A Description of Maternal and Child Health in
Rural Kenya, Nigeria and Tanzania
&
The Potential for a Health Insurance Program to Improve
Maternal and Child Health

A Study for USAID

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Contents

1. Introduction

Even though global progress has been made since the United Nations Millennium Development Goals (MDGs) were defined in 2001 (UN, 2001), maternal and child mortality remains high in Sub–Saharan Africa (Hogan et al., 2010; Rajaratnam et al., 2010). Maternal mortality in Nigeria, for example, accounts for an estimated 14% of global maternal deaths (WHO, 2012a).[1] The country accommodates approximately 2% of the world's population. Furthermore, Nigeria accounts for an estimated 9% of global first–day deaths, with less than 5% of the world's births this makes Nigeria the second worst country into which one can be born (SCT, 2013). Without further and new interventions it will be difficult, if not impossible, for Nigeria to achieve MDG 4 (reduced child mortality by two thirds) and MDG 5 (reduced maternal mortality by three quarters and universal access to reproductive health) by 2015. Kenya and Tanzania are not doing as bad as Nigeria. However, when ranking countries with respect to neonatal mortality, Tanzania holds the tenth and Kenya the eleventh position (SCT, 2013).[2,3] It is therefore critical that novel interventions are developed and tested.

For instance, interventions aimed at increasing access to (demand–side) and improving available quality of (supply–side) healthcare might very well have a direct positive effect on maternal and child health (references below), as well as reduced deaths of both mothers and children. Improving maternal health, birth outcomes and early nutrition will be essential for the child's cognitive development (such as the ability to learn). Which, in turn, will greatly affect children's future earning capacity and, on a larger scale, the development of their communities and countries (Shonkoff et al., 2012).

A growing literature on the impact of health insurance on healthcare utilization and health status in general shows mixed but mostly very promising results. For example, Jütting (2009), Trujillo (2005), Giedion et al. (2007) and Yip et al. (2008) show a positive impact on access to and utilization of healthcare. Furthermore, Franks et al. (1993) and Card et al. (2004) show that health

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[1] Death during pregnancy or delivery as a consequence of pregnancy within forty−two days after delivery or abortion.

[2] Death of newborn within the first twenty−eight days of life.

[3] The worst country in which one can be born is India, with an estimated 29% of global first day deaths.

insurance has a positive impact on health outcomes.[4] Note that these studies did not specifically include pregnant women or (young) children.

To date only one study exists which examines the impact of health insurance on access to maternal healthcare in Sub–Saharan Africa (SSA), namely in Senegal, Mali and Ghana (Smith and Sulzbach, 2008). The authors find a positive correlation between health insurance and access to maternal healthcare, provided that maternal healthcare is included in the benefits package. However, their study only addresses the demand–side, and the authors note explicitly that complementary supply–side interventions are also critical for improving maternal health and the health of newborns. A supply−side study, by Campbell and Graham (2006), found that increasing access to delivery and emergency obstetric care assisted by skilled birth attendants, is the best way to bring down high maternal and newborn mortality rates. In addition, a recent study in Nigeria showed that interventions that include upgrading of antenatal, delivery and emergency obstetric care are cost–effective, and in some cases even cost–saving (Erim et al., 2012).

The Health Insurance Fund (HIF) is an international not–for–profit organization dedicated to improving access to quality health care in sub-Saharan Africa. The philosophy of HIF is to simultaneously focus on both financing and delivery in order to increase access to health care. HIF recognizes that all elements of the healthcare system – patients, hospitals and clinics, administrative systems, financing, laws and regulations – must be in place to enable the delivery of quality health care. Through complimentary initiatives, namely health insurance (Health Insurance Fund), quality improvements (SafeCare) and financing of healthcare (Medical Credit Fund) over 120,000 people now have access to quality health care.

The insurance package of the HIF program covers comprehensive primary healthcare services (such as antenatal, delivery and postnatal care), as well as a limited list of registered and approved medication (such as prenatal vitamins). In Nigeria limited basic secondary healthcare services (such as cesarean sections) are part of the insurance package, as well. In Kenya, enrollees can choose from either a basic package, which includes maternity healthcare services, or a comprehensive package, which includes primary and secondary care (such as cesarean sections or surgeries).

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[4] See pages five to seven of the previous USAID report for a detailed review of the literature on the impact of health insurance on healthcare utilization and health outcomes.

The purpose of this study is to describe maternal and child health in Kenya, Nigeria and Tanzania before implementation of the HIF program. In addition, valuable knowledge on the potential for the HIF program is provided in order to improve maternal and child health in the intervention areas in these three countries. This has been done by specifically focusing on the following health indices: reproductive health, family planning, measured health, utilization of antenatal care, choice for hospital delivery, complications during delivery, vaccinations and early nutrition.

This study draws on four rich data sets gathered as part of a multi−year operational research program on the HIF interventions led by the Amsterdam Institute for International Development (AIID) and the Amsterdam Institute for Global Health and Development (AIGHD). In order to carry out an evaluation of the impact of the health insurance programs, the HIF funded the implementation of extensive household surveys in Kenya, Nigeria and Tanzania. It simultaneously funded an in−depth evaluation of the HIF program on maternal and child health (MACHS) in Nigeria.

Establishing the potential benefits of integrated interventions is of particular interest from a policy perspective. Recently, a report on the short term impact of the HIF program in Central Kwara State, Nigeria was published. The focus of this evaluation was the impact of health insurance on healthcare utilization and out−of−pocket expenditures on healthcare. The results show that healthcare utilization in the program area almost doubled, whilst rates remained stable in the control area (where health insurance was not made available). Furthermore, in the intervention area out−of−pocket expenditures were cut by 50%. It was particularly noticeable that the results were strongest for the poorer half of the population and for those below the age of 18 (AIID, 2013). Evidently, making health insurance available while simultaneously upgrading the quality of the participating health facilities has the desired effect of increasing access to affordable healthcare in this population. This study portrays the lack of access to healthcare and the poor quality of already available healthcare, which is one of the underlying causes of high maternal and child mortality in Kenya, Nigeria and Tanzania. If there is a potential for health insurance to improve maternal and child health, then this finding can serve as an important tool to inform the policy dialogue.

The report is structured as follows; section 2 provides background information on maternal and child health and early childhood development. Section 3 gives a description of the data set used in this study. Section 4 shows the results, first for women of reproductive age (women from 15 to 49 years old) and women who have been pregnant in the past twelve months, and second for children under the age of five. For women of reproductive age, descriptive statistics on reproductive health, family planning, measured health, utilization of antenatal and delivery care, complications during delivery, out–of–pocket expenditures on health and health insurance will be presented. For children under the age of five, descriptive statistics on nutritional status, immunization and health insurance will be presented. Section 5 will conclude.

2. Background

2.1. Maternal and Child Mortality

Approximately 800 women die from pregnancy and delivery related complications worldwide every day, while most of these deaths could have been prevented.[5] Almost all maternal deaths (99%) occur in developing countries, and maternal mortality is highest in rural areas and poor communities (WHO, 2012b).[6]

In 2010, Nigeria alone accounted for an estimated 14% of global maternal deaths, compared to an estimated 2% of the world's population. The Nigerian maternal mortality ratio (MMR) was estimated at 630 deaths per 100,000 live births. In the same year, the MMR was estimated at 460 in Tanzania and 360 in Kenya, compared to less than 20 deaths per 100,000 live births in developed countries (WHO, 2012a), see figure 1.

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[5] The most common causes of death being: high blood pressure during pregnancy, death as a result of malaria or AIDS during pregnancy, severe bleeding after delivery, infections after delivery, and unsafe abortion.
[6] Here China and Eastern European countries are considered developing countries, as well.
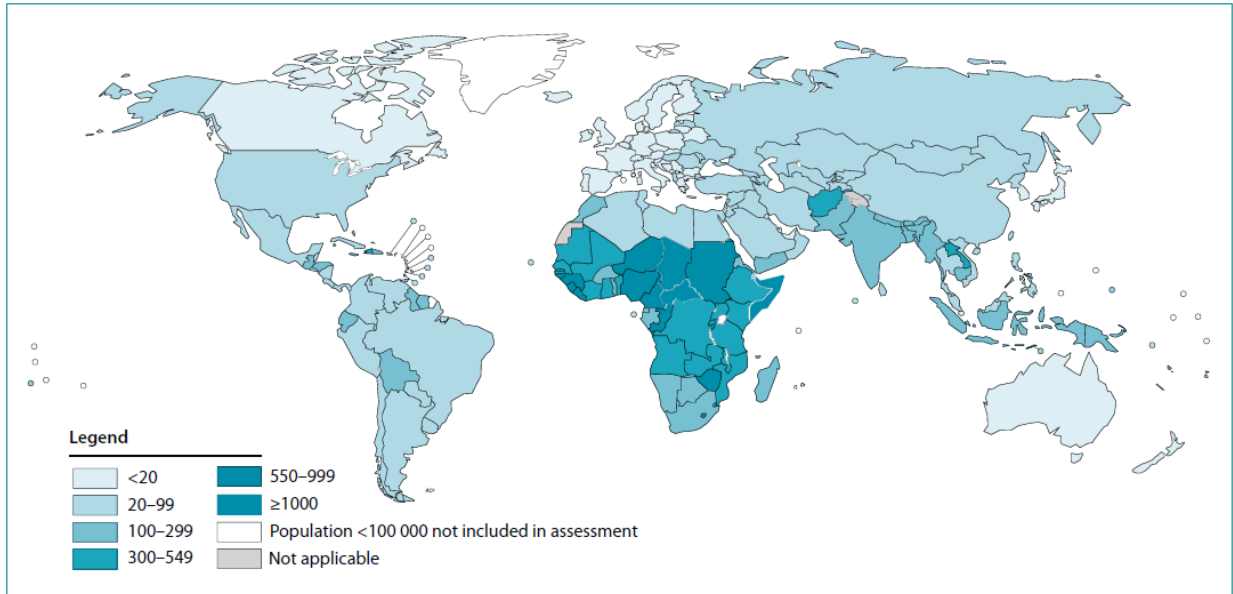
Figure 1: Maternal mortality ratio by country, 2010
Source: WHO, 2012a, pg. 32

SSA is also the region with the highest under–five mortality rate (U5MR), estimated at 98 per 1,000 children die before reaching the age of five years. In addition, by 2050 it is expected that SSA will be the region with the single largest population of children under the age of five years, accounting for 37% of the global total and close to 40% of all live births (UNICEF, 2013). In 2010, the U5MR was estimated at 132 deaths per 1,000 live births in Nigeria, at 79 deaths per 1,000 live births in Kenya, and at 62 deaths per 1,000 live births in Tanzania. See table 1 for an overview of the most recent maternal and child health statistics for Kenya, Nigeria and Tanzania.

Table 1: Maternal and child health statistics

	Kenya	Nigeria	Tanzania	
Demography				
Total population	41,610,000	162,471,000	46,218,000	(2011)
Total fertility rate (per woman)	4.7	5.5	5.5	(2010)
Total live births	1,560,000	6,458,000	1,913,000	(2011)
Adolescent birth rate (per 1,000 women)	106	123	128	(2006)
Total under–five population	6,807,000	27,215,000	8,273,000	(2011)
Maternal epidemiology				
Total number of maternal deaths	5,500	40,000	8,500	(2010)
Lifetime risk of maternal death (1 in N)	55	29	38	(2010)
MMR (per 100,000 live births)	360	630	460	(2010)
Average annual reduction in MMR (MDG 5)	0.5	2,1	2.4	(1990-2010)
Newborn epidemiology				
Total number of first–day deaths	14,700	89,700	17,000	(2011)
First–day morality rate (per 1,000 live births)	9	14	9	(2011)
Total number of neonatal deaths	41,700	254,100	48,100	(2011)
NMR (per 1,000 live births)	27	40	22	(2011)
Average annual reduction in NMR (MDG 4)	0.8	1.1	2.3	(1990-2011)
Under–five epidemiology				
Total number of under–five deaths	107,000	756,000	122,000	(2011)
U5MR	73	124	54	(2012)
Average annual reduction in U5MR (MDG 4)	1.2	1.9	4.4	(1990-2012)

Source: Adapted from WHO, 2013a, pg. 66, 82, and 98

Dynamics in maternal and child mortality

Major global progress towards reducing maternal and child deaths has been made over the past 20 years. Both maternal and under–five mortality dropped worldwide by an estimated 47%. However, many countries on the African continent are lacking behind and within the countries that perform well (Asia and South America), marginalized communities are being excluded from these improvements. In particular many countries in Sub–Saharan Africa, including Kenya, Nigeria and Tanzania, will most likely fail to achieve MDGs 4 and 5 by 2015.

Between 1990 and 2010 the MMR decreased on average 0.5% per year in Kenya, 2.1% per year in Nigeria, and 2.4% per year in Tanzania. This implies that between 2010 and 2015 an average reduction of 11% per year in Nigeria and Tanzania, and 14% per year in Kenya will be necessary in order to reduce maternal death by 75% from 1990 to 2015, i.e. a target of MDG 5, see figure 2.
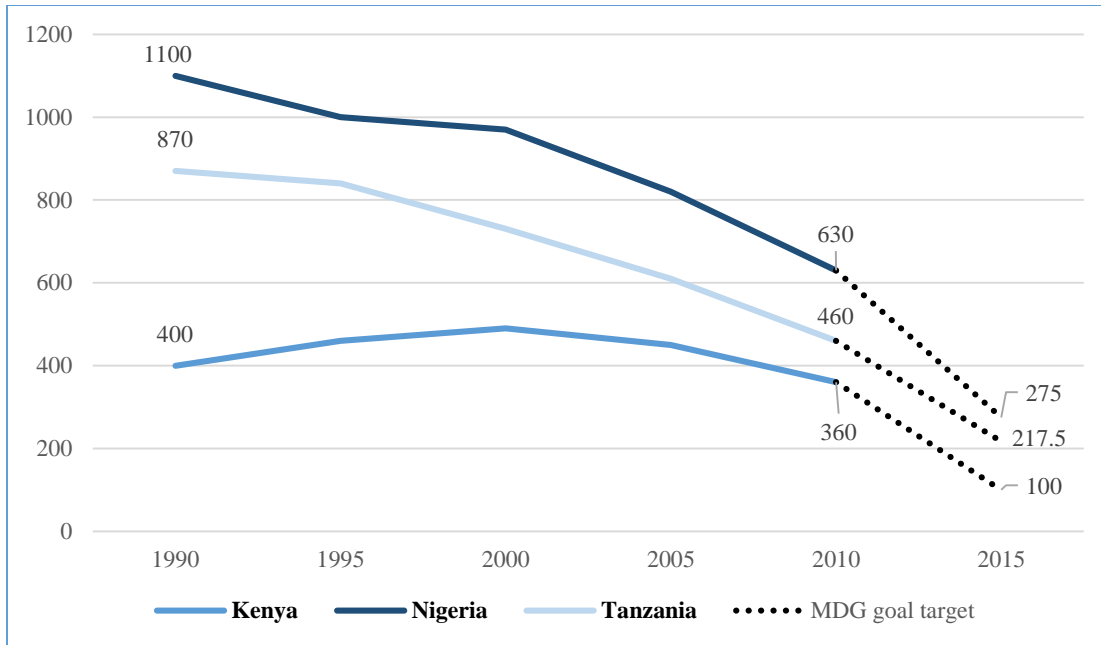
Figure 2: Dynamics in maternal mortality ratio
Source: World Bank data (WB, 2012a)

Reducing child mortality by 66% between 1990 and 2015 is the target of MDG 4. Figure 3 shows a slight reduction in the U5MR in Kenya (1.2% per year), a moderate reduction in Nigeria (1.9% per year), and a substantial reduction in Tanzania (4.4% per year). This implies that the U5MR should reduce by 9% per year in Kenya and 12% per year in Nigeria between 1990 and 2015. Tanzania will most likely achieve the target of MDG 4 by 2015. However, neonatal mortality has decreased only slightly in all three countries. This implies that the proportion of child mortality that occurs during the first 28 days of a child's life has been increasing. Furthermore, a recent study found that 75% of newborn deaths occur during the first 7 days of life, with the highest risk of death on the first day of life (Oestergaard et al., 2011).[7]

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[7] Other main causes of child death, besides neonatal causes, are malaria, undernutrition, measles, pneumonia and diarrhea.

Figure 3: Dynamics in under–five (top) and neonatal (bottom) mortality rate
Source: World Bank data (WB, 2012b,c)

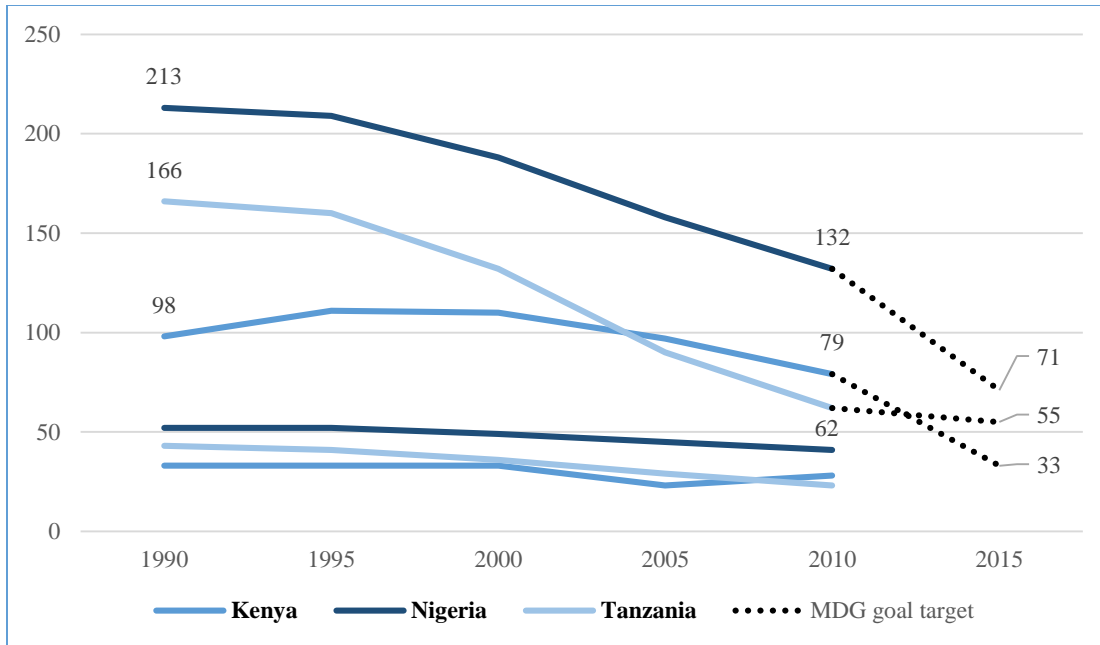This shows that more progress is needed. In particular interventions aimed at providing access to antenatal, postnatal and delivery care (including emergency obstetric care when complications arise) assisted by skilled birth attendants, could make a difference between life and death. Such interventions would accelerate progress towards achieving MDGs 4 and 5.

2.2. Early Childhood Development

There is little doubt that what happens in early childhood matters greatly for the life chances of individuals concerned as well as in shaping the productivity potential of their communities and countries. Recent advances across multiple disciplines have come to illuminate the links between early nutrition and stimulation and the development of neural pathways in the brain that are responsible for the cognitive, social and emotional development of the individual (Shonkoff et al., 2012).

More than 200 million children under the age of five in the developing world are at risk of not reaching their full development potential because they suffer from the negative consequences of poverty, nutritional deficiencies and inadequate learning opportunities (Lancet, 2007). 165 million children (one in four) are chronically underfed (stunted) with 90% living in Africa and Asia (UNICEF et al., 2012). Even though some progress has been made globally, in 1990 253 million

under−five year olds were stunted, child malnutrition remains a serious public health problem with enormous human and economic costs.

Figure 4 shows timing of different early childhood interventions necessary to reach the full development potential of a child. The figure shows that interventions that aim for a healthy pregnancy, proper nutrition with exclusive breast feeding through 6 months of age and adequate micronutrient content in diet and regular growth monitoring and immunization are needed for the full physical development of a child. In this study we do not focus at the nonphysical early childhood interventions. Note that, the HIF program could affect the nutritional status of a child indirectly, by reducing poverty among households, through reducing out−of−pocket health expenditures and unexpected health related costs of any family member.
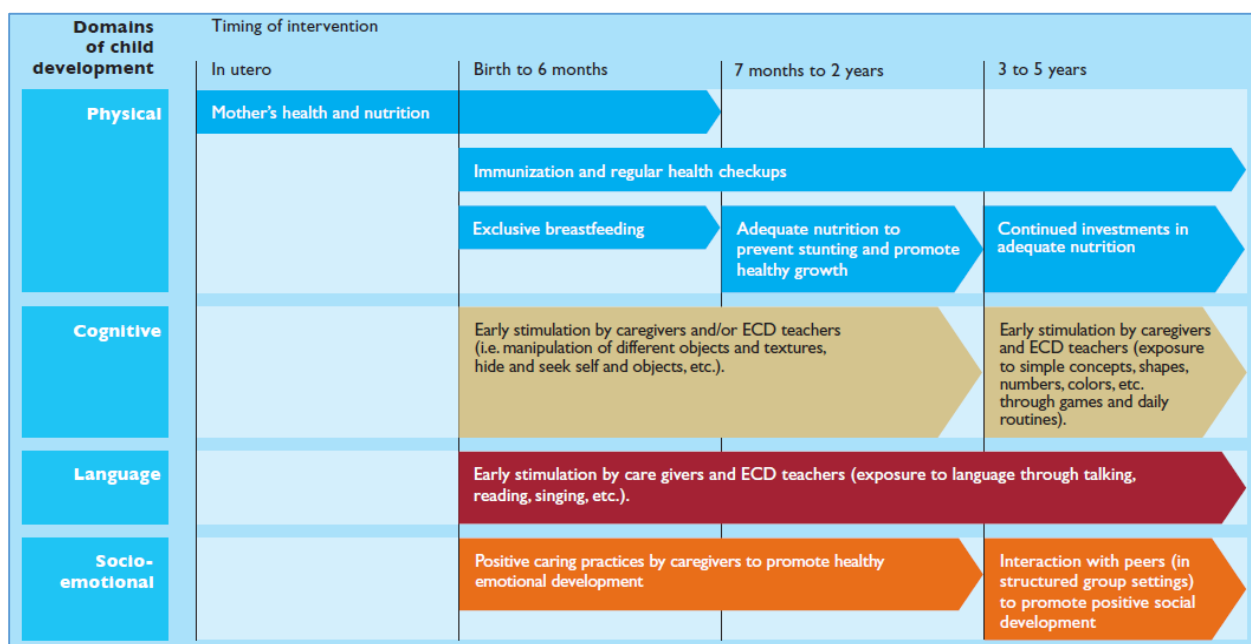
Figure 4: Early childhood interventions at different ages
Source: WB, 2010, pg. 6.

3. Data Description

This study uses information collected in an in−depth survey on maternal and child health (MACHS) in Nigeria and in three household surveys conducted in Kenya, Nigeria and Tanzania. The surveys were administered by the Amsterdam Institute for International Development (AIID) and the Amsterdam Institute for Global Health and Development (AIGHD) on behalf of the HIF. The surveys are designed to evaluate the causal impact of the HIF programs using a difference−

in–differences (DD) methodology which analyses data obtained in a baseline and follow–up survey(s) to be carried out in an intervention and control area. Data obtained during the baseline surveys were included in the study described in this report.[8]

The baseline household surveys were carried out shortly before the implementation of the HIF programs. In Nigeria, the survey was conducted in May 2009 among 1500 households in Central Kwara State. The survey in Kenya was carried out in March 2011 among members of two dairy farmer cooperatives and their families (1200 households) in the Nandi district.[9] In Tanzania, the survey was conducted in February 2012 among members of a coffee farmer cooperative and their families (1500 households) in the Kilimanjaro region. The Maternal And Child Health Survey (MACHS) was designed as a prospective non–randomized controlled intervention study conducted in the Nigeria site only. The subjects were recruited from the same area as the Nigerian baseline household survey. The MACHS followed around 1100 children at intervals of four months for over two years and 300 pregnant women.[10] The first data set was collected in January 2010.

The three baseline household surveys consist of a comprehensive socio–economic and biomedical questionnaire, including biomedical measurements. The socio–economic section of the survey contains detailed information for the entire household on self−reported employment, housing, education, income, consumption, household assets, social networks and credit and savings. The survey in Kenya also included a section on dairy farming and the survey in Tanzania on coffee farming. The biomedical questionnaire contains information on self–reported health status and questions related to demand for utilization of healthcare (such as antenatal and delivery care). In addition, the biomedical survey includes anthropometric measurements and the collection of blood samples to map the prevalence of main diseases in the target populations. The MACHS consists of a comprehensive biomedical questionnaire which contains information on medical history, health status, diet and healthcare utilization. Furthermore, the survey includes anthropometric measurements for children under the age of five.

For children under the age of five anthropometric measurements on weight and height were used to construct z–scores for weight–for–height and height–for–age, the two most commonly

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[8] To date Nigeria is the only country where the follow-up surveys were conducted and an impact evaluation on healthcare utilization and out−of−pocket expenditures was completed.

[9] One dairy farmer cooperative represents the program area and the other the control area.

[10] To date the maternal data is still being collected.

used anthropometric indicators to assess the nutritional status of children. The z–score expresses how many standard deviations the measured anthropometric value of a child deviates from the reference mean value of children of his or her age, as determined by the WHO. The z–scores were calculated by making use of the WHO Anthro software (version 3.2.2, January 2011). The WHO international reference population has mean zero. We will utilize two measures of malnutrition; namely *stunting* (chronic undernutrition) and *wasting* (acute undernutrition). Stunting, or low height–for–age, is caused by long–term insufficient nutrient intake and frequent infections. The effects of stunting include impaired cognitive function, delayed motor development and poor school performance. Wasting, or low weight–for–height, is a strong predictor of mortality among children below the age of 5 years old. Wasting is usually the result of acute malnutrition and or disease.

In each country the samples were conducted in a rural region. However, due to different underlying populations, i.e. rural families in Nigeria and dairy farmer families and coffee farmer families in Kenya and Tanzania, respectively, the sampled populations are not fully comparable between countries and are not representative of the respective country as a whole.

4. Results

4.1. Samples

This study will present statistics for the following subsamples: *women aged 15 to 49* (women of reproductive age), *women who gave birth in the past twelve months*, *women who were pregnant at the time of the survey*, and *children under the age of five*. Table 2 shows the number of individuals in each sample for the three countries. For Nigeria we will make use of both the household survey (*HHS*) and the maternal and child health study (*MACHS*) data sets, as well as the linked data set (*HHS+MACHS*).[11] The linked data set contains detailed information on the health of children under the age of five, as well as their socio–economic characteristics.

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[11] All output will report the sample used in the title of the respective table or figure. The data set(s) used will be mentioned as sources(s) in a footnote under the table.

Table 2: Count

	Kenya HHS Obs.	**Nigeria** HHS Obs.	**Nigeria** MACHS Obs.	**Nigeria** HHS+MACHS Obs.	**Tanzania** HHS Obs.
Women of reproductive age	1832	1208	n/a	n/a	1231
Pregnant, incl. currently pregnant (past 12 months)	274	263	n/a	n/a	93
Currently pregnant	69	101	n/a	n/a	34
Delivered a child (past 12 months)	205	156	n/a	n/a	57
Children under the age of five years old	871	876	991	239	499

4.2. Women of Reproductive Age

This subsection presents data on socio−economic characteristics, reproductive health, measured health, family planning, utilization of antenatal and delivery care, complications during delivery, out–of–pocket expenditures on health and health insurance for women of reproductive age and for women who have been pregnant in the past twelve months. Henceforth, the tables will include data for the countries where statistics are available.

4.2.1. Socio−Economic Characteristics

Table 3 provides an overview of the socio–economic characteristics of women of reproductive age in the Kenya, Nigeria and Tanzania samples. The statistics are given at both the individual and the household level. The table shows that on average the Nigerian women were slightly older when compared with the Tanzanian and Kenyan women. In the Nigeria sample over 70% of the women of reproductive age were married, compared to around 40% in the other two countries. The percentage of women of reproductive age living in a household with a female household head is 18%, 20% and 25% in the Kenya, Nigeria and Tanzania samples, respectively.

The percentage of women who reported to have been working in the past twelve months is 42% in the Kenya sample, 17% in the Tanzania sample and a substantial higher 67% in the Nigeria sample. We use per capita consumption as a measure of income. In order to compare per capita consumption between the three samples, the local currency values were converted into US dollars

(USD).[12] The table shows that, when comparing the three samples, the women of reproductive age in Nigeria have the lowest annual per capita consumption while in Kenya, the subjects have the highest. However, in the Kenya sample the average annual per capita consumption in the fifth quintile is nearly eight times higher than in the first quintile, which implies higher income inequality. In the Nigeria sample, the average annual per capita consumption in the fifth quintile is six times higher than in the first quintile, which implies less income inequality compared to Kenya. The Tanzania sample shows the lowest income inequality with average annual per capita consumption in the fifth quintile only three times higher than in the first quintile. Yet, the Tanzania sample has the highest percentages of poor and extreme poor women of reproductive age.

Over 60% of the subjects in the Tanzania sample do not have any education, compared to 44% in the Nigeria sample and 30% in the Kenya sample. The percentage of completed tertiary education among the women of reproductive age is 8%, 7% and 0.2% in the Kenya, Nigeria and Tanzania samples, respectively. Generally, the spouses of the women are on average more highly educated relative to their wives, with the exception of Tanzania.

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[12] Aggregate per capita annual consumption in each country is deflated to January 6, 2012 by using the CPI deflator of the respective country obtained from: http://www.tradingeconomics.com. Local currencies are then converted to US Dollars using exchange rates obtained for January 6, 2012 from: http://www.freecurrencyrates.com.

Table 3: Socio−economic characteristics – sample women of reproductive age

	Kenya		Nigeria		Tanzania	
	Obs.	mean/%	Obs.	mean/%	Obs.	mean/%
All women of reproductive age						
Age, years (mean)	1832	28.1	1208	30.0	1231	29.6
Married (%)	1808	42.4	1204	70.3	1231	39.8
Employed, past 12 months (%)	1815	41.5	1207	67.1	1231	17.3
Aggregate annual per capita consumption, LCU (mean)	1830	62467.9	1208	85116.6	1231	779576.2
Aggregate annual per capita consumption, USD[a] (mean)	1830	643.2	1208	484.3	1231	555.2
Poor, daily per capita consumption <2 USD (%)	1830	66.6	1208	62.4	1231	88.3
Extreme poor, daily per capita consumption <1.25 USD (%)	1830	37.9	1208	33.3	1231	53.7
Consumption quintiles, USD[a] (mean)						
Q1 (poorest)	338	197.4	212	163.0	258	303.8
Q2	366	325.3	227	270.6	241	404.3
Q3	364	445.6	239	373.5	239	491.5
Q4	396	648.2	266	535.8	248	620.0
Q5 (richest)	366	1563.9	264	974.5	245	931.8
Education (%)						
No education	1799	29.5	959	43.7	1231	61.6
Primary	1799	39.2	959	29.6	1231	22.9
Secondary	1799	23.7	959	19.7	1231	15.3
Tertiary	1799	7.6	959	7.0	1231	0.2
Education spouse (%)						
No education	747	25.6	698	41.0	427	77.2
Primary	747	29.7	698	25.5	427	10.5
Secondary	747	27.4	698	21.2	427	11.9
Tertiary	747	17.3	698	12.3	427	0.5
All households with women of reproductive age						
Household size (mean)	1129	6.3	911	5.0	865	5.1
Female household head (%)	1099	17.6	910	20.3	865	25.2
Aggregate annual household consumption, LCU (mean)	1129	371652.2	911	397560.3	865	3728977.6
Aggregate annual household consumption, USD[a] (mean)	1129	3826.9	911	2262.0	865	2655.7

[a] CPI deflators used: Kenya: 0.8761657; Nigeria: 0.923449612; Tanzania: 1.125465178, exchange rates used: Kenya: 0.0117523; Nigeria: 0.00616143; Tanzania: 0.0006328

Note: the table includes respondents that answered the question

Sources: Kenya *HHS*, Nigeria *HHS* and Tanzania *HHS*

Summary socio–economic characteristics:

In the three sampled populations, women of reproductive age are found to be poor. The women in the Tanzania sample are the poorest with almost 90% living in poverty. Income inequality is highest in the Kenya sample and lowest in the Tanzania sample. The employment rate is substantially lower in the Tanzania sample, as well.

The women of reproductive age and their spouses are found to have low levels of education or do not have any education at all. Generally, the spouses are higher educated than the women of reproductive age.

4.2.2. Reproductive Health

In Sub–Saharan Africa more than a quarter of all girls become pregnant before the age of 18 (WHO, 2013b). The age at first pregnancy has an effect on the number of children a woman delivers throughout her reproductive period (if the use of contraception is low). A higher number of pregnancies increases the risk of pregnancy related deaths of both mothers and children. Maternal mortality is three times higher for teenage mothers compared to older women of reproductive age. Furthermore, many girls who become pregnant have to leave school. This will have long–term implications for these girls and their families, communities and countries.

Table 4 presents the number of reported pregnancies, deliveries and alive children in the Kenya and Nigeria samples for all women of reproductive age and by socio–economic subgroup. The table shows that the women in the Nigeria sample are pregnant on average 4.3 times per lifetime, compared to 3.9 times in the Kenya sample. The mean number of pregnancies is associated with the social economic status and level of education (e.g. richer and or educated women have less pregnancies). The difference between the number of deliveries and the number of alive children gives an indication of child mortality in the Kenya and Nigeria samples. In the Nigeria sample on average twice as many children died compared to the Kenya sample. Furthermore, child mortality is the highest among lowest in the poorest income quintile and among women without education. Note that we find lower fertility rates in our samples compared to the rates found for the whole countries, see table 1.

Table 4: Total number of pregnancies, deliveries and alive children by subgroup – sample women of reproductive age

| | **Kenya** | | | | | **Nigeria** | | | | |
	Obs.	pregnant mean	delivered mean	alive mean	diff. mean	Obs.	pregnant mean	delivered mean	alive mean	diff. mean
Total	913	3.9	3.9	3.7	0.2	842	4.3	4.1	3.7	0.4
Age										
age 15-30	322	2.3	2.2	2.2	0.0	351	2.8	2.6	2.5	0.1
age 31-49	591	4.9	4.7	4.6	0.1	491	5.4	5.2	4.5	0.7
Poor	640	4.2	4.1	4.0	0.1	535	4.6	4.4	3.9	0.5
Extreme poor	367	4.4	4.3	4.2	0.1	289	4.6	4.5	3.9	0.6
Consumption quintile										
Q1 (poorest)	189	4.4	4.4	4.2	0.2	161	4.6	4.5	3.9	0.6
Q2	182	4.3	4.3	4.1	0.2	154	4.7	4.6	4.1	0.5
Q3	195	4.0	3.9	3.8	0.1	167	4.5	4.4	3.9	0.5
Q4	185	3.5	3.4	3.3	0.1	186	4.2	3.9	3.5	0.4
Q5 (richest)	162	3.4	3.2	3.1	0.1	174	3.7	3.4	3.1	0.3
Education										
No education	295	4.8	4.7	4.5	0.2	378	5.0	4.9	4.1	0.8
Primary	334	3.7	3.6	3.5	0.1	243	4.1	3.9	3.5	0.4
Secondary	191	3.2	3.1	3.0	0.1	140	3.4	3.2	3.0	0.2
Tertiary	74	3.2	3.0	3.0	0.0	59	3.5	3.1	3.0	0.1
Education spouse										
No education	170	5.3	5.2	5.0	0.2	267	5.0	4.8	4.1	0.7
Primary	189	4.0	4.0	3.8	0.2	159	4.5	4.2	3.8	0.4
Secondary	173	4.0	3.8	3.8	0.0	141	3.8	3.6	3.3	0.3
Tertiary	99	4.0	3.8	3.8	0.0	83	3.8	3.5	3.2	0.3

Note: the table includes respondents that answered the question
Sources: Kenya *HHS* and Nigeria *HHS*

Table 5 presents the age at first pregnancy for women of reproductive age and by socio–economic subgroup. The table indicates a difference in the age of first pregnancy. In Nigeria this will be at a mean age of 23 compared with a mean age of 20 in the Kenyan women. In both countries, the age increases with income (richer women have their first child at an older age) and education (higher educated women and women with a higher educated spouse have their first child at an older age).

Table 5: Age at first pregnancy by subgroup – sample women of reproductive age

	Kenya		Nigeria	
	Obs.	mean	Obs.	mean
Total	914	20.4	461	23.1
Age				
age 15-30	316	19.7	189	21.6
age 31-49	598	20.7	272	24.1
Poor	643	20.1	277	22.5
Extreme poor	374	19.7	144	22.4
Consumption quintile				
Q1 (poorest)	194	19.6	77	22.0
Q2	185	19.8	80	22.6
Q3	192	20.5	93	22.7
Q4	182	20.7	108	23.0
Q5 (richest)	161	21.4	103	24.6
Education				
No education	302	19.0	177	22.2
Primary	331	20.0	146	22.7
Secondary	188	22.3	87	23.6
Tertiary	72	22.8	40	26.7
Education spouse				
No education	172	19.4	124	21.9
Primary	192	20.2	101	23.0
Secondary	172	20.8	85	22.9
Tertiary	97	21.8	57	24.6

Note: the table includes respondents that answered the question
Sources: Kenya *HHS* and Nigeria *HHS*

Table 6 presents the percentage of adolescent pregnancies for women of reproductive age and by socio–economic subgroup. The table shows that 6% and 18% of all pregnancies by women of reproductive age were pregnancies before the age of 18 in the Nigeria and Kenya samples, respectively. Adolescent pregnancies decrease with income and education. Our observed pregnancy rates are different (higher rate in our Kenya sample and lower rate in our Nigeria sample) from the once reported from Kenya and Nigeria as a whole, see table 1.

Table 6: Adolescent pregnancy rate (%) - sample women of reproductive age

	Kenya		Nigeria	
	Obs.	%	Obs.	%
Total	914	17.5	461	6.9
Poor	643	19.4	277	7.9
Extreme poor	374	23.3	144	8.3
Consumption quintile				
Q1 (poorest)	194	24.7	77	7.8
Q2	185	21.6	80	8.7
Q3	192	14.1	93	7.5
Q4	182	15.9	108	7.4
Q5 (richest)	161	9.9	103	3.9
Education				
No education	302	32.5	177	10.2
Primary	331	13.6	146	6.8
Secondary	188	3.7	87	4.6
Tertiary	72	2.8	40	0.0
Education spouse				
No education	172	26.7	124	11.3
Primary	192	16.1	101	8.9
Secondary	172	11.6	85	5.9
Tertiary	97	8.2	57	0.0

Note: the table includes respondents that answered the question
Sources: Kenya *HHS* and Nigeria *HHS*

Figure 5 shows the number of pregnancies in the past twelve months, with 15%, 22% and 8% in the Kenya, Nigeria and Tanzania samples, respectively. Thus in the Nigeria sample one in five women was pregnant in the past year, compared to one in seven in the Kenya sample and one in thirteen in the Tanzania sample.
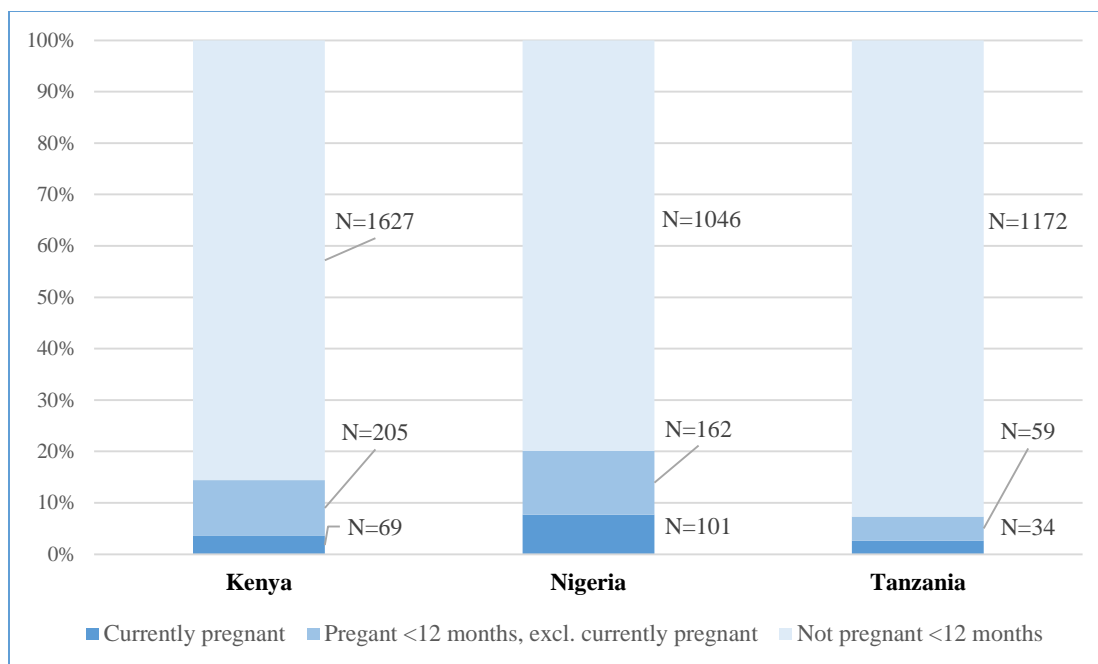
Figure 5: Pregnancy rate in the past twelve months (Obs. and%) – sample women of reproductive age
Sources: Kenya HHS, Nigeria HHS and Tanzania HHS

Summary reproductive health:

Women in the Nigeria sample are pregnant on average 4.3 times per lifetime, compared to 3.9 times in the Kenya sample. In the Nigeria sample reported child mortality is twice as high as in the Kenya sample. Child mortality is the highest among the extreme poor and poor, and among women with no education.

Nigeria is also the country with the highest pregnancy rate in the last twelve months (22%). This rate was 15% and 8% in the Kenya and Tanzania samples, respectively.

4.2.3. Family Planning

Figure 6 presents how long Nigerian women of reproductive age want to wait before getting pregnant, with 17% having an immediate wish to get pregnant and around 50% of the women want a(nother) child within the coming five years. Over 30% of the women do not want a(nother) child. Around 66% of these women used a birth control method the last time they had sexual intercourse. This implies that 33% did not use any birth control method the last time they had sexual intercourse, even though these women did not want a(nother) child.
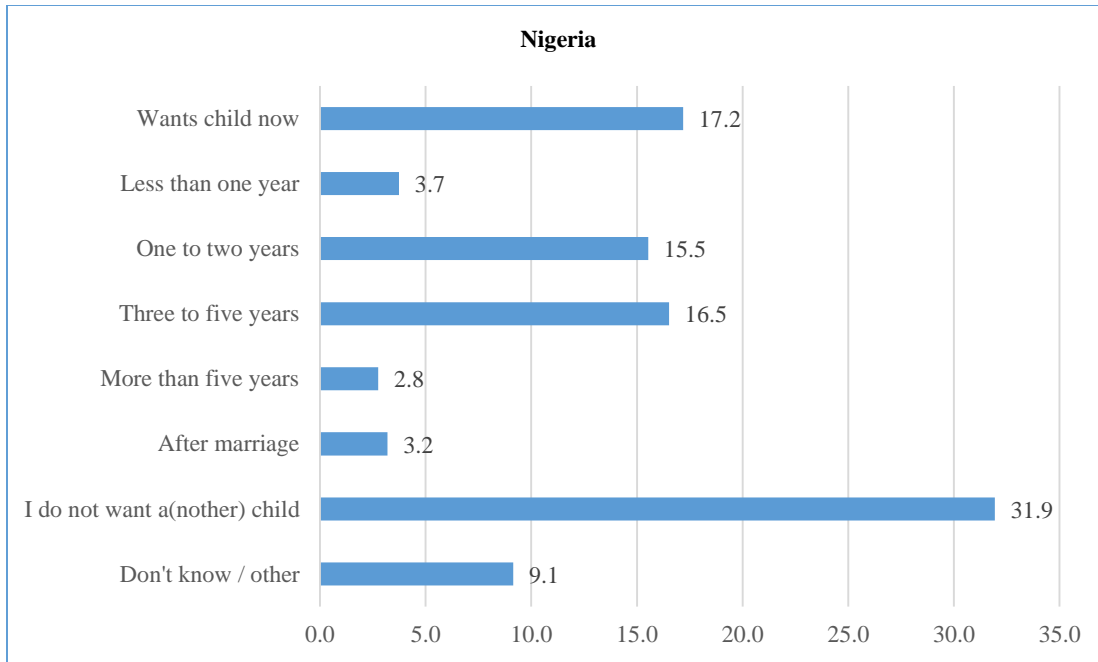
Figure 6: How long do you want to wait to become pregnant (again)? (%) – sample women of reproductive age
Note: the figure includes respondents that answered the question, N=908
Source: Nigeria HHS

Table 7 presents the percentage of Nigeria women of reproductive age who ever tried to delay or avoid pregnancy. The table shows that this percentage is highest in the richer income quintiles and among tertiary educated women and women with a highly educated spouse.

Table 7: Ever tried to avoid or delay pregnancy? – sample women of reproductive age

	Nigeria	
	Obs.	%
Total	906	23.8
Age		
age 15-30	405	22.2
age 31-49	501	25.1
Poor	563	22.0
Extreme Poor	305	17.7
Consumption quintile		
Q1 (poorest)	172	16.3
Q2	160	20.6
Q3	175	28.6
Q4	200	23.5
Q5 (richest)	199	29.1
Education		
No education	389	15.7
Primary	252	28.6
Secondary	154	32.5
Tertiary	62	29
Education spouse		
No education	274	12.4
Primary	164	24.4
Secondary	144	34
Tertiary	84	35.7

Note: the table includes respondents that answered the question
Source: Nigeria *HHS*

Figure 7 presents which method women tried to delay or avoid pregnancy in the Nigeria sample. The figure shows that the most popular method is using a condom. Other popular methods are using contraceptives, using injectable contraceptives, and abstaining from sexual intercourse.
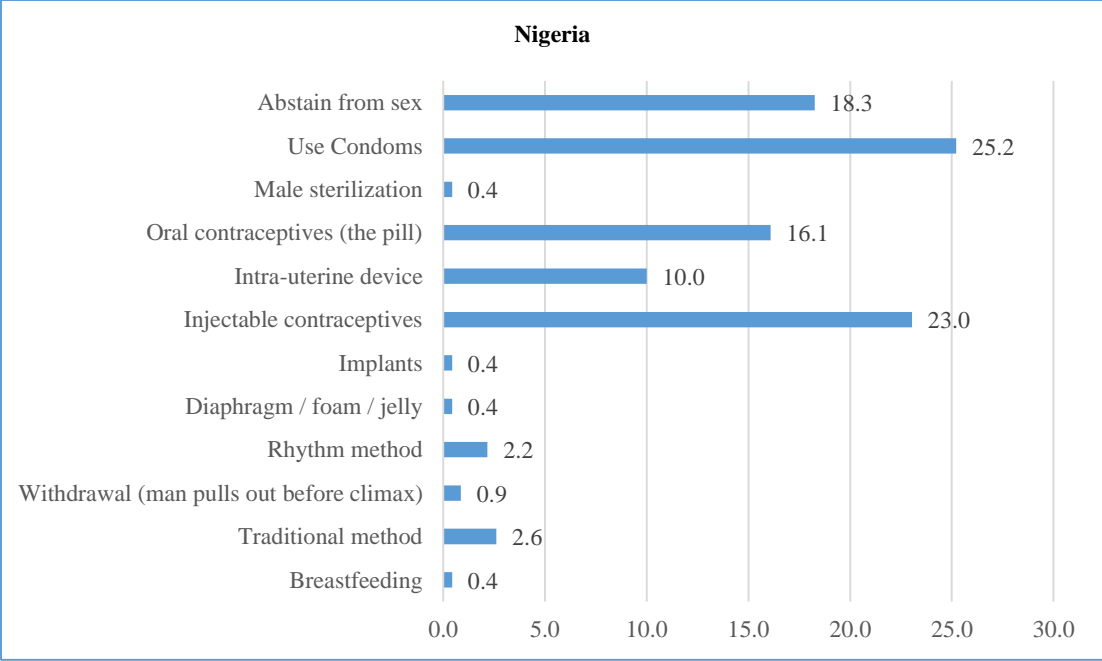
Nigeria

Method	%
Abstain from sex	18.3
Use Condoms	25.2
Male sterilization	0.4
Oral contraceptives (the pill)	16.1
Intra-uterine device	10.0
Injectable contraceptives	23.0
Implants	0.4
Diaphragm / foam / jelly	0.4
Rhythm method	2.2
Withdrawal (man pulls out before climax)	0.9
Traditional method	2.6
Breastfeeding	0.4

Figure 7: What did you do to avoid or delay pregnancy? (%) – sample women of reproductive age
Note: the figure includes respondents that answered the question, N=230
Source: Nigeria HHS

> **Summary family planning:**
>
> In the Nigeria sample, 50% of the women would like to have a(nother) child within the coming five years. Over 30% does not want a(nother) child. However, 33% of these women did not use any birth control method the last time they had sexual intercourse.
>
> The most popular method to avoid pregnancy in the Nigeria sample is using a condom. The highest percentage of women who tried to avoid pregnancy is found in the richer income quintiles and among tertiary educated women.

4.2.4. Measured Health

The most common causes of maternal deaths in Africa are; high blood pressure during pregnancy, death as a result of malaria or AIDS during pregnancy, severe bleeding after delivery, infections after delivery, and unsafe abortion. Anemia has a significant impact on the health of the fetus and the mother. Moreover, anemia contributes to maternal deaths, as well.[13] This subsection presents data on the measured prevalence of hypertension, diabetes, anemia and HIV/AIDS in the Kenya, Nigeria and Tanzania samples of women of reproductive age. Table 8 provides an overview of the total percentage of women that suffered from at least one of the indicated diseases in Kenya

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[13] Anemia is often caused by malaria.

and Nigeria, as well as by socio–economic subgroup. The table shows that 32% in the Kenya sample and 46% in the Nigeria sample suffered from at least one disease.[14] Both samples do not show a clear pattern across consumption quintiles or education levels.

Table 8: Measured disease (hypertension, diabetes, anemia or HIV/AIDS) by subgroup – sample women of reproductive age

| | Kenya | | Nigeria | |
	Obs.	%	Obs.	%
Total	694	32.4	290	45.9
Age				
age 15-30	269	22.7	110	44.5
age 31-49	425	38.6	180	46.7
Poor	503	32.6	173	50.3
Extreme poor	289	30.1	92	52.2
Consumption quintile				
Q1 (poorest)	141	28.4	54	50.0
Q2	152	31.6	40	52.5
Q3	149	32.9	57	50.9
Q4	127	36.2	72	36.1
Q5 (richest)	125	33.6	67	44.8
Education				
No education	230	33.5	96	51.0
Primary	241	30.3	86	51.2
Secondary	156	35.3	63	41.3
Tertiary	53	32.1	27	33.3

Note: the table includes respondents with measurements
Sources: Kenya *HHS* and Nigeria *HHS*

Table 9 presents the measured prevalence of hypertension, diabetes, anemia and HIV/AIDS among women of reproductive age in the three countries, if applicable. The prevalence of hypertension is 10%, 13% and 13% in the Kenya, Nigeria and Tanzania samples, respectively. The prevalence of diabetes and HIV/AIDS is low in the Kenya and Nigeria samples. However, the prevalence of Anemia is high, with a prevalence of 21% and 31% in the Kenya and Nigeria sample, respectively.[15]

Women of reproductive age have increased iron requirements, especially during pregnancy. Iron is essential for the development of the brain of a child. In particular iron deficiency in pregnancy during the third trimester could be detrimental for a child's mental and motor

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[14] This finding for Kenya is in line with the previous USAID study, which included the Kenya sample, as well.
[15] The previous USAID study found a lower prevalence of anemia in the Kenya sample. However, this prevalence was measured among all respondents aged 15–65, including men. Thus the prevalence of anemia is in particular high among women of reproductive age.

development (Lozoff et al., 2002, McCann et al. 2007). Women of reproductive age who want a child greatly benefit from screening for anemia and prescription of prenatal supplementation (such as iron, folic acid and multivitamin supplements). Prescription of these supplements is part of the insurance package of the HIF program. Antenatal care is also included in the insurance package, testing for anemia and providing prenatal supplements will generally be done during antenatal care visits.

Table 9: Prevalence of measured hypertension, diabetes, anemia or HIV/AIDS – sample women of reproductive age

	Kenya		Nigeria		Tanzania	
	Obs.	%	Obs.	%	Obs.	%
Hypertension						
Normal blood pressure	957	90.0	538	87.3	575	87.1
Hypertension	106	10.0	78	12.7	85	12.9
Diabetes						
Normal glucose	710	99.9	811	99.0	n/a	n/a
Diabetes	1	0.1	8	1.0	n/a	n/a
Anemia						
No anemia	570	79.1	234	68.6	n/a	n/a
Anemia	151	20.9	107	31.4	n/a	n/a
HIV/AIDS						
No HIV/AIDS	689	96.0	792	96.0	n/a	n/a
HIV/AIDS	29	4.0	33	4.0	n/a	n/a

Note: the table includes respondents with measurements
Sources: Kenya *HHS*, Nigeria *HHS* and Tanzania *HHS*

Summary measured health:

Around 32% and 46% of the women of reproductive age suffer from hypertension, diabetes, anemia or HIV/AIDS in the Kenya and Nigeria samples, respectively. Both samples do not show a clear pattern across socio–economic characteristics.

In both samples anemia has the highest prevalence: 21% in the Kenya sample and 31% in the Nigeria sample. The prevalence of hypertension is 10%, 13% and 13% in the Kenya, Nigeria and Tanzania samples, respectively. The prevalence of diabetes and HIV/AIDS is low in the Kenya and Nigeria samples.

4.2.5. Healthcare Utilization

Timely access to quality healthcare is highly important in the prevention of maternal and newborn deaths, as well as to avert the consequences of prenatal iron deficiency. In particular, access to antenatal and delivery care assisted by skilled birth attendants can make a difference between life and death. Table 10 provides an overview of the utilization of antenatal care for pregnant women by socio–economic subgroup in the Kenya, Nigeria and Tanzania samples. The utilization of antenatal care is high in the three countries. The table shows that in the Kenya and Nigeria samples around 95% and in Tanzania sample 81% attended antenatal care visits, which is high when compared with other African countries. The utilization of antenatal care increases with income in the Nigeria and Tanzania samples, but decreases with income in the Kenya sample. We cannot logically explain this observation. Also, we do not observe a clear association with education of the pregnant woman and education of her spouse.

Pregnant women in our samples report high use of antenatal care. However, we are not informed about the provider and quality of these visits. In many cases the provider might be a traditional birth attendant, traditional healer or another less skilled health worker.[16] Furthermore, antenatal care should start as early as possible in pregnancy, preferably in the first trimester and it should include at least four visits.[17] Due to data limitations in the Kenya HHS and Nigeria HHS we do not know the number of antenatal care visits nor the timing of antenatal care visits. The Tanzania HHS provides more detailed information with respect to antenatal care visits. Only 13% of the pregnant women started attending antenatal care in their first trimester and the average number of antenatal care visits was 2 visits.

Antenatal care is part of the insurance benefit package in the HIF programs. As the pregnant women are found willing to make use of antenatal care (at any provider, including traditional birth attendants or traditional healers), it is expected that access to better quality of antenatal care, better health insurance coverage, together with better awareness of illness (such as anemia) and pregnancy danger signs may largely benefit the pregnant women in our samples and their yet unborn children.

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[16] The follow–up survey for Nigeria does include this information.
[17] The follow–up survey for Nigeria does include this information, as well.

Table 10: Utilization of antenatal care (at least one visit) by subgroup – sample pregnant women (past twelve months)

	Kenya		Nigeria		Tanzania	
	Obs.	%	Obs.	%	Obs.	%
Total	271	95.9	259	94.6	91	81.0
Age						
age 15-30	145	95.9	170	94.1	63	79.4
age 31-49	126	96.0	89	95.5	28	84.4
Poor	202	96.0	170	92.9	80	77.5
Extreme poor	121	97.5	99	90.9	55	72.7
Consumption quintile						
Q1 (poorest)	76	97.4	51	92.2	19	69.8
Q2	47	97.9	54	90.7	23	85.8
Q3	60	96.7	50	94.0	21	78.6
Q4	42	92.9	47	100.0	10	59.4
Q5 (richest)	46	93.5	57	96.5	18	96.9
Education						
No education	88	97.7	101	92.1	71	81.6
Primary	108	92.6	87	95.4	11	86.5
Secondary	50	98.0	53	98.1	9	65.2
Tertiary	24	100.0	12	100.0	0	n/a
Education spouse						
No education	50	98.0	74	90.5	39	76.5
Primary	74	95.9	52	96.2	7	100.0
Secondary	52	96.2	56	98.2	9	100.0
Tertiary	21	95.2	26	92.3	0	n/a

Note: the table includes respondents that answered the question
Sources: Kenya *HHS*, Nigeria *HHS* and Tanzania *HHS*

Figure 8 shows the number of deliveries at home, in a primary health center and in a hospital for the pregnant women who delivered a child in the last twelve months.[18] Tanzania has the lowest percentage of home deliveries (4%) and Kenya has the highest percentage of home deliveries (55%), in Nigeria roughly a quarter of the pregnant women delivered at home. 35% of the pregnant women in Kenya delivered in a hospital. The percentage of hospital deliveries is twice as high in Nigeria, as well as in Tanzania.

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[18] A hospital delivery is defined as a delivery in a public or private hospital or in a maternity center.
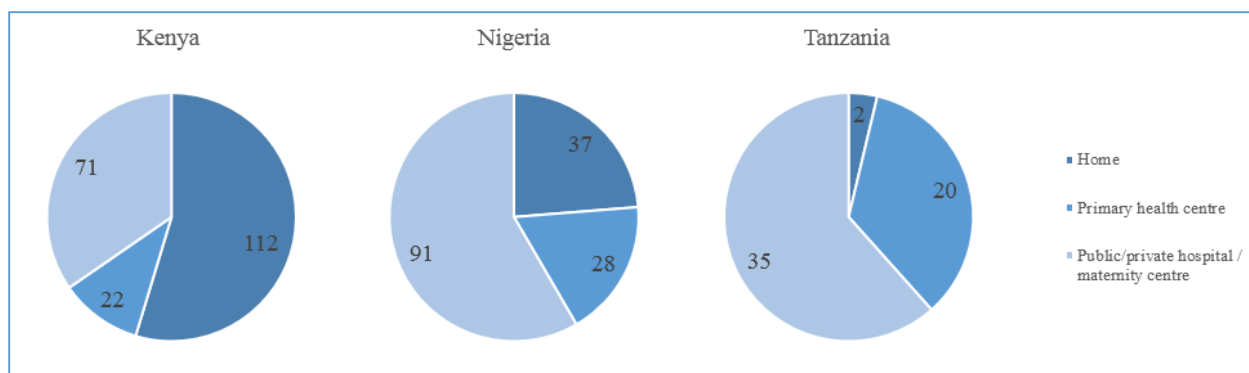
Figure 8: Delivery provider (Obs.) – sample pregnant women with delivery (past twelve months)
Sources: Kenya HHS, Nigeria HHS and Tanzania HHS

Table 11 presents the percentage of respondents that delivered their child in a hospital, for all women who delivered a child in the past year, as well as by socio–economic subgroup. In all three countries hospital deliveries increased with income. The percentage is (almost) twice as high in the richest quintile, compared to the poorest quintile. Hospital deliveries increased with educational level of the pregnant women and educational level of her spouse, with the exception of Tanzania. The number of observed pregnancies is very low in most of the education groups in Tanzania, which may explain why we do not observe an increase in hospital deliveries with an increase in educational level.

Table 11: Hospital delivery by subgroup – sample pregnant women with delivery (past twelve months)

	Kenya		Nigeria		Tanzania	
	Obs.	%	Obs.	%	Obs.	%
Total	205	34.6	156	58.3	57	61.6
Age						
age 15-30	108	38.0	98	58.2	41	63.3
age 31-49	97	30.9	58	58.6	16	56.9
Poor	156	27.6	107	58.9	50	56.9
Extreme poor	99	23.2	59	50.8	34	43.5
Consumption quintile						
Q1 (poorest)	62	22.6	34	47.1	11	56.4
Q2	38	26.3	29	58.6	17	34.0
Q3	43	30.2	34	61.8	12	62.6
Q4	30	53.3	31	67.7	4	63.2
Q5 (richest)	32	56.3	28	57.1	13	84.9
Education						
No education	69	21.7	58	53.4	42	57.7
Primary	81	30.9	53	56.6	8	80.9
Secondary	35	48.6	36	66.7	7	63.3
Tertiary	19	68.4	7	57.1	0	n/a
Education spouse						
No education	35	31.4	41	43.9	22	68.7
Primary	57	22.8	30	53.3	3	74.9
Secondary	40	42.5	39	69.2	5	17.2
Tertiary	15	73.3	19	52.6	0	n/a

Note: the table includes respondents that answered the question
Sources: Kenya *HHS*, Nigeria *HHS* and Tanzania *HHS*

Summary healthcare utilization:

The utilization of antenatal care is high in the three samples, 96%, 95% and 81% in the Kenya, Nigeria and Tanzania samples, respectively. The utilization of antenatal care increases with income in Nigeria and Tanzania, but, surprisingly, decreases with income in Kenya.

The percentage of home deliveries is 55%, 24% and 4% in the Kenya, Nigeria and Tanzania, samples, respectively. 35% of the pregnant women in Kenya delivered in a hospital while this was twice as high in the Nigeria (58%) and Tanzania samples (62%). In all three samples hospital deliveries increase with income. The percentage is (almost) twice as high in the richest quintile, compared to the poorest quintile. Hospital deliveries increase with educational level of the pregnant women and educational level of her spouse.

4.2.6. Complications

Figure 9 shows the number of complications during delivery reported by women who delivered a baby in the last twelve months. 21%, 7% and 16% of all deliveries were complicated deliveries in the Kenya, Nigeria and Tanzania samples, respectively. Complications occurred either with the baby (13%, 3% and 5% in the Kenya, Nigeria and Tanzania samples, respectively) or with the mother (8%, 3% and 11% in the Kenya, Nigeria and Tanzania samples, respectively).
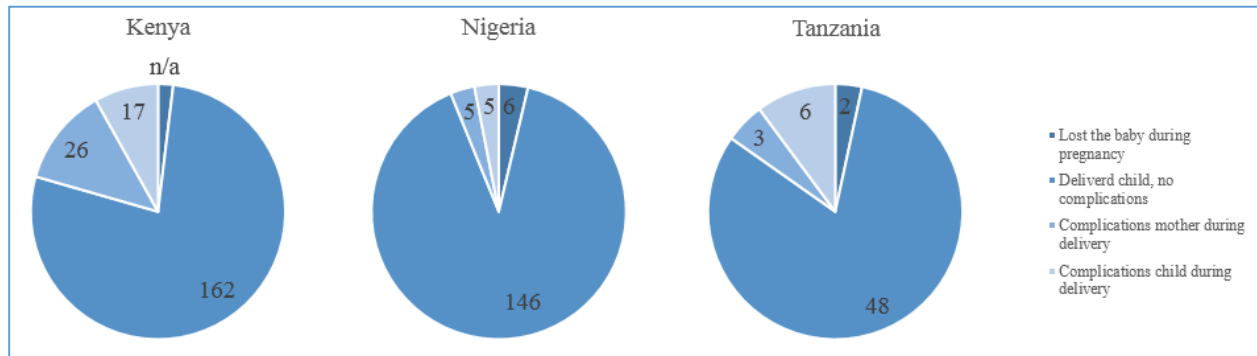

Figure 9: Complications (Obs.) - sample pregnant women (past twelve months, excl. currently pregnant)
Sources: Kenya HHS, Nigeria HHS and Tanzania HHS

Table 12 presents the complications, which were reported by women who delivered a baby in the past twelve months. The number of complications reported was very low, especially in the Nigeria and Tanzania samples. Complications as a result of high blood pressure were most reported In Kenya, while severe vaginal bleeding was most reported in Nigeria.

Table 12: Breakdown reported complications – sample pregnant women with delivery (past twelve months)

	Kenya		Nigeria		Tanzania	
	Obs.	%	Obs.	%	Obs.	%
Mother						
High blood pressure	9	20.9	1	10.0	0	0.0
High blood glucose	1	2.3	0	0.0	0	0.0
Severe vaginal bleeding	1	2.3	3	30.0	1	11.1
Prolonged labor	3	7.0	1	10.0	0	0.0
Cesarean section	6	14.0	0	0.0	2	22.2
Other	6	14.0	0	0.0	0	0.0
Child						
Still born	4	9.3	0	0.0	0	0.0
Baby came too early	3	7.0	0	0.0	2	22.2
Baby did not cry	4	9.3	2	20.0	0	0.0
Low birth weight	2	4.7	0	0.0	0	0.0
Baby became very ill within 7 days	0	0.0	0	0.0	1	11.1
Other	4	9.3	3	30.0	3	33.3

Note: the table includes respondents that answered the question
Sources: Kenya *HHS*, Nigeria *HHS* and Tanzania *HHS*

Summary complications:

21%, 7% and 16% of all deliveries were reported complicated deliveries in the Kenya, Nigeria and Tanzania samples, respectively. Complications occurred either with the baby (13%, 3% and 5% in the Kenya, Nigeria and Tanzania samples, respectively) or with the mother (8%, 3% and 11% in the Kenya, Nigeria and Tanzania samples, respectively).

4.2.7. Out−Of−Pocket Health Expenditures

Table 13 presents the total reported out−of−pocket health expenditures in the past 12 months for non−pregnant women and pregnant women with and without a hospital delivery. Note that these include *all* health expenditures reported by these women, including expenditures on chronic disease, injuries, etc. We see that in the Kenya and Nigeria samples the total out−of−pocket health expenditures were higher for pregnant women who delivered their baby in the hospital in the past twelve months, compared to pregnant women without a hospital delivery and non−pregnant women. In the Nigeria sample pregnant women had higher out−of−pocket health expenditures than non−pregnant women, in the Tanzania sample non−pregnant women had the highest out−of−pocket health expenditures.

Table 13: Total out–of–pocket health expenditures in the past 12 months – sample women of reproductive age or pregnant women

	All women aged 15-49		Pregnant < 12 months (excl. hospital delivery)		Hospital delivery <12 months	
	Obs.	mean	Obs.	mean	Obs.	mean
Kenya Average per capita OOP health expenditure (excluding premium) (LCU)	1524	1679.6	126	490.0	68	2101.4
Nigeria Average per capita OOP health expenditure (excluding premium) (LCU)	1098	1051.9	229	1287.7	89	1460.6
Tanzania Average per capita OOP health expenditure (excluding premium) (LCU)	1230	136726.7	75	132195.9	34	119328.5

Note: the table includes respondents that answered the question
Sources: Kenya HHS, Nigeria *HHS* and Tanzania *HHS*

Figure 10 shows how much of the total health expenditures is done out–of–pocket and how much of the total income was spent on health for women of reproductive age. In the Kenya, Nigeria and Tanzania sample 97%, 94% and 89% of all health expenditures is made out–of–pocket. This implies a high financial burden with respect to health expenditures for the women in our samples. Furthermore, we see that in Tanzania a high percentage of total income is spend on health (almost 18%). In the Kenya and Nigeria sample around 2% of total income is spend on health.
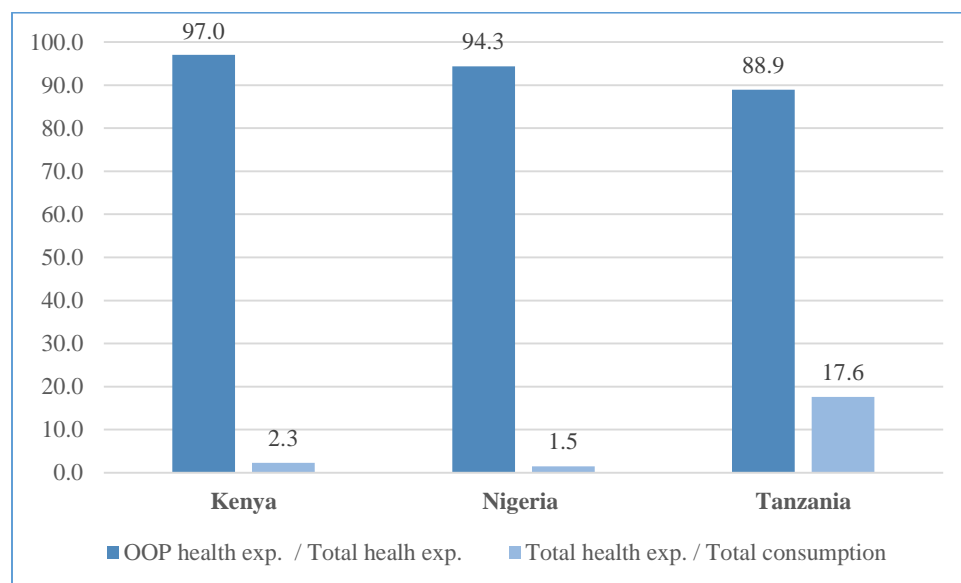

Figure 10: Out–of–pocket w.r.t. total health expenditures and total health expenditures w.r.t. total consumption (%) – sample women of reproductive age
Sources: Kenya HHS, Nigeria MACHS+HHS and Tanzania HHS

Summary out–of–pocket health expenditures:

In the Kenya and Nigeria samples the total out–of–pocket health expenditures were higher for pregnant women who delivered their baby in the hospital in the past twelve months, compared to pregnant women without a hospital delivery and non−pregnant women. In the Nigeria sample pregnant women had higher out–of–pocket health expenditures than non−pregnant women, in the Tanzania sample non−pregnant women had the highest out–of–pocket health expenditures.

4.2.8. Health Insurance

Table 14 presents the current insurance status for women of reproductive age, as well as by socio–economic subgroup. Note that at the time of the baseline survey the HIF insurance program was not yet introduced. Enrollment in insurance is 0.7% and 18%% in the Nigeria and Tanzania samples respectively.[19] Enrollment increases with income and educational level. Women who are currently pregnant are more enrolled in health insurance, as well.

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[19] In Tanzania the women are enrolled in either the Community Health Fund or the National HIF.

Table 14: Current health insurance status insured – sample women of reproductive age

	Nigeria		Tanzania	
	Obs.	%	Obs.	%
Total	1208	0.7	1231	17.5
Age				
age 15-30	684	1.0	678	15.3
age 31-49	524	0.4	553	20.0
Poor	754	0.3	1098	17.5
Extreme poor	402	0.2	684	18
Consumption quintile				
Q1 (poorest)	212	0.0	258	17.4
Q2	227	0.4	241	17.7
Q3	239	0.4	239	18.9
Q4	266	0.0	248	15.7
Q5 (richest)	264	2.7	245	18.0
Education				
No education	419	0.0	760	15.3
Primary	284	0.4	278	19.2
Secondary	189	2.1	190	22.5
Tertiary	67	3.0	3	100.0
Education spouse				
No education	286	0.0	326	10.8
Primary	178	0.0	45	14.9
Secondary	148	2.0	54	43.4
Tertiary	86	3.5	2	100.0
Pregnant past 12 months	156	0.0	57	13.2
Currently pregnant	101	3.0	34	20.1
Antenatal care past 12 months	245	1.2	75	14.3
Hospital delivery past 12 months	91	0.0	34	21.4
Want child right now / coming year	156	1.3	n/a	n/a

Note: the table includes respondents that answered the question

Sources: Nigeria *HHS* and Tanzania *HHS*

Table 15 shows the willingness to enrol in the HIF program for the women of reproductive age and by socio–economic subgroup in Nigeria. The willingness to enrol is high in Nigeria. The willingness to enrol increases with age and educational level and decreases with income. This implies that poorer women are more willing to join than the richer women. We also find that the willingness to join increases if a woman was pregnant in the past year or is currently pregnant and is highest for women who want a child within one year. The latter could be attributed to the fact that women know that antenatal, postnatal and delivery care are part of the insurance package. Also, from table 13 and figure 10, we have seen that out–of–pocket health expenditures are higher for pregnant women in Nigeria and that almost all health related cost are paid out−of−pocket. This

suggests that health insurance would decrease substantial out–of–pocket health expenditures in our samples.

Table 15: Interested in health insurance – sample women of reproductive age

	Nigeria	
	Obs.	%
Total	1014	84.1
Age		
age 15-30	493	81.9
age 31-49	521	86.2
Poor	625	85
Extreme poor	329	84.8
Consumption quintile		
Q1 (poorest)	175	85.1
Q2	185	84.3
Q3	197	85.3
Q4	230	84.3
Q5 (richest)	227	81.9
Education		
No education	410	81.2
Primary	269	89.6
Secondary	178	87.6
Tertiary	67	86.6
Education spouse		
No education	283	84.5
Primary	177	83.6
Secondary	145	84.8
Tertiary	86	87.2
Pregnant past year	154	87.7
Currently pregnant	98	85.7
Antenatal care past year	241	86.7
Hospital delivery past year	89	88.8
Want child right now or coming year	154	89

Note: the table includes respondents that answered the question
Source: Nigeria *HHS*

Summary health insurance and out–of–pocket health expenditures:

For women of reproductive age, enrollment in health insurance is low with 0.7% and 18% in the Nigeria and Tanzania samples, respectively. Enrollment increases with income and educational level. Women who are currently pregnant are more enrolled in health insurance as well.

The willingness to enroll is high in Nigeria. The willingness to enroll increases with age and educational level. The willingness decreases with income, which implies that the poorer women are more willing to enroll than the richer. The willingness to join is the highest for women who want a child within one year.

In the Kenya and Nigeria samples the total out–of–pocket health expenditures were higher for pregnant women who delivered their baby in the hospital in the past twelve months, compared to pregnant women without a hospital delivery and non–pregnant women. In the Nigeria sample pregnant women had higher out–of–pocket health expenditures than non–pregnant women, in the Tanzania sample non–pregnant women had the highest out–of–pocket health expenditures.

4.3. Under Five Year Olds

This subsection presents data on socio−economic characteristics, nutritional status, immunization and health insurance for children under the age of five.

4.3.1. Socio−Economic Characteristics

Table 16 provides an overview of the socio−economic characteristics of the sample of children under the age of five. The table shows that the percentage of children with married parents is 74%, 97% and 68% in the Kenya, Nigeria and Tanzania samples, respectively. The percentage of children living in a household with a female household head is 14%, 18% and 21% in the Kenya, Nigeria and Tanzania samples, respectively.

The percentage of young children with a mother who reported to have been working in the past twelve months is 53% in the Kenya sample, 20% in the Tanzania sample and a substantial higher 82% in the Nigeria sample. The table shows that the Tanzania sample has the highest percentages of poor and extreme poor children under the age of five. Over 90% is poor and 64% is subject to extreme poverty. In both the Kenya and Nigeria samples around 75% is poor and around 45% is extreme poor.

In all three countries the parents of the under–five year olds are poorly educated. Almost 80% of the mothers in the Tanzania sample do not have any education, compared to 43% in the Nigeria sample and 29% in the Kenya sample. The percentage of completed tertiary education among the mothers is 9%, 5% and 0.5% in the Kenya, Nigeria and Tanzania samples, respectively. The fathers are on average higher educated than the mothers.

Table 16: Socio−economic characteristics – sample under–five year olds

	Kenya		Nigeria		Tanzania	
	Obs.	mean/%	Obs.	mean/%	Obs.	mean/%
All under–five year olds						
Age, years (mean)	871	2.3	876	2.1	499	2.2
Married parents (%)	781	74.3	764	96.7	392	67.6
Employed mother, past 12 months (%)	789	53.1	764	81.7	392	20.2
Aggregate annual per capita consumption, LCU (mean)	869	53675.4	876	70965.6	499	705096.4
Aggregate annual per capita consumption, USD[a] (mean)	869	720.0	876	473.5	499	396.4
Poor, daily per capita consumption <2 USD (%)	869	75.6	876	73.4	499	91.0
Extreme poor, daily per capita consumption <1.25 USD (%)	869	46.3	876	43.9	499	63.8
Consumption quintiles, USD[a] (mean)						
Q1 (poorest)	225	257.9	222	191.5	135	237.0
Q2	181	418.5	190	317.0	124	320.0
Q3	183	580.9	181	439.3	93	386.8
Q4	155	836.4	156	619.5	82	477.9
Q5 (richest)	125	2047.5	127	1069.9	65	770.2
Education mother (%)						
No education	780	29.1	753	42.9	392	79.3
Primary	780	39.1	753	33.1	392	10.1
Secondary	780	22.4	753	18.7	392	10.6
Tertiary	780	9.4	753	5.3	392	0.0
Education father (%)						
No education	632	22.2	641	38.8	250	75.3
Primary	632	35.0	641	26.8	250	10.2
Secondary	632	28.3	641	21.7	250	14.1
Tertiary	632	14.6	641	12.6	250	0.5
All households with under–five year olds						
Household size (mean)	632	6.6	601	5.6	402	5.7
Female household head (%)	623	13.6	599	17.5	402	26.2
Aggregate annual household consumption, LCU (mean)	632	349857.8	601	389411.8	402	3830897.2
Aggregate annual household consumption, USD[a] (mean)	632	4692.7	601	2598.2	402	2153.9

[a] CPI deflators used: Kenya: 0.8761657; Nigeria: 0.923449612; Tanzania: 1.125465178, exchange rates used: Kenya: 0.0117523; Nigeria: 0.00616143; Tanzania: 0.0006328

Note: the table includes under–five year olds for who the question was answered (by the father or mother)

Sources: Kenya *HHS*, Nigeria *HHS* and Tanzania *HHS*

Summary socio–economic characteristics:

In the three sampled populations, children under the age of five are found to be poor. The children in the Tanzania sample are the poorest with 91% living in poverty.

The mother and fathers of the children are found to have low levels of education or do not have any education at all.

4.3.2. Nutritional Status

This subsection presents data on the nutritional status of under–five year olds in the Kenya, Nigeria and Tanzania samples. Table 17 presents the percentage of stunted and wasted children in the Kenya, Nigeria and Tanzania samples. The percentage of stunted (including severely stunted) children is 24%, 31% and 10% in the Kenya, Nigeria and Tanzania samples, respectively. The percentage of severe stunted children is 9%, 12% and 2% in the Kenya, Nigeria and Tanzania samples, respectively. These percentages are high, in particular in Nigeria and Kenya the under–five year old suffered a lot from chronic malnutrition. The percentage of wasted (including severely wasted) children is lower in the three countries. The percentage is 9, 7 and 4% in the Kenya, Nigeria and Tanzania samples, respectively.

Table 17: Nutritional status – sample children under the age of five

	Kenya		Nigeria		Tanzania	
	Obs.	mean/%	Obs.	mean/%	Obs.	mean/%
Height-for-age z-score (%)						
Severely stunted: z < -3	38	8.6	138	12.0	11	1.5
Stunted: -3 ≤ z < -2	69	15.7	221	19.3	40	8.0
Normal: -2 ≤ z ≤ 2	295	67.1	759	66.2	379	83.3
Overweight: z > 2	38	8.6	28	2.4	35	7.2
Weight-for-height z-score (%)						
Severely wasted: z < -3	16	3.7	33	2.9	3	0.4
Wasted: -3 ≤ z < -2	24	5.5	59	5.2	12	3.6
Normal: -2 ≤ z ≤ 2	375	85.8	1026	89.6	417	90.0
Overweight: z > 2	22	5.0	27	2.4	30	6.1

Note: the table includes under–five year olds for who measurements were conducted
Sources: Kenya *HHS*, Nigeria *MACHS* and Tanzania *HHS*

For children aged zero to five, figure 11 shows the distributions of height–for–age and weight–for–height, in the Kenya, Nigeria and Tanzania samples, respectively. A shifted to the left distribution implies that the respective group of children is more stunted or wasted than the WHO international reference population. We tested the null hypothesis of mean zero, against the alternative hypothesis of mean smaller than zero (a shifted to the left distribution) in all distributions.

The mean of the height–for–age z–score is -0.85, -1.30 and -0.04 in the Kenya, Nigeria and Tanzania sample respectively. The null hypothesis of mean zero is strongly rejected for the under–five year olds in Kenya (p<0.001) and Nigeria (p<0.001), but is not rejected for Tanzania (p=0.302). The mean of the weight–for–height z–score is -0.25, -0.26 and 0.05 in the Kenya, Nigeria and Tanzania sample respectively. The null hypothesis of mean zero is strongly rejected for the under–five year olds in Kenya (p<0.001) and Nigeria (p<0.001), but is not rejected for Tanzania (p=0.235). This implies that the children in the Kenya and Nigeria samples are significantly more chronically and acute malnourished than the WHO international reference population. Children in the Tanzania sample are not more malnourished than the reference population.
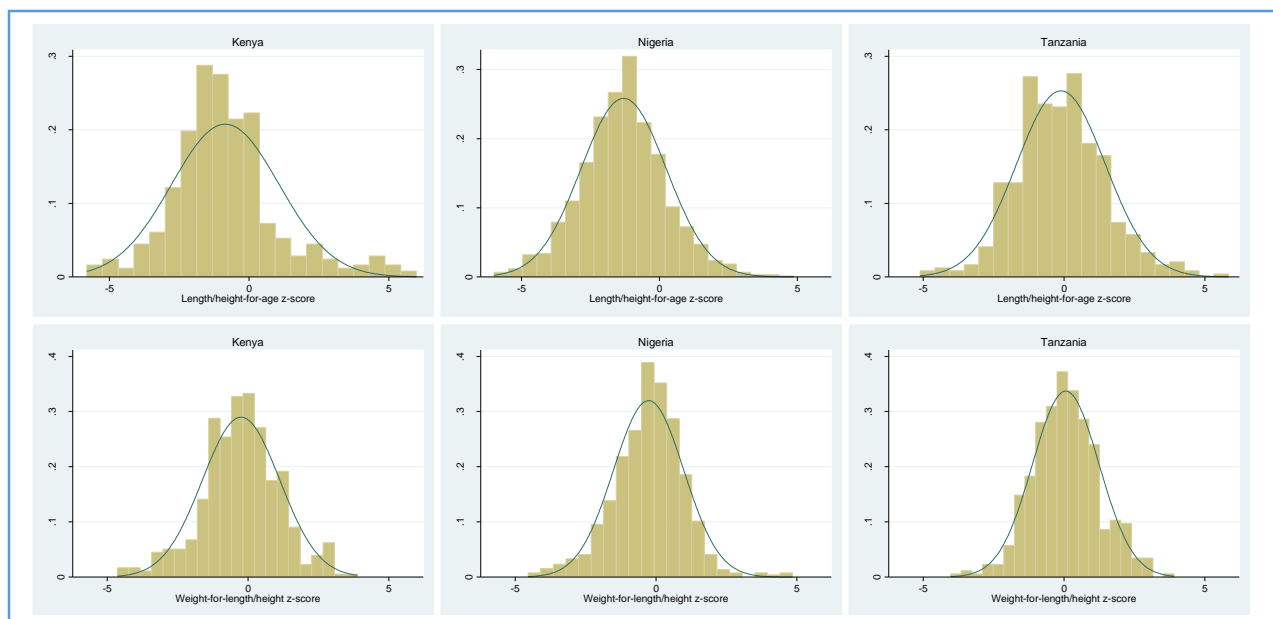

Figure 11: Distributions of height–for–age and weight–for–height – sample under–five year olds

Children in our samples below the age of five suffer more from chronic malnutrition than from acute malnutrition, therefore table 18 provides an overview of the weight–for–height z–score by socio–economic subgroup. In all three samples the z–score becomes less negative (closer to zero) among the children from richer families and with higher educated parents. The z–score is more negative (further away from zero) among the poor and extreme poor.

Table 18: Height–for–Age z–score – under–five year olds

	Kenya		Nigeria		Tanzania	
	Obs.	%	Obs.	%	Obs.	%
Total	428	-0.85	234	-1.56	465	-0.04
Age						
age 0-1	143	-0.48	139	-1.83	161	0.21
age 2-5	285	-1.03	95	-1.17	304	-0.17
Poor	331	-0.87	172	-1.61	429	-0.05
Extreme poor	216	-0.87	114	-1.72	302	-0.22
Consumption quintile (%)						
Q1 (poorest)	127	-1.08	65	-1.93	127	-0.33
Q2	92	-0.49	57	-1.41	115	-0.10
Q3	86	-1.04	42	-1.56	85	-0.02
Q4	64	-0.98	38	-1.17	76	0.39
Q5 (richest)	57	-0.46	32	-1.53	62	0.07
Education mother (%)						
No education	123	-0.72	96	-1.77	291	-0.04
Primary	144	-1.06	69	-1.63	28	0.06
Secondary	85	-0.78	33	-1.24	43	0.40
Tertiary	36	-0.63	12	-0.86	n/a	n/a
Education father (%)						
No education	79	-0.90	72	-1.66	172	-0.07
Primary	100	-0.94	56	-1.82	19	0.53
Secondary	99	-0.55	34	-1.36	33	0.22
Tertiary	40	-0.90	22	-1.15	1	-1.24

Note: the table includes under–five year olds for who measurements were conducted
Sources: Kenya *HHS*, Nigeria *MACHS+HHS* and Tanzania *HHS*

Summary nutritional status under–five year olds:

The percentage of stunted children is 24%, 31% and 10% in the Kenya, Nigeria and Tanzania samples, respectively. The percentage of wasted children is 9%, 7% and 4% in the Kenya, Nigeria and Tanzania samples, respectively. These percentages can be considered high, indicating that in particular in Nigeria and Kenya the under–five year old suffer a lot from chronic malnutrition.

A significant proportion of children in the Kenya and Nigeria sample, but not in the Tanzania sample, are malnourished when compared to the WHO international reference population. This is mostly chronic malnutrition.

Chronic malnutrition is less prevalent among children from richer families and children with

4.3.3. Immunization

Table 19 shows the percentage of immunized (with at least one vaccine) under–five year olds by socio–economic subgroup in the Kenya, Nigeria and Tanzania samples, respectively. The percentage is 67%, 52% and 60% in the Kenya, Nigeria and Tanzania sample, respectively. Immunization decreases with educational level of mother and father in the Nigeria and Kenya sample, but not in the Tanzania sample. With the exception of Tanzania. In Tanzania the number of observed immunizations is very low in the education groups. There is no clear pattern with consumption in any of the countries.

Table 19: Immunized – sample children under the age of five

	Kenya		Nigeria		Tanzania	
	Obs.	%	Obs.	%	Obs.	%
Total	820	66.5	808	51.6	477	59.7
Consumption quintile (%)						
Q1 (poorest)	215	67.9	204	54.9	131	50.2
Q2	173	68.2	172	51.2	116	72.4
Q3	176	63.1	165	60.6	89	65.3
Q4	142	66.9	149	51.0	78	55.6
Q5 (richest)	112	65.2	118	34.7	63	52.9
Education mother (%)						
No education	219	74.0	299	53.8	299	68.0
Primary	284	67.6	229	49.3	32	60.0
Secondary	167	65.9	133	42.1	42	58.0
Tertiary	67	59.7	40	37.5	n/a	n/a
Education father (%)						
No education	135	75.6	231	58.4	179	69.5
Primary	208	70.7	151	51.0	22	58.8
Secondary	172	68.0	136	35.3	32	58.4
Tertiary	82	63.4	80	42.5	1	100.0

Note: the table includes under–five year olds for who the question was answered (by the father or mother)
Sources: Kenya *HHS*, Nigeria *HHS* and Tanzania *HHS*

Table 20 shows which vaccinations the under–five year olds received and the number of vaccinations for each vaccine. For example, 98% of children in Tanzania are immunized against polio with on average 3 vaccinations. Vaccinations against tuberculosis (BCG), polio and measles were received in all three countries. The table also shows that the immunization rates against yellow fever, diphtheria, pertussis and tetanus (DTP), hepatitis B, and *Haemophilus influenzae* type B (HiB) are low in the Kenya, Nigeria and Tanzania samples.

Table 20: Breakdown vaccinations – sample children under the age of five

	Kenya			Nigeria			Tanzania		
	Obs.	Prob.	mean	Obs.	Prob.	mean	Obs.	Prob.	mean
BCG	538	99.6	1.0	389	77.0	1.0	276	97.2	1.1
Polio	532	98.5	3.4	411	81.4	3.8	277	97.5	3.2
Measles	446	82.6	1.0	318	63.0	1.0	211	74.3	1.3
Yellow fever	n/a	n/a	n/a	280	55.5	1.1	n/a	n/a	n/a
DPT	12	2.2	3.0	375	74.3	2.8	272	95.8	3.0
Hepatitis B	6	1.1	3.0	363	71.9	2.7	214	75.4	2.9
HiB	6	1.1	6.0	n/a	n/a	n/a	143	50.4	2.8

Note: the table includes under–five year olds for who the question was answered (by the father or mother)
Sources: Kenya *HHS*, Nigeria *HHS* and Tanzania *HHS*

> **Summary immunization under–five year olds:**
>
> The percentage of immunized children (any vaccine) is 67%, 52% and 60% in the Kenya, Nigeria and Tanzania samples, respectively. Vaccinations against tuberculosis (BCG), polio and measles were received in all three countries. Immunization rates against yellow fever, diphtheria, pertussis and tetanus, hepatitis B, and *Haemophilus influenzae* type B are very low in the Kenya, Nigeria and Tanzania samples.

4.3.4. Health Insurance

Table 21 presents the current insurance status for children below the age of five, as well as by socio–economic subgroup. Enrollment in insurance is 0.3% and 8% in the Nigeria and Tanzania samples, respectively, which is low.

Table 21: Current health insurance status – sample children under the age of five

	Nigeria		Tanzania	
	Obs.	%	Obs.	%
Total	876	0.3	499	7.8
Age				
age 15-30	335	0.3	174	4.5
age 31-49	541	0.4	325	9.5
Poor	643	0.2	460	8
Extreme poor	385	0	325	8
Consumption quintile				
Q1 (poorest)	222	0	135	9
Q2	190	0	124	7.1
Q3	181	0.6	93	6.7
Q4	156	0	82	6.3
Q5 (richest)	127	1.6	65	9.9
Education				
No education	323	0	313	7.5
Primary	249	0	35	1.7
Secondary	141	2.1	44	11.2
Tertiary	40	0	n/a	n/a
Education spouse				
No education	249	0	191	8.9
Primary	172	0	24	2
Secondary	139	1.4	34	2.4
Tertiary	81	1.2	1	100

Note: the table includes under–five year olds for who the question was answered (by the father or mother)
Sources: Nigeria *HHS* and Tanzania *HHS*

> **Summary health insurance:**
>
> For children aged zero to five, enrollment in health insurance is low; 0 and 8% in the Nigeria and Tanzania samples, respectively.

4. Conclusion and Discussion

Maternal and child mortality remains high in Sub−Saharan Africa. Additionally, many of the children that do survive are at serious risk of not reaching their full educational and earnings potential, because they suffer from the negative consequences of poverty and nutritional deficiencies. Integrated interventions aimed at increasing access to and improving quality of healthcare might have a direct positive effect on maternal and child health. The HIF programs provide access to low−cost health insurance, in combination with health facility improvements, to selected families in rural Kenya, Nigeria and Tanzania. The aim of the HIF program is to improve

individual health by increasing healthcare utilization and to reduce poverty among households by reducing out−of−pocket health expenditures and unexpected health related costs.

This study has sought to provide valuable knowledge relating to maternal and child health and the potential for the HIF program to improve mother and child health in the program areas in Kenya, Nigeria and Tanzania. Improving maternal and child health is one of the key components of the HIF program, which includes antenatal (including diagnostics tests and supplements and or drugs), postnatal (including immunization) and delivery care (including cesarean section) in the insurance benefits package.

The women of reproductive age and the children under the age of five are found to be poor in all three samples. The women and children in the Tanzania sample are the poorest with almost 90% living in poverty. Income inequality is highest in the Kenya sample and lowest in the Tanzania sample. The women and their spouses are found to have low levels of education or do not have any education at all.

Women in the Nigeria sample have the highest fertility rate, compared to the Kenya sample. However, in the Nigeria sample child mortality is twice as high as in the Kenya sample. In Nigeria, 50% of the women would like to have a(nother) child within the coming five years. Over 30% does not want a(nother) child. However, 33% of these women did not use any birth control method the last time they had sexual intercourse. When birth control methods are used, the most popular methods is using a condom. In particular higher educated and richer women are practicing family planning.

The burden of chronic disease is high among women of reproductive age in our samples. Around 32% and 46% of the women suffer from hypertension, diabetes, anemia or HIV/AIDS in the Kenya and Nigeria samples, respectively. In particular the prevalence of anemia is high; 21% in the Kenya sample and 31% in the Nigeria sample. Iron is essential for the development of the brain of a child during pregnancy. In particular iron deficiency during the third trimester could be detrimental for a child's mental and motor development. In our samples, women of reproductive age who want a child would greatly benefit from screening for and treatment of anemia. Ideally this would be done during antenatal care visits. These services are provided in the HIF programs. Moreover, we found that the utilization of antenatal care is high in the three countries; 96%, 95%

and 81% in the Kenya, Nigeria and Tanzania samples, respectively. However, we do not know anything about the provider and quality of these visits. In many cases the provider might be a traditional healer or another less skilled health worker. As the population already makes high use of antenatal (willingness is high), it is expected that, access to better quality of antenatal care, through health insurance coverage, together with better awareness of (chronic) illness may largely benefit the women in our samples and their yet unborn children.

The percentage of home deliveries is 55%, 24% and 4% in the Kenya, Nigeria and Tanzania, samples, respectively. In all three samples, hospital deliveries increase with income. The percentage is (almost) twice as high in the richest quintile, compared to the poorest quintile. Hospital deliveries increase with educational level of the pregnant women and educational level of her spouse, as well. Around 21%, 7% and 16% of all deliveries were complicated deliveries in the Kenya, Nigeria and Tanzania sample, respectively. The HIF program can increase access to delivery and emergency obstetric care assisted by skilled birth attendants, as well as reduce out−of−pocket expenditures on health. In particular among the poorer women, who are most willing to enroll in the HIF program and have less hospital deliveries (and high out−of−pocket expenditures).

Child malnutrition is a serious public health problem with enormous human and economic costs. Healthy pregnancy, proper nutrition with exclusive breast feeding through 6 months of age and adequate micronutrient content in diet and regular growth monitoring and immunization are needed for the full physical development of a child. Children in the Kenya and Nigeria samples are significantly more underfed compared to the WHO international reference population, which results of both acute and chronic malnutrition, though mostly chronic malnutrition. The percentage of stunted children is 24%, 31% and 10% in the Kenya, Nigeria and Tanzania samples, respectively. The percentage of wasted children is 9%, 7% and 4% in the Kenya, Nigeria and Tanzania samples, respectively. These percentages are high, in particular in Nigeria and Kenya the under−five year old suffer a lot from chronic malnutrition. If a child suffers from repeated infectious diseases combined with undernutrition, they could easily end up in a downward spiral, with severe consequences of their lives' trajectories.

The percentage of immunized children is 67%, 52% and 60% in the Kenya, Nigeria and Tanzania samples, respectively. Mainly vaccinations against tuberculosis (BCG), polio and measles were received in all three countries. Immunization rates against yellow fever, diphtheria, pertussis and tetanus, hepatitis B, and *Haemophilus influenza* type B are very low in the Kenya, Nigeria and Tanzania samples. The HIF program could affect the nutritional status of a child indirectly, by reducing poverty among households, through reducing out–of–pocket health expenditures and unexpected health related costs of any family member (which implies more money for food) and directly by providing all the necessary vaccinations.

For women of reproductive age, enrollment in health insurance is low; 0.7% and 18% in the Nigeria and Tanzania samples, respectively. Enrollment increases with income and educational level. Women who are currently pregnant are more enrolled in health insurance as well. The willingness to enroll is high in Nigeria. The willingness to enroll increases with age and educational level. The willingness to enroll decreases with income, this implies that the poorer women are more willing to enroll than the richer women. The willingness to join is the highest for women who want a child within one year. In the Kenya and Nigeria samples the total out–of–pocket health expenditures were higher for pregnant women who delivered their baby in the hospital in the past twelve months, compared to pregnant women without a hospital delivery and non−pregnant women. In the Nigeria sample pregnant women had higher out–of–pocket health expenditures than non−pregnant women, in the Tanzania sample non−pregnant women had the highest out–of–pocket health expenditures. For children aged zero to five, enrollment in health insurance is low; 0.3% and 8% in the Nigeria and Tanzania samples, respectively. Enrollment increases with income and educational level of the parents.

In this paper, we have documented the state of health of mothers and children in selected low-income communities in Kenya, Nigeria and Tanzania. The study was motivated by the fact that these three countries will have great difficulty to reach MDG 4 (reduced child mortality) and MDG 5 (improved maternal health), by 2015. The burden of disease is very high in these population groups and access to quality health care is relatively low, and comes with severe financial consequences (high out−of−pocket expenditures). The HIF sponsored interventions− i.e. making low−cost health insurance available and improving the quality of the participating health facilities−have been proven to effectively increase access to quality health care (in Central Kwara

State) and reduce out−of−pocket expenditure by 50%. Further implementation and expansion of such programs to well−chosen target groups is likely protecting the population from health related financial shocks and improving the health status of mothers and their (young) children, thus putting the relevant MDGs within reach, as well as improve early childhood development.

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