



THE AGA KHAN UNIVERSITY



CONTINUITY OF ESSENTIAL HEALTH SERVICES STUDY

Exploring Effect Of Covid-19 On Demand For and Utilization of Maternal, Newborn & Child Health Services

December 2021



Prepared by Agha Kahn University Centre of Excellence in Women and Child Health

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Research team

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The short-term study explores the effect of the Covid-19 pandemic on demand- and supply-side factors affecting maternal, newborn, and child health (MNCH) service utilization in Kenya, Malawi and Mozambique. The CoEWCH led the three-country study, providing guidance, coordination, and quality assurance to the partner research teams in Malawi and Mozambique.

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Consultant 3: Dr. Jasmit Shah. Biostatistician. Provided technical assistance in analysis of secondary data and report writing.

Acronyms

AKU	Aga Khan University
ANC	Antenatal care
ART	Antiretroviral therapy
CES	Continuity of essential health services
CHV	Community health volunteer
CHW	Community health worker
CoEWCH	Centre of Excellence in Women and Child Health
DHIS2	District Health Information Software 2
EID	Early infant diagnosis
ESAR	UNICEF Eastern and Southern Africa region
FBO	Faith-based organization
FGD	Focus group discussion
FP	Family planning
HCP	Healthcare provider
HCW	Healthcare worker
HMIS	Health Management Information System
ICU	Intensive care unit
IDI	In-depth interview
IPC	Infection Prevention and Control
KHIS	Kenya Health Information System
KII	Key informant interview
MMR	Maternal mortality ratio
NMR	Neonatal mortality rate
MNCH	Maternal, newborn, and child health
MoH	Ministry of Health
NACOSTI	National Commission for Science, Technology, and Innovation
NGO	Non-governmental organization
ORS	Oral rehydration solution
PHSM	Public health and social measures
PI	Principal investigator
PMA	Performance Monitoring for Action
PMTCT	Prevention of mother-to-child transmission of HIV
PNC	Postnatal care
PPC	Postpartum care
PPE	Personal protective equipment
RA	Research Assistant
RMNCH	Reproductive, maternal, newborn, and child health
SOP	Standard operating procedures
SRH	Sexual and reproductive health
SRMNCH	Sexual, reproductive, maternal, newborn, and child health
TBA	Traditional birth attendant
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Executive summary

Overview

This Continuity of Essential Health Services (CES) Study in Kenya was part of a multi-country cross-sectional study undertaken in three countries of the Eastern and Southern Africa Region (ESAR) – Kenya, Malawi and Mozambique. The study aimed to understand the extent to which the Covid-19 pandemic impacted people's willingness and ability to access essential maternal, newborn, and child health (MNCH) services, their experiences of care, and the health system's readiness to continue to provide essential care during the pandemic. The research approach and study tools were common across all three study countries. This report presents the study results for Kenya only. Separate reports are available for Malawi and Mozambique.

Study design and methodology

The Kenya study was conducted in Mathare Valley, an urban informal settlement in Nairobi County, and the rural Kaloleni sub-county in Kilifi County. Qualitative data collection took place between June and July 2021. In total, 109 participants were involved in in-depth interviews, focus groups discussions, and key informant interviews. Participants included: adolescent and adult women who were pregnant and/or breastfeeding, or had a child below five years of age – these categories included women living with HIV; fathers of children under five; healthcare workers; health management officers, and community health volunteers.

In addition, a secondary data review and analysis were undertaken using Ministry of Health MNCH data for the period January 2018 – March 2021. The purpose was to identify potential patterns to assess the effects of Covid-19 period on MNCH services and outcomes in Kilifi and Nairobi Counties and at the national-level.

Findings – qualitative component

Relevant WHO and Ministry of Health **policies and guidelines** were implemented to facilitate provision of MNCH services within the context of the Covid-19 pandemic. Healthcare workers were trained and communities sensitized on Covid-19. Health facilities were reorganized to ensure availability of space for effective service provision in line with pandemic protocols. This included redeploying some healthcare workers, demarcating and labelling new waiting areas, establishing screening and triage areas, and preparing isolation rooms or centres.

Communication of Covid-19-specific policy and mitigation measures was broadly carried out. Health messaging covered Covid-19 signs and symptoms and associated prevention measures. Community health volunteers, healthcare workers, village elders, and service users spread messages and used diverse channels including Ministry of Health health talks, radio talks, posters, billboards, community dialogue days, and TV. The initial community response to the messages around Covid-19 was fear and resistance, which eventually eased, as the messages became better understood and applied accordingly.

A number of effects of the Covid-19 pandemic on **accessibility and provision of MNCH** care were reported, especially in the first 3–4 months of the pandemic. Some families and individuals lacked the funds to access care – this included transport fares, fees for hospital procedures and drugs, and mandatory facemasks. The inability to attend routine care led to high defaulter rates; the low turnout was mainly due to fear of contracting Covid-19. Some service users opted for traditional healers and traditional birth attendants (TBAs) instead.

Although health facilities limited the number of clients served per day, public facilities were still

considered the preferred choice due to their more affordable services. There were reports of additional complications, births before arrival, and maternal mortalities associated with (1) closed facilities, (2) curfew and movement restrictions, (3) difficulty accessing transport services on time, and (4) poor or missing postpartum support. Public facilities experienced congestion and stock-outs and were understaffed as healthcare workers succumbed to Covid-19 infection.

Healthcare workers complained about inadequate information on Covid-19 at the beginning of the pandemic, increased workload, inadequate space, shortage of personal protective equipment (PPE) and fears of contracting Covid-19. Their low morale was also associated with inadequate hand-washing facilities, lack of insurance cover for healthcare personnel, fear of infecting others, and the burden of seeing so many die of Covid-19.

Nevertheless, **healthcare workers reported motivating factors**, including seeing colleagues and patients recover from Covid-19, availability of vaccination, Covid-19 training, availability of PPE, and a sense of higher mission. Furthermore, supportive supervision and sensitization, stipends and a government offer of tax relief for everyone were mentioned, which encouraged staff to continue working hard.

Concerning **effects on the referral system**, while there were designated ambulances for Covid-19 patients, some areas had few vehicles, few drivers, or/and were poorly equipped. Furthermore, some clients lacked fares to get to referral facilities; some misplaced referral letters; and others did not have the required facemasks.

On **continuation and utilization of facility- and community-based healthcare**, use of MNCH services, growth monitoring, and family planning services was affected, especially in the first 3–4 months of the pandemic, but the health system showed resilience in MNCH and family planning. More vulnerable population groups, including those living in poverty and pregnant adolescent girls had more limited ability to access to care.

There was a mixed picture in terms of availability of **HIV services** and commodities, due to Covid-19 restrictions, some patients had to get their refills from health facility gates or over the counter, while others stopped attending counselling and group therapies for people living with HIV. Some people living with HIV and the elderly population tended to avoid visiting health facilities for fear of Covid-19 infection because they had understood that they were at heightened risk of death or complications.

Findings – quantitative component

The analysis of secondary Ministry of Health statistical data showed that across most of MNCH service utilization indicators, there was a mixed picture comparing the period before and after the index month of March 2020 in Nairobi County, Kilifi County, and nationwide. Trends in service utilization before the Covid-19 pandemic were mixed, with some showing steady progress nationally and in the two study counties, while others showed variation between the counties and /or between the counties and nationally. There was a decline in most service indicators in March 2020. After the onset of the pandemic, consistent findings nationally and across the two study counties included a decrease in the incidence of pneumonia cases in children under five, the contraceptive prevalence rate, and the proportion of pregnant women who are adolescents. In contrast, deliveries by skilled personnel and postnatal care had increased. An increase was also seen in neonatal deaths both nationally and across the two study counties. Initially, there was an increase in maternal deaths, however, data were largely not available after September 2020. A significant drop in some service utilization indicators between December 2020 and March 2021 coincided with the time of the health workers' strike (December 2020 to February 2021). These data are likely limited by data quality concerns common to routinely collected data systems, limiting the reliability of this analysis.

Lessons learned

Target groups were asked to articulate key lessons from Covid-19. Many of these reflect the need to general health systems strengthening, regardless of Covid-19, noting the importance of expanding the health workforce, ensuring the consistent availability of supplies and improving referral pathways. With respect to Covid-19 specifically, respondents highlighted the need for improved government communication about the pandemic; the importance of greater supply of PPE to facilities and community health volunteers, particularly early on; the need to ensure the continuity of essential services, despite the pandemic; the importance of investments in emergency preparedness and surveillance and the need to consider barriers to care, such as limited transport at high cost, lockdown measures and facemask requirements, that were unaffordable for some.

Conclusions

Like almost all countries in the Eastern and Southern Africa region, the Kenyan government responded swiftly to the Covid-19 pandemic by employing new public health and social measures on a national scale. While these measures may have helped reduce Covid-19 transmission, particularly early on, findings from this study reveal that these measures were not without unintended costs. This study highlights the importance of balancing health emergency response measures with efforts to maintain regular health system function. In the Kenyan context, where the burden of Covid-19 deaths has been significantly less than initial forecasts and relatively less impactful than in many countries in other regions of the world, this is especially relevant. Mortality due to regular causes, such as non-communicable disease, HIV/AIDS, neonatal causes and diarrhoea, far outweighed those due to Covid-19 and must continue to be the priority of the health system. Attention to all dimensions of the promotion of continued utilization of essential MNCH services is needed. This should include clear communication within the health system and with the public; mitigation of the impact of new cost barriers; reliable supply of services and commodities with adequate staffing and attention to the particular support needs of more vulnerable populations such as adolescents; the immunocompromised (including people living with HIV/AIDS); and pregnant women.

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1. Introduction

This report provides an overview of the effect of the Covid-19 pandemic on demand- and supply-side factors affecting maternal, newborn, and child health (MNCH) service utilization in Mathare Valley, Nairobi County, and Kilifi, Kaloleni sub-county in Kenya.

The Continuity of Essential Health Services (CES) Study was a mixed-methods study comprising a desk review of documents, semi-structured key informant and in-depth interviews in the field (at district management level; at service delivery level with providers at health facilities; and with community health workers and community members), focus group discussions (FGDs) with community members, and quantitative secondary data analysis of selected key maternal, newborn and child health (MNCH) indicators extracted from the National Health Information System. Qualitative data were collected in June and July 2021 and quantitative data were abstracted for the period January 2018–March 2021.

The study included a specific focus on vulnerable populations, including adolescents, women living with HIV, and infants and young children. The immediate target informant groups included pregnant and breastfeeding women and girls in the 15–49 age group, including those living with HIV, as well as parents and guardians of children under five. In addition, health personnel, both clinical and management, and relevant community health workers were included in the study.

Ethics approval for this study in Kenya was received from the AKU Institutional Ethics Review Committee (IERC – Ref No. 2021/IERC-41 (v2)) and the National Commission for Science, Technology, and Innovation (NACOSTI) (Permit dated 7 June 2021; Ref No. 199230). Permission to conduct the study was also obtained from the County Governments of Nairobi and Kilifi.

2. Background and rationale

2.1 The Covid-19 pandemic in Kenya between March 2020 and March 2021

The World Health Organization (WHO) declared Covid-19 a pandemic on 11 March 2020, and it has had significant adverse population-wide effects on health, social, economic, and political life around the world since¹. In Kenya, the first Covid-19 cases were announced on 13 March 2020. According to official case data of the Ministry of Health (MoH)², the country experienced three waves of the Covid-19 pandemic between March 2020 and May 2021. The first wave peaked in July/August 2020; the second in October/November 2020, and the third in March/April 2021, reaching a maximum of approximately 1,800 registered new daily infections and 19 daily deaths in the beginning of April 2021³. The capital, Nairobi, was the most affected part of the country. Vaccinations began to be rolled out in March 2021, initially for frontline health workers in the public and private sectors, and then for people over 58 years of age.

As soon as the first cases were reported, the Kenyan Government introduced country-wide public health and social measures (PHSM) to help limit the spread of the virus; these were updated as the situation unfolded. First, the government issued traveler health advice and restricted international travel (March 2020–1 August 2020) and domestic travel (March 2020–15 July 2020). Next, it

¹ WHO Director-General's opening remarks at the media briefing on Covid-19 – 11 March 2020

² MOH. Covid-19 outbreak in Kenya: Daily situation report – 409. Ministry of Health, Kenya; 2021 <https://www.health.go.ke/>

³ Ref: REUTERS Covid-19 Tracker on 15/08/2021 <https://graphics.reuters.com/world-coronavirus-tracker-and-maps/countries-and-territories/kenya/>

launched information, education, and communication campaigns focusing on hand hygiene; respiratory etiquette; wearing facemasks in public; and social distancing and avoidance of crowds. This was accompanied by enhanced Covid-19 surveillance, public health quarantine for exposed asymptomatic individuals and isolation and treatment for those who fell ill, as well as contact tracing and monitoring contacts for symptoms. Public transport was limited to 60 per cent capacity and wearing protective face coverings became mandatory in public areas, including private vehicles and while using public transportation. The Government also issued new guidelines on workplace closures and shut schools and other education institutions for the remainder of 2020.

The first curfew affecting movement between dusk and dawn (7.00 p.m. to 4.00 a.m.) was implemented from 28 March 2020. Subsequent curfew restrictions fluctuated with the rate of infections over the following months. Schools reopened on 4 January 2021 with strict Covid-19 protocols. On 3 January 2021, a statement was issued extending certain measures to curb the spread of Covid-19, including night curfews and rules regarding gathering, through to March 2021. By March 2021, the country was undergoing its third wave of the pandemic, with a substantial increase in Covid-19 infection rates. This prompted another lockdown, which began on 26 March 2021 in five counties – Nairobi, Nakuru, Kiambu, Machakos, and Kajiado— which were identified as Covid-19 hotspots. Travel in and out of these counties was restricted until May 2021. In addition, bars, restaurants, and other public establishments were once again closed to the public, and only allowed to provide outside catering services.

In mid-June 2021, Kenya imposed restrictions on gatherings and a curfew in the country's western Lake Basin region. The MoH declared 13 of the country's 47 counties hotspots, jointly accounting for 60 per cent of new infections and more than double the average positivity rate. In some of these counties, police closed local markets, affecting many businesses and livelihoods. Domestic and international flights remained operational throughout 2021, and land borders stayed open for commercial cargo.

The health sector had a critical role to play during the Covid-19 pandemic. Healthcare workers received training and were instructed to use personal protective equipment (PPE) – though significant shortages of such equipment affected public health facilities. Isolation and treatment centres were set up in referral facilities. Many health services were downsized or closed in 2020 to limit the risk of transmission.

Existing staff shortages were amplified as frontline healthcare workers fell sick or died in places where there were already too few to provide essential services. Healthcare workers announced industrial action due to lack of protective gear and other essential equipment in hospitals during the pandemic. The strike affected health service provision across the country for 70 days between December 2020 and February 2021, when it was suspended following a court order.

By March 2021, Kenya had an average of two Covid-19 treatment centres in public hospitals in each county, with some exceptions – e.g., Mombasa County had only one centre, and Baringo County none. There was a total of 1,893 regular isolation beds nationally (of the 2,576 isolation beds recommended by the Ministry of Health) and 470 beds in intensive care units (ICUs) for general patients, in public and private facilities.

2.2 Evidence of Covid-19's direct and indirect impact

Contrary to expectation, Africa reported significantly lower numbers of confirmed Covid-19 infections and deaths compared to other parts of the world, carrying only 4 per cent of the global burden of the

pandemic.⁴ According to data compiled by the Johns Hopkins University, by October 2020, Africa, with a population of more than 1 billion, had about 1.5 million cases, and recorded 37,000 deaths in the region, compared with roughly 580,000 deaths in the Americas; 230,000 in Europe; and 205,000 in Asia⁵. Compared with Europe and the United States, Kenya's pandemic has been characterized by a high proportion of asymptomatic cases and a lower incidence of severe disease, hospitalizations, and deaths.⁶

Several theories have been put forward to explain this phenomenon, including limitations in terms of testing and difficulty in detecting asymptomatic cases⁷. It is also almost certain that a number of other factors are likely to have contributed to the region's lower incidence and death rates⁸ including the quick administration of lockdowns and curfews; broad public support for safety measures; youthful demographics; a low number of old people's homes; a favourable climate; and well-established community-based health systems.

While the attention of governments is understandably focused on the direct impact of the Covid-19 pandemic, it is essential to see the health crisis from a broader perspective. In the countries of the Eastern and Southern Africa region (ESAR), health systems are already fragile and people often live in extremely precarious conditions. The Covid-19 pandemic risks further reducing vulnerable people's already limited access to healthcare, as resources – both human and financial – get diverted from regular healthcare to the Covid-19 response.

In this regard, the West Africa Ebola epidemic 2014–2016 can be considered instructive as it demonstrated that indirect mortality can at times exceed the direct mortality of the health emergency. An April 2020⁹ rapid literature review summarized evidence on the effects of the Ebola outbreak on the provision of other health services. The review suggests that the Ebola crisis had a strong negative impact on the use of health services due to both supply-side and demand-side factors, leading to an average 18 per cent reduction in the provision of health services across all services in Liberia, Guinea, and Sierra Leone; inpatient services and facility-based deliveries were among the most affected areas.

Available evidence at the time of this study, suggested that essential health services globally and in Kenya had been disrupted during the Covid-19 period. The World Health Organization (WHO) *Pulse survey on continuity of essential health services during the COVID-19 pandemic* administered in 105 countries¹⁰ showed disruption of essential health services in nearly all countries, and greater disruption in lower-income than in higher-income countries. The majority of service disruptions were partial, defined as a change of 5–50 per cent in service provision or use. All types of health services

⁴ Edwin N. Wangari. Kenya's response to the Covid-19 pandemic: a balance between minimising morbidity and adverse economic impact. PMC. Published online 2021 Mar 29. Version 2. AAS Open Res. 2021; 4: 3.

PMCID: PMC7921885. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7921885/>

⁵ <https://www.bbc.com/news/world-africa-54418613>

⁶ Ojal J, Brand SPC, Were V, Okiro EA, Kombe IK, Mburu C, et al. Revealing the extent of the Covid-19 pandemic in Kenya based on serological and PCR-test data. Medrxiv. 2020.

⁷ Itai Chitungo and Mathias Dzobo. College of Medicine and Health Sciences, Faculty of Medicine, University of Zimbabwe, Harare, Zimbabwe. Mbuzeleni Hlongwa and Tafadzwa Dzinamarira, Department of Public Health Medicine, School of Nursing and Public Health, University of KwaZulu-Natal, Durban, 4001, South Africa. Covid-19: Unpacking the low number of cases in Africa, Public Health in Practice. 2020 Nov; 1: 100038. Published online 2020 Dec 22. doi: 10.1016/j.puhip.2020.100038 : 34173573 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7485446/>

⁸ <https://www.bbc.com/news/world-africa-54418613>

⁹ Ottar Mæstad, Eskindir Loha Shumbullo. Bergen: Chr. Michelsen Institute. Ebola outbreak 2014-2016: Effects on other health services. CMI Brief | 2020 (CMI Brief no. 2020:03) 4 p.

¹⁰ WHO. "Pulse survey on continuity of essential health services during the Covid-19 pandemic: interim report, 27 August 2020". WHO, August 2020

were affected. A review of 40 studies from 17 countries¹¹, conducted between 1 January 2020 and 8 January 2021, analyzed data on more than 6 million pregnancies and found increases in maternal deaths, stillbirth, ruptured ectopic pregnancies, and maternal depression. While findings varied by country, the analysis showed that during the pandemic stillbirth and maternal mortality rates increased by about one third, while surgeries for ectopic pregnancies grew almost sixfold.

Studies from Kenya point to similar trends. One study on the effect of the Covid-19 pandemic in Kenya¹² showed a statistically significant reduction in inpatient service utilization. It noted that international supply chains, the health workforce, health infrastructure, service provision, and patient access were disrupted during the pandemic, while financing of essential health services and domestic supply chains were not noticeably affected. In Kenya, there have been other reports of lower attendance at vaccination and antenatal care appointments, a decrease in hospital deliveries, and an increase in stillbirths during the Covid-19 pandemic^{13,14,15}. Further early results of an unpublished AKU-CoEWCH study¹⁶ focusing on three Kenyan counties – Nairobi, Mombasa, and Kilifi – suggest severe disruption in the provision and access to sexual and reproductive health services, including maternal and newborn health services, contraception, and management of unintended pregnancies. The study also shows an increase in gender-based violence in the three counties. These negative effects tend to disproportionately affect populations from lower socioeconomic backgrounds, thus further broadening the gap in access to reproductive health services.

2.3 Purpose of the study and rationale

While the public health and social measures targeting the spread of Covid-19 are considered both necessary and relevant, this study concerns itself with the unintended impact of these measures on the demand for, access to and experience of maternal, newborn, and child health services, from the perspectives of clients and front line health workers.

Given relatively limited healthcare capacity, governments need to balance the threat of Covid-19 mortality and morbidity with the potential secondary impacts of mitigation measures that might also result in excess mortality and morbidity. Several studies have examined levels of disruption to essential MNCH services from the supply side, and efforts have been undertaken to monitor these disruptions through routine health information. This study, deliberately aimed to also understand the perspectives of potential MNCH service users.

¹¹ Barbara Chmielewska, Imogen Barratt, Rosemary Townsend, Erkan Kalafat, Jan van der Meulen, Ipek Gurol-Urganci, Pat O'Brien, Edward Morris, Tim Draycott, Shakila Thangaratinam, Kirsty Le Doare, Shamez Ladhani, Peter von Dadelszen, Laura Magee, Asma Khalil. Effects of the Covid-19 pandemic on maternal and perinatal outcomes: a systematic review and meta-analysis. *The Lancet Global Health Articles*. 31 March 2021

¹² Barasa, E., Kazungu, J., Orangi, S. et al. Indirect health effects of the Covid-19 pandemic in Kenya: a mixed methods assessment. *BMC Health Serv Res* 21, 740 (2021). <https://doi.org/10.1186/s12913-021-06726-4>

¹³ Mwobobia JM. The repercussions of Covid-19 fight. *Standard Newspaper Kenya. Sect Health Sci*. 2020;2020 <https://www.standardmedia.co.ke/health/article/2001373476/the-repercussions-of-covid-19-fight>.

¹⁴ Oketch A. Hospital births, vaccination visits drop as Kenya battles virus. *Daily Nation*. 2020; <https://www.nation.co.ke/kenya/news/hospital-births-vaccination-visits-drop-as-kenya-battles-virus-308144>.

¹⁵ Pallangyo E, Nakate MG, Maina R, Fleming V. The impact of covid-19 on midwives' practice in Kenya, Uganda and Tanzania: a reflective account. *Midwifery*. 2020.

¹⁶ Marleen Temmerman et al. Impact of Covid-19 mitigation measures in Kenya on Reproductive Health: Case of Nairobi, Kilifi and Mombasa Counties. Final report. Study title: Impact of Covid-19 mitigation measures in Kenya on Reproductive Health.

3. Research objectives, focus and questions

3.1 Study objectives

The **overall study objective** was to understand the extent to which the Covid-19 pandemic has impacted demand, access and experience of essential MNCH services through the July 2021 period.

The specific study objectives were to:

- (1) Understand how the Covid-19 pandemic has affected pregnant and breastfeeding women's demand for, access to, and uptake of maternal and newborn health services, including post-partum family planning (FP), and identify coping strategies they have used to overcome challenges.
- (2) Understand how the Covid-19 pandemic has affected demand for, access to, and uptake of child health services for children under five, and identify coping methods that parents/caretakers/custodians (including mothers, fathers, and female and male custodians and caretakers) have used to overcome challenges.
- (3) Identify any specific challenges in terms of demand for, access to, and uptake of MNCH services faced by vulnerable groups during the Covid-19 pandemic, in particular pregnant and breastfeeding women living with HIV; these include adolescent women (15 to 19 years old) who are pregnant, breastfeeding, and/or living with HIV.
- (4) Assess MNCH service readiness during the Covid-19 pandemic, and changes in service delivery that may have affected access and demand for services.
- (5) Describe the national and local context with respect to Covid-19 response measures, Covid-19 epidemiology, and essential MNCH service continuity.

3.2 Research focus

The focus of interest for this research was on maternal, newborn, and child healthcare services, including:

- antenatal care (ANC)
- delivery by skilled personnel and post-partum care (PPC)
- post-partum family planning (FP)
- newborn care, including care for small and sick newborns
- immunization of pregnant women and children under five
- prevention and treatment of childhood diseases (malaria, pneumonia, diarrhoea) in children under five
- nutrition of pregnant and breastfeeding women and children under five
- MNCH services provided to pregnant and breastfeeding adolescent women (15–19 years of age)
- MNCH services provided to adolescent (15–19 years) and adult (20–49 years) pregnant and breastfeeding women living with HIV, including HIV testing and counselling during pregnancy; early infant diagnosis (EID); antiretroviral therapy (ART) for prevention of mother-to-child transmission of HIV (PMTCT), viral load monitoring, and lifelong antiretroviral therapy.

3.3 Research questions

The research questions were organized around four major themes:

- (A) Demand-side factors (intention-action gap drivers, reaching care, and receiving care)
- (B) Supply-side factors (providing care)
- (C) Utilization of MNCH services
- (D) Country-specific national and subnational environment during the Covid-19 pandemic.

The detailed list of research questions is included in Appendix 1.

4. Methodology

The scope of this research was to undertake a cross-sectional study, which included descriptive and analytical research methods to examine demand-side factors as well as supply-side factors affecting MNCH service utilization during the Covid-19 pandemic. The themes were explored in one urban and one rural location. The selected locations – Mathare Valley in Nairobi County and Kaloleni sub-county in Kilifi County – were agreed with the UNICEF Kenya Country Office in consultation with the Ministry of Health.

The study had two major components: primary qualitative data collection and a literature review and secondary data analysis of Ministry of Health HMIS data.

4.1 Qualitative study

4.1.1 Study scope and study design

A total of 109 study participants were involved in this cross-sectional study, through key informant interviews (KIIs), in-depth interviews (IDIs), and focus group discussions (FGDs), which took place in June and July 2021. Focus group discussions were held with services users; key informant interviews were conducted with healthcare sector personnel; and in-depth interviews were carried out with adolescents and women living with HIV in a secured space to ensure privacy and preclude stigma of this group.

4.1.2 Study sites

The study was conducted in the urban informal settlement of Mathare Valley, Nairobi, and a rural location, Kaloleni sub-county in Kilifi County. Both locations are home to marginalized populations with relatively poor socioeconomic backgrounds and have high maternal, newborn, and child mortality rates, as well as high HIV prevalence and adolescent pregnancy rates compared with the national average. With approximately 90,000 people living within a square kilometre, the Mathare informal settlement is Kenya's most densely populated area. With 120 people per km² according to the 2019 census, Kilifi County comes closer to the national average population density of 92 people per km².

Reported Covid-19 caseloads in these two settings were quite different. Ministry of Health data from July 2020 shows that Nairobi was classified as high-burden area throughout the pandemic, while Kilifi County ranked tenth of 47 counties in regard to the Covid-19 burden.¹⁷

Within its area of approximately 3 km², Mathare Valley has three Government-run health facilities (two dispensaries and one district hospital), two Voluntary Counselling and Testing (VCT) centres, two medical centres run by private enterprises, and one clinic run by a German non-governmental organization (NGO). Overall, the Mathare population is in geographical proximity to health services, including MNCH facilities, with a high standard of care provided by the NGO facility.

The rural Kaloleni sub-county has a total of 32 health facilities, of which 19 are public (two sub-county hospitals, two health centres, and 15 dispensaries), three are owned by faith-based organizations (FBOs), and 11 are private. Just like most of the country, the population of Kaloleni

¹⁷ <https://www.health.go.ke/cs-health-visits-kilifi-to-assess-covid-19-preparedness-as-first-medic-dies-from-the-virus-kilifi-july-10-2020/>

sub-county have access to a relatively high number of health facilities, with about 80 per cent of the population living within a 5-kilometre radius of a facility (Ministry of Health 2019).

National public health and social mitigation measures were implemented across all counties to help curtail the spread of Covid-19 in Kenya. There were some regional differences. For example, during the third wave of the Covid-19 pandemic, in March and April 2021, a new lockdown was announced for Nairobi but not Kilifi County. The exact response of the counties' health systems also varied in areas such as reorganization of space; closure of facilities; and redeployment of personnel within and between healthcare facilities. While the health workers' strike which resulted in closure of many public health facilities affected continuity of available services in Kilifi County, the people of Mathare fared better due to the presence of the NGO-run medical centre, which continued providing essential high-quality MNCH services free of charge throughout the pandemic and the health workers' strike.¹⁸ Similarly, where limitations on transport proved to be a significant obstacle to reaching health facilities from the remote rural areas of Kilifi County, in the urban settlement of Mathare, a number of facilities can be reached by means of a short walk. It was also reported that the Government had provided some support to transport for pregnant women at the beginning of the pandemic.

4.1.3 Study population

This study targeted the following population groups:

- (1) Adult pregnant and breastfeeding women (aged 20–49 years)
- (2) Adolescent pregnant and breastfeeding women (aged 15–19 years)
- (3) Pregnant and breastfeeding women (aged 15–49 years) living with HIV, disaggregated into adolescent (15–19 years) and adult (20–49 years) groups
- (4) Women with children under five years of age
- (5) Adult men – fathers/caretakers/custodians of children under five years of age
- (6) Facility-based healthcare providers
- (7) County and sub-county level health managers
- (8) Community health volunteers.

4.1.4 Sample size

Participants of KIIs, IDIs and FGDs were selected purposefully. A total of 48 data collection sessions were carried out, with 109 individuals participating in the study. Specifically, a total of 24 interviews (12 KIIs, 6 IDIs, and 6 FGDs) were completed in both Kilifi County and Nairobi County.

Table 1. Study participants in Kenya (N=109)

Population	Mathare Valley (Nairobi County) <i>Urban site</i>	Kaloleni sub-county (Kilifi County) <i>Rural site</i>	Total

¹⁸ Personnel talks with German doctors in Mtwapa in January 2021.

Population	Mathare Valley (Nairobi County) <i>Urban site</i>	Kaloleni sub-county (Kilifi County) <i>Rural site</i>	Total
Key informant interviews (KIIs)			
Community Health Volunteers (CHVs)	4	4	8
Facility-based health workers	4	4	8
Facility-based health service managers	2	2	4
Sub-county healthcare managers	2	2	4
Total key informant interviews	12	12	24
Focus group discussions (FGDs)			
<i>[With 6 participants per group, with the exception of one session with pregnant women in Kilifi County, which had 7 participants]</i>			
Women of reproductive age (20–49 years): Separate groups for 1) pregnant and breastfeeding women and 2) mothers of children under five	4	4	8
Adult fathers	2	2	4
Total focus group discussions	6	6	12
In-depth interviews (IDIs)			
<i>[Number of interviews held at each site indicated in square parentheses]</i>			
Pregnant [1] and/or breastfeeding [2] adolescents (aged 15–19 years)	3	3	6
Key subgroups of people living with HIV: pregnant [1] and breastfeeding [1] adolescents (aged 15–19 years) and adult women [1] (aged 20–49 years)	3	3	6
Total in-depth interviews	6	6	12

4.1.5 Recruitment strategy

County permissions were sought through AKU-CoEWCH introductory letters outlining the study, together with the letters from the relevant research and ethics approving bodies. Once obtained, letters of support from Nairobi and Kilifi Counties endorsed entry into health facilities and communities.

The field team was well received, with no refusal in participation. Two main recruitment liaison persons at the sub-county level were engaged at both sites. They subsequently tasked other field contacts, such as community health volunteers, to assist and reach potential participants for FGDs, IDIs, and KIIs. Selection of healthcare providers was guided by the sub-county level authorities. All key informant interviewees were asked to participate in the project by way of telephone conversation at their place of work.

4.1.6 Fieldwork team recruitment, training, and pilot activities

Four trained research assistants (RAs) (2 in Kilifi and 2 in Nairobi) and a field coordinator were recruited and trained for qualitative data collection. The four-day training was conducted online via Zoom. The training was organized in line with the study's field work standard operating procedure (SOP) requirements developed by research experts of AKU-CoEWCH.

The main goal of the training was to orient and equip participants with skills for the smooth running of the consent, assent, and data collection procedures during fieldwork. The following core aspects were covered in the training: CES Study overview – objectives, study design, population, and sites; research ethics – skills needed to obtain informed consent and assent; review of study tools in English and Kiswahili; skills needed to conduct IDIs, KIIs, and FGDs; review and application of relevant CES Study SOPs; the study pre-test, and field logistics issues.

Study tools were pilot-tested and refined on 21 June 2021. The testing was carried out as part of the training of RAs and to run face validity of the tools. The pre-test was carried out with individuals similar to those included in the study but in different geographical areas.

4.1.7 Data collection and management

The data collection exercise was implemented by the four RAs and the field coordinator. Data collection using English and Kiswahili tools was carried out in Kaloleni sub-county on 5–9 July 2021, and in Mathare Valley on 8–13 July 2021. Data collection was completed within five working days in each of the study sites. Most of the sessions were done face-to-face and captured using audio recorders and shorthand notes, with the exception of one interview in Nairobi, which was conducted over Zoom. In keeping with Covid-19 prevention measures, the research team and participants were required to wear facemasks during the data collection exercise. Social distancing was also observed during all data collection sessions, and focus groups were kept small (N=6) to avoid overcrowding.

Each audio recording was transcribed by transcribers who were fully competent in Kiswahili and English, who listened and typed out all data in English. All transcripts were reviewed and uploaded to a password-protected file for consequent coding and analysis.

4.1.8 Ethical considerations

The following ethical considerations were taken into account:

- **Informed consent:** All respondents over 18 years of age were required to provide written consent to participate in the study.
- **Parental permission:** Written permission was sought from parents of minors (adolescents aged 15–17 years) prior to their assenting to the study.
- **Assent:** All adolescents aged 15–17 years were required to provide written assent to participate in the study.
- **Confidentiality and protection of participants:** This was ensured through conducting individual interviews in a private setting; maintaining confidentiality of all materials and information; and limiting access to study information to authorized personnel only. The information collected from participants was de-identified and stored in password-protected files. Care was taken to ensure the information included in this final report contains no identifying information.

- **Sensitivity to sociocultural diversity:** Assessment team members were sensitive to respondents' culture and were mindful of language and other factors when carrying out the study.
- **Ethical approval:** This study was reviewed and approved by AKU IERC (Certificate number: 2021/IERC-41(v2), NACOSTI (Ref No. 199230), and County governments. The approval documents can be viewed in Appendix 3.

4.1.9 Data analysis

A framework analysis was used for cross-sectional analysis of data from the focus group discussions, in-depth interviews, and key informant interviews. Analysts developed a coding scheme that combined a priori codes for key concepts related to the study objectives, with data-driven codes identified through initial reading of the transcripts. A qualitative software data package (NVivo) was used to organize qualitative data for analysis. Coding was done with periodic checks for inter-coder discrepancies. Once coding was completed, data reduction techniques were used to examine codes in detail, to identify subthemes and patterns across the transcripts, which were reviewed and agreed by two researchers. Findings were consequently summarized into data frames according to themes available by specific data sources.

An illustrative example of a matrix used to summarize the data for analysis with respect to a specific category of participants and by specific sites is presented below.

Table 2. Illustrative data analysis matrix – key informant interviews (KIIs) with county and sub-county healthcare managers

	Kaloleni sub-county (Kilifi County) <i>Rural site</i>		Mathare Valley (Nairobi County) <i>Urban site</i>		
County and Sub-county Managers	1	2	3	4	N
1. Position and duties					
Duration in the institution	X	X	X	X	4
Position	X	X	X	X	4
<i>Sub-County Community health coordinator</i>		X			1
<i>Sub-County MoH</i>				X	1
<i>Sub-County Nurse manager</i>			X		1
<i>Sub-County RHC</i>	X				1
2. Changes in health service delivery during Covid-19					
Employment of more staff				X	1
Expansion of facilities and availability of equipment				X	1
Long turnaround time for clients	X				1
Need for a supplementary budget		X			1

3. Effects of Covid-19 pandemic					
Closure of facilities	X	X	X		3
Fear of contracting Covid by the healthcare providers	X	X	X		3
Low delivery services			X		1

4.2 Secondary data review

4.2.1 List of indicators

The following indicators were selected for the secondary data analysis:

1. Maternal mortality ratio (MMR) – facility-based events
2. Neonatal death rate (NMR) – facility-based events
3. Percentage of pregnant women who are adolescents (10–19 years of age)
4. Contraceptive prevalence rate
5. Proportion of children under 1 year of age who are fully immunized
6. Percentage of children under 5 years of age presenting at a health facility with diarrhoea who were treated with zinc and oral rehydrating solution (ORS)
7. Pneumonia incidence among children under 5 years of age
8. Percentage of deliveries assisted by skilled birth attendants
9. Postnatal care (PNC) attendance (within 2–3 days) coverage
10. Antenatal care (ANC) coverage, 4th visit (ANC4).

4.2.2 Data sources

Secondary data analysis indicators were extracted from the Kenya Health Information System (KHIS), which is based on the District Health Information Software (DHIS)-2 database. KHIS is the national routine health monitoring database for all recognized health facilities in Kenya.

4.2.3 Data analysis

The timeframe for analysis spanned the period January 2018 through March 2021, with March 2020 designated as the index month when Covid-19 was first reported and when related restrictions were introduced in Kenya. The two-year interval (January 2018 – February 2020) preceding the index month was used as a reference period for the multi-year trend in health service utilization prior to the index month. The time after the index month (March 2020 – March 2021) was designated as the Covid-affected period for analysis.

Data were analyzed for Nairobi County, Kilifi County, and at the national level, to assess the consistency of trends. Statistically significant differences were determined for each outcome by comparison of the outcome variables pre- and post-index month using the Kruskal–Wallis test. Segmented regression of the outcome variables of interest was also utilized, based on known

factors. March 2020 was introduced as the index month, denoting the introduction of Government-mandated and other social responses to the Covid-19 epidemic in Kenya. Dummy variables were introduced to examine the effect of duration of time under the Covid-19 response (post-March 2020, the index month) on the outcomes of interest. This method allowed for analysis of the effect of time post introduction of the Government Covid-19 mitigation measures and social responses to the pandemic while also controlling for any seasonal factors that may independently affect service utilization (captured as the month of the year in the dataset).

4.3 Study limitations and mitigation strategies

Qualitative study component

- The sample size for this study was limited due to the resources available. Therefore, general conclusions about the broader country context can only be made with caution.
- Challenging recruitment of study participants: Early booking and follow-up of the study participants reduced this problem. The RAs and the entire team worked together with the recruitment liaison persons on the ground to mobilize and recruit the participants. Some participants, like the breastfeeding mothers, were recruited upon exit from a health facility. The field team reached out to key personnel, such as youth group leaders in the target sub-counties, to help recruit participants who were difficult to reach, such as those living with HIV.
- Difficulty finding male participants: The study team engaged local mobilizers, such as CHVs, to help in recruiting participants.
- Guarded adolescent participants: RAs encouraged the respondents to be open and at ease, and gave them ample time to adequately respond to the questions.
- Delays in getting approvals at the county and sub-county level: The study team intervened to ensure that the necessary approvals and support were issued by the relevant authorities in good time.
- Poor road networks and weather conditions, e.g. rains in Kilifi County: The RAs used the most easily available and efficient means of transport, especially motorcycles, to reach remote facilities. When some of the study participants could not easily reach interview locations due to either distance or weather conditions, the RAs travelled to their homesteads or, in some cases, the interviews were rescheduled for another day.
- Participants unavailable for a face-to-face interview: The RAs arranged to have the consent process and interviews held on a Zoom call.
- Busy schedule for the healthcare providers: The RAs patiently waited for an appropriate time to have the interviews with healthcare providers. In some cases, interviews would have to be rescheduled to a more convenient time, e.g. late evening or early morning.

Secondary data review and analysis

- The statistical analysis should be treated with caution. Findings may be unduly biased by disruptions to data completeness observed from September 2020 onward. Further investigation is necessary to understand the reasons behind the mixed outcomes in terms of service utilization, maternal mortality, and locations. Possible reasons for incomplete data or data disruption could be linked to poor data recording and reporting processes due to the Covid-19 pandemic and/or other events such as the health workers' strike, and require additional investigation.

- Triangulation of qualitative data and the analysis of secondary data was affected by inconsistent and unreliable data obtained from the Kenya Health Information System, as well as difficulty linking interviewee remarks to specific time periods.

5. Results of the study

This section presents findings from the qualitative component of the Continuity of Essential Health Services (CES) Study and a summary of findings from the secondary data review.

In the qualitative part of the study, experiences in seeking and receiving MNCH care during the pandemic shared in the rural (Kilifi County) and urban (Nairobi) sites were similar overall.

5.1 Policy change/actions and mitigation measures instituted

The following specific measures were described by health service providers and service users as having an impact on the demand for, and supply of MNCH services:

- Guidelines and training on provision of maternal, newborn, and child health services during the Covid-19 pandemic
- Implementation of preventive measures to help curb the spread of the Covid-19 virus (hand-washing, screening, personal protective equipment, social distancing)
- Partial closure of facilities, limited services, and limits on client numbers
- Utilization of community services during the Covid-19 pandemic.

A more detailed analysis of these themes is presented below.

5.1.1 Guidelines and training on provision of MNCH services during the Covid-19 pandemic

Guidelines for maternal, newborn, and child health services during the Covid-19 pandemic

There was a guideline on the provision of MNCH services, which emphasized necessary preventive measures to be put in place when offering services in the context of the Covid-19 pandemic. The Ministry of Health followed World Health Organization recommendations; guidelines were implemented at the county level.

“The guidelines articulated what you need to do, [and] the role of the client. Are you able to wear a mask, are you able to social distance, are you able to work in a space that is [in the open air]? Are you able to observe social distance as clients wait? You as a health worker, do you have PPE [personal protective equipment], is it available? The guidelines were articulating that you can still provide the services but with preventive measures [in place].”

– KII, Health Manager, Mathare

“It was more of a directive on what to do on triage for women coming for antenatal services, women coming in. How will healthcare workers be able to handle themselves? Yes, we are telling these women to put on masks when they are in labour (...) This can also be a means of spreading or getting Covid. So, it was more of a directive, both for the healthcare workers working in the MNCH [service] delivery points and for the clients seeking the services.”

– KII, Health Manager, Kilifi

In Kilifi County, special guidelines were put in place to ensure that pregnant and breastfeeding women continued to receive the requisite care without any disruption due to Covid-19. For instance, the *boda-boda* (motorcycle taxi) riders were given official letters by the Sub-county Ministry of Health as passes to enable them to take pregnant and breastfeeding women to MNCH facilities to access essential services during the hours of curfew. The guidelines also ensured that no pregnant woman was refused MNCH services due to barriers such as cost.

“We decided to give them [the boda-boda drivers] letters, stamped by the Sub-county Ministry of Health (...) and no pregnant mother who comes to our health facility should be denied care because of either finance or any complication. So that was one of the standard operating procedures to help the situations of addressing the MNCH services.”

– KII, Health Manager, Kilifi

Training of healthcare workers

Healthcare workers at all levels of the system received training and sensitization on Covid-19. Staff were taught how to optimize triage during the pandemic; how to notice Covid signs and symptoms; and how to protect themselves from contracting the virus. Community health volunteers (CHVs) were trained on Covid-19 prevention measures, and administrators and support staff were trained on Covid-19 and how to handle waste generated from health facilities. Staff also received counselling and psychosocial support on how to cope with the pandemic.

Staff feedback suggests the guidelines were easy to understand and implement as they related to activities such as disinfection, ventilation of the facilities, arrangement of beds to ensure social distancing, and care of Covid-19 patients.

5.1.2 Preventive measures implemented to help curb the spread of the Covid-19 virus

Hand-washing

Health facilities were encouraged to be vigilant about hand-washing as a key Covid-19 preventative measure. Hand-washing facilities were strategically placed at entry points to health facilities and various departments so as to be more accessible to clients.

Screening of clients, and isolation of the exposed

Patients and visitors arriving at health facilities had their temperature checked – typically at a triage desk set up outside the facility to enable social distancing. The two counties also set up isolation centres or isolation rooms in some of the facilities for confirmed or suspected Covid-19 cases. Thanks to this measure, healthcare workers or clients with Covid-19 symptoms could be isolated so as not to interact with other people in the facility before their status was confirmed.

“For the maternity area, we basically had to ensure that if you have a client who is suspicious, you have to isolate. You give PPE, and then you initiate the services by informing the emergency response team.”

– KII, Healthcare Provider, Kilifi

Use of personal protective equipment (PPE)

Health facilities worked to ensure health workers were provided with personal protective equipment (PPEs) even though there were shortages. CHVs also received facemasks, and patients were required to wear masks when accessing any health services.

Social distancing

Patient flow was adjusted to help reduce the risk of people contracting or spreading Covid-19 in health facilities. One example of changes made was that patients were now being called inside the building by their names or numbers only at the time they were being seen so as to avoid overcrowding indoors.

“We had to do away with the crowd: I mean we had to spread people out. One person was responsible for (...) calling people in as their numbers came up, so not everyone was gathered in the waiting area [at the same time].”

– KII, Facility-based Manager, Kilifi

‘Social distancing’ was observed in waiting areas and within departments in health facilities. This and other measures were put in place to limit the spread of the virus and encourage clients to trust that services in healthcare facilities can continue to be accessed safely.

“We had marked seating positions for the clients and also some clients were asked to use a waiting bay provided outside the service room.”

– KII, Facility-based Manager, Mathare

5.1.3 Partial closure of facilities, limited services and numbers of users

Restricted hours in healthcare facilities

Some of the measures implemented at the time of the Covid-19 pandemic resulted in restricted opening hours at some healthcare facilities. For example, some clinics or departments were closed until noon so that fumigation could be carried out and during this time clients would often wait, then give up and go back home without having received the care they sought.

In addition, some staff were redeployed within departments or between facilities. Further measures were taken to protect elderly staff and those with comorbidities from infection: they were provided with the necessary protective gear and often allowed to work in lower-risk departments.

Limited provision of services, restrictions on user numbers and visitors

Some services were disrupted or discontinued – and only essential services performed in some cases. For example, mothers seeking routine MNCH services were given appointments far in the future as long as their condition was stable and they were not in need of emergency treatment, and child growth monitoring services were placed on hold.

“Children [coming in for] immunization, like the BCG vaccine [against tuberculosis] or injectables were allowed to come to the facility but [when it came to children coming in] only for growth monitoring, weighing, we were not seeing them in order to reduce patient congestion.”

– KII, Healthcare Provider, Kilifi

In addition to limiting provision of non-essential services, fewer patients were seen per day, and consultation time was shortened. In many cases, patients staying in the hospital were not allowed to receive visitors.

“Before, we could go into the clinic like twenty people [at a time] but right now it has changed, only about ten of us go (...). They also used to start offering services as from eight but currently it starts like from ten o’clock and, again, the time in which they offer services is less.”

– FGD, Mothers, Kilifi

“We ensured that no visitor went to the [inpatient] wards and they had to leave anything brought for the patient with us [healthcare providers], for onward delivery to patients.”

– KII, Healthcare Provider, Mathare

5.1.4 Utilization of community services during Covid-19

Limitations in continuation and utilization of community-based healthcare

The Covid-19 pandemic affected the services routinely provided by CHVs. This included services such as referrals to health facilities, follow-up, and tracing of patients in the community. Lower numbers of household visits – due, in part, to fear of contracting Covid-19 from the CHVs – translated into fewer referrals.

Health education and sensitization of the community

In order to build trust and dispel myths surrounding Covid-19 transmission, CHVs held sensitization meetings with the general community. CHVs Volunteers were also provided with PPE to help them carry out their work at the community level and community members received information on how to protect themselves and cope with the Covid-19 pandemic. They were also sensitized on the mitigation measures put in place in local healthcare facilities to enable them to gain confidence and visit facilities to receive the necessary health services.

5.2 Changes in the utilization and readiness of health-facility-based maternal, newborn, and child health services since the beginning of the Covid-19 pandemic

5.2.1 Effects on accessibility and provision of MNCH services

Study findings show changes in utilization and readiness of health facilities to offer MNCH services in the following areas:

- Accessibility and provision of MNCH services
- Human resources – Availability of health workers
- Availability and cost of transport
- Financial challenges.

Accessibility and provision of maternal, newborn, and child health services

While health facilities remained operational, some services were limited or unavailable due to the Covid-19 pandemic. In MNCH departments, this particularly affected maternity services, growth monitoring, and family planning. Study findings also indicate that pregnant and breastfeeding women were by-and-large able to find providers and access MNCH services in study sites during the pandemic, though access was more difficult than before. Services were delivered in strict adherence to the Covid-19 protocol.

“Outpatient clinics – like the medical outpatient clinics, the surgical outpatient clinics, the gynaecological outpatient clinics – all those clinics were temporarily closed because of the fear of this pandemic. So people resorted to only handling the emergencies, like a delivery. There is no option: someone must come and deliver.”

– KII, Healthcare Provider, Kilifi

While public facilities offered health services at no cost or at a lower price than private services, some service users mentioned that, even with very limited means, they opted for private facilities due to fear of contracting Covid-19 in the congested public facilities.

“People used to fear each other. [It is not] that at that time we had money, or that we were able; people were avoiding each other – that disease was very serious. So people chose private [facilities] instead of going there and interacting with people.”

– FGD, Fathers, Mathare

People were afraid to seek healthcare in health facilities and, similarly, coming into contact with health workers in the community due to a perception that they could easily contract the Covid-19 virus from them. As a consequence, there was a low level of utilization of routine services and high rates of people defaulting on their appointments. Some people had also migrated to their rural homes at the peak of the pandemic.

Healthcare providers reported high defaulter rates among patients attending the HIV Comprehensive Care Clinics and some MNCH clinics, including the Prevention of Mother-to-Child Transmission of HIV (PMTCT) clinic. Scheduled immunization and nutritional appointments for children were often missed, and phone calls and CHVs helped trace patients who missed their appointments.

“PMTCT numbers went down; the turnout is [low when it comes to] keeping appointments. So that was affected: (...) keeping appointments on register for us (...). But we kept on calling them, until even those who had their phones off were reached.”

– KII, Healthcare Provider, Mathare

Some clinics and departments placed limits on the number of patients that could be seen in a day. The result was that people who needed to access health services became discouraged as they were turned away without getting the care they sought.

“You find that at a hospital, they pick a few people (...) they do not want so many people, they just pick a few people who they will treat (...) then you are told to come the next day.”

– IDI, Pregnant adolescent, Mathare

Furthermore, there were frequent stock-outs of the necessary drugs and supplies at public health facilities, including shortages of vaccines. Some pregnant women living with HIV who took part in the study reported that one of the main effects of the Covid-19 pandemic on them was the limited availability of antiretroviral therapy (ART) services and medication, which meant they had to buy their medicines over the counter.

Human resources – availability of health workers

Covid-19 infections and deaths among staff, and the requisite isolation requirements, resulted in shortages of healthcare personnel. Those present had to be deployed to work in busy departments, such as isolation centres. Staff were redeployed within and between facilities.

“At that point, there was a need for some reorganization. Especially those [staff members] with comorbidities – they were not supposed to be in the front line, they were to be deployed to less risky areas.”

– KII, Healthcare Provider, Kilifi

“Of course, the ones who had comorbidities and maybe the elderly (...) say 50-plus years, we tried to see how we can limit or reduce the contact hours they would have with the patients (...) We can look at who is at more risk, and rotate or reduce their contact with risky environments. Yes, that’s how we tried to ensure the environment and staff are safe.”

– KII, Health Manager, Mathare

In addition to staff shortages and redeployments, healthcare worker strikes affected service delivery, with some facilities closed and clients turned away during the strike.

“There was a strike last year (...) Even for those who were pregnant, you were turned away at the gate (...) Later, things got better, as the strike was short and they reopened.”

– FGD, Breastfeeding women, Mathare

“When I was just starting my pregnancy (...), the public facilities were closed [due to the healthcare worker strike] so I was forced to visit a private facility (...) because the public ones were closed and I was suffering.”

– FGD, Pregnant women, Kilifi

In general, staff morale suffered during the pandemic. Healthcare workers complained about inadequate information about Covid-19 at the beginning of the pandemic; increased workloads and excess overtime; and inadequate space to observe social distancing, limited hand-washing facilities, and shortages of essential personal protective equipment putting them at greater risk of contracting the virus. In addition, staff expressed worry about a lack of insurance cover for healthcare providers, fear of infecting others, the low level of compliance with mitigation measures, and awareness of positive cases and those who died due to Covid-19.

“Health workers were also [afraid] as they didn’t want to get into contact with people for fear of contracting Covid-19.”

– KII, Health Manager, Mathare

“The stock-out of PPE: in the beginning we had very minimal support for PPE and we were receiving a very small consignment from the county. (...) Some partners (...) assisted us with PPE and some companies (...) gave us PPE.”

– KII, Health Manager, Kilifi

At the same time, many health workers found motivation in their work to limit the spread of Covid-19 and treat those affected by the virus, and to continue administering essential healthcare services to the people in their communities during the pandemic. Staff were buoyed by seeing their colleagues and patients recover; some found religious purpose in their work. Covid-specific training, the Covid-19 vaccine, and personal protective equipment helped instil confidence that they can deliver services safely. In addition, a stipend for healthcare workers and tax relief were mentioned as motivating factors. Healthcare staff also received counselling and psychosocial support, and cited support supervision and debriefing sessions as helpful in supporting their work.

Lockdown, curfews more limited transport

The curfew and movement restrictions affected accessibility of health facilities and this was especially of concern for women going into labour. At the peak of the pandemic, only emergency cases were entitled to transportation to health facilities. For instance, in Nairobi, in the first four months of the pandemic, free transport was provided by the county government which worked together with a health development partner to enable women to access maternity services. This was particularly relevant at night, amid the curfew.

“And we would have that service of free transport [thanks to] one of our partners. A mother would dial a number and transport would be availed just to mitigate what was happening then.”

– KII, Health Manager, Mathare

In light of the movement restrictions associated with lockdown, some patients, who perhaps were not aware of exceptions for pregnant women or who believed there would still be difficulty negotiating with the police, chose to wait until the morning before making their way to the health facility. As a result, some women ended up giving birth at home rather than at the health facility.

“If you want to go to the hospital, they [police] will tell you ‘Buy me some tea so we can go.’ If there is no tea [bribe], then you go back home.”

– FGD, Mothers, Mathare

“I gave birth at home. Because of curfew.”

– FGD, Mothers, Kilifi

Other barriers to accessing care at health facilities included not having a facemask, which was mandatory in health facilities, and not being able to afford the fare for transport. In addition, because of the curfew, CHVs often did not make referrals to health facilities during the night. These factors meant that some women did not seek care in health facilities – even to give birth, or to find treatment for sick children.

“When it comes to maternity, they refuse to go. They say, ‘No one will attend to you without a mask’, ‘Yet, I have none, let me just give birth at home’. [And] so you find many cases of young children who stay sick at home because [their parents] fear coming to the hospital because they cannot be attended to without a mask.”

– KII, Community Health Volunteer, Mathare

Difficulty accessing health facilities and delays in getting to the clinic – e.g., due to curfew restrictions – led to some birth complications and births before arrival. For instance, pregnant women would find that their haemoglobin levels were low, while others needed a Caesarean delivery. Moreover, those who gave birth at home missed out on postpartum tests, postnatal care and other support.

“Coming early to the clinic, there is a baseline test that would be done: if they have anaemia, it would be sorted out; they would get the prophylaxis for malaria; and also the mebendazole [deworming pill]. Now that they could not access the facility early because of the restriction, the majority would just stay at home and pray.”

– KII, Healthcare Provider, Kilifi

Financial challenges

Affordability of healthcare was a concern. Often, people could not afford private hospital services when some of the cheaper public facilities were closed due to Covid-19. Many families lost their income during the pandemic, and could ill afford hospital fees, transport fares, or the required facemasks.

“They fear coming to the hospital because they cannot be attended to without a mask, and the money required to get such a mask is not even there (...) Another thing (...) is lack of jobs. They lost their jobs, so even getting food (...) was hard.”

– KII, Community Health Volunteer, Mathare

“The government should supply them [masks] (...) [If] you buy a mask, then you lack money for buying the baby’s diapers.”

– FGD, Fathers, Kilifi

“On my side, I have even lacked a job due to corona[virus].”

– FGD, Breastfeeding Women, Mathare

The cost of medication, especially at a time health facilities were experiencing stock-outs, posed an additional financial barrier.

“Where we were instructed to get some medications outside of the clinic, it was really tough. Most men were at home with no source of income. We had to take loans though it wasn’t a guarantee and we could take loans from chemists. And, also, the chemists are not nearby. It was therefore a huge challenge.”

– FGD, Fathers, Kilifi

People in need of urgent care also chose to use private health services when public facilities were closed during the workers’ strike.

“When I was just starting my pregnancy (...), the public facilities were closed [due to the healthcare worker strike] so I was forced to visit a private facility but now when they opened I went back to the public facilities (...) I used private in the beginning because the public ones were closed and I was suffering.”

– FGD, Pregnant women, Kilifi

At the time of the pandemic, people also sought alternatives to facility-based care. One example would be turning to traditional birth attendants (TBA), or relatives such as grandmothers, to assist in home deliveries, instead of giving birth at a health facility.

“I went to the traditional [healer] since I could [have gone to the health facility and be told there are too many people] and I am also in pain. So I thought the best option was to go [to the traditional healer]. It helped.”

– FGD, Breastfeeding women, Mathare

5.2.2 Effects on the referral system

The overall number of referrals was lower than in pre-Covid times – due, in part, to lower patient attendance in health facilities. Facility-based health workers reported that referrals to other facilities were available, as usual, and that designated ambulances were available for Covid-19 patients. While decision-makers at the county and sub-county level suggested that referral services between county facilities operated smoothly, there were reports about ambulance shortages, which resulted in delays on the ground. Service users also reported that while available in theory, in practice, some of the allocated vehicles did not serve their communities.

“There should be a vehicle that can be easily accessed (...) So let it be readily available (...) Because there are some that are there, yes they are there, but they will tell you that they cannot get in to the [slums], – that is what they usually say. So I can say, (...) for Mathare, let them have three of them and they should go all over [so] that even if we have curfew, they can still help us.”

– FGD, Breastfeeding women, Mathare

“Maybe you want to refer a patient to the sub-county hospital and you don’t have an ambulance, or maybe it has broken down [and] it needs maintenance. So maybe you might end up having the patient wait for seven hours for the ambulance.”

– KII, Healthcare Provider, Kilifi

The use of the same vehicles for both Covid-19 and non-Covid patients also presented a challenge due to the risk of transmission.

Two CHVs working in Kilifi mentioned they had encountered difficulties in finding transport to take emergency patients to health facilities. Other barriers to the referral process included the service users' inability to pay for transport fares to reach the facility or purchase a facemask to be seen at the facility and, in some cases, clients misplacing referral letters.

5.2.3 Continuation and utilization of community-based healthcare

The Covid-19 pandemic also affected the services routinely provided by CHVs in the community. For instance, restrictions on movement made it difficult for CHVs to visit households and identify clients for referral services and for follow-up care.

“Yes, their [community health volunteers] mandate is to conduct household visits, and there was a restriction on movement. The person who is supposed to be visited is (...) suspect, [and] the person visiting is also suspect. So those restrictions and limitations on visitation actually affected their indicators; they were not able to know about what was happening in each household, so they were not able to report –because they have not visited.”

– KII, Health Manager, Kilifi

As the situation developed, health personnel held meetings with community leaders, and provided CHVs with PPE to help them carry out their work at the community level.

“Sometime in June 2020, one of the [implementing] partners decided that we could now [resume] outreach [activities]. We carried out integrated outreach [activities]; we were able to go to the community, observing the [Covid-19] protocol. Slowly, people started regaining confidence in healthcare facilities and health workers. Now, people are seeking services, and facilities are following the guidelines in the protocol.”

– KII, Health Manager, Mathare

5.2.4 Specific effects on the disadvantaged target population

People living with HIV

Study findings suggest that many HIV services continued to be available during the pandemic period under study – albeit with limitations. There were mixed reports about the continuity of HIV Treatment commodities by different respondents. One aspect of care that particularly suffered during the pandemic was social and emotional support through group therapy for people living with HIV: Covid-19 restrictions seemed to have affected access to patient group activities. The study also found high defaulter rates among patients attending the HIV Comprehensive Care Clinic.

This could be due to a number of factors: First, some people living with HIV missed care because of the limited time for service provision and low numbers served daily at the health facility. Moreover, upon arrival at the health facility, some found it difficult to explain their situation – as this would require disclosure of their HIV status. However, issues of this nature were mainly noted at the beginning of the pandemic.

“For those mothers that were [living with] HIV (...) they had a hard time considering only a certain number were being allowed at the facility. And they would not be able to explain themselves and not willing to disclose [their HIV status]. But after [a] few days [members of]

the department [were] able to sit down, [and] make arrangements that assisted (...) I feel it's only the first few months that they didn't get the best care."

– KII, Healthcare Provider, Kilifi

In addition, HIV counselling and testing services were often limited or unavailable. Healthcare providers who usually provide these services are few and their numbers reduced further during the pandemic because some resigned.

Many people living with HIV worried about contracting Covid-19, as they had been told that it was particularly easy for people living with HIV to acquire the virus due to their compromised immunity. The media broadcast messaging that suggested people with underlying conditions were at risk of developing serious complications if they contracted the disease. This made some patients avoid health facilities. Among the most vulnerable groups were women who needed care together with their children.

"I think it was the panic part of it because [people were thinking] 'I am already immunocompromised'. We were told it was all over, that the immunocompromised were at risk of getting Covid. So, there was a psychological part of it among clients [with] HIV and TB because [they were thinking] already, 'Here I am facing an infection, and I am at risk of getting Covid and can make my situation worse.'"

– KII, Health Manager, Kilifi

"Maybe, for example, if we talk about people living with HIV, you see that is an underlying condition, so many of them were not coming to the facility. They do not want to interact with people here; they think that their immunity is low, and so they may fall sick, so they could not come to access the healthcare in the facility. Even during their clinics, they were not coming."

– KII, Community Health Volunteer, Mathare

"There are groups that were affected, like the ones seeking comprehensive care services with their children. They were really scared of contracting Covid-19. I tried to start providing services to them to make sure they come in very small numbers to start services immediately. They were scared as they already had low immunity and [were] now scared of contracting Covid-19."

– KII, Healthcare Provider, Mathare

To reduce the number of patients at the facility, HIV and TB patients who were considered stable received long-term prescriptions and their check-up appointments were spaced farther apart. Moreover, where there was partial closure of facilities – e.g., during fumigation – patients could pick up their prescription refills at the health facility gate.

Poor and vulnerable populations

Just like the rest of the community, the poorest and most vulnerable community members accessed health services free of charge in some of the public facilities. Some were also visited by CHVs, and some received food donations from partners and well-wishers. When it came to accessing facility-based healthcare, often the cost of transport and finding the means to purchase the prescribed medicine were among the most significant obstacles.

"Mostly, they are women because women sometimes you could get that the husband has no money, he has left her some little money and you get something like that mask (...) so getting that service becomes difficult."

– FGD, Fathers, Mathare

“Mostly, they come to hospitals like Vishakani. You will find there, many people. They wake up at 4.00 a.m. there. If someone has a cold, they wake up at 4.00 a.m. to go and queue because on getting there, you will find others waiting. The doctor finds them there. You may find people really shaking but they have no money to go to another hospital. So, they opt to get help. These hospitals, [in particular], have no medicine. They write a prescription for you to go and buy. When they write down the prescription, you just put the book away and remain the same. You may also buy a few medicines and take them, then survive.”

– FGD, Breastfeeding Women, Kilifi

Often with no means to buy basic necessities, such as food, people living in poverty could not afford simple protective equipment, such as facemasks, and their living conditions made it difficult to observe social distancing.

“In one of the households, there was a mother who had a small baby, she had just delivered [when] her partner tested positive for Covid. (...) They were living in a bedsitter so isolation was not possible and so he transmitted the virus to the rest of his family members: all of them got Covid. (...) They lost their jobs so even getting food to feed that baby was hard.”

– KII, Community Health Volunteer, Mathare

The elderly

While Covid-19 and its complications claims a disproportionate number of lives among the elderly, seniors did not enjoy any particular privileges in the context of health facilities, and had to endure long waiting times alongside other clients, until the arrival of the vaccine. Many avoided visiting health facilities altogether, due to fear of infection. Some of those who attended services struggled with having to wear a facemask; others could ill afford one.

Pregnant adolescent girls

During the Covid-19 period, schools closed for long periods and some adolescent girls got pregnant. Many could not afford essentials for their baby; some worried about attending the clinic for antenatal appointments due to fear of being asked intimidating questions by the care providers. Thus, some became defaulters.

Given the fact that adolescents had limited resources and options, e.g., they could not afford private care, they would keep returning hoping to get served at the public health facilities. As shared by a pregnant adolescent in Mathare, sometimes they did not make the daily list of patients to be served, and at other times they arrived at the health facility late and were turned away.

“Because you find that at a hospital they pick a few people who they will treat (...), then you are told to come the next day. And you find that if you are the kind of person who does not keep time you come and then again you are sent back home (...) You definitely go back home because, like, for us who are in that underage [group], we do not have money for private [facilities] because in private, you have to pay. So we only depend on this government to help us, and if they still don't help us, we will wait until the time they will help us.”

– IDI, Pregnant adolescent, Mathare

5.3 Reorganization of space for service provision

Inside health facilities, space was reorganized to conform with Covid-19 guidelines. People arriving

to seek care would first be directed to a screening and triage area. Sitting positions and waiting bays were clearly marked. In some places, additional space was made available to waiting clients and, in others, waiting areas were established for clients coming to the facility to wait before being directed further on to next steps to receiving care and treatment. Some facilities had holding and isolation rooms for suspected cases of Covid-19, and certain facilities were used as dedicated Covid-19 isolation centres.

“We tried to space the beds [apart] to ensure social distancing was observed at the maternity [ward].”

– KII, Health Manager, Mathare

“Spaces were designated for (...) cases of Covid (...). Like in the sub-county hospital, here we identified a room where all suspected cases were admitted (...). Yes, we did that to avoid infection to other clients who were coming here.”

– KII, Health Manager, Kilifi

“We only had holding spaces for the [Covid-19] suspected cases just before they were able to move to the next level as you collect samples for testing. We were using KMTC, Mbagathi, and Mama Lucy hospital as they were put by Nairobi County.”

– KII, Health Manager, Mathare

A number of challenges related to reorganizing space for service provision during the pandemic became apparent. Limited space meant some facilities were not suitable for observing social distancing; some were not in a position to set aside isolation rooms. Additionally, changes made meant patients spent longer in the waiting area before accessing services: some became tired or restless and chose to leave the health facility without being seen.

5.4 Communication of Covid-19-specific policy/mitigation measures and messaging instituted

Community members in Kilifi and Mathare received critical messaging about the Covid-19 virus, prevention, restrictions, and available services through the radio and television, as well as posters and billboards. In addition, healthcare workers and the network of CHVs were an important source of reliable, first-hand information for the community. CHVs went door-to-door, and demonstrated best practices, such as hand-washing, during community meetings. Village elders and *Nyumba Kumi* leaders [individuals in communities who monitor security threats] also took part in sharing information around Covid-19.

“I got them [messages about Covid-19] through the radio, TV, as well as these billboards, the kind that are always put on the roadside (...) They were easy to understand because it was clearly put there.”

– IDI, Pregnant adolescent living with HIV, Kilifi

The main purpose of these efforts was community sensitization about Covid-19. This included raising awareness of the signs and symptoms of the virus and its modes of transmission; prevention measures, including social distancing and using facemasks in public places to help curtail the spread of the virus; as well as guidance on available services at local health facilities, together with any restrictions relating to patient numbers, or visitors there. Messages were also designed to debunk some of the myths and misconceptions circulating in the community, and to minimize confusion. Initial fear and resistance to the new information gave way to gradual understanding of the parameters of the new situation.

5.5 Secondary data review – Summary of changes in key maternal, newborn, and child health indicators

The data source for this section is monthly MNCH service statistic (use and outcomes) obtained from the national DHIS-2 reporting system, for the period January 2018 to March 2021, including the index month of March 2020 when Covid-19 was first detected in Kenya and national public health and social measures were introduced. Denominators for rates are included in DHIS2 and largely based on modelled population estimates. Statistical analysis using a Segmented Regression, as defined in Appendix 2, was applied to identify changes in key MNCH indicators following the outbreak of Covid-19 Kenya in the index month (March 2020). A detailed presentation of the findings in figures and tables can be found in Appendix 2.

5.5.1 Maternal, newborn, and child health trends before the pandemic

Between January 2018 and February 2020, before the pandemic was announced, the trends for the selected MNCH indicators were as follows:

MNCH service utilization

- ***Contraceptive prevalence rate:*** There was an overall increase in the contraceptive prevalence rate across both counties and nationally from January 2018 up to the index month of March 2020.
- ***Utilization of antenatal care (4th visit):*** The effect of Covid-19 on antenatal care coverage was measured through coverage of the 4th antenatal care visit. There was an increase across both counties and nationally from January 2018 up to the index month of March 2020. Coverage in Kilifi County was comparable to the national average, whereas Nairobi county showed higher rates. All data showed a drop in November–December 2019 which would require further investigation.
- ***Deliveries by skilled birth attendants:*** This indicator showed an increasing trend over time before the Covid-19 outbreak, both at national level (significant) and in Nairobi and Kilifi County, the two counties under study. Nairobi County was seen to have higher rates of deliveries by skilled birth attendants, as compared with the national rate, and that for Kilifi County. A short-term drop in all three localities between October 2019 and December 2019 requires further investigation.
- ***Postnatal care attendance (2-3 days after birth):*** There was a steadily increasing trend (not significant) in the coverage of postnatal care attendance across both counties and nationally from January 2018 up to the index month of March 2020. Kilifi County showed higher rates in postnatal coverage than the national average and the increasing trends were similar across the two counties and nationally.
- ***Children under one year of age who are fully immunized:*** There was a declining trend in the proportion of children under one year of age who are fully immunized in both counties and nationally from January 2018 up to the index month of March 2020.
- ***Children under five with diarrhoea treated with zinc and oral rehydration solution (ORS):*** There was a decrease in this indicator in both counties under study, and an increase in the national rate from January 2018 up to the index month of March 2020.

Maternal, neonatal, child, and adolescent health

- *Adolescent pregnant women (10–19 years of age)*: There was a modest and significant decrease in the percentage of pregnant adolescent women nationally and in Kilifi County from January 2018 up to the index month of March 2020. The proportion of adolescent pregnancies in Nairobi County was stagnant, but generally lower as compared to the national levels and those seen in Kilifi County.
- *Maternal mortality (deaths that occurred in health facilities)*: Based on the segmented regression, the coefficient for monthly change in maternal mortality was negative nationally and for the two counties, though not statistically significant from 2018 up to the index month March 2020. As expected, the national trend shows lower variability than the trends for either county.
- *Neonatal mortality (deaths that occurred in health facilities)*: There was a minimal increase in the neonatal mortality rate from January 2018 up to the index month of March 2020.
- *Pneumonia in children under five*: There was a slight increase in the incidence rate for pneumonia among children under five in Nairobi County and nationally while in Kilifi county there was a significant increase from January 2018 up to the index month of March 2020.

5.5.2 Maternal, newborn, and child health trends following the outbreak of Covid-19

Data at the onset of Covid-19 in Kenya show that the effect of Covid-19 and the related mitigation measures was immediate but short-lived. The analysis showed that in the index month of March 2020, most of the service utilization indicator values declined at national level as well as in the two counties, with a few variations.

After March 2020, through March 2021, findings show a mixed picture, as seen in Table 3.

Consistent findings nationally and across the two study counties were observed for a decrease in pneumonia incidence in children under five, a decrease in the contraceptive prevalence rate, and a decrease in the percentage of pregnant women who are adolescents. Consistent increases were observed for the percentage of deliveries carried out by skilled birth attendants; the facility maternal mortality ratio; and neonatal death rate after the index month of March 2020.

While there was an initial increase in maternal deaths, data were largely not available after September 2020. Variations were seen in antenatal care coverage (4th visit) with a drop in utilization both in Nairobi and Kilifi Counties, but an increase nationally. A decrease in the percentage of children under 5 years of age with diarrhoea who were treated with zinc and ORS was seen in both counties, while an increase was observed at the national level. An increase in the proportion of fully immunized one-year-olds was seen at national level and in Kilifi County, while a decrease was observed in Nairobi County. Significant drops in some service utilization indicators between December 2020 and March 2021 coincided with the timing of the health workers' strike in the country (December 2020 to February 2021).

Underreporting due to the pandemic or other events, including the strike might have grossly influenced these data. Substantial loss of data pertaining to maternal mortality and postnatal care after September 2020 might be linked to reporting gaps during the course of the Covid-19 pandemic and/or other reasons which would need further exploration. In general, data gaps and incomplete reporting limited the reliability and validity of the findings, raising questions about potential challenges plaguing Kenya's health information system, particularly during health crises.

The results based on the differences between January 2018 – February 2020 compared with March 2020 – March 2021 are shown in Table 3 below. The Kruskal–Wallis test was used to examine the differences in averages of the two time periods.

Table 3. Select MNCH indicator trends comparing pre Covid-19 pandemic period (January 2018–February 2020) with a pandemic period (March 2020 – March 2021)

	National	Nairobi County	Kilifi County
Key MNCH indicators	Change		
Institutional maternal mortality ratio	▲	▲	▲
Neonatal death rate	▲	▲	▲
Percentage of pregnant women who are adolescents (10–19 years of age)	▼	▼	▼
Contraceptive prevalence rate	▼	▼	▼
Proportion of children under 1 year of age who are fully immunized	▲	▼	▲
Percentage of children under 5 years of age with diarrhoea treated with zinc and ORS	▲	▼	▼
Pneumonia incidence rate in children under 5 years of age	▼	▼	▼
Percentage of deliveries conducted by skilled birth attendants	▲	▲	▲
Postnatal care (PNC) attendance (2–3 days) coverage	▲	▲	▲
Fourth antenatal care (ANC) appointment coverage	▲	▼	▼

* Green arrows indicate an positive change (ie for the better) in the indicator; red arrows indicate a negative change; cells shaded in yellow are those where the change is statistically significant. Statistical significance was based on the Kruskal–Wallis test, comparing the average of the respective indicator before and after the Covid-19 outbreak.

6. Lessons learned

Target groups were asked to articulate key lessons from Covid-19. Many of these reflect the need to general health systems strengthening, regardless of Covid-19, noting the importance of expanding the health workforce, ensuring the consistently available supplied and improving referral pathways. With respect to Covid-19 specifically, respondents highlighted the need for improved government communication about the pandemic; the need to greater supply of PPE to facilities and CHVs; the need to ensure the continuity of essential services, despite the pandemic; the importance of investments in emergency preparedness and surveillance and the need to consider barriers to care, such as lockdown measures and facemask requirements, that were unaffordable for some.

In the paragraphs below, key suggestions from the different target groups are presented:

Facility-based healthcare managers suggested that the Government needs to ensure that healthcare workers are well equipped with the necessary PPE to protect their lives and those of others. They also noticed that there was a need to equip health facilities to enable them to offer quality services to the clients, for instance, by ensuring a constant supply of commodities. They noted the need for more training of the healthcare workers on how to handle health emergencies.

“The hospital and the department should sit down put down measures on any kind of pandemic that may come (...) our way. We need to strengthen the staff capacity on issues and to handle [the] pandemic as that was lacking in the beginning.”

– KII-Healthcare Provider, Kilifi

Facility-based managers also emphasized that awareness creation and sensitization of the community needed to be put in place as soon as emergencies arise to debunk myths and misconceptions, and to promote appropriate behaviors. It is also necessary to provide financial support to CHVs to motivate them and enable them carry out their activities.

This group of respondents recognized the value of mitigation measures put in place by the Ministry of Health and would like to see them continue to be observed. Such measures helped improve IPC both in healthcare facilities and even at an individual level. They learned that the Covid-19 pandemic is manageable.

“Hygiene has gone high among everyone. Many of us were not taking it seriously. Hand-washing has really helped a lot. We have learned how to put on the masks properly, which was a challenge initially. No more handshakes. I wish these practices can continue even after the Covid pandemic. The minimized crowding at the health facilities. People have learned to keep distances. The measures have also helped with TB control.”

– KII-Healthcare Provider, Mathare

Facility-based managers also learned that it was important to ensure uninterrupted delivery of essential health services irrespective of the pandemic.

“I think at the beginning of the pandemic [it] was not wise for us to stop all the services, because most of the patients were told to go back home, and also the immunization services were not conducted well, and also maybe screening (...) was not done. So I think maybe if there is a pandemic, we need to sit down and discuss [what] we can do in order to serve our clients well.”

– KII-Healthcare Provider, Kilifi

Managers emphasized the need to strengthen emergency preparedness from the community level to

the national level with more emphasis on the facility-level. For instance, there is a need for an enhanced disease surveillance system and more comprehensive support.

“And always there should be (...) a response team in place – cutting across various departments – in readiness for (...) any emergencies that may (...) arise. Yeah. In case of (...) any other disease outbreak. Just like we’ve had before for cholera and such.”

– KII-Facility Manager, Mathare

Health facility managers noted the need to strengthen referral systems from the community to the facility and from one facility to others – and recognized the importance of an adequate number of reliable ambulances in facilitating smooth transfers between different levels of care.

“And more emphasis [should] be put on referral systems across the board, not only for this facility, whereby we should have...well-equipped ambulances on standby all the time.”

– KII-Facility Manager, Mathare

The **county- and sub-county-based managers** underlined the need for simple, clear communication.

“I will only speak on the issue of communication to the community. Right from the month of March, clear communication messages [should] have been developed, easy to understand, avoid[ing] medical terms – difficult terms (...) community members are not even able to understand. (...) Simple messages that this is a new disease, [that] we are carrying out research to understand [it], [that] there is no cause of alarm, [and] these are the ways we think we can protect ourselves from it. Very simple messages [rather] than introducing [too much] medical jargon. So, that [type of] communication – it was lacking and that is what caused all these problems because people were [becoming scared] because of those big names. We should learn how to communicate simply and be [easily] understood.”

– KII-Health Manager, Kilifi

Healthcare managers also recognized the importance of emergency preparedness plans in place.

“Routine health services can still continue in the context of Covid-19. We need an emergency preparedness plan, with teams in place for any future pandemic. Every pandemic is unique but where we need supplies that [are] not normally in use, [we] need to have funds in place to procure [them]. [We need] information shared effectively. MNCH services and other services should continue undisrupted so that we [can] assist our clients as usual. A challenge experienced during [the] Covid [pandemic] was [that] ART supplies (...) were inadequate but the situation has now stabilized.”

– KII-Health Manager, Mathare

Community Health Volunteers learned that Covid is real and that social distancing can reduce Covid-19 infections. They also learned that it is important to be patient and supportive when serving community members. One Community Health Volunteer explained:

“[It is important] to be very patient when working with communities and [not to] engage in any verbal altercation with members. Besides that, avoid people who provoke you for physical abuse.”

– KII-Community Health Volunteer, Mathare

CHVs wished the following could be done differently: the community should be supplied with facemasks when these are essential; the county should have an emergency fund; community

sanitation services could be improved; and CHVs should be paid a Government stipend.

“As community health volunteers, we really are unrecognized, and we go through harder situations than those who treat patients. Because we are the ones who search for patients in the community to come here.”

– KII-Community Health Volunteer, Kilifi

Adolescent girls and women suggested that there is a need to increase the number of health workers in health facilities to ensure timely, efficient, high-quality service delivery. They wished that free ultrasound services, essential medication and vaccines would be procured by the Government and always be available at health facilities.

“My recommendations are that health workers should be always available in hospitals. Challenges such as giving birth at home and lacking other health services could end.”

– IDI-Breastfeeding Woman, Kilifi

“We should stop being scared of going to the clinic because we are thinking we are still [too] young. (...) No one gets pregnant because they want, (...), and it is not like we wished to get that pregnancy, (...) you only learn later that you are pregnant. So we should stop being scared of coming to the clinic. Let us stop viewing [as] too young and all those things.”

– IDI, Pregnant Adolescent, Mathare

Similarly, **pregnant women living with HIV** suggested that there was a need for additional hospitals and efforts to ensure drug availability in health facilities. They encouraged people to continue adhering to the Covid-19 mitigation measures as laid down by the Ministry of Health. They also wished for easy access to Covid-19 vaccination. Additionally, they wished the healthcare workers would share correct and easily understood information about Covid-19 with the community.

“The health workers should provide the community with correct information to avoid fear.”

– IDI-Adolescent living with HIV, Mathare

Pregnant and breastfeeding women suggested that hospitals should provide 24-hour services and be well supplied with adequate drugs, and that more health facilities should be built or renovated, and more health workers should be available in healthcare facilities. Additionally, this group suggested that private hospitals should hire qualified health workers, and that ambulance services could be easily accessible to patients. They wished for free maternal services and thought adolescents should be given access to Linda mama services [free services for pregnant women]. They reported a need for emergency services for pregnant mothers and provision of means of transport for referral cases. They also agreed that the government should distribute free facemasks fairly among community members; and do away with movement restrictions and school closures that were put in place as containment measures for Covid-19.

The **mothers of children under five** suggested that the Government should give out free facemasks when these are mandatory, and that health facilities should increase community sensitization on current health crises, such as Covid-19. They also said the Government should ensure that the necessary drugs and equipment is available in local clinics, increase the number of health workers, and lengthen the time allocated for serving patients.

“On my side, the Government is to [provide] drugs so that [no drugs are missing at] the hospital (...) Every citizen who has no means should not find difficulties in the Government hospital.”

– FGD, Mothers, Kilifi

Fathers of children under five suggested there was a need to increase number of health workers and health centres and make drugs available at health facilities.

“The medicine should be made available, so that you don’t come and get a prescription for a drug that is hard to find. They should look into that. We want to be served here.”

– FGD, Father, Mathare

They saw a need for distribution of free facemasks and creation of isolation rooms in some of the facilities. They wished that there was constant and adequate provision of water at hospital and improved road infrastructure to improve access. Moreover, they recognized the need to empower and recognize CHVs for their work in the community. Lastly, they wished that the Government would facilitate easy access to services in neighbouring counties.

7. Conclusions and discussion

Like almost all countries in the Eastern and Southern Africa region, the Kenyan government responded swiftly to the Covid-19 pandemic by employing new public health and social measures on a national scale. While these measures may have helped reduce Covid-19 transmission, particularly early on, findings of from this study reveal that these measures were not without costs. While the societal impacts have been wide ranging, this study concerns itself with unintended impacts on the continuity of essential health services, with a focus on maternal, newborn and child health services. The disruption of these services is particularly impactful in an environment marked by significant maternal and child mortality.

This study explored population demand, access and experience of MNCH services as well as front line health worker perceptions of changes in delivery practices and population uptake in two relatively socio-economically disadvantaged populations. Though one site was rural and the other highly urban, with varying Covid-19 reported case burdens between the two areas, there was no notable differences in experience across these locations, according to qualitative data collected in June and July 2021.

Interviews with county and sub-county health managers, health facility providers and CHVs, revealed the stress that Covid-19 put on the health system. Healthcare providers were affected by staff shortages and high workloads, due to staff re-deployment and illness. This combined with shortages of PPE and inadequate hygiene amenities, particularly in the early phases of the pandemic, lead to significant loss of staff morale and even industrial action. Facilities also struggled to implement new guidelines aimed to decongest facilities, in many cases due to limited space. Disruptions in supplies of some critical health commodities was also a challenge and led to population dissatisfaction.

Both healthcare workers and prospective health clients noted the confusion caused by strict lockdowns and unclear “stay-at-home” messaging, which had significant dampening effect on health service demand early on. Clients also expressed reluctance to go to crowded public facilities for fear of contracting Covid-19 there. This fear was heightened among more immunocompromised population, such as people living with HIV. In addition, new cost barriers to health seeking, such as the need to buy facemasks and increasing transportation costs dissuaded some clients from seeking care including adolescents, women living with HIV, and people with special needs. Efforts to decongest facilities to ensure social distancing, shorter hours, and fewer services on offer resulted in prolonged waiting times, and some clients being turned away without receiving the care they sought. Curfews had notable impact on access to emergency and delivery services at night, and ambulance shortages complicated referrals. Users perceived public health facilities as congested and often stocked out of essential drugs and equipment, in contrast to private facilities which were still regarded as being well-equipped and providing the necessary treatment – albeit at higher cost. Of note, people living with HIV were affected by stock-outs of antiretroviral treatment (ART) and often had to resort to purchasing drugs over the counter with cost implications.

Overall, a drop in MNCH service utilization and increasing home births and use of traditional healers were reported by health workers across both study sites. Though we sought to triangulate these observations with service statistics, data quality limitations restrict our ability to make confident assertions, though there is some evidence of increased maternal and newborn mortality during the March 2020-21 period nationally and in both study counties. In addition, missing systematic references to specific pandemic time periods respondent remarks makes it difficult to link variations in the statistical data with qualitative study findings.

This study highlights the importance of balancing health emergency response measures with efforts to maintain regular health system function. In the Kenyan context, where the burden of Covid-19

deaths has been significantly less than initial forecasts and relatively less impactful than in many countries in other regions of the world this is especially relevant. Mortality due to regular causes, such as non-communicable disease, HIV/AIDS, neonatal causes and diarrhoea, far outweigh Covid-19 and must continue to be the priority of the health system. Attention to all dimensions of the promotion of continued utilization of essential MNCH services is needed. This should include clear communication within the health system and with the public; mitigation of the impact of new cost barriers; reliable supply of services and commodities with adequate staffing and attention to the particular support needs of more vulnerable populations such as adolescents; the immunocompromised (including people living with HIV/AIDS); and pregnant women.

While the Covid-19 experience in Kenya highlights the importance of careful consideration of the range of effects of risk mitigation measures during health emergencies, it has also underscored the importance of addressing persistent health system challenges that require greater attention. Too few human resources for health and lack of formal remuneration for the community health workforce limits system performance generally, but particularly strains the health systems ability to adapt during emergencies. Investing in the health workforce can go a long way towards improving client experience and building greater confidence in the system. Investments in health system preparedness, infection prevention control improvements and surveillance systems also can better prepare the health system to respond to meet new challenges. Given the anticipated interlocking impacts of climate change, population growth and urbanization, these investments cannot be made too soon.

Appendices

Appendix 1. Continuity of Essential Health Services (CES) Study list of specific research question

**Appendix 2. Quantitative component of the Continuity of Essential Health Services (CES) Study-
Secondary data review: All graphs and descriptions**

Appendix 3: Continuity of Essential Health Services (CES) Study Approval Documentation

Appendix 1. Continuity of Essential Health Services (CES) Study list of specific research questions

A. Maternal, newborn and child health: Demand-side factors

Intention action/gap drivers

- a. During the Covid-19 pandemic, did the target groups of primary interest use essential MNCH services (essential as defined in the national packages of care and provided by skilled personnel) to the same extent (frequency, based on needs/demands) as during non-Covid times?
- b. What were the main factors/reasons that affected the use of essential MNCH services by the primary target groups during the Covid-19 pandemic? What was different to non-Covid times with regard to the topics below?

Topics to explore with regard to specific barriers:

- Challenges related to self-efficacy:
 - i. women cannot attend the health services due to competing priorities (child caring, house chores, workload, etc.).
 - ii. women need to seek approval from partner/husband/mother-in-law or other to access services.
 - iii. women usually use other services than those offered by skilled personnel.
- Fear of stigma – fear of being stigmatized as a result of having Covid-19 positive test results.
- Fear of Covid-19 infection – e.g. lack of infection protection at health facility levels; fear of becoming infected through other clients/patients.
- Perceptions of community confidence in health-seeking; decreased acceptability of essential MNCH health services during the Covid-19 pandemic (e.g. mistrust regarding available staff, available supplies, poor quality of care, etc.).
- Official messaging about health seeking during Covid-19: potential existence of contradictory Government guidance and law enforcement (stay home v/s access MNCH services).
- Rumours/misinformation and miscommunication about Covid-19 and restrictions/health seeking; different messages through different channels: religious leaders, community leaders, TV/radio channels, social media, Government instructions on official websites, newspapers, etc.

Reaching essential maternal, newborn, and child health (MNCH) services

- a. To what extent and how were the primary target groups able to reach a health facility / seek essential MNCH services during the Covid-19 pandemic compared to non-Covid times?
- b. What were the main factors/reasons that stopped or made it difficult for the primary target groups to reach essential MNCH care during the Covid-19 pandemic compared to non-Covid times?

Topics to explore:

- Stay-at home advice/ restriction on movement/travel during Covid-19 pandemic.
 - Restrictions/disruptions in public transport during Covid-19 pandemic hampering reaching health facilities.
 - Affordability: increased cost of accessing services, including hidden fees such as transportation cost and/or drop in income due to Covid-19 measures (out-of-pocket expenses while purchasing power decreases). Additional costs of masks, other out-of-pocket costs?
 - Unfriendly enforcement of Covid-19-related measures (e.g. police brutality in informal urban settlements in Kenya) eroding trust.
- c. What alternative arrangements were made by households and communities to reach essential (skilled health workers') MNCH services during Covid-19 times?

Receiving essential maternal, newborn, and child health (MNCH) services when the health facility is reached

- a. To what extent and why were essential MNCH services not available to the primary target groups when reached?
- b. What kind of changes were observed or experienced by the primary target groups with regard to the quality of MNCH services provided during the Covid-19 pandemic compared to non-Covid times?

Topics to explore:

- Waiting times, time of staff attention.
 - Refusal of care / being turned away from services.
 - Neglect (e.g., not conducting all essential care steps), poor attitude of staff.
 - Physical abuse, verbal abuse by staff.
 - Poor communication and explanation (including non-consented care).
 - Limited space for waiting / crowded areas.
 - Lack of infection protection (e.g., social distancing, hand-washing, sterilizers, people/health workers not wearing masks).
 - Privacy and confidentiality during service delivery.
 - Payment for formerly free services during the Covid-19 pandemic.
- c. How were the shortcomings of MNCH services during the Covid-19 time communicated with the primary target groups at facility level? Were people correctly and politely informed? Were they told what to do / where else to go in case MNCH services were not available?
- d. If the essential MNCH services were not available, what alternative services were available and used by the primary target groups during Covid-19 times?
- e. Were referral services functioning during Covid-19 times? Was there a difference compared to non-Covid-19 times? Why?

- f. Were ambulance services functioning during the Covid-19 pandemic? What were the reasons that ambulance services were affected in Covid-19 times?

B. Maternal, newborn and child health: Supply-side factors

Providing adequate care to the primary target groups according to demand and needs

- a. To what extent did essential MNCH services become disrupted and/or unavailable during the Covid-19 pandemic? How was the readiness of essential MNCH – to serve the primary target population as needed – affected?
- b. Which MNCH services were most affected and why?
- c. To what extent and why was the quality of services affected during the Covid-19 pandemic and/or by Covid-19? What kind of changes were seen or experienced with regard to the MNCH services provided to the primary target groups?

Topics to explore:

- Availability of staff.
 - Availability of functioning equipment and supplies, medicines.
 - Adequate space for service delivery, privacy.
 - Change of payment procedures/prices due to the Covid-19 pandemic.
- d. How was staff morale and motivation affected during the Covid-19 pandemic? What factors strengthened or reduced staff morale? What was the impact of staff motivation on the provision of MNCH services?

Topics to explore:

- Staff stressed by workload.
 - Low motivation and why?
 - Fear of infection.
 - Lack of PPE and adequate orientation on Covid-19 prevention/infection protocols.
- e. To what extent were the referral pathways (from community to first-line health service and hospital level) for MNCH care functioning/not functioning during the Covid-19 pandemic in comparison to the pre-Covid-19 period?
- f. Was emergency transport for pregnant women and children under five affected during the Covid-19 pandemic?
- g. Were referral services available/ready at the health centre/hospital levels and were patients received at referral level and appropriately treated during the Covid-19 pandemic?
- h. To what extent did available staff/health managers at facility and sub-county/county levels manage to keep up essential MNCH service provision and referral services?
- i. What were the mitigation measures implemented by the facility staff, and/or healthcare management to ensure continuation of essential MNCH service provision during Covid-19 times?

To explore:

- Revising patient flow pathways to ensure physical distancing.
 - Alternate modes of distribution of drugs (multi-month dispensing).
 - Infection prevention and control (IPC); provision of IPC/PPE and other supplies to ensure safe working environment.
 - Staff training and provision of guidelines for infection prevention and control.
 - Changes to referral chain.
 - Reorganization of services.
 - Arrangement for alternative services, including delivery of services through outreach/mobile approaches; Covid-19 centres.
 - Other.
- j. Were pregnant and breastfeeding women and parents/caretakers of children under five, including adolescent women and women living with HIV, provided with adequate information about Covid-19 and infection prevention, including safe breastfeeding? How this was communicated?

C. Maternal, newborn and child health: Service utilization

- a. Did the MNCH service utilization pattern change during the Covid-19 pandemic?
- b. How did the service utilization pattern change?
- c. If yes, to what extent and for which MNCH services specifically?
- d. What were the main factors/reasons influencing utilization patterns?
- e. If there has been a change in the pattern of service utilization, what is the perception of the target groups and the healthcare providers/managers on the potential impact of this change on MNCH outcomes?

To explore:

- Complications, ill health and death among pregnant women, newborns, and children under five utilizing the facility-level services and those who could not/would not use these services during the Covid-19 pandemic.

D. Country-specific and subnational environments

This assessment will primarily be done through desk review. Some specific questions will also be included in the key informant interviews for healthcare managers.

- What was the epidemiological, national, and local policy response context relating to MNCH service provision during the Covid-19 pandemic?
- What were the country-specific national and local Covid-19 policies/response actions in relation to MNCH service provision?
- Covid-19 epidemiology; Covid-19 surveillance data.

- Essential MNCH service statistics and service delivery guidance in the context of Covid-19.
- Major budget changes relating to provision of MNCH services during the Covid-19 pandemic and potential changes compared to before.

Lessons learned: demand-side and supply-side

Based on the questions raised above, the study teams will elaborate on what were the main lessons learned from the Covid-19 pandemic with regard to demand for, access to, and readiness of MNCH services. In addition, the interviews will include a question on what the lessons learned were.

Focus will be on:

- Health services.
- Healthcare providers.
- Healthcare users.
- Community-based health service delivery.
- Referral pathways/linkages between community systems and health systems.

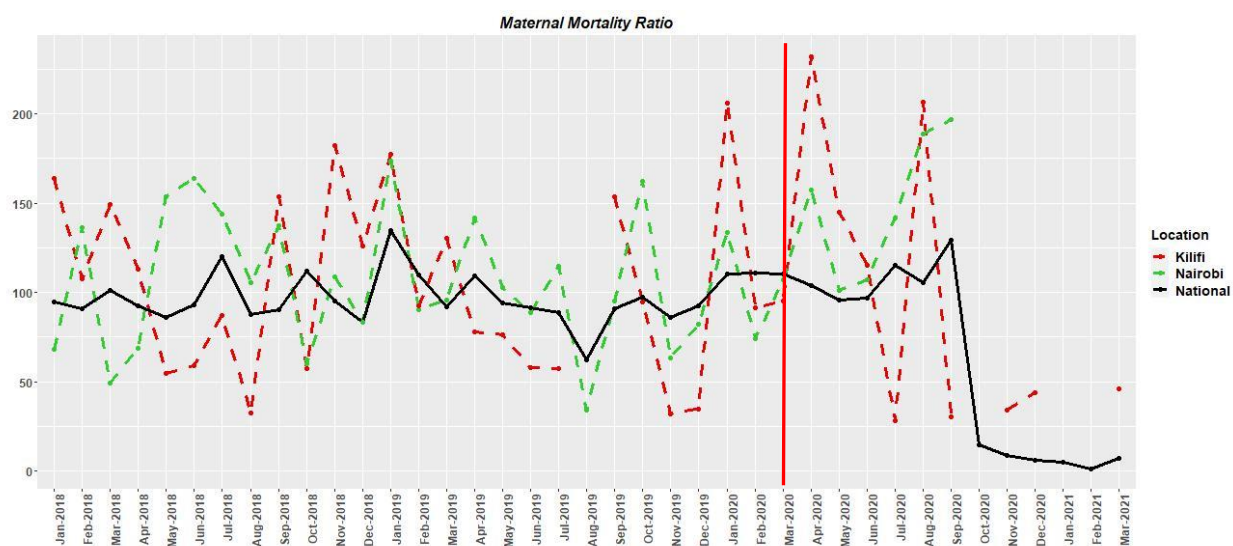
Appendix 2. Quantitative component of the Continuity of Essential Health Services (CES) Study- Secondary data review: All graphs and descriptions

1. Mortality

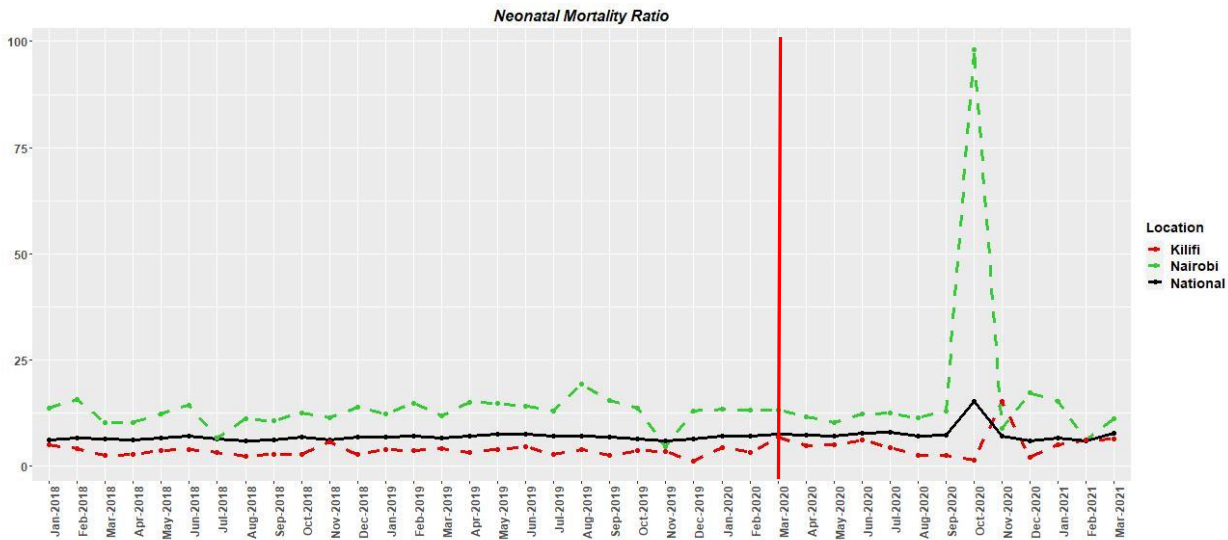
The effect of Covid-19 on mortality was measured through two variables: maternal mortality ratio (MMR) and neonatal mortality rate (NMR), restricted to deaths occurring in a health facility¹⁹. Figures 5.6 a-b below show the monthly trends for facility-based maternal and neonatal mortality reported nationally and by the two counties, between January 2018 and March 2021. From 2018 through September 2020, including the outbreak of Covid-19 in March 2020, there was no meaningful recorded change in either mortality indicator. As expected, the national trend shows lower variability than the trends for either county.

Beginning in October 2020, however, MMR and NMR data for Nairobi and Kilifi counties was largely unavailable. Correspondingly, the national data showed a substantial drop, likely due to non-reporting or non-recording of maternal and neonatal deaths. The reason for this disruption to data reporting is not clear.

Figure 5.1 a-b showing maternal and neonatal mortality for Kenya (solid black line), and Kilifi and Nairobi counties (dashed red and green lines, respectively).



¹⁹ Data received from UNICEF Kenya Office, retrieved from DHIS2



Tables 1 and 2 describe the results of the segmented regression for maternal mortality and neonatal mortality. There was a modest but consistent decrease in the maternal mortality rate from January 2018 up to the index month of March 2020. Based on the segmented regression, the coefficient for monthly change in maternal mortality is negative nationally and across the two counties, though not statistically significant. The Covid-19 outbreak in March 2020 (index month) and related social responses was estimated to have a dramatic effect in increasing the maternal mortality rates particularly nationally and in Kilifi County whereas Nairobi County showed a decrease but not significant. By contrast, the estimates for maternal mortality after the index month are consistently negative nationally and in Kilifi County whereas positive in Nairobi County.

Table 1. Covid-19 effects on maternal mortality (National, Nairobi, Kilifi; 2018-2021)

County	Time (b_1)	Covid-19 (b_2)	Time Since Covid-19 (b_3)
National	-0.03	44.78*	-11.36
Nairobi	-0.53	-8.70	13.80
Kilifi	-0.79	72.57	-10.48*

Note: * P value < 0.05

Among neonatal mortality, there was a minimal increase in neonatal mortality rate from January 2018 up to the index month of March 2020. The Covid-19 outbreak in March 2020 also showed an increase in the neonatal mortality rate but not significantly. After the index month, nationally the neonatal mortality showed a decrease whereas Nairobi and Kilifi showed an increase, again not statistically significant.

Table 2. Covid-19 effects on neonatal mortality (National, Nairobi, Kilifi; 2018-2021)

County	Time (b_1)	Covid-19 (b_2)	Time Since Covid-19 (b_3)
National	0.02	0.97	-0.05
Nairobi	0.06	2.18	0.36
Kilifi	-0.02	1.53	0.09

Note: * P value < 0.05

As noted previously, the incomplete data on MMR and NMR may introduce a bias in the statistical

estimates for the Covid-affected period. Accordingly, interpretation of these findings is subject to caution about the quality of the data and its effect on the statistical analysis.

2. Adolescent pregnant women

Figure 5.2 below shows the monthly trends for the percentage of pregnant women that are adolescents (10-19 years). Nationally and in the two counties, there is a trend seen toward decreasing proportions of adolescent pregnancies. The proportion of adolescent pregnancies in Nairobi County is generally lower as compared to the national levels and also Kilifi County. Kilifi County had similar rates from January 2018 to December 2018 as compared nationally, but there was decrease in the rates following December 2018.

Figure 5.2 showing the percentage of pregnant women who are adolescents (10-19 years) nationally, and for Kilifi and Nairobi counties.

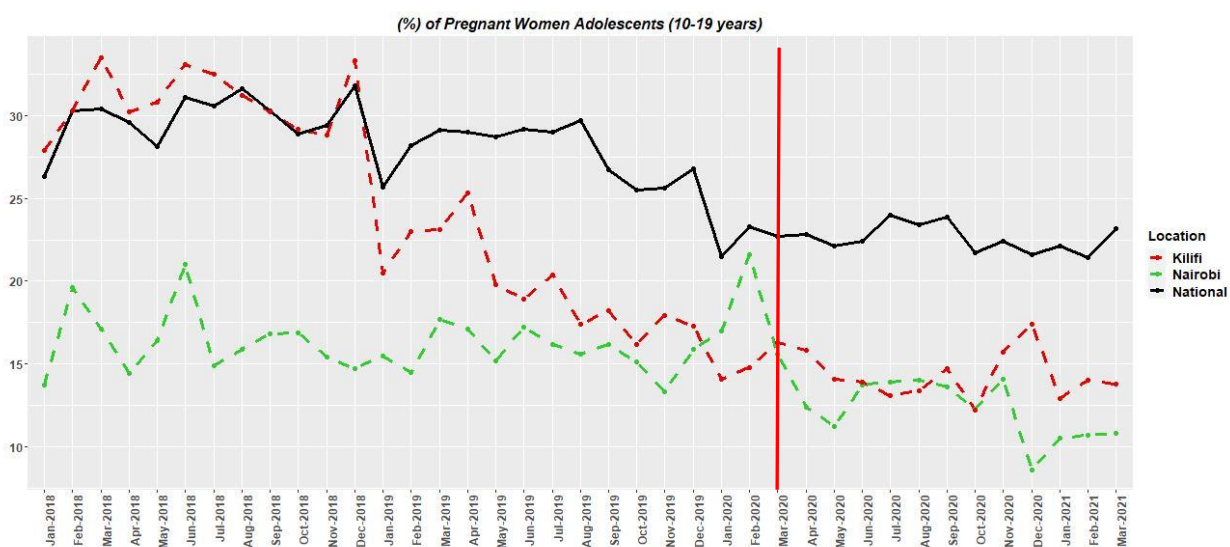


Table 4 describes the results of the segmented regression for the percentage of pregnant women who are adolescents (10-19 years). There was a modest and significant decrease in percentage of adolescents nationally and in Kilifi county from January 2018 up to the index month of March 2020. The Covid-19 outbreak in March 2020 (index month) and related social responses was estimated to have a decrease nationally and in Nairobi County whereas an increase in Kilifi County. The estimates for the percentage of pregnant women who are adolescents after the index month was positive nationally and significant in Kilifi County, whereas was negative and statistically significant in Nairobi County.

Table 4. Covid-19 effects on the percentage of pregnant women who are adolescents (10-19 years) (National, Nairobi, Kilifi; 2018-2021)

County	Time (b_1)	Covid-19 (b_2)	Time Since Covid-19 (b_3)
National	-0.20*	-2.74*	0.14
Nairobi	0.01	-1.82	-0.32*
Kilifi	-0.78*	0.14	0.70*

Note: * P value < 0.05

This difference between a decrease in the percentage of pregnant women who are adolescents in

Nairobi, compared to either Kilifi or the national trend, may be explored further in subsequent qualitative research.

3. Deliveries

Figure 5.3 below shows the monthly trends for the percentage of deliveries conducted by skilled birth attendants. Nairobi is seen to have higher rates compared to the national level and Kilifi County. Also nationally, there has been an increase in the rates over time, with the exception of a short-term drop from September 2020 to January 2021. A similar pattern is depicted among national rates and with Kilifi County across the entire timeframe.

Figure 5.3 showing the percentage of deliveries conducted by skilled birth attendants nationally and for Kilifi and Nairobi counties.

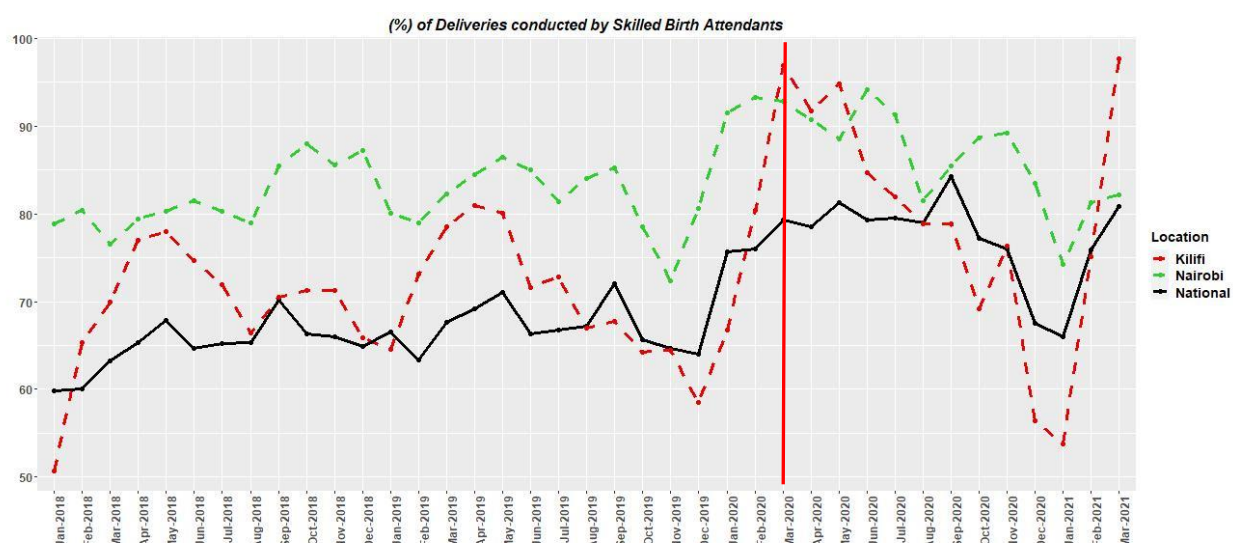


Table 5 describes the results of the segmented regression for the percentage of deliveries conducted by skilled birth attendants. There was a slight increase in percentage of deliveries conducted by skilled birth attendants; significant nationally from January 2018 up to the index month of March 2020. The observed drop between December 2020 and January 2021, during the Covid-19 affected period and related social responses, was estimated to have a significant increase across both counties and nationally. These findings coincident with the health workers’ strike (November 2020 to February 2021). The estimates for the percentage of deliveries conducted by skilled birth attendants after the index month was negative and significant across both counties and nationally.

Table 5. Covid-19 effects on the percentage of deliveries conducted by skilled birth attendants (National, Nairobi, Kilifi; 2018-2021)

County	Time (b_1)	Covid-19 (b_2)	Time Since Covid-19 (b_3)
National	0.31*	10.88*	-0.91*
Nairobi	0.21	8.75*	-1.30*
Kilifi	0.05	22.39*	-1.96*

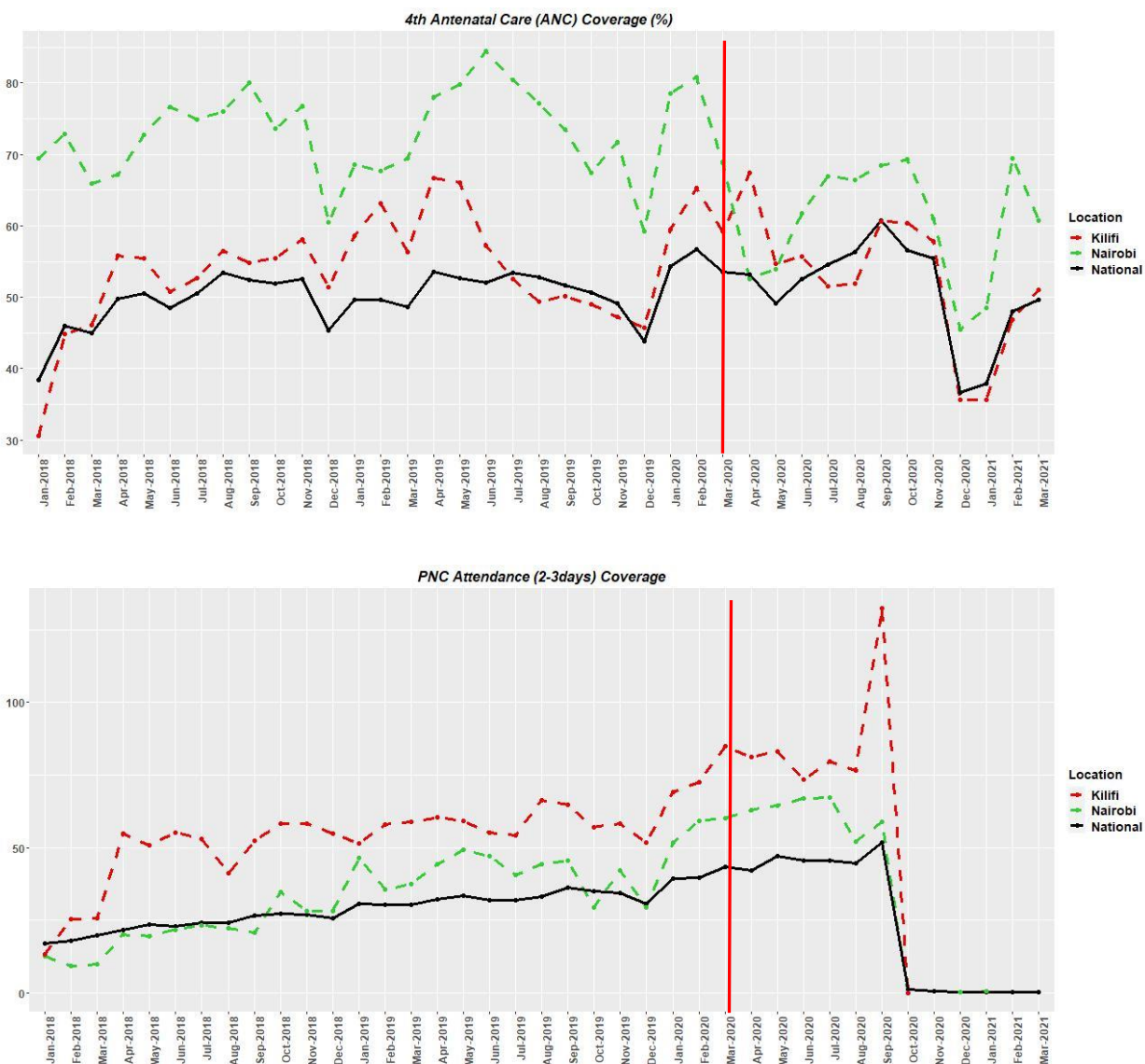
Note: * P value < 0.05

It will be important to observe future data in order to ascertain whether the effect of Covid-19, attributed to the short-term decline between September 2020 and January 2021, is sustained or followed by a return to previous levels.

4. Antenatal and postnatal coverage

The effect of Covid-19 on antenatal and postnatal coverage was measured through: 4th antenatal coverage and postnatal attendance coverage (2-3days after birth). Figures 5.4a-b below show the monthly trends for the 4th antenatal coverage and postnatal coverage (2-3 days). Kilifi County was comparable to the national coverage for the 4th antenatal coverage whereas Nairobi county showed a higher coverage as compared nationally. Kilifi County showed higher rates in postnatal coverage as compared nationally, though the trends were similar as compared nationally with Nairobi and Kilifi counties. The drop in October 2020 to March 2021 may result from not being reported correctly due to the pandemic and other issues. Also these findings coincident with the time of the health workers' strike in Kenya.

Figure 5.4 a-b showing the 4th antenatal care (ANC4) coverage and postnatal care (PNC) coverage for the National, and Kilifi and Nairobi counties.



Tables 6 and 7 describe the results of the segmented regression for the 4th antenatal care coverage and postnatal (2-3 days) attendance coverage.

Similarly to the incomplete data observed in maternal mortality and neonatal mortality, there is a

substantial loss of data beginning in October 2020. Further inquiries are necessary to establish why this gap exists in the KHIS data, and whether the missing data can be recovered. An alternative possibility may be that ANC4 and PNC services were disrupted or that pregnant women and new mothers were deterred from seeking services after September 2020. The information in hand cannot determine the cause of this abrupt shift in the trends.

There was a significant increase in the coverage of 4th antenatal care visits across both counties and nationally from January 2018 up to the index month of March 2020. The Covid-19 outbreak in March 2020 (index month) and related social responses was estimated to have an increase substantially, and was significant nationally and in Nairobi county. The estimates for the 4th antenatal care visits coverage after the index month was negative and significant nationally and in Nairobi County.

Table 6. Covid-19 effects on the coverage of 4th antenatal care visits (National, Nairobi, Kilifi; 2018-2021)

County	Time (b_1)	Covid-19 (b_2)	Time Since Covid-19 (b_3)
National	0.77*	22.03*	-5.89*
Nairobi	1.51*	34.64*	-9.03*
Kilifi	1.27*	26.18	-5.45

Note: * P value < 0.05

There was an increase but not significant in the coverage of postnatal care attendance across both counties and nationally from January 2018 up to the index month of March 2020. The Covid-19 outbreak in March 2020 (index month) and related social responses was estimated to have a substantial significant decrease in Nairobi County whereas an increase nationally and in Kilifi County. The estimates for the postnatal care attendance after the index month was negative and significant nationally and in Kilifi County.

Table 7. Covid-19 effects on the coverage of postnatal care (2-3 days) attendance (National, Nairobi, Kilifi; 2018-2021)

County	Time (b_1)	Covid-19 (b_2)	Time Since Covid-19 (b_3)
National	0.24	3.35	-1.02*
Nairobi	0.14	-12.32*	-0.38
Kilifi	0.34	5.21	-1.80*

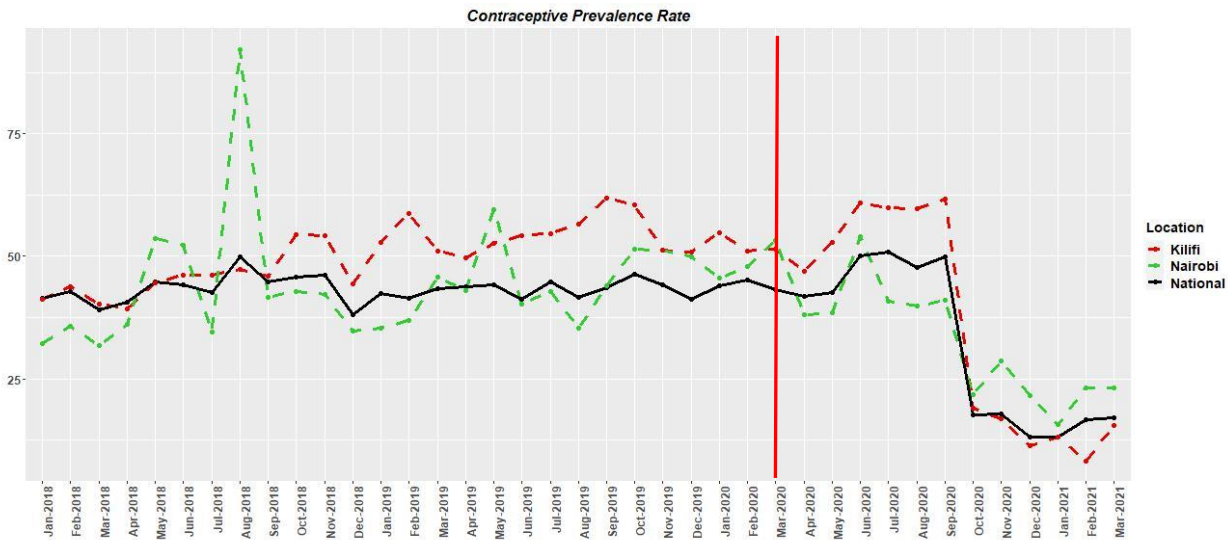
Note: * P value < 0.05

As noted earlier, caution must be taken in interpreting these findings, due to the apparent incompleteness of the data beginning in October 2020.

5. Family planning

The effect of Covid-19 on family planning was measured through the contraceptive prevalence rate. Figure 1.5 below shows the monthly trends for the contraceptive prevalence rate. Similar trends were seen across the two counties as compared nationally. Post September 2020, there was a decline in the rate nationally and also across the two counties.

Figure 5.5 showing the contraceptive prevalence rate nationally, and Kilifi and Nairobi counties.



There was an overall increase in the contraceptive prevalence rate across both counties and nationally from January 2018 up to the index month of March 2020. The Covid-19 outbreak in March 2020 (index month) and related social responses was estimated to have an increase substantially, and was significant nationally. The estimates for the contraceptive prevalence rate after the index month was negative and significant in nationally and in Nairobi and Kilifi county.

Table 8. Covid-19 effects on the contraceptive prevalence rate (National, Nairobi, Kilifi; 2018–2021)

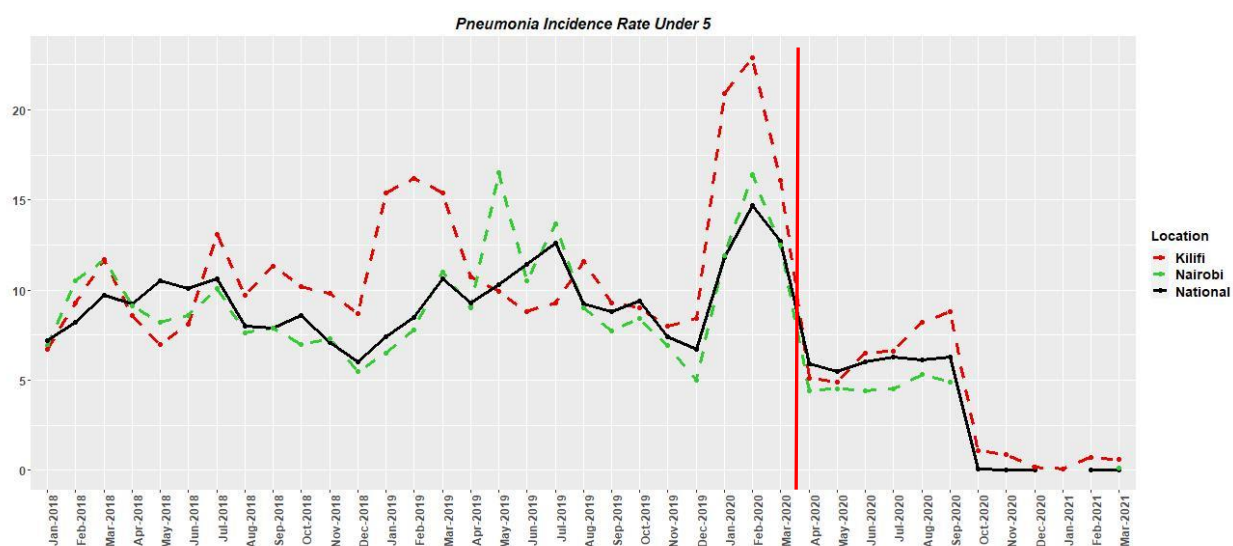
County	Time (b_1)	Covid-19 (b_2)	Time Since Covid-19 (b_3)
National	0.05	11.85*	-3.38*
Nairobi	0.25	4.74	-2.92*
Kilifi	0.59*	11.49	-5.24*

Note: * P value < 0.05

6. Pneumonia under five

Figure 5.6 below shows the monthly trends for the effect of Covid-19 on facility-based care for pneumonia among children under 5. Similar trends were seen across the two counties as compared nationally.

Figure 5.6 showing the pneumonia under 5 incidence rate for the National, and Kilifi and Nairobi counties.



There was a slight increase in the incidence rate for pneumonia among children under 5, where Kilifi county was significant from January 2018 up to the index month of March 2020. The Covid-19 outbreak in March 2020 (index month) and related social responses was estimated to have a decrease across both counties and nationally. The estimates for the incidence rate after the index month was negative and significant across both counties and nationally.

Table 9. Covid-19 effects on the pneumonia under 5 incidence rate (National, Nairobi, Kilifi; 2018-2021)

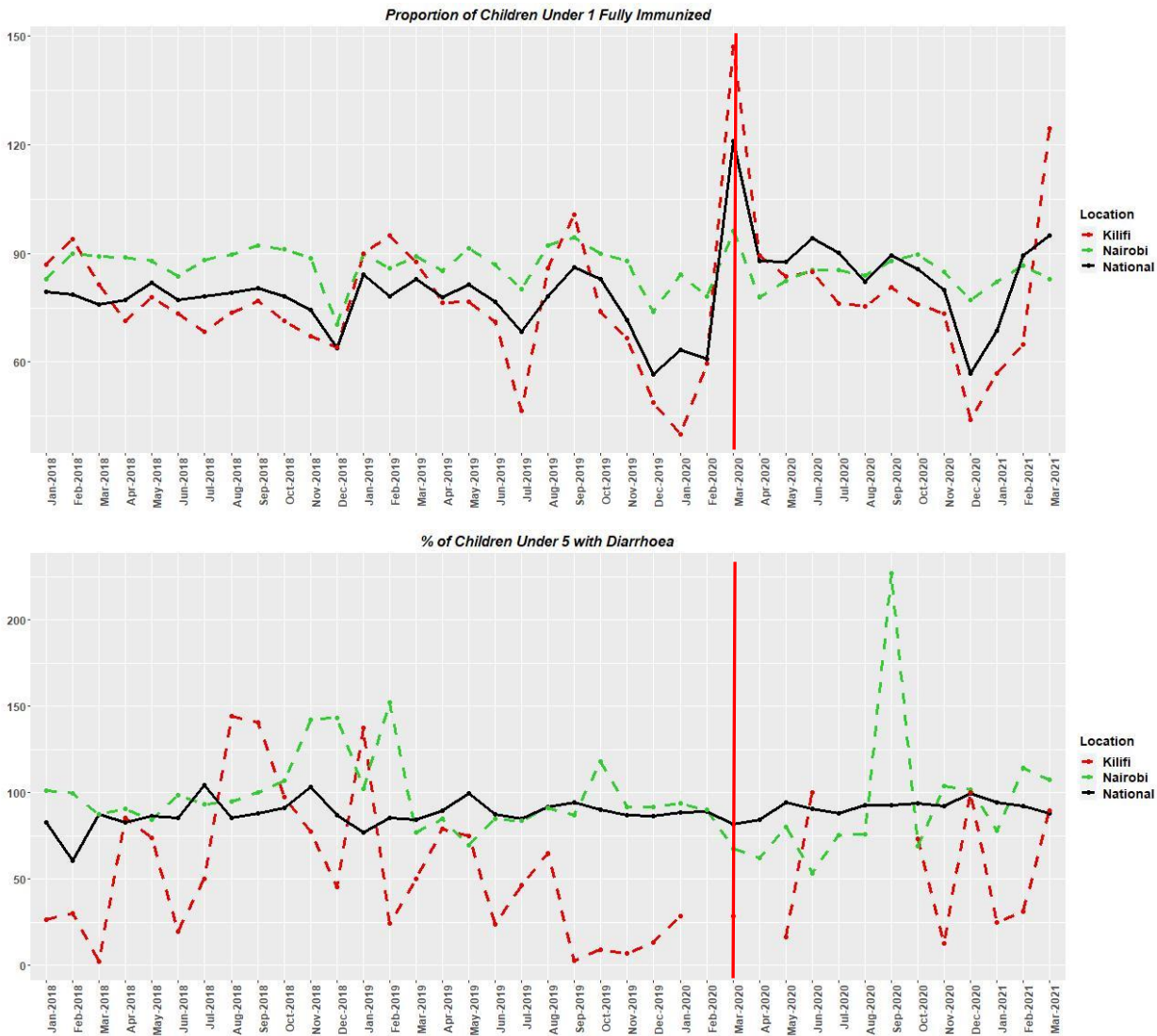
County	Time (b_1)	Covid-19 (b_2)	Time Since Covid-19 (b_3)
National	0.08	-0.23	-0.98*
Nairobi	0.08	-1.82	-0.75*
Kilifi	0.21*	-2.60	-1.15*

Note: * P value < 0.05

7. Childhood immunizations and treatment of diarrhoea

The effect of Covid-19 on childhood immunizations and treatment of diarrhoea was measured through two indicators: proportion of children under one year who are fully immunized and percentage of children under five with diarrhoea treated with zinc & ORS. Figure 5.7 a-b below shows the monthly trends for the proportion of children under one year who are fully immunized and percentage of children under five with diarrhoea treated with zinc & ORS.

Figure 5.7 a-b showing the proportion of children under one year who are fully immunized and percentage of children under five with diarrhoea treated with zinc & ORS for the national level, and Kilifi and Nairobi counties.



There was a decrease in the proportion of children under one year who are fully immunized across both counties and nationally from January 2018 up to the index month of March 2020. The Covid-19 outbreak in March 2020 (index month) and related social responses was estimated to have an increase substantially and significantly nationally and in Kilifi County, and was also an increase in Nairobi County. The estimates after the index month was negative and significant nationally.

Table 10. Covid-19 effects on the proportion of children under one year who are fully immunized (National, Nairobi, Kilifi; 2018-2021)

County	Time (b_1)	Covid-19 (b_2)	Time Since Covid-19 (b_3)
National	-0.42	29.68*	-1.53*
Nairobi	-0.16	2.39	-0.15
Kilifi	-0.79	37.61*	-1.91

Note: * P value < 0.05

There was a decrease in the percentage of children under 5 with diarrhoea treated with zinc and ORS across both counties but was an increase nationally from January 2018 up to the index month of March 2020. The Covid-19 outbreak in March 2020 (index month) and related social responses was estimated to have a decrease nationally and in Nairobi County and an increase in Kilifi County. The estimates after the index month was positive showing an increase in percentage of children under 5 with diarrhoea treated with zinc and ORS.

Table 11. Covid-19 effects on the percentage of children under 5 with diarrhoea treated with zinc and ORS (National, Nairobi, Kilifi; 2018-2021)

County	Time (b_1)	Covid-19 (b_2)	Time Since Covid-19 (b_3)
National	0.30	-4.73	0.33
Nairobi	-0.30	-27.36	4.06
Kilifi	-1.59	6.98	3.18

Note: * P value < 0.05

Definition of segmented regression

The statistical model

$$Y = b_0 + b_1T + b_2D + b_3P + e$$

where:

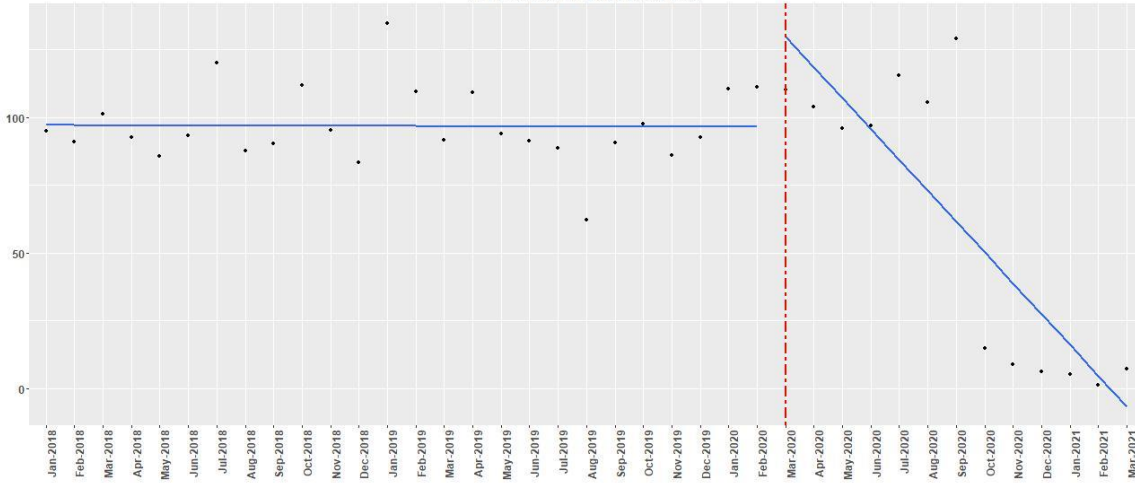
Y is the outcome variable; T indicates the time (months) passed from the start of the observational period (Jan-2018); D is a dummy variable indicating observation collected before (=0) or after (=1) Covid-19; P indicates time passed since Covid-19 (before Covid-19 P is equal to 0).

The figures below depict the effects through the segmented regression analysis. The vertical red dashed line marks the index month of March 2020. The blue line to the left is the regression estimate based on the respective variable prior to the Covid-19 epidemic in Kenya, and the regression line to the right of the index month shows the regression estimate for the respective variable during the Covid-19 outbreak.

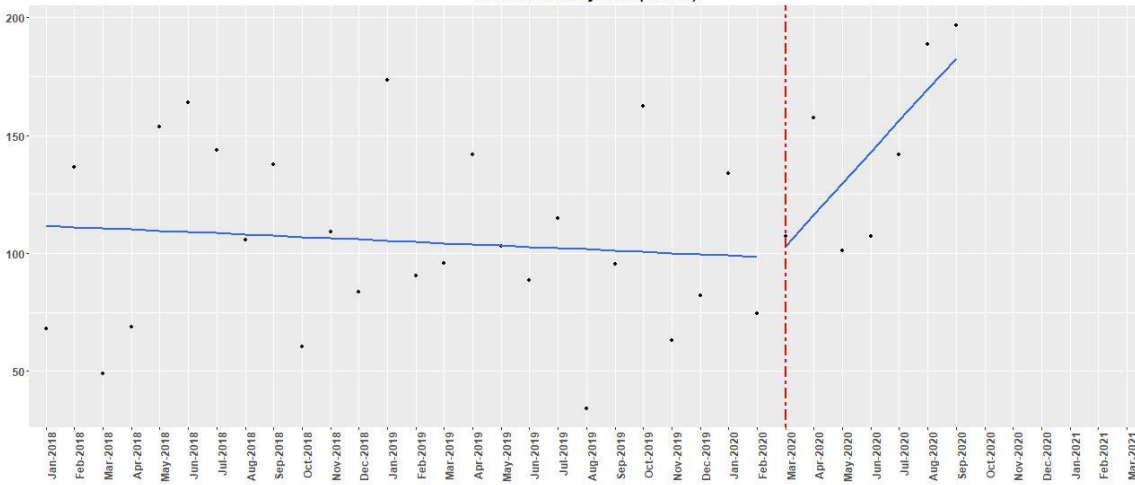
As noted in the commentary in several indicators, the statistical analysis should be treated with caution. Findings may be unduly biased by disruptions to data completeness observed from September 2020 onwards. Further investigation is necessary to understand the reasons behind the dramatically lower values for both counties and in national data for several indicators. Possibilities may include a sudden reduction in seeking reproductive, maternal, newborn and child health (RMNCH) services among women of reproductive ages and mothers of young children, or else a disruption to the data recording and reporting processes that underlie the KHIS. It does not seem plausible, however, that the entire effect can be ascribed to Covid-19 alone.

1. Facility maternal mortality ratio

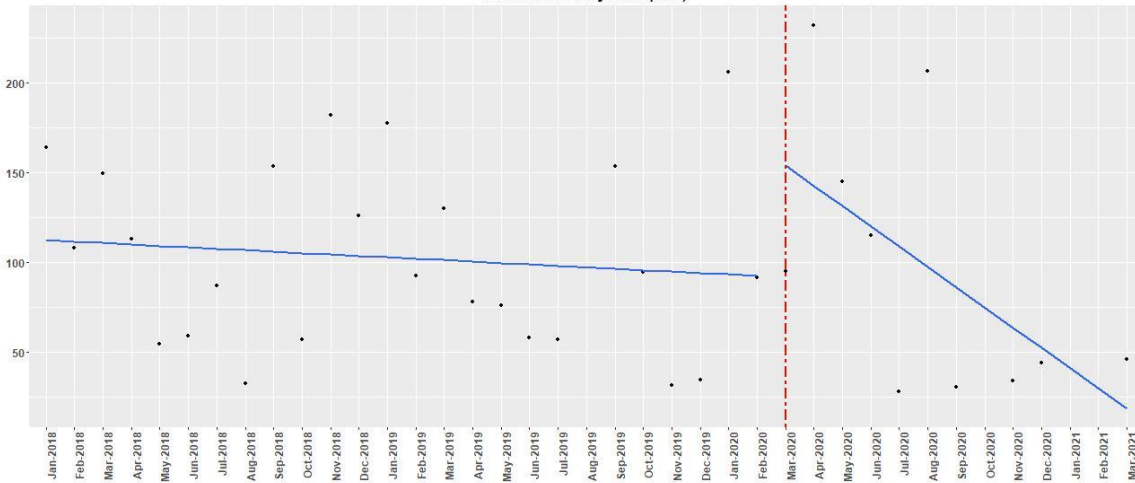
Maternal Mortality Ratio (National)



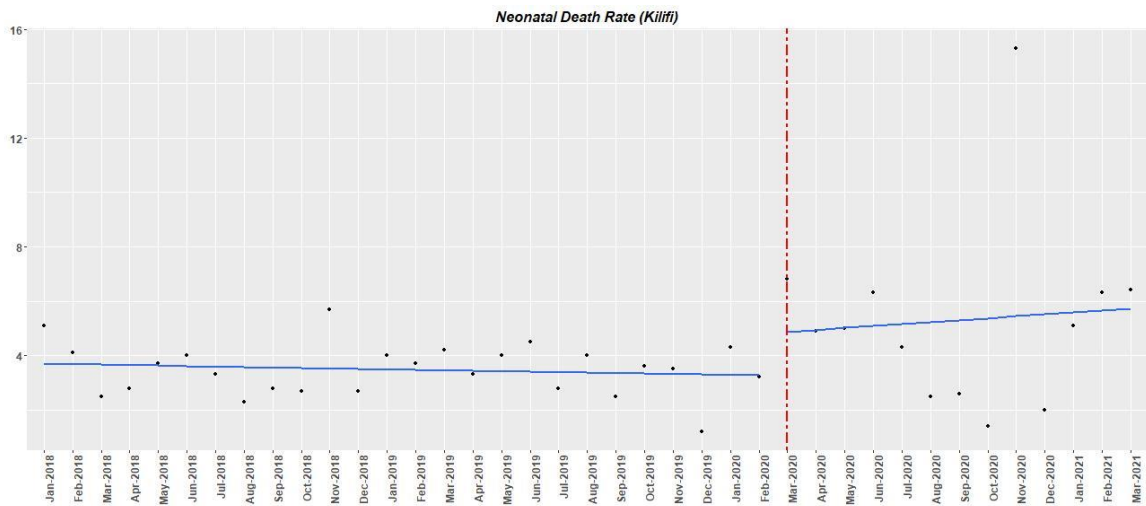
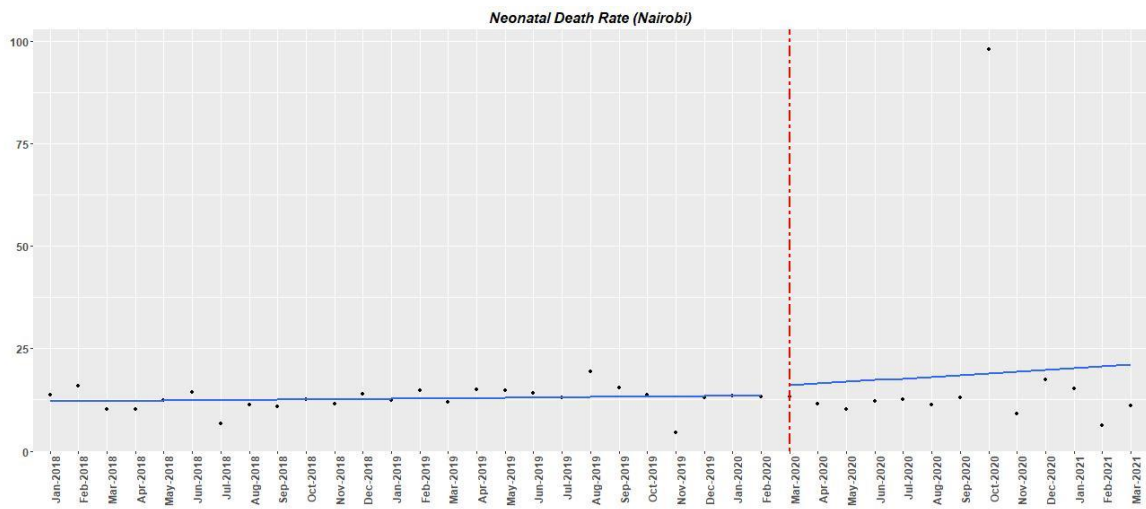
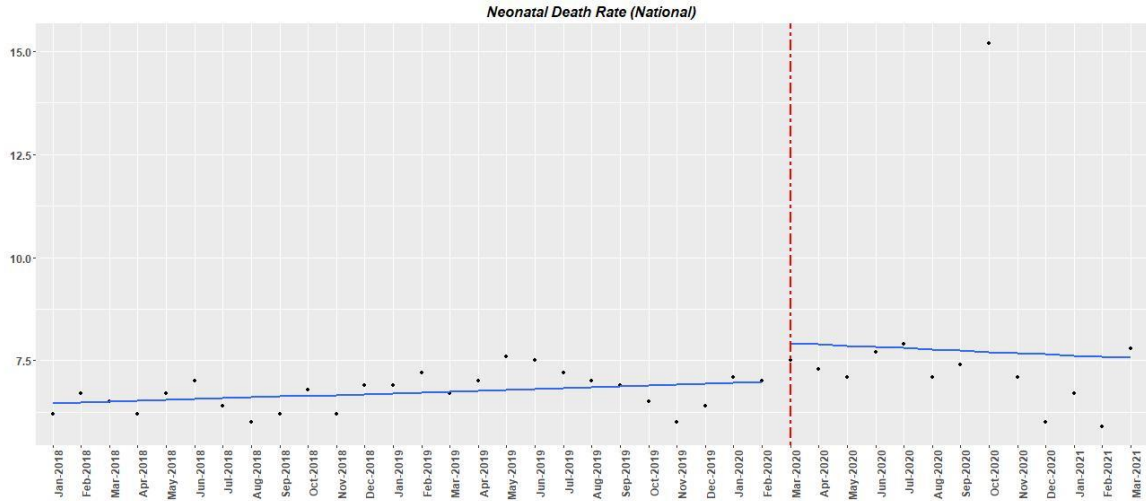
Maternal Mortality Ratio (Nairobi)



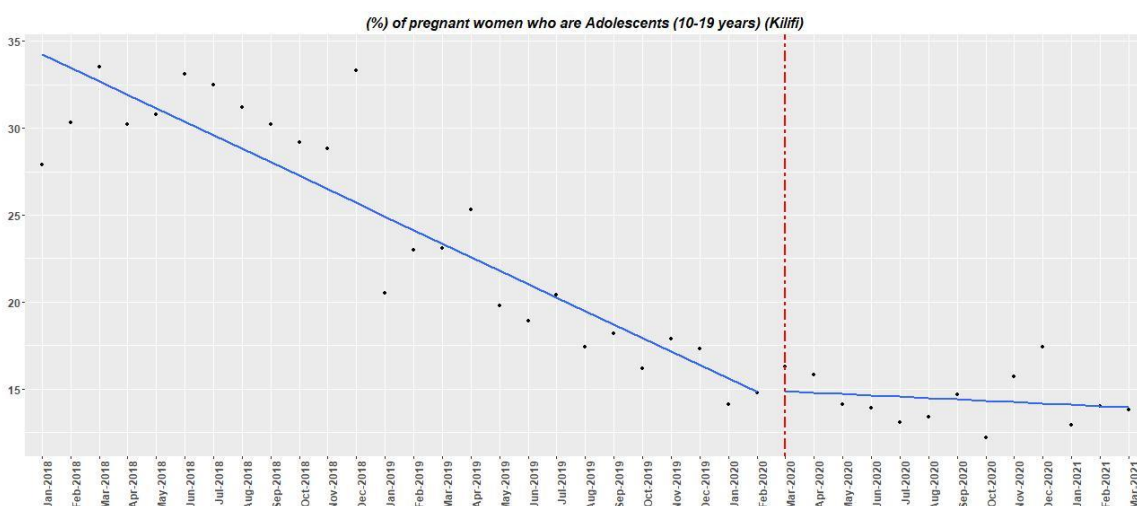
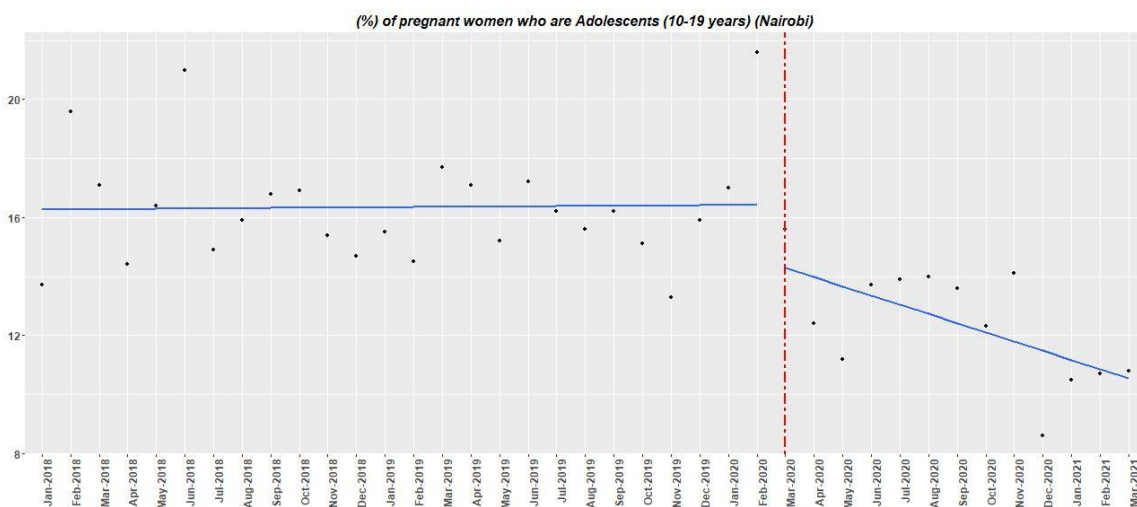
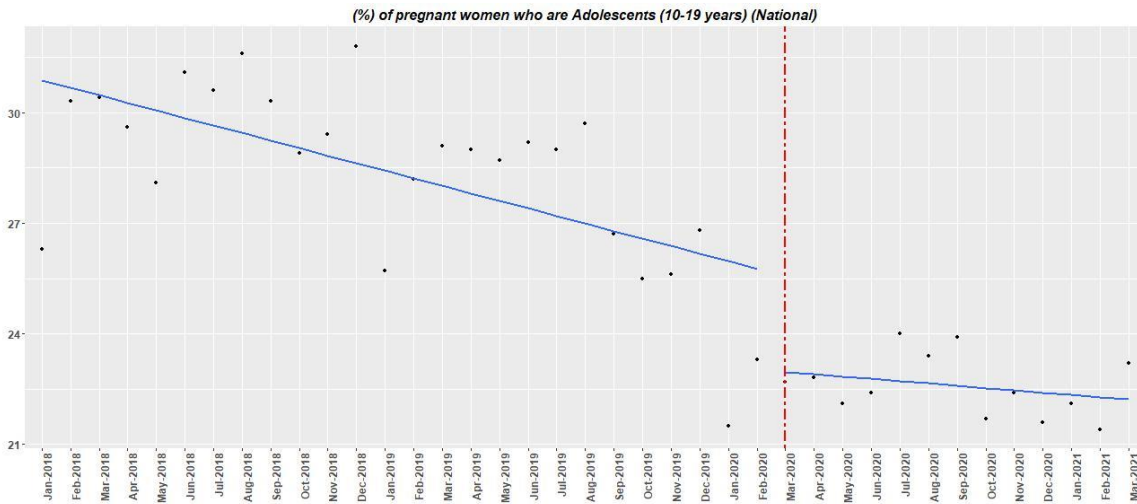
Maternal Mortality Ratio (Kiiff)



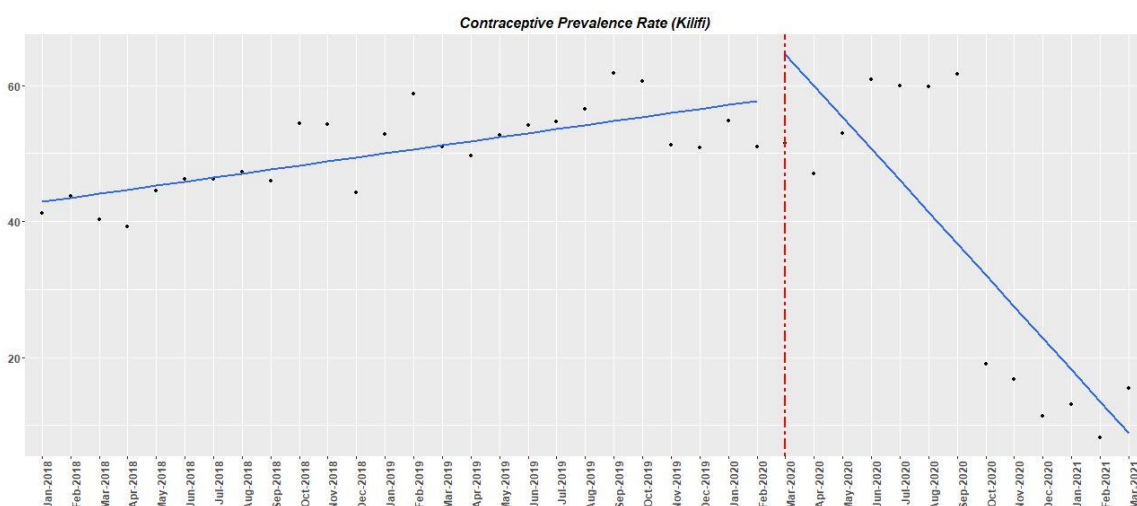
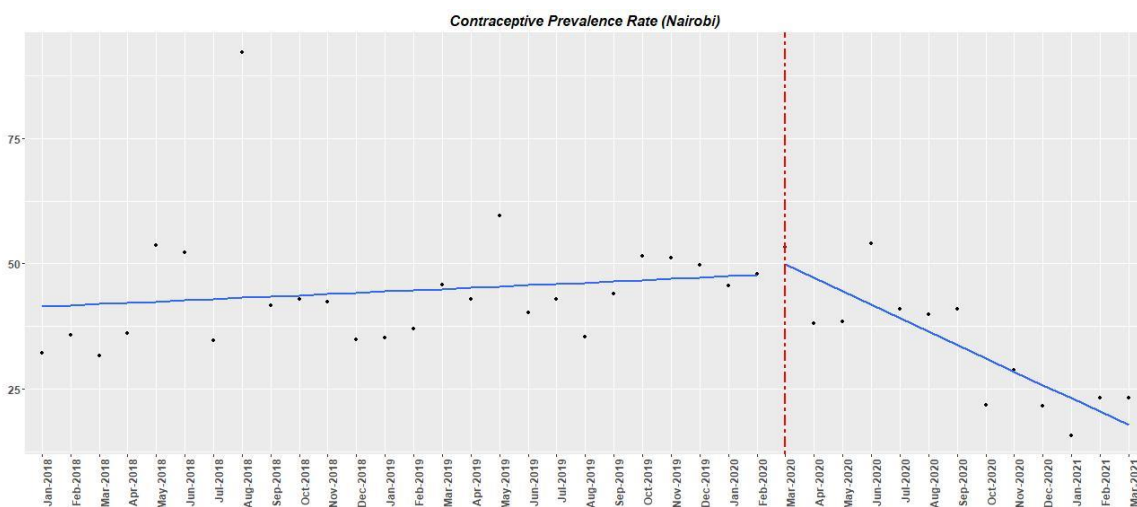
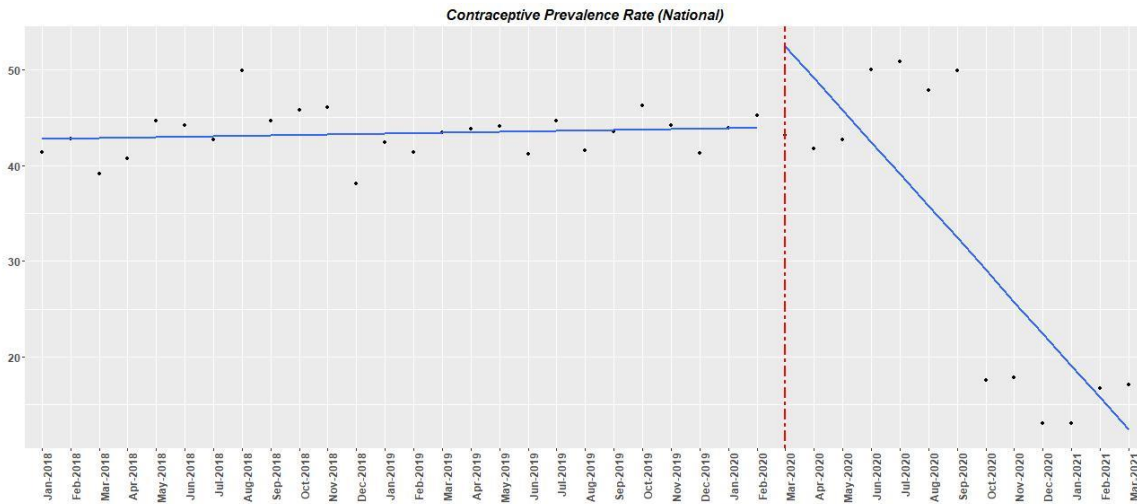
2. Neonatal death rate



3. Percentage of pregnant women who are adolescents (10–19 years)

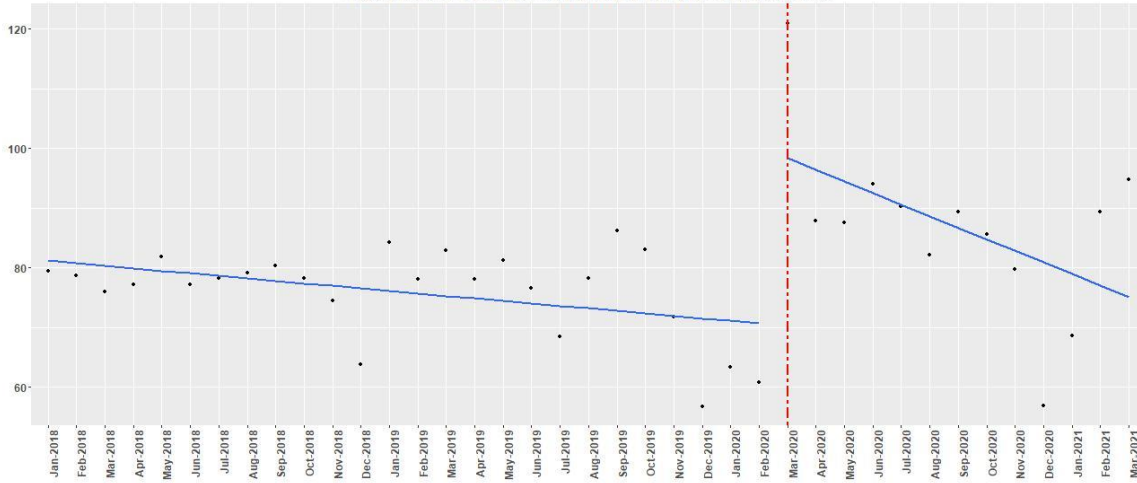


4. Contraceptive prevalence rate

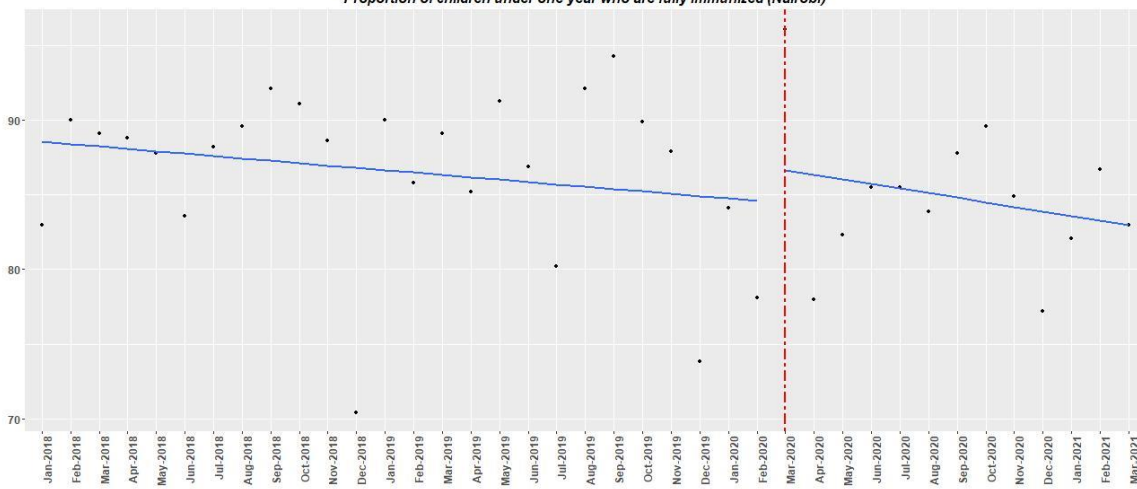


5. Proportion of children under one year who are fully immunized

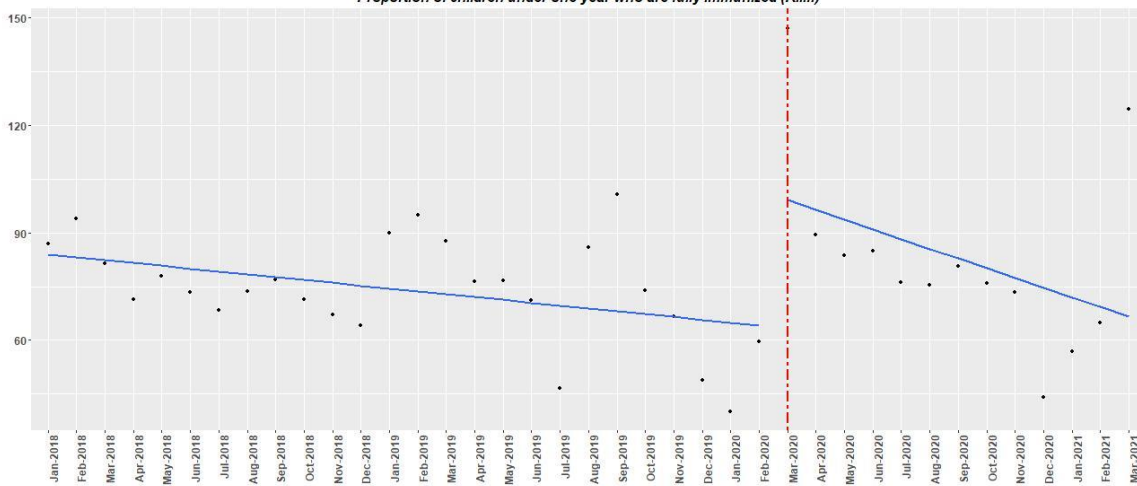
Proportion of children under one year who are fully immunized (National)



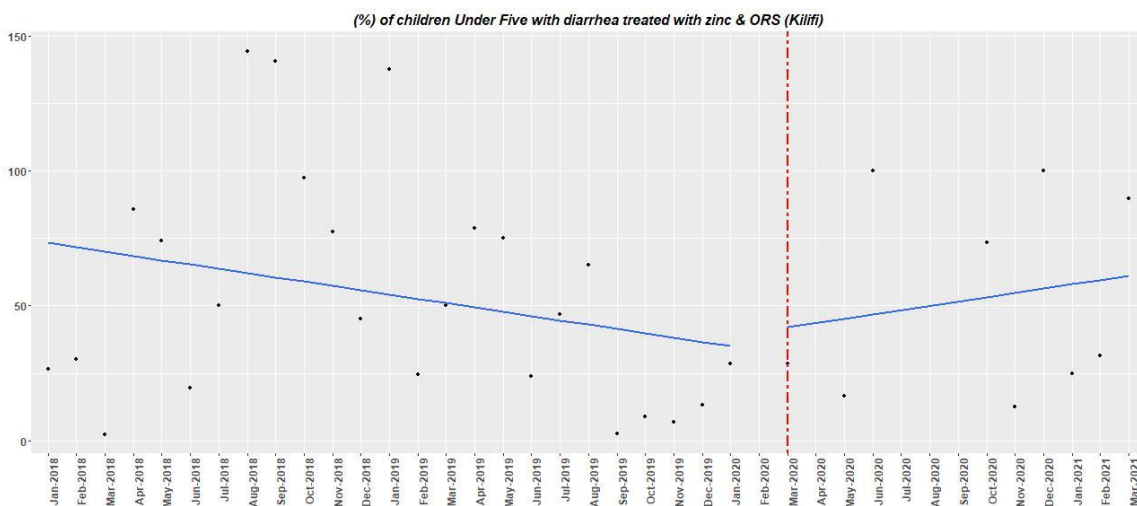
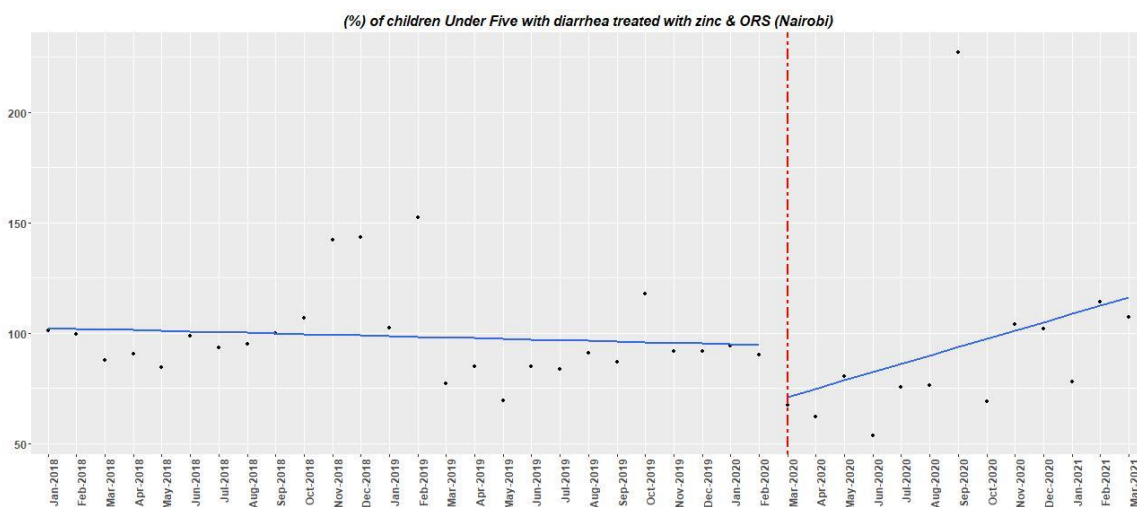
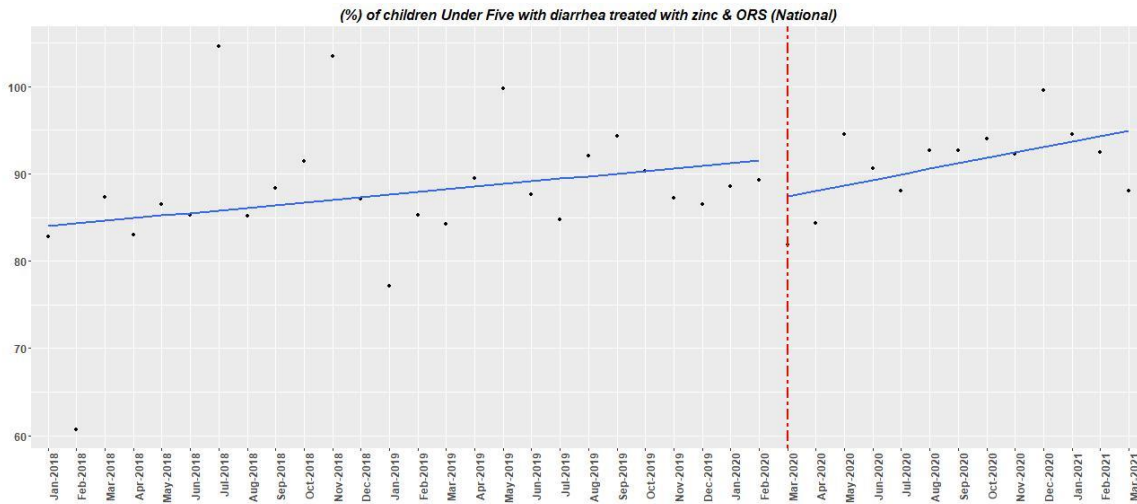
Proportion of children under one year who are fully immunized (Nairobi)



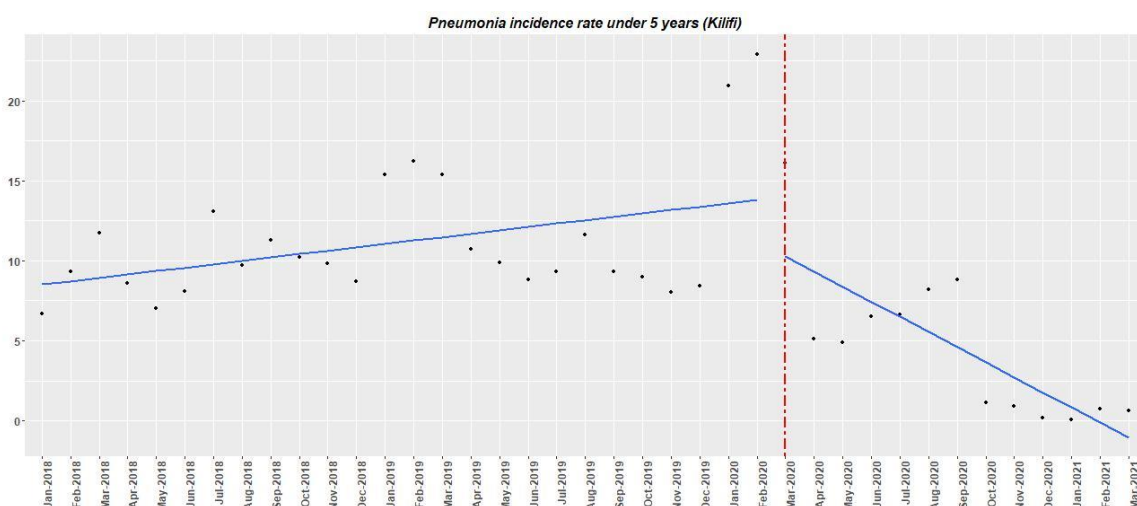
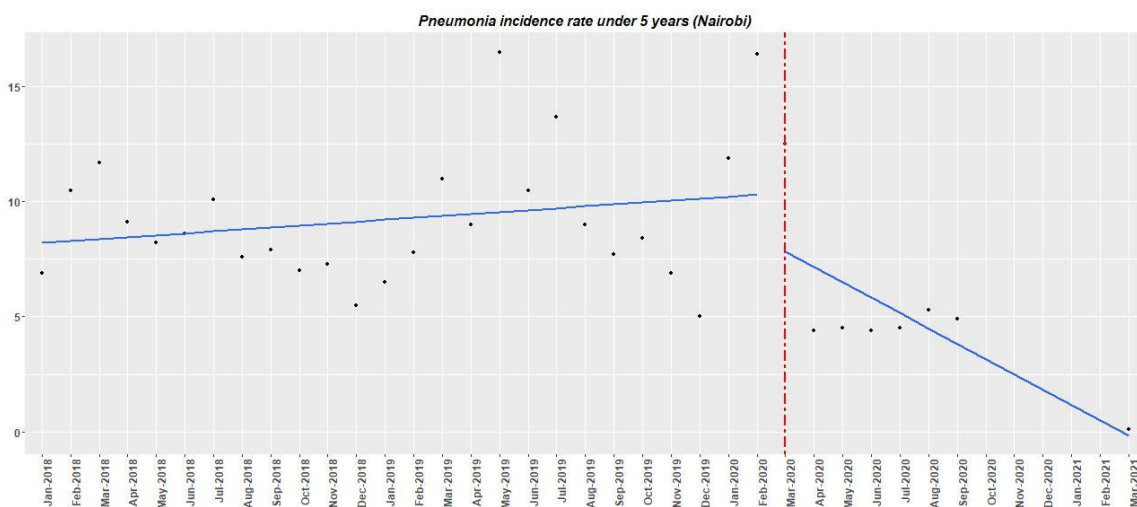
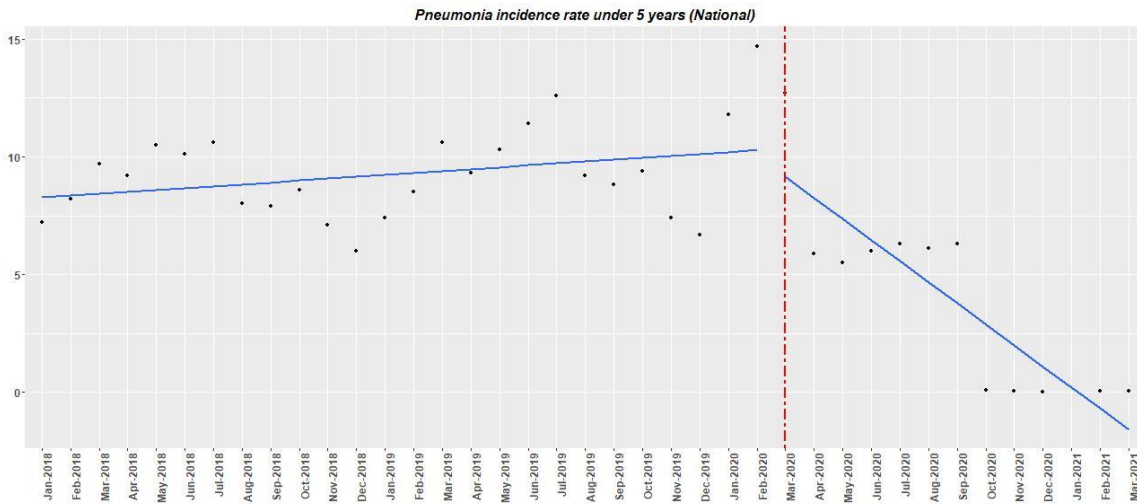
Proportion of children under one year who are fully immunized (Kiirfi)



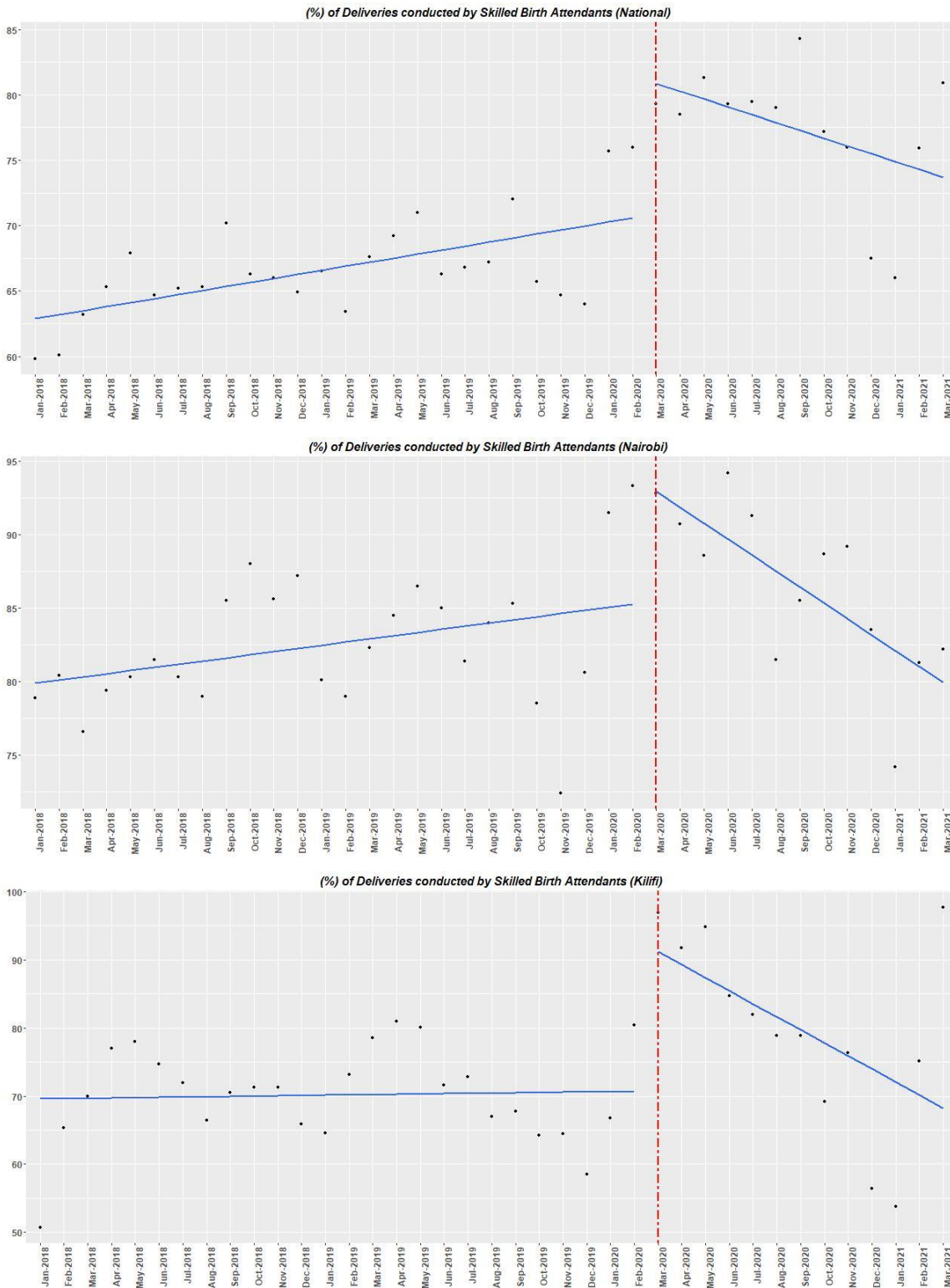
6. Percentage of children under five with diarrhoea treated with zinc & ORS



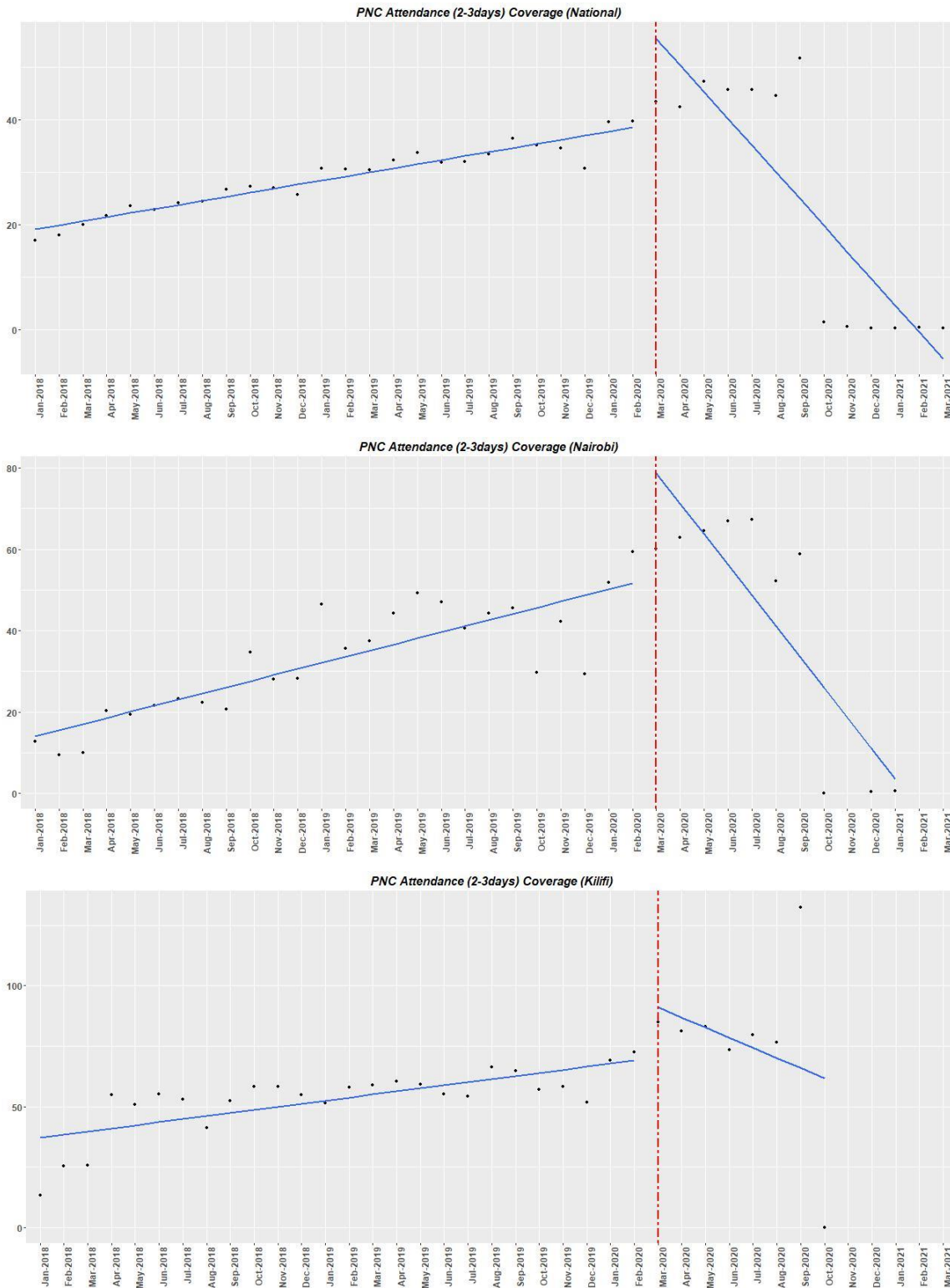
7. Pneumonia incidence rate under 5 years



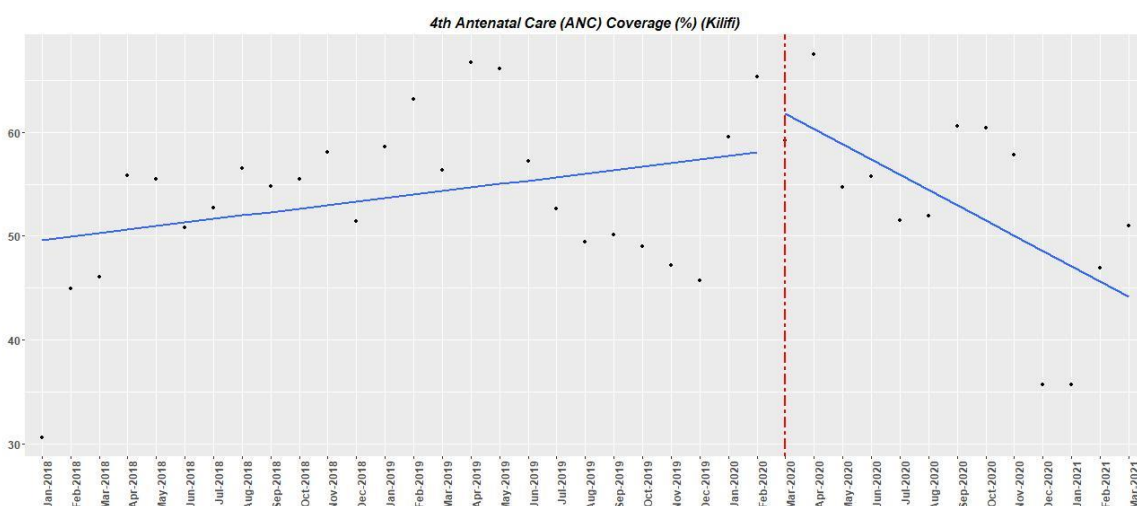
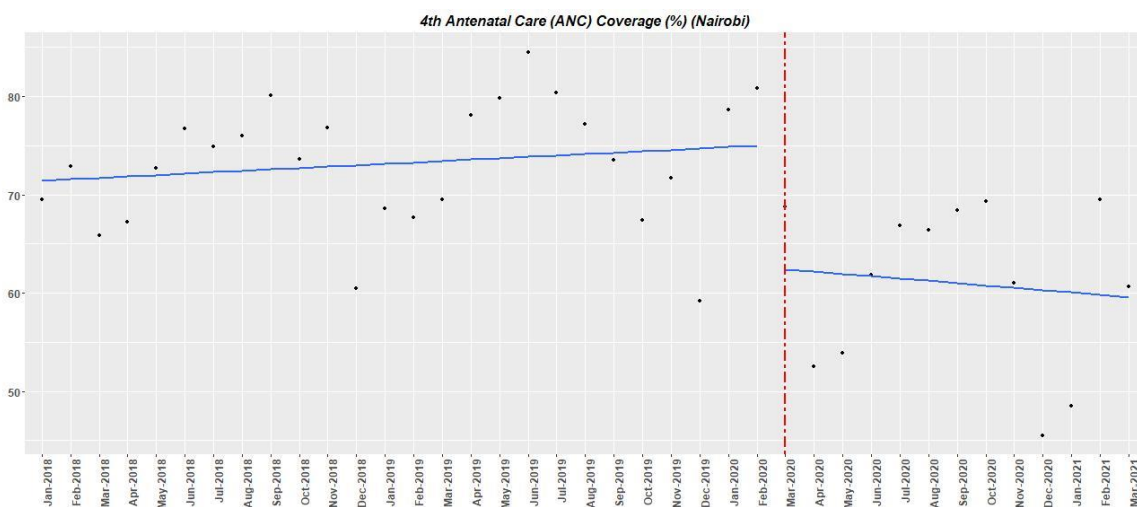
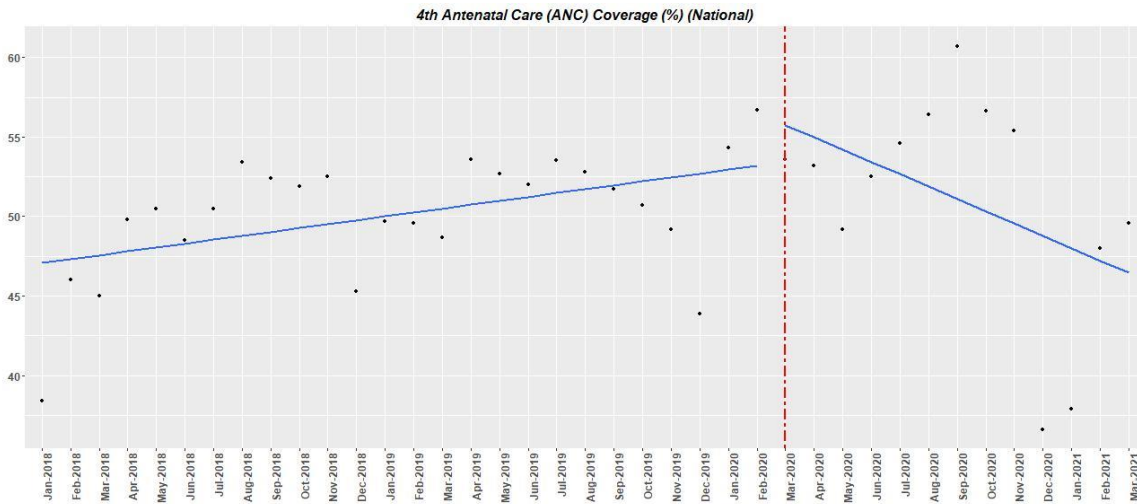
8. Percentage of deliveries conducted by skilled birth attendants



9. PNC attendance (2–3 days) coverage



10. 4th antenatal care (ANC) coverage (%)



Appendix 3. Continuity of Essential Health Services (CES) Study letters of approval

Appendix 3.1 AKU IERC certificate



THE AGA KHAN UNIVERSITY

Faculty of Health Sciences
Medical College

Ref: 2021/IERC-41 (v2)
May 24, 2021

Prof. Marleen Temmerman, Principal Investigator
Faculty, Department of Obstetrics and Gynaecology
Aga Khan University- Nairobi

Dear Prof. Marleen and team,

Re: Continuity of Essential Health Services (CES) Study - Exploring Effect of COVID-19 on demand for and utilization of maternal, newborn and child health services

The Aga Khan University, Nairobi Institutional Ethics Review Committee (IERC), is in receipt of your protocol resubmitted to the Research Office (RO) on May 06, 2021. With reference to the IERC letter Ref: 2021/IERC-41 (v1) dated April 19, 2021, the IERC reviewed and **approved** this project (*as per attached official stamped protocol and attachments - version 2021/IERC-41 (v2)*). You are authorized to conduct this study from May 25, 2021. This approval is valid until May 24, 2022 and is subject to compliance with the following requirements;

1. The conduct of the study shall be governed at all times by all applicable national and international laws, rules and regulations. IERC guidelines and Aga Khan University Hospital policies shall also apply, and you should notify the committee of any changes that may affect your research project (amendments, deviations and violations)
2. Researchers desiring to initiate research activities during COVID-19 pandemic must comply with the [COVID-19 SOPs for Research](#) as well as submit to the Research Office a [Request Form to Initiate, Reinstate or Continue Research During COVID-19 Pandemic](#).
3. **Prior** to human subjects enrolment you must obtain a research license from the [National Commission for Science, Technology and Innovation \(NACOSTI\)](#); site approvals from the targeted external site(s) and file the copies with the RO.
4. As applicable, prior to export of biological specimens/data, ensure a Material Transfer Agreement (MTA)/Data Transfer Agreement (DTA), is in place as well as seek shipment authority/permit from the relevant government ministry. Copies of these approvals, should be submitted to the RO for records purpose.
5. All Serious Adverse Events and the interventions undertaken must be reported to the IERC as soon as they occur but not later than 48 hours. The SAE shall also be reported through the AKUHN quality monitoring mechanism(s) at Client Relations Department of the Chief of **Staff's Office**.
6. All consent forms must be filed in the study binder and where applicable, patient hospital record.
7. Further, you must provide an interim [Progress Report Form](#) 60 days before expiration of the validity of this approval and request extension if additional time is required for study completion.
8. You must advise the IERC when this study is complete or discontinued and a final report submitted to the Research Office for record purposes. The hospital management should be notified of manuscripts emanating from this work.

If you have any questions, please contact Research Office at AKUKenya_ResearchOffice@aku.edu or 020-366 2148/1136.

With best wishes,

Professor Stanley Luchters
Interim Chair - Institutional Ethics Review Committee (IERC)
[Aga Khan University, \(Kenya\)](#)

cc: Co- Investigators

AK/93

3rd Parklands Avenue, off Limuru Road, P. O. Box 30270, GPO 00100, Nairobi, Kenya
Telephone: +254 20 366 2107/2109; Fax: +254 20 374 4035

Appendix 3.2 NACOSTI Permit

 **REPUBLIC OF KENYA**

 **NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION**

Ref No: **199230** Date of Issue: **07/June/2021**

RESEARCH LICENSE



This is to Certify that Prof. marleen temmerman of Aga Khan University, has been licensed to conduct research in Kilifi, Nairobi on the topic: Continuity of Essential Health Services (CES) Study - Exploring Effect of COVID-19 on demand for and utilization of maternal, newborn and child health services for the period ending : 07/June/2022.

License No: **NACOSTI/P/21/10986**

199230
Applicant Identification Number


Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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Appendix 3.3a Nairobi County approval letter



**NAIROBI
METROPOLITAN
SERVICES**

Directorate of Health Services



REF: EOP/NMS/HS/164

DATE: 7TH July 2021

Prof. Marleen Temmerman
Aga Khan University
NAIROBI

Dear Prof. Temmerman,

RE: RESEARCH AUTHORIZATION

This is to inform you that the Nairobi Metropolitan Services - Health Directorate's Research Technical Working Group (RTWG) reviewed the documents on the study titled "Continuity of Essential Health Services (CES) Study - Exploring Effects of COVID-19 on demand for utilization of maternal, newborn and child health services."

I am pleased to inform you that you have been authorized to undertake the study in Mathare Valley, Nairobi County. The researcher will be required to adhere to the ethical code of conduct for health research in accordance to the Science Technology and Innovation Act, 2013 and the approval procedure and protocol for research for Nairobi.

On completion of the study, you will submit one hard copy and one copy in PDF of the research findings to the RTWG. In addition, you will disseminate recommendations of the research at a virtual meeting organized by the RTWG. By copy of this letter, the Medical Officer of Health – Ruaraka is to accord you the necessary assistance to carry out this research study.

Yours sincerely,

DR. OUMA OLUGA, OGW
DIRECTOR HEALTH SERVICES

CC: Medical Officer of Health - Ruaraka

Kenyatta International Convention Centre P.O. Box 49130-00100, GPO, Nairobi, Kenya
Tel: +254 (0) 20 2217774/3
Email: health@nms.go.ke | Web: www.nms.go.ke

Appendix 3.3b Kilifi County approval letter

COUNTY GOVERNMENT OF KILIFI

DEPARTMENT OF HEALTH SERVICES

When Replying quote
Email: ehmkilifi@gmail.com
REF:KLF/DoH/RES/Vol.1/90



P. O. Box 9-80108
KILIFI

Date: 22nd June 2021

OFFICE OF THE COUNTY DIRECTOR

Prof. Marleen Temmerman
Principal Investigator
Department of Obstetrics and Gynaecology
Agakhan University - Nairobi,
Kenya

Dear Professor Temmerman and Team

RE: DEPARTMENTAL AUTHORIZATION TO CARRY OUT RESEARCH IN KILIFI COUNTY

The Kilifi County Department of Health Services is in receipt of your request dated June 2nd, 2021 to conduct a study, "**Continuity of Essential Health Services(CES) – Exploring effects of COVID – 19 on demand for and Utilization of Maternal, Newborn and Child health services in Kilifi County, Kenya**" that has received approvals from Agakhan University Institutional Ethics Review Committee **Ref:2021/ IREC-41 (v.2)** dated 24th May 2021, and as per licence No: NACOSTI /P/21/10986 dated 7th June 2021 from the National Commission for Science, Technology & Innovation.

The Department is glad to grant you authorization to conduct your study in Kilifi County in line with the ethical considerations stipulated in the approved study protocol, the guidelines on the conduct of research in Kilifi County during COVID-19 pandemic. This approval is valid until 7th June 2022.

Upon completion of the study, you will be required to share your study findings, conclusion and recommendations with the Department of Health Services, Kilifi County.

Sincerely,



Dr. David Mulewa, P. O. Box 9 - 80108, KILIFI

County Director of Health Services

Department of Health / Kilifi County

Cc:

- CECM – Health Services
- Chief Officer Medical & Public Health
- Heads of Divisions

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Wherever he lives.
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A fair chance.
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The furthest from help.
The most left behind.
The most excluded.
It's why we stay to the end.
And never give up.



UNICEF Eastern and Southern
Africa Regional Office
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Kenya 00100
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December 2021