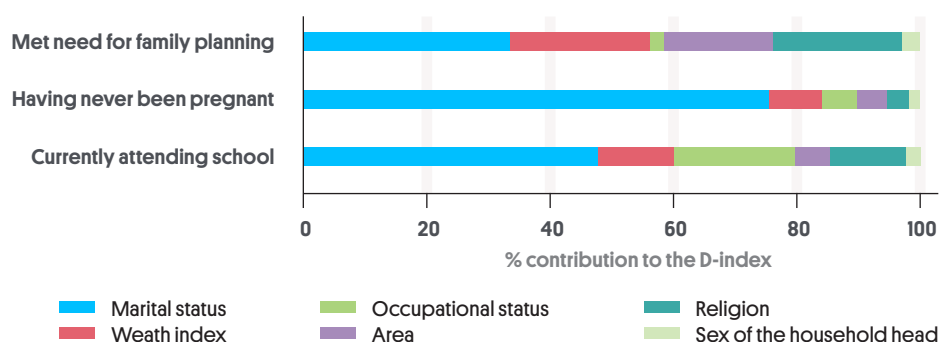
Note: The average contributions of circumstances to inequality of opportunity for the group of countries are calculated pooling all country samples and weighting them taking into account the number of women between 15 and 49 years old of each country.

Conclusions

▪ In general, results are similar to those obtained in the country level analysis, with a few exceptions. Wealth, education and area of residence are the most important contributors to inequality for adult women, while for older adolescent girls marital status is the main contributor.

▪ Religion has a more important role in the pooled analysis and appears to be a relevant contributor to inequality across SSA.

4.3
Adolescent girls and marital status: the major source of inequalities

Analyses of older adolescent girls' opportunities reveal that a major share of inequalities in this particular age group is attributable to differences in marital status. The large contribution of marital status indicates that the drivers of inequality are likely to be very different for groups with different marital status, which in turn makes the interpretation of the contributions from other circumstances difficult. To account for these differences, the same analyses (country level and multi-country pooled analysis) have been performed in this section for older adolescent girls by dividing them into two groups: adolescent girls who are married or "in union"[XII] (i.e. living with the partner, widowed, divorced or separated), and adolescent girls who were never in union.

4.3.1
Country level analysis results

▪ Wealth appears to be the highest contributor to inequalities between both groups of older adolescent girls (i.e. "in union" and "never in union") in most cases (Figure 4.8). The only exception to this pattern is observed for the group of "never in union" adolescents with regard to the "school attendance" opportunity, where differences in occupation contribute the most to the D-index.

▪ In all cases, there are differences in the order of importance of the contributors to inequality between the two groups of older adolescent girls, with the most significant differences seen for inequality in "school attendance", where occupation accounts for as much as 46 percent of the D-index (inequality) for the "never in union" adolescents.

▪ For the other two opportunities (i.e. "having never been pregnant" and "met need for family planning"), an important difference between the two groups is that "religion" is an important contributor to inequalities among "in union" adolescents, while "sex of the household head" is relatively more important for "never in union" adolescents.

[XII]Women currently or previously married or in union.

Figure 4.8 Country level analysis – Older adolescent girls' opportunities by marital status: circumstances' contributions to the D-index

Currently attending school
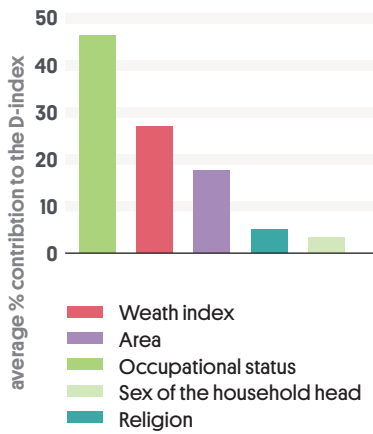
a. Never in union
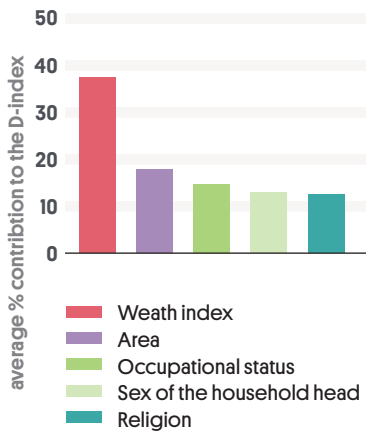
b. In union

Met need for family planning
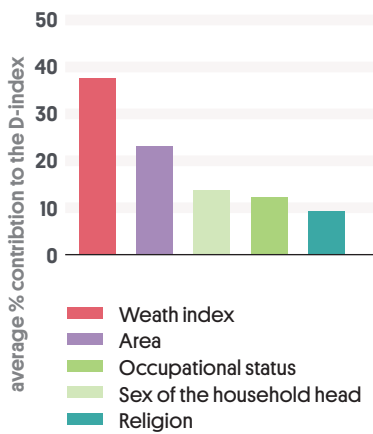
a. Never in union
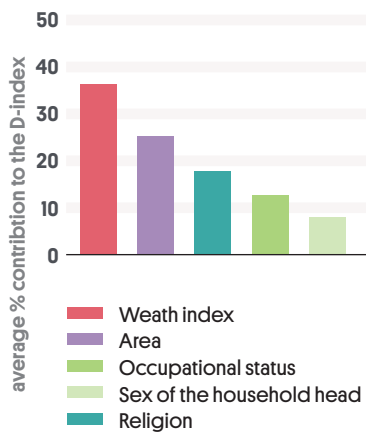
b. In union

figure continues next page

Figure 4.8 Country level analysis – Older adolescent girls' opportunities by marital status: circumstances' contributions to the D-index (continued)

Having never been pregnant

a. Never in union
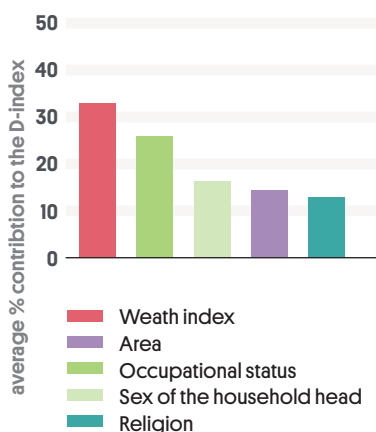
b. In union
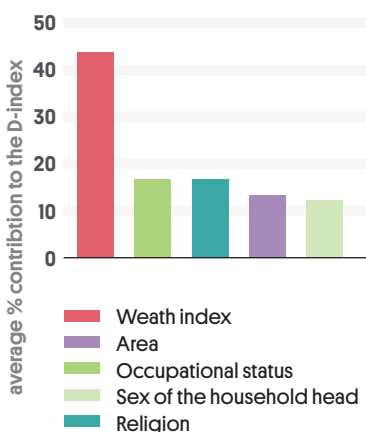
Note: The average contributions circumstances to inequality of opportunity for the group of countries are calculated as the unweighted or simple averages (across all countries) of Shapley decompositions of the D-index for that opportunity.

4.3.2
Multi-country pooled analysis results

In order to highlight the impact of marital status on the inequalities computed with the pooled data, weighted by the number of women in each country, the HOI and the D-index (inequality) are shown for each of the three opportunities applicable to adolescents for both subgroups (Figure 4.9).

- The HOIs for the "never in union" subgroup of adolescents are higher than those for the "in union" subgroup for all opportunities examined. Notably, there is a difference of almost 60 percent in adolescent pregnancies, over 50 percent in school attendance and about 25 percent in family planning needs between both groups of girls.

- Conversely, the D-index shows more inequalities among the subgroup of married or "in union" adolescents for all three opportunities – "school attendance", "met need for family planning" and "having never been pregnant"; 38 percent, 18 percent and 9 percent of the D-index, respectively, compared to ten percent, eight percent and one percent of the "never in union" subgroup.

Figure 4.9 **Multi-country pooled analysis – Older adolescent girls' opportunities by marital status: HOI and D-index by opportunity**

Currently attending school

a. Never in union

b. In union

Met need for family planning

a. Never in union

b. In union

Having never been pregnant

a. Never in union

b. In union

Note: The average HOIs and D-indices (inequality) for the group of countries are calculated pooling all country samples and weighting them taking into account the number of women between 15 and 49 years old of each country.

**Figure 4.10** Multi-country pooled analysis - Older adolescent girls' opportunities by marital status: circumstances' contributions to the D-index
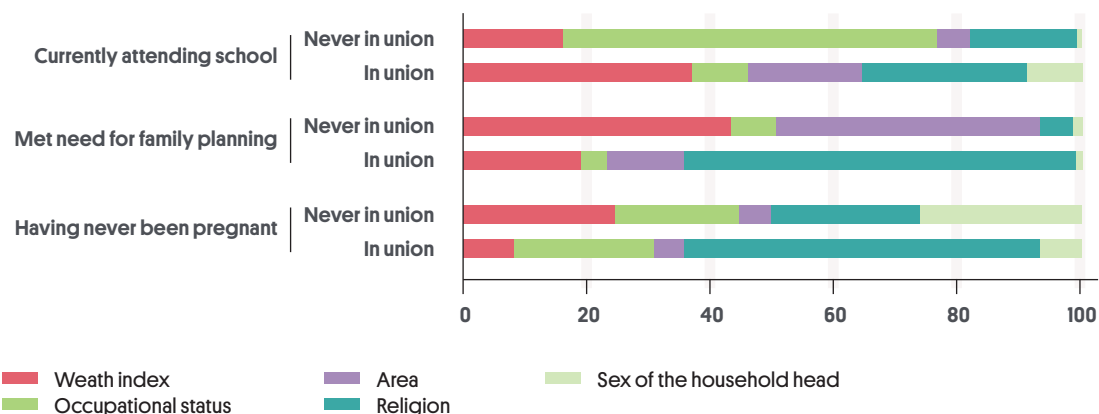

Note: The average contributions of circumstances to inequality of opportunity for the group of countries are calculated pooling all country samples and weighting them taking into account the number of women between 15 and 49 years old of each country.

- Shapley decompositions of the D-indices compared in Figure 4.10 show differences between the two subgroups that are qualitatively similar to what was observed in the averages obtained from country-specific analysis.

- For two of the three indicators ("met need for family planning" and "having never been pregnant"), religion is an important contributor to inequality among "in union" adolescents but not for the other group.

- For inequality in "school attendance", occupation is an important factor among the "never in union" group but not for the other group. A possible explanation of this finding could be that those girls who do not have a partner work for themselves and their families, whereas "in union" girls do not work outside home in many cases.

- Given the caveats discussed earlier, the results cannot be interpreted as the direct effect of religion on inequality of opportunities among older adolescent girls. What they show quite clearly are significant differences in the opportunities of older adolescent girls by religion, with these differences being much higher among married adolescents when it comes to meeting needs for family planning and the likelihood of being pregnant. Whether this indicates differential access to family planning services among married adolescent girls of different religions, is a question that would merit more in-depth analysis.

Conclusions

- In general, wealth is the main contributor to inequality for "in union" and "never in union" adolescents at country level.

- Religion appears to be an important driver of inequalities among "in union" adolescents in the multi-country pooled analysis.

- For all three indicators analysed, the HOI is always higher for "never in union" adolescents, and the D-index (inequality) is always lower for the same group, meaning that older adolescent girls that have ever been in union (married, living with their partner, etc.) have large disadvantages in access to reproductive health and education opportunities.

Key messages

- On average, wealth and related circumstances such as education and area of residence are the main sources of inequality for women of reproductive age health opportunities at country level in SSA.

- In the multi-country pooled analysis of women from all countries, a more prominent role of religion and a reduced contribution of wealth are observed.

- For older adolescent girls' education and reproductive health indicators and outcomes (i.e. access to contraception, pregnancy), the main source of inequalities is marital status.

  - In general, once marital status is controlled for, wealth becomes the first contributor to inequalities al country level.

  - For the "school attendance" opportunity, after adjusting for marital status, employment status of adolescents is the main source of inequality.

- For older adolescents, multi-country pooled analysis also shows a significant contribution of religion across countries.

  - Religion is more associated with inequalities for older adolescent girls who are married or have ever been in union, particularly with regards to access to family planning and becoming pregnant.

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Chapter 5.
Conclusions

5.1
Conclusions

Improvements in maternal, neonatal and reproductive health can only be achieved if access and quality of care are ensured for all women and girls, including those who are currently underserved or excluded from health systems[1]. In the transition to the new Sustainable Development Goals (SDGs) era, there is a need to focus more deliberately on improving the health of women, children and adolescents from an equity standpoint. The aim of this report is to highlight the sources of unequal and preventable health differences among women and adolescent girls in sub-Saharan Africa (SSA). It presents findings based on the most recent available information that can be used to inform policy at different levels. Additionally, the report introduces new metrics such as the Human Opportunity Index (HOI), which provides a novel approach to understanding the constraints and opportunities for achieving equity in maternal and reproductive health.

Table 5.1 Country level average HOIs and multi-country pooled HOIs

		HOIs (%)	
	Opptunities	**Country level average**	**Multi-country pooled average**
Women of reproductive age (15-49 years old)	**Not having anaemia**	45.47	62.55
	Having the recommended BMI	58.76	62.06
	Met need for family planning	46.26	46.14
	Knowledge of a place where to get an HIV test	66.48	60.90
Pregnant women	**Four antenatal care visits**	46.20	34.21
	Delivery attended by skilled personnel	53.10	36.96
	Postnatal checkup	52.77	40.90
	Maternity care package	26.08	15.87
	Malaria prophylaxis during pregnancy	47.45	42.52
	HIV test offered during pregnancy	61.26	57.51
	Infant checkup within two months after delivery	45.51	31.65
	Six months of exclusive breastfeeding	76.67	78.09
Older adolescent girls (15-19 years old)	**Met need for family planning**	37.80	40.01
	Having never been pregnant	63.72	66.24
	Currently attending school	39.45	40.17

Note: BMI = Body Mass Index, HIV = Human Immunodeficiency Virus. The country level average is the average of individual country HOIs. The multi-country pooled average is the predicted HOI for the group of countries that has been calculated by pooling all country samples and weighting them taking into account the number of women between 15 and 49 years old of each country.

In general, the findings of this analysis are in accordance with those of other articles and reports[2,3]: Overall, coverage of services is low; inequalities are driven by income, education and location (urban and rural) for most indicators across women in SSA. Baseline coverage is even lower, and inequalities higher, for those interventions that require higher provider-patient interaction (e.g. antenatal care or delivery attended by skilled personnel) than for interventions that could be delivered through strategies outside the health system (e.g. exclusive breastfeeding or HIV information and testing) (Table 5.2).

This report provides a novel approach to understand inequalities of opportunities in Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCAH) by simultaneously analysing all the factors – wealth, education, place of residence and others such as, religion, marital status or age –, that may affect inequality and their relative contributions to it. The findings suggest that wealth, educational level and area of residence (urban/rural) are the three main variables associated with inequality of access to health care by women. Notably, these socio-economic barriers to demand are often interlinked (Figure 5.3).

The HOI approach enables the establishment of associations between individual and household circumstances and inequality. It also allows quantification of the different levels of inequalities[XIII] that exist within and across countries and among different opportunities, as it is shown in Appendix A, where country-level specific data complement the regional findings. It also complements other existing data, such as the Countdown to 2015 reports[4].

Table 5.2 Opportunities ranked by inequality level (multi-country pooled analysis)

		D-index (%)			D-index (%)
1	Maternity care package	32.67	9	Having never been pregnant	15.30
2	Currently attending school	23.73	10	Knowledge of a place where to get an HIV test	11.46
3	Delivery attended by skilled personnel	23.32	11	HIV test offered during pregnancy	11.36
4	Four antenatal care visits	19.26	12	Malaria prophylaxis during pregnancy	7.34
5	Postnatal checkup	17.17	13	Having the recommended BMI	6.51
6	Infant checkup after delivery	15.89	14	Not having anaemia	4.46
7	Met need for family planning (older adolescents)	15.39	15	Six months of exclusive breastfeeding	1.11
8	Met need for family planning (20-49 years old)	15.37			

Note: D-index= dissimilarity index. The multi-country by pooling average is the predicted HOI for the group of countries that has been calculated by pooling all country samples and weighting them taking into account the number of women between 15 and 49 years old of each country.

[XIII]Although the existence of inequalities in maternal and reproductive health opportunities is well known, this report highlights the different levels of inequalities that exist among countries and among different opportunities.

Table 5.3 Three main contributors to inequality for each opportunity and subgroup of women

	Opportunities	Country level		Multi-country	
Women of reproductive age (15-49 years old)	**Not having anaemia**	Wealth index	27.31	Religion	38.32
		Marital status	16.79	Educational level	21.14
		Educational level	15.18	Wealth index	13.85
	Having the recommended BMI	Wealth index	26.38	Age	26.27
		Age	23.11	Wealth index	25.65
		Area (urban/rural)	17.60	Area (urban/rural)	22.39
	Met need for family planning	Wealth index	22.15	Educational level	23.59
		Marital status	19.47	Wealth index	20.29
		Educational level	18.36	Religion	15.05
	Knowledge of a place where to get an HIV test	Educational level	25.20	Educational level	30.42
		Wealth index	21.60	Wealth index	22.72
		Marital status	17.11	Religion	18.79
Pregnant women	**Four antenatal care visits**	Wealth index	31.83	Educational level	30.71
		Educational level	20.25	Area (urban/rural)	24.91
		Area (urban/rural)	17.24	Wealth index	23.20
	Delivery attended by skilled personnel	Wealth index	32.45	Educational level	27.20
		Area (urban/rural)	24.17	Wealth index	21.81
		Educational level	18.36	Area (urban/rural)	20.40
	Postnatal checkup	Wealth index	32.62	Educational level	26.27
		Area (urban/rural)	21.64	Area (urban/rural)	24.81
		Educational level	19.61	Wealth index	22.13
	Maternity care package	Wealth index	32.26	Educational level	27.60
		Area (urban/rural)	22.24	Area (urban/rural)	26.82
		Educational level	20.58	Wealth index	24.23
	Malaria prophylaxis during pregnancy	Wealth index	26.09	Religion	65.77
		Marital status	18.78	Educational level	15.88
		Educational level	15.19	Marital status	6.39
	HIV test offered during pregnancy	Wealth index	30.67	Educational level	26.60
		Area (urban/rural)	23.64	Wealth index	22.43
		Educational level	21.09	Area (urban/rural)	18.81
	Infant checkup within two months after delivery	Wealth index	31.40	Area (urban/rural)	23.94
		Area (urban/rural)	17.50	Educational level	23.24
		Educational level	16.65	Wealth index	19.06
	Six months of exclusive breastfeeding	Wealth index	25.09	Wealth index	28.56
		Marital status	19.92	Educational level	25.90
		Educational level	15.75	Number of children	15.59

table continues next page

Table 5.3 Three main contributors to inequality for each opportunity and subgroup of women (continued)

	Opportunities	Country level		Multi-country	
Older adolescent girls (15-19 years old)	**Met need for family planning**	Marital status	38.98	Marital status	33.31
		Wealth index	24.15	Wealth index	22.61
		Area (urban/rural)	16.03	Religion	20.99
	Having never been pregnant	Marital status	69.11	Marital status	75.24
		Wealth index	10.54	Wealth index	8.66
		Occupation	9.91	Occupation	5.69
	Currently attending school	Marital status	40.07	Marital status	47.63
		Occupation	28.19	Occupation	19.69
		Wealth index	15.43	Religion	12.26

Note: The country level average is the average of individual country HOIs. The multi-country pooled average is the predicted HOI for the group of countries that has been calculated by pooling all country samples and weighting them taking into account the number of women between 15 and 49 years old of each country.

Based on data analysed, the most pressing issues identified are:

- Baseline coverage of maternal and reproductive health services is very low: about half of women of reproductive age in SSA are not provided with routine maternity care components that have a potentially significant impact on maternal and infant health. Multi-country coverage rate of "four antenatal care visits" is 42 percent, "delivery attended by skilled personnel" is 48 percent and "mother checkup" is 49 percent. Adolescents are the most neglected group in terms of access to contraceptive information and services. While for all women of reproductive age, "met need for family planning" has a multi-country coverage rate of 55 percent and a country level average of 53 percent, for adolescent girls the multi-country coverage rate for "met need for family planning" is 47 percent, and the country level average is 46 percent. Importantly, the same proportion of women is not provided with preventive interventions for infectious diseases that contribute significantly to the burden of perinatal and neonatal deaths in the region. For example, multi-country coverage rate for "malaria prophylaxis during pregnancy" is lower than 50 percent (46) and coverage rates for HIV-related opportunities are around 65 percent.

- The combination of high inequality indices (D-index) with low HOIs and coverage rates for most RMNCAH indicators, suggests a situation of uneven distribution of available reproductive and maternal health opportunities. What this indicates is the dramatic situation for the poorest and most marginalised women, adolescent girls and newborns in SSA. With few exceptions for specific health opportunities such as "six months of exclusive breastfeeding", these groups are essentially excluded from the health system.

- For women of reproductive age as a whole (15-49 years old), wealth, education and area of residence (urban/rural) are the most prominent determinants of access to the health opportunities analysed. However, for older adolescent girls (15-19 years old), being married appears to be the main source of inequalities for all opportunities observed, with percentages ranging from 40 to 75 percent (see Table 5.3).

The descriptions of inequality of opportunity in this report may be relevant for decision-makers and managers in low and middle income countries (LMICs), and other development stakeholders in guiding broad strategic priorities and designing equity-oriented policies. They will also help to identify services with the largest inequality, as well as the most underserved groups. In turn, this may inform decisions on better targeting RMNCAH resources – both domestic and foreign – to support the scale-up of health interventions.

Actions directed to increase access to and use of quality maternal and reproductive health services and to reduce inequalities between women are urgently needed, especially in settings where baseline inequalities are high.

Box 9. Strengths and limitations of the study

The large number of countries and observations included in the analysis provides strong statistical power to the study.

The relationships presented here should not be interpreted as causal. Rather, the report provides information about associations between individual and household circumstances and inequality. In this respect, more context-specific research, including a number of causal relations to identify the determinants of inequalities, is needed in order to design the most appropriate interventions to address the observed inequities.

Notably, each of the 29 SSA countries included in the study has distinctive features that should be taken into account by policy makers to generate appropriate and effective policies. Although individual country results cannot be extrapolated to the rest of the SSA region, the results of the multi-country pooled analyses allow for drawing policy implications that could be generalised throughout the region.

The representativeness of the sample populations is an essential criterion in order to be generalisable. In this report the Demographic Health Surveys (DHS) samples used are representative of the populations they include[5].

The HOIs and the D-indices are always upper and lower bounds respectively. Thus, in all cases conclusions are drawn following the most conservative results.

Finally, the opportunities analysed in this report are strongly associated with individual efforts and decisions, therefore they are not "opportunities" in the strict economic sense. As explained in Chapters 1 and 2, the opportunities selected for the study are not as exogenous as would be desirable, since they are to a certain extent related to personal choices in the case of adult women. This is a limitation of this study.

5.2
Policy options for adolescent girls

Overall reproductive health opportunities among older adolescent girls scored low HOIs and high inequalities in these analyses. They appear to be the most neglected group in terms of access to contraceptive information and services, putting them at risk of early pregnancy and contracting HIV and other sexually transmitted diseases. Only around half have their family planning needs satisfied and are enrolled at school, and, on average, more than 20 percent have had a pregnancy before the age of 19 (multi-country pooled analysis results).

Addressing the needs of adolescent girls requires addressing potential factors that act as barriers to accelerating progress. Marital status, along with wealth and occupation, appear to be strongly correlated with inequality of opportunity for this group. Increasing access to schooling is a critical strategy in ending child marriage and ensuring that married girls have the opportunity to complete their education. Strategies aimed at retaining older adolescent girls in school, preferably through at least the end of secondary education, e.g. scholarships, conditional or unconditional cash transfers and economic assistance for material and transportation, are key. If expanded and promoted, they could help adolescent girls (and their families) to delay marriage and first pregnancy, while reducing the high fertility rates observed among adolescents[6]. Introducing economic incentives or schemes (cash transfers, scholarships microfinance, loans) to increase the economic security of girls and families can encourage families to avoid or postpone early entry of children into the workforce or other consider alternatives[7].

Beyond education, protection services need to be accessible via a number of channels (in the health facility, at school, in the community) in order to ensure that cases of child marriage in the community are responded to effectively. There is an urgent need for SSA countries to implement youth-friendly health services – for both unmarried and married girls –, as several African countries are already doing[8], and to make them accessible, acceptable and appropriate for adolescents' needs[9].

Advocating to strengthen, implement and fund laws and policies that prevent child marriage is crucial to upholding girls' rights. For example, advocacy in favour of raising the legal marriage age for girls to 18 years old and enforcing compliance where this already exists are crucial[9]. In addition, policies impeding girls' access to contraceptive methods by requiring parental or spousal consent need to be reviewed[10].

Further, policies should target adolescent girls as well as other influential family members, who are often the decision makers on their behalf, and communities, which can have a powerful influence over them[11].

5.3
Final considerations

Despite progress between 1990 and 2015 in some Millennium Development Goals (MDGs) indicators, the target of reducing maternal mortality by 75 percent was not achieved. Importantly, inequality within and among countries for this indicator is growing. The gap in levels of maternal mortality between the best and worst performing countries in the past 20 years has doubled[12]. Though more women and adolescent girls are receiving services (e.g. delivery with a skilled birth attendant, antenatal care visits), these are often of poor-quality. In addition, many still undergo pregnancy and childbirth outside the health system or do not access modern contraceptives, the most cost-effective intervention to curb the number of maternal deaths[13,14].

Ensuring access to and availability of these basic services for the most vulnerable women, adolescents and newborns is necessary, and remains one of the most pressing issues to address the high risk of death from causes related to pregnancy and childbirth that millions of women and girls in SSA face on a daily basis. Moreover, prioritising provision of equitable access to reproductive, maternal and perinatal healthcare is a prerequisite to achieve the SDG3 targets associated with maternal, reproductive health and other related issues such as SDG5, gender equality or SDG10, reduced inequalities (see Box 1, Chapter 1).

The main circumstance that poses a major barrier to the health and wellbeing of women and girls in most opportunities analysed is the unequal distribution of wealth. Thus, efforts to increase the incomes of the poorest segments of the population may have a significant impact on maternal mortality reduction in all settings. Furthermore, the pathway towards universal health coverage (UHC) – defined by the World Health Organization (WHO) as the situation in which "all people receive the health services they need without suffering financial hardship when paying for them"[15] –, appears as the goal to work for to alleviate the financial constraints that deter less affluent women and girls from seeking and accessing health services.

An approach towards progressive universalisation can advance the RMNCAH agenda by ensuring focus on and acceleration of effective coverage of key lifesaving interventions (e.g. childbirth attended by skilled personnel, emergency obstetric care). Additionally, those efforts should be driven by locally designed and tailored policies oriented to favour first the poorest and most excluded subsets, especially for those services where baseline inequalities are very marked, to ensure that the most vulnerable women's needs are addressed and prioritised[16] (e.g. marginalised groups could be exempted from or receive subsidies for user fees, premiums or co-payments, transportation subsidized, etc.). The present situation in SSA countries is far from UHC, and thus governments and stakeholders should prioritise actions towards scaling-up coverage of quality maternal and reproductive health services with the above-mentioned pro-poor approach aimed to curb

inequalities. This requires political will and mobilisation, sustained financing for health systems strengthening as well as new tools and knowledge.

The financial gap to scale-up coverage of an essential package of reproductive, maternal and newborn health services poses a major but attainable challenge that can secure large health, social, and economic returns[17]. The Global Financing Facility launched in 2015 offers a window of opportunity for increased coordination and dialogue between donors and LMICs to address the resource gap and guarantee sustainable financing mechanisms for woman, child and adolescent health over the next years[18].

As we transition to the SDGs era, a number of external factors can influence the progress of the new agenda[16]. Challenges range from future humanitarian crises, global health governance issues, political instability, ensuring sustained momentum for RMNCAH among many competing health targets, to LMICs ability to increase their domestic fiscal space for health. The ability of the RMNCAH community to navigate such complex issues will determine effective and equitable provision of maternal and reproductive health that leaves no one behind.

Finally, research is a central component to advance the post-2015 agenda in a more equitable way. Commensurate with the magnitude of the problem, more efforts and resources should be devoted to the evaluation of inequalities in access to health services and health outcomes. It is imperative to measure the extent of gaps in access to maternal-perinatal and reproductive health services and outcomes between population groups and the determinants of (or contributors to) these gaps, as well as tracking how coverage and inequalities for interventions change over time. Moreover, there is a need to generate more data concerning highly vulnerable groups such as migrant women and adolescents including younger adolescents and women in humanitarian crisis settings.

Box 10. **Data gaps identified**

Despite notable progress in recent years, important gaps remain in the availability of data collected through DHS:

- Data about younger adolescent girls (10-14 years old) are missing. Unlike data on older adolescent girls (15-19 years old), which are routinely recorded in the DHS as well as in other household surveys, information on younger adolescents is almost always obtained through retrospective questions asked to women 15 and older. DHS and other household surveys funders and stakeholders need to make an effort to include this subset of younger adolescent girls in their surveys to enable new data generation that identifies their needs.

- Indicators related to newborn health opportunities, such as newborn checkup within hours after delivery, are included in the DHS, but are of poor quality in many countries. Frequently, values are missing for questions regarding the first hours after birth that may be due to respondents' inability to recall information or the low number of women attending the newborn checkup within hours after delivery. While these data gaps are not filled, possible alternatives to obtain quality information about newborn health opportunities could be obtained through health facility survey data and records.

- Six out of the 29 SSA countries included in this report do not have available data on anaemia for women of reproductive age. Additionally, domestic violence and migration status indicators – two circumstances that can drive inequalities – were not included in the analysis because of lack of data (see Chapter 2).

- This report covers around 79 percent of the SSA population. The DHS do not have available data on the other 21 percent for the period 2010 and later, although some surveys are currently being carried out. These and other existing gaps highlight the need for innovative measurement approaches and support to SSA countries to upgrade their capacity to develop and implement better and sound measurement approaches.

Key messages

- Despite notable progress achieved in the last decade, overall reproductive and maternal health opportunities for women and girls in SSA are scarce and unequally distributed. As a result, a lack of services and a major burden of disease are more concentrated among the worst-off, the less-educated and those living in rural settings.

- Further progress in improving women's and adolescents' health and well-being can only be achieved by expanding coverage and reducing inequalities. This requires scale-up of needed services currently unavailable to large proportions of women and girls, while targeting first underserved populations in order to curb the inequality gaps that can otherwise impede acceleration of overall progress and the achievement of the SDGs targets. SSA countries and the RMNCAH community at large need political mobilisation and sustained financing for health system strengthening.

- Ensuring access for all women everywhere to skilled attendance in childbirth is key to addressing the high risk of death from causes related to pregnancy and childbirth; this is especially critical for the poorest and most marginalised women, girls and newborns, and thus, they should be prioritised. However, this is one of the biggest obstacles that lies ahead because of the challenge to provide access to quality care 24/7 in the context of weak health systems poses.

- Adolescent girls are a highly vulnerable group among women of reproductive age with very poor results in terms of access to reproductive health services and educational achievements. Early marriage is the main contributor to poor maternal and reproductive health indicators and outcomes for this group.

- Ensuring equitable expansion of health coverage should be the cornerstone of efforts to meet SDG3 – including the reproductive, maternal and child health targets – and the ultimate goal of achieving universal health coverage.

- Actions outside the health system focused on poverty reduction, raising educational achievements and improving communities' physical access to healthcare or ending child marriage have the potential to reduce inequalities in maternal and reproductive health, and highlight the need to strengthen inter-sectorial co-operation and coordination mechanisms among health and other sectors concerned.

- Research has a key role to play to further ascertain the levels and causes of inequalities, bridge the existing data gaps for specific subgroups of vulnerable women and girls, as well as for monitoring and accountability purposes.

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Appendix A

Table A1 Levels: Currently attending school (older adolescent girls)

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	38.35	25.95	13.44	51.79	0.81
Burkina Faso	13.34	42.69	9.94	23.28	0.57
Burundi	37.93	29.92	16.19	54.13	1.03
Cameroon	45.43	23.09	13.64	59.07	0.75
Comoros	63.31	12.74	9.24	72.56	1.53
Congo	50.19	21.52	13.76	63.95	1.33
Congo DR	46.38	21.24	12.51	58.89	0.91
Côte d'Ivoire	17.79	40.97	12.35	30.14	0.90
Ethiopia	45.29	19.73	11.14	56.43	0.95
Gabon	72.33	9.86	7.91	80.25	1.61
The Gambia	37.40	25.80	13.00	50.40	1.01
Ghana	38.21	15.61	7.07	45.28	1.41
Guinea	23.30	37.32	13.88	37.18	0.89
Kenya	56.93	17.86	12.38	69.31	1.00
Liberia	57.32	12.98	8.55	65.87	1.32
Malawi	43.38	23.46	13.29	56.68	0.64
Mali	17.77	40.28	11.98	29.75	0.76
Mozambique	27.42	34.10	14.19	41.60	0.85
Namibia	65.71	10.34	7.58	73.29	1.12
Niger	6.01	61.81	9.73	15.74	0.41
Nigeria	34.04	31.25	15.47	49.51	0.43
Rwanda	39.78	22.78	11.73	51.51	0.99
Senegal	36.99	21.55	10.16	47.15	1.15
Sierra Leone	45.74	21.93	12.85	58.59	0.79
Tanzania	24.92	38.68	15.72	40.64	0.90
Togo	38.42	28.55	15.35	53.77	0.90
Uganda	43.81	24.21	13.99	57.80	0.85
Zambia	44.54	19.78	10.98	55.52	0.81
Zimbabwe	32.22	29.11	13.23	45.45	0.91

Table A2 Levels: Having never been pregnant (older adolescent girls)

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	73.85	11.89	9.96	83.81	0.56
Burkina Faso	61.10	18.97	14.30	75.40	0.91
Burundi	83.19	7.98	7.22	90.40	0.56
Cameroon	62.17	16.92	12.67	74.83	0.78
Comoros	79.44	10.44	9.26	88.70	0.74
Congo	52.01	22.40	15.01	67.02	0.85
Congo DR	58.76	19.23	13.99	72.75	0.73
Côte d'Ivoire	59.89	15.07	10.63	70.52	1.35
Ethiopia	78.47	10.54	9.24	87.72	0.92
Gabon	63.63	12.05	8.72	72.35	1.52
The Gambia	71.31	13.72	11.33	82.64	1.00
Ghana	80.18	6.57	5.64	85.82	1.13
Guinea	50.95	22.50	14.80	65.75	1.14
Kenya	73.93	9.98	8.20	82.12	0.87
Liberia	59.87	12.76	8.76	68.63	1.37
Malawi	59.42	20.14	14.99	74.41	0.65
Mali	44.23	27.17	16.50	60.74	1.13
Mozambique	47.09	24.46	15.25	62.34	1.02
Namibia	76.35	6.26	5.09	81.45	1.08
Niger	45.12	24.24	14.44	59.56	1.44
Nigeria	63.93	17.60	13.66	77.58	0.59
Rwanda	89.51	3.45	3.20	92.71	0.50
Senegal	71.75	12.90	10.63	82.38	1.28
Sierra Leone	61.94	14.16	10.22	72.16	0.77
Tanzania	65.75	14.74	11.37	77.12	1.01
Togo	74.23	11.14	9.30	83.53	0.79
Uganda	62.48	17.96	13.68	76.16	0.93
Zambia	60.06	16.08	11.51	71.57	0.67
Zimbabwe	62.08	18.76	14.33	76.41	1.02

Table A3 Levels: Met need for family planning (older adolescent girls)

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	46.00	15.47	8.42	54.42	1.73
Burkina Faso	26.63	30.36	11.61	38.25	1.81
Burundi	23.38	24.11	7.43	30.82	4.27
Cameroon	49.72	16.06	9.51	59.24	1.73
Comoros	26.96	27.21	10.08	37.04	3.89
Congo	64.64	8.97	6.37	71.01	2.33
Congo DR	38.04	13.89	6.14	44.18	2.13
Côte d'Ivoire	38.86	19.75	9.56	48.42	2.38
Ethiopia	36.21	17.45	7.66	43.87	3.28
Gabon	55.84	12.11	7.69	63.53	2.46
The Gambia	12.40	26.87	4.56	16.96	3.14
Ghana	37.72	11.19	4.75	42.47	3.31
Guinea	19.63	28.82	7.95	27.58	1.93
Kenya	51.57	12.47	7.35	58.92	3.04
Liberia	32.53	14.34	5.45	37.98	2.00
Malawi	43.42	12.39	6.14	49.56	1.97
Mali	22.03	22.87	6.53	28.56	2.42
Mozambique	21.59	32.35	10.32	31.92	1.65
Namibia	68.45	7.67	5.69	74.13	2.18
Niger	29.06	14.28	4.84	33.90	3.50
Nigeria	36.43	26.94	13.44	49.87	1.37
Rwanda	25.97	34.41	13.63	39.60	3.52
Senegal	28.91	27.18	10.79	39.70	3.35
Sierra Leone	49.65	13.08	7.47	57.13	1.47
Tanzania	47.37	12.42	6.72	54.09	3.10
Togo	37.31	21.55	10.25	47.56	2.38
Uganda	37.74	21.52	10.35	48.09	3.34
Zambia	35.58	19.71	8.73	44.32	1.96
Zimbabwe	53.18	12.20	7.39	60.56	3.22

Table A4 Levels: Not having anaemia

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	56.61	3.34	1.96	58.56	0.81
Burkina Faso	48.33	5.61	2.87	51.21	0.65
Burundi	79.12	2.94	2.39	81.52	0.76
Cameroon	58.37	3.34	2.02	60.38	0.68
Congo	43.95	4.10	1.88	45.83	1.21
Congo DR	59.99	2.67	1.65	61.63	0.74
Côte d'Ivoire	44.40	3.85	1.78	46.17	1.00
Ethiopia	80.81	3.06	2.55	83.36	0.51
Gabon	36.80	6.58	2.59	39.40	1.16
The Gambia	36.82	10.68	4.40	41.22	0.88
Ghana	54.76	4.99	2.88	57.64	0.91
Guinea	47.74	6.08	3.09	50.83	0.88
Malawi	68.78	2.77	1.96	70.75	0.74
Mali	45.75	5.84	2.84	48.59	0.85
Mozambique	43.90	4.60	2.12	46.01	0.58
Namibia	77.46	2.44	1.94	79.39	0.77
Niger	51.89	4.25	2.30	54.19	0.91
Rwanda	79.14	2.02	1.63	80.77	0.58
Sierra Leone	51.80	6.28	3.47	55.27	0.72
Tanzania	58.17	2.91	1.74	59.91	0.68
Togo	49.18	5.37	2.79	51.96	0.89
Uganda	74.63	3.01	2.32	76.95	1.11
Zimbabwe	70.35	2.00	1.44	71.79	0.61

Table A5 Levels: Having the recommended BMI

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	61.74	7.25	4.82	66.56	0.46
Burkina Faso	70.94	4.21	3.12	74.07	0.61
Burundi	74.14	3.67	2.82	76.96	0.74
Cameroon	54.15	10.76	6.53	60.68	0.65
Comoros	49.46	10.99	6.11	55.57	0.89
Congo	55.30	8.36	5.04	60.34	1.15
Congo DR	67.42	4.28	3.01	70.43	0.73
Côte d'Ivoire	61.44	8.08	5.40	66.84	0.96
Ethiopia	66.66	3.52	2.43	69.09	0.59
Gabon	41.49	14.18	6.85	48.35	1.12
The Gambia	57.37	5.93	3.62	60.99	1.07
Ghana	44.71	16.57	8.88	53.59	0.89
Guinea	64.50	6.47	4.47	68.96	0.87
Kenya	52.94	9.63	5.64	58.58	0.62
Liberia	60.31	9.01	5.97	66.28	1.08
Malawi	70.72	4.32	3.20	73.92	0.76
Mali	67.09	6.07	4.33	71.42	0.75
Mozambique	70.68	6.26	4.72	75.39	0.46
Namibia	49.11	10.59	5.82	54.93	0.90
Niger	65.15	5.62	3.88	69.04	0.77
Nigeria	59.27	7.72	4.96	64.23	0.32
Rwanda	67.77	5.50	3.95	71.71	0.63
Sierra Leone	69.07	4.85	3.52	72.59	0.70
Tanzania	63.44	6.75	4.59	68.04	0.65
Togo	54.99	11.46	7.12	62.11	0.83
Uganda	65.94	6.23	4.38	70.32	1.12
Zambia	62.03	7.52	5.04	67.07	0.52
Zimbabwe	56.06	8.87	5.46	61.52	0.62

Table A6 Levels: Met need for family planning

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	27.11	16.77	5.46	32.57	0.62
Burkina Faso	34.40	20.39	8.81	43.22	0.70
Burundi	35.73	11.34	4.57	40.30	1.05
Cameroon	47.51	17.62	10.16	57.67	0.71
Comoros	32.37	19.64	7.91	40.28	1.40
Congo	72.24	5.88	4.51	76.75	0.98
Congo DR	39.74	14.41	6.69	46.43	0.92
Côte d'Ivoire	39.03	16.46	7.69	46.72	1.04
Ethiopia	45.06	16.34	8.80	53.87	1.00
Gabon	55.39	10.34	6.39	61.77	1.26
The Gambia	22.67	24.55	7.38	30.04	1.08
Ghana	46.96	10.54	5.53	52.50	1.02
Guinea	20.38	32.51	9.82	30.19	0.88
Kenya	73.55	5.94	4.65	78.20	0.65
Liberia	40.45	10.96	4.98	45.43	1.06
Malawi	61.13	6.12	3.98	65.11	0.60
Mali	22.83	24.35	7.35	30.18	0.86
Mozambique	29.84	22.35	8.59	38.43	0.88
Namibia	78.43	4.53	3.72	82.15	0.68
Niger	42.07	11.70	5.58	47.64	1.20
Nigeria	44.67	20.66	11.63	56.31	0.53
Rwanda	68.42	4.92	3.54	71.97	0.70
Senegal	40.54	16.21	7.84	48.38	1.25
Sierra Leone	42.55	15.86	8.02	50.57	0.83
Tanzania	53.82	10.31	6.19	60.01	0.95
Togo	36.78	13.76	5.87	42.65	0.87
Uganda	43.65	15.49	8.00	51.65	1.01
Zambia	66.59	5.32	3.74	70.34	0.67
Zimbabwe	77.73	3.43	2.76	80.49	0.75

Table A7 Levels: Knowledge of a place where to get an HIV test

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	47.16	14.27	7.85	55.01	0.41
Burkina Faso	67.62	6.83	4.96	72.58	0.43
Burundi	81.38	4.82	4.12	85.50	0.52
Cameroon	35.78	9.96	3.96	39.74	0.45
Comoros	24.75	23.26	7.50	32.25	0.71
Congo	66.47	9.77	7.20	73.67	0.64
Congo DR	41.31	19.54	10.03	51.34	0.51
Côte d'Ivoire	53.14	14.45	8.98	62.12	0.65
Ethiopia	58.14	12.53	8.33	66.47	0.60
Gabon	85.15	4.34	3.86	89.02	0.65
The Gambia	62.91	8.25	5.65	68.56	0.65
Ghana	72.36	7.81	6.13	78.49	0.55
Guinea	32.83	16.93	6.69	39.52	0.59
Kenya	95.41	1.74	1.69	97.10	0.23
Liberia	70.07	7.97	6.07	76.14	0.61
Malawi	95.65	1.33	1.29	96.94	0.21
Mali	19.23	28.77	7.77	27.00	0.45
Mozambique	72.95	7.00	5.49	78.44	0.55
Namibia	96.14	1.23	1.20	97.34	0.26
Niger	37.15	16.22	7.19	44.34	0.59
Nigeria	49.05	18.72	11.30	60.35	0.30
Rwanda	98.77	0.39	0.39	99.16	0.12
Senegal	70.02	7.63	5.79	75.81	0.00
Sierra Leone	66.57	5.55	3.91	70.48	0.47
Tanzania	89.52	3.07	2.84	92.36	0.43
Togo	63.78	11.34	8.16	71.94	0.55
Uganda	92.40	2.42	2.29	94.68	0.38
Zambia	94.88	1.66	1.60	96.48	0.24
Zimbabwe	87.39	3.60	3.26	90.65	0.43

Table A8 Levels: Four antenatal care visits

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	51.87	13.64	8.19	60.06	0.57
Burkina Faso	9.44	29.35	3.92	13.36	0.31
Burundi	31.83	4.85	1.62	33.46	0.79
Cameroon	53.58	14.65	9.19	62.78	0.68
Comoros	51.45	9.90	5.65	57.10	1.56
Congo	74.04	6.22	4.91	78.95	0.75
Congo DR	30.38	13.85	4.88	35.26	0.65
Côte d'Ivoire	35.89	18.82	8.32	44.21	0.85
Ethiopia	10.28	35.69	5.70	15.98	0.49
Gabon	73.86	6.98	5.54	79.41	0.94
The Gambia	75.00	3.40	2.64	77.64	0.89
Ghana	76.50	6.72	5.51	82.01	0.75
Guinea	42.92	16.87	8.71	51.64	0.84
Kenya	14.98	22.98	4.47	19.45	0.53
Liberia	74.00	5.72	4.49	78.49	0.76
Malawi	42.48	3.86	1.71	44.18	0.57
Mali	20.98	29.00	8.57	29.56	0.57
Mozambique	29.14	18.29	6.52	35.66	0.66
Namibia	77.96	4.19	3.41	81.37	0.92
Niger	28.65	10.01	3.19	31.84	0.66
Nigeria	36.17	26.63	13.13	49.30	0.37
Rwanda	40.38	7.99	3.51	43.89	0.71
Senegal	43.24	12.41	6.13	49.37	0.99
Sierra Leone	85.02	1.80	1.56	86.59	0.52
Tanzania	34.73	11.80	4.64	39.38	0.80
Togo	36.52	21.72	10.13	46.66	0.74
Uganda	44.51	7.29	3.50	48.01	0.90
Zambia	51.59	5.35	2.91	54.51	0.65
Zimbabwe	62.27	4.99	3.27	65.54	0.88

Table A9 Levels: Delivery attended by skilled personnel

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	75.21	8.41	6.91	82.12	0.50
Burkina Faso	18.01	30.45	7.88	25.89	0.41
Burundi	57.60	8.74	5.51	63.11	0.85
Cameroon	53.84	20.51	13.89	67.73	0.57
Comoros	80.18	6.11	5.21	85.40	1.20
Congo	90.23	3.56	3.34	93.57	0.38
Congo DR	45.91	10.10	5.16	51.06	0.69
Côte d'Ivoire	52.57	15.83	9.88	62.45	0.90
Ethiopia	4.91	58.41	6.90	11.81	0.30
Gabon	88.65	3.53	3.24	91.89	0.58
The Gambia	57.22	13.95	9.27	66.49	0.77
Ghana	63.45	13.03	9.51	72.96	0.85
Guinea	30.72	29.38	12.79	43.51	0.72
Kenya	56.85	14.83	9.90	66.75	0.72
Liberia	57.32	11.45	7.41	64.74	0.82
Malawi	69.88	5.67	4.20	74.08	0.53
Mali	28.46	29.62	11.97	40.43	0.62
Mozambique	15.70	27.95	6.09	21.79	0.50
Namibia	85.21	5.16	4.64	89.85	0.66
Niger	23.84	27.89	9.22	33.06	0.59
Nigeria	25.35	36.97	14.87	40.22	0.29
Rwanda	87.99	3.09	2.80	90.79	0.51
Senegal	50.69	16.37	9.92	60.61	0.83
Sierra Leone	56.45	9.88	6.19	62.64	0.69
Tanzania	42.89	19.02	10.07	52.96	0.82
Togo	48.43	21.49	13.26	61.69	0.74
Uganda	53.14	12.29	7.44	60.59	0.89
Zambia	59.85	12.95	8.90	68.75	0.62
Zimbabwe	59.20	12.11	8.16	67.36	0.86

Table A10 Levels: Delivery attended by skilled personnel, by place of delivery

Country	Home deliveries					Deliveries in health facilities				
	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	4.29	38.37	2.67	6.97	0.53	89.92	2.74	2.53	92.45	0.40
Burkina Faso	0.17	50.73	0.17	0.34	0.06	27.49	23.14	8.28	35.76	0.59
Burundi	0.63	53.97	0.74	1.38	0.15	99.35	0.20	0.20	99.55	0.18
Cameroon	4.33	45.59	3.63	7.97	0.47	99.18	0.25	0.25	99.42	0.20
Comoros	22.78	27.01	8.43	31.20	0.00	99.54	0.21	0.21	99.75	0.27
Congo	18.24	23.66	5.65	23.89	1.76	98.97	0.34	0.34	99.31	0.16
Congo DR	15.72	11.01	1.95	17.67	1.06	54.81	7.17	4.23	59.04	0.79
Côte d'Ivoire	4.89	27.00	1.81	6.69	0.58	98.82	0.42	0.41	99.23	0.25
Ethiopia	0.19	64.50	0.34	0.53	0.05	94.49	2.07	2.00	96.49	1.20
Gabon	4.17	47.39	3.75	7.92	0.88	97.41	0.55	0.54	97.95	0.57
The Gambia	2.33	31.17	1.05	3.38	0.30	99.78	0.09	0.09	99.87	0.09
Ghana	1.52	51.22	1.59	3.11	0.34	94.57	1.43	1.37	95.94	0.50
Guinea	5.36	48.41	5.03	10.39	0.44	84.16	5.88	5.26	89.42	1.03
Kenya	2.31	25.78	0.80	3.11	0.34	98.92	0.25	0.25	99.17	0.24
Liberia	9.87	31.14	4.46	14.34	0.72	96.72	0.95	0.93	97.65	0.39
Malawi	0.39	51.20	0.41	0.79	0.11	96.32	0.51	0.49	96.81	0.27
Mali	1.70	35.92	0.96	2.66	0.26	59.01	13.12	8.91	67.92	0.99
Mozambique	-	-	-	0.00	-	30.83	13.45	4.79	35.62	0.87
Namibia	6.50	24.80	2.14	8.65	1.18	99.58	0.13	0.13	99.71	0.14
Niger	0.61	28.56	0.24	0.85	0.11	94.41	1.75	1.68	96.09	0.63
Nigeria	3.12	53.07	3.52	6.64	0.15	94.39	1.74	1.67	96.06	0.33
Rwanda	0.21	67.16	0.44	0.65	0.12	99.76	0.09	0.09	99.86	0.09
Senegal	1.83	64.80	3.37	5.21	0.31	70.59	6.49	4.90	75.48	0.98
Sierra Leone	9.37	35.50	5.16	14.52	0.53	98.58	0.35	0.35	98.93	0.22
Tanzania	1.47	33.99	0.76	2.23	0.26	94.37	1.69	1.62	95.99	0.62
Togo	0.61	62.27	1.00	1.61	0.20	73.99	9.49	7.76	81.75	0.83
Uganda	4.00	18.41	0.90	4.91	0.52	96.97	0.51	0.50	97.47	0.45
Zambia	0.42	38.71	0.27	0.69	0.13	93.21	2.16	2.06	95.27	0.40
Zimbabwe	2.96	27.59	1.13	4.09	0.41	98.94	0.36	0.36	99.31	0.26

Table A11 Levels: Postnatal checkup

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	62.38	8.04	5.45	67.83	0.56
Burkina Faso	81.21	3.95	3.34	84.56	0.47
Burundi	27.18	12.00	3.71	30.89	0.75
Cameroon	36.36	18.65	8.34	44.70	0.61
Comoros	60.49	7.85	5.15	65.65	1.45
Congo	73.74	5.87	4.60	78.34	0.73
Congo DR	44.44	10.60	5.27	49.71	0.70
Côte d'Ivoire	76.58	5.62	4.56	81.13	0.80
Ethiopia	5.22	44.10	4.12	9.34	0.34
Gabon	71.10	5.39	4.05	75.15	0.99
The Gambia	74.33	5.16	4.04	78.37	0.69
Ghana	81.72	5.40	4.66	86.39	0.71
Guinea	37.42	15.86	7.06	44.48	0.82
Kenya	52.53	12.57	7.55	60.09	0.75
Liberia	71.32	5.77	4.37	75.69	0.78
Mali	39.66	17.80	8.59	48.24	0.71
Mozambique	63.79	7.31	5.03	68.82	0.77
Namibia	82.33	4.58	3.95	86.29	0.73
Niger	36.61	14.87	6.39	43.00	0.69
Nigeria	31.62	28.15	12.39	44.02	0.35
Rwanda	42.18	6.38	2.87	45.06	0.72
Senegal	77.77	7.67	6.46	84.23	0.69
Sierra Leone	78.94	3.01	2.45	81.39	0.58
Togo	77.06	6.08	4.99	82.05	0.71
Uganda	32.04	15.29	5.79	37.83	0.81
Zambia	66.63	8.90	6.51	73.14	0.60
Zimbabwe	45.60	11.07	5.68	51.28	0.86

Table A12 Levels: Maternity care package

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	35.63	18.21	7.93	43.56	0.53
Burkina Faso	6.25	37.04	3.68	9.93	0.25
Burundi	9.94	15.26	1.79	11.73	0.50
Cameroon	23.02	27.97	8.94	31.96	0.48
Comoros	31.85	14.64	5.46	37.31	1.37
Congo	57.46	10.45	6.70	64.16	0.84
Congo DR	10.89	25.99	3.82	14.71	0.46
Côte d'Ivoire	24.86	26.27	8.86	33.72	0.72
Ethiopia	1.17	70.41	2.79	3.96	0.12
Gabon	52.98	10.70	6.35	59.33	1.12
The Gambia	43.28	13.49	6.75	50.03	0.80
Ghana	53.82	15.57	9.93	63.75	0.88
Guinea	15.62	34.80	8.34	23.95	0.56
Kenya	8.42	34.58	4.45	12.86	0.39
Liberia	42.67	14.72	7.36	50.03	0.83
Mali	12.05	39.06	7.72	19.77	0.42
Mozambique	6.96	35.50	3.83	10.80	0.31
Namibia	57.77	11.17	7.26	65.03	0.98
Niger	8.21	32.42	3.94	12.14	0.36
Nigeria	16.23	42.22	11.86	28.10	0.24
Rwanda	17.50	13.78	2.80	20.30	0.53
Senegal	24.35	23.89	7.64	31.99	0.77
Sierra Leone	44.58	11.09	5.56	50.15	0.69
Togo	28.37	27.63	10.83	39.19	0.67
Uganda	14.44	23.74	4.49	18.93	0.59
Zambia	31.28	14.91	5.48	36.76	0.57
Zimbabwe	24.63	19.77	6.07	30.70	0.71

Table A13 Levels: Malaria prophylaxis during pregnancy

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	43.97	5.33	2.47	46.45	0.66
Burkina Faso	58.73	5.48	3.40	62.13	1.06
Burundi	0.22	46.98	0.20	0.42	0.08
Cameroon	48.21	6.20	3.18	51.39	0.75
Comoros	48.42	6.22	3.21	51.63	1.49
Congo	52.09	4.31	2.34	54.43	1.13
Congo DR	34.22	7.65	2.84	37.06	0.84
Côte d'Ivoire	27.79	8.01	2.42	30.21	0.86
Gabon	5.45	17.58	1.16	6.62	0.56
The Gambia	92.74	1.39	1.31	94.04	0.69
Ghana	84.94	2.18	1.89	86.83	0.84
Guinea	34.32	7.52	2.79	37.11	0.92
Kenya	23.82	13.70	3.78	27.60	1.30
Liberia	66.11	3.22	2.20	68.31	0.96
Malawi	88.31	1.50	1.35	89.66	0.38
Mali	68.52	4.95	3.57	72.09	1.00
Mozambique	44.28	7.93	3.81	48.09	0.89
Namibia	7.13	17.42	1.50	8.63	0.48
Niger	70.31	1.65	1.18	71.49	0.73
Nigeria	33.02	14.95	5.81	38.83	0.54
Senegal	79.14	3.51	2.88	82.02	0.80
Sierra Leone	65.26	3.13	2.11	67.37	0.67
Tanzania	63.47	5.04	3.37	66.84	0.93
Togo	81.45	1.55	1.28	82.74	0.82
Uganda	47.21	5.99	3.01	50.22	0.93
Zambia	93.06	1.35	1.27	94.33	0.35
Zimbabwe	13.94	12.01	1.90	15.84	0.61

Table A14 Levels: HIV test offered during pregnancy

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	55.80	11.66	7.36	63.17	0.73
Burkina Faso	42.39	19.90	10.53	52.92	1.14
Burundi	56.29	5.26	3.12	59.41	0.95
Cameroon	69.15	10.32	7.96	77.11	1.07
Comoros	23.93	11.31	3.05	26.98	1.48
Congo	42.20	14.24	7.01	49.21	1.03
Congo DR	24.11	29.00	9.85	33.96	0.81
Côte d'Ivoire	49.08	15.29	8.86	57.94	1.08
Ethiopia	45.62	17.03	9.37	54.99	1.83
Gabon	87.32	3.11	2.80	90.13	1.14
The Gambia	65.71	3.55	2.42	68.13	0.86
Ghana	76.15	5.83	4.72	80.87	1.05
Guinea	10.10	36.71	5.86	15.96	0.63
Kenya	97.36	0.84	0.82	98.18	0.63
Liberia	74.10	5.37	4.20	78.30	0.99
Malawi	91.89	1.34	1.25	93.14	0.36
Mali	29.21	20.61	7.58	36.80	1.16
Mozambique	71.53	7.41	5.72	77.25	0.99
Namibia	97.36	0.80	0.79	98.15	0.43
Niger	29.25	22.74	8.61	37.86	0.85
Nigeria	50.81	16.13	9.77	60.58	0.53
Rwanda	99.11	0.23	0.23	99.34	0.17
Sierra Leone	71.44	4.89	3.67	75.11	0.67
Tanzania	80.56	4.82	4.08	84.64	0.88
Togo	75.14	7.83	6.39	81.52	0.99
Uganda	80.97	3.52	2.96	83.92	0.86
Zambia	94.13	1.34	1.28	95.40	0.38
Zimbabwe	85.94	2.97	2.63	88.57	0.79

Table A15 Levels: Infant checkup within two months after delivery

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	45.74	8.86	4.45	50.19	0.59
Burkina Faso	80.66	2.78	2.31	82.97	0.50
Burundi	16.90	13.55	2.65	19.55	0.81
Cameroon	11.36	24.94	3.77	15.13	0.68
Comoros	30.05	8.65	2.85	32.90	1.40
Congo	53.62	6.39	3.66	57.27	0.94
Congo DR	15.78	15.50	2.89	18.67	0.53
Côte d'Ivoire	68.92	2.82	2.00	70.92	0.93
Ethiopia	3.24	22.35	0.93	4.17	0.30
Gabon	53.88	5.71	3.26	57.14	1.22
The Gambia	68.92	4.95	3.59	72.50	1.50
Ghana	70.00	4.62	3.39	73.39	0.92
Guinea	55.65	7.35	4.41	60.07	0.87
Kenya	64.45	5.87	4.02	68.47	0.74
Liberia	61.45	4.69	3.02	64.47	0.97
Malawi	29.91	6.63	2.12	32.03	1.09
Mali	33.64	11.28	4.28	37.91	0.72
Namibia	51.29	7.07	3.90	55.19	0.97
Niger	58.23	5.83	3.60	61.83	0.74
Nigeria	20.42	29.95	8.73	29.15	0.32
Rwanda	50.39	4.67	2.47	52.86	1.04
Senegal	80.58	5.80	4.96	85.54	0.72
Sierra Leone	68.77	2.83	2.00	70.77	0.66
Tanzania	16.66	7.67	1.38	18.05	0.82
Togo	69.40	4.84	3.53	72.93	0.80
Uganda	28.56	11.14	3.58	32.14	0.83
Zambia	54.87	4.79	2.76	57.63	0.66
Zimbabwe	56.48	7.21	4.39	60.87	1.10

Table A16 Levels: Six months of exclusive breastfeeding

Country	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)
Benin	58.66	6.02	3.75	62.42	1.65
Burkina Faso	94.75	1.39	1.33	96.09	1.05
Burundi	92.86	1.79	1.70	94.56	1.62
Cameroon	72.93	5.59	4.32	77.25	2.46
Comoros	66.29	5.76	4.05	70.34	0.00
Congo	59.82	9.48	6.26	66.08	3.95
Congo DR	70.96	5.11	3.82	74.78	2.29
Côte d'Ivoire	79.05	5.87	4.93	83.98	2.72
Ethiopia	86.94	2.32	2.07	89.01	1.62
Gabon	67.64	7.65	5.60	73.24	3.96
The Gambia	88.58	3.08	2.82	91.39	2.38
Ghana	73.16	6.60	5.17	78.34	3.21
Guinea	85.95	3.23	2.87	88.81	2.14
Kenya	81.98	3.85	3.29	85.27	2.02
Liberia	90.81	3.68	3.47	94.28	1.90
Malawi	77.00	5.73	4.68	81.68	2.62
Mali	73.52	3.71	2.84	76.36	2.38
Mozambique	54.78	7.52	4.45	59.24	1.99
Namibia	76.95	4.79	3.87	80.83	3.28
Niger	89.26	1.56	1.42	90.68	1.45
Nigeria	71.14	3.38	2.49	73.63	1.09
Rwanda	95.17	1.69	1.63	96.80	1.35
Senegal	83.16	4.00	3.46	86.62	2.96
Sierra Leone	77.32	3.56	2.85	80.18	2.35
Tanzania	62.29	6.19	4.11	66.40	2.31
Togo	85.18	3.57	3.15	88.34	2.42
Uganda	69.80	6.63	4.96	74.75	3.38
Zambia	79.49	2.85	2.33	81.82	1.50
Zimbabwe	57.85	5.06	3.08	60.94	2.38

Table A17 Shapley decomposition: Currently attending school (older adolescent girls)

Country	Marginal contribution to the total inequality of opportunities (%)					
	Wealth index	Area	Sex of the household head	Occupation	Religion	Marital status
Benin	13.97	5.39	2.55	45.02	8.01	25.06
Burkina Faso	18.19	15.08	2.08	27.77	10.66	26.23
Burundi	9.23	0.39	0.09	75.90	0.76	13.64
Cameroon	14.69	8.97	3.69	14.02	17.40	41.23
Comoros	24.78	7.86	0.75	18.47	0.65	47.49
Congo	15.59	7.47	0.62	35.12	3.70	37.50
Congo DR	11.24	11.22	0.27	24.82	1.12	51.34
Côte d'Ivoire	17.11	16.32	2.90	37.33	9.14	17.20
Ethiopia	15.19	9.17	2.22	5.00	5.77	62.65
Gabon	22.06	3.90	1.74	17.18	5.67	49.45
The Gambia	11.86	12.28	3.17	22.18	1.78	48.72
Ghana	9.13	1.32	5.69	51.94	3.92	28.00
Guinea	19.86	14.25	0.95	32.66	1.48	30.79
Kenya	8.76	9.59	0.67	37.59	3.82	39.58
Liberia	23.31	14.29	3.07	7.19	8.77	43.38
Malawi	12.29	2.95	3.36	10.08	1.63	69.69
Mali	31.22	16.64	1.25	-	1.22	49.67
Mozambique	21.75	14.46	1.50	8.30	3.30	50.69
Namibia	17.96	6.38	6.92	33.17	2.53	33.04
Niger	27.57	25.41	2.33	0.97	-	43.71
Nigeria	20.56	9.97	3.71	8.87	17.60	39.29
Rwanda	8.55	2.70	4.15	76.50	0.67	7.43
Senegal	18.00	22.73	6.77	-	4.60	47.90
Sierra Leone	13.92	13.55	4.21	31.53	3.32	33.47
Tanzania	8.40	5.13	0.43	63.12	-	22.91
Togo	2.52	1.92	1.06	61.33	7.80	25.38
Uganda	7.37	3.76	1.91	23.11	0.51	63.34
Zambia	14.12	8.61	1.60	20.20	0.32	55.14
Zimbabwe	8.22	1.03	2.29	28.27	2.18	58.02

Table A18 Shapley decomposition: Having never been pregnant
(older adolescent girls)

Country	Marginal contribution to the total inequality of opportunities (%)					
	Wealth index	Area	Sex of the household head	Occupation	Religion	Marital status
Benin	9.11	5.02	2.76	6.46	3.51	73.16
Burkina Faso	8.06	7.15	1.26	2.22	4.00	77.30
Burundi	1.61	1.13	4.34	15.84	3.10	73.97
Cameroon	6.84	6.00	2.17	5.38	5.18	74.43
Comoros	7.28	2.20	4.69	4.11	0.19	81.53
Congo	10.10	6.39	0.54	16.40	1.54	65.04
Congo DR	6.95	5.07	0.09	15.02	0.48	72.38
Côte d'Ivoire	18.61	15.22	2.85	3.70	5.16	54.47
Ethiopia	7.81	6.30	2.06	1.70	1.52	80.62
Gabon	24.48	4.91	0.28	14.36	1.44	54.52
The Gambia	6.64	6.36	2.81	5.03	1.16	78.00
Ghana	18.44	5.00	4.72	14.52	8.44	48.88
Guinea	9.94	7.59	0.33	11.82	2.16	68.15
Kenya	7.46	1.27	2.32	19.17	1.05	68.72
Liberia	21.78	11.54	4.55	6.45	2.15	53.54
Malawi	5.73	1.20	3.21	4.50	0.81	84.54
Mali	9.23	8.34	1.50	-	1.51	79.42
Mozambique	6.14	2.99	2.12	5.13	1.90	81.72
Namibia	28.16	4.21	4.60	23.24	1.59	38.21
Niger	8.42	11.46	0.88	5.59	-	73.64
Nigeria	10.98	9.50	2.67	5.24	9.07	62.55
Rwanda	8.47	1.43	1.33	21.67	1.05	66.05
Senegal	11.42	8.79	1.18	-	0.65	77.96
Sierra Leone	9.24	8.92	1.94	17.61	1.26	61.03
Tanzania	6.48	5.48	0.47	23.19	-	64.37
Togo	7.01	4.60	1.98	17.67	5.08	63.66
Uganda	6.78	0.60	2.67	8.05	1.38	80.51
Zambia	14.07	9.05	0.58	9.94	0.22	66.13
Zimbabwe	8.41	3.68	2.72	3.40	1.97	79.81

Table A19 Shapley decomposition: Met need for family planning
(older adolescent girls)

Country	Marginal contribution to the total inequality of opportunities (%)					
	Wealth index	Area	Sex of the household head	Occupation	Religion	Marital status
Benin	11.59	4.06	5.88	4.15	10.11	64.20
Burkina Faso	27.99	29.08	1.56	3.69	4.96	32.71
Burundi	29.84	9.25	15.21	17.91	11.58	16.21
Cameroon	28.71	14.73	3.82	3.51	11.40	37.82
Comoros	13.91	28.41	2.28	8.95	0.46	46.00
Congo	13.76	8.13	0.69	6.77	8.00	62.66
Congo DR	13.77	15.48	2.42	4.10	1.74	62.50
Côte d'Ivoire	14.76	11.86	15.13	10.45	30.89	16.91
Ethiopia	21.57	11.15	8.97	9.95	26.85	21.51
Gabon	31.46	7.93	1.77	3.34	18.32	37.18
The Gambia	29.19	44.32	0.61	2.85	0.38	22.65
Ghana	20.04	1.80	15.13	8.48	14.82	39.73
Guinea	22.46	12.92	4.21	1.63	3.85	54.93
Kenya	28.41	22.78	2.80	29.57	2.87	13.58
Liberia	38.42	20.95	7.43	6.33	5.10	21.77
Malawi	20.17	8.61	6.54	6.40	14.31	43.96
Mali	33.77	36.99	2.31	-	1.99	24.94
Mozambique	44.15	25.76	0.96	4.69	4.13	20.31
Namibia	51.78	9.99	13.26	7.07	7.05	10.85
Niger	17.50	12.15	8.70	2.53	-	59.12
Nigeria	19.62	13.29	4.24	3.00	20.22	39.64
Rwanda	15.86	0.78	6.43	6.74	1.39	68.80
Senegal	30.19	33.70	15.23	-	2.12	18.76
Sierra Leone	10.81	8.73	2.96	14.47	8.94	54.09
Tanzania	43.45	20.62	5.89	14.51	-	15.53
Togo	30.48	16.37	4.17	9.51	7.30	32.17
Uganda	21.76	6.01	2.09	6.84	1.73	61.58
Zambia	7.71	12.39	10.65	1.55	0.99	66.70
Zimbabwe	7.29	16.75	4.45	3.29	4.54	63.68

Table A20 Shapley decomposition: Not having anaemia

	Marginal contribution to the total inequality of opportunities (%)							
Country	Wealth index	Area	Religion	Marital status	Sex of the household head	Education level	Age	Number of children
Benin	13.62	0.72	15.28	51.34	2.52	13.35	1.58	1.59
Burkina Faso	25.15	13.80	28.55	10.71	3.55	14.82	0.68	2.74
Burundi	32.40	2.03	1.78	34.52	8.85	14.28	2.62	3.52
Cameroon	21.51	11.69	23.54	14.98	1.72	20.65	1.70	4.22
Congo	22.13	30.55	15.14	20.42	0.93	3.65	4.16	3.02
Congo DR	14.78	13.55	5.52	11.23	2.16	32.40	14.52	5.83
Côte d'Ivoire	23.28	6.63	14.90	25.70	2.13	24.15	1.07	2.16
Ethiopia	11.45	10.68	30.16	13.40	0.35	18.50	8.02	7.43
Gabon	27.78	4.76	20.38	11.55	8.25	24.28	1.69	1.30
The Gambia	31.32	32.02	3.49	6.92	5.68	13.50	1.47	5.61
Ghana	43.00	4.77	4.23	8.19	6.63	12.34	17.21	3.63
Guinea	32.00	15.86	5.63	13.40	7.72	12.80	3.15	9.44
Malawi	21.42	8.82	28.35	20.30	4.39	7.13	5.44	4.15
Mali	29.49	16.49	6.38	6.02	6.90	25.45	2.27	6.99
Mozambique	45.94	8.64	10.40	8.68	0.83	23.66	0.90	0.94
Namibia	12.89	10.22	2.45	19.52	3.64	16.34	25.36	9.58
Niger	66.94	7.42	0.00	5.18	1.60	10.19	2.43	6.25
Rwanda	37.52	9.50	0.90	23.79	13.50	7.69	5.49	1.62
Sierra Leone	23.40	27.19	14.78	9.03	1.14	10.04	12.18	2.25
Tanzania	22.38	22.75	0.00	11.62	6.20	27.61	6.84	2.60
Togo	31.25	11.50	4.41	15.44	3.30	6.07	11.71	16.32
Uganda	28.73	5.53	4.13	20.80	1.41	6.04	13.33	20.03
Zimbabwe	9.72	22.16	3.86	23.50	18.82	4.21	13.66	4.08

Table A21 Shapley decomposition: Having the recommended BMI

Country	Marginal contribution to the total inequality of opportunities (%)							
	Wealth index	Area	Religion	Marital status	Sex of the household head	Education level	Age	Number of children
Benin	29.19	15.93	8.93	5.47	1.82	7.23	25.88	5.56
Burkina Faso	25.36	15.65	5.17	8.94	0.94	9.47	29.35	5.13
Burundi	23.79	16.44	2.20	24.94	11.37	10.17	8.16	2.94
Cameroon	23.05	14.57	3.23	15.26	0.49	9.56	26.43	7.41
Comoros	9.29	6.36	0.43	35.06	0.59	6.54	24.13	17.60
Congo	25.85	19.92	3.18	8.69	2.19	8.98	25.74	5.44
Congo DR	40.67	21.24	2.37	3.39	2.93	8.45	16.65	4.29
Côte d'Ivoire	26.54	27.22	7.67	4.92	3.34	5.54	20.97	3.80
Ethiopia	13.23	9.59	2.69	30.61	7.19	20.21	10.21	6.28
Gabon	15.44	3.45	5.39	19.97	1.77	2.59	36.24	15.16
The Gambia	13.28	10.88	0.60	10.90	15.89	7.74	33.12	7.59
Ghana	30.34	12.57	2.18	16.48	1.82	10.04	21.40	5.17
Guinea	29.58	29.08	6.19	3.71	0.65	8.95	19.16	2.68
Kenya	30.35	12.88	2.22	13.22	0.24	5.08	29.81	6.19
Liberia	17.58	6.91	1.68	18.27	0.96	6.24	34.31	14.06
Malawi	35.67	19.41	0.41	5.62	0.94	7.54	22.68	7.73
Mali	33.20	29.28	2.76	2.21	0.56	7.21	18.85	5.92
Mozambique	38.13	17.72	4.52	7.30	1.17	9.10	19.33	2.72
Namibia	21.57	11.38	0.71	19.37	1.06	2.75	31.90	11.26
Niger	28.33	27.79	0.00	9.96	3.74	11.44	15.76	2.97
Nigeria	26.76	15.59	5.26	6.94	2.00	13.90	24.14	5.41
Rwanda	35.71	25.32	1.81	11.00	3.88	9.05	6.79	6.45
Sierra Leone	27.58	21.80	4.17	6.97	7.67	4.27	20.42	7.11
Tanzania	39.55	26.01	0.00	4.85	0.38	5.37	20.68	3.16
Togo	22.64	16.80	7.10	14.17	1.14	4.89	27.75	5.51
Uganda	24.67	22.28	2.11	7.16	5.14	11.89	22.25	4.50
Zambia	32.10	22.21	0.87	7.98	1.01	6.19	22.42	7.21
Zimbabwe	19.08	14.42	2.07	10.86	0.89	4.41	32.64	15.63

Table A22 Shapley decomposition: Met need for family planning

Country	Marginal contribution to the total inequality of opportunities (%)							
	Wealth index	Area	Religion	Marital status	Sex of the household head	Education level	Age	Number of children
Benin	12.07	6.21	7.10	25.02	7.18	19.31	12.88	10.23
Burkina Faso	28.55	20.52	7.48	8.23	1.59	21.94	2.15	9.54
Burundi	24.99	10.89	5.22	6.08	2.99	28.40	5.65	15.78
Cameroon	19.72	11.71	10.37	14.03	4.59	21.41	4.05	14.12
Comoros	11.71	34.81	0.12	21.09	0.71	17.78	6.13	7.67
Congo	15.89	7.12	6.98	27.30	3.83	12.24	9.79	16.85
Congo DR	21.22	20.38	0.91	10.49	0.54	30.58	5.55	10.35
Côte d'Ivoire	16.87	11.13	11.48	18.73	2.80	24.09	4.69	10.21
Ethiopia	26.27	16.17	12.78	6.50	0.74	12.28	5.15	20.11
Gabon	18.32	5.59	7.83	25.36	5.04	21.89	3.04	12.92
The Gambia	20.75	17.11	2.25	17.10	5.37	27.34	4.50	5.60
Ghana	8.56	2.30	8.58	40.98	2.56	13.92	5.03	18.06
Guinea	11.75	11.34	10.60	27.07	4.66	13.79	5.62	15.18
Kenya	33.59	8.58	10.49	7.60	2.86	14.58	2.79	19.51
Liberia	21.38	11.87	8.47	28.66	5.26	17.85	1.79	4.72
Malawi	19.83	6.61	14.76	28.49	6.08	12.07	9.35	2.80
Mali	41.09	26.28	1.47	4.33	1.14	17.49	1.36	6.83
Mozambique	30.65	19.87	3.95	9.91	1.14	20.20	3.28	11.00
Namibia	14.20	20.32	0.61	21.99	4.14	16.17	8.47	14.10
Niger	38.39	18.67	0.00	12.10	3.86	12.77	5.25	8.95
Nigeria	21.58	13.17	16.06	11.52	3.24	21.00	3.80	9.63
Rwanda	19.06	2.28	0.70	32.39	16.85	4.92	8.26	15.54
Senegal	16.59	20.98	2.07	24.05	1.00	27.75	2.73	4.82
Sierra Leone	16.50	16.24	5.29	31.20	3.29	15.14	3.59	8.74
Tanzania	38.23	14.17	0.00	10.54	1.55	14.08	4.36	17.07
Togo	9.87	7.34	11.21	29.30	3.98	26.49	4.28	7.53
Uganda	27.25	12.87	1.73	16.50	6.41	17.49	8.28	9.47
Zambia	29.59	22.34	0.84	12.01	2.17	17.35	3.58	12.12
Zimbabwe	27.84	8.28	4.06	35.97	4.53	12.10	0.98	6.23

Table A23 Shapley decomposition: Knowledge of a place where to get an HIV test

Country	Marginal contribution to the total inequality of opportunities (%)							
	Wealth index	Area	Religion	Marital status	Sex of the household head	Education level	Age	Number of children
Benin	34.97	17.59	9.54	6.27	1.76	27.05	0.78	2.02
Burkina Faso	26.01	22.61	12.30	10.64	1.24	23.42	2.26	1.53
Burundi	10.01	4.15	1.86	49.29	2.64	10.85	10.81	10.38
Cameroon	25.56	15.04	8.88	10.52	8.27	26.40	1.90	3.42
Comoros	24.59	15.13	0.12	15.77	0.41	35.12	4.80	4.06
Congo	27.81	16.66	4.27	8.71	0.86	29.87	9.11	2.72
Congo DR	35.19	30.11	0.57	4.26	0.63	25.18	2.61	1.46
Côte d'Ivoire	20.40	20.63	11.54	6.63	2.95	33.58	0.57	3.70
Ethiopia	27.40	18.72	6.38	5.84	2.85	30.91	2.21	5.69
Gabon	14.73	6.00	9.05	17.58	10.70	30.46	8.23	3.25
The Gambia	5.95	4.32	0.61	42.53	0.24	10.36	16.36	19.65
Ghana	29.57	16.07	4.88	9.89	2.20	29.24	4.66	3.49
Guinea	24.94	23.98	5.56	6.75	1.68	27.80	2.42	6.86
Kenya	14.82	8.29	9.95	23.17	0.56	23.99	12.91	6.30
Liberia	22.03	16.98	2.91	17.91	2.84	32.03	3.88	1.42
Malawi	9.01	2.12	1.78	38.66	1.38	25.67	10.44	10.94
Mali	34.02	32.22	1.38	3.96	0.88	24.21	0.96	2.37
Mozambique	37.36	20.11	7.65	10.83	1.12	19.28	1.12	2.52
Namibia	8.44	11.35	1.88	6.32	3.73	38.63	22.10	7.54
Niger	39.93	30.49	0.00	3.86	0.12	21.54	2.06	1.98
Nigeria	22.67	13.71	21.92	5.40	2.99	27.56	2.32	3.43
Rwanda	8.65	3.47	1.82	33.33	1.79	20.40	15.48	15.07
Senegal	25.91	18.95	1.04	9.55	3.39	27.04	10.50	3.63
Sierra Leone	22.29	24.63	3.25	21.61	2.84	20.69	2.52	2.17
Tanzania	17.90	13.61	0.00	20.54	1.70	25.53	12.66	8.06
Togo	28.07	22.79	10.19	11.16	2.62	19.92	1.60	3.66
Uganda	11.04	4.63	0.98	25.71	1.89	31.25	13.40	11.11
Zambia	7.05	4.08	1.43	34.26	1.34	15.20	20.85	15.79
Zimbabwe	10.21	3.64	1.96	35.36	2.20	17.70	19.95	8.99

Table A24 Shapley decomposition: Four antenatal care visits

Country	Marginal contribution to the total inequality of opportunities (%)							
	Age at birth	Number of children	Education level	Wealth index	Area	Sex of the household head	Religion	Marital status
Burkina Faso	2.82	9.82	16.90	27.22	28.12	1.22	8.80	5.11
Burkina Faso	2.82	9.82	16.90	27.22	28.12	1.22	8.80	5.11
Burundi	4.57	16.86	18.79	24.49	7.66	0.33	9.63	17.67
Cameroon	2.42	7.31	25.60	25.57	18.32	3.20	11.26	6.33
Comoros	5.38	13.78	34.64	32.46	3.17	4.64	1.39	4.54
Congo	1.92	10.07	25.24	31.34	24.46	0.16	4.33	2.48
Congo DR	2.15	7.87	22.92	30.60	29.71	0.38	2.10	4.27
Côte d'Ivoire	1.70	8.65	22.20	29.87	25.92	2.35	6.96	2.35
Ethiopia	2.79	8.83	23.08	35.20	22.26	1.64	3.33	2.88
Gabon	2.32	11.65	22.07	37.95	16.41	0.21	3.15	6.23
The Gambia	22.64	6.78	10.33	27.69	9.71	4.19	9.20	9.44
Ghana	2.05	9.29	22.07	32.78	17.13	1.45	8.83	6.41
Guinea	1.80	5.84	14.04	38.54	28.83	2.93	1.90	6.12
Kenya	2.60	14.72	15.99	36.63	21.24	0.93	3.52	4.36
Liberia	1.53	5.20	21.74	35.99	22.91	3.84	5.62	3.19
Malawi	6.54	18.95	22.29	32.90	7.05	4.85	0.92	6.50
Mali	0.71	4.56	14.82	47.24	29.28	0.42	1.60	1.38
Mozambique	2.55	6.16	15.34	38.31	19.23	1.85	2.90	13.66
Namibia	16.47	8.74	38.71	13.70	5.73	2.09	4.19	10.37
Niger	0.72	3.14	23.02	41.18	21.91	2.69	0.00	7.34
Nigeria	3.04	4.09	27.40	28.78	17.27	2.32	14.27	2.85
Rwanda	7.10	24.25	11.87	6.03	0.72	13.10	2.37	34.61
Senegal	2.88	14.37	14.14	38.98	13.07	4.17	0.55	11.86
Sierra Leone	7.68	11.90	22.50	22.90	20.17	0.81	3.34	10.70
Tanzania	3.24	11.41	12.55	32.77	24.43	3.37	0.00	12.23
Togo	1.29	7.75	11.34	35.43	27.74	1.57	11.92	2.96
Uganda	4.12	13.50	15.39	35.84	10.69	3.53	7.71	9.23
Zambia	20.23	4.71	13.67	43.65	10.20	0.73	1.79	5.02
Zimbabwe	11.61	15.42	28.42	20.56	5.77	0.69	3.33	14.19

Table A25 Shapley decomposition: Delivery attended by skilled personnel

Country	Marginal contribution to the total inequality of opportunities (%)							
	Age at birth	Number of children	Education level	Wealth index	Area	Sex of the household head	Religion	Marital status
Benin	0.44	3.29	15.51	36.16	13.52	3.03	24.64	3.41
Burkina Faso	1.99	7.11	15.27	30.68	34.13	1.29	5.62	3.91
Burundi	15.73	15.73	25.35	22.39	11.35	2.04	1.57	5.83
Cameroon	1.65	6.19	24.46	29.66	17.32	3.10	8.94	8.68
Comoros	1.40	10.43	26.73	41.97	15.12	0.18	0.91	3.25
Congo	2.01	7.72	23.29	30.09	28.32	1.15	5.29	2.13
Congo DR	1.78	2.82	12.17	39.51	20.34	0.46	1.90	21.02
Côte d'Ivoire	1.46	6.91	12.83	32.01	37.19	1.63	5.82	2.15
Ethiopia	3.30	9.90	17.58	31.17	28.70	2.96	3.57	2.83
Gabon	1.51	6.47	19.63	34.21	28.78	0.19	6.37	2.84
The Gambia	1.35	6.48	12.98	26.67	44.96	4.38	0.73	2.46
Ghana	1.74	9.75	20.97	33.62	21.58	1.87	6.24	4.23
Guinea	1.96	6.03	14.70	34.90	31.94	1.73	2.56	6.18
Kenya	4.85	16.75	21.88	32.49	17.31	1.43	2.97	2.31
Liberia	2.30	5.62	20.76	33.26	24.57	4.94	3.91	4.64
Malawi	8.17	15.97	18.35	40.35	12.16	0.29	1.95	2.78
Mali	0.76	3.29	10.77	49.83	31.23	0.47	1.57	2.08
Mozambique	2.18	5.19	13.22	35.82	27.16	2.93	2.90	10.60
Namibia	4.95	15.82	32.37	18.15	16.29	4.13	2.54	5.76
Niger	1.89	7.02	18.72	36.43	33.17	0.58	0.00	2.19
Nigeria	2.65	5.65	26.24	25.46	16.85	2.14	18.11	2.90
Rwanda	14.25	27.47	12.05	22.16	7.99	6.02	1.38	8.66
Senegal	1.32	8.22	12.92	35.44	30.06	7.12	0.35	4.56
Sierra Leone	4.93	7.42	18.41	26.67	26.85	1.54	8.20	5.97
Tanzania	4.81	13.31	12.18	37.39	24.84	0.98	0.00	6.48
Togo	2.04	7.66	11.35	33.70	26.90	2.19	11.42	4.75
Uganda	4.77	10.29	22.65	31.10	19.07	2.69	6.22	3.21
Zambia	5.06	11.05	18.80	28.10	32.85	0.52	0.39	3.24
Zimbabwe	3.81	15.03	20.34	31.55	20.41	1.56	3.36	3.93

Table A26 Shapley decomposition: Postnatal checkup

Country	Marginal contribution to the total inequality of opportunities (%)							
	Age at birth	Number of children	Education level	Wealth index	Area	Sex of the household head	Religion	Marital status
Benin	1.18	4.69	18.37	35.42	16.96	1.28	17.38	4.72
Burkina Faso	3.85	12.74	8.92	37.73	15.34	0.53	18.63	2.25
Burundi	11.52	20.30	25.14	27.08	7.82	0.07	2.47	5.62
Cameroon	1.46	7.47	23.41	31.21	19.36	3.80	7.07	6.23
Comoros	1.93	10.51	20.48	37.37	20.78	2.82	0.75	5.36
Congo	2.84	6.09	21.62	33.33	27.83	0.15	3.27	4.88
Congo DR	2.73	3.53	27.34	31.43	31.31	0.66	1.29	1.72
Côte d'Ivoire	2.13	9.14	12.48	33.02	28.33	0.65	5.66	8.60
Ethiopia	2.26	7.87	18.17	32.56	26.51	4.01	4.76	3.86
Gabon	7.97	8.61	11.84	39.93	19.09	0.21	7.21	5.13
The Gambia	1.75	4.47	14.87	23.12	47.38	4.99	0.82	2.59
Ghana	2.14	9.92	20.47	33.51	17.21	2.13	9.96	4.65
Guinea	2.20	3.99	17.63	37.28	31.90	0.34	2.60	4.05
Kenya	3.84	15.64	23.07	28.47	17.42	1.83	3.69	6.03
Liberia	2.36	7.65	14.70	38.28	22.02	2.88	7.58	4.52
Mali	0.78	1.35	17.60	50.51	26.64	0.25	1.49	1.39
Mozambique	3.64	4.55	16.38	43.48	21.02	0.68	0.74	9.50
Namibia	3.50	12.13	34.42	20.63	10.77	1.58	5.27	11.71
Niger	1.12	6.06	21.48	38.24	29.76	1.00	0.00	2.33
Nigeria	1.80	6.31	27.63	27.81	14.45	2.04	16.85	3.12
Rwanda	7.08	23.39	17.48	21.80	4.06	4.33	1.65	20.21
Senegal	3.72	6.59	13.75	41.07	23.57	6.01	0.51	4.77
Sierra Leone	5.05	9.51	21.63	19.62	15.45	3.77	13.78	11.19
Togo	2.96	10.44	17.01	25.44	15.29	1.34	23.67	3.85
Uganda	4.02	11.93	25.04	30.75	17.81	1.00	2.95	6.50
Zambia	4.98	10.95	17.46	30.46	33.13	0.56	0.66	1.80
Zimbabwe	6.72	7.71	21.21	31.19	22.98	3.98	3.25	2.97

Table A27 Shapley decomposition: Maternity care package

Country	Marginal contribution to the total inequality of opportunities (%)							
	Age at birth	Number of children	Education level	Wealth index	Area	Sex of the household head	Religion	Marital status
Benin	1.47	6.16	21.03	37.93	14.26	1.67	16.11	1.37
Burkina Faso	2.53	9.61	16.47	29.00	29.05	1.48	7.39	4.46
Burundi	6.86	21.36	24.67	28.11	8.59	1.58	3.27	5.56
Cameroon	2.31	7.97	25.10	29.03	18.10	3.59	8.39	5.51
Comoros	6.60	13.98	32.06	33.76	8.10	0.17	0.50	4.83
Congo	1.75	8.04	21.86	33.48	26.68	0.33	3.85	4.02
Congo DR	1.64	6.44	23.11	31.64	32.51	0.89	1.71	2.06
Côte d'Ivoire	1.94	8.77	18.44	31.97	29.21	2.34	5.39	1.94
Ethiopia	2.24	9.13	17.84	32.59	28.84	2.73	3.77	2.86
Gabon	4.07	10.55	14.69	40.91	14.21	0.68	5.96	8.92
The Gambia	3.00	6.83	14.75	27.33	39.05	4.48	1.87	2.71
Ghana	1.63	9.89	20.84	34.97	20.79	1.57	5.87	4.43
Guinea	1.92	6.10	15.86	35.07	32.67	1.21	1.81	5.36
Kenya	2.95	15.39	19.20	34.79	21.99	0.52	1.47	3.69
Liberia	1.78	5.58	21.12	34.76	23.60	4.71	4.05	4.41
Mali	0.69	4.00	14.73	46.46	30.16	0.82	1.96	1.18
Mozambique	2.54	7.24	17.96	36.73	23.57	1.55	3.23	7.18
Namibia	4.42	13.24	38.10	19.08	13.57	0.84	3.32	7.43
Niger	1.04	6.40	21.85	37.06	29.18	0.96	0.00	3.50
Nigeria	3.31	6.01	26.28	28.42	17.22	1.75	14.64	2.37
Rwanda	7.51	34.46	16.50	11.81	3.52	1.69	1.43	23.08
Senegal	2.31	14.17	15.31	36.71	18.63	5.17	0.81	6.90
Sierra Leone	4.45	8.70	19.07	27.05	24.30	1.87	8.17	6.39
Togo	1.51	8.33	11.20	35.41	27.10	1.49	11.81	3.14
Uganda	2.60	9.83	23.92	35.89	18.57	3.40	3.97	1.80
Zambia	2.98	11.49	20.95	32.18	27.86	1.02	0.70	2.83
Zimbabwe	4.35	12.88	22.63	29.01	19.18	1.14	5.52	5.29

Table A28 Shapley decomposition: Malaria prophylaxis during pregnancy

Country	Marginal contribution to the total inequality of opportunities (%)							
	Age at birth	Number of children	Education level	Wealth index	Area	Sex of the household head	Religion	Marital status
Benin	1.47	7.94	6.61	9.73	5.49	1.85	14.77	52.16
Burkina Faso	1.47	3.59	16.55	38.57	15.36	1.25	4.56	18.65
Burundi	3.46	10.73	8.83	10.16	0.28	10.78	5.90	49.87
Cameroon	3.51	6.64	22.63	14.12	1.82	1.18	8.27	41.83
Comoros	9.99	2.18	10.77	38.81	6.57	16.09	2.72	12.87
Congo	15.42	4.36	6.29	23.77	9.98	17.01	10.43	12.74
Congo DR	10.87	2.36	34.49	18.50	14.80	1.13	3.78	14.07
Côte d'Ivoire	12.76	4.23	22.03	21.65	9.65	2.87	16.59	10.21
Gabon	3.17	2.13	6.63	18.06	7.32	16.18	3.41	43.11
The Gambia	13.33	10.69	7.07	32.98	22.75	2.80	0.16	10.21
Ghana	0.92	1.51	8.62	10.40	16.11	1.54	20.60	40.30
Guinea	14.34	4.61	5.62	23.00	9.80	2.43	27.27	12.93
Kenya	8.06	12.88	8.28	21.20	5.18	2.82	27.86	13.72
Liberia	17.35	3.09	12.02	20.17	4.50	0.41	19.85	22.61
Malawi	7.37	5.69	27.34	30.57	12.55	2.12	5.80	8.58
Mali	4.88	0.89	9.98	62.19	10.50	0.31	6.99	4.26
Mozambique	4.65	6.05	15.99	18.98	28.29	1.11	10.49	14.42
Namibia	3.36	1.10	7.21	40.53	20.78	0.16	4.31	22.54
Niger	8.01	2.12	11.49	66.97	2.28	1.14	-	8.00
Nigeria	0.79	3.49	19.02	3.79	0.76	3.78	61.83	6.54
Senegal	8.89	1.93	26.42	27.72	17.69	7.50	1.17	8.68
Sierra Leone	2.99	8.91	28.20	26.59	20.42	0.21	2.16	10.52
Tanzania	6.06	5.57	22.70	38.51	14.74	1.03	-	11.39
Togo	10.71	12.12	16.70	11.30	28.37	1.82	13.27	5.70
Uganda	7.83	1.71	24.37	23.25	7.63	0.79	8.01	26.41
Zambia	14.39	6.18	17.17	28.42	19.18	1.42	6.25	6.98
Zimbabwe	10.61	6.03	7.10	24.49	30.53	1.34	2.12	17.78

Table A29 Shapley decomposition: HIV test offered during pregnancy

Country	Marginal contribution to the total inequality of opportunities (%)							
	Age at birth	Number of children	Education level	Wealth index	Area	Sex of the household head	Religion	Marital status
Benin	0.57	6.69	18.49	35.63	31.36	0.45	4.22	2.59
Burkina Faso	2.51	7.88	15.30	29.14	36.24	0.98	2.16	5.78
Burundi	5.57	7.57	36.07	23.04	11.31	1.94	3.80	10.70
Cameroon	2.11	7.83	27.95	28.66	16.69	2.83	7.56	6.37
Comoros	7.61	3.91	32.29	32.53	13.33	1.37	0.75	8.22
Congo	1.95	9.25	16.24	34.89	24.93	3.11	5.89	3.72
Congo DR	3.09	1.62	17.44	42.51	31.06	0.38	0.70	3.19
Côte d'Ivoire	0.84	4.58	14.13	25.94	40.63	2.80	4.70	6.38
Ethiopia	1.86	5.03	20.49	31.01	27.93	3.18	1.37	9.15
Gabon	13.65	2.21	14.80	37.23	7.34	6.38	12.51	5.88
The Gambia	7.59	2.89	4.67	18.54	41.73	1.74	0.69	22.15
Ghana	1.58	11.26	15.87	43.27	19.75	0.48	5.20	2.59
Guinea	1.57	8.36	19.67	31.11	28.59	1.04	2.98	6.67
Kenya	1.12	0.71	50.65	15.93	2.44	10.10	3.21	15.84
Liberia	2.79	7.96	27.12	26.14	24.01	3.26	2.07	6.66
Malawi	1.64	3.90	13.75	40.67	26.04	3.02	3.21	7.76
Mali	0.95	4.20	16.28	33.28	38.39	0.59	2.98	3.34
Mozambique	1.97	4.55	15.28	40.00	21.44	4.36	6.59	5.81
Namibia	2.04	3.65	41.61	5.97	13.34	4.54	9.08	19.78
Niger	1.48	3.74	14.32	37.29	39.19	1.30	0.00	2.68
Nigeria	3.38	5.94	28.27	25.50	17.04	1.98	15.03	2.85
Rwanda	8.52	14.25	8.17	40.72	5.56	0.64	4.13	18.01
Sierra Leone	3.16	9.01	21.05	26.09	24.84	3.45	4.97	7.43
Tanzania	2.89	8.67	19.78	30.99	26.22	1.67	0.00	9.78
Togo	1.10	6.60	12.80	35.53	27.00	1.60	12.70	2.66
Uganda	7.87	14.65	21.66	24.71	16.85	4.33	3.83	6.12
Zambia	4.28	8.58	23.76	28.96	29.48	0.28	1.54	3.12
Zimbabwe	3.19	5.53	22.68	33.56	19.35	4.96	3.84	6.90

Table A30 Shapley decomposition: Infant checkup within two months after delivery

Country	Marginal contribution to the total inequality of opportunities (%)							
	Age at birth	Number of children	Education level	Wealth index	Area	Sex of the household head	Religion	Marital status
Benin	1.31	4.18	21.76	24.22	22.38	2.00	17.09	7.06
Burkina Faso	2.56	10.18	2.95	48.62	7.83	0.04	25.88	1.95
Burundi	8.43	18.50	8.52	32.45	6.93	4.77	5.13	15.26
Cameroon	3.43	3.05	16.17	36.17	17.36	4.60	11.81	7.41
Comoros	6.51	3.89	17.32	23.75	38.87	0.13	0.74	8.80
Congo	4.38	12.44	15.09	37.49	18.45	0.15	6.73	5.27
Congo DR	1.79	4.79	32.11	22.10	27.06	5.04	2.61	4.49
Côte d'Ivoire	1.91	1.03	12.90	45.89	2.79	1.43	8.65	25.39
Ethiopia	0.39	1.32	18.30	46.66	9.54	1.41	12.71	9.69
Gabon	7.30	5.20	19.82	30.25	11.39	1.74	3.91	20.39
The Gambia	2.72	7.71	12.93	20.49	44.51	1.89	0.25	9.49
Ghana	3.94	4.86	4.78	34.50	9.43	4.66	18.52	19.32
Guinea	2.75	6.69	15.42	31.21	26.46	0.49	12.99	3.99
Kenya	2.23	12.53	13.21	29.65	8.49	0.82	8.52	24.54
Liberia	0.62	1.57	21.95	18.99	6.17	4.22	28.72	17.77
Malawi	12.67	3.88	12.77	25.98	2.25	2.11	18.08	22.26
Mali	0.90	1.07	17.84	50.71	24.37	0.04	4.15	0.91
Namibia	16.67	8.44	15.68	18.77	4.09	0.87	4.63	30.85
Niger	3.49	7.00	29.67	30.75	19.27	2.18	0.00	7.63
Nigeria	1.91	5.66	28.08	28.38	16.59	1.99	14.35	3.04
Rwanda	2.08	7.54	11.07	38.59	27.64	1.12	5.47	6.48
Senegal	4.55	7.13	12.26	44.01	20.10	5.96	0.82	5.17
Sierra Leone	2.20	4.15	25.80	29.74	5.73	2.83	4.65	24.89
Tanzania	5.48	7.09	10.51	25.42	26.56	8.98	0.00	15.97
Togo	2.80	10.03	30.09	13.24	3.11	3.88	31.35	5.51
Uganda	3.42	10.59	14.67	39.70	12.78	2.04	2.70	14.10
Zambia	2.54	5.40	5.20	22.83	51.98	0.92	1.63	9.49
Zimbabwe	3.46	14.96	19.26	28.74	17.92	3.79	3.67	8.20

Table A31 Shapley decomposition: Six months of exclusive breastfeeding

Country	Marginal contribution to the total inequality of opportunities (%)							
	Age at birth	Number of children	Education level	Wealth index	Area	Sex of the household head	Religion	Marital status
Benin	8.40	5.62	14.19	15.70	3.23	2.99	22.82	27.04
Burkina Faso	12.17	21.99	13.40	23.99	0.71	5.17	6.75	15.81
Burundi	20.26	12.42	14.65	10.61	15.90	0.55	6.69	18.93
Cameroon	4.80	3.21	10.77	19.90	17.66	3.44	5.71	34.51
Comoros	17.47	2.73	9.69	11.29	24.05	14.18	1.93	18.65
Congo	7.39	6.87	11.08	26.68	18.84	1.61	3.40	24.13
Congo DR	1.00	0.50	9.13	50.18	3.47	15.83	3.41	16.48
Côte d'Ivoire	2.08	1.49	13.66	41.50	3.67	0.70	18.79	18.10
Ethiopia	3.50	1.94	7.12	11.08	0.98	1.55	60.72	13.11
Gabon	5.30	2.69	25.21	24.24	2.43	7.99	14.57	17.58
The Gambia	1.70	4.95	7.06	45.32	22.89	8.16	1.97	7.94
Ghana	2.21	6.52	7.32	37.35	3.83	8.84	7.68	26.25
Guinea	6.53	2.15	19.75	22.42	4.76	14.16	3.86	26.36
Kenya	4.22	8.74	11.40	20.26	25.80	0.62	11.51	17.44
Liberia	2.92	13.22	17.63	13.24	2.42	17.65	8.08	24.84
Malawi	2.37	2.14	23.94	39.53	9.93	2.60	12.54	6.95
Mali	5.17	4.03	37.35	18.77	1.20	3.30	18.16	12.02
Mozambique	9.97	2.94	12.66	12.14	14.74	6.22	9.20	32.11
Namibia	0.69	7.29	26.94	42.39	8.39	0.50	4.25	9.56
Niger	3.79	7.64	25.26	18.16	3.00	7.95	0.00	34.20
Nigeria	0.75	6.79	22.35	36.23	17.63	0.49	4.66	11.10
Rwanda	5.46	17.02	22.34	17.40	6.57	5.09	1.59	24.52
Senegal	9.87	7.14	4.01	29.07	20.14	1.87	14.28	13.61
Sierra Leone	8.89	18.57	14.54	26.12	4.13	0.79	6.25	20.71
Tanzania	0.65	3.10	3.69	43.14	25.43	4.24	0.00	19.75
Togo	7.61	4.75	17.17	15.95	9.54	1.44	23.50	20.05
Uganda	2.53	6.33	18.43	27.15	5.49	5.74	12.56	21.77
Zambia	20.72	6.46	20.02	15.43	9.24	15.15	4.37	8.62
Zimbabwe	8.98	9.16	16.00	12.33	0.36	4.83	12.81	35.52

Table A32 HOI comparisons among African regions

Opportunities	African regions – HOI (%)					
	Unweighted analysis			Weighted analysis		
	West	East	Central	West	East	Central
Met need for family planning	32.09	36.63	52.06	34.62	39.56	42.09
Having never been pregnant	62.95	69.22	59.14	63.57	69.59	59.30
Currently attending school	31.13	41.78	53.58	30.82	41.27	46.78
Met need for family planning	35.42	53.45	53.72	40.86	53.36	43.14
Knowledge of a place where to get an HIV test	54.76	81.02	57.18	51.74	80.52	41.94
Not having anaemia	37.48	50.45	49.78	20.64	56.02	58.53
Having the recommended BMI	56.66	63.62	54.59	56.84	63.98	63.51
Four antenatal care visits	47.40	37.60	57.97	40.26	27.82	38.16
Delivery attended by skilled personnel	45.21	53.47	69.66	34.97	37.88	50.33
Postnatal checkup	63.59	35.97	56.41	48.15	26.29	44.39
Maternity care package	27.38	16.24	36.09	21.46	9.37	16.32
Malaria prophylaxis during pregnancy	62.02	38.43	34.99	47.28	31.20	37.60
HIV test offered during pregnancy	48.40	75.21	55.70	48.18	73.43	35.95
Infant checkup within two months after delivery	60.18	31.96	33.66	41.19	25.75	17.10
Six months of exclusive breastfeeding	80.81	74.95	67.84	75.48	76.24	70.85

Table A33 HOI comparisons between HIV prevalence regions

Opportunities	HIV prevalence – HOI (%)			
	Unweighted analysis		Weighted analysis	
	≤5	>5	≤5	>5
Knowledge of a place where to get an HIV test	57.28	90.54	52.51	90.08
HIV test offered during pregnancy	51.28	87.47	46.71	86.00

Table A34 Levels and Shapley decompositions for the multi-country pooled analysis: women of reproductive age and pregnant women

Opportunities	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)	Marginal contribution to the total inequality of opportunity (%)									
						Wealth index	Area	Sex of the household head	Education level	Religion	Marital status	Age (at delivery)	Number of children		
Not having anaemia	62.55	4.46	2.92	65.47	0.22	13.85	10.99	1.55	21.14	38.32	10.76	1.70	1.68		
Having the recommended BMI	62.06	6.51	4.32	66.38	0.17	25.65	22.39	1.83	12.32	2.25	4.85	26.27	4.45		
Met need for family planning	46.14	15.37	8.38	54.52	0.25	20.29	12.44	2.54	23.59	15.05	9.34	3.42	13.34		
Knowledge of a place where to get al HIV test	60.90	11.46	7.89	68.78	0.14	22.72	12.02	4.97	30.42	18.79	6.19	1.92	2.97		
Four antenatal care visits	34.21	19.26	8.16	42.37	0.18	23.20	24.91	1.94	30.71	4.83	4.71	2.43	7.26		
Delivery attended by skilled personnel	36.96	23.32	11.24	48.20	0.17	21.81	20.40	2.64	27.20	10.23	7.48	1.96	8.29		
Postnatal checkup	40.90	17.17	8.48	49.38	0.19	22.13	24.81	2.68	26.27	5.70	6.94	2.22	9.25		
Maternity care package	15.87	32.67	7.70	23.58	0.12	24.23	26.82	1.66	27.60	4.33	3.45	3.03	8.88		
Malaria prophylaxis during pregnancy	42.52	7.34	3.37	45.88	0.27	3.11	1.92	1.41	15.88	65.77	6.39	1.74	3.78		
HIV test offered during pregnancy	57.51	11.36	7.37	64.88	0.37	22.43	18.81	4.12	26.60	12.51	5.59	2.38	7.57		
Infant checkup two months after delivery	31.65	15.89	5.98	37.62	0.18	19.06	23.94	4.24	23.24	5.90	8.12	3.35	12.15		
Six months of exclusive breastfeeding	78.09	1.11	0.87	78.96	0.52	28.56	1.08	3.18	25.90	13.41	9.27	3.02	15.59		

Table A35 Levels and Shapley decompositions for the multi-country pooled analysis: older adolescent girls

Opportunities	HOI (%)	D-index (%)	Penalty (%)	Coverage (%)	SD HOI (%)	Marginal contribution to the total inequality of opportunity (%)						
						Wealth index	Area	Sex of the household head	Occupation	Religion	Marital status
Met need for family planning	40.01	15.39	7.28	47.29	0.81	22.61	17.77	3.06	2.28	20.99	33.31
Currently attending school	40.17	23.73	12.50	52.67	0.26	12.18	5.65	2.60	19.69	12.26	47.63
Having never been pregnant	66.24	15.30	11.96	78.20	0.26	8.66	4.79	2.06	5.69	3.56	75.24

Table A36 Levels and Shapley decompositions for the multi-country pooled analysis: older adolescent girls by marital status

Opportunities	Marital status	HOI	Penalty (%)	Coverage (%)	SD HOI (%)	Marginal contribution to the total inequality of opportunity (%)					
						Wealth index	Area	Sex of the household head	Occupation	Religion	Marital status
Met need for family planning	Never in union	53.64	8.44	4.95	58.59	1.04	43.26	42.90	1.28	7.34	5.21
	In union	28.90	18.27	6.56	35.36	1.09	18.89	12.54	0.80	4.23	63.54
Currently attending school	Never in union	60.31	9.87	6.60	66.91	0.39	16.03	5.15	0.69	60.53	17.61
	In union	3.70	37.64	2.23	5.93	0.23	36.81	18.61	8.77	9.28	26.52
Having never been pregnant	Never in union	92.64	1.29	1.21	93.85	0.19	24.39	5.12	26.10	20.07	24.31
	In union	24.95	8.81	2.41	27.36	0.63	8.14	5.07	6.73	22.50	57.56

Table A37 Country data

Country	UN Region[1]	Survey year[2]	Language[2] (A/F)	Economy[3]	IMR[3]	MMR[3]	Population of women 15-49[3]	HIV prevalence[3]	IPTp (2 or 3 doses) policy since[4]
Benin	Western	2011-2012	F	LIC	70	436	2311289	1.2	2005
Burkina Faso	Western	2010	F	LIC	70	417	3579459	1.1	2005
Burundi	Eastern	2010	F	LIC	64	808	2187036	1.6	-
Cameroon	Middle	2011	F	LMIC	64	652	4978935	5	2004
Comoros	Eastern	2012	F	LIC	60	365	178949	-	2003
Congo	Middle	2011-2012	F	LMIC	40	494	979629	3.1	2006
Congo DR	Middle	2013-2014	F	LIC	78	746	16167171	1.1	2004
Côte d'Ivoire	Western	2011-2012	F	LMIC	75	715	4701945	3.8	2005
Ethiopia	Eastern	2011	-	LIC	48	482	20811496	1.3	-
Gabon	Middle	2012	F	UMIC	40	314	387504	4.3	2003
The Gambia	Western	2013	A	LIC	49	730	439525	1.9	2003
Ghana	Western	2014	A	LMIC	44	322	6803551	1.5	2003
Guinea	Western	2012	F	LIC	67	695	2678217	1.6	2005
Kenya	Eastern	2014	A	LMIC	37	525	10853576	5.3	1999
Liberia	Western	2013	A	LIC	57	762	1002431	1.2	2004
Malawi	Eastern	2010	A	LIC	58	629	3297665	11.7	1993
Mali	Western	2012-2013	F	LIC	79	617	3517972	1.4	2003
Mozambique	Eastern	2011	-	LIC	68	596	5735866	11	2006
Namibia	Southern	2013	A	UMIC	34	283	624523	16.2	2005
Niger	Western	2012	F	LIC	62	619	3636832	0.6	2005
Nigeria	Western	2013	A	LMIC	74	821	39172542	3.3	2004
Rwanda	Eastern	2014-2015	F	LIC	33	304	2905877	2.8	2005 – until 2008
Senegal	Western	2014	F	LMIC	42	323	3546400	0.5	2004
Sierra Leone	Western	2013	A	LIC	94	1460	1492597	1.5	2004
Tanzania	Eastern	2010	A	LIC	42	514	10532046	6.1	2001
Togo	Western	2013-2014	F	LIC	55	386	1689457	2.5	2003
Uganda	Eastern	2011	A	LIC	46	408	7460696	7.1	2000
Zambia	Eastern	2013-2014	A	LMIC	47	237	3476200	12.6	2001
Zimbabwe	Eastern	2010-2011	A	LIC	56	446	3551962	18	2004

Note: all country data belong to the year of the particular survey.
UN=United Nations. LIC=Low Income Countries. LMIC=Lower Middle Income Countries. UMIC=Upper Middle Income Countries. F=Francophone.
A=Anglophone. IMR=Infant Mortality Rate. MMR=Maternal Mortality Ratio. IPTp=Intermittent Preventive Treatment of malaria in Pregnancy.

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Table A38 Circumstances' variables codification

Circumstance	Type of variable	Categories
Age	Continuous variable	
Age at delivery	Continuous variable	
Area	Categorical variable	Urban Rural
Educational level	Categorical variable	No schooling Primary school Secondary school Higher education
Marital status	Categorical variable	Never married or in union Married and living with the partner* Married and not living with the partner* Not married but living with the partner* Widowed* Divorced* Separated*
Number of children	Continuous variable	
Occupational status	Categorical variable	Not working Working
Religion	Categorical variable	Non-religious Muslim Christian Animist/Traditional religion Others/Unclassified
Sex of the house-hold head	Categorical variable	Male Female
Wealth index	Categorical variable	1st quintile (the poorest) 2nd quintile 3rd quintile 4th quintile 5th quintile (the richest)

Note: * = Women currently or previously married or in union.