

MONITORING PROGRESS IN REPRODUCTIVE MATERNAL NEONATAL CHILD AND
ADOLESCENT HEALTH (RMNCAH) FOLLOWING DEVOLUTION OF HEALTH
SERVICES IN KENYA: A TREND ANALYSIS

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W62/9860/2018


A THESIS SUBMITTED AS A PARTIAL FULFILLMENT FOR A MASTERS OF
SCIENCE DEGREE IN MEDICAL STATISTICS AT THE UNIVERSITY OF
NAIROBI

DECEMBER 2019

DECLARATION AND AUTHORSHIP

I affirm that I am the only author of this thesis and am aware of the laws of plagiarism. Prior articles or texts by other sources have been recognized. I solemnly declare that the work in this thesis has not been previously submitted as part of requirements for a degree elsewhere.

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DEDICATION

To the Almighty God creator of heaven and earth,
To my husband for his relentless sacrifice, love and support,
To my late dad Mr Mike R. Bolaji,
To my mum, Mrs Janet Aduke Bolaji for her unmeasurable love,
To Esther, Emmanuela, Eunice my beautiful queens who keep me pushing hard,
To my brothers.

ACKNOWLEDGEMENT

I give all the credit to God for keeping me in a good healthy state and for timely completion of my program.

I want to express my deep gratitude to my supervisors Dr Hillary Kipruto and Dr Joseph Kyalo Mung'atu for their constant support, guidance and patience despite their extremely tight schedule.

I want to express profound gratitude to my husband for encouraging me thus proffering me with courage to take on this opportunity.

I appreciate my late dad Mr Mike R. Bolaji, who raised me to be a strong woman.

I am deeply grateful to you mum, Mrs Janet Aduke Bolaji for your selfless love, prayers and sacrifice putting your life on hold to take care of your grandchildren.

Esther, thanks for bearing with me and been very understanding, Emmanuela for your emotional support, and Eunice my beautiful queen whose antics makes me laugh when feeling lonely, together you three gave me strength to keep pushing hard.

To my brothers and sisters-in-law thanks for your unquestionable supports and prayers. My father-in-law for his prayers.

I am deeply grateful to PAMAPs, Intra-ACP mobility sponsored by the European Union for funding this degree and to Dr Kefa Bosire for offering a listening here.

I will like to appreciate Professor M'Imunya James Machoki former director, Prof Julius Oyugi for offering sound advice, Dr Jared Mecha for your kindness and support. I want thank my dear course coordinator Mrs Anne Wang'ombe for her motherly support in my difficult time.

Thank you Emily, William Watembo, Moses Masika for their continued guidance and help.

Rhoda, Diane thanks for the nice times we shared.

I will not fail to mention my gratitude to Deeper Christian Life ministry especially Pastor and Mummy Obe, Madam Cecilia, Mum Eucabeth, Mama Alice etc. And to the Ministry of Health, Kenya National Bureau of Statistics for providing data for use. Also to all healthcare providers and mothers who shared their view on this RMNCAH. May God bless you all.

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LIST OF ACRONYMS/ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
ARI	Acute Respiratory Infection
CRE	Credit Reporting System
CSO	Civil Society Organization
DHS	Demographic and Health Survey
EDA	Exploratory Data Analysis
EHP	Environmental Health Practices
EWEC	Every Woman Every Child
FGD	Focused Group Discussion
GFF	Global Financing Facility
HRH	Human Resources for Health
HIV	Human Immunodeficiency Virus
IHME	Institute for Health Metrics and Evaluation
KDHIS	Kenya District Health Information Software
KDHS	Kenya Demographic and Health Survey
KHP	Kenya Health Policy
KNBS	Kenya National Bureau of Statistics
KSH	Kenyan Shillings
LST	Lives Saved Tool
MDGs	Millennium Development Goals
MDSR	Maternal Death Surveillance and Response
MMCs	Muslim Majority Countries
MMR	Maternal Mortality Ratio
MOH	Ministry of Health
OOP	Out of Pocket
OECD	Organization for Economic Co-operation and Development
RMH	Reproductive Maternal Health
RMNCH	Reproductive, Maternal, Newborn, Child and Health
RMNCAH	Reproductive, Maternal, Newborn, Child and Adolescent Health
SDG	Sustainable Development Goals
SDI	Socio-demographic Index
SES	Socio-economic Status
UN	United Nations
UHC	Universal Health Coverage
WHO	World Health Organization

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ABSTRACT

Introduction-Universal Health Coverage is viewed as making essential Health Services accessible and affordable to the entire populace such that individuals in the population do not suffer financial wreckage due to health challenges. Although there has been some improvement in Maternal, Child and Adolescent Health in Kenya (the focus of this study), this progress has not met up with the targets set towards achieving Universal Health Coverage.

Objective-This study aimed to determine the progress in Reproductive Maternal Neonatal Child and Adolescent Health(RMNCAH) following Devolution of Health services in Kenya.

Methodology-This was a mixed study comprising of both quantitative and qualitative study. For the quantitative study, data was collected from the District Health Information System the World Health Organization and the Ministry of Health. Descriptive study was used to explain the proportion of these indicators using Counties as the subjects (i.e. 47). This was carried out using frequency tables, graphs, plots (including time series plot), etc. Changes in the Indicators selected was modeled over time using Repeated measures one-way ANOVA in the 47 counties. RMNCAH index was generated using weighted average for selected indicators. This was then mapped to appreciate the changes over time. For the qualitative study, 3 FGDs and key Informant Interviews were conducted in a National, County and Sub-county facility to understand the knowledge of the women on UHC, services offered and received, differences observed pre and post devolution and finally factors promoting or hindering access to RMNCAH service was determined using a semi-structured interview. R software version 3.3.1, QGIS and SPSS version 13 were utilized to analyze trends.

Result- This study shows a decline in the average proportion of women screened for cervical cancer from 2012 to 2018. In this same study period there appears to be an increase in uptake of either long or short acting family planning, proportion of women attending at least 4 ANC visits and a reduction in the proportion of under 1 children immunized, Maternal Mortality Ratio and Neonatal Death. However, proportion of children from 0 to 59 months with severe stunting has increased. Findings revealed a decline in proportion of teenage females aged 15-19yrs pregnant from 2016 to 2018.

Conclusion-

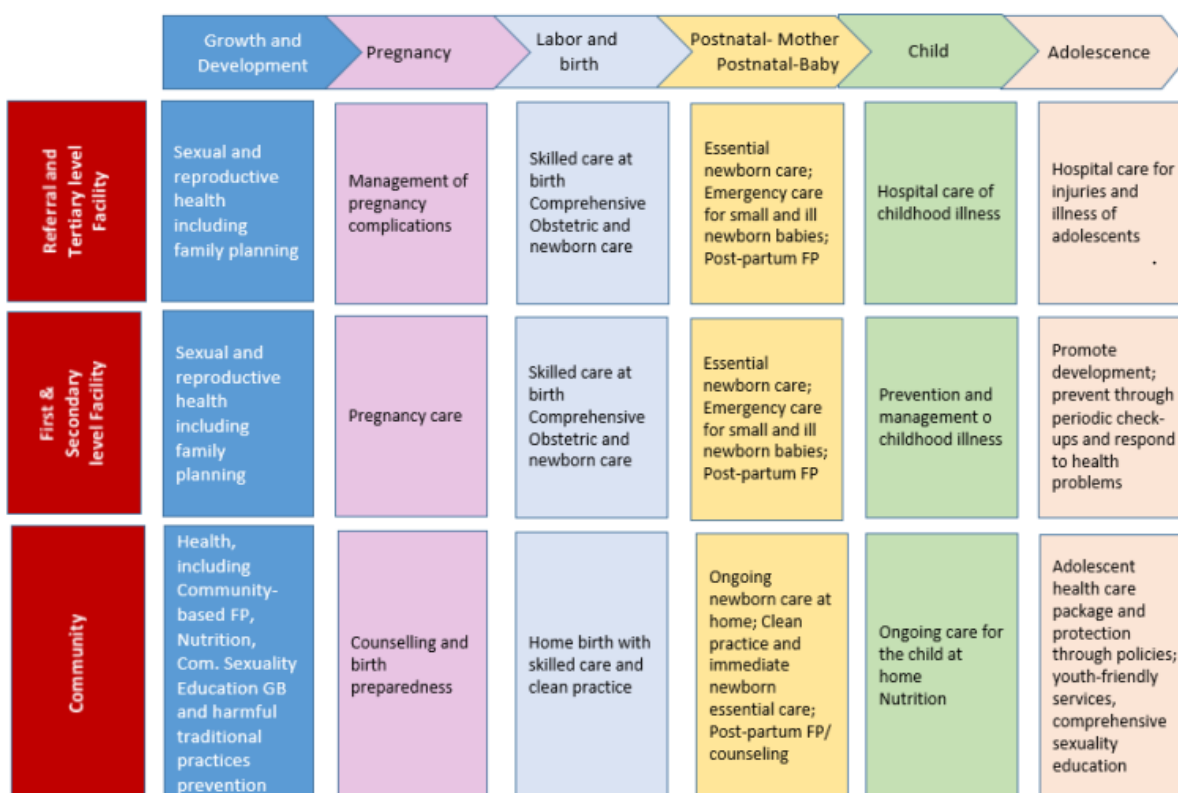
Comparing 2012 and 2018 data there appears to be some progress in the proportion of women using either short or long-acting family planning methods, reduction in Maternal Mortality Ratio neonatal deaths and teenage pregnancy while there appears to be no progress, rather reduction in the proportion of women that attend at least 4 ANCs, women screened for cervical cancer and proportion of under 5 children severely stunted. These findings were corroborated by the primary data analysis i.e. qualitative study findings.

CHAPTER ONE: INTRODUCTION

1.1 Background Information

Universal Health Coverage simply means the provision of essential health services at an affordable price to people such that they do not suffer financial strain that can plunge them into debts or financial bankruptcy (14). Reproductive, Maternal, Newborn, Child Health and Adolescent health covers the holistic wellbeing across the entire lifespan of women pre and post pregnancy; newborns in the first 28 days of life; children until their fifth birthday and adolescents between 10 and 19 years of age (11)

There has been an increase in global efforts to improve Maternal Child and Adolescent Health. In 2010, the United Nation (UN) Secretary-General, Ban-Ki-moon at the UN MDGs Summit kicked off the program Every Woman Every Child (EWEC), in an effort to produce a worldwide sensitization on the need to augment the existing global and national actions to combat pertinent health issues experienced by Women, Children and adolescents. Thus a Global Strategy for women’s Children and Adolescent was developed. This is the summary of what EWEC entails and as described by Ban Ki-moon “3 overarching objectives of the Global Strategy are Survive, Thrive and Transform. With its full implementation—supporting country priorities and plans and building the momentum of Every Woman Every Child—no woman, child or adolescent should face a greater risk of preventable death because of where they live or who they are.” (12)



Source: Global Strategy for Women’s Children’s Adolescents’ Health Draft *modified* (2015)

Fig1.1- Modified Global Strategy for women's children's and Adolescent Health

Recently the strategy for women’s, children’s and adolescent Health was modified (2016-2030) to support the SDGs. They consequently produced a clear path to terminating all preventable deaths in this target group and improve their general wellbeing including mental health.

Similarly, in September 2014, 3 developed countries (United States, Norway, and Canada) and the World Bank declared the Global Financing Facility(GFF) for RMNCAH at the UN General Assembly. 2 other donors joined in 2015(Bill Gates Foundation and the Japan Government), and although at the initial phase started in 4 countries Kenya inclusive. Presently it is operating in 16 countries (13).

Table 1.1: Global Financing Facility countries

September 2014(First Wave)	June 2014(Second Wave)	September 2016
1) Ethiopia 2)Democratic Republic of Congo 3)Tanzania 4) Kenya	1) Cameroon 2) Bangladesh 3)Liberia 4)Mozambique 5)Nigeria 6)Senegal 7)Uganda	1)Guatemala 2)Guinea 3)Myanmar 4)Sierra Leone

The aim of GFF is to increase funding and motivate less developed countries to truncate preventable maternal, infant mortality and accelerate good quality of living for these target group. The goal is that between 2015 and 2030, there is reduction in 107 million child deaths; 4 million maternal deaths, and 22 million stillbirths. (10).

The Civil Society Organization have also been mobilized in each participating Country, to play a key role in promoting RMNCAH by ensuring the various stakeholders contributing to the program are held accountable. Also, they represent the communities and provide technical support etc. (13) The WHO Regional Office for Africa in 2017 in its "Leave no one behind: strengthening health systems for UHC and the SDGs in Africa" proposed a set of services for the different age group to improve the health care of this cohorts. Of importance to this study include (11);

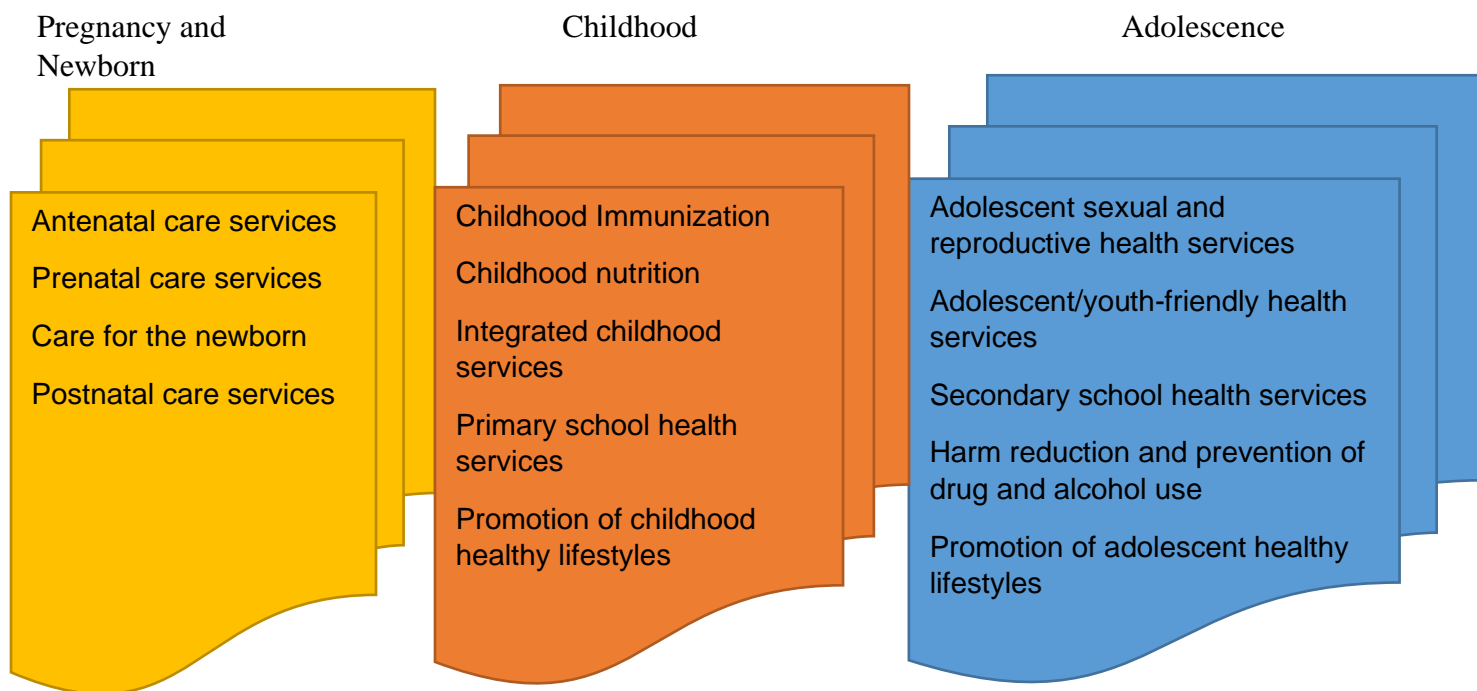


Fig 1.2 Tracer essential services for each age-cohort

In 2015, all United Nations member state (including Kenya) agreed that by 2030 UHC will be attained which is part of the Specific Development Goals.

The 3rd goal of the SDG is to Ensure healthy lives and promote wellbeing for all, at all age and the 3.8 target is to achieve UHC (11);

3.1-Maternal Mortality

3.2-Child Mortality

3.3-End Epidemics of AIDS, TB, NTDS, Etc

3.7-Sexual and Reproductive Health

3.8-Universal Health Coverage

The objectives of the Universal Health Coverage include; Fairness in ingress to health services, quality health service and protection against the financial ruin of beneficiaries by 2030.

Also, the 2010 Kenya Constitution, aims to attain maximum standard possible with regards to health.

The Kenya Health Policy (KHP) 2014-2030 has explained the long-term strategic directions the country expects to take in the tracking of the implementation to achieve the national long-term agenda in Vision 2030. Health plays a dual function of both social and development agenda.

The country aims to transform itself into an industrialized, middle-income country (17).

The principles guiding Universal Health Coverage Are Efficiency, Effectiveness, and Equity. These principles encompass inputs and outputs of health systems and are quantified by access, quality, demand and sustainability of essential health services. This UHC is achieved in synergy

with service satisfaction, health security and the non-health SDG interventions, in order words the key aim of UHC is Universality and Sustainability of health care provision (Fig 1.3).



Fig 1.3-Aim of Universal Health Coverage

There are two broad measurements used to measure progress towards UHC, (WHO);

- 1) The percentage of a nation that can get quality basic/essential health service,
 - 2) The percentage of the populace that spends a bulk of family earnings on Health
- To monitor this progress, the World Health Organization in conjunction with the World Bank, came up with a structure to track it. There are 4 categories with 4 essential health services each, making 16 health indicators (14). These include;

- 1) Service Capacity and Access
- 2) Non Communicable Diseases
- 3) Infectious disease,
- 4) Reproductive, Maternal, Newborn and Child Health

The indicators identified for RMNCH were;

- 1) Antenatal and Delivery care.
- 2) Family Planning.
- 3) Health-seeking behavior for Pneumonia.
- 4) Full child immunization.

For the purpose of this study, the following indicators were utilized.

Table 1.2: Indicators for this study.

Dimension	Indicators
Reproductive and Maternal Health	Proportion of women using either Long acting or short acting family planning
	Mode of delivery
	Proportion of women who attended ANC>4
	Maternal Mortality Ratio
	Cervical cancer screening
Neonatal and Child Health	The proportion of neonatal death/1000live births
	Percentage of under1 children that had Full immunization
	Percentage of children below 59months with severe stunting

Adolescents	Percentage of Teenage women aged 15-19 that are pregnant
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Kenya initiated a very important strategy in 2010 in which there was a transfer of important duties from the national level to Counties, also known as Devolution. This was found to be an essential thing to do because lack of clear demarcations and specification of this hierarchy with respect to health led to many challenges especially inequitable distribution of health service.

The role of the National Government is to enact policies that are basic and necessary, establish rules and enforce regulations, financing national hospitals and provision of training and technical support for Counties. The responsibilities of Counties include delivery of health services, security of goods, resource utilization etc.

The Kenyan Government has given RMNCAH services superiority over all other health strata because of the vulnerability of this group and the long term implication and or cost of neglecting them. This is very conspicuous in the various policies that have been put in place in the past years. Among which are Vision 2030, 2010 constitution, Health Sector Strategic and Investment Plan 2014-2018(9). Some of these initiatives are the provision of free Maternity Services, Beyond Zero campaign etc. (9).

In Jan 2016 Post-MDG era, the Ministry of Health in Kenya came up with Kenya RMNCAH Investment Framework in order to improve on already established policies because it was discovered that since the MDGs targets were not reached there needs to be a more proactive step if Vision 2030 goal of UHC will be realized. This provides a compass for counties to prioritize the felt needs peculiar to them and facilitate joint effort amongst the county with full support from the Government, society private sector and external funding parties to improve RMNCAH. These ensure that the resources that are invested in the counties are fully utilized and there is consistent and sustained Improvement in their health. These are the principles as stated in the Framework; respecting human and reproductive health rights), supporting equity and gender non-discrimination, ensuring a responsive health system to client needs, and leadership and ownership at both county and national levels. The expected end result is to prevent maternal, child deaths, unwanted pregnancies, ensure no incidence of HIV infection in adolescents, women, children and consequently increase the quality of living. In summary, the investment framework was designed to tremendously increase RMNCAH services by increasing local and foreign resources and to bring into agreement shareholders with respect to high priority investments.

The specific targets of investment framework using the following indicators (9):

1) skilled deliveries to 87 percent, 2) 4+ ANC visits to 69 percent, 3) full immunization to 76 percent, 4) contraceptive use by currently married women in reproductive age to 73 percent, and 5) pregnant women tested for HIV who received results and post-test counseling to 75 percent by 2020, 6) It also aims to reduce stunting to 19 percent, 7) teenage pregnancy to 11 percent, and contribute to 8) decrease in neonatal mortality to 18 percent 9)to decrease the absolute deaths numbers of children under five years from 77,761 to 48,590 and maternal from 5,453 to 3,276 between 2014/15 and 2019/20. 10) Finally, it aims to ensure that at least three out of four births will be registered hence providing more robust denominators to effectively plan and monitor RMNCAH service delivery.

The modality in which progress will be tracked will be by improving the quality of routine data collected, carry out surveys that are independent, carrying out innovative research. The following data source was identified; Routine Data (Civil registration and Vital statistics), independent verification, population-based surveys (e.g. KDHS), Maternal Death Surveillance and Response (MDSR) etc.

20 Counties were selected (Kakamega, Nairobi, Bungoma, Turkana, Nakuru, West Pokot, Samburu, Migori, Trans-Nzoia, Garissa, Kilifi, Wajir etc) as priority Counties by the use of multidimensional ranking using the following indicators with sensitivity analysis (9);

Table 1.3: RMNCAH Investment Framework Indicators

Dimension	Indicator
Reproductive Health	Any modern contraceptive method
Maternal And Neonatal Health	Delivery by a skilled provider
	4+ antenatal care visits
Child Health	Full Immunization
	Children with diarrhea seeking advice on treatment
	Children with symptoms of Acute Respiratory Infection seeking advice on treatment
	Children with fever seeking advice on treatment
Adolescent Health	Percentage of teenage women aged 15-19 currently pregnant
HIV	HIV prevalence among females 15-49

Other key areas identified in tracking progress aside increasing the quality of data collected are, improving data analysis and dissemination to generate regular information on program costs and effectiveness.

To accomplish all the intended goals and objectives and Implementation of the RMNCAH investment framework, health care financing will be key. Hence an increase in current annual per capita public expenditures on RMNCAH from Kenyan Shillings (KSH) 1,033 (US\$10.87) in 2015/16 to KSH 1,306 (US\$ 13.75) by 2019/20. An additional KSH 59 billion (US\$ 617 million) will be required to address the financing Gap (9)

A question pertinent to this is how will the financing be sustained and fully utilized? To ensure sustainable financing for RMNCAH the Ministry of Health has developed a roadmap for UHC including action plans in health financing which aims to facilitate movement of more domestic resources and garner more support from stakeholders to achieve UHC.

Table 1.4: Resource Requirements (KSH million) For the Nation-wide Scale-up (9)

	2015/16	2016/17	2017/18	2018/19	2019/20	Total	Overall %
Adolescent and Youths	1,834	2,351	2,897	3,475	4,084	14,640	5%
Child Health	4,872	5,413	6,036	6,741	7,431	30,493	11%
Family planning	3,063	3,251	3,478	3,726	3,853	17,371	6%
Immunization	5,396	5,791	6,244	6,747	7,216	31,394	11%
Maternal and Newborn	23,150	24,927	26,995	28,993	31,486	135,552	49%
Nutrition	6,497	7,288	8,171	9,105	9,979	41,041	15%
Civil registration And Vital Statistics(CRVC)	1,679	1,007	672	-	-	3,358	1%
Innovation and Research	126	132	139	146	153	696	0.3%
Total	46,617	50,161	54,633	58,933	64,203	274,546	100%

The major impact UHC initiative aims to achieve reduction out of pocket spending and financial bankruptcy of Kenyan Nationals hence proper investments of resources will provide an estimated economic return of three shillings and 65 cents for every shilling invested (9)

However, despite all the efforts by various global and local bodies to promote RMNCAH there appears to still be a lot to do if the Vision 2030 of attaining Universal Health Coverage is to be achieved.

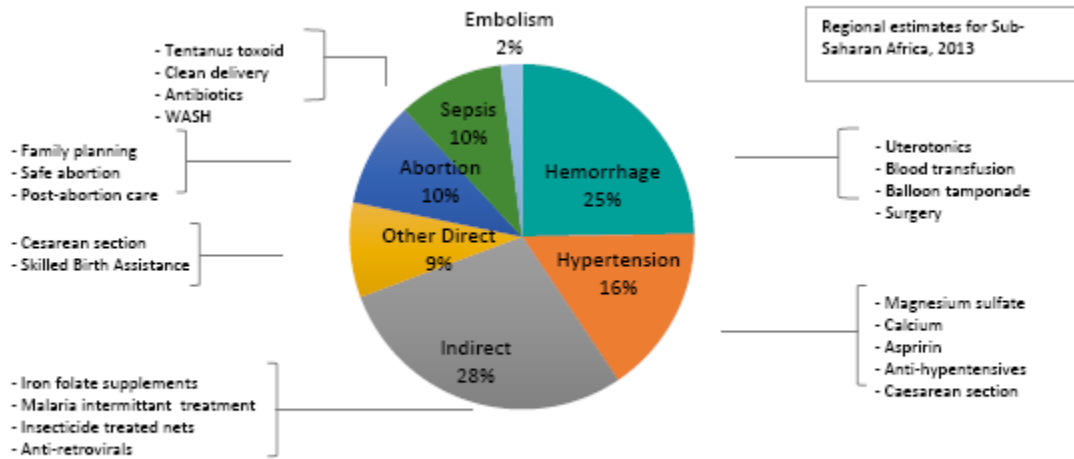
1.2 Problem Statement

Worldwide, 400 million people cannot get basic health services. Each year 100 million people become impoverished and 150 million people suffer financial bankruptcy because of OOP expenses for health services. Although the SDGs targets decreasing MMR world-wide to not up to 70 per 100 000 live, still, 830 women were estimated to die from pregnancy and childbirth-related issues. The most alarming thing is that 99% of these deaths occur in developing countries. (11) Due to the tender nature and vulnerability of adolescents, they are exposed to a greater risk of pregnancy-related complications and death. (11)

Although there has been a remarkable reduction in under 5 mortalities since 2000, the *United Nation Inter-Agency Group for Child Mortality Estimation (2018)* estimated that in 2017, approximately 5.4 million out of 6.3 million children and young adolescents, dying from preventable causes i.e. 1 in every 5 seconds are under 5. Unfortunately, half of these deaths occur in Sub Saharan Africa which means that a child who lives in Sub Saharan Africa has 15 times the likelihood of dying compared to those who live in Europe (11). If immediate actions are not taken, ~56 million children below age 5, will lose their lives from now till 2030 (50% of this deaths will consist of newborns). Although significant improvement has been made since 1990 many people in their millions are going to die because of the location where they are born and their level of vulnerability. Also, increasing accessibility of children to vaccines, pure water etc. will better their lives (33).

Although the recent Kenya Demographic and Health Survey (KDHS) 2014 shows that Kenya has improved most of its RMNCAH outcomes, the MDGs for maternal and child health could not be achieved due to inadequate coverage and inequalities existing in service delivery across the different Counties including Urban Slums.

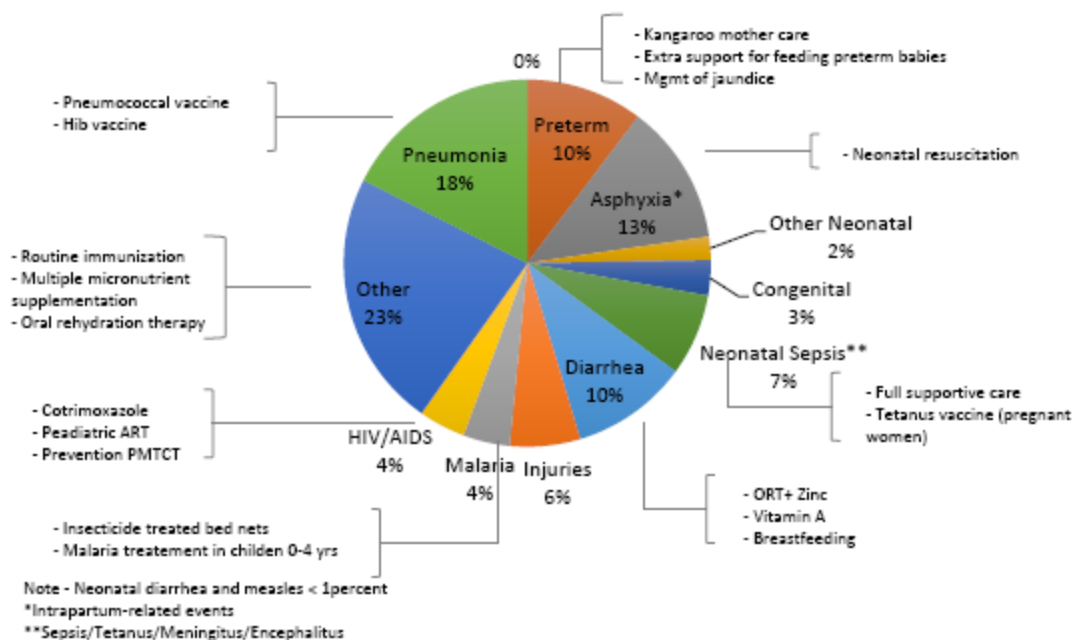
Identified leading causes of maternal mortality in Kenya include; excessive blood loss i.e. Hemorrhage, Hypertension and cardiovascular related disorders, obstruction in labor, termination of pregnancy and other causes that are not directly related to pregnancy but affects it, for example, HIV/AIDS (9). The contribution to maternal death and the interventions so far as specified below;



Sources: WHO 2014; Stenberg et al, 2014; PMNCH, 2011; Say et al, 2014; Benova et al, 2014; WHO 2012b; Requejo et al, 2012

Fig 1.4 Causes of Maternal Mortality, Regional estimate for Sub-Saharan Africa

Severe Diarrhea resulting in dehydration, ARI, and premature birth are major contributing factors to child deaths etc. (9)



Sources: WHO/CHERG 2014; Stenberg et al., 2013; PMNCH 2011

Fig 1.5 Causes of Infant Mortality, Regional estimate for Sub-Saharan Africa

In Kenya today, many women, neonates, children, and adolescents still die from preventable conditions and those who are still alive suffer from reduced quality of life due to complications from childbirth or childhood diseases etc. This has immensely affected the economy of Kenya and other areas.

According to the Framework developed, surveys recently conducted in Kenya showed that demand and supply side gaps and difficulties in coverage of health services have resulted in persistent difficulties between counties, rural and urban settlers.

The remaining gaps and obstacles identified in the framework are numerous and can be grouped into four main areas:

A) Inequitable coverage among certain areas or population groups, including adolescents, requiring well targeted additional investments.

B) Demand-side Obstacles-This restricts access and uptake of demonstrated high impact interventions to achieve Kenya’s RMNCAH goal. Some of the identified barriers are remoteness of the facilities, expensive services, religion, cultural ideologies and practices, and reduced women empowerment in terms of socio-economic status and inadequate information and knowledge.

This is reinforced by attitudes of providers, low quality and restricted integration of services that also hinder and demotivates utilization of services.

C)Supply-side problems resulting from below optimal functioning of the health systems e.g. human resources for health (HRH), supply chain, facilities, health Information, financing health services, and leadership/governance). Health financing fragmentation due to disjointed and poorly coordinated investments in the sector.

The major challenges observed in the health system are inadequate workforce dispersion and productivity coupled with funding gaps and weak supply chain management for the provision of essential RMNCAH commodities etc.

D) High burden of HIV and AIDS and related mortality and morbidity remain a challenge (9)

Funding Gap is the quantity of money that will be used to sponsor ongoing operations or succeeding development of a project that is not currently given by liquid cash, or debt. In Kenya, it is estimated at about KSH 59 billion (US\$617 million) during the period of 5 years from 2015/16 to 2019/20. However, if the households' contribution decreases consistently, with respect to government policy, the gap will even be greater. For example, if there occurs a continuous decline in the OOP expenditure for reproductive health services from KSH 10 billion 2015/16 to KSH 5 billion in 2019/20, a resulting funding gap of KSH 71 billion (US\$ 748) for the five years will be observed. (9)

1.3 Justification

The literature available currently on monitoring progress towards RMNCAH have not utilized the entire indicators selected to generate indices for this study especially post-devolution in Kenya (Table 1.2). Moreover, literature on Adolescent health is sparsely available globally.

1.4 Research Hypothesis

There is no change in the RMNCAH Indicators following the devolution of health services in Kenya.

1.5 Research Questions

- 1) What is the trend along time of RMNCAH indicators in achieving Universal Health Coverage in Kenya with respect to RMNCAH?
- 2) How do we measure the progress so far in achieving Universal Health Coverage with respect to Reproductive Maternal Neonatal and Child Health.
- 3) What are the factors that hinder or promote access to RMNCAH services post-devolution in Kenya?

1.6 General Objective

To determine the progress in Reproductive Maternal Neonatal Child and Adolescent Health (RMNCAH) following Devolution of Health services in Kenya.

1.7 Specific Objectives

1. To model the trend of RMNCAH indicators in achieving Universal Health Coverage following devolution (2012-2018) in Kenya.
2. To generate indices from these indicators to measure essential health services with respect to RMNCAH in Kenya.
3. To evaluate factors that hinder or promote access to RMNCAH services post-devolution in Kenya.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Few among the current existing literature on progress towards RMNCAH will be reviewed in this section. The aim is to compare and evaluate other researches that have been done in relation to this study.

2.2 Study on RMNCH

A systematic review about facts on the part to which policies on determinants of RMNCAH was carried out and major obstacles to achieving the SDGs was identified and there were proposed crucial steps for worldwide and country-based policies to give direction in achieving SDGs (1)

Data was extracted from DHIS to evaluate the level of progress in coverage of RMH service in MDG Era, (2). The relative and absolute fairness (equity) was measured between some countries from 1990 till 2014. Analysis was done using multivariate method in order to check the relative significance of policy factors (e.g. dedication of the government to health, prepayment level, etc.) to access countries improvement in equity in relation to RMH service coverage. Findings revealed that although there has been continuous improvement of relative equity over the last quarter century in all countries, uneven coverage remains within each country. This lack of equity differs from one country to another. Also, there was a significant association between higher equity of service coverage and higher education, governments dedication to RH and MH. There was no significant association between equity and National income, better governance (2).

Standardized GBD 2016 procedure was utilized by some SDG collaborators, to estimate 37 health-related indicators 37 between 1990 till 2016. They reviewed the UHC measure and each indicator was converted using a span of 0–100. The 2.5th percentile and 97.5th percentile was measured represented as 0 and 100 respectively from 1990 to 2030(4). An index was developed standing for 37 SDG indicators relating to health using mean (geometric) of indicators scaled using target. Using previous trends, they developed a prediction of indicators, making use of the weighted average of the indicator and national-specific annualized change rates between 1990 and 2016. Out-of-sample validity served as the basis for which weight for a yearly rate of difference was estimated (4). In 2016, the average health-based SDG index was found to be 56.7 worldwide was 56.7. Sweden, Singapore, and Iceland were found to have the highest performance country wise with respect to the SDG index i.e. 85.6, 86.8, 86.0 respectively with varied uncertainty interval while the lowest performing countries were Somalia, the Central African Republic and Afghanistan (11.3, 11.0, 10.9 respectively). Significant improvement in UHC index was found between 2000 and 2016 in many countries like Rwanda, Cambodia, Equatorial Guinea, Laos, China, Turkey. Little gains were observed in low-income countries like Central African Republic, Lesotho and surprisingly in a developed country like the USA. It was projected from past studies that by 2030 the average SDG targets that will be attained will be 5 (IQR 2–8) of the 24 currently set targets (4). 60% of countries are predicted to meet up with the SDGs targets for MMR, neonatal mortality, under-5 mortality, and malaria while 5% of countries are predicted to achieve just 11

out of the total targets (4). In summary, more rapid improvement must be made in regards to meeting the SDGs target if these targets will be achieved.

To determine the current health states in Muslim communities and the associated factors affecting RMNCAH, secondary data analysis was done using over 40 countries in these countries of which more than 25 were high-burdened nations. These high-burden nations were compared with over 45 countries that are non-Muslim. Using standardized procedure, mortality across the RMNCAH strata was measured. Other key indicators measured include reasons for death, basic health interventions coverage, determinants of health among them. The determinants of the death of neonates and children below 5 of Muslim communities with low or middle income, was carried out using Multivariable analysis (5).

It was observed that the area covered by basic interventions for measures used in accessing prenatal labor, delivery, reproductive health care, and vaccines for children is lower in the Muslim communities. It was discovered from the study that measures used to access state polity, dissensions and girl child and women rights were conspicuously lower in Muslim communities than in non-Muslim communities. This unsurprisingly is highly related to newborn and child death in both low and middle economic strata. Death in children below 5 is greater with the influx of asylum seekers from other nation but reduces with non-presence of Terrorism, stable polity, effective governance, increase in per capita country earning high literacy in adults and females specifically. Etc. Muslim communities that were identified as highest performers in this indicators include Bangladesh, Indonesia, Azerbaijan, Egypt, Niger, Morocco, Senegal and Kyrgyzstan which is due to their greater coverage in vaccination of neonates and children, FP initiatives and, and other determinants compared to the poor and medium performers.

Between 1990–2016, data available in public on Countdown and IHME was used to compare 4 inventions in support of RMNCH. This gave estimates of indicators for Organization for Economic Co-operation and Development (OECD) policy and Muskoka with the use of OECD CRS data. An explanation of dissimilarities of estimates was done by making a comparison of procedures utilized by an individual approach in order to recognize and analyze these supports, measure the out-turn of the options used on estimates.

RMNCH aid worldwide, grew significantly with time using the 4 methods. However, the countries (both givers and receivers) had significant differences in the annual trends and calculated aids or support. Countdown's and Muskoka's appeared to be the greatest and identical of all, of course with an annual difference. OECD policy indicator gave the least aid because of inconsistencies or under-reporting of funders. Next to it is the IHME. Other identified causes of differences in the 4 methods include currency difference amongst countries, inflation, failure in crediting appropriate funders and lack of specification of beneficiaries (15).

The CCI from several indicators found to be useful for monitoring progress and inequalities in RMNCH care in 49 developing countries. The indices utilized includes FPC-family planning coverage, ANC1-at least one ANC visit, SBA- skilled birth attendant BCG vaccination; DTP3- 3 diphtheria–tetanus–pertussis vaccine, MSL-measles vaccination; ORT- oral rehydration therapy for treating infant diarrhea; CAREP-healthcare seeking behavior for childhood pneumonia. This index generated using the formula below (18)

$$CCI = \frac{1}{4} \left(FPC + \frac{SBA + ANC1}{2} + \frac{2 \times DTP3 + BCG + MSL}{4} + \frac{ORT + CAREP}{2} \right)$$

Repeated Measures ANOVA was one of the statistical methods utilized to explain the impact of mobile health interventions (in form of SMS alerts on appointments, vital signs, safe delivery, nutrition, danger signs, and adherence to medication and preventive care within 5 months in 2014. Pretest and post- test measurements were taken. Findings revealed that the flexibility of this model is useful in ensuring that the characteristic features of a mobile health intervention to meet the needs of users and influence decision makers in prioritizing investments in the best digital health method to use (38)

2.3 Study on Adolescent Health

Few studies have been carried out on adolescent health. However, research was done to measure and explain the change over time of deaths and morbidity among adolescents and children between 1990 and 2015. The aim of this study was to provide a base for policymakers to make decisions with respect to these age groups. More than 190 countries were accessed using data on deaths rates and health-related issues that were not deadly. Stratification was done with respect to gender, year and age range following appropriate standardization techniques. The results gotten were then analyzed to explain the difference in region and year across the different age groups. Several indicators were used to generate a comprehensive measure of difference. These include the level of education, fertility, and income. Result revealed that death rates in children and adolescents reduced from 14.18 to 7.26 million from 1990 to 2015. However, this improvement was observed to be unequally distributed among countries. In 2015, 75% of the mortalities were recorded in countries with lesser Socio-demographic index as opposed to 1990 which was 61%. Majority of these deaths occurred in sub-Saharan Africa and South Asia. Between this period under study, it was observed that owing in part to the reduction in death rates, there was a somewhat increase in the prevalence of disability in these groups by 4.3%. Other identified cause was an increase in growth of population worldwide. A major cause of disability is infections, others include; complications related to or during births, convulsions, visual and or hearing impediments, low blood levels, low Intelligence quotient. In countries with low SDI, the main etiology in disease prevalence in female adolescents is health issues related to their sexual or reproductive health. While countries with higher SDI battle with an increase in disabilities among adolescents and children, countries with lower SDI are faced with combatting increase mortality in these age groups. (7)

2.4 Study on Qualitative research approach

Qualitative study method was used to measure Gaps in UHC in rural communities in Malawi. 6 villages were chosen from these communities from where a cross-sectional study was carried out. The data source was from 12 FGDs within dwellers and verified with 8 interviews of key informant i.e. health caregivers. Stratified purposive sampling technique was used to select participants. 3 researchers were chosen to independently assess the opinion of respondents. They did this by transcribing and coding the interview recorded via tape. The findings revealed EHP has birthed an increased feeling of rights to access to health services without cost. Unequal location of health

centers, failure to agree in private-public service implementation was seen as major threats to protect against financial ruin. This lack of protection against financial ruin was perceived to be caused by supply-side gaps like scarcity of drugs, health workers and structures, transportation problems and lack of good quality of health services. (8)

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This aspect explains the study area, study design, populations under study, statistical methods, software, data source and limitation of the study, ethical considerations, work plan and ends with the budgets.

3.2 Study Area

The study spans all the 47 counties of the Republic of Kenya, using county as the unit of analysis. Kenya is a country found in East Africa and the most populous city is Nairobi which lies between latitude 5° north and 5° south and between 24° and 31° east longitude on the equator. and lies upon the East African Rift spanning a varied and large stretch of land that stretches from Lake Victoria to Lake Turkana (previously named Lake Rudolf) and further south-east to the Indian Ocean, to the north is Ethiopia, Somalia to the north-east, north-west to it is South Sudan, to the south and west of Kenya is Tanzania and Uganda respectively. Kenya covers 591,971 sq. km (228561 square miles) out of which 580,609 km island area and 11,362 km water area. The population estimate was approximately 43 million people in 2014 (16). Kenya is divided into 8 administrative provinces Central, Coast, Eastern, Nairobi, North Eastern, Nyanza, Rift Valley and Western Province (22).



Fig. 3.1- Kenya administrative boundaries (16)

3.3 Study population

Quantitative Study (Objective 1-2)

County-based data was extracted from 1st July 2012 till June 2018 because these data became available following the devolution of health services (mid-year population) Hence “subjects” are **not individuals** but **counties**.

Qualitative study-(Objective 3)

Women of reproductive age group (15-49yrs) and health care provider in Maternal and Child Health clinics.

3.3.1 Inclusion Criteria-

Quantitative study

Women of reproductive age group (15-49yrs), children and adolescents in Kenya were included in this study. The study was county-based.

Qualitative study

Focused Group Discussion-Women of the reproductive age group that were pregnant or attending MCH clinic.

Key Informants- In-charge/Delegated personnel at the MCH Clinic. The key informants/In-charge were all women.

3.3.2 Exclusion Criteria

Quantitative study-

Women more than 50 years were excluded from this study. Men were also exempted

Qualitative study

Women more than 50 years for FGDs and health care workers who were not working in the MCH clinic or had no prior experience offering services to the study target population were excluded from key informants/In-charge interview

3.4 Data Source

Quantitative study

Kenya District Health Information Software (DHIS-2), Demographic and Health Survey(DHS), KNBS and the Ministry of Health. Efforts was made to secure data from these sources.

Qualitative study

Key Informant Interview and Focused Group, Discussion from beneficiaries using an interview guide were the source.

3.5 Data source verification

Efforts was put in place to ensure that the data obtained was verified to be true.7 counties were randomly selected as a sample of the 47 counties and the data collected from them were verified.

3.6 Study variables/INDICATORS;

3.6.1 Indicators for monitoring progress include the following;

- i.** Reproductive and Maternal Health- Proportion of women using either Long acting or short acting Family planning, mode of delivery, Proportion of women who attended ANC>4, Maternal Mortality Ratio, proportion of women who had cervical cancer screening.
- ii.** Neonatal and Child Health- Percentage of under1 children who had Full immunization, the percentage of children below 60 months with stunted growth, The proportion of neonatal death/1000live births.
- iii.** Adolescents- Percentage of Teenage women aged 15-19 currently pregnant.

3.6.2 Variables of interest for evaluating factors that hinder or promote access to RMNCAH services are;

- i.** Demographic: Age (years), number of pregnancies/children, etc.
- ii.** Socio-economic Status (*SES*): Occupation, education, and income

3.7 Study design and sample size

The quantitative study was designed to investigate retrospectively what has changed in the RMNCAH indicators selected subject to availability on routine health and survey data. This study utilized data from all 47 counties in Kenya with respect to the indicators specified in Table 2 for the quantitative study while for the qualitative study 30 mothers were involved with 3 key

informants chosen via purposive sampling to get a representative sample of the population. Details is explained in the procedure for qualitative study (Pg. 20).

3.8 Statistical Analysis

Quantitative Study

3.8.1 Data Access and Abstraction-After securing ethical clearance from UON/KNH ERC, a request letter was sent by the Director UNITID for data access.

The data utilized in this survey are aggregate data without identifiers with the exception of the health facility, sub-county, and County. The data is maintained in a centralized repository at the Ministry of Health. Permission to access the data for the purpose of this study was obtained from the Ministry of Health.

Once permission was granted an indicator reference list was sent to the data manager at MOH to support in extracting the data from DHIS2 for the period 2012-2018. The abstracted data was reviewed for completeness and consistency of the indicators.

3.8.2 Data Cleaning and coding was done using Microsoft Excel (Data source is in Excel format).

3.8.3 A descriptive study was done for all selected indicators to explain the proportion in the 47 counties. This was carried out using graphs, maps(lattice), line plots etc.

3.8.4 Inferential statistics (Obj. 1)

- i) Trend Analysis was done to assess changes in the Indicators selected over time in all the counties using Repeated measures ANOVA in the 47 counties. Repeated measures ANOVA was selected because, 1) few time points post devolution {i.e. 7} in this study and 2) the several subjects involved (47counties) which discourages the use of other statistical techniques such as Time series analysis. Mixed models and longitudinal analysis can also be used but for the more flexible nature. Also, longitudinal analysis will be very much useful if the aim of this study was to check for differences in the counties, however this will be looked at in later research.

Repeated Measure designs

They are a type of General Linear model, an extension of the paired t-test useful when samples are matched based on important features. The matched groups have equal sample size and are exposed to a level of factor or group of factors. There is the within subjects and between-subjects factor which means the outcome variable is repeatedly measured for all members of the sample across a range of conditions and measurement of independent group members respectively. Thus a repeated measures ANOVA consists of these 2 factors explained above. The utility of this model is in its' excellent precision capability when comparing time points or treatments within some subjects, thus eliminating all sources of variation between subjects with just within-subjects variability making up the experimental error. Subjects becomes their own controls. The disadvantage lies in its' order effect and carryover effect. There is assumption of normality of response variable, homogenous variance known as sphericity (i.e. a significant value, for the purpose of this study level of significance =0.05). Violation of this assumption, might not exclude the model use but reduces the power of the test. Alternatively, multivariate analysis can be used such as Hotelling-Lawley trace, Wilks' lambda and Pillai-Bartlett trace. There is a similarity between the test statistic for repeated-measures ANOVA and that for independent-measures ANOVA. Repeated measure can be One-way ANOVA or

two-ANOVA depending on the number of independent variables included in the study for the purpose of this study One-way ANOVA (one variable) is utilized (36).

Within-subject model

$$Y_{ij} = \mu + \beta_i + \delta_j + \varepsilon_{ij} ; i = 1, 2, \dots, n ; j = 1, 2, \dots, k$$

μ : overall mean, fixed constant, β_i : random subject effects $\beta_i \sim N(0, \sigma_\beta^2)$,
 δ_j : factor level independent of β , ε_{ij} : random error $\varepsilon_{ij} \sim N(0, \sigma^2)$

$$\sum_{j=1}^k \delta_j = 0$$

Between-subject model

$$Y_{ijk} = \mu + \alpha_i + b_{j(i)} + \tau_k + (\alpha\tau)_{ik} + \varepsilon_{ijk}$$

μ \equiv overall mean, $\alpha_i \equiv$ effect of i of group factor, $\sum_{i=1}^t \alpha_i = 0$,

$b_{j(i)} \equiv$ effect of j^{th} subject in level i $b_{j(i)} \sim N(0, \sigma_b^2)$,

$\tau_k \equiv$ effect of k^{th} time points $\sum_{k=1}^t \tau_k = 0$

$(\alpha\tau)_{ik}$ is equivalent to interaction between group level i and time points level k

$$\sum_{i=1}^a (\alpha\tau)_{ik} \sum_{i=1}^t (\alpha\tau)_{ik} = 0$$

ε_{ij} : random error $\varepsilon_{ij} \sim N(0, \sigma_\varepsilon^2)$

Mauchly's Test is used to check for Sphericity. If violations of sphericity do occur, corrections can be made such that a more valid critical F -value is gotten, thereby, reducing the Type I error rate. An estimation of the extent of sphericity violation is done and a correction factor is applied such as Greenhouse-Geisser, Huynh-Feldt and lower-bound correction. They correct this firstly by estimating the degree of sphericity using epsilon ε . When ε is equal to 1 then there is maximum sphericity. The more ε reduces ($\varepsilon < 1$) the greater the extent of sphericity. The Huynh-Feldt and Greenhouse-Geisser methods estimate ε although using different methods. These 3 methods of correction adjust the degree of freedom by multiplying the degree of freedom using their individual ε estimates.

$$df_{\text{time/condition}} = \hat{\varepsilon}(k - 1)$$

$$df_{\text{error}} = \hat{\varepsilon}(k - 1)(n - 1)$$

- **Multivariate analysis of variance (MANOVA)**

The multivariate test gives multiple alternative statistical tests as opposed to a univariate model which only permits one statistical test (F-ratio) as a result of violations of assumptions needed to carry out an ANOVA (repeated measures). Pillai's trace, Hotelling's trace, Wilks' Lambda, and Roy's largest root are used for this analysis. Increasing statistic values in Pillai's trace represents the effects which contributes more to the model while Wilks' Lambda like Pillai's statistic is positive valued ranging from 0-1. Reducing values indicate effects which contribute largely to the model. Hotelling's trace adds up the eigenvalues within the test matrix. Also, a statistic with positive values and increasing value represents effects which contribute more to the model. In the event that the eigenvalues of the test matrix are not large Hotellings test and Pillai's test are almost equal otherwise Hotelling's trace is mostly larger. Roy's largest root gives the largest eigen value within the test matrix and increasing values also represents effects which play greater role in the model. Roy's largest root is always \leq Hotelling's trace. Equal values of these 2 statistic denotes effect is largely associated with only 1 of the outcome variables, strong correlation exists between

the outcome variables, or the effect did not contribute very much to the model (34). Pillai's trace is more robust than the other 3 statistics from research in treating issues relating to violations of model assumptions (35)

Equations for Multivariate analysis of variance (MANOVA)(37).
Wilks' Lambda

$$\Lambda_{p,h,e} = \frac{|E|}{|E+H|}$$

$$= \prod_{j=1}^p (1 - \theta_j)$$

Lawley - Hotelling Trace

$$T_g^2 = e \sum_{j=1}^s \phi_j$$

Where $s = \min(p, h)$

Pillai's Trace

$$V^{(s)} = \sum_{j=1}^s \theta_j = \text{tr}(H(E+H)^{-1})$$

Where $s = \min(p, h)$

Roy's Largest Root (ϕ_{\max}), is described as the largest of the ϕ_i 's. An approximation using the F distribution is utilized to calculate levels of significance:

$$F_{(2v_1+2)/(2v_2+2)} = \frac{2v_2+2}{2v_1+2} \phi_{\max}$$

Where $s = \min(p, h)$

$$v_1 = (|p - h| - 1) / 2$$

$$v_2 = (e - p - 1) / 2$$

ii)Independent ANOVA test was used to check for relationships between neonatal death and the 4 different mode of delivery. The outcome variable (neonatal death) and assisted vaginal delivery were found not to be normally distributed using Kolmogorov-Smirnov(KS) due to presence of outliers and this was adjusted for by transformation using natural logarithm of the original values (17)

Regression model;

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \dots \dots \dots + \beta_p X_p + \varepsilon$$

Between Group Variation, BSS

$$BSS = n_1(\bar{X}_1 - \bar{X})^2 + n_2(\bar{X}_2 - \bar{X})^2 + n_3(\bar{X}_3 - \bar{X})^2$$

Within Group Variation, WSS

$$WSS = (n_1 - 1)SD_1^2 + (n_2 - 1)SD_2^2 + (n_3 - 1)SD_3^2$$

With F statistics calculated as,

$$F = \frac{SSR/p}{SSE/n-p-1} \sim F(p, n-p-1)$$

3.8.5 RMNCAH index was generated using indicators that are well established and validated to access progress towards UHC. This was done in two ways;

- a) **Simple Index**-One indicator was used to access the improvement over the years following Devolution of Health Services (2012 till date) across counties.
- b) **Composite Indices**- A composite index(CCI) was generated to assess the average across the 7 years (i.e. 2012-2018) post devolution. For this Index the following indicators were used Cervical Screening{C}, Long acting and short acting family planning{FP}, Proportion of women that attended at least 4ANC{A} and Full Immunization of Under 1{FI}. This formula was used to calculate the weighted average for indices giving different weights (18).

$$CCI = (1/4*(C+FP)) + (1/4*(A)) + (1/2*(FI))$$

These indices were then mapped to visualize each county performance.

3.8.6 Qualitative Study

The qualitative study was done in a National Hospital (Kenyatta National Hospital), County based, and Sub-County Based Facility to access factors that hinder or promote access to health care in order to measure progress towards achieving RMNCAH following devolution in Kenya using an Interview guide.

i. Sampling technique and recruitment;

Stratified purposive sampling was used to choose the In-charge or delegated personnel at the clinic for the Key Informant interview. For the FGDs this method was utilized also to ascertain the involvement of various categories of women i.e. nulliparous women, multiparous and teenage mothers, in the research at each focus group discussion site. An average of 10 women were involved.

ii. Selection and Interview procedures

This was carried within 2 modalities;

a) **Key Informant Interview**-3 Interviews was conducted, 1 in each of the facilities. Following written consent, the In-charge (Key-Informant) at the Maternal and Child Health Clinic provided information which helped detect factors responsible for clients' access or non-access to RMNCAH services. This is to determine progress made in achieving UHC with respect to RMNCAH post-devolution. Not more than 10 questions were asked so as not to take too much of the Informants time. They were asked to give recommendations on possible solutions to the perceived barriers to access to care of these women and their children.

b) **Focused Group Discussion.** This was done targeting women attending the Maternal and Child Health Clinic to get information on factors hindering or promoting access to RMNCAH services using the Interview guide. Following written consent, the FGD was conducted for about an hour. The participants were selected by the Nurses as they have access to their records so that the group's diversity can be ascertained. This ensured the inclusion of more women with at least 8-10years experience in childbearing (multiparous), nulliparous women and at least one teenage mother. This enabled the lead researcher to achieve a sample representative of the general population and proffer robust answers to the question that gave answers to questions relating to RMNCAH services pre

and post-devolution. The Demographic data (Table 4.24-4.27) excluding names was provided which assisted in screening participants. All conversations were taken in a relatively serene environment (private room) during the clinics. Questions asked were short simple and precise without prompting at first to discourage pre-empting the respondents.

These categories of people were chosen because of the following reasons;

- 1) Easy Accessibility to ease financial and time constraint.
- 2) These women were either currently pregnant or have infants hence can be asked questions on accessibility/constraints to care as opposed to the general population of women which include women who do not have children and would create some level of discomfort for them during the recruitment process.
- 3) Carrying out the FGD at the Pediatric Outpatient was considered but for the anticipated difficulty for mothers to focus on the discussion as a result of distraction from the children brought to the clinic. Also, these children might be brought by other caregivers or their fathers (not the target audience).
- 4) Some of them were multiparous women and have children so were asked questions on past experiences with regards to neonatal and child health.
- 5) It was anticipated that at least one or more pregnant teenage will be available to answer questions related to adolescent health which proved true.

For questions relating to adolescents another separate interview was conducted for them to create an enabling environment that encouraged open conversation without fear of criticism.

iii. Qualitative Data Coding and Analysis

This study was conducted using the RATS (Relevant, Appropriate, Transparent and Sound) guidelines for reporting qualitative research. For each Key Informant interview and FGD conducted, coding sheets was developed. After seeking consent audiovisual device was used to record these sessions and interviews.

An analysis was done in the following sequence; 2 other researchers (3 in all) were chosen to independently assess the opinion of respondents recorded. Subsequently, transcription and coding of the FGD and interview was done. The second and third authors analyzed 33% of the material manually (8). Thematic analysis (Analysis which helps identify patterns within data providing a detailed account of respondents views) was used to understand the knowledge of the women on UHC, services offered and received, changes observed pre and post devolution and finally factors promoting or hindering access to RMNCAH service was determined using a semi-structured interview (8).

3.9 Quality Assurance and control before and during data collection

The Data collection tool was pre-tested at KNH a day prior to actual study. Counterchecking of the transcript of this interview and FGD with the original recording was done by the lead researcher. Necessary modifications and improvement, following ethical clearance, will be made subsequently from the result of this pilot testing if imperative.

3.10 Confidentiality and data security

Data was held safe by; ensuring the laptop used was strongly secured using passwords which are not stored within the computer to prevent third-party access. Adequate data backup including the cloud option was used to prevent data loss. Automating the updating of the software involved in

storage and the use of a strong antivirus was implemented with the use of secured wireless at home and at work etc. To secure the privacy of the respondents in the FGDs, they were advised not to air each other's view outside the FGD circus. No names were recorded to avoid leaking the identity of participants.

3.11 Ethical considerations

3.11.1 Ethical Clearance

The study was conducted in agreement with the ethical rules and guidelines for the safety of human subjects in this research. Data acquisition commenced following ethical clearance from the Ethical Review Committee of the University of Nairobi at Kenyatta National Hospital (KNH-UoN). Permission was also gotten from the 2 other facilities that was involved in the study.

3.11.2 Consent explanation

Informed consent

Informed consent form clearly describing the reason for the study was provided for the participants. The interviews and FGD was carried out ONLY following a written consent obtained by the lead researcher. There was no form of coercion to participate in this study. There was respect for their opinion and there was exemption from the study subjects who declined participation due to any reason best known to them (Appendix 1 and 3 for informed consents).

Conditions for withdrawing

The respondents were given ample opportunities to withdraw from the study at any time or stage without any consequence.

3.12 Handling of missing values- This was excluded to avoid bias in comparison among Counties.

3.13 Study results dissemination plan

The final copy of this document will be submitted to University of Nairobi Institute of Tropical and Infectious Diseases (UNITID) and a manuscript will be sent to one of the peer review journals for review and publication. This can also be made available to stakeholders, interested participants and the public.

3.14 Software and tools

The statistical analysis was carried out using the latest version of the following software;

- i. SPSS and R statistical software: Explorative data analysis and line plots.
- ii. QGIS software for mapping.

CHAPTER 4-RESULTS

QUANTITATIVE STUDY

DESCRIPTIVE STUDY

The indicators chosen for this study in order to check for trends (Table 2) were assessed yearly to explain the changes in proportions from 2012-2018. The table 4.1 below shows the average of these proportions of the 47 counties in Kenya. Overall, comparing 2012 and 2018 there is a decline in number of people screened for cervical screening, increase in uptake of either long or short acting family planning, proportion of women attending at least 4 ANC visits and under-1 children immunized have dropped, Maternal Mortality Ratio and Neonatal Death has reduced however, severe stunting has increased. Data on teenage pregnancy reveals some reduction comparing 2016 and 2018. Though available data (3 time points) is not very effective to deduce trends. For the list of counties that make up a province refer to appendix 6.

Table 4.1 County indicators values in proportions/ratio in Kenya(SD)								
	Cervical Screen	FP(Either Long or short)	4 ANC Visits	MMR/1000	Neonatal Death	Full Immunized <1	Severe stunting <5	Teenage Preg15-19yrs
2012	0.008 (0.009)	0.104 (0.040)	0.790 (0.210)	169.21 (99.940)	.012 (0.005)	0.880 (0.053)	0.006 (0.010)	NA
2013	0.142 (0.141)	0.103 (0.040)	0.710 (0.170)	131.490 (63.040)	.011 (0.005)	0.770 (0.400)	0.011 (0.010)	NA
2014	0.013 (0.147)	0.120 (0.050)	0.700 (0.150)	116.970 (65.690)	.010 (0.005)	0.700 (0.220)	0.013 (0.009)	NA
2015	0.027 (0.117)	0.118 (0.050)	0.730 (0.150)	109.650 (70.480)	.010 (0.005)	0.750 (0.210)	0.013 (0.008)	NA
2016	0.010 (0.013)	0.120 (0.050)	0.690 (0.130)	145.620 (72.000)	.010 (0.004)	0.710 (0.190)	0.014 (0.008)	0.106 (0.055)
2017	0.007 (0.008)	0.104 (0.060)	0.620 (0.130)	138.020 (102.980)	.009 (0.004)	0.640 (0.020)	0.0149 (0.012)	0.125 (0.052)
2018	0.006 (0.008)	0.139 (0.050)	0.760 (0.140)	129.230 (61.14)	.009 (0.005)	0.750 (0.020)	0.0195 (.0122)	0.079 (0.031)

REPRODUCTIVE HEALTH

CERVICAL CANCER SCREENING WOMEN BETWEEN 15-49YRS

There is an irregular pattern in proportion of women who were screened for cervical cancer but overall there appears to be a drop from 8 to 6 out of 1000 women in the reproductive age group were screened in 2012 and 2018 (Table 4.1). The highest screening recorded was in 2013 i.e. 142/1000 (Fig 4.1).

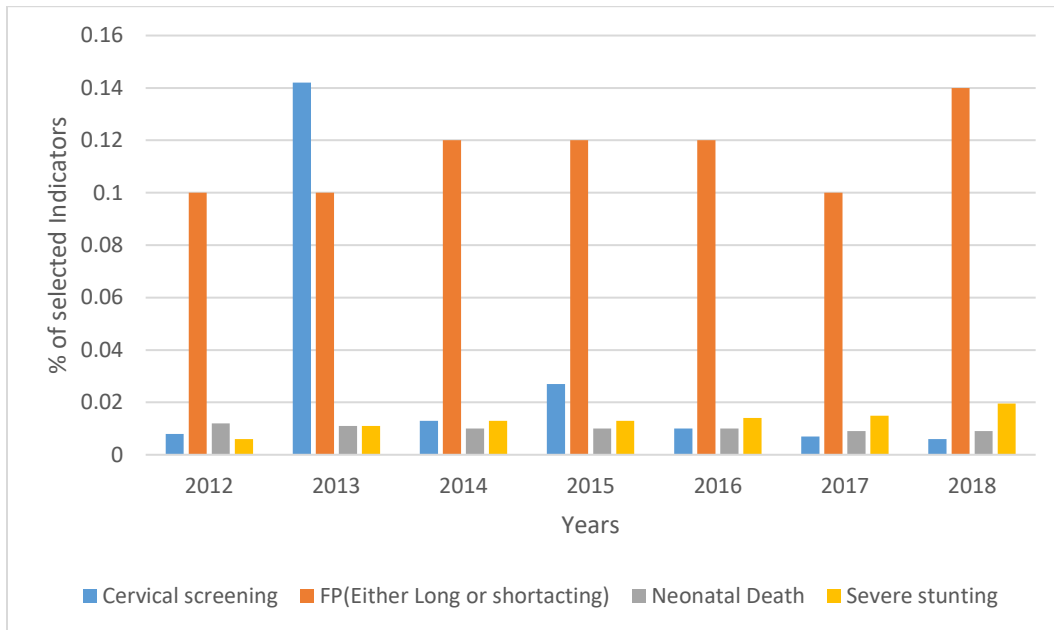


Fig 4.1- Distributions of percentages of women who Cervical Cancer Screening, use of either long or short acting, neonatal death, severe stunting in Kenya.

To explain this distribution further a spatial mapping done highlights areas with lowest (darker areas) and highest proportion of screening (lighter). Mandera has a persistently low cancer screening rate throughout the years with Garissa, Tana River also have very low proportions in most of the years. The best performing counties across the years in cervical cancer are Nairobi, Taita Taveta, Migori, Homabay and Kisumu (Fig 4.2).

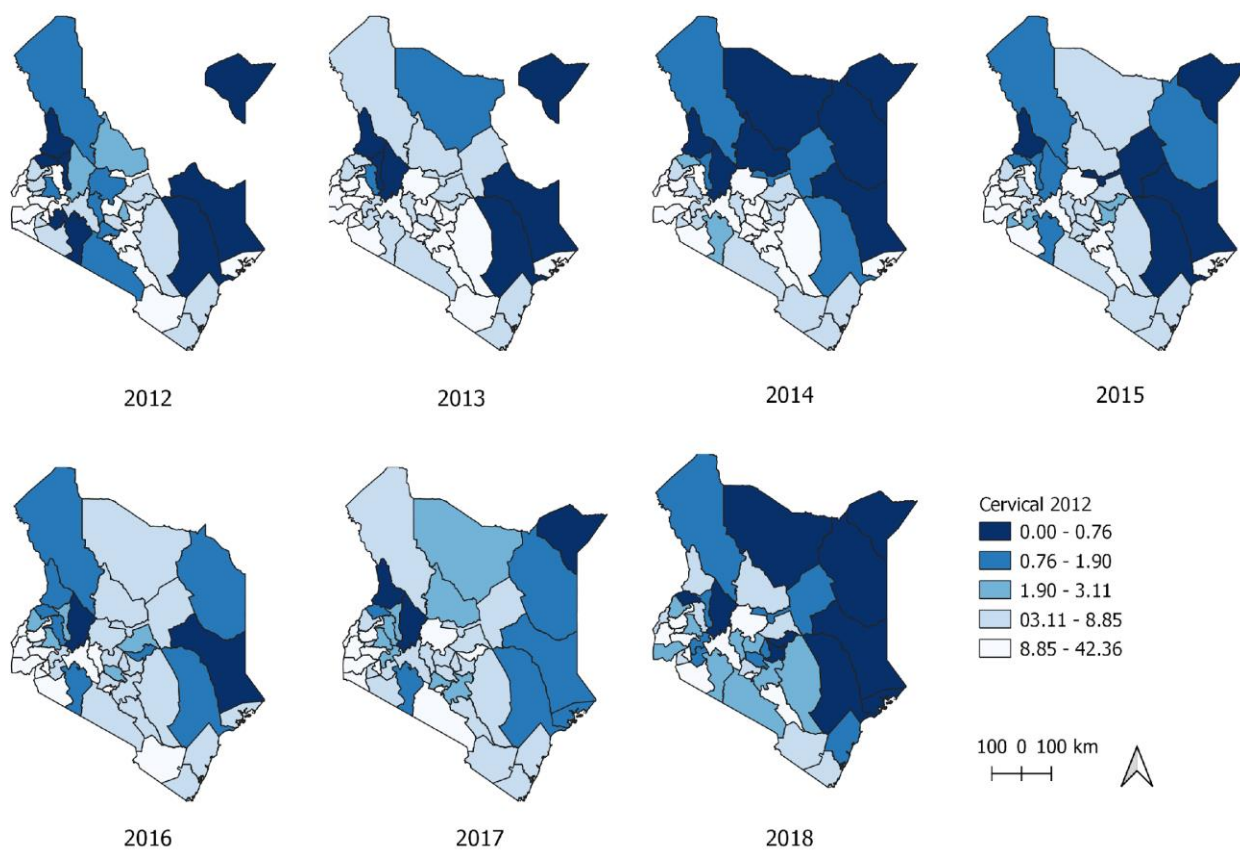


Fig 4.2 Spatial distribution of use of cervical cancer screening/1000 women in reproductive age group in Kenya

FAMILY PLANNING

For the purpose of this study due to easy availability of data, proportion of women in the reproductive age group using either a short acting family planning (pills, injections) or long acting family planning method (i.e. intrauterine contraceptive devices (IUCDs) and sub-dermal implants). Denominator is women of reproductive age group. There has been an average increase in the use of long acting family planning method from ~23/1000women to around 55/1000 while the use of short acting family planning as remained consistently at about 80/1000 with a slight dip in 2017 where it was around 60/1000 women between ages 15-49yrs (Fig 4.3).



Fig 4.3 Line charts of 2 major group of family planning depending on duration of effect in Kenya from 2012-2018

A spatial distribution map gives a further insight to which counties are performing better (lighter colors) or worse (darker colors) in the utility of long acting and short acting family planning methods. Counties in the North Eastern and Eastern province of Kenya are the least performing in uptake while larger counties in Western, Nairobi and Nyanza province (eg Busia, Bungoma; Nairobi; Homabay, Migori etc performed better along the years. Although the Rift valley zone was poor performing in uptake Laikipia remained one of the top counties using these family planning methods. By 2018, there was some improvement in the uptake in Samburu and Isiolo (Fig 4.4).

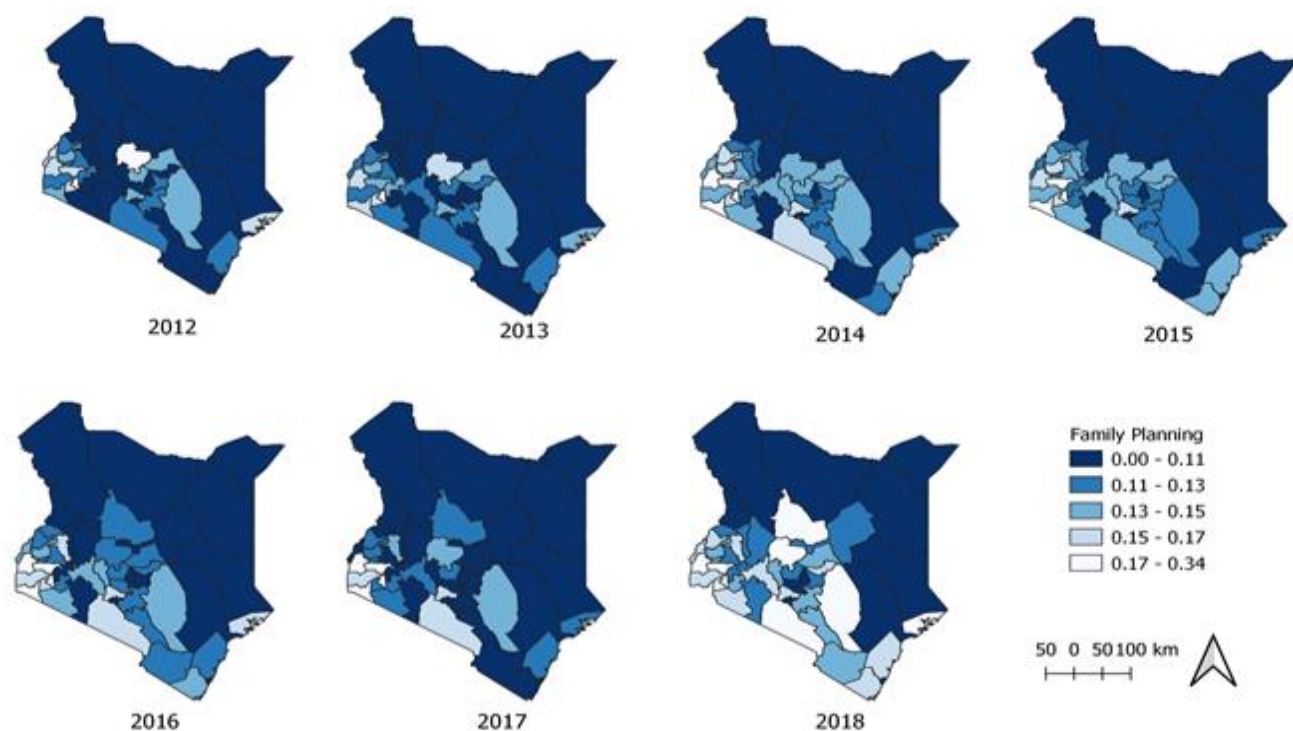


Fig 4.4 Spatial distribution of use of either Long or short acting Family planning method from 2012-2018

MATERNAL HEALTH

ANTENATAL CARE VISITS UP TO AT LEAST 4 VISITS

Antenatal care visit was divided by number of live birth around the same period (28). This study revealed overall decline in the percentage of women who visit ANC up to at least 4 times. From 78.7% in 2012 to 76.1% in 2018.

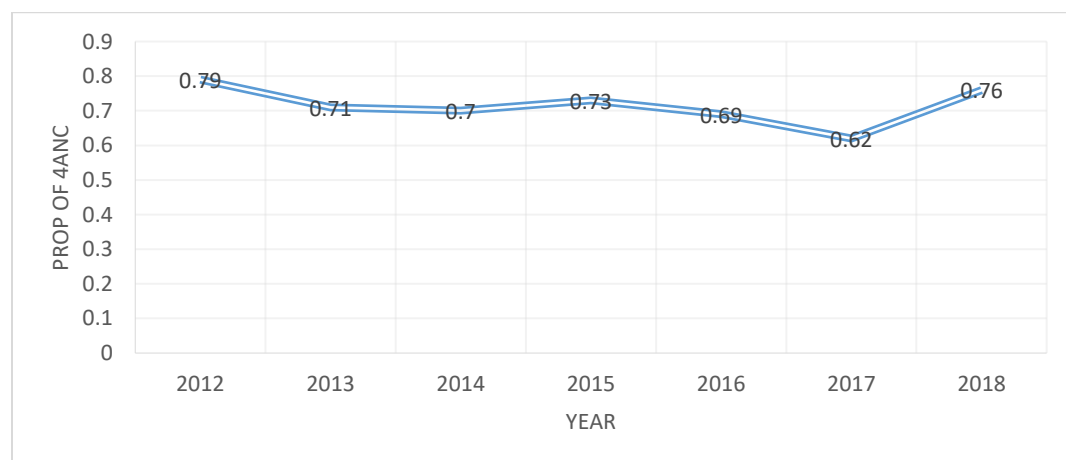


Fig 4.5 Line charts of total proportion of women attending at least 4 ANC in Kenya from 2012-2018

Further in-depth analysis using spatio-temporal analysis revealed the counties that are performing well (Darker colors) and those not performing well (lighter colors). North-Eastern, central province appears to be the worst performing regions with respect to ANC attendance particularly between 2013-2017. Meru appears to be the county in Eastern province that performed persistently lower (<50% of the women attending ANC). Eastern province, coast and majorities of counties in Rift valley had >69% of their women attending at least 4 ANC's (fig 4.6&4.7).

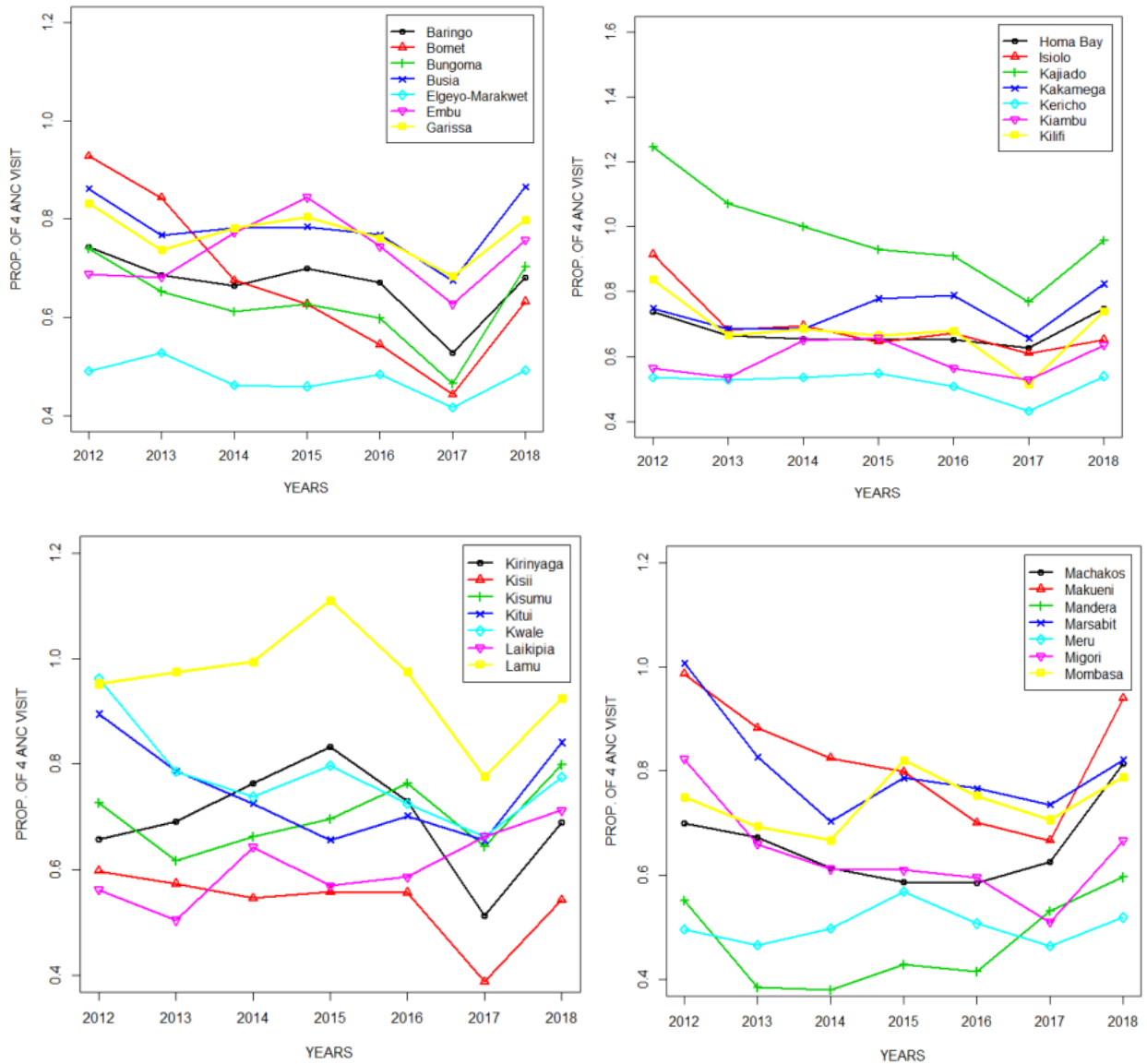


Fig 4.6 Line plots for percentage of women who attended at least 4ANC visits across counties grouped in an alphabetical order in Kenya from 2012-2018

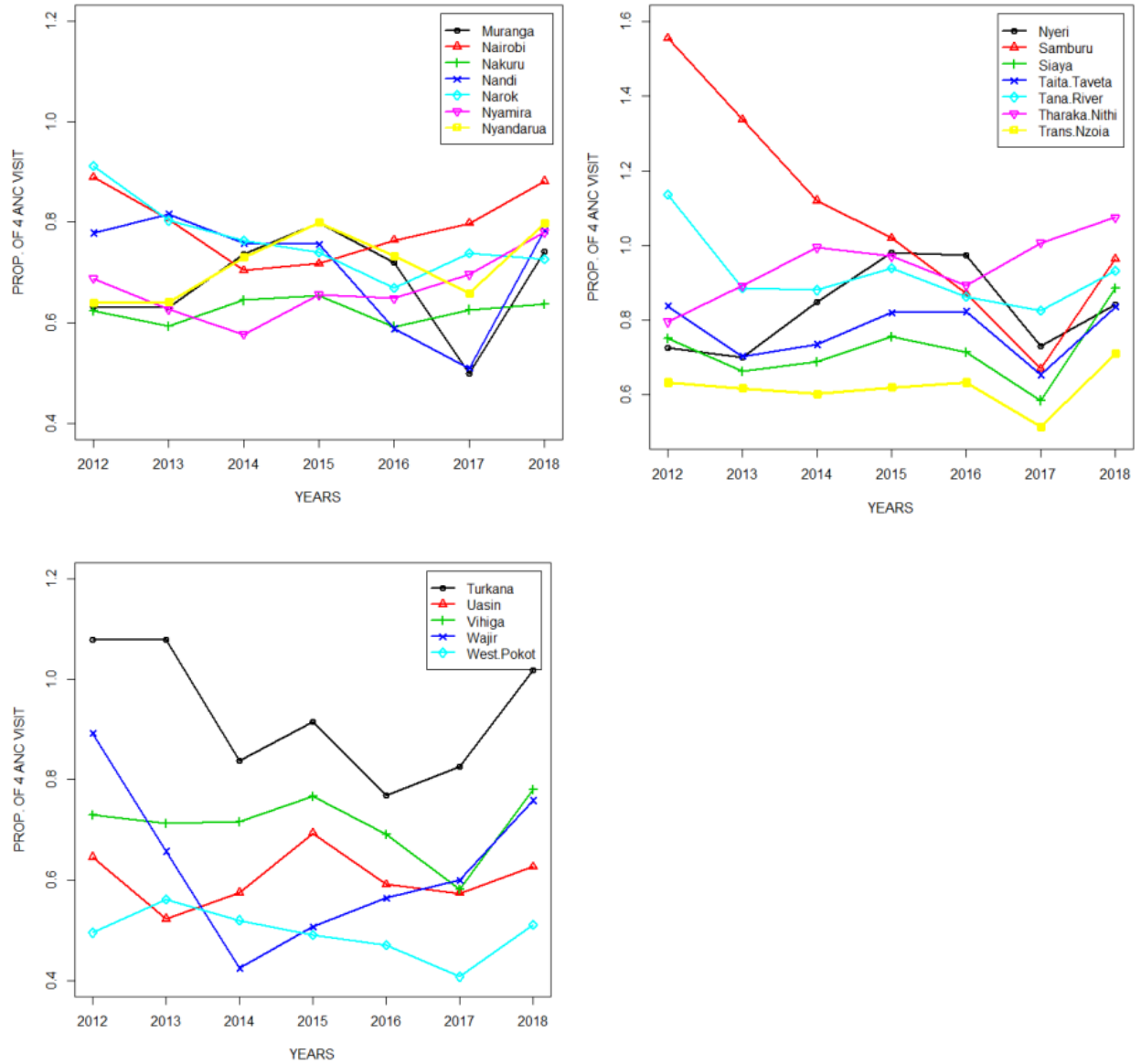


Fig 4.6 Line plots for percentage of women who attended at least 4ANC visits across counties grouped in an alphabetical order in Kenya from 2012-2018 (contd.)

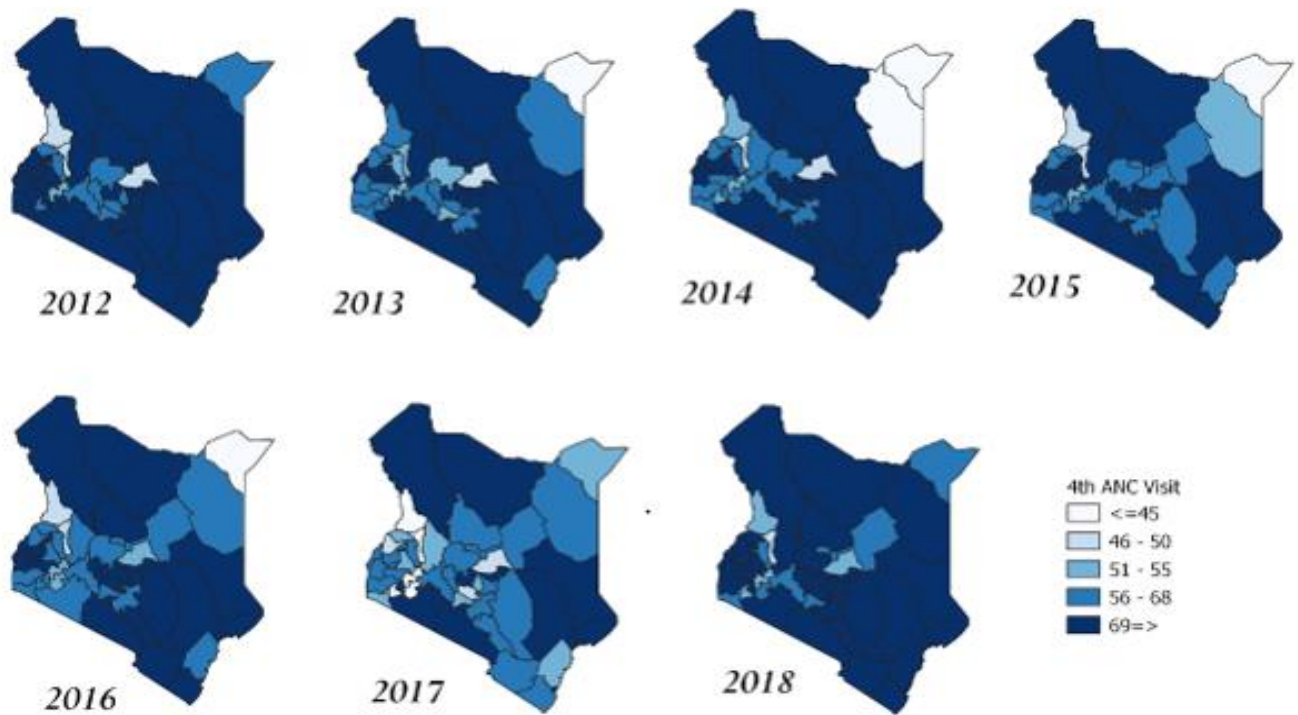


Fig 4.7 Spatial distribution of percentage of women who attended at least 4ANC visits in Kenya from 2012-2018

MODE OF DELIVERY

In this study delivery modality was considered. There are 4 types identified; Assisted vaginal delivery such as forceps or vacuum delivery, Breech delivery, Caesarian section and normal deliveries. The Denominator was Total Delivery at the same period (27) Although there was increase in the absolute numbers of normal deliveries the proportion of normal deliveries remained relatively constant at about 85% of all deliveries over the years (2012-2018) (Fig17). There is a slight increase in the percentage from 12% in 2012 to around 14% in 2018, while breech delivery and assisted vaginal deliveries have reduced from 1.6% and 1.2% to 0.5% and 0.8% respectively (Table 4.2).

Table 4.2- Proportions of delivery types in Kenya from 2012-2018

	Assisted Vag Del	Breech	Caesarean	Normal
2012	0.016	0.012	0.123	0.849
2013	0.013	0.011	0.126	0.851
2014	0.008	0.010	0.124	0.858
2015	0.007	0.009	0.127	0.857
2016	0.007	0.009	0.130	0.853
2017	0.008	0.008	0.145	0.839
2018	0.005	0.008	0.140	0.847

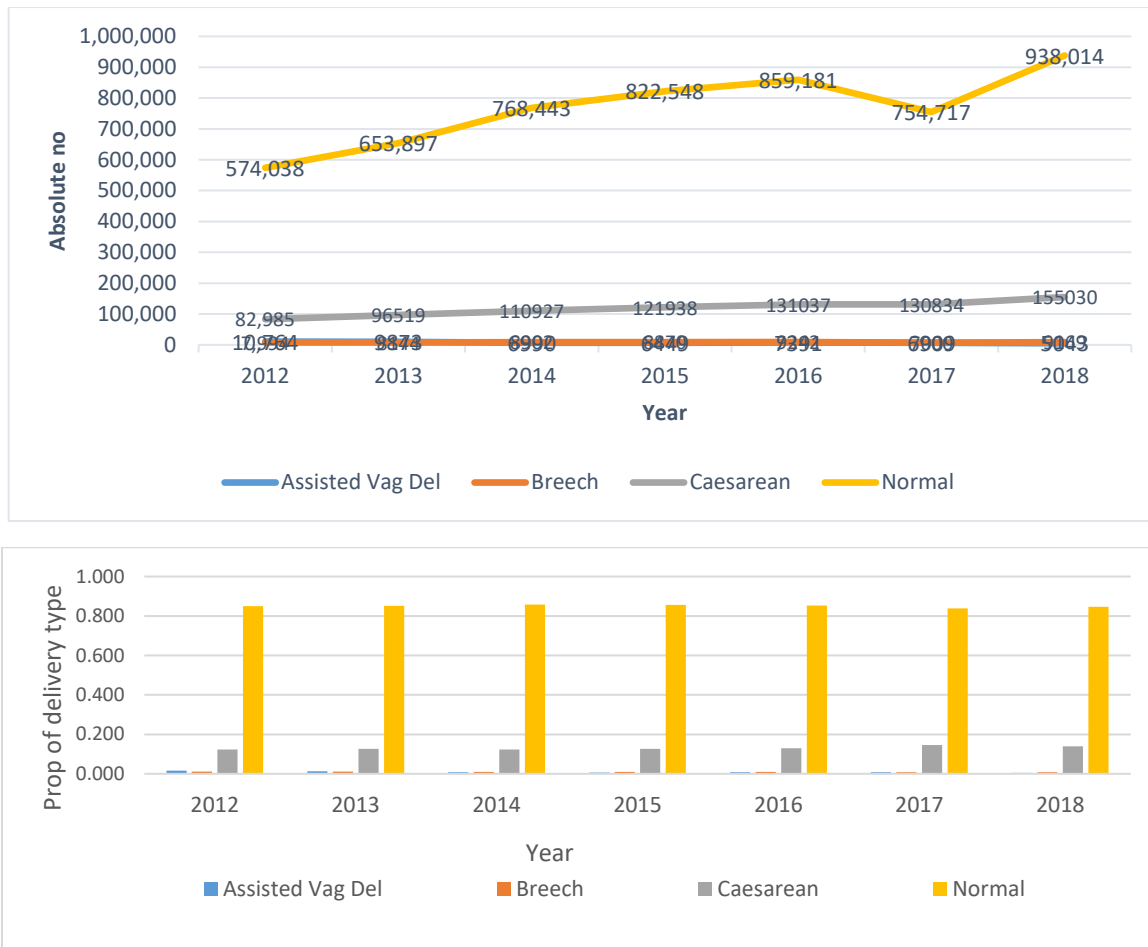


Fig 4.8- Line and column charts of absolute counts for Mode of delivery in Kenya from 2012-2018

County based data is presented below to explain the differences within Kenya. Nairobi, Kiambu, Nyeri and Kirinyaga have more deliveries via Caesarian section(CS) ranging between 20% and 25%, with Kirinyaga county having the highest rate. (Fig 4.8).

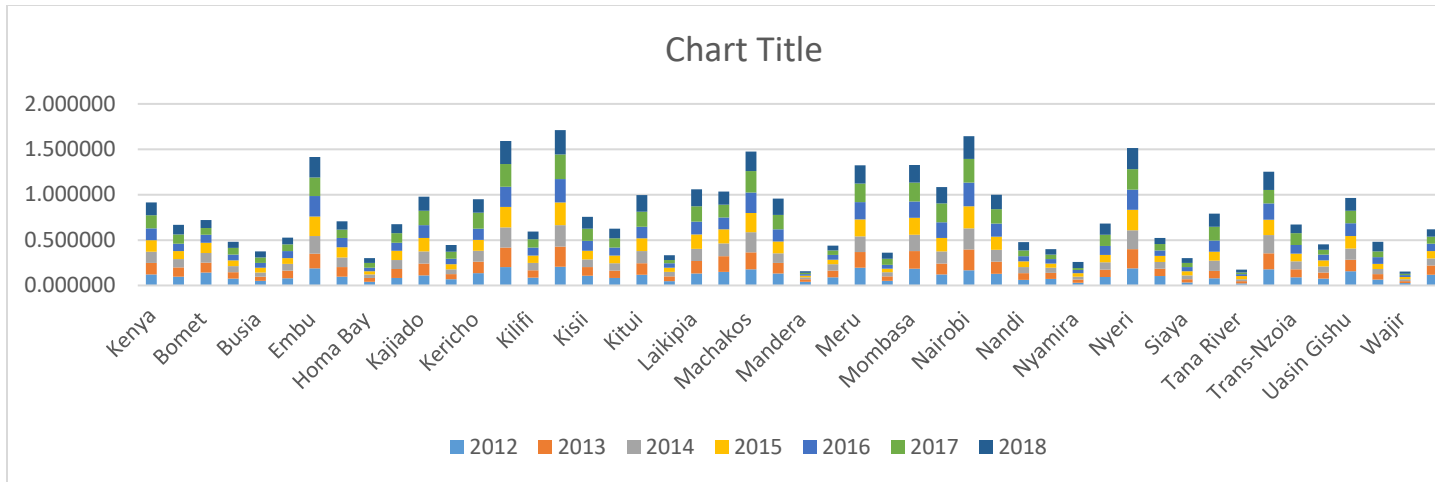


Fig 4.9 Stacked column chart of Proportion of Caesarian section in Kenya from 2012-2018

MATERNAL MORTALITY RATIO

Overall considering 2012 and 2018 there is a decline in maternal deaths per 100,000 live births. Although there was a decline from 170 to 110 from 2012 till 2015, there was an increase to 146 in 2016, however there appears to be a steady decline thereafter such that by 2018 it was 130/100,000 (Table 4.1, Fig 4.10)

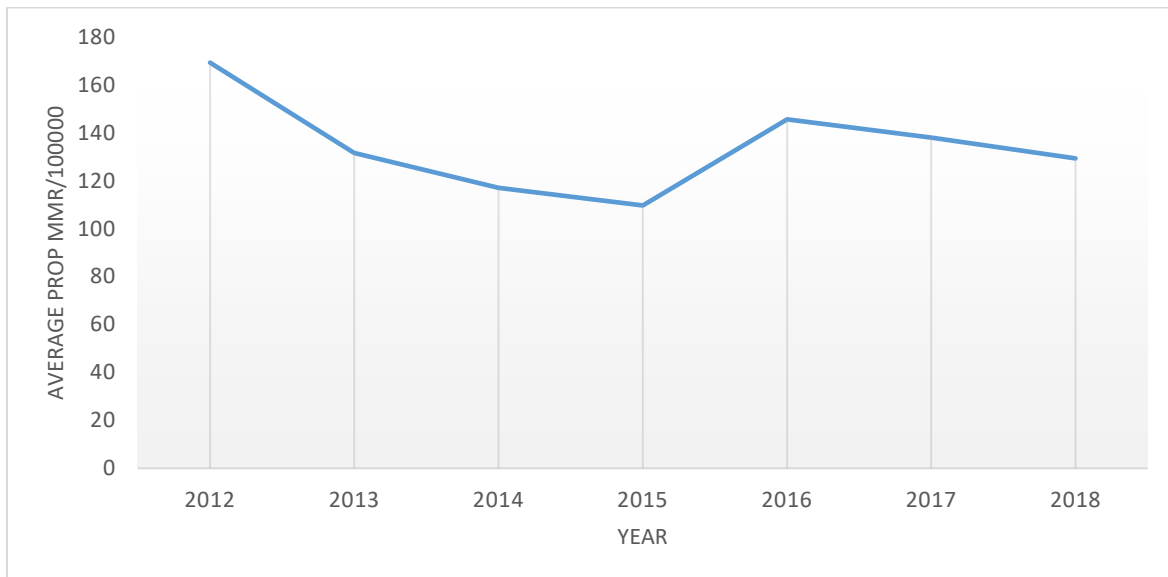


Fig 4.10-Line graph of total proportion of MMR/100,000Live birth in Kenya

County based temporal analysis revealed Lamu, Garissa, Mombasa and Mandera had very high MMR in 2012(429, 351, 335, 325/100,000 respectively). There was a steady decrease in MMR in Garisa, Mombasa, Busia,Elgeyo, Samburu and Uasin. In 2016, there was a remarkable increase compared to the ratio they had from 2012-2015 in Siaya and Tana River. In 2017, there was a sharp

increase in MMR in Vihiga, West-Pokot and Nairobi. There was a consistently low MMR in County Embu, Laikipia, and Migori with about 100deaths/100,000 with Kiambu, Nyamira having a lower MMR below 100/100000 from 2012-2018 (Fig 4.11).

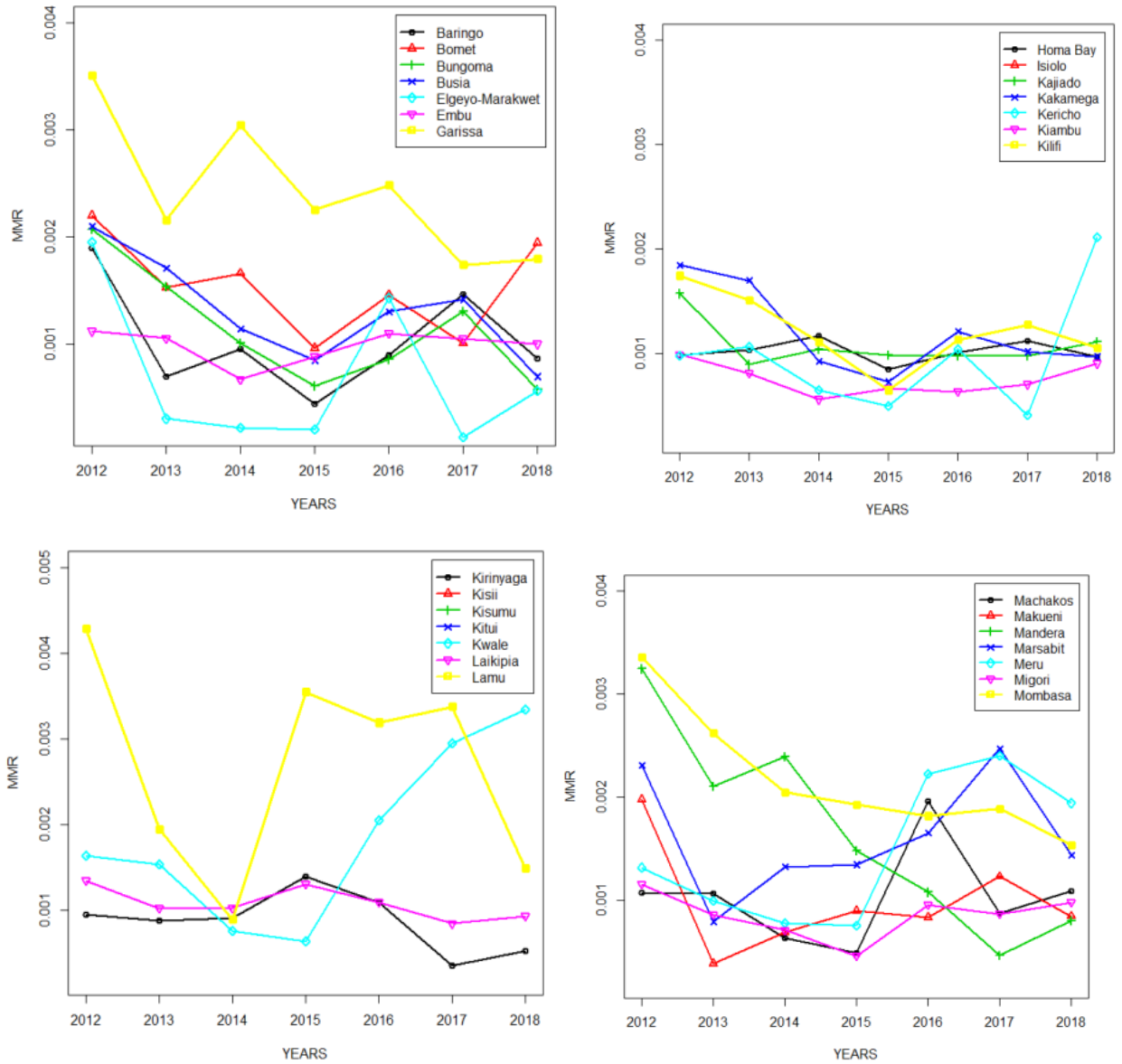


Fig 4.11-Line plots for MMR across counties grouped in an alphabetical order in Kenya from 2012-2018.

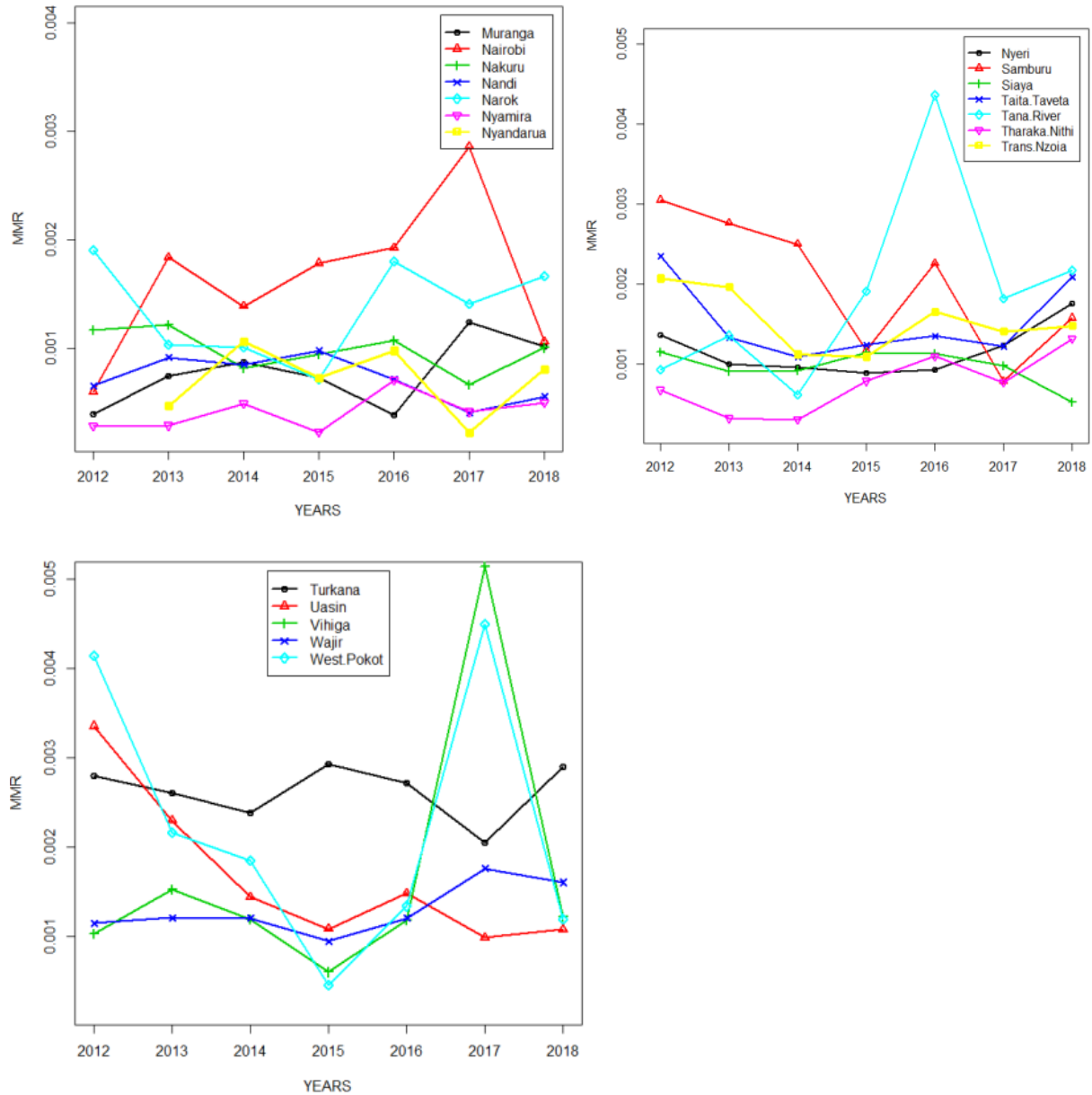


Fig 4.11-Line plots for MMR across counties grouped in an alphabetical order in Kenya from 2012-2018 (contd.)

A spatial distribution of changes within counties is presented below with darker colors showing higher MMR (Fig 4.12)

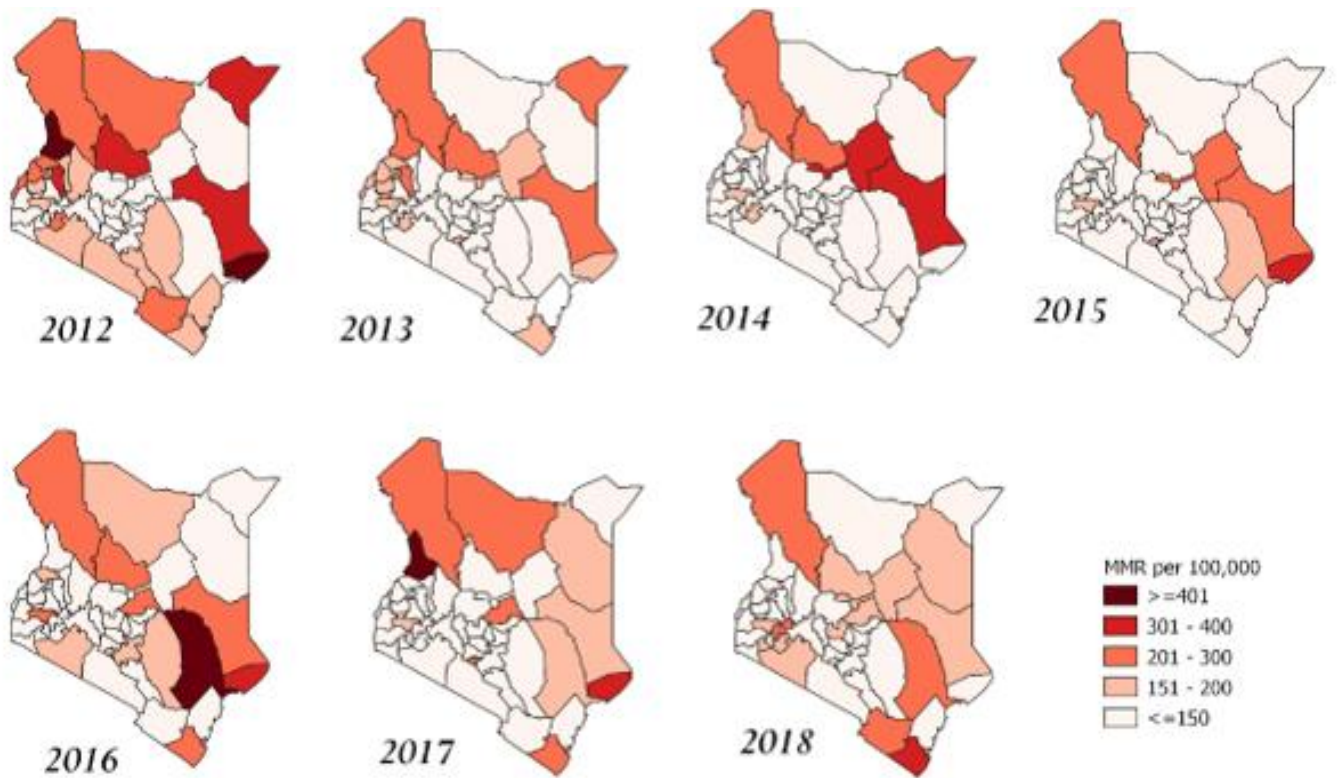


Fig 4.12-Spatial distribution of MMR/100,000 live birth in Kenya from 2012-2018

NEONATAL HEALTH

Neonatal health is examined by investigating the proportion of neonatal deaths per live birth (26). There is a decrease in Neonatal death from 12/1000live births in 2012 to 9/1000 in 2018(Fig 4.13)

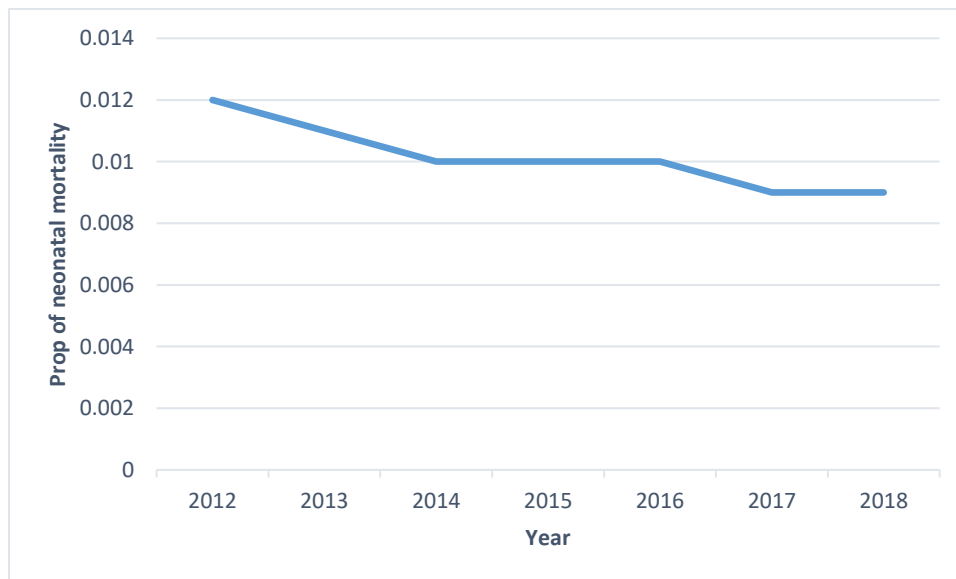


Fig 4.13 Line graph of proportion of Neonatal Death in Kenya from 2012-2018

Spatio-temporal distribution amongst counties of neonatal death rate is exhibited below. In 2012, Mandera had the lowest proportion of neonatal death while the highest proportion was in Uasin-Gishu with 32 neonatal death per 1000 live birth, followed by Laikipia which had 25/1000. Uasin-Gishu had elevated neonatal death over the years though reduced to 21/1000 in 2017 but has increased to 25/1000 in 2018. Embu county Neonatal Death Rate increased from 22/1000 in 2012 to 28/1000 in 2018. Baringo, Kericho, Nairobi, West Pokot had steady decline from 10,19, 22,16/1000 to 6,11,15,8/1000 respectively (Fig 23). By 2018, the highest neonatal death rate was in Embu with 28/1000 followed closely by Uasin-Gishu 25/1000 (Fig 4.14).

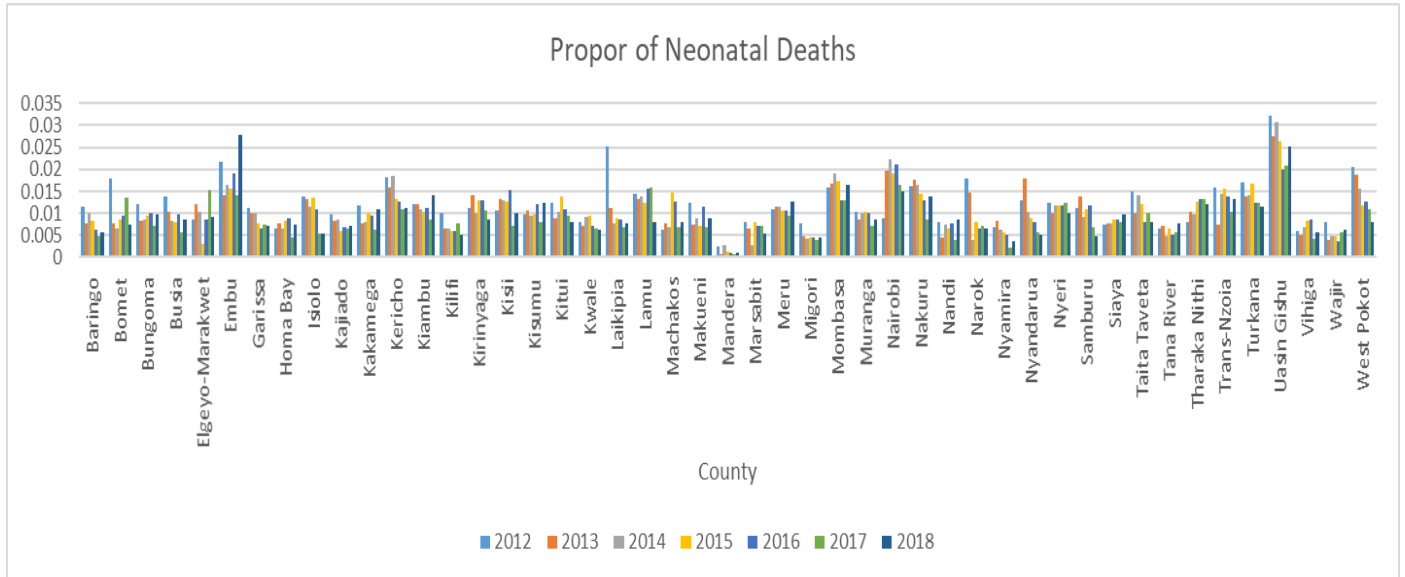


Fig 4.14 Column chart of proportion of Neonatal Death in Kenya from 2012-2018

A spatial map emphasizes further on the areas with higher red zone areas (darker color mean higher rate) like Uasin-Gishu as explained earlier (Fig 4.15).

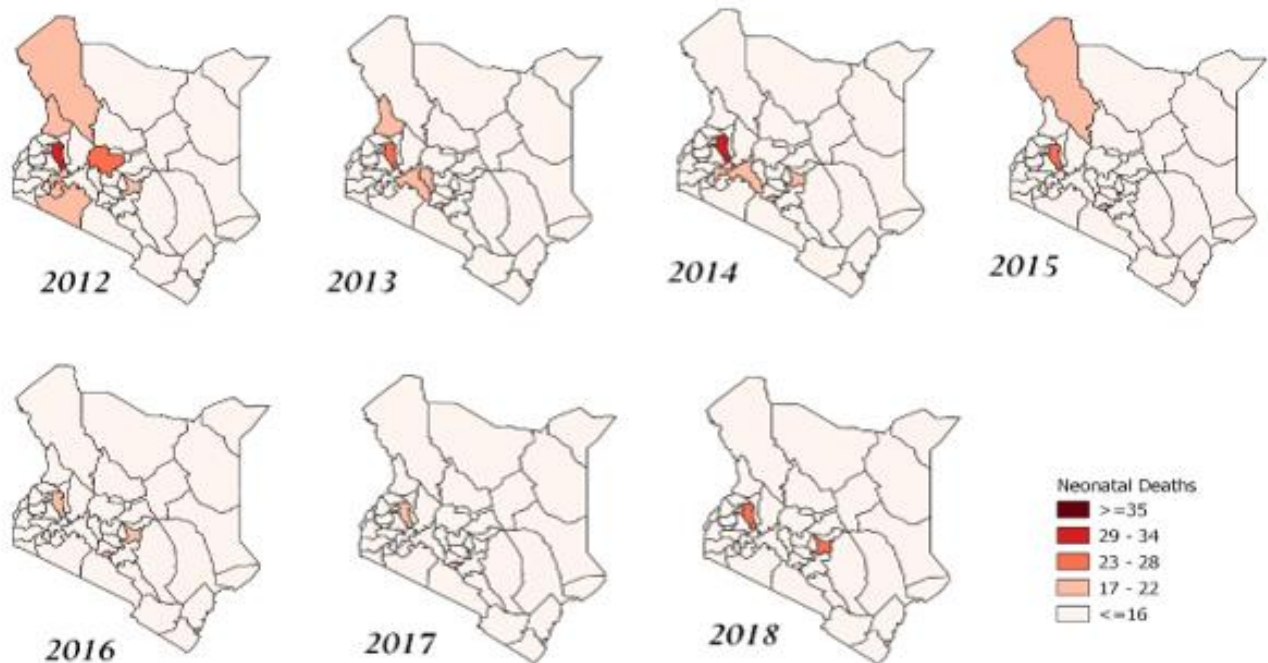


Fig 4.15- Spatial distribution of Neonatal Death/1000 live birth in Kenya from 2012-2018.

CHILD HEALTH

Many indicators have been used to assess child health. This study due to data availability has utilized Full Immunization and proportion of under 5 that are **severely** stunted-an evidence of malnutrition

FULL IMMUNIZATION OF UNDER 1 INFANTS

For full Immunization, denominator used is no of infants below 1yr old. Looking at the trend there is irregular movement across time from 2012-2018 ranging from 88% in 2012 to 75% in 2018 (fig 4.16).

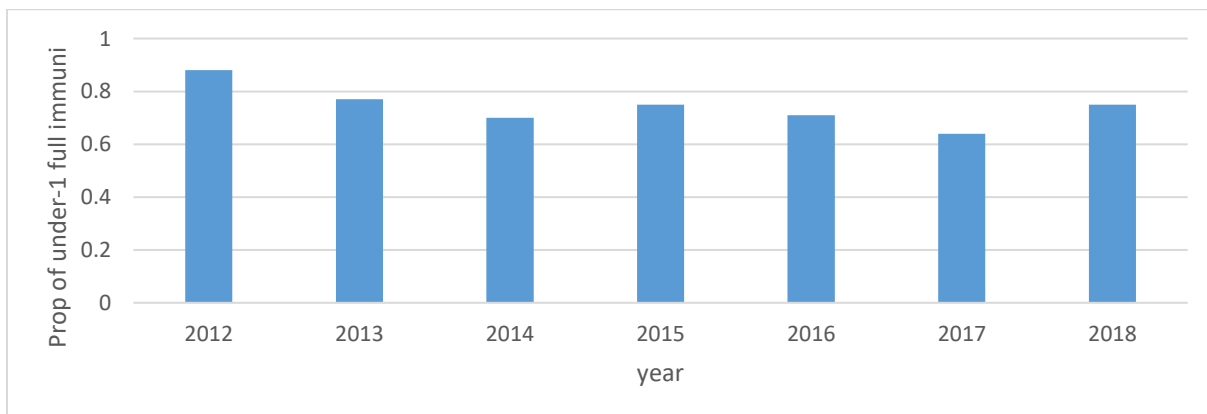


Fig 4.16-Barchart full immunization of under 1 Infants in Kenya from 2012-2018

Further analysis revealed extreme values in 2012; Makueni(2.48), Nyandarua(2.07), Nairobi(1.54), Kiambu(1.20), Embu (1.10), Muranga, Taita-Taveta(0.95) which might be possibly due to migration or errors with the denominators recorded from DHIS-2. The county with the lowest proportion of immunization in 2012 was West Pokot with a value of 0.4, however, by 2018 it had increased to 0.53 (dropping from 0.70 in 2015). In 2018, Kiambu had extreme values of(1.09) with West-Pokot maintaining its' status as the county with the lowest proportion of full immunization of under1 (See Fig 27).

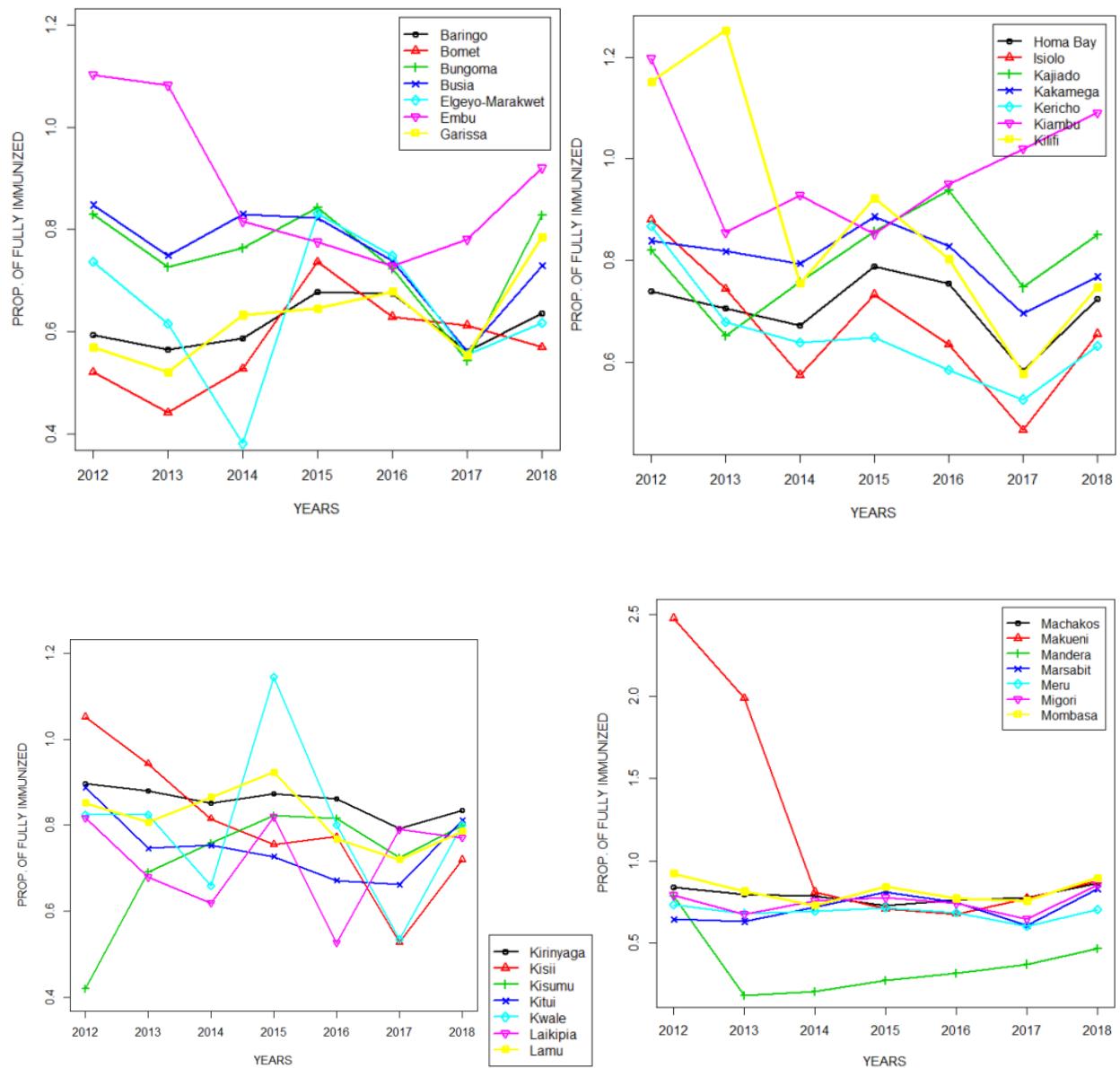


Fig 4.17 Line plots for full Immunization of under 1 Infants across counties grouped in an alphabetical order in Kenya from 2012-2018

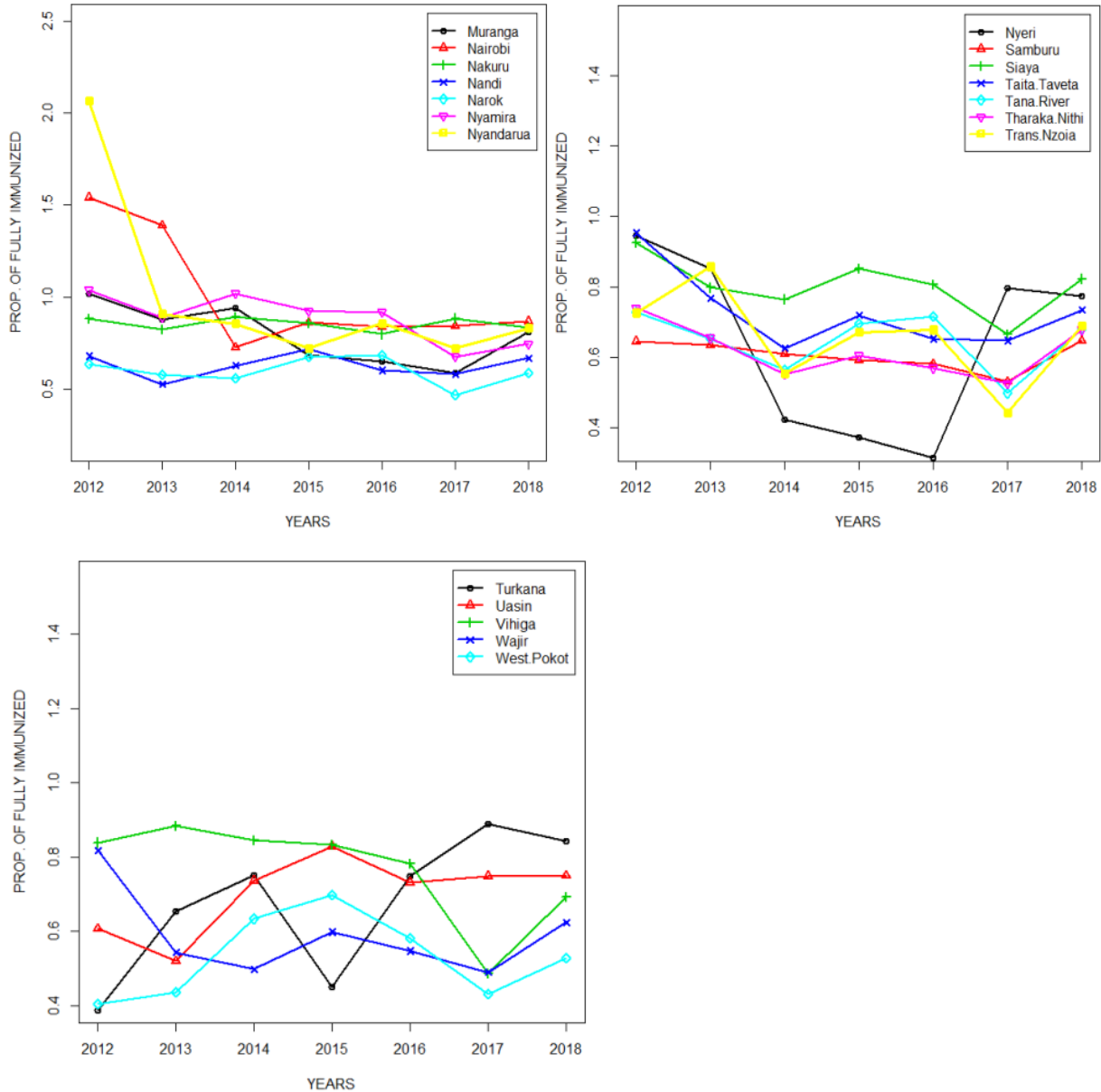


Fig 4.17 Line plots for full Immunization of under 1 Infants across counties grouped in an alphabetical order in Kenya from 2012-2018 (contd)

The spatial distribution of under 1 full immunization across counties is denoted below to buttress the earlier stated fact and give a snapshot interpretation of the line plots (Fig 4.18).

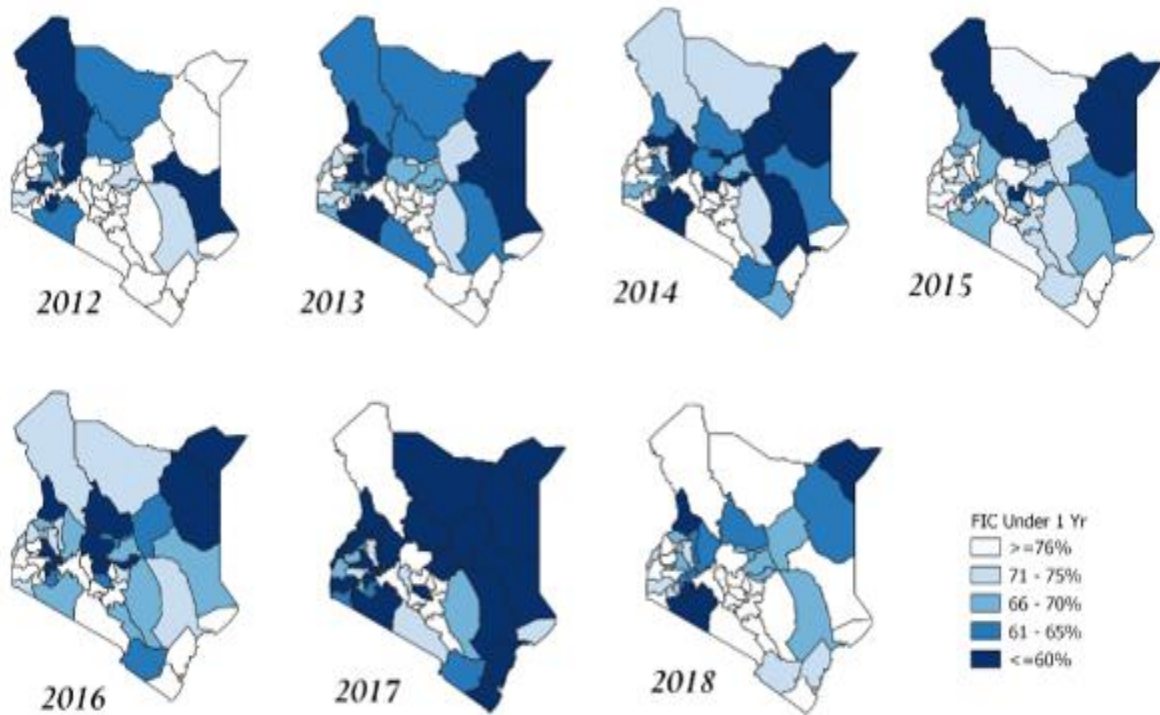


Fig 4.18-Spatial distribution of percentage of fully immunized under 1 children in Kenya
UNDER 5 CHILDREN WITH SEVERE STUNTING

Stunting is defined as the percentage of under 5 children, with height for age of less than minus 3 standard deviation from the median value obtained from the Child Growth Standards designed by the World Health Organization (30). The proportion of under 5 children (0-59months) has increased remarkably from 8/1000 under 5 children to ~20/1000 in 2012 and 2018 respectively (Fig 8).

In 2012, County based assessment revealed Samburu to be the county with the highest level of severe stunting in Under 5s was 49/1000 followed by Tana-River 25/1000 and Kwale 23/1000 with the lowest level in Elgeyo-Marakwet 10/1000. Embu county has recorded an Escalation in the proportion of severely stunted under 5s from 1 to 24/1000 (2012 to 2018), with Kericho from increasing from 2 to 14/1000, Isiolo from 12 to 36/1000, Baringo from 6 to 23/1000. In 2018, Bomet had the lowest proportion of children with severe stunting 2/1000 while the highest 79/1000 in Marsabit. Details of these changes is reported in the plots below (Fig 4.19);

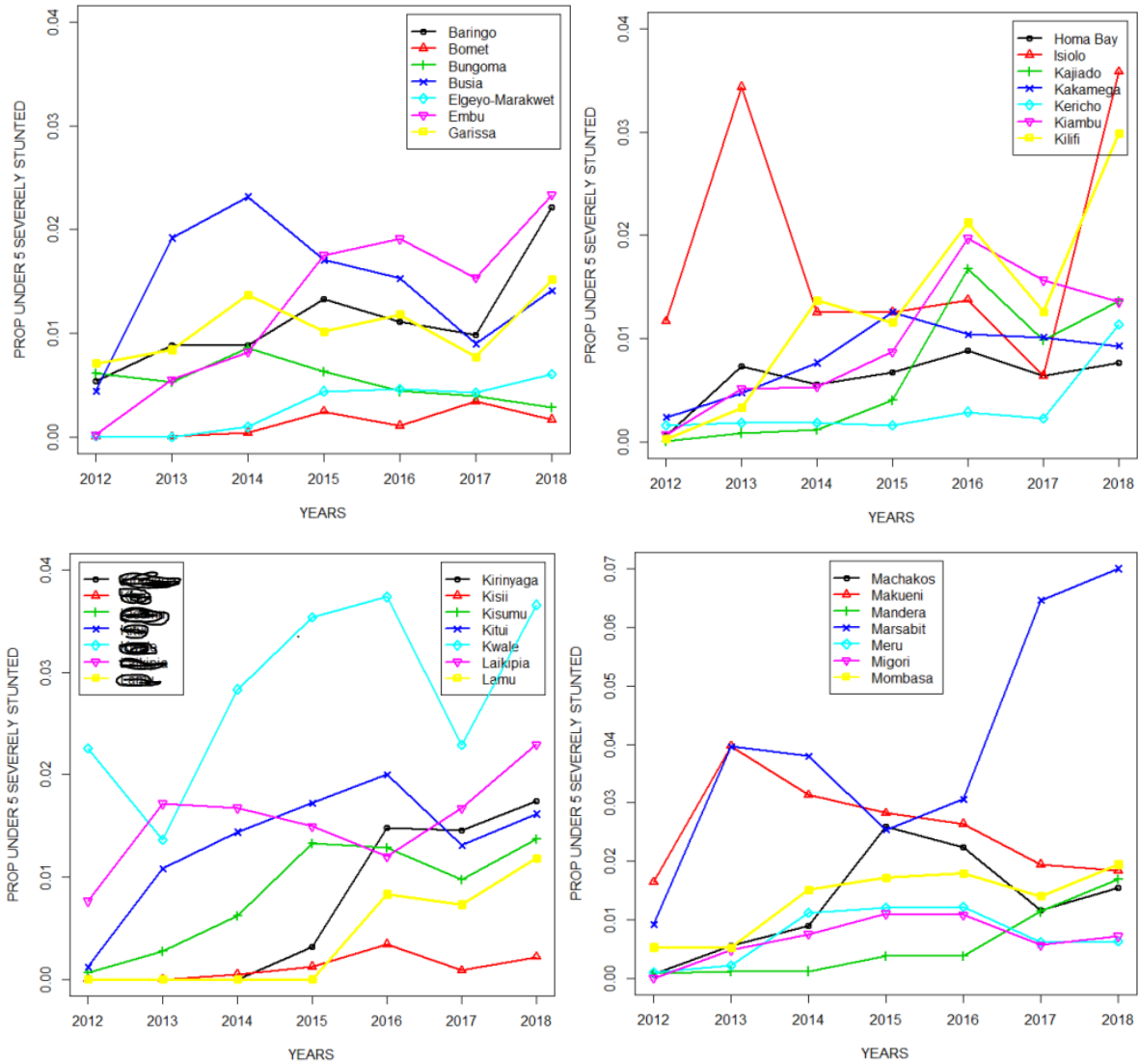


Fig 4.19 Line plots for full Immunization of under 1 Infants across counties grouped in an alphabetical order in Kenya from 2012-2018

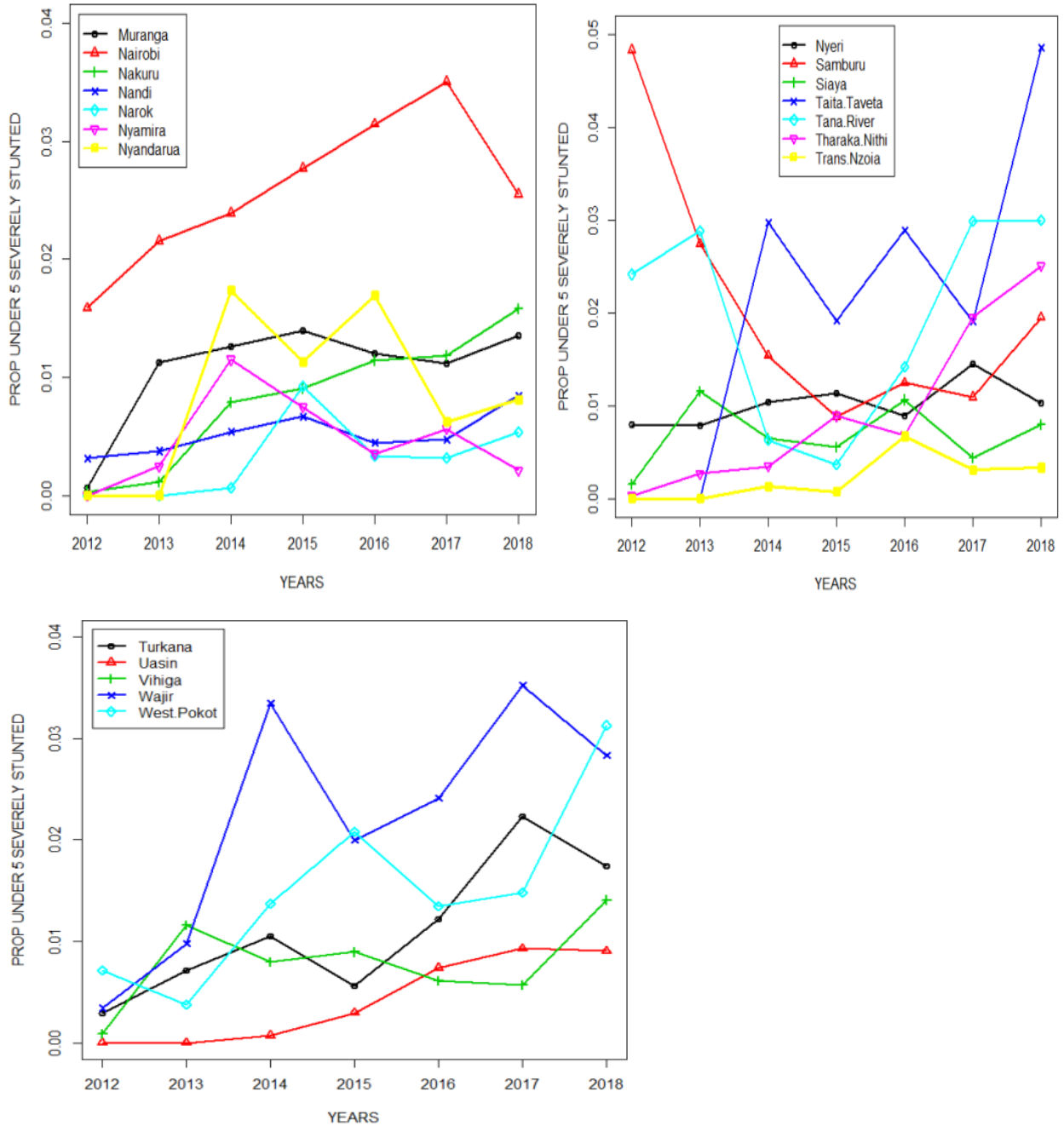


Fig 4.19 Line plots for full Immunization of under 1 Infants across counties grouped in an alphabetical order in Kenya from 2012-2018 (contd.)

Higher proportions are presented on these spatial maps with darker colors while lower proportions of severely stunted under 5s are counties with lighter colors (Fig 4.20).

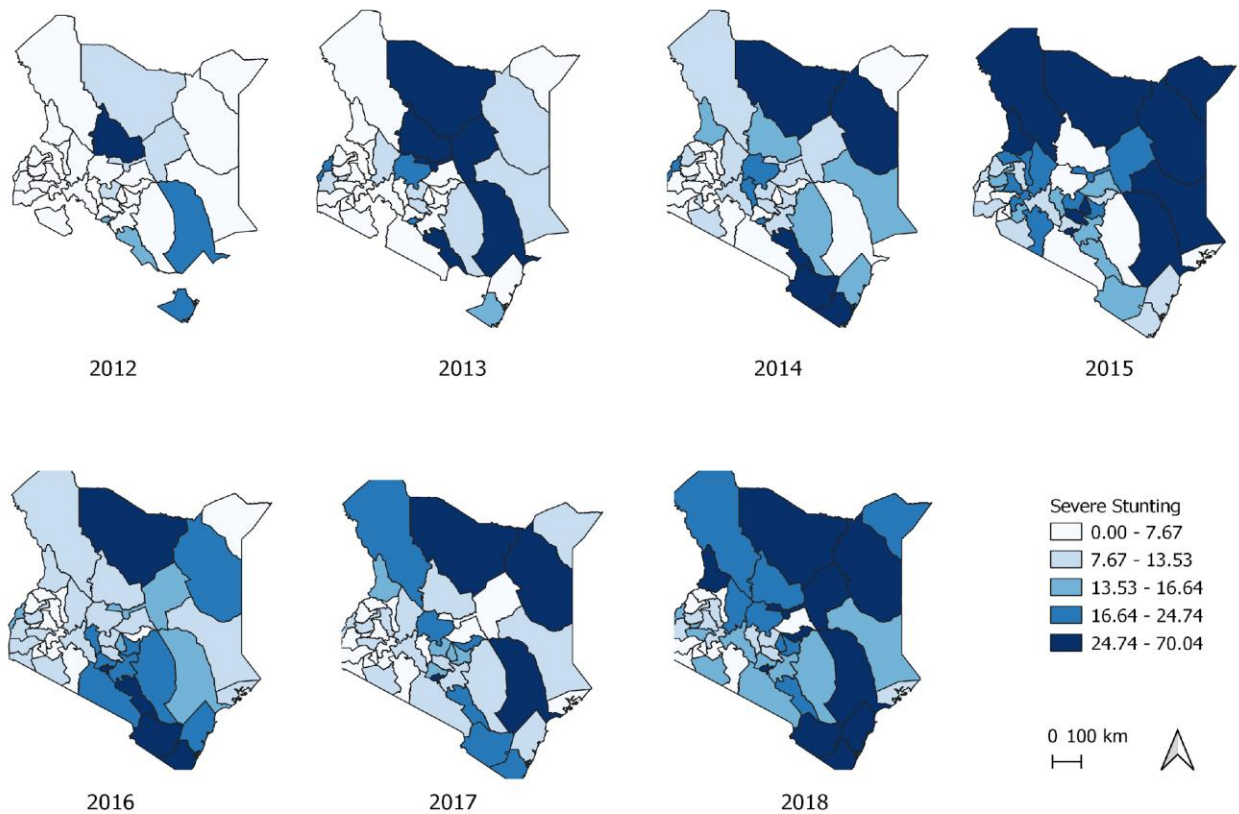


Fig 4.20 Spatial distribution of proportion of severe stunting of under 5 children in Kenya

COMPOSITE INDICES GENERATION

A composite index(CCI) was generated (Table 7) to assess the average across the 7 years (i.e. 2012-2018) post devolution. Geometric mean of the percentages was calculated across the years to get the average value post devolution. Geometric mean equals;

$$\left(\prod_{i=1}^n x_i \right)^{\frac{1}{n}} = \sqrt[n]{x_1 x_2 \cdots x_n}$$

where, n=number of terms(x) whose product is found.

For this Index the following indicators were used Cervical Screening{C}, Long acting and short acting family planning{FP}, Proportion of women that attended at least 4ANC{A} and Full Immunization of Under 1{FI}. The formula was adapted from the WHO summary indices for monitoring MCH care was used to calculate the weighted average for indices giving different weights (18).

$$CCI= (1/4*(C+FP)) + (1/4*(A)) + (1/2*(FI))$$

Table 4.3-Composite Index generated from Cervical Screening{C}, Long acting and short acting family planning{FP}, Proportion of women that attended at least 4ANC{A} and Full Immunization of Under 1{FI}.

County	CCI	County	CCI	County	CCI
Baringo	0.49	Kitui	0.6	Nyandarua	0.67
Bomet	0.48	Kwale	0.62	Nyeri	0.53
Bungoma	0.56	Laikipia	0.55	Samburu	0.59
Busia	0.61	Lamu	0.68	Siaya	0.63
Elgeyo Marakwet	0.46	Machakos	0.59	Taita Tateva	0.58
Embu	0.65	Makueni	0.75	Tana River	0.57
Garissa	0.51	Mandera	0.28	Tharaka Nithi	0.57
Homa Bay	0.56	Marsabit	0.57	Trans Nzoia	0.51
Isiolo	0.52	Meru	0.5	Turkana	0.56
Kajiado	0.68	Migori	0.6	Uasin Gishu	0.53
Kakamega	0.62	Mombasa	0.63	Vihiga	0.59
Kericho	0.48	Murang'a	0.58	Wajir	0.45
Kiambu	0.68	Nairobi	0.71	West Pokot	0.4
Kilifi	0.63	Nakuru	0.62		
Kirinyaga	0.62	Nandi	0.52		
Kisii	0.56	Narok	0.51		
Kisumu	0.58	Nyamira	0.66		

In this Chloropleth map lighter values indicate poor performing counties with regards to the 4 Indices while the darker it is the higher the values for the county. Findings revealed averagely over the years, that the highest performing counties with respect to CCI are Kajiado, Kiambu, Lamu, Machakos, Makueni, Nairobi, Nyandarua and Nyamira while the least performing are Mandera and West Pokot (Fig 4.21)

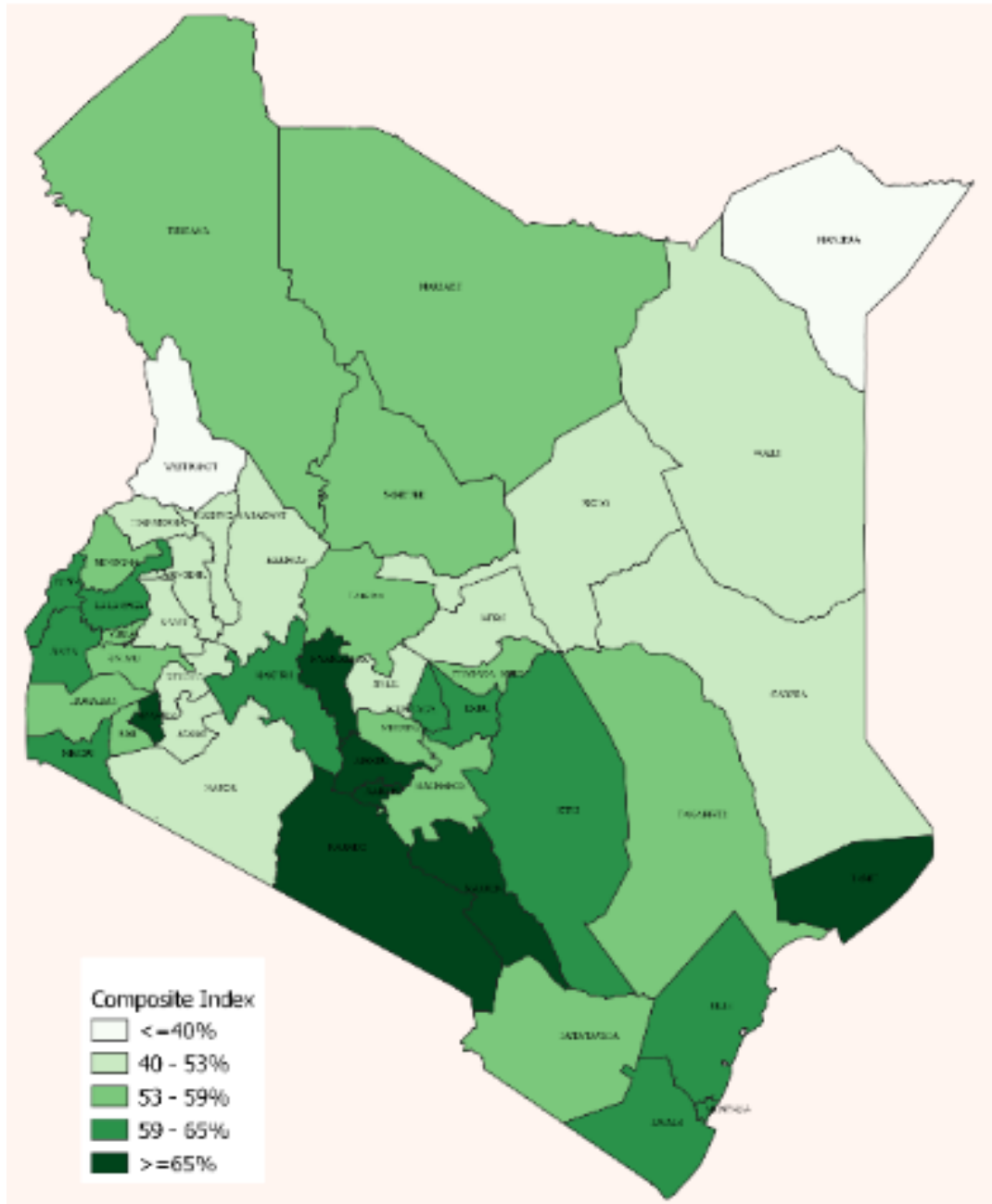


Fig 4.21-Spatial distribution of a composite index generated from Cervical Screening{C}, Long acting and short acting family planning{FP}, Proportion of women that attended at least 4ANC{A} and Full Immunization of Under 1{FI}.

ADOLESCENT HEALTH (TEENAGE 15-19YRS PREGNANT)

County based data on Teenage pregnancy for 2012 to 2015 are not available hence the inability to show more trend with respect to adolescent health. There was however an increase in Teenage pregnancy from 55/1000 Adolescents to 125/1000 in 2017 but declined to 79/1000 in 2018 (Fig 4.22).

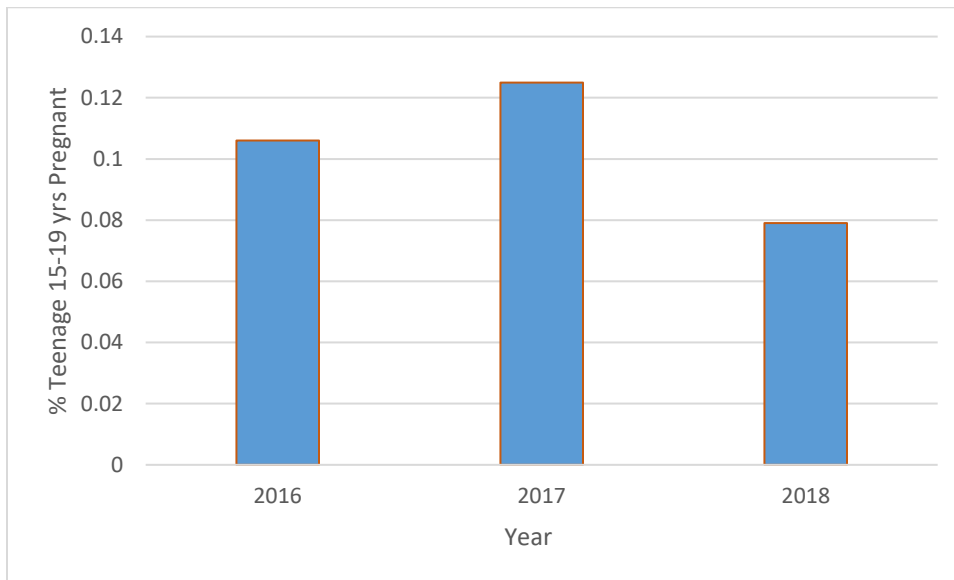


Fig 4.22 Bar chart showing the % teenage pregnant between 15-19yrs in Kenya

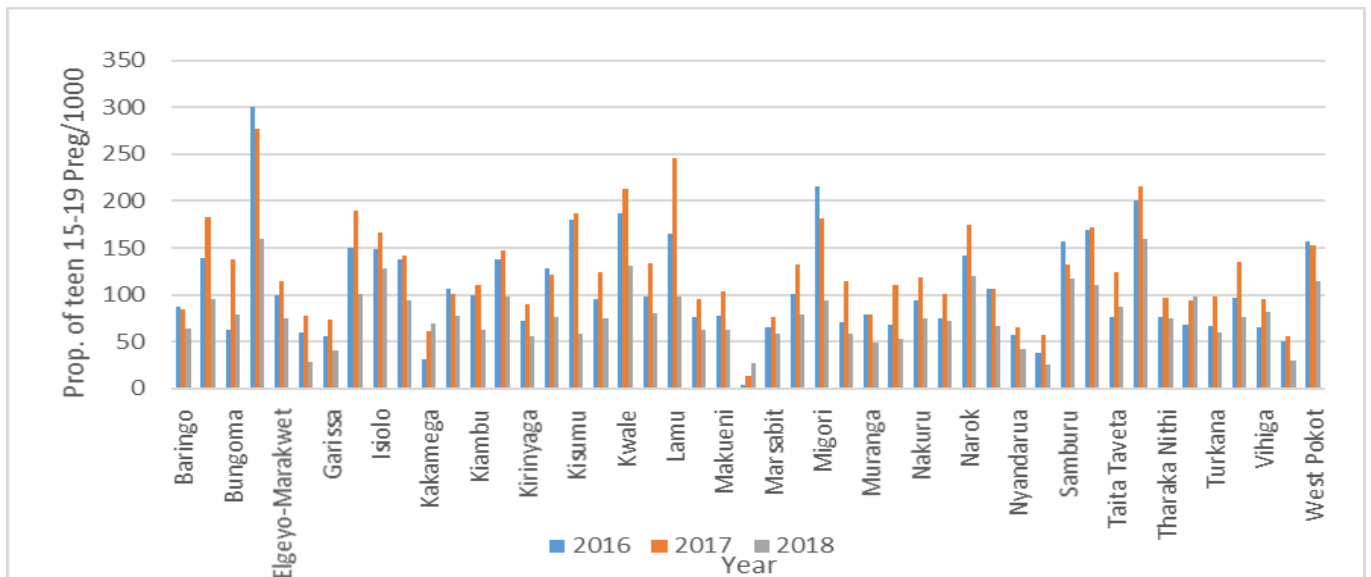


Fig 4.23 Line graph of county based proportion of teenage pregnant between 15-19yrs in Kenya

Spatial distribution of county based data is shown below, and it revealed the county with highest proportion of teenage from age 15-19yrs that are pregnant in 2016 to be Busia with 300/1000 teenage aged 15-19 pregnant while Mandera recorded the lowest proportion of 4/1000. In 2017, Mandera remained still the county with the lowest proportion of teenage (15-19) pregnancy but had risen to 14/1000, Busia remained the leading county in teenage pregnancy of adolescents from age 15-19 but had dropped slightly to 277/1000. By 2018, Nyeri had replaced Mandera by 1/1000 has the county with the lowest proportion of Teenage pregnancy (26/1000). Tana River and Busia tied as the highest counties with teenagers (15-19) pregnant i.e 159/1000(Fig 4.22&4.23).

The Chloropleth map is presented below for better visualization (Fig 4.24);

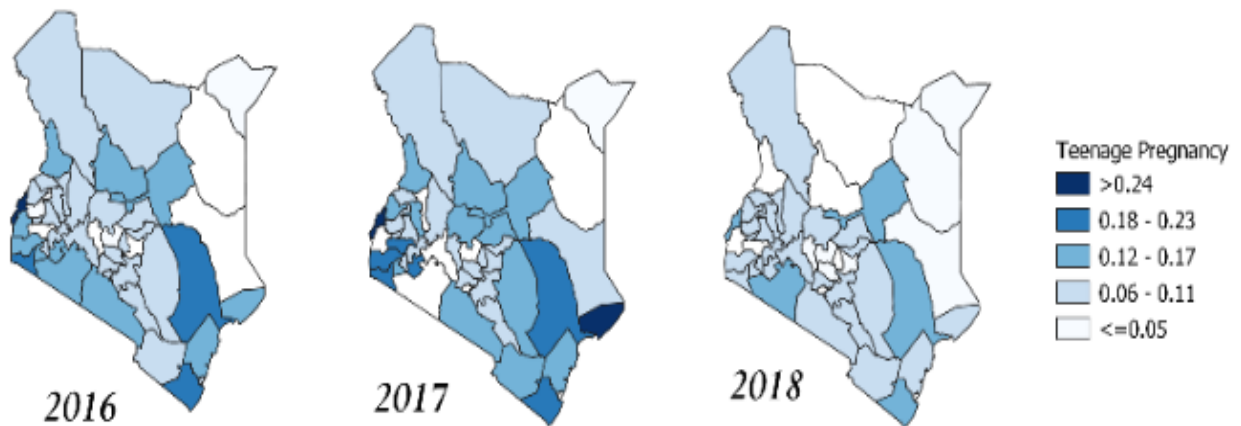


Fig 4.24 Spatial distribution of proportion of teenage pregnant between 15-19yrs in Kenya from 2016-2018 with darker colors representing higher values

INFERENCEAL STATISTICS

TREND ANALYSIS USING REPEATED MEASURES ANOVA

This study aimed to investigate the changes in the RMNCAH indicators over time and check if this difference with respect to time is significant. Repeated measures can be utilized when correlated samples are taken in the same subject over repeated periods, in this case yearly. Where homogeneity of variance for repeated measure ANOVA is breeched (significant result) using Mauchly's Test for sphericity, multivariate analysis (Hotelling-Lawley trace, Wilks' lambda and Pillai-Bartlett trace) was utilized for reporting the results (20). However, for the purpose of this study both analysis is presented. Average values of some selected indicators were calculated and analyzed for statistical difference over the 7 years. Level of significance for this study was set at 0.05

USE OF EITHER LONG OR SHORT ACTING FAMILY PLANNING IN KENYA.

The tables below (4.4-4.7) show a significant difference in within a year and between one year and the other. For the first pairwise comparison there is a significant difference between 2012 and 2014,2015,2016, 2018 while no difference exists in 2013 and 2017 in uptake of either long or short acting family planning use. Mauchly's test of sphericity which was found to be significant and a Greenhouse Geisser correction was done.

Table 4.4: Significant Tests of Within-Subjects Effects for either Long Or Short acting Family Planning in Kenya

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	
Years	Sphericity Assumed	.048	6	.008	22.113	.000
	Greenhouse-Geisser	.048	1.941	.025	22.113	.000
	Huynh-Feldt	.048	2.025	.024	22.113	.000
	Lower-bound	.048	1.000	.048	22.113	.000
Error(Years)	Sphericity Assumed	.101	276	.000		
	Greenhouse-Geisser	.101	89.297	.001		
	Huynh-Feldt	.101	93.171	.001		
	Lower-bound	.101	46.000	.002		

Table 4.5: Linear trend for either Long Or Short acting Family Planning in Kenya

Source	Years	Type III Sum of Squares	df	Mean Square	F	Sig.
Years	Linear	.020	1	.020	13.775	.001

Table 4.6- First Pairwise comparison for either Long Or Short acting Family Planning in Kenya visit revealing significant difference across the years

(I) Years	(J) Years	Mean Difference (I-J)	Std. Error	P-value
2012 (reference)	2013	.001	.002	.750
	2014	-.016*	.003	.000
	2015	-.014*	.004	.001
	2016	-.016*	.006	.007
	2017	.000	.006	.961
	2018	-.035*	.006	.000

Table 4.7-Multivariate testing with significant difference using the 4 tests for uptake of either Long or Short acting Family Planning in Kenya

	Value	F	Hypothesis df	Error df	Sig.
Pillai's trace	.872	46.662a	6.000	41.000	.000
Wilks' lambda	.128	46.662a	6.000	41.000	.000
Hotelling's trace	6.829	46.662a	6.000	41.000	.000
Roy's largest root	6.829	46.662a	6.000	41.000	.000

ATTENDANCE OF AT LEAST 4 ANCS

Following Komolgorov S. test for normality, 2013 was found to not to be normally distributed. Consequently, a natural logarithm transformation was done. Followed by Mauchly's test of sphericity which was found to be significant and a Greenhouse Geisser correction was done. There was significant difference within each year and among the years and pairwise comparison revealed significant difference in the attendance of at least 4 ANC visits of women between 2012 and all the years except 2015 and 2018 (Table 4.8-4.12).

Table 4.8-Mauchly's test of Sphericity with significant value 4ANC.

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Years	.017	177.571	20	.000	.399	.422	.167

Table 4.9-Significant Tests of Within-Subjects Effects for attendance of at least 4 ANC visits in Kenya

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Years	Sphericity Assumed	47.631	6	7.938	1019.615	.000
	Greenhouse-Geisser	47.631	2.392	19.911	1019.615	.000
	Huynh-Feldt	47.631	2.532	18.808	1019.615	.000
	Lower-bound	47.631	1.000	47.631	1019.615	.000
Error(Years)	Sphericity Assumed	2.149	276	.008		
	Greenhouse-Geisser	2.149	110.043	.020		
	Huynh-Feldt	2.149	116.493	.018		
	Lower-bound	2.149	46.000	.047		

Table 4.10-Trend Analysis 4ANC

Source		Type III Sum of Squares	df	Mean Square	F	P-value
Years	Linear	5.883	1	5.883	270.727	.000
Error(Years)	Linear	1.000	46	.022		

Table 4.11-First Pairwise comparison 4ANC visit revealing significant difference across the years

(I) Years	(J) Years	Mean Difference (I-J)	Std. Error	P-value
2012(reference)	2013	1.152	.015	.000
	2014	.087	.020	.002
	2015	.060	.024	.299
	2016	.100	.024	.002
	2017	.170	.025	.000
	2018	.026	.022	1.000

Table 4.12-Multivariate testing with significant difference using the 4 tests for 4ANC

	Value	F	Hypothesis df	Error df	Sig.
Pillai's trace	.996	1659.417 ^a	6.000	41.000	.000
Wilks' lambda	.004	1659.417 ^a	6.000	41.000	.000
Hotelling's trace	242.841	1659.417 ^a	6.000	41.000	.000
Roy's largest root	242.841	1659.417 ^a	6.000	41.000	.000

MATERNAL MORTALITY RATIO (MMR)

Mauchly's test of sphericity which was found to be significant and a Greenhouse Geisser correction was done. There was significant difference within each year and among the years and pairwise comparison revealed significant difference in the Maternal Mortality Ratio between 2012 and all the years except 2016 and 2017 (Table 4.13-4.21).

Table 4.13-Significant Tests of Within-Subjects Effects for MMR in Kenya

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Years	Sphericity Assumed	108231.830	6	18038.638	4.790	.000
	Greenhouse-Geisser	108231.830	3.886	27850.768	4.790	.001
	Huynh-Feldt	108231.830	4.290	25231.680	4.790	.001
	Lower-bound	108231.830	1.000	108231.830	4.790	.034
Error(Years)	Sphericity Assumed	1039421.067	276	3766.018		
	Greenhouse-Geisser	1039421.067	178.762	5814.547		
	Huynh-Feldt	1039421.067	197.318	5267.746		
	Lower-bound	1039421.067	46.000	22596.110		

Table 4.14-Trend analysis for MMR in Kenya

Source	Years	Type III Sum of Squares	df	Mean Square	F
Years	Linear	10281.072	1	10281.072	1.572
Error (Years)	Linear	300877.431	46	6540.814	

Table 4.15-First pairwise comparison Maternal Mortality Ratio in Kenya (significant result)

Year(I)	(J) Years	Mean Difference (I-J)	Std. Error	Sig.
2012	2013	37.726	10.660	.001
	2014	52.253	12.821	.000
	2015	59.568	14.215	.000
	2016	23.604	14.442	.109
	2017	31.200	16.603	.067
	2018	39.987	15.532	.013

Table 4.16-Multivariate testing with significant difference using the 4 tests for MMR in Kenya

	Value	F	Hypothesis df	Error df	Sig.
Pillai's trace	.376	4.123 ^a	6.000	41.000	.003
Wilks' lambda	.624	4.123 ^a	6.000	41.000	.003
Hotelling's trace	.603	4.123 ^a	6.000	41.000	.003
Roy's largest root	.603	4.123 ^a	6.000	41.000	.003

NEONATAL DEATH

Mauchly's test of sphericity which was found to be significant and a Greenhouse Geisser correction was done. For the first pairwise comparison there is a significant difference between 2012 and all the years except 2014 and 2017 of 2012, 2014, 2017, 2018 variables as it relates to Neonatal Death.

Table 4.17- Mauchly's test of Sphericity with significant value Neonatal Death

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower bound
YEARS	.000	885.148	20	.000	.400	.424	.167

Table 4.18- Significant Tests of Within-Subjects Effects Neonatal Death

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	
Years	Sphericity Assumed	1776.879	6	296.147	3160.600	.000
	Greenhouse-Geisser	1776.879	2.402	739.605	3160.600	.000
	Huynh-Feldt	1776.879	2.544	698.433	3160.600	.000
	Lower-bound	1776.879	1.000	1776.879	3160.600	.000
Error(Years)	Sphericity Assumed	25.861	276	.094		
	Greenhouse-Geisser	25.861	110.514	.234		
	Huynh-Feldt	25.861	117.028	.221		
	Lower-bound	25.861	46.000	.562		

Table 4.19- Linear trend Neonatal Death

Source	Years	Type III Sum of Squares	df	Mean Square	F	Sig.
Years	Linear	52.809	1	52.809	652.172	.000
Error	Linear	3.725	46	.081		

Table 4.20-Pairwise Comparisons Neonatal Death

(I) Years	(J) Years	Mean Difference (I-J)	Std. Error	Sig.
2012	2013	-4.508	.064	.000
	2014	.180	.058	.068
	2015	-4.507	.064	.000
	2016	-4.507	.064	.000
	2017	.387	.061	.000
	2018	.169	.057	.103

Table 4.21- Multivariate testing with significant difference using the 4 tests for Neonatal Death

Effect		Value	F	Hypothesis df	Error df	Sig.
Years	Pillai's Trace	.993	936.868	6.000	41.000	.000
	Wilks' Lambda	.007	936.868	6.000	41.000	.000
	Hotelling's Trace	137.103	936.868	6.000	41.000	.000
	Roy's Largest Root	137.103	936.868	6.000	41.000	.000

Other findings for stunted growth and teenage pregnancy revealed similar patterns with significant difference within a year and in between years. The pairwise comparison are all very significant.

In summary the earlier depicted trend is significant with different levels of improvement or no improvement even decline in the uptake of essential services across the counties with minimal change in levels of stunting moderate decrease in neonatal death

INDEPENDENT ANOVA

To test for relationship between Neonatal Deaths and the identified mode of delivery in this study (Assisted vaginal delivery e.g. Forceps, vacuum delivery(AVD); Breech Delivery(BD), Caesarian section (CaS), normal delivery(ND)), an ANOVA test was carried out. Assumptions were checked however the dependent variable (Neon_death) and AVD were not normally distributed using Kolmogorov-Smirnov test so a natural log transformation was done (see appendix 7). The result revealed an overall significance of the model with Adjusted R2 of 0.415($p < 0.0001$) Result of regression is as follows (Table 17);

Table 4.22: ANOVA for testing relationship between neonatal death and mode of delivery

Model	Sum of Squares	df	Mean square	F	Pvalue
Regression	4.378	4	1.094		0.000
Residual	5.025	42	.120		
Total	9.403	46			

Table 4.23 Coefficients for ANOVA relationship between neonatal death and mode of delivery

Standardized β	t	P-value
Cons	-.270	.789
BD .337	2.686	.010
CaS .311	.200	.842
NoD -.402	-.260	.796
AVD .009	.054	.957

Further analysis revealed the different relationship of different mode of deliveries with neonatal deaths. Neonatal death was significantly associated with breech delivery ($\beta=0.337$, $p=0.010$). For every unit increase in breech delivery neonatal death increased by 1.40(exponential due to natural log transformation for normality) others were not statistically significant.

QUALITATIVE STUDY

FOCUSED GROUP DISCUSSION(FGD)

This approach was utilized to gather important information on the level of knowledge and understanding of women on UHC as it relates to maternal, child and adolescent health, differences in service delivery pre and post devolution and to evaluate factors that hinder or promote access to RMNCAH services post-devolution in Kenya.

SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS.

Majority of the women in this study particularly in KNH and Mbagathi are between ages 32-37 while. In KNH none of the women are beyond 37yrs of age. Overall, the respondents were high school leavers or did not complete high school and were unemployed at the time of study. Many of them had no children yet and majority of those who had no children have had several miscarriages. Mothers were reluctant to share further details especially income. Refer to appendix 9 for more details on the women (Table 4.24-4.27).

Table 4.24-Demographic characteristics of the FGD participants by Facility with most of them either 20-25 or 32-37

Age category by County	<20yrs	20-25	26-31	32-37	>38
KNH(National)	1(9.1%)	2(18.2%)	3(27.3%)	5(45.5%)	0(0.0%)
Mbagathi(County)	1(11.1%)	2(22.2%)	1(11.1%)	3(33.3%)	2(22.2%)
Mwala(Subcounty)	2(20.0%)	5(50.0%)	1(10.0%)	1(10.0%)	1(10.0%)

Table 4.25-Level of Education majority of the FGD participants High school leavers

Facility	Level of Education			
	College	High School	Primary	University
KNH(National)	3(27.3%)	6(54.5%)	1(9.1%)	1(9.1%)
Mbagathi(County)	2(22.2%)	6(66.7%)	1(11.1%)	0(0.0%)
Mwala(Subcounty)	0(0.0%)	7(70.0%)	3(30.0%)	0(0.0%)

Table 4.26-Employment status with majority of the FGD participants unemployed

Facility	Employment					
	Artisan	Dental Assistant	Nurse	Teacher	Trading	Unemployed
KNH(National)	0(0.0%)	1(9.10%)	0(0.0%)	0(0.0%)	7(63.6%)	3(27.3%)
Mbagathi(County)	2(22.2%)	0(0.0%)	1(11.1%)	1(11.1%)	1(11.1%)	4(44.4%)
Mwala(Subcounty)	1(10.0%)	0(0.0%)	0(0.0%)	0(0.0%)	1(10.0%)	8(80.0%)

Table 4.27- Number of children of FGD participants

Facility	No of Children				
	None	less than 3	3-5	>5	7
KNH(National)	6(54.6%)	5(45.5%)	0(0.0%)	0(0.0%)	0(0.0%)
Mbagathi(County)	5(55.5%)	2(22.2%)	0(0.0%)	2(22.2%)	0(0.0%)
Mwala(Subcounty)	1(10.0%)	7(60.0%)	2(20.0%)	0(0.0%)	1(10.0%)

WOMEN HEALTH

Knowledge and understanding of UHC

The knowledge and understanding of the women on what UHC means and entails was assessed by a direct question. Universal health care means availability, accessibility at minimal or no cost to the populace so none is rendered incapacitated due to financial implication of *ill health*. 16% of the entire population of 30 simply described it as free medical care.

It was defined as;

- Access to a health facility regardless of age and income but entitlement to quality health care as a woman such that any time in case of emergency I am supposed to access medical services regardless of where I come from (Female 6 dental assistant, KNH).
- Services to all children and women (Female 4, KNH) and health services to all without discrimination based on gender or way of life (Female 9 trader, KNH).
- A program that was launched by the president in some counties e.g. Machakos and Nyanza and is used with until you are old people and you can register with it and get treated with it (Female 9 Nurse, Mbagathi).

Most recipient in Mwala simply referred to it as “a program that provides just free maternity so women can deliver safely” (Female 6,7,8 Mwala).

Access to health care

In order to assess their understanding further, who has access to this health care was asked. Women from Mbagathi did unanimously agree it is everyone while those from Mwala appeared to have no answer to the question.

However, in KNH the answer from 2 of the 10 women (female 6&7), with others nodding their head in approval, was that;

- depends on your financial well-being because with an NHIF card you cannot access all services (Female 6, KNH)
- it depends on if you have money or not. She further explained that "opening a file is 2700,

the process is tedious I had to come here for 3 days in order to complete the process of opening the file, seeing the doctor and ultrasound. I used a lot of money for transport because I come from very far yet I have come here because it's a general hospital with all services. I have stayed for 19 years without giving birth and I can't get all these services in the local hospitals so I have come to a general hospital so that in case of a complication they will have everything, but you see without money I can't come here" (Female 7 Trader, KNH)

- An aggrieved high school certificate petty trader, KNH further elucidated "I am rhesus negative and this comes with a lot of complications so I have come here and without the money I cannot get all the services".

Services available to address the health needs of women in the reproductive age group.

Majority of the women mentioned ANC and postnatal care while only 1 mother mentioned use of ambulance services for home emergencies and home visits (Table 4.28)

Table 4.28 Frequency table of the type of services available for mothers Services available as mentioned

Service for mothers	KNH	Mbagathi	MWALA
cancer screening	2	1	0
free medicine/treatment	2	0	1
ultra sound e.g. for fibroid testing	2	0	0
ANC and post-natal care	1	2	2
fertility tests for women with problems conceiving	1	0	0
testing for HIV	1	1	0
Physiotherapy	1	0	0
family planning	1	1	0
free medical checkups for the mother e.g. blood pressure tests	0	2	0
Free health counseling (ANC)	0	1	0
Ambulance services	0	0	1
Home visits	0	0	1

Health seeking behaviors for mothers

Attitude of mothers to seeking health and possible reasons for that was investigated. Most women in KNH did not have their previous babies in KNH. Majority of them confidently gave the reason for coming as referral from smaller facilities from present pregnancy or past complications and experience. Also some of the reasons for referral from smaller facilities was highlighted;

- I was referred here from Waithaka health center because I have lost a number of babies (Female 6, Mbagathi)
- I was referred here from Dagoretti market because I have had several miscarriages (Female 5, Mbagathi)
- I was referred here due to several miscarriages (Female 3&4 Mbagathi). Others simply said due to complications

Mothers in *MWALA* were encouraged to come to their facility due to nearness and good services provided by the health care providers. These were some of the answers given in the facilities;

- I have stayed for 19 years without getting a baby and this is a general hospital so I have come here just in case I need blood, operation, incubators all the tools are here so instead of going to a private hospital and being transferred to here I brought myself here (Female 7, KNH)
- This is a general hospital and in my past pregnancy I was referred here (Female 8, KNH)
- In 2014 I was here and given good services so I have decided to come back (Female 10, KNH)
- I was here in 2012 and went through a caesarian section so I'm here because I knew in private I will not be served well (Female 11, KNH)
- To see if the position of my child is okay, to see if the blood circulation from mother to child is okay, to see my blood pressure (Female 4, Mbagathi)
- I was referred here because I had complications that could not be solved in a health center which is in riruta (Female 8 , Mbagathi)
- I was referred here from dagorreti because I had a postdate so I went through a caesarian section. I was referred from dagoretti (Female 7, Mbagathi)

Other reasons for seeking care in the facility were;

- I am rhesus negative and this comes with a lot of complications(Female 1, KNH)
- Because they give vaccines well (Female 9, Mwala)
- Because I gave birth here and it's near (Female 1, Mwala)
- Because it's a government hospital and it has all services we want (Female 1, Mwala)

- My past birth experience was not nice. I was in a private facility and I was not well taken care of I left and went to Kenyatta. So I chose here this time (Female 7, Mbagathi)

The table below summarizes the frequency of mention with larger percentage of the women mentioning referral from smaller facilities as reasons for utility of the present facility while fewer people mentioned easy accessibility due to nearness to home (Table 4.29);

Table 4.29-Frequency table of reasons for mothers coming to the facility with majority mentioning personal preference/prior use as reasons

Reasons elucidated	KNH	Mbagathi	Mwala	N(%)
Personal preference and from Prior use	4	2	7	13(44%)
Referral from another facility	4	7	0	11(37%)
For specialized and good service	1	1	6	8(27%)
Referral from friends/collegues/family	3	1	0	4(13%)
First pregnancy	2	1	0	3(10%)
Convenience/Distance	0	1	2	3(10%)

CHILD HEALTH

Maternal health status, education, practice, environment, financial capability etc. impact largely on child health according to WHO definition which involves a completely healthy state including physical, mental, social wellbeing not just the non-existence of disease.

Understanding of UHC regarding Child health

To evaluate their knowledge of UHC as it relates to child health the mothers were asked some questions to which the answer was;

- Something that is there to provide health for my child, my family and I myself to cheer me up to be able to continue building my country” (Female 7, KNH)
- Health services to all without discrimination based on gender or way of life" (Female 9, KNH)

Services available for children

Services available for children in the respective facilities is list below with majority of the women mentioning full Immunization services (Table 4.30).

Table 4.30-Services available for children in each facility full immunization most mentioned

Services for children	KNH	Mbagathi	Mwala
Free Immunization	5	5	5
Growth monitoring	4	5	1
Admission	3	0	0
Health talks on nutritional intake of baby	2	1	0
Vitamin A supplement	1	1	1
free treatment	0	0	1

Knowledge on child health (without prompting)

The following were the answers of the mothers what they know about child health;

- Caring for your children to eat well, be clean, get good treatment, go to school and have shelter (Female 5 Trader, KNH)
- Children to get good treatment and have good health and when I come to a facility like this I get good services (Female 10 Trader, KNH)
- So long as you have kept your child clean. You have followed up the steps given by the doctor the child will be healthy. I have a child who is 5 years and has never gotten sick because I kept everything clean and followed my doctor's advice (Female 5, KNH)
- After child is born they have to go through immunization schedules, then whenever they fall ill they are supposed to access health facilities and access to a good balanced diet (Female Dental assistant, KNH).
- Be clean, take care of your child well, and teach them to wash hands (Female Trader, KNH)
- Condition of the baby since birth and condition of mother after delivery (Female Artisan, Mbagathi)
- Assessing child since birth, growth rate, vaccinations up to one and a half years, weight check till up to like 5 years, nutritional advice which includes exclusive breastfeeding till 6 months then weaning where we are taught about the foods to introduce, when the child is sick you can come for treatment (Female Nurse, Mbagathi)

- if you follow doctor's advice, when giving birth they make sure the child is free of HIV and if they are not they are given medicine (Unemployed, primary school leaver, Mbagathi).
- Mother should be clean, the environment of the child should be clean, they should be taught how to wash hands before eating and after going to the toilet, as a mother before breastfeeding should make sure the breast is clean especially the nipples, child should be given a balanced diet to avoid malnutrition (Female 8, Mbagathi).

In MWALA no one volunteered any information.

Common childhood disease

Following Probe for common childhood disease the mothers volunteered the following information;

- Fever, diarrhea, cold, jaundice, yellow fever" were listed as common childhood disease in KNH, Mbagathi and Mwala.

Health seeking behavior for children

On health seeking behavior for children that informs their decision whether or not to take a child to the hospital they gave the following opinion;

- Fever, back then women did not take children to hospital until it's an emergency, also mothers tend to think the money used for hospital could have been used for something else, as much as health is important sometimes it's not a priority (Female 6, KNH)
- When they have breathing problems (Female 11, KNH).
- High negligence of private doctors (Female 1, KNH).
- Preference of other patients, tribalism in the MCH (Female 7, KNH).
- Children we get nowadays pick diseases from the hospital and we realize when it's late (Female 1, KNH).
- Doctors are rude (Female 5, KNH).
- Doctors giving wrong medicine, and biasedness in the facility (Female 7, KNH).
- When sick, diarrhea, fever (Female 6, Mbagathi).
- High fever, diarrhea, vomiting (Female 7, Mbagathi).
- If the child is sick, for weight measuring (Female 6, Mwala).
- For vaccination (Female 9, Mwala)
- Checkup, for vitamin supplements (Female 10, Mwala)
- To know how the baby is doing (Female 1, Mwala)

BARRIERS TO ACCESSING CARE FOR WOMEN AND CHILDREN

Frequency of barriers hindering access to care. A higher percentage of women ascribed their hesitation to seek help at the health facility due to cost of service, poverty, distance, delay in attendance, lack of medicine which necessitates buying at higher cost. Some informing comments are;

- Doctors carry medicine from here and take them to their own chemists so when you come here you are told to go buy medicine in that particular chemist at a higher price (Female 5, KNH).
- Doctors talk badly some will ask you if they sent you to get pregnant and lack of ethics and morality by the care givers they are inhumane, lack of medicine, delayed attendance (Female 6, KNH).
- Religion, some religions pray for you and tell you to stop using the medicines you were given (Female 9, Mbagathi).
- Some families don't allow mothers to come to hospital, financial problems, distance which requires fare, laboratory tests and scanning require payment by cash, purchasing medicine is also a problem, delays and biasedness yet you came early from far. Some complications like scanning get as referred to Kenyatta where we cannot use NHIF yet here we can use NHIF, sometimes you have already spent a lot then you are prescribed medicine for like ksh2000, also on Sundays when you come here the scanning room isn't always open so you are directed to a certain facility then the doctor you have left here is the one who comes to serve you and it is at a higher price, (Female 4, unemployed primary school leaver, Mbagathi).
- If the service is available elsewhere I would prefer not to come here because of the distance. Also, there is a consultation fee of ksh 100 that is charged all the time even if you have not come to see the doctor you have only come for laboratory tests (Female 8, Mbagathi).
- Expensive procedures yet they say that maternity is free, if you have a complication you are prescribed to buy medicines at a particular chemist inside the hospital yet services should be free (Female 2, Mbagathi).
- Gynecologists are not readily available. I came here on Monday and I was told to back today and right now I'm still waiting (Female 5, Mbagathi).
- At one time I brought someone to deliver and they refused to provide the ambulance which was here, lack of enough medicine such that sometimes you are prescribed to buy elsewhere (Female 8, Mwala).

Summary of the barriers to access care are listed in Table 4.31 below;

Table 4.31-Barriers to accessing care for women and the children with majority mentioning distance and lack of money

Barriers	KNH	Mbagathi	MWALA	%of total
Lack of money/Poverty/Cost of service	1	4	0	17%
Distance	1	2	2	17%
Lack of medicine in the facility	1	2	1	13%
Delay in attending to them	2	1	1	13%
Rudeness and disrespect of Doctors	2	2	0	13%
Corruption of healthcare workers	3	1	0	13%
Family and cultural beliefs	0	2	0	7%
Mothers ignorance	0	2	0	7%
Tribalism	1	1	0	7%
Ignorance of doctors	2	0	0	7%
Too many patients	0	1	1	7%
Previous unpleasant experience	0	1	0	3%
Attendance to them by student under training	0	1	0	3%
Unavailabilty of specialists	0	1	0	3%
Religious beliefs	0	1	0	3%
Unavailabilty of Ultrasound	0	1	0	3%
No night emergencies	0	1	0	3%

CHANGES OBSERVED PRE AND POST DEVOLUTION- 10YRS PRIOR AND NOW

To know the difference between the pre and post devolution, decentralization of health service to County levels. Majority accepting there is some improvement especially with respect to cost of treatment, fewer patients. The following observation was made by the women;

- Many hospitals surrounding us (Female 7, KNH).
- In the past there were no many cost but nowadays 80% of women are going for caesarian section and I think it's because of the food we are eating and we are not exercising (Female 5, KNH).
- Before devolution many referrals were to Kenyatta but after devolution coast general was

made a referral hospital so it led to decongestion and also hospitals were built in places like Isiolo. Clinics are everywhere for us to take our children to. Also, health care has improved because of awareness leading to less deaths and NHIF has reduced the cost (Female 6, KNH).

- Decongestion and better health care, hospitals are now near, there are less deaths due to availability of medicines (Female 11, KNH).
- Nowadays ultrasound is done and it is a must. It is important because it helps us know the development of the child (Female 7, KNH).
- Things have improved (Female 1, KNH).
- These days when you bring a child to hospital they are not served immediately and they can die also doctors are rude unlike in the past. Corruption is high nowadays you have to give something small to be served quickly (Female 5, Mbagathi).
- Nowadays they use computers and things are computerized and everything is tested (Female 2, Mbagathi).
- These days there is order, and before treatment begins for children they will be told children below the age of six years to go to a certain room where they will be treated (Female 4, Mbagathi).
- In the past you had to give money in order to give birth but nowadays it's free (Female 6, Mbagathi).
- Delivery for women has improved, if you have little cash you can register with Linda mama and get delivered in a facility, for children when you go for admission with a child they tell you the government has not supplied medicine for children so they ask you to bring some cash so that they can buy for you when you give out the money you find that you are giving out twice the amount of the medicine, medicine are less now. (Female 7, Mbagathi).
- Before we were paying money but now we don't (Female 8, Mwala).
- We are treated free (Female 8, Mwala).
- In the past there were no ambulances nowadays there are there (Female 4, Mwala).

RECOMMENDATIONS BY FGD PARTICIPANTS

Majority of them suggested the government should provide more health workers, medicines, ultrasound machines, buildings. These are the suggestions made by the mothers on what should be done to improve service delivery;

- Woman 7: we should be served accordingly since we have paid for the services (Female 7, KNH).
- Reduce money for beginning antenatal clinic and prices should be subsidized. Also, government should hire more staff and the care givers should be human and they should

love their jobs (Female 6, KNH).

- More staff to be employed and doctors to have human hearts and more machines (Female 9, KNH).
- They should keep time, doctors should be available (Female 2, KNH).
- Health caregivers should stop negligence (Female 1, KNH).
- Health care givers should stop tribalism (Female 3, KNH).
- Enough doctors to be hired (Female 11, KNH).
- Referrals by a doctor to be returned to the same doctor (Female 4, Mbagathi).
- If you don't have cash and you have a problem you should be treated first then sent to get money (Female 3, Mbagathi).
- When they say government hospitals are free, they should be free by actions not by word of mouth, then they should stop corruption (Female 2, Mbagathi).
- If services are said to be free they should be truly free (Female 5, Mbagathi).
- Doctors should come early for expectant mothers (Female 7, Mbagathi).
- Information to avoid miscarriages should be given clearly, Consultations to be reduced. It's cheaper outside than inside here (Female 8, Mbagathi).
- More medicines (Female 3,5,8,9, Mwala).
- More doctors, more hospitals (Female 6,7, Mwala).
- Enlargement of hospitals wards (Female 4, Mwala).
- More cleaners because the facility is not clean (Female 4, Mwala).
- Everything is okay (Female 2, Mwala).

ADOLESCENT HEALTH

Adolescent health focuses on promoting actions that fosters healthy leaving and so to this effect a private, extra interview was conducted for the adolescents in the group (4adolescents (2 in Mwala 1 each in KNH and Mbagathi), to facilitate adequate communication and reduce fear of stigmatization.

Knowledge on adolescent reproductive health services

In KNH the adolescent claims lack of knowledge as she categorically said “I don't know” while in Mbagathi it was described as “guidance and counselling, HIV testing” The other 2 teens in Mwala stated HIV testing.

Knowledge and access to contraceptive; This was evaluated and the responses were;

- There are there but I'm not sure if they are available to teenagers (Adolescent, KNH)
- Yes, **but mother cannot** allow me (Adolescent, Mbagathi)
- Family planning but I knew after getting pregnant, I was told pills are good during breastfeeding (Female 1, Mwala)
- Family planning (Female 9, Mwala)

Type of contraceptives-Their knowledge on types of contraceptives was evaluated and they mentioned “condoms, pills and standard day method” although the teen in Mbagathi got to know about contraceptives after getting pregnant.

Barriers to contraceptive use

- Also because of cost some teenagers cannot access condoms I heard about HIV counselling in school but they don't give contraceptives, teenagers are afraid to go to hospital due to what people may say (KNH)
- My mother cannot allow me (Adolescent, Mbagathi)

School health education

- There is availability of sex education in school says KNH teen
- We are counselled about how to protect ourselves by counting safe days (Female 1, Mwala)
- I go to kamwala secondary and we are counselled about safe days that is 14 days after getting your periods (Female 9, Mwala).
- No comment from the teen Mbagathi.

Availability and accessibility to HIV Counselling and testing; These were the responses

- It's there (Adolescent, KNH)
- Guidance and counselling, HIV testing is available(Mbagathi)
- HIV testing (both Teens Mwala).

Reasons for teenage pregnancies

They had several reasons for getting pregnant from not doing accurate calendar tracking of ovulation, peer pressure etc. These was their opinion;

- Negligence of parents, government doesn't have activities for idle youths to get in, lack of communication between elders and teenagers, Internet (KNH)
- Peer pressure, bad company(Mbagathi)
- I did not count the days well (Female 1, Mwala)
- I counted the days wrongly (Female 9, Mwala)

Recommendation for prevention of teenage pregnancy

- More advice and sessions of speaking to the teenagers, engaging teenagers in useful activities of the society, engaging teenagers in adult talking to make them know the dangers, seminars in schools, churches to educate the youths (KNH)
- The female from Mbagathi had no contribution
- Testing of one's partner and timely advice (Female 1, Mwala).

KEY INFORMANTS INTERVIEW

General information on skills and year of experience

Key Informant 1 is an Assistant Chief nurse who supervises more than 30 health workers (10 nurses, 3 health information personnel, 3 lab technicians, 7 Attached supporting staff nurses training for 2yrs from University of Nairobi. She is trained to care for HIV patients, MCH care, pregnant youths, gynecological problems including infertility, PMTCT mothers who have been diagnosed with HIV in pregnancy. Mothers are taken care of till when the child is two years that's when they are referred to their own counties.

Key Informant 2 is a nurse in charge of the facility with a Master's of science degree in nursing, she oversees all the activities in that facility. They provide antenatal and post-natal care services, child welfare which includes growth monitoring and child immunization services, being a level 5 hospital they teach students from all institutions

Key Informant 3 is a nursing officer working since 2009 in outpatient department.

Services offered to women in the reproductive age group and children *without prompting*

- These ladies either walk in or they are referred from various counties. They need to have a national identification card, NHIF, money in mpesa (Outpatient services are paid for at about ksh 2760), those from counties need to have a referral letter to enlighten us about what is going on, the walk ins need to tell us if they have any dangers. If the numbers are not many we can take in all but when they walk in like a hundred mothers, we do a triage. so we register them and give priorities to mothers who are at risk first. Observation starts, we take their blood pressures, height, urinalysis, antenatal profile then they proceed to be seen by a clinician, once they are seen the clinician may demand some tests or some may go to the ward directly for care. The mothers get a lot of health education from nurses, nutritionists, physiotherapies concerning danger signs, hygiene (Key Informant 1).
- Antenatal and post-natal care services, child welfare, family planning services, teaching students on practical, cervical cancer screening, gynecological outpatient clinic, supporting research people (Key Informant 2).
- Immunization, family planning, antenatal, PMTCT, health talks, monthly outreaches within the sub county, cervical screening, administration of prophylaxis to positive children, treatment, admission (Key Informant 3).

Further prompting on other services provided the following information;

Beyond antenatal we give gynecological services, mothers who have difficulties in conceiving, couples with ejaculation issues, and mothers with fibroids. After delivery mothers are taken to postnatal ward for two or three days. After discharge they come back after two weeks for post-natal checkup immunization of their babies. Growth assessment for the children, nutritional services, admission when sick in PEU (pediatric emergency unit) (Key Informant KNH).

Children admission, child welfare, after delivery children are given vaccines and immunization (Key Informant 2).

Immunization, intervention of PMTCT, administration of prophylaxis to positive children, treatment, admission (Key Informant 3).

Experience of service providers in giving health care services

- Good care is given to pregnant women. Issues are discovered and dealt with early leading to safe delivery. The problem is some mothers come from poor families and cannot be able to provide NHIF here we involve the social workers (Key Informant 1).
- Government gives us enough materials for our services so there is no shortage of supplies, shortage of staff and less space. In conjunction with the NGOs the government keeps upgrading our knowledge through workshops because immunizations and antigens keep changing. We are supplied with enough ARVs for our clients (Key Informant 2).
- Women in the reproductive age group are not hard to cope with in family planning methods they prefer the short term methods like injections. Women are cooperative. Many clients are not aware whether we offer free services (Key Informant 3).

1) Barriers to women accessing care here

- The problem is some mothers come from poor families and cannot be able to provide NHIF here we involve the social workers (Key Informant 1).

Table 4.32-Key Informants opinion on barriers to women accessing care

Key Informant 1	Key Informant 2	Key Informant 3
1)Financial challenges 2)Shortage of staffs 3)Requirements are high	1)Distance and transport issues 2)Facility charges e.g. ksh 1000 for antenatal profile 3) A lot of health facilities around the slums that offer normal deliveries and refer to us cases of complications not early enough	1)Antenatal mothers do not have ultrasound 2)Lack of equipment's 3)Too many clients hence lack of enough medicines 4)Lack of space 5)Lack of enough staff

Changes observed in health services after devolution

- After devolution the rights to health care have improved, a mother has a right to choose where to deliver a baby, there are availability of supplies and power to directly purchase some items, we can be able to collect items and use this has improved the facilities (Key Informant 1).
- A lot of health centers in the slums that offer deliveries, these facilities have been upgraded (Key Informant 2).
- Antenatal mothers are starting their clinic very early this has increased the mode of delivery home deliveries have reduced and maternal complications too (Key Informant 3).

Other observations are given in the Table 4.33 below;

Table 4.33-Key Informants highlight changes post devolution

Key Informant 1	Key Informant 2	Key Informant 3
<p>1)Space was an issue before devolution but right now space is not an issue.</p> <p>2)Devolution has affected in that children under 5 are treated for free before they used to pay 100 shillings</p> <p>3)Antenatal care is very comprehensive</p> <p>4)Most mothers opt to have the Linda mama but it doesn't cover outpatient, inpatient and post-natal</p>	<p>1)There is somebody in the county in charge of referrals where ambulances and communication are organized.</p> <p>2)After devolution maternity care is free before it was free, the outcome is positive</p> <p>4)Care is closer to the people</p>	<p>1)Now there is free medical care</p> <p>2)There is the UHC so clients have improved and their health has improved</p> <p>3)Children born with HIV are few</p>

Recommendations

They recommended that the Government should provide free health care, more staff. These were the suggestions;

- Services should be integrated such that when the mother comes the child is weighed, immunized and the mother can pack and go home (Key Informant 1).
- Everything should be free and clients should know that it's free. (Key Informant 2).

Table 4.34-Recommendations given by the Key Informants

Key Informant 1	Key Informant 2	Key Informant 3
1)Integrated services under one roof in MCH 2)Having multidisplinary specialist 3)NHIF card to cover antenatal and post-natal fully 4)More staffs e.g. 15 nurses on ANC ward 5)Open communications to our mothers via telephone 6)Mothers to be equipped with knowledge on maternal health and personal health	1)For adolescent health we need to have programs to support them and special rooms in the facility for them so that they don't queue with mothers 2)Enough staff about two more nurses and one stationary doctor 3)Extend services beyond working hours 4)Involving the community and talking to them about the need to come to the facility 5)Supervision of community health workers 6)Outreaches to the community by us professionals, like we can go the community <ul style="list-style-type: none"> • Upgrading of our staff through training 	1)Employment of more staff 2)More medicines 3)Ultrasound and CT scan machines 4)More buildings e.g. wards

CHAPTER 5 DISCUSSION OF RESULTS

Objective 1

This study shows a decline in the average proportion of women screened for cervical cancer from 2012 to 2018 which means more missed cases of cervical cancer or late detection which worsens prognosis. In this same study period there appears to be an increase in uptake of either long or short acting family planning, proportion of women attending at least 4 ANC visits and a reduction in the proportion of under 1 children immunized, Maternal Mortality Ratio and Neonatal Death. However, proportion of children from 0 to 59 months with severe stunting has increased. Findings revealed a decline in proportion of teenage females aged 15-19yrs pregnant from 2016 to 2018.

Considering the Scale-up targets set in the Kenya Investment framework for 2018/2019 which includes; reducing MMR/100,000 live birth to 297, Neonatal mortality rate to 20/1000live birth, full immunization to 69% (9) and the Kenya Health Sector Strategic and Investment Plan(17) to increase % of pregnant females going for at least 4 ANC visits to 80%, women receiving any family planning commodity to 80% by 2017 there appears to be a gap in attainment, with greater disparity across the 47 counties. The crucial role attendance at ANC clinics of women when pregnant cannot be over-emphasized as it increases the ability to detect high risk pregnancies that can pose a great risk to the mother and the unborn child. Maternal, fetal and neonatal deaths can be reduced if warning signs are detected early enough (23).

Rising Caesarian session rate in this study poses more threat to the mother as it has been associated with certain short term complications (e.g. higher blood loss), dysfunction in sexual capacity, delayed bonding between mother and child, prolonged hospitalization>7days and neonatal demise (23-25).

Repeated measures one-way ANOVA which is useful in comparing average values of dependent variable at different time points (31) was used to assess selected indicators. There was significant change in these indicators over time. Relationship between Neonatal death and mode of delivery was assessed using ANOVA and it highlights an overall significance of the model with Adjusted R2 of 0.415($p<0.0001$) ascertaining some associations. Neonatal death was significantly associated with breech delivery every unit increase in breech delivery neonatal death increased by ($\beta=0.337(1.40$ actual value), $p=0.010$) there was no statistical association with other 3 modes of delivery, namely, Assisted Vagina Delivery, Normal Delivery and Caeserian section which is different from a study carried out in Brazil between 2003-2004 where the study revealed a significant association between neonatal mortality and elective caesarean section only (32).

Objective 2

The composite index generated for Reproductive maternal and child health revealed that the highest performing counties with respect to CCI are Kajiado, Kiambu, Lamu, Machakos, Makueni, Nairobi, Nyandarua and Nyamira while the least performing are Mandera and West pokot from 2012-2018 which is likely due to the fact that these counties are in hardship areas and are constantly migrating i.e. nomadic farmers.

Objective 3

Qualitative study highlights majority of the women who participated in FGD in KNH and Mbagathi to be from age 32-37. Majority of the respondents did not go beyond high school and were unemployed/house wives.

The most knowledgeable group on UHC has it relates to their health and children's health was in KNH and Mbagathi and it was accurately explained by the health professionals in the group. Access to health is impeded due to distance, cost implication, lack of medicine, misdemeanor of health care givers but facilitated by past bad obstetric history, referrals from smaller facilities and confidence in the expert management of the health care providers. There was synchrony in the services specified by the key informants and those stated by few of the patients.

The key informants made meaningful suggestion for example in KNH to have an integrated service under one roof in the ANC unit to avoid missing cases and improve communication amongst the different fields of care (i.e. Obstetrics and gynecology, Pediatrics). They 3 Key Informants suggested employing more workers, more equipment, outreaches to the communities and encouraging community participation to improve the health of others and children.

Adolescent that were pregnant (KNH, Mbagati) or have delivered (Mwala) were not properly educated on contraceptive use prior to pregnancy and they also declared shyness and shame in procuring these contraceptives. They do not feel they were treated differently from other mothers. They suggested engagement in meaningful activities that keeps teen busy as a way of mitigating against teenage pregnancy. Health talk should be improved on.

CHAPTER 6 CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION

This study revealed the trend in important RMNCAH indicators listed in Table 2. Comparing 2012 and 2018 data there appears to be some progress in the proportion of women using either short or long-acting family planning methods (11% to 14%), reduction in Maternal Mortality Ratio (170 to 130/1000), neonatal deaths (12 to 9/1000) and teenage pregnancy (11% to 8%). However, from this study there appears to be no progress, rather reduction in the proportion of women that attend at least 4 ANC visits (79% to 76%), women screened for cervical cancer (8 to 6/1000) and the proportion of under 5 children severely stunted (10 to 13/1000). These findings were corroborated in the primary data analysis i.e. qualitative study findings.

6.2 STUDY LIMITATION

For the quantitative study, there is limited control over the quality of secondary data. Also, missing data and extreme values are difficult to track as it is in the past. Also, more advanced analysis could be done such as longitudinal analysis, fixed effect models etc. to know the difference in the counties more objectively.

Furthermore, the FGD participants for the qualitative study comprised women already accessing care. Also, judging by the fact that qualitative study might not be the strongest causal-effect scientific evidence it is very useful especially in this case to either validate or disprove the secondary data gathered further strengthening the evidence in this study especially with regards to evaluating benefits/disadvantages of devolution and reasons for some decline in RMNCAH. Better still, it provides a baseline for future studies that will guide policymakers in making informed decisions.

6.3 RECOMMENDATION

6.3.1 Recommendation from this study

There is need for the government to address these inequalities in county attainment of RMNCAH goals and urgent attention should be directed to Mandera, West Pokot, Uasin Gishu, Samburu, Tana River.

As recommended by the key informants NHIF card should cover antenatal and post-natal fully to increase number of ANC visits and people that seek for care in the hospital. More staffs, equipment and facilities should be provided, open communications to the mothers via telephone should be encouraged, more health education to mothers with more programs conducted to encourage healthy practices amongst adolescent etc.

6.3.2 Recommendation for future studies

More advanced analysis such as longitudinal analysis, fixed effect models can be done to find out why the counties are different e.g. nomadic areas, facility accessibility and availability, budget allocation etc.

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Appendix 1a: Written consent for the study participant(FGD) on factors hindering or promoting access to Reproductive Maternal Neonatal Child and Adolescent Health(RMNCAH) following Devolution of Health services in Kenya (English Version)

A) INTRODUCTION, STUDY PURPOSE AND REASON FOR SELECTION

I am Deborah Awe a postgraduate student at the University of Nairobi Institute of Tropical and Infectious Disease. The result of this study will be submitted as a fulfillment of my Master's program.

I am carrying out this research to investigate what progress has been made with respect to women and children's health. One of the objectives of this study is to know what are the experiences you have in accessing and receiving care.

You were selected because you belong to the category of women in the reproductive age group (15-49yrs).

B) PROCEDURES

If you agree to be part of this research, you will be involved in a group discussion involving 6-10 other respondents where some questions will be asked on your views about the experience you or known persons have in the process of accessing healthcare. This discussion will not be more than an hour and will be before the clinic starts. This discussion will be recorded to maintain the originality of the information you share however will be kept confidential without giving away your identity.

C) RISKS AND BENEFITS OF THE STUDY

There will be no direct benefit from this study but it will help gather information that will eventually assist policymakers to make informed decisions or provide a baseline for further studies that will benefit you or other women and children in the nearest future. There is no foreseen risk associated with your participation in this study.

D) CONFIDENTIALITY

Whatever information got from you will be kept confidential. The only person that will have access to your information is Two other researchers and me. Your voice will be recorded via audio-visual means which will be kept in a secure place i.e. locked. Nothing linking you to the research in terms of names or any other identifier will be used in any reports or research publications. At the termination of this study, the tapes will be destroyed.

E) RIGHT TO REFUSE OR WITHDRAW

You have a right to accept or decline participation in this study, i.e. involvement in this study is voluntary. If you accept to participate and feel like you want to withdraw from participation before

Kiambatisho 1B: idhini inayoandikwa kwa mshiriki wa utafiti (kikundi cha majadiliano) juu ya sababu zinazozuia au kukuza ufikiaji wa Afya ya uzazi, ya kina mama, watoto wachanga na vijana (RMNCAH) baada ya ugatuzi wa huduma za afya nchini Kenya

A) UTANGULIZI, LENGU LA UTAFITI NA SABABU YA KUCHAGULIWA KUSHIRIKI

Jina langu ni Deborah Awe mwanafunzi katika Chuo Kikuu cha Nairobi Taasisi ya magonjwa ya Kitropiki na ya Kuambukizana. Matokeo ya utafiti huu yatawasilishwa kwa ajili ya utimilifu wa programu ya Shahada ya uzamili (Master's Degree).

Ninafanya utafiti huu ili kuchunguza maendeleo ambayo yamefanyika kuhusiana na afya ya wanawake na watoto. Moja ya lengo la utafiti huu ni kujua uzoefu wako katika kupata na kupokea huduma.

Ulichaguliwa kwa sababu wewe ni wa kikundi cha wanawake katika umri wa kizazi (15-49yrs).

B) MIPANGO

Ikiwa unakubali kuwa sehemu ya utafiti huu, utashiriki katika mjadala wa kikundi unaohusisha washiriki wengine 6-10 ambapo maswali kadhaa yataulizwa kupata maoni yako kuhusu uzoefu wako ama wa wale unaowajua katika mchakato wa kupata huduma za afya. Mjadala huu hauchukui muda zaidi ya saa moja na itakuwa kabla ya kliniki kuanza. Mjadala huu utarekodiwa ili kudumisha uhalisi wa habari utakazosema. Hata hivyo ujumbe huu utawekwa siri bila kupeana utambulisho wako.

C) ATHARI NA MANUFAA YA UTAFITI HUU

Hakuna manufaa ya moja kwa moja kutokana na utafiti huu lakini itasaidia kukusanya habari ambazo hatimaye zitasaidia watunga sera kufanya maamuzi sahihi au kutoa msingi kwa ajili ya masomo zaidi ambayo yatakufaidi wewe au wanawake wengine na watoto katika siku zijazo. Hakuna athari inayohusishwa na kushiriki kwako katika utafiti huu.

D) USIRI

Taarifa yoyote utakayotoa itahifadhiwa kwa siri. Watu pekee watakaopata maelezo yako ni mimi na watafiti wengine wawili .rekodi ya sauti yako itahifadhiwa kwa kufungiwa mahali salama. Hakuna kitakachokuunganisha kwenye utafiti iwe ni kwa majina au kitambulisho chochote kitakachotumika katika machapisho ya utafiti au ripoti yoyote. Utafiti huu ukikamilika nakala za rekodi zitaharibiwa.

E) HAKI YA KUTOSHIRIKI AMA KUSITISHA USHIRIKI

Una haki ya kukubali au kukataa kushiriki katika utafiti huu, yaani kushiriki ni kwa hiari. Uko na huru wa kusitisha ushiriki wako kabla ya mwisho wa majadiliano. Uamuzi wako hautatumiwa dhidi yako, wala hautaathiri usimamizi wako kama mteja, kwa njia yoyote. Uko huru kuuliza swali

yoyote kuhusu utafiti kabla ya kutoa idhini yako inayoandikwa. Kunaweza kuwa na maneno ambayo huelewi, tafadhali niambie nisimamishe habari na nitachukua muda wa kuelezea.

F) UHIFADHI NA MATUMIZI YA DATA KWA AJILI YA MASOMO YA BAADAYE

Maelezo kutoka kwenye utafiti huu yatachapishwa au kupelekwa kwenye mikutano bila majina au vitambulisho binafsi ili kulinda utambulisho wako. Itawekwa kwa muda wa utafiti ili kuruhusu usindikaji wa data na marejeleo. Nambari ya siri itatumika kukutambua halafu baadaye itaharibiwa. Baada ya kipindi cha mwaka mmoja, rekodi ya sauti itaharibiwa ili kuruhusu uandishi.

Ikiwa una maswali zaidi kuhusu utafiti huu unaweza kuwasiliana na mimi.

Jina la Mtafiti.Deborah Awe nambari ya simu +254753411229

Ikiwa kuna maswali mengine Zaidi kuhusu utafiti huu, una uhuru wa kuwasiliana na:

Katibu Prof. Mark Chindia

Hospitali ya Taifa ya Kenyatta / Chuo Kikuu cha Nairobi

Kamati ya Uchunguzi wa Maadili

Tele: (254-020)2726300 Ext 44102

G) TAMKO LA MHOJIWA

Nimeelewa kuwa lengo la utafiti huu ni kujua mambo ambayo yanahimiza au kuzuia upatikanaji wa huduma ya afya ya uzazi wa watoto wachanga na vijana. Nimeisoma habari hapo juu, au nimesomewa. Nilipewa fursa ya kuuliza maswali kuhusu utafiti huu na maswali yangu yote yamejibiwa na nimeridhishwa. Ninakubali kwa hiari yangu kushiriki kama mhojiwa katika utafiti huu na kuelewa kuwa nina haki ya kujiondoa kwenye utafiti wakati wowote bila kuathiri maisha yangu kwa njia yoyote.

Saini / tarehe ya mhojiwa

Shahidi

H) TAMKO LA MHOJIWAJI

Nimemueleza mshiriki kila kitu kuhusu utafiti huu na naamini ya kuwa mshiriki ameelewa na kwahiari amenipa kibali

Mtafiti/tarehe

Appendix 2: Written consent for the study participant (Key Informant) on factors hindering or promoting access to Reproductive Maternal Neonatal Child and Adolescent Health(RMNCAH) following Devolution of Health services in Kenya

A) INTRODUCTION, STUDY PURPOSE AND REASON FOR SELECTION

I am Deborah Awe a postgraduate student at the University of Nairobi Institute of Tropical and Infectious Disease. The result of this study will be submitted as a fulfillment of my Master's program and will be published subsequently or presented in conferences.

I am carrying out this research to investigate what progress has been made with respect to women and children's health. One of the objectives of this study is to know what are the experiences you have in providing health service to women and children.

You were selected because you are a caregiver of women and children.

B) PROCEDURES

If you agree to be part of this research, you will be asked questions on the services you provide at the maternal and Child Clinic. This is to learn your views on factors that affect access of women and children to healthcare. This discussion will not be more than an hour and will be at your convenience. This discussion will be recorded to maintain the originality of the information you share however will be kept confidential without giving away your identity.

C) RISKS AND BENEFITS OF THE STUDY

There will be no direct benefit from this study but it will help gather information that will eventually assist policymakers to make informed decisions or provide a baseline for further studies that will benefit you or other women and children in the nearest future. There is no risk associated with your participation in this study.

D) CONFIDENTIALITY

Whatever information got from you will be kept confidential. The only person that will have access to your information is Two other researchers and me. Your voice recorded via audio-visual means will be kept in a secure place i.e. locked. Nothing linking you to the research in terms of names or any other identifier will be used in any reports or research publications. At the termination of this study, the tapes will be destroyed.

E) RIGHT TO REFUSE OR WITHDRAW

You have a right to accept or decline participation in this study, i.e. involvement in this study is voluntary. If you accept to participate and feel like you want to terminate participation before the end of the discussion you are free to do so. Your decision will not be used against you, neither will it hamper your management as a client, rather. You are free to ask any questions about the research

Appendix 3a: Focus Group Discussion Guide for Women attending MHC Clinic on factors hindering or promoting access to Reproductive Maternal Neonatal Child and Adolescent Health(RMNCAH) following Devolution of Health services in Kenya

I am Deborah Awe a postgraduate student at the University of Nairobi Institute of Tropical and Infectious Disease. The result of this study will be submitted as a fulfillment of my Master's program.

I will be asking some questions to know your views on the following issues related to the above topic. You are not mandated to answer any question you feel uncomfortable answering. i.e. your participation in this study is voluntary. Your name will not be written down and every information gotten from you will be held strictly confidential.

Name of Interviewer: Dr O.D. Awe **Location:** _____ **Date:** _____

1)What is your understanding of universal health care regarding your health,

a) as a woman? and

b) regarding your children?

2) a) What services are available to address the health needs of women in the reproductive age group. Do not prompt at first (*later probe for preconception; family planning, cervical screening. Antenatal care, place, and care during delivery and post-delivery*). Who can access these services?

3)What is your knowledge on child health? (*Probe for exclusive breastfeeding what age were the children weaned), immunization, child nutrition, childhood diseases, health-seeking behavior*).

4) What informs your decision to take a child to the hospital?

5) What services are available to address the health needs of children under 5 age (*probe for immunization programs and growth monitoring, how are they treated*).

6)What prompted you to seek health service in this facility here (*probe for where the last child was born, reinforcing factors to visit the MCH*). In your opinion what has changed in the last 5-7 years in health care access for you or your children?

7)What are the barriers to accessing care? (*probe for cost, distance, availability, accessibility, the attitude of caregivers to them*).

a) as mothers

b) for your children

8) For Teenagers knowledge of adolescent reproductive health services (*probe for available services, availability, access to contraceptive and barriers, HIV counseling and testing*)

9) What else do you want to add? (*probe for advice, recommendation, and AOB*)

Conclusion. Thank you for your participation.

Kiambatisho 3B Mwongozo wa kikundi cha mtazamo wa wanawake wanaohudhuria kliniki ya MHC juu ya sababu zinazozuia au kukuza ufikiaji wa Afya ya uzazi, ya kina mama, watoto wachanga na vijana (RMNCAH) baada ya ugutuzi wa huduma za afya nchini Kenya

Jina langu ni Deborah Awe mwanafunzi wa shahada katika Chuo Kikuu cha Nairobi Taasisi ya magonjwa ya Kitropiki na ya Kuambukizana. Matokeo ya utafiti huu yatawasilishwa kwa ajili ya utimilifu wa programu ya Shahada ya uzamili. Nitakua nikiuliza baadhi ya maswali ili kujua maoni yenu kuhusu maswala yafwatayo yanayohusiana na somo hapo juu. si lazima ujibu swali ambalo unaona wasiwasi kujibu yaani ushiriki wako kwa huu utafiti ni wa kijitolea. Jina lako halitaandikwa na kila habari kutoka kwako zitawekwa siri.

Jina la mhojiwaji Deborah Awe eneo tarehe

1) Una ufahamu gani wa huduma ya afya ulimwengu wote kuhusu afya yako

a) Kama mwanamke na

b) Kuhusu watoto wako

2) Ni huduma gani zinapatikana ili kushughulikia mahitaji ya afya ya wanawake katika umri wa uzazi. usiharakishie mara ya kwanza (utafiti wa baadae kabla ya kupata mimba , upangaji uzazi, uchunguzi wa kizazi, utunzaji wa ujauzito, mahali na huduma wakati wa kujifungua na baada ya kujifungua) nani anafikia huduma hizi ?

3) Ufahamu wako wa afya ya watoto ni upi? (utafiti wa kunyonyesha kikamilifu, ni umri gani watoto waliacha kunyonyeshwa), chanjo, lishe ya watoto, magonjwa ya utoto, tabia ya kutafuta afya.

4) Nini hufanya uamue kumpeleka mtoto hospitalini?

5) Ni huduma gani zinapatikana kushughulikia mahitaji ya kiafya ya watoto chini ya umri wa miaka 5 (utafiti kwa ajili ya mipango ya kupeana chanjo na kufuatilia ukuaji, jinsi wanatibiwa)

6) Nini kilichokusababisha kutafuta huduma za afya katika kituo hiki hapa. (utafiti wa mtoto wa mwisho alizaliwa wapi, kuimarisha sababu za kutembelea MCH) kwa maoni yako nini kilichobadilika katika miaka mitano au misaba yaliyopita katika upatikanaji wa huduma za afya kwako na kwa watoto wako?

7) Nini zinazo zuia upatikanaji wa huduma? (utafiti wa gharama, umbali, upatikanaji, ufikiaji, mtazamo wa walezi wao)

a) Kama wamama.

b) Kwa watoto wenu.

8)Kwa vijana, ufahamu wa huduma za afya za uzazi wa kijana(utafiti wa huduma zilizopo, upatikanaji, upatikanaji wa vipanga uzazi na vikwazo vyao, ushauri na kupimwa kwa virusi vya ukimwi)

9)Nini ingine mnaeza taka kuongeza.(utafiti wa ushauri mapendekezo na jambo lolote lingine)

Hitimisho Asante kwa ushirika wako

Appendix 4: Key Informant Interview Guide for MHC Clinic on factors hindering or promoting access to Reproductive Maternal Neonatal Child and Adolescent Health(RMNCAH) following Devolution of Health services in Kenya

I am Deborah Awe a postgraduate student at the University of Nairobi Institute of Tropical and Infectious Disease. The result of this study will be submitted has a fulfillment of my Master's program.

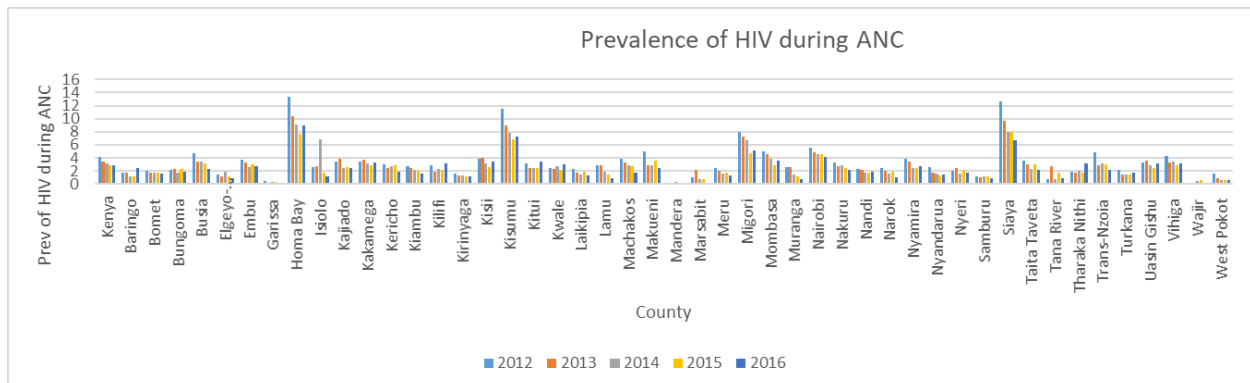
I will be asking some questions to know your views on the following issues related to the above topic. You are not mandated to answer any question you feel uncomfortable answering. i.e. your participation in this study is voluntary. Your name will not be written down and every information gotten from you will be held strictly confidential.

Name of Interviewer: _____ **Location:** _____ **Date:** _____

- 1) Tell me a little about what you do, position. (*probe for training, skills, years of experience*)
- 2) What services do you offer women of reproductive age?
- 3) What has been your experience generally in providing services to women? (*Probe for challenges and facilitations to women accessing care i.e. Demand and supply barriers and enhancers*).
- 4) What services do you offer to children under 5?
- 5) What has been your experience generally in providing services to children? (*Probe for challenges and facilitations to children accessing care i.e. Demand and supply barriers and enhancers*).
- 6) In your opinion what has changed since devolution *probe for the changes?*
- 7) What are your recommendations for improving RMNCAH health service?

Conclusion. Thank you for your participation.

Appendix 5-Prevalence of HIV during ANC



Appendix 6-Kenya County and Province

County	Province	County	Province	County	Province
Baringo	Rift Valley	Kitui	Eastern	Nyandarua	Central
Bomet	Rift Valley	Kwale	Coast	Nyeri	Central
Bungoma	Western	Laikipia	Rift Valley	Samburu	Rift Valley
Busia	Western	Lamu	Coast	Siaya	Nyanza
Elgeyo Marakwet	Rift Valley	Machakos	Eastern	Taita Taveta	Coast
Embu	Eastern	Makueni	Eastern	Tana River	Coast
Garissa	North Eastern	Mandera	North Eastern	Tharaka Nithi	Eastern
Homa Bay	Nyanza	Marsabit	Eastern	Trans Nzoia	Rift Valley
Isiolo	Eastern	Meru	Eastern	Turkana	Rift Valley
Kajiado	Rift Valley	Migori	Nyanza	Uasin Gishu	Rift Valley
Kakamega	Western	Mombasa	Coast	Vihiga	Western
Kericho	Rift Valley	Murang'a	Central	Wajir	North Eastern
Kiambu	Central	Nairobi	Nairobi	West Pokot	Rift Valley
Kilifi	Coast	Nakuru	Rift Valley		
Kirinyaga	Central	Nandi	Rift Valley		
Kisii	Nyanza	Narok	Rift Valley		
Kisumu	Nyanza	Nyamira	Nyanza		

APPENDIX 7-ANOVA Neonatal death and mode of delivery

Before nat log transformation	Kolmogorov-Smirnova		
	Statistic	df	Sig.
NEO_DEATH	.15	47	.01
AVD	.18	47	.00
BD	.10	47	.20
CS	.13	47	.05
ND	.13	47	.06

After nat log trans	Kolmogorov-Smirnova		
	Statistic	df	Sig.
NEOD_NL	.130	47	.047
AVD_NL	.074	47	.200*
BD	.097	47	.200*
CS	.130	47	.045
ND	.127	47	.054

APPENDIX 8 Further studies Multivariate Tests

Family planning L&S	Value	F	Hypothesis df	Error df	Sig.
Pillai's trace	.840	35.919a	6.000	41.000	.000
Wilks' lambda	.160	35.919a	6.000	41.000	.000
Hotelling's trace	5.256	35.919a	6.000	41.000	.000
Roy's largest root	5.256	35.919a	6.000	41.000	.000

Each F tests the multivariate effect of Years. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests 4ANCs

	Value	F	Hypothesis df	Error df	Sig.
Pillai's trace	.872	46.662a	6.000	41.000	.000
Wilks' lambda	.128	46.662a	6.000	41.000	.000
Hotelling's trace	6.829	46.662a	6.000	41.000	.000
Roy's largest root	6.829	46.662a	6.000	41.000	.000

Each F tests the multivariate effect of Years. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests MMR

	Value	F	Hypothesis df	Error df	Sig.
Pillai's trace	.376	4.123a	6.000	41.000	.003
Wilks' lambda	.624	4.123a	6.000	41.000	.003
Hotelling's trace	.603	4.123a	6.000	41.000	.003
Roy's largest root	.603	4.123a	6.000	41.000	.003

Each F tests the multivariate effect of Years. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

APPENDIX 9-Demographic and socio-economic status of respondents in qualitative study

Su bj ID	Ag e	County	Level of Educati on	Employm ent	No of Pregnan cy ever	No of Childr en	Marit al Status	Hospit al	Income
1	30		High School	Trading		2		KNH	
2	25		High School	Unemplo yed		2		KNH	
3	34		College	Trading		1		KNH	
4	30		College	Trading		1		KNH	
5	29		High School	Trading		2		KNH	
6	22		Univers ity	Dental Assistant		0	Marri ed	KNH	
7	36		Primary	Trading		1		KNH	
8	32		High School	Trading		2		KNH	
9	18		High School	Unemplo yed		0		KNH	
10	34		High School	Trading		2		KNH	
11	34		College	Unemplo yed		1		KNH	
1	18	Nairobi	High School	Unemplo yed	1	0		Mbagat hi	0
2	30	Migori	College	Teacher	2	1		Mbagat hi	5000mont hly
3	37	Kakame ga	High School	Tailor	6	2		Mbagat hi	30,000
4	41	Kakame ga	Primary	Unemplo yed	7	4		Mbagat hi	0
5	35	Kiambu	High School	Trading	3	2		Mbagat hi	-
6	25	Bungom a	High School	Unemplo yed	2	0		Mbagat hi	0
7	42	Kiambu	High School	Unemplo yed	5	4		Mbagat hi	0
8	25	Nairobi	High School	Artisan	4	1		Mbagat hi	15000

9	32	Kakamega	College	Nurse	2	1	Married	Mbagathi	30000
1	18	Machakos	High School	Unemployed	1	1		Mwala	0
2	23	Bungoma	High School	Unemployed	1	0	Single	Mwala	0
3	27	Machakos	Primary	Trading	3	3	Married	Mwala	
4	22	Machakos	High School	Tailor	1	1	Married	Mwala	
5	36	Machakos	Primary	Unemployed	3	3	Married	Mwala	0
6	48	Machakos	High School	Unemployed	7	7	Married	Mwala	0
7	24	Machakos	High School	Unemployed	2	2	Single	Mwala	0
8	23	Machakos	High School	Unemployed	1	1	Married	Mwala	0
9	17	Machakos	High School	Unemployed	1	1	Single	Mwala	0
10	21	Machakos	Primary	Unemployed	1	1	Single	Mwala	0

Appendix 10-Kenya County names for reference (21,22)

