



THE AGA KHAN UNIVERSITY



unicef   
for every child

# CONTINUITY OF ESSENTIAL HEALTH SERVICES STUDY

Exploring the Effect of the Covid-19  
Pandemic on the Demand for, and  
Utilization of, Maternal, Newborn, and  
Child Health Services in Malawi

December 2021

Prepared by The Centre for  
Reproductive Health  
Kamuzu University of Health  
Sciences (formerly Malawi  
College of Medicine) and Aga  
Khan University Centre of  
Excellence in Women and Child  
Health





## Acknowledgements

First, we would like to thank the participants of this study – both community members and health service providers – for warmly welcoming our research team and taking the time to share their knowledge and experience. We extend our gratitude to community leaders and local guides who actively helped inform communities about the research and supported the team with their work in communities. We also thank our committed research assistants who worked tirelessly to complete each task in an efficient and timely manner.

We would like to thank the Directors of Health and Social Services in Blantyre and Mchinji Districts for their support for this study in their respective health facilities and communities. We also wish to thank Dr Fannie Kachale the Director of Reproductive Health in the Ministry of Health for advice and guidance.

We acknowledge assistance from the UNICEF Malawi Country Office, especially Dr. Mesfin Senbete and Dr. Bejoy Nambiar. We would like to thank the UNICEF Eastern and Southern Africa Regional Office (ESARO) team, Braeden Rogers, Fatima Gohar, and Kerry Lee Wolfaardt and the team from the UNICEF Headquarters, Jennifer Requejo and Tedbabe Degeffie Hailegebriel, for continuous support and follow-up, valuable guidance and fruitful discussions throughout the duration of this project.

Our sincere gratitude also goes also to the Director of the Aga Khan University Centre of Excellence in Women and Child Health (CoEWCH), Professor Marleen Temmerman, for ably spearheading this study to the desired end. We extend our gratitude to the dedicated CoEWCH project coordination team, Dr. Michaela Mantel, Dr. Ferdinand Okwaro, and Grace Wairimu, and the consultant experts Professor Violet Naanyu, Ravi Ram, and Dr. Jasmit Shah for guiding the various components of the study, and the latter two for undertaking the statistical analyses. Finally we should like to acknowledge these members of the research team at Centre for Reproductive Health for their efforts in gathering the data: Shida Kondowe, Medrina Mtende, Apatsa Galagade, Desire Chikafutwa, Gertrude Chatha, Grace Nkhwazi, Veronica Chimwaza and Aisha Lundu. In-country analysis was undertaken by Monica Malata, Dr Effie Chipeta and Prof William Stones.

Lastly, we would like to thank our funders, USAID and 2gether 4 SRHR.

## Disclaimer

This research is part of a project supported by funding from the UNICEF Eastern and Southern Africa Regional Office. The information and opinions contained in this report do not necessarily reflect the views or policies of UNICEF, the Aga Khan University CoEWCH or the Council of the Kamuzu University of Health Sciences (formerly University of Malawi).

## Research team

This series of reports has been commissioned by the UNICEF Eastern and Southern Africa Regional Office (ESARO) and led and coordinated by the Aga Khan University Centre of Excellence in Women and Child Health (AKU-CoEWCH).

UNICEF contracted AKU-CoEWCH to undertake this short-term study to explore 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 Centre for Reproductive Health, Kamuzu University of Health Sciences (formerly College of Medicine, University of Malawi) led the research in Malawi.

### **The study team – investigators:**

*Principal Investigator: Professor Marleen Temmerman, AKU-CoEWCH*

*Principal Investigator for Malawi: Professor William Stones, Centre for Reproductive Health*

*Co-Investigator: Dr. Effie Chipeta, PhD, Scientific Operations Manager, Centre for Reproductive Health*

*Research Associate: Monica Malata, MA (Economics), Centre for Reproductive Health*

## Acronyms

<b>AKU</b>	Aga Khan University
<b>ANC</b>	Antenatal care
<b>ART</b>	Antiretroviral therapy
<b>CES</b>	Continuity of essential health services
<b>CoEWCH</b>	Centre of Excellence in Women and Child Health
<b>COMREC</b>	College of Medicine Research Ethics Committee
<b>CRH</b>	Centre for Reproductive Health
<b>DHIS2</b>	Malawi District Health Information System (DHIS2)
<b>EID</b>	Early infant diagnosis
<b>ESAR</b>	UNICEF Eastern and Southern Africa region
<b>FGD</b>	Focus group discussion
<b>FP</b>	Family planning
<b>HMIS</b>	Health Management Information System
<b>HSA</b>	Health Surveillance Assistant
<b>IDI</b>	In-depth interview
<b>KII</b>	Key informant interview
<b>KMC</b>	Newborn Kangaroo Mother Care
<b>LTA</b>	Long-term agreement
<b>MCH</b>	Maternal and child health
<b>MNCH</b>	Maternal, newborn, and child health
<b>MoH</b>	Ministry of Health
<b>NGO</b>	Non-governmental organization
<b>PHSM</b>	Public health and social measures
<b>PI</b>	Principal investigator
<b>PMTCT</b>	Prevention of mother-to-child transmission of HIV
<b>PNC</b>	Postnatal care
<b>PPC</b>	Post-partum care
<b>PPE</b>	Personal protective equipment (PPE)
<b>SOP</b>	Standard operating procedures
<b>SRH</b>	Sexual and reproductive health
<b>UNICEF</b>	United Nations Children's Fund
<b>WHO</b>	World Health Organization



## Executive summary

### *Context*

The World Health Organization (WHO) declared Covid-19 a pandemic in 2020, and the Government of Malawi announced its first confirmed cases in April 2020.

This study concerns itself with the unintended impact of public health and social measures employed to mitigate the impact of Covid-19 on the demand for, and utilization of, essential maternal, newborn, and child health (MNCH) services, while simultaneously investigating resilience of the healthcare system and supply-side factors that influence access to these services. The multi-country research took place in the Eastern and South Africa region (ESAR), specifically Kenya, Malawi, and Mozambique, and was led by the Aga Khan University Centre of Excellence in Women and Child Health (AKU-CoEWCH) with support from UNICEF at the country, regional, and global levels. This report focuses on the research activities carried out in Malawi and their specific findings.

While there have been important gains in reproductive, maternal, newborn, child, and adolescent health indicators in Malawi in recent years, the country's health system is still relatively fragile and a large proportion of Malawi's people live in extremely precarious conditions. The coronavirus pandemic risks further reducing vulnerable people's already limited access to healthcare, as resources – both human and financial – get diverted from regular healthcare services to the Covid-19 response. Some health services were downsized or closed to limit the risk of transmission and staff shortages became common as frontline healthcare workers fell sick or died in places where there were already too few to provide essential services.

### *Methodology*

Two districts – urban Blantyre and rural Mchinji – were identified for the study in coordination with the Ministry of Health and the UNICEF Malawi Country Office. The locations were chosen based on their MNCH health indicators and national programme priorities. Following the development of appropriate tools, ethical clearance, and training of research staff, field work was undertaken through interviews and focus group discussions with community members and health service providers. Service providers who took part included community health workers, health managers, and midwives. Service users included pregnant and/or breastfeeding women and adolescents, including women living with HIV, as well as women with children under five, and their male partners. Transcripts were coded and subjected to thematic analysis.

Health system data were examined to identify potential patterns of impact on service use and outcomes relating to reproductive, maternal, newborn and child health. A total of 25 indicators were selected and analysed at zonal level using segmented regression analysis for the periods before the Covid-19 outbreak, and during the Covid-19 pandemic.

### *Findings*

Mitigation measures were introduced to reduce the frequency of contact between service users and service providers. Health workers began to work in shifts and the frequency of routine appointments was reduced thanks to longer-term prescriptions for routine antiretroviral therapy or contraceptives. Women were discharged 12 hours after giving birth and fully vaccinated children were no longer required to attend well-child clinics. Both service users and service providers were required to wear

facemasks, and to observe social distancing. This proved difficult for service providers due to severe shortages of personal protective equipment (PPE), especially at the beginning of the pandemic. Service users also reported that this served as an access barrier as some were unable to afford masks.

The Covid-19 pandemic and related measures resulted in reduced uptake of health-facility-based MNCH services. Community health workers were tasked with additional duties related to Covid-19, and service providers described working under intense pressure. At the same time, many people avoided health sector personnel and facilities for fear they may spread the virus. The operation of some services – including support groups for adolescents living with HIV and maternity waiting homes – was curtailed or interrupted. Pandemic restrictions also resulted in increased transport costs, increasing the cost of getting to and from health facilities. In many cases, companions or guardians – usually an essential source of support for patients, providing food, medicines, and communication support – were no longer allowed to accompany service users. The lack of timely communication on the virus and prevention measures fuelled misinformation and rumours.

The analysis of trends in key MNCH indicators was complicated by substantial variation in trends between different zones of the country. Consistent findings across all five national zones applied to a reduction in the number of fully vaccinated children and in antenatal testing for syphilis. Postnatal care for mothers and babies was noted to have been largely preserved and even strengthened. There were increases in maternal complications, stillbirths, neonatal mortality, and possibly in adolescent pregnancies.

### *Conclusions and recommendations*

Public health protection measures instituted to contain the spread of the pandemic have had unintended consequences but the actual impact on health service access has been quite variable, depending on the location and indicator assessed.

Effective mitigation requires attention to offset the costs of transport and essential supplies, such as face masks, and measures to limit the impact of a loss of household income, which may result in extreme poverty and de-prioritization of health-seeking behaviours.

Attention to all dimensions of access is needed. This begins with simple measures, such as clear communication of opening hours, and extends to addressing more fundamental structural factors in health system capacity: in particular, the numbers and capacity of trained healthcare professionals in post so as to lay the foundations for a degree of resilience of the health system as a whole.

Timely communication is also needed to build and maintain trust between communities and health service providers to limit misunderstandings and counteract the spreading of misinformation.

## Contents

Acknowledgements.....	2
Research team.....	3
Acronyms.....	4
Executive summary.....	5
Contents .....	7
List of tables .....	9
List of figures .....	9
1. Introduction.....	10
2. Background and rationale .....	11
2.1 Covid-19 in Malawi .....	11
2.2 Purpose of the study and rationale.....	15
3. Research objectives, focus, and questions.....	16
3.1 Study objectives .....	16
3.2 Research focus .....	16
3.3 Research questions.....	17
4. Methodology .....	19
4.1 Qualitative study.....	19
4.1.1 Study scope and study design .....	19
4.1.2 Study sites .....	20
4.1.3 Study population and demographics.....	21
4.1.4 Sample size .....	21
4.1.5 Participant recruitment strategy .....	22
4.1.6 Fieldwork team recruitment, training, and pilot activities.....	22
4.1.7 Data collection and management .....	23
4.1.8 Ethical considerations.....	23
4.1.9 Data analysis .....	23
4.2 Secondary data review .....	24
4.2.1 List of indicators.....	24
4.2.2 Data sources.....	25
4.2.3 Data analysis .....	25
4.3.3 The statistical model .....	25
4.3 Study limitations .....	26
5. Results of the study .....	27
5.1 Policy change/actions and mitigation measures instituted .....	27



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 – views and experiences of the target population.....	28
5.2.1 Effects on the accessibility of MNCH services .....	28
5.2.2 Service utilization – availability of resources and health system preparedness.....	28
5.2.3 Service utilization – acceptability of services .....	30
5.2.4 Service utilization – affordability of resources .....	30
5.2.5 Effects on the referral system .....	32
5.2.6 Continuation and utilization of community-based healthcare .....	32
5.2.7 Specific effects on the disadvantaged target population.....	33
5.2.8 Reorganization of space for service provision.....	34
5.2.9 Communication of Covid-19-specific policy and mitigation measures .....	34
5.2.10 Impact on staff morale .....	35
5.3 Key maternal, newborn, and child health statistics – a summary of changes in key indicators.	36
6. Lessons learned on demand for and access to maternal, newborn, and child health services during the Covid-19 pandemic .....	39
7. Conclusions and discussion .....	41
Appendices .....	42
Appendix 1. Continuity of Essential Health Services (CES) Study list of specific research questions .....	43
Appendix 2. Secondary data review: All graphs and descriptions/conclusions .....	48

## List of tables

Table 1. Number of key informant interviews (KIIs), focus group discussions (FGDs), and in-depth interviews (IDIs) undertaken as part of the study.....	21
Table 2. Effects of the Covid-19 pandemic on key quarterly reproductive, maternal, newborn, child and adolescent health indicators in Malawi .....	37
Table 3. Quarterly number of adolescents aged 10–19 attending their first antenatal consultation (Indicator 25), Malawi .....	38

## List of figures

Figure 1. Daily new cases of Covid-19 in Malawi, February 2020 – August 2021 .....	12
Figure 2. Daily deaths related to Covid-19 in Malawi, February 2020 – August 2021 .....	12
Figure 3. Total Covid-19 cases in Malawi, February 2020 – August 2021.....	13
Figure 4. Total deaths related to Covid-19 in Malawi, February 2020 – August 2021	<b>Error! Bookmark not defined.</b>
Figure 5. Governance and Capacity to Manage Resilience of Health Systems conceptual framework	20

## 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 Blantyre and Mchinji districts in Malawi.

The report, which is based on an analysis of qualitative and quantitative data from Malawi, is part of a series that also covers two other countries in the Eastern and Southern Africa region (ESAR): Kenya and Mozambique. This series of reports has been commissioned by the UNICEF Eastern and Southern Africa Regional Office (ESARO) and led and coordinated by the Aga Khan University Centre of Excellence in Women and Child Health (AKU-CoEWCH) as part of a long-term agreement established in August 2019 entitled 'Evidence Generation for Improved UNICEF Health Programming in Eastern and Southern Africa'. The report follows a standard template across the three countries, with country-specific adaptations, as applicable. Common tools and standard operating procedures (SOPs) were used across the three countries.

In Malawi, the study was conducted between June and August 2021 by the Centre for Reproductive Health, Kamuzu University of Health Sciences (formerly College of Medicine, University of Malawi) under the guidance and coordination of the AKU-CoEWCH.

Ethics approval for this study in Malawi had been received from the College of Medicine Research Ethics Committee (COMREC) on 4 June 2021 (Certificate number: P.03/21/3282).

This was a mixed-methods study comprising a desk review of documents, semi-structured in-depth interviews and focus group discussions (FGDs) in the field (at district management level; at service delivery level with providers at health facilities; and interviews with community health workers and community members, focus group discussions (FGDs) with community members, and quantitative secondary data analysis of selected key reproductive, maternal and child health (RMCH) indicators extracted from the National District Health Information System (DHIS2) for the period 2018–2020.

The study included a specific focus on vulnerable populations, including adolescents, women living with HIV, and infants and young children. The immediate target 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.



## 2. Background and rationale

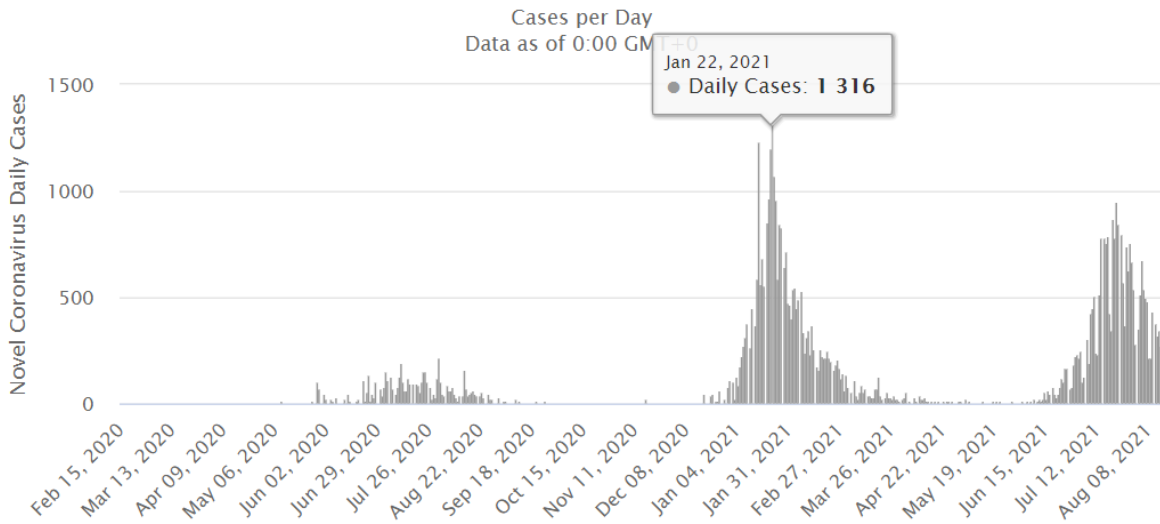
### 2.1 Covid-19 in Malawi

The first three Covid-19 cases were confirmed in Malawi on 3 April 2020. The number of confirmed cases rose slowly (see Figure 1), peaking in June 2020 in what would come to be considered the first wave. Despite the relatively low number of infections, the Government of Malawi took a proactive stance and a Presidential Taskforce on Covid-19, whose membership included public health experts, technical experts, and Members of the Cabinet, was established to guide the country's response. Measures put in place to limit the spread of the virus included closing schools; social distancing; the obligation to wear facemasks in public; and self-quarantine for all who tested positive for Covid-19, as well as for all incoming travellers. The number of passengers on public transport vehicles was limited to only 2 people per row where normally four or five persons would sit. Public gatherings were also initially limited to 100 people though this was later suspended following actions to secure injunctions by civil society activists.

The number of new infections reduced significantly after August 2020, to the point that there were almost no new infections by December of the same year. This may have fuelled a false sense of security which lowered adherence to Covid-19 prevention measures. Things changed in January 2021, when Malawi entered its second wave of the Covid-19 pandemic and the number of daily infections and deaths reached a new peak. The highest number of new infections (1316 new daily cases) was recorded on 22 January 2021 and the highest number of daily deaths (41) was recorded on 24 January 2021. The country declared a State of Disaster at this point and the Vice President of Malawi led the team to develop new, stricter guidelines for the Covid-19 response. Mask-wearing was made mandatory in all public places, including markets and shops; and restrictions were made to trading hours for bars and markets. Attendance at public gatherings was now capped at 50 people. Once again, the number of Covid-19 cases subsided to a very low level starting in March 2021, only to be followed by third wave which started in June 2021.

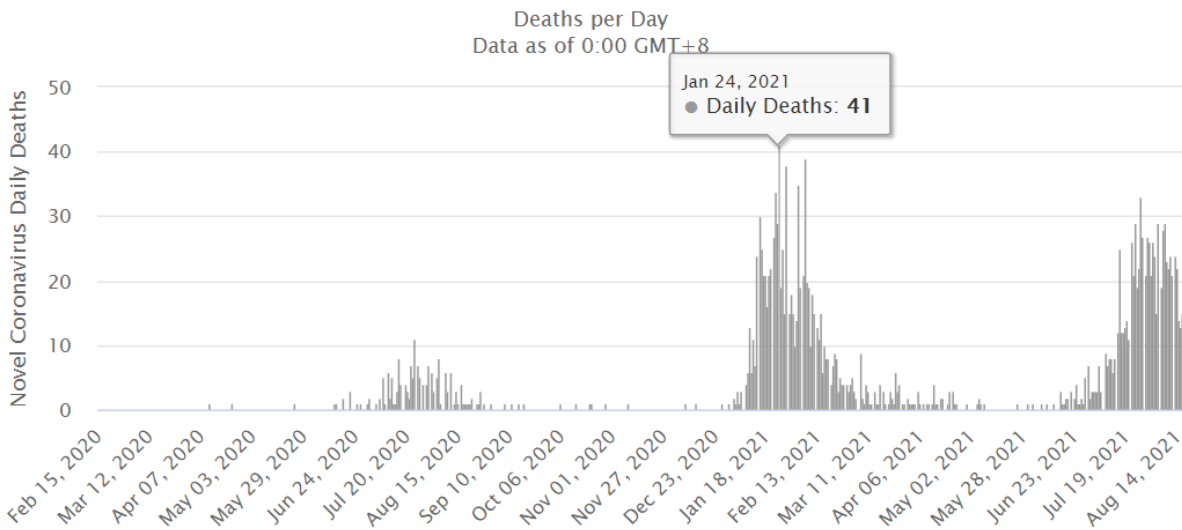
Beginning during the second wave of Covid-19, more people were tested and found to be positive, of whom many were hospitalized, stretching the capacity of the healthcare system. The Government responded by attempting to increase the number of healthcare staff and treatment centres for Covid-19, and took steps to secure assistance for essential equipment and supplies, especially oxygen cylinders and accessories, as well as Covid-19 testing kits, which were in limited supply. As of 30 June 2021, a total of 36,126 Covid-19 cases and 1,196 deaths were recorded in Malawi.

Figure 1. Daily new cases of Covid-19 in Malawi, February 2020 – August 2021



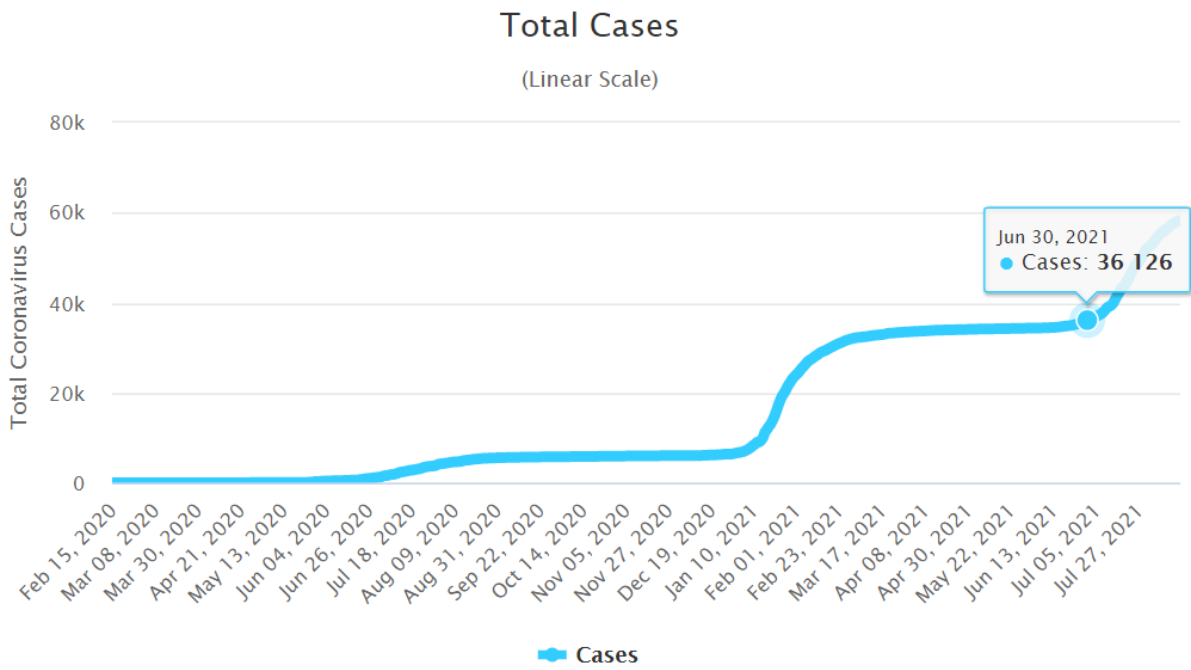
Source: Public Health Institute of Malawi (<https://covid19.health.gov.mw/>)

Figure 2. Daily deaths related to Covid-19 in Malawi, February 2020 – August 2021



Source: Public Health Institute of Malawi (<https://covid19.health.gov.mw/>)

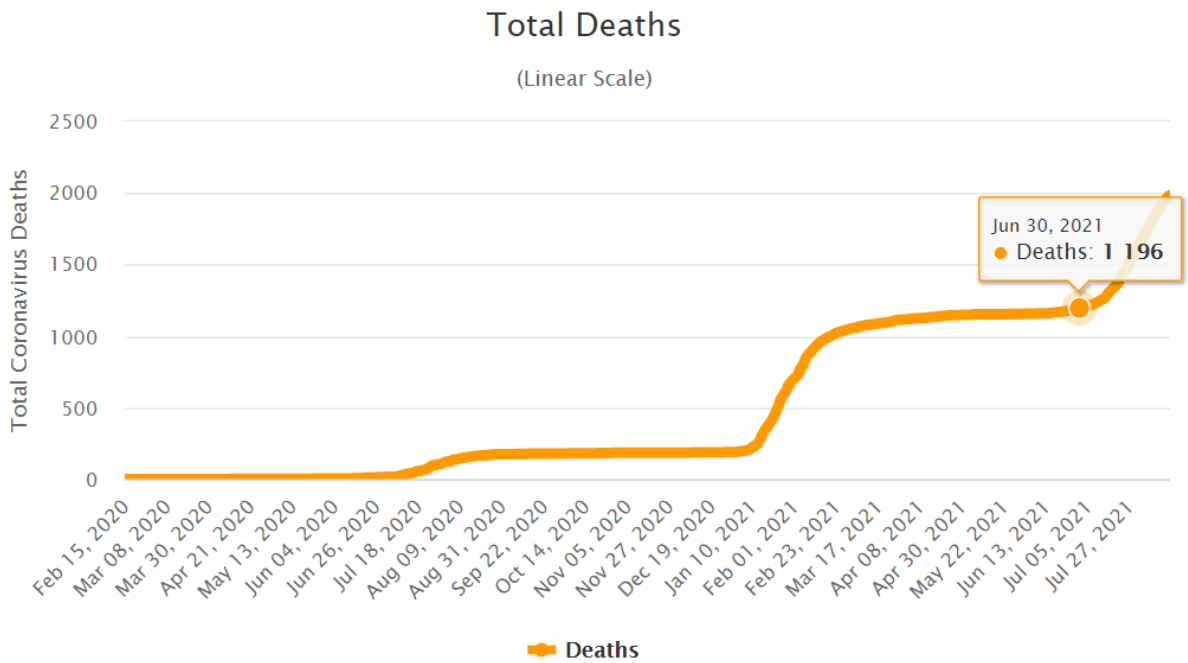
Figure 3. Total Covid-19 cases in Malawi, February 2020 – August 2021



Source:  
Public  
Health  
Institute  
of  
Malawi  
(

<https://covid19.health.gov.mw/>

Figure 4. Total deaths related to Covid-19 in Malawi, February 2020 – August 2021



Source: Public Health Institute of Malawi ( <https://covid19.health.gov.mw/> )



While the public health and social measures implemented have likely contributed to limiting the spread of Covid-19, they have also had an indirect detrimental impact on the social, economic, and health sectors. Given relatively limited healthcare capacity in Malawi, particularly for critical care, a ‘flatten the curve’ paradigm may be less apposite in the region and governments need to balance the threat of Covid-19-specific mortality with the potential secondary impacts of mitigation measures, which may also result in excess mortality. 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 arising from the health emergency. Scenario-based modelling of excess maternal and child mortality due to reduced coverage of essential health and nutrition services suggests that the indirect impact of Covid-19 mitigation measures could result in an increase of between 9.8 per cent and 44.7 per cent in under-five deaths per month, and an 8.3 per cent to 38.6 per cent increase in maternal deaths per month, across 118 countries.<sup>1</sup>

Projections suggest that approximately 15 million additional unintended pregnancies could occur over one year if Covid-related service disruptions affected 10 per cent of women in need of sexual and reproductive health (SRH) services in low- and middle-income countries around the world.<sup>2</sup> Anecdotal evidence from the countries of sub-Saharan Africa, including Malawi, indicates an increase in adolescent pregnancies since the closure of schools due to Covid-19. Schools typically provide Malawian adolescents with some access to reproductive health information and counselling, the presence of mother-groups to support girls in need of services, and peer-to-peer support.

The impact of Covid-19 on the availability and quality of maternal, neonatal, and child health (MNCH) services, and the impact of the accompanying socioeconomic disruption on access to these services, require further investigation. The World Health Organization (WHO) *Pulse survey on continuity of essential health services during the COVID-19 pandemic* administered in 105 countries<sup>3</sup> 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 services were affected, including essential services for communicable diseases; non-communicable diseases; mental health; reproductive, maternal, newborn, child and adolescent health; and nutrition services. While emergency services were the least disrupted overall, 16 countries reported disruptions across all of their emergency services. The most severely affected service delivery platforms were mobile services, often suspended by governments, and campaigns, for example as used for malaria prevention or immunization. The disruption was caused by a mix of demand and supply factors. On the demand side, 76 per cent of countries reported reductions in outpatient care attendance. Other factors, such as lockdowns hindering access and financial difficulties during lockdown limiting people’s ability to pay, were also mentioned. On the supply side, the most commonly reported factor was cancellation of elective services (66 per cent). Other factors mentioned included staff redeployment to provide Covid-19 relief, unavailability of services owing to closures of health facilities or health services, and supply chain difficulties.

---

<sup>1</sup> Timothy Roberton, DrPH. Emily D Carter, PhD. Victoria B Chou, PhD. Angela R Stegmuller, BS. Bianca D Jackson, MSPH. Yvonne Tam, MHS. et al. Early estimates of the indirect effects of the Covid-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study. *The Lancet Articles*; Volume 8, ISSUE 7, E901-E908, July 01, 2020

<sup>2</sup> Riley T, Sully E, Ahmed Z, Biddlecom A. Estimates of the Potential Impact of the Covid-19 Pandemic on Sexual and Reproductive Health In Low- and Middle-Income Countries. *Int Perspect Sex Reprod Health*. 2020;46:73–6.

<sup>3</sup> WHO. “Pulse survey on continuity of essential health services during the Covid-19 pandemic: interim report, 27 August 2020”. WHO, August 2020

## **2.2 Purpose of the study and rationale**

While attention 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 included in this multi-country study – including Malawi – health systems are already fragile and people often live in extremely precarious conditions. The coronavirus 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. During 2020, in Kenya, Malawi and Mozambique some health services were reorganized, downsized, or closed to limit the risk of transmission. Staff shortages became more common as frontline healthcare workers fell sick or died in places where there were already too few to provide essential services. Keeping essential health services available and accessible is vital to prevent losing even more lives, whether from malaria, measles, malnutrition, or complicated pregnancies.

This study focused primarily on an investigation of demand-side barriers to better understand the extent to which the pandemic impacted people's willingness and ability to access MCNH services in Malawi. This research explored the effect of the Covid-19 pandemic and related mitigation measures on the demand for and utilization of essential MNCH services by the target population at health facility and community levels, while simultaneously investigating the resilience of the healthcare system and supply-side factors that influenced access to these services. One urban site (Blantyre) and one rural site (Mchinji District) were identified for data collection.

### 3. Research objectives, focus, and questions

The research objectives and questions for the Malawi study have undergone an ethics review, and are worded as follows:

#### 3.1 Study objectives

The overall study objective was to understand the extent to which the Covid-19 pandemic has impacted people's willingness and ability to access essential maternal, newborn and child health (MNCH) services, their experiences of care, and the readiness of MNCH services to provide essential care during the pandemic.

**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, including post-partum FP, faced by vulnerable groups during the Covid-19 pandemic, in particular pregnant and breastfeeding women living with HIV and/or living in remote geographical areas; these include adolescent women (15 to 19 years old) who are pregnant, breastfeeding, and/or living with HIV.
- (4) Assess MNCH, including post-partum FP, 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 MNCH care, including:

- antenatal care (ANC)
- delivery by skilled personnel and postpartum care (PPC)
- postpartum 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 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.

Below an excerpt of key research questions is provided. For the full list, please see **Appendix 1**.

#### **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?

##### ***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?

##### ***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?

**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 did available staff / health managers at facility and sub-county/county levels manage to keep up essential MNCH service provision and referral services?
- d.** 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?
- e.** 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?

## 4. Methodology

### 4.1 Qualitative study

#### 4.1.1 Study scope and study design

The qualitative component of the study included key informant interviews (KIIs) with service providers and facility managers, focus group discussions (FGDs) and in-depth interviews (IDIs) with specific target groups (e.g., pregnant and breastfeeding women living with HIV). The scope of the study included data collection, data quality monitoring, transcription and translation, data analysis, and reporting on study results.

#### *Conceptual framework*

The conceptual framework proposed in *Governance and Capacity to Manage Resilience of Health Systems* describes three types of capacity that together contribute to health system resilience: absorptive capacity, adaptive capacity, and transformative capacity<sup>4</sup>. This framework is considered relevant as it arose from the experience of health systems in the context of recent Ebola outbreaks in West and Central Africa, and certain parallels can be drawn between the pressure on the health system in the context of Ebola and the Covid-19 pandemic.

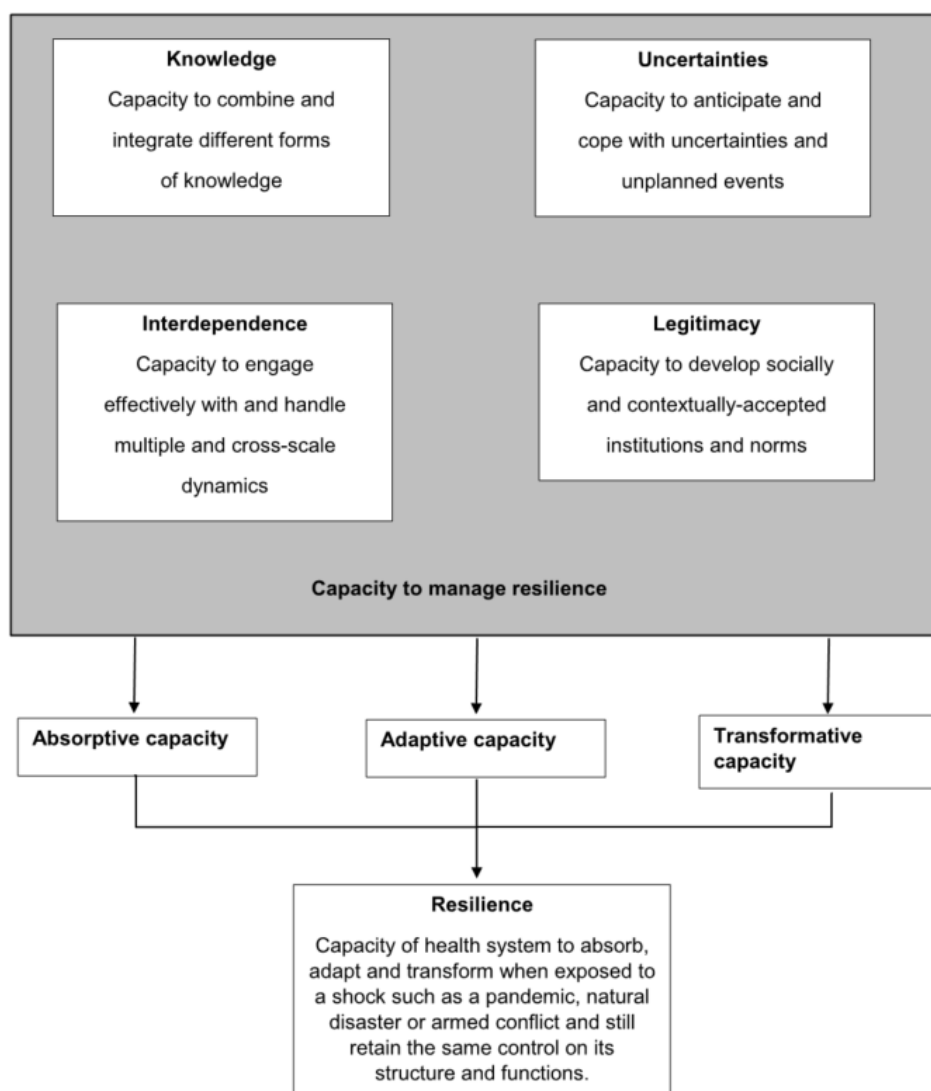
'Absorptive capacity' relates to the capacity of a health system to continue to deliver the same level (quantity, quality, and equity) of basic healthcare services and protection to populations despite the shock (in this instance, the Covid-19 pandemic) using the same level of resources and capacities. 'Adaptive capacity' is the capacity of health system actors, such as health workers, to deliver the same level of healthcare services with fewer and/or different resources, which requires making organizational adaptations. Finally, 'transformative capacity' describes the ability of health system actors to transform the functions and structure of the health system to respond to a changing environment. An example would be adaptations to Covid-19 guidelines and provision of Covid-19 care without compromising other services.

---

<sup>4</sup>Karl Blanchet et al. (2017) Governance and Capacity to Manage Resilience of Health Systems: Towards a New Conceptual Framework. *International Journal of Health Policy Manag* 6(8), 431–435, model adapted from Lebel L, Anderies JM, Campbell B, et al. Governance and the capacity to manage resilience in regional social-ecological systems. *Ecol Soc*. 2006;11(1):19.



Figure 5. A Conceptual Framework: The Dimensions of Resilience Governance



Source: Blanchet et al. (2017) Governance and Capacity to Manage Resilience of Health Systems: Towards a New Conceptual Framework. *International Journal of Health Policy and Management* 6(8), 431-435.

#### 4.1.2 Study sites

The qualitative research was carried out in agreement with national Government stakeholders and the UNICEF Malawi Country Office in selected geographical areas chosen on the basis of relatively poor reproductive, maternal, newborn, and child, and adolescent health (RMNCAH) indicators as well as national programme priorities.

The two districts selected for the study were Blantyre District (urban) and Mchinji District (rural). Blantyre City in the Southern Region has Malawi's highest HIV prevalence while Mchinji District illustrates the challenges of a typical rural district in the Central Region of the country. Two facilities were selected in each district: Ndirande and Limbe Health Centres in Blantyre District and Mchinji District Hospital and Mkanda Health Centre in Mchinji District. At the time of planning, local Covid-19 infection rates were not readily available so this was not a factor in site selection.

### 4.1.3 Study population and demographics

The following target groups were interviewed:

- (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
- (4) Parents/caretakers of children under five years of age, including adolescent mothers and fathers
- (5) Facility-based healthcare workers and health facility managers
- (6) Community health workers/volunteers and other community-based health agents, such as peer mother supporters
- (7) Subnational level healthcare managers (district).

Only service providers with one or more years of experience were chosen for the study so that they were in a position to provide a comparison of realities before the Covid-19 outbreak and during the Covid-19 pandemic. For each group, both rural and urban participants were recruited. Owing to limitations of scope, mothers were not stratified by prior birth history.

### 4.1.4 Sample size

Purposive sampling was used to obtain inclusive coverage. Following principles of qualitative investigation, data collection with particular subgroups would conclude at saturation or be extended should unanticipated new material be identified. The sample size also reflected the scale of the project within time and budgetary constraints. The investigators anticipated challenges in running focus groups with staff in health facilities owing to the demands on staff time, and this was planned to be undertaken only where feasible. In the event, it proved possible to undertake FGDs at one rural health centre and the rural District hospital but not at the urban site. The composition of the study sample is presented in Table 1.

**Table 1. Number of key informant interviews (KIIs), focus group discussions (FGDs), and in-depth interviews (IDIs) undertaken as part of the study**

Population	Blantyre District	Mchinji District	Total
<b>Key informant interviews (KIIs)</b>			
Community-based health workers (e.g., Community Health Volunteers, Community Midwives)	4	4	8
Facility-based health workers	4	4	8
Facility-based health service managers (health facility in-charges, MNCH Coordinator/Safe Motherhood Coordinator)	2	4	6
Subnational healthcare managers (district/sub-county/province/county/region)	2	2	4
<b>Total key informant interviews</b>	<b>12</b>	<b>14</b>	<b>26</b>

Population	Blantyre District	Mchinji District	Total
<b>Focus group discussions (FGDs)</b> <i>Maximum of 6–8 participants per group in light of the Covid-19 pandemic, total 57 lay and 12 health care professional participants</i>			
Nurses and midwives in a rural health centre and District hospital	0	2	2
Women of reproductive age (20–49 years: Separate groups for pregnant and breastfeeding women and mothers of children under five	4	4	8
Men/fathers	2	2	4
<b>Total focus group discussions</b>	<b>6</b>	<b>8</b>	<b>14</b>
<b>In-depth interviews (IDIs)</b>			
Pregnant and/or breastfeeding adolescent women and adolescent mothers and fathers (aged 15–19 years)	3	3	6
Key subgroups of people living with HIV: pregnant and breastfeeding adolescents (aged 15–19 years) and adult women (aged 20–49 years)	3	3	6
<b>Total in-depth interviews</b>	<b>6</b>	<b>6</b>	<b>12</b>

#### 4.1.5 Participant recruitment strategy

Before the start of data collection, the study was introduced to the district research teams who endorsed the study and provided guidance in the selection of study sites and key personnel working in the healthcare sector, who were recruited as study participants. Potential key informants – healthcare providers or managers – were contacted at work and asked to participate in the project. Interviews were conducted at a suitable time and place for the interviewee, and all interviews took place face-to-face. All key informants who agreed to participate signed informed consent forms to confirm their voluntary informed participation.

Focus group discussions (FGDs) were held with various groups of service users. Focus groups had a maximum of 6–8 participants per group due to Covid-19 social distancing restrictions. In each locality, FGD participants were recruited in the catchment areas of the health facilities with the help of a local mobilizer, usually a Health Surveillance Assistant (HSA). All FGDs were conducted in the local language, Chichewa. Women and adolescents living with HIV were recruited through facility-based support groups.

#### 4.1.6 Fieldwork team recruitment, training, and pilot activities

The data were collected by research assistants, selected based on their experience in conducting similar studies. A total of eight research assistants were recruited. These were divided into two teams, one in Mchinji and the other in Blantyre. Each team was led by a research supervisor. Research assistants underwent a four-day training programme on standard operation procedures (SOPs) for the study, research ethics, and study protocols. Tools were tested and piloted during the training to assess comprehensibility of the Chichewa-language versions.

#### **4.1.7 Data collection and management**

Following introductions, provision of information sheets and completion of consent forms, interviews were recorded using an audio recorder and transferred to a secured computer to maximize data safety. To ensure confidentiality, participants were encouraged not to use names during the interviews; audio recordings were saved using unique identifiers and not participant names. Data collectors made field notes where appropriate.

#### **4.1.8 Ethical considerations**

The study was approved by the College of Medicine Research Ethics Committee (COMREC), with the Protocol Approval Number P03/21/3282. All study activities were undertaken in accordance with COMREC regulations on research ethics.

As part of the consent process, participants – both interviewees and those who took part in focus groups – were given detailed information about the research background, goals, and objectives. Potential interviewees or focus group participants were told how long the interviews or discussions would be expected to last, and that participation is voluntary, and confidential. For those who did not speak English, an approved translated informed consent form in Chichewa was available. The informed consent forms were read out to participants by the interviewer or the FGD moderator in private and discussed to ensure that each participant understood every part of the form, had an opportunity to ask questions, and did not feel coerced to take part. The researchers reinforced the fact that participants were under no obligation to go forward and that they had the right to change their mind at any time. Those who decided to take part were asked to sign two copies of the consent form – one for the participant and one to be kept on file. Participants were also informed that their names would not be linked to any of the data they provided.

For those below 18 years of age and living with their parents or guardians, consent was obtained from the parents or guardians while the adolescents also signed an assent form before participating in the discussions.

All participants were compensated MK4000 (approximately US\$5) for their time in the study in line with nationally mandated Ethics Committee requirements.

#### **4.1.9 Data analysis**

A thematic content analysis approach was followed during the data analysis process. All qualitative data were transcribed and processed in Microsoft Word. Interviews that were conducted in Chichewa were translated to English. The analysis team developed a code book to guide analysis of all qualitative data; data was coded using NVivo software. The data analysis entailed coding the data; developing a list of emerging themes; categorizing the themes within a hierarchical framework of main themes and subthemes; looking for patterns and associations between the themes; and comparing and contrasting within and between the different groups of participants. Findings from this analysis are summarized and presented in the Results section.

## 4.2 Secondary data review

### 4.2.1 List of indicators

The following were identified for the present study, based on relevance and consistency across the study period of interest. It should be noted that this list is specific to the Malawi study only.

1. Percentage of women starting antenatal care (ANC) in first trimester of pregnancy
2. Number of adolescents attending their first ANC visit (national level)
3. Number of women living with HIV receiving antiretroviral medicine prophylaxis to prevent HIV transmission during pregnancy, labour and delivery, and breastfeeding (PMTCT)
4. Women tested for syphilis as part of ANC
5. Percentage of women completing at least 4 ANC visits
6. Institutional delivery coverage: percentage of expected deliveries
7. Percentage of mothers with preeclampsia who received anticonvulsants in a facility
8. Proportion of women delivering who were administered immediate postpartum uterotonic (oxytocin) for postpartum haemorrhage prevention
9. Proportion of women delivering with direct obstetric complications (i.e. 10–15 per cent) who were treated for direct obstetric complications at a CEmONC facility (Met need for CEmONC)
10. Institutional stillbirth rate (per 1,000 total births)
11. Fresh stillbirth per 1,000 total births in health facilities
12. Institutional neonatal mortality rate (per 1,000 total births)
13. Number of newborns initiated on facility-based Kangaroo Mother Care (KMC)
14. Number of mothers checked in 2x in 7 days
15. Number of mothers checked in <48 hours
16. Number of babies checked in 2x in 7 days
17. Number of babies checked in <48 hours
18. Percentage of children under 1 year of age who are fully immunized
19. Percentage of children who have been fully immunized
20. Proportion of children under 5 years of age treated for diarrhoea
21. 22. Proportion of children under 1 year of age treated for diarrhoea

22. Proportion of children under 1 year of age treated for pneumonia
23. Proportion of children under 5 years of age treated for pneumonia
24. Confirmed malaria cases in children under 5 years of age (per 1,000)
25. Malaria cases in children under 5 years of age (total cases)

#### 4.2.2 Data sources

Indicators were identified in the Malawi District Health Information System (DHIS2) and scrutinized for applicability to the present study. The DHIS2 experienced some technical challenges during 2020, including a large-scale data loss that required restoration.

Data were examined in quarterly rather than monthly intervals and at zonal rather than district levels. The DHIS2 system also gathers returns from the three national referral (Central) hospitals. As the focus was on access and experience of care at primary level and it was not feasible to identify referral service users within communities during this study, these Central Hospital returns hospitals were omitted from the analysis.

A national-level indicator for adolescent pregnancy based on the number of adolescents attending their first antenatal visit was identified and examined separately.

#### 4.2.3 Data analysis

Following scrutiny of quarterly trends from 2018 through to the first quarter of 2021, and data quality as reflected in distributions across time and zone, Quantitative descriptive cross-sectional analysis was performed using interrupted time series analysis (segmented regression) and looking at average differences.

Each time series analysed represents observed quarterly cases between January 2018 and December 2020, with some data considered for January-March 2021. Considering that the Covid-19 pandemic in Malawi began in March 2020, this period was defined as the breakpoint for segmented regression analysis. The objective of interrupted time series analysis is to evaluate the tendency of RMNC variables before the breakpoint, the immediate effect at the breakpoint, and the tendency after the breakpoint, comparing the average number of cases and identifying the statistical model applied to each variable with a 95 per cent confidence interval.

#### 4.3.3 The statistical model

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

where:

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

Statistical significance was based on the Kruskal–Wallis test, comparing the average of the respective indicator before Covid-19 was detected and the months after the outbreak of Covid-19.



Considering the mixed-methods approach applied to the study, qualitative and quantitative data were cross-analysed. A narrative text with a combination of quantitative data expressed in figures (tables and/or graphs) and text with explicit quotes is used to present the findings.

### **4.3 Study limitations**

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. Notably, it was not possible to include study sites from the Northern Region which is quite different in terms of socioeconomic conditions and culture. Nevertheless, the results do provide insight into the perceptions, challenges, and barriers on the demand side (clients) and supply side (providers) of RMNCH services at the time of the Covid-19 pandemic in urban and rural contexts and areas to target for interventions in similar contexts.

Another limitation was the limited participation of adolescents given their inexperience utilizing MNCH services as most of them were pregnant for the first time.

## 5. Results of the study

This section outlines the findings of both the qualitative study and the secondary data review.

### 5.1 Policy change/actions and mitigation measures instituted

Service providers reported that they had implemented various changes in service delivery as a way of mitigating the spread of Covid-19 and the related demands on their time. These changes affected the range of maternal, newborn, and child health services. Mitigation measures were introduced primarily to reduce contact between service users and service providers, and to rationalise working patterns to cope with the demand. In particular, there was a change from normal work patterns to working in shifts.

Reported changes in the delivery mode for HIV-related services included giving clients on antiretroviral therapy (ART) multi-month rather than monthly prescriptions so as to reduce the frequency of routine visits to health facilities. The same approach was followed in family planning: clients were encouraged to choose long-term over short-term contraceptive methods to reduce the number of visits. Similarly, in children's services, children who were fully immunized were no longer required to attend under-five clinics. Lastly, most women were discharged 12 hours after giving birth.

*"There have been a few changes in the protocols that we are supposed to follow, say for example we are supposed to be with the mother for at least 48 hours after delivery but currently we are doing it only for 12 hours. So we stay with the mother only for 12 hours and then we send them back home (...) and then after delivery we are supposed to have mothers come back for postnatal check-ups at 1 week and then at 6 weeks. I think we are not doing 1-week check-ups but we are only doing the 6-week follow-up so there have been such changes, though if [the mothers] happen to come at 1 week we still see them, we don't turn them back, but we are not encouraging people to come at one week."*

–Urban health manager

Changes affecting service providers were noted. For example, healthcare workers were required to work in shifts – usually a weeklong shift, followed by a week off duty. Furthermore, as those workers started to get sick with Covid-19, their colleagues had to take on extra tasks to cover the workload.

*"The things that changed were mostly (...) the numbers of health workers (...) present in the office – if there were 10 [before], there would be 5 [now]. So we were working in shifts to avoid congestion in the offices (...) preventing the transmission of this Covid-19."*

–Urban community health worker

*"I was sick for 14 days; I was at home. (...) It meant that there was a gap here at work and it was not easy for [my] fellow health workers to cover that gap. In addition, it was not easy for me to find workers to replace those who are sick in this department, and there was a huge workload since there were only a few people working. Despite this, some health workers still turned down your request to come and work. Some could say they are sick, or their children are sick – such things – and the result [was] huge workloads."*

–Rural health manager

In addition to the measures described above, both service users and service providers were required to have facemasks on at all times, and to observe social distancing. This proved difficult for service

providers due to severe shortages of personal protective equipment (PPE), particularly at the beginning of the pandemic. Service users also reported that this served as an access barrier as some were unable to afford masks – and thus could not access 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 – views and experiences of the target population**

### **5.2.1 Effects on the accessibility of MNCH services**

Findings from this study show that the Covid-19 pandemic had an effect on the utilization of health services by affecting the three dimensions of access: acceptability, availability, and affordability as outlined by Thiede and colleagues<sup>5</sup>. Service providers reported lower uptake across all MNCH services, especially antenatal care; institutional delivery; under-five clinics, including vaccination; and general outpatient services.

*“Yeah, it [Covid-19] [had] an impact because in this period, that is early January of 2021, the numbers started to increase. People were afraid. As a result, few women and few pregnant mothers, and even deliveries, made the trip [to the health facility as they were] fearing to get infected by health workers.”*

–Rural health facility manager

*“It has been observed that people in the community have worries that they will be forced to take a Covid test and/or [get] vaccinated for corona[virus]. Hence the number of people coming for services is very low. Ah! Even for ART services, [the number of] pregnant women living with HIV and children who are followed up have decreased. For example, if we used to have 100 people, (...) we now have 60: this is due to (...) Covid. (...) [M]ost women stopped coming for antenatal services, some others started having labour and deliveries in their communities (homes) due to fear. Most of them did not get the service they [should] receive, because there were myths and misconceptions [about] the oxytocin and water given after birth for them to recover: [it] was mistaken with the Covid vaccine or Covid test. Hence, ... most of them would opt to visit private clinics or stay at home.”*

–Urban health manager

*“I can say that the outcomes in terms of newborns’ health status and also [that] of mothers have been affected greatly. (...) The uptake has lowered meaning many of them do not come to seek health services. Most people come when the child’s condition has worsened and [when the child] is in critical stage and the child cannot survive; hence, most children are dying.”*

–Rural health manager

### **5.2.2 Service utilization – availability of resources and health system preparedness**

Study participants – both service providers and users – reported that the pandemic affected the availability of essential resources. These included shortages of essential MNCH drugs and supplies,

---

<sup>5</sup> Thiede, M., Akweongo, P., & McIntyre, D. (2007). Exploring the dimensions of access. In D. McIntyre & G. Mooney (Eds.), *The Economics of Health Equity* (pp. 103-123). Cambridge: Cambridge University Press. doi:10.1017/CBO9780511544460.007

such as vaccines. As a result, people felt discouraged from visiting facilities, feeling they may not obtain the required treatment or care.

*“When we ask [the health staff] they say, they [have been] told that they don’t have the BCG vaccine [and that] where they come from they are also hit with the pandemic and for them to send [supplies of vaccine] to the facility it is taking a long time, that is why newborns are not vaccinated with [the] BCG [vaccine] at birth.”*

–Rural father

*“In most cases now, there seems to be a short supply of medical equipment, especially medication, which we are constantly told to go buy as they are running short on most drugs.”*

–Urban pregnant adolescent girl

Respondents also reported that health facilities were not prepared to adequately respond to the Covid-19 outbreak, especially at first. Health centres experienced severe shortages in PPE, including facemasks, and received insufficient quantities of Covid-19 test kits to confirm the Covid-19 status of all suspected cases. This made it difficult to provide services to clients and also contributed to low utilization of services. Health workers reported that, fortunately, the situation improved over time.

*“The changes since Covid was affecting everyone. We worked in fear because we were never provided with the PPE [personal protective equipment] in the first place. Therefore, provision of services was done at a distance, [more so] than usual, observing social distance [out of] fear of being close to the patients. On the other hand, we would make sure to [attend to] those in need of assistance and when we are done with that group, we would pick another category to be assisted.”*

–Urban health manager

Lastly, health sector workers could only see a given number of clients per day in adherence with social distancing protocols. Both men and women who took part in the study reported that they were unclear about facility operating days and hours. As a result, women felt discouraged to seek services as they perceived their chances of receiving care to be uncertain.

*“It has affected them in terms of time: when they wanted to come here, there was a certain number of people who needed to be assisted at [the same] time. So because they were waiting for a long time in order to be assisted, some women were going back home without receiving the service they wanted.”*

–Rural community health worker

*“Yes, this affected us. There was a limited number of people that were attended to in order to adhere to social distancing measures. So, it was on a first-come, first-served basis, so if we arrived late then we were sent back to be assisted the next day.”*

–Urban breastfeeding woman

*“This affected a lot of the contraceptive services that women seek here (...) because there was a limit on the numbers of people to receive this service since social distancing was observed. (...) As such, women could opt just to stay home without coming here because when they did come, they would be sent back without getting the contraceptives they needed.”*

–Urban father of a child under five and/or partner of a pregnant woman

### 5.2.3 Service utilization – acceptability of services

Participants reported that the number of service users went down when the Covid-19 outbreak was declared; this was particularly noticeable in antenatal care and family planning services. While in time numbers began to recover, they did not return to former levels. Urban and rural service users were afraid that using health services would increase their chances of Covid-19 infection – both due to health workers being perceived as a high-risk population for Covid transmission and due to conspiracy theories, which stipulated that, e.g., Covid-19 was the Government’s weapon to reduce population size. Such beliefs had people convinced that the services on offer were not for their benefit and thus they elected not to use them.

*“[In terms of] child health services, the Covid-19 [pandemic] has been a big challenge. (...) When there was no information on this pandemic in the community, most of the women were failing to come to the hospital, saying that if they were to come, they would be infected with Covid-19. Most of them were saying the health workers have Covid-19 and the hospitals are where Covid-19 is found the most.”*

–Rural community health worker

*“With regard to vaccinations, like my colleague said here, a lot of people were afraid to come to the hospital; when people got sick they would just think that they will die. If [someone] had a cough, they were afraid to go to the hospital, assuming that they would get the the coronavirus and if that happens then my children would suffer, as a result they would just stay at home waiting on the Lord [waiting for God’s intervention].”*

– Urban father of a child under five and/or partner of a pregnant woman

*“Most people were very reluctant to access health services. This was due to myths and misconceptions that spread throughout the communities – that we will get infected with the virus if we visit the hospitals. It was [perceived to be] more dangerous to visit the hospitals, especially when you have a newborn baby. Hence, most pregnant women stayed in their homes if they had any health problems rather than accessing the care they needed.”*

–Urban pregnant woman

### 5.2.4 Service utilization – affordability of resources

Service utilization also fell due to barriers that challenged the affordability of services. Participants reported that the pandemic made it more difficult to access services as it became more costly to do so. Limits on the number of passengers allowed on public transportation translated into increased transport fares for the public – and led to fewer trips to health facilities.

*“Disruption, such as the increase in transport costs is a problem. At first, we only used 300 Kwacha to come here; [now the price of] transport services ha[s] increased significantly due to corona[virus] and it is difficult to get transport as [the services] have also become scarce.”*

–Rural Urban Adolescent, recently delivered

*“Yes, due to corona[virus], transportation costs have risen. It was said that we must be seated 2 people per seat [fewer than normal] in the bus hence the cost changed from normal to another cost. Hence, we couldn’t come to access health services at times.”*

–Urban breastfeeding woman

*“On the issue of transport: in most cases, the [means of] transport to the hospitals that are found in our areas are few; because of Covid, social distancing is also [being] observed in vehicles. So because of the scarcity of the transport, we are having challenges in accessing services at the hospital.”*

–Rural father of a child under five and/or partner of a pregnant woman

*“It has affected us a lot. (...) [N]ow transport fares are very expensive – yet children are still suffering different kinds of diseases so if you don’t have transport you can’t go to the hospital if you are staying far away. Secondly, you may find transport and come to the hospital but when you reach here and you don’t have a mask then you go back without any service or being attended to by the health workers.”*

–Rural pregnant woman

Transport challenges were more often quoted as a barrier by urban respondents; some rural residents reported relying on walking or cycling to reach their local clinic.

*“Here we can say [that a rise in transportation prices did not have a significant effect], for mostly people use bicycles and these are readily available. It is different for those who use minibuses – but here someone will likely borrow a bicycle from someone else and (...) get the medicine.”*

–Rural pregnant and/or breastfeeding woman

Many study participants reported a drop in earnings either due to job loss or lower business opportunity during the pandemic. Male respondents in particular expressed their frustration with being less able to fulfil their traditional role of provider; many felt responsibility for paying for transport and essential commodities, such as facemasks, that would enable their partners and children to access the services they needed. As a result of financial constraints exacerbated by higher costs of transport and the requirement to wear a mask in the healthcare setting, many families chose not to seek care from health facilities.

*“In the past we’d come to the hospital and buy medicine using the money we made from our business, but now it is difficult for us because we don’t have money to buy the medicine. We are finding it difficult because we don’t make money like we used to.”*

–Urban adolescent, breastfeeding young mother

*“In my opinion, Covid-19 has brought chaos in terms of money. First and foremost, here in Mchinji most of us depend on farming; (...) we cultivate many commodities but we rely on international markets to buy our commodities. We mostly sell to foreign countries.”*

–Rural father of a child under five and/or partner of a pregnant woman

*“Our daily routines have not been going well: the Covid-19 pandemic disrupted everything in an individual’s life. For us to come to the hospital, we needed to have essential supplies, like facemasks. Without a facemask, we cannot be seen. And also with regard to jobs – they were scarce and even businesses were not doing well.”*

–Urban father of a child under five

In addition, the obligation to use facemasks as a means of Covid-19 prevention became a barrier preventing those who could not afford them from accessing the requisite services.



*“Yes, it has affected us. There are times when we don’t have the essentials like hand sanitizers and masks. Sometimes we make our own masks because we don’t have enough money to buy masks for us to be able to go to the hospital.”*

–Urban adolescent, recently delivered

*“When there was no corona[virus], we were able to come to the hospital freely, we could enter the gate without a facemask. So now that there is coronavirus, you find that you are sent back without getting any care simply because you don’t have a facemask. They send you back saying: ‘go and put on a facemask’. Imagine being sent back (...) without receiving any services despite your child being very sick.”*

– Rural mother of a child under five

### **5.2.5 Effects on the referral system**

Study participants reported no changes to the referral system or the way ambulances worked during the pandemic. Critical cases continued to be referred to higher levels of the health system. The only change was that new guidelines meant that guardians were restricted from accompanying patients in ambulances and health facilities; patients travelled without escorts. However, there were practical challenges in transporting patients alone rather than in groups as is normally the practice.

*“We are just lucky that our main hospital (...) is near here so people were referred there easily. But there was a limit on numbers of those [who can enter the hospital], (...) [just] the patient and a guardian [companion]. So you know it is hard for some people to understand (...) [and] you could find many people [coming] to be with the patient. Unfortunately, they could be [turned back with the explanation that only patients and guardians are allowed in] here. For them, [this was difficult to hear], but for us, we saw that it was a good arrangement.”*

–Urban community health worker

*“Yes, it happens that you, as a guardian [companion], are left behind, and the patient goes alone, so you become dismayed. If the patient has tested positive for Covid-19, you are not allowed to accompany the patient; only the patient is taken from the health centre [when referred to the main hospital]. (...) [T]he guardian is anxious wondering how the patient will cope alone. So it has affected us (...) that way.”*

–Rural father of a child under five and/or partner of a pregnant woman

*“Of course, referrals were affected. (...) For example, in the past, as a cost-saving measure, we could send 2 or 3 patients in one vehicle, but now with Covid-19 and limitations on passengers, we only send 1 patient and a guardian, or sometimes even, depending on the condition of the patient, we just send the patient only, without a guardian. So at the end of the day, it still affects (...) the care and support for the patient when she or he gets to the other facility.”*

–Rural health worker

### **5.2.6 Continuation and utilization of community-based healthcare**

The Covid-19 pandemic increased the workload of Community Health Workers, known in the Malawi health system as Health Surveillance Assistants. They were tasked with additional responsibilities, including sharing information about Covid-19 and prevention measures, and making home visits to people who tested positive for Covid and disinfecting their homes as they recovered. This prompted

mixed reviews from members of the community: while some welcomed them, others closed their doors, afraid of contracting Covid-19.

*“The services exceeded normal [levels]. The doctors relied on us (...) [to reach] the people (...) in the communities. We went further, (...) distributing chlorine door-by-door so that [people] could put [it] in water and use [it] to wash their hands if they did not have soap, so the health surveillance assistants were in ‘panic mode’ during this Covid-19 period. They worked day and night, to ensure that Covid did not spread further.”*

–Urban health manager

*“We were also affected [when it came to] follow-ups. For us as HSAs [community health workers], (...) it meant added workload. (...) As not all women were coming to the hospital, (...) it was our duty to follow up [with] those that were not coming. So this meant that each and every day we had to follow these women for they were being helped bit by bit.”*

–Rural community health worker

*“For us here, what happened was that we encouraged people to access more community care than facility care, especially from clinics, to minimize congestion here at the hospital. So in terms of the follow-ups done by the HSAs [community health workers], the turnout was good and people preferred that they were attended right [there] in their homes, not at the hospital. So you could find that the participation of people during the HSA visit was good because they felt it was in their setting and to them they think they are safe from Covid-19.”*

–Rural service provider

### **5.2.7 Specific effects on the disadvantaged target population**

Further, this study explored whether vulnerable populations, particularly adolescents and adult women living with HIV, were additionally disadvantaged at the time of the pandemic. One aspect was that teen clubs that previously served adolescents living with HIV, including pregnant and breastfeeding adolescents, had been suspended or reduced in light of the national guidance to reduce social gatherings. In both urban and rural sites, the frequency with which they were able to meet had been reduced as recommended by the Ministry of Health. In addition, the number of routine visits to health facilities to stock up on ART was cut, as longer prescriptions were offered. The quantitative data suggest an uneven impact on delivery of services and this may have affected vulnerable subgroups to a greater extent. For example, the number of tests for syphilis performed as part of antenatal care was reduced during the Covid-19 pandemic, which might have led to an increase in undetected disease among women and their newborns, potentially affecting especially those at risk of sexually transmitted infections.

*“It was also said that people who are in danger are those that are living with HIV so when some people heard those messages, they were afraid to come collect ART drugs. They were not coming as required. For example, if they were due to come and collect drugs today, you would find that they are postponing their visit. For others, they simply defaulted: we saw that in the period of Covid-19, there were a lot of defaulters.”*

–Rural service provider

*“We give them a schedule. At first, they received medication for 3 months and they’d come back after 3 months to receive more medication. This helped us to follow up with them if they are really taking their drugs as prescribed. But now, they are given drugs for 6 months and it takes time for them to come back to the hospital. Since people don’t want to come to the*

*hospital because of Covid-19, the rate of defaulters has increased. People stop taking their drugs. It is also difficult to monitor them if they are really taking the medicine and if they are eating healthy.”*

–Urban service provider

### **5.2.8 Reorganization of space for service provision**

Adjustments were made in the way facilities operate to conform with Covid-19 guidelines. One significant change was reorganizing the way maternity waiting homes were run: to reduce congestion in the rooms, only pregnant women were admitted and no companions were allowed to stay. Both service providers and the women concerned reported that this was far from optimal as the guardians/companions performed an important role in supporting patients by providing food, monitoring the women’s health status, and communicating with the nurses; the facilities themselves did not have adequate resources to support the well-being of their pregnant patients as they awaited delivery. It was difficult for health managers to intervene effectively in this matter because maternity homes fall under the remit of the District Council, and not the health facility.

*“Here at the hospital we have a waiting home for [expectant] women which was crowded already – but now, with the Covid-19 pandemic, people need to keep their distance, which wasn’t possible. (...) Unfortunately, the waiting home is not under us directly (the maternity ward); it is under the Town Assembly, so it becomes difficult for us to have total control, but of course the situation is also known by our superiors, so we have been having meetings. We have also been talking to the mothers there –that only those that are in severe condition or need to be at this facility are the ones who are allowed to stay. We have been sending the others to the nearest health centres and some who understood the situation went home voluntarily. The health centres around Mchinji Hospital were also told that when they are sending mothers who have maternal problems, this should only be those that have high-risk problems, and not for simple issues like because someone is a first-time mother and she should be sent to the district hospital.”*

–Rural hospital health worker

### **5.2.9 Communication of Covid-19-specific policy and mitigation measures**

Misinformation and communication challenges were among the key factors influencing low utilization of health services. It was difficult to overcome misconceptions about the causes and transmission of Covid-19, fuelled by conspiracy theories stipulating that, e.g. the virus was a tool generated by Governments to reduce population size, as illustrated above. Service providers holding Covid-19 sensitization meetings with communities struggled to change people’s minds – the information came too late.

*After some time, when information about the pandemic started being communicated to the community – [information about] social distancing, putting on facemasks – some people in the community were afraid. The issue of facemasks affected people a lot. (...) Some [did not] come to the hospital for a service for they did not have a mask, and this affected children the most.”*

–Rural community health worker

*I: What has changed? What is happening?*

*R: (...) And also since people don't want to come to the hospital because of covid. The rate of defaulters has increased. People stop taking their drugs. It is also difficult to monitor them if they are really taking the medicine and if they are eating healthy.*

*I: All these problems you have mentioned; do you think they came about because of what was happening at of the hospital?*

*R: I don't think so. But rather because of social media and what people are hearing and believing about Covid-19 which is not true.*

–Urban service provider

*“Awareness campaigns were done by NGOs [non-governmental organizations]. They [employed] HSAs to deliver messages to the community [The Health Surveillance Assistants] gave people first-hand information [about the benefits] of getting assistance from the hospital, which then helped the turnout of people in hospitals. The myths and misconceptions that were spreading then diminished.”*

–Urban service provider

Over time, community members became familiar with the new information and Covid-19 preventative measures in place and were confident that they had received adequate information on how to protect themselves.

*“Yes, we have been asked before to take precautionary measures against Covid-19. We should be washing hands frequently, we should be wearing masks, but also we should not stay too close to each other whenever we are in a large crowd but stay apart from each other in order to protect ourselves from the pandemic.*

–Urban pregnant adolescent

### **5.2.10 Impact on staff morale**

The pandemic also seriously impacted the mental health of health workers, many of whom reported that they were demotivated and feared for their lives. The perception that the health system was not in a position to ensure their safety led to feelings of demoralization and despair.

*“Honestly, to say the truth, (...) people still do come here to work for they know that there is a salary (...) and most of the staff come due to that. But honestly, during the pandemic, everyone was demotivated (...) and everyone was afraid. To add on that, there were a lot of applications from staff to go on leave – everyone just wanted to get away from the hospital environment, for them it was better to stay at home so that they [could] stay away from all the crisis. So I can say what motivated staff was the salary, that's all.”*

–Rural health manager

Healthcare workers also reported experiencing stigma and discrimination from the public. People saw health service providers as high-risk and openly expressed their negative opinions and fears. Such perceptions made being out in public and commuting unpleasant on top of an already difficult workload for health workers in a pandemic situation.

*“We were being discriminated [against] in public. [People] would scream at us, saying, ‘A corona[virus]! A corona[virus]!’ So apart from the protective equipment, we faced a lot of discrimination [in] the communities we were coming from and in the minibuses that we board.”*

–Urban health manager

*“During this period, we were mostly discriminated [against]. People would say, ‘Eh! This health worker will infect us with Covid, so let us not associate with him/her.’ We would be denied of public transport or [rides in] other people’s vehicles because we are health workers.”*

–Urban service provider

### **5.3 Key maternal, newborn, and child health statistics – a summary of changes in key indicators**

The data for this analysis is sourced from the national Malawi District Health Information System, DHIS2. This is a top-level summary of the more detailed analysis of the 24 RMNCAH indicators which is included in Appendix 2.

Two considerations affected the presentation of findings: First, during 2020, there was a large-scale loss of data in the Malawi DHIS2. While the data are now largely restored from backups, a decision was made to de-emphasize month-to-month variations and potential differences in district-level reporting, and to use a quarterly analysis based on the five national zones (administrative level 2 comprised of clusters of districts). Second, scrutiny of the data revealed a number of implausible values in the data for the January–March 2021 quarter and so this has been excluded from the analyses shown below. The data are available for further examination, if required.

Indicators reflect reproductive, maternal, newborn, child, and adolescent health (RMNCAH) service access and outcomes; some are presented as raw numbers of patients/clients and others as rates. Denominators for rates are embedded in the DHIS2 and largely based on modelled population estimates.

Trends in service access precede the Covid-19 pandemic, with some indicators showing steady progress nationally while others reveal significant variation between zones. For example, *Met need for emergency obstetric care for complications* showed steady improvement. However *Percentage of infants fully immunized* had been stagnating but showed marked improvement in the first quarter of 2020, immediately prior to the pandemic. *Percentage of women attending antenatal care in the first trimester of pregnancy*, showed a notable trend toward improvement just before the pandemic but only in 3 of the 5 zones. A similar favourable trend was noted for *Completion of 4 antenatal care visits* in 4 of the 5 zones. The disease burden for *Malaria in children under 5 years* follows seasonal patterns, reflected in a spike in numbers early in the year.

Statistical analysis using segmented regression was applied to the indicators to identify changes following the Covid-19 outbreak in Malawi in April 2020. These effects are illustrated in Table 2, which shows trends and their statistical significance. Full details are included in Appendix 2.

It should be noted that there is substantial variation in the Covid-19-related trends between zones for most of the indicators. Indicators showing notable consistency in trends across zones include *Percentage of fully vaccinated children* (statistically significant adverse effect) and *Antenatal testing*

for syphilis (adverse effect). The data also suggest that postnatal care for mothers and babies has been largely preserved and even strengthened in most zones despite the challenges of the Covid-19 pandemic. The findings with regard to *Institutional delivery* may require further examination as overall the rates are somewhat lower than expected based on national data (e.g., the Malawi Demographic and Health Survey 2015–2016) which showed very high coverage of institutional delivery. If confirmed by other sources, this drop is a concern as adverse coverage effects are apparent in access to institutional delivery in 4 of the 5 zones.

The data suggest a possible negative impact on maternal and newborn care arising from Covid-19, with increases in pregnancy/labor complications, stillbirth, and neonatal mortality across all zones. It must be noted that only the increase in direct obstetric complications reaches the level required for statistical significance.

Table 2. Effects of the Covid-19 pandemic on key quarterly reproductive, maternal, newborn, child and adolescent health indicators in Malawi

	CE	CW	N	SE	SW
Proportion of women delivering who were administered postpartum uterotonic	***	***		***	***
Percentage of mothers who had pre eclampsia who received anticonvulsants	***				
Fresh stillbirth per 1000 deliveries in health facilities					
Institutional Neonatal Mortality Rate (per 1000)					
Institutional Still Birth Rate (per 1000)					
Proportion of women delivering with direct obstetric complications	***		***		***
Percentage of Under 1 year children fully immunized	***		***	***	
Percentage of Children that have been fully Immunized	***	***	***	***	***
Proportion of Under 5 children treated for diarrhoea			***		
Proportion of Under 1 Diarrhoea cases treated			***	***	
Proportion of Under 1 children treated for pneumonia					
Proportion of Under 5 children treated for pneumonia		***			
Confirmed Malaria Cases <5 Years (per 1000)					
Malaria Cases <5(Malaria)					
Percentage of women starting ANC in first Trimester			***	***	
Percentage of Women completing at least 4 ANC Visits	***		***	***	
ANC - women tested for syphilis					
Institutional delivery coverage (% of expected deliveries)		***		***	
Number of Mother Checked in 2x in 7 Days					
Number of Mother Checked in <48 Hours			***		***
Number of Baby Checked in 2x in 7 Days					
Number of Baby Checked in <48 Hours					***
Number of babies initiated on facility-based KMC					
Number of HIV Positive Women Treated for PMTCT					

\*\*\*Statistical significance was based on Kruskal–Wallis test, comparing the average before and after the Covid-19 outbreak.

Zones:

CE = Central East




CW = Central West

N = North

SE = South East

SW = South West.



Key	
Increase	
Decrease	
No Difference	
*** Statistically Significant	

In addition to the 24 indicators analysed by zone, a national-level analysis of the proxy for adolescent pregnancy – the number of adolescents aged 10–19 attending first antenatal consultation – was carried out.

**Table 3. Quarterly number of adolescents aged 10–19 attending their first antenatal consultation (Indicator 25), Malawi**

	Q1	Q2	Q3	Q4
2018	28,832	24,893	28,484	29,672
2019	33,698	33,143	37,260	40,505
2020	38,023	31,379	34,947	39,958
2021	38,693			

It is noted that while the number of adolescents presenting for antenatal care has increased over time, this trend is evident from late 2019 and cannot be conclusively ascribed to the Covid-19 context. However, statistical analysis (Appendix 2) suggests a rise as 2020 progressed and into 2021 after an initial fall. This may not be a sufficiently sensitive indicator to reflect the more local impact of school closures on adolescent pregnancy – a trend which has been highlighted in the media in Malawi. It should also be noted that this indicator depends on an adolescent’s ability to access ANC and that this is not a population-level measure. At the same time, noting that ANC services appear to have been largely preserved and given the national context of a generally very high utilization of ANC services, a true increase in adolescent pregnancies is plausible.

## 6. Lessons learned on demand for and access to maternal, newborn, and child health services during the Covid-19 pandemic

Trends in DHIS2 data reveal a complex pattern of change in service delivery during the Covid era, against a background of generally increasing access and uptake of RMNCH services in the years immediately preceding the pandemic. It is possible that aspects of service delivery that had long been a focus of attention for policy makers, such as postnatal care for mothers and babies, may have been better preserved during the pandemic, whereas some established practices, such as institutional births, may have seen more of an adverse impact. Taking evidence from the qualitative interviews, **the study finds evidence of disruption in access to key services.**

The following lessons can be drawn from this analysis, of relevance for future policy and programming around preparedness:

- **Communication:**
  - Community information and education programmes may not have been adequate to mitigate against community members' fear of contracting Covid-19. For the future, information provision to communities should be an early priority in response formulation.
  - Some of the reduced access to health services is attributable to changes in practical arrangements, such as facility opening hours. For the future there is ready scope for mitigation by appropriate communications about practical service arrangements, which will have the added benefit of conveying a sense of the Government being in control of the situation.
  - Effective communication would have been particularly critical in the challenging early months of the pandemic, when myths and rumours flourished in communities, reducing people's readiness to seek services. Counteracting myths and rumours in future episodes though timely and accurate information provision should be an early consideration.
- **Equitable access to services:** In a country characterized by high levels of poverty, Covid-19 mitigation actions resulted in particular challenges for people of limited means. The increased cost of public (minibus) transport – a direct result of pandemic restrictions on passenger numbers – created a very significant obstacle for people wishing to access health facilities. This represents an unfortunate unintended consequence of measures to reduce crowding: one which could be offset by, e.g., commensurate transport subsidies. Similarly, facilitating non-pharmaceutical protection measures especially making available free or heavily subsidised face masks would be advantageous.
- **Pressure on health service providers:** Healthcare staff came under intense pressure as Covid-19 became prevalent. They were expected to adjust to new working arrangements while remaining highly vulnerable to infection owing to initially inadequate provision of personal protective equipment (PPE). Given that most health facilities in the country were already dealing with challenges regarding access to water, soap, sanitation and power supplies, the presence of a highly infectious disease in health facilities represented a justifiable source of anxiety and stress on health workers in addition to the physical impact on those who contracted the virus in the course of their duties. Public health and organisational responses need in future to emphasise the care and support of health care professionals and support staff.

- **Exposing gaps in the health system:** The Malawi health system relies heavily on patients being accompanied to health facilities by relatives or companions – people referred to as ‘guardians’. Guardians fulfil an essential role in dealing with administrative matters, obtaining food and medication for the patient, and liaising with nursing staff and family members. As part of the Covid-19 response, restrictions were placed on access for guardians in order to reduce overcrowding and the potential for cross-infection. As a result, companions were no longer allowed to perform their essential functions, with the unintended consequence of leaving patients isolated and unsupported. Operations of other useful services, such as maternity waiting homes, were curtailed, further limiting access to care. This experience exposed critical gaps in a health system with unsustainable patient-to-provider ratios, which relies on relatives to undertake essential care and support functions. In future as part of an all-round response that engages communities and patients as partners, ways to maintain the ‘guardian’ role need to be identified, for example allowing relatives to perform this function but with suitable orientation and explanation of how to meet standards of infection prevention.

## 7. Conclusions and discussion

Findings from this study highlight the inherent complexities in access to, demand for, and availability of health services. Health equity is a key consideration: while access can be seen as the freedom to use health services, various aspects including provider, individual, and wider institutional factors are all intertwined to determine whether or not services are utilized.<sup>6</sup> As discussed above, Thiede et al (2007) defines access as a multidimensional concept comprising affordability, acceptability, and availability of services<sup>7</sup>. Affordability is defined as the ability of users to cover the full cost of care, acceptability addresses beliefs and perceptions relating to the effectiveness of treatment and overall trust in the health system, and availability looks beyond proximity to facilities to include availability of essential resources and convenient opening hours.

Resilience is measured as the health system's ability to absorb, adapt, and transform when exposed to a shock and still retain control over its structure and functions. A lack of adequate and accurate information about Covid-19 early on led to rumours and misconceptions about the virus. To an extent, preventative measures put in place challenged the health system's ability to deliver on its core functions. Uptake of essential maternal, newborn, and child health services, including antenatal services, family planning, immunization, and services for children under five fell as a result and there were concerns about the ability of the health system itself to uphold the measures that have been put in place given shortages in PPE and testing kits made it difficult to protect service providers.

The findings of the study also highlight the inequitable burden of Covid-19 on the population. It is clear that those of lower economic status were harder hit by the pandemic. Simple preventative measures, such as the obligation to use facemasks and reduced minibuss capacity, increased the cost of accessing services at a time when many people were dealing with additional economic strain. An overall increase in prices further diminished the purchasing power of their already reduced income,<sup>8</sup> and, for some, healthcare needs had to take a back seat in favour of more immediate needs, such as food and shelter. Thus, the findings from this study also highlighted the interdependence between the health sector and other sectors, including finance, agriculture and transport. Adequate measures to cushion the effects of such shocks must be implemented if demand for, and utilization of, essential MNCH services is to be sustained.

While the findings of the present study cannot be generalized, they are consistent with the conclusions of another recent report on maternity services from Malawi, which also included data from the Northern region.<sup>9</sup> The pattern of variable impact on different RMNCAH indicators observed in this quantitative analysis is also seen in a recent report from Uganda.<sup>10</sup>

---

<sup>6</sup> Chuma, J., Okungu, V. & Molyneux, C. Barriers to prompt and effective malaria treatment among the poorest population in Kenya. *Malar J* 9, 144 (2010). <https://doi.org/10.1186/1475-2875-9-144>

<sup>7</sup> Thiede, M., Akweongo, P., & McIntyre, D. (2007). Exploring the dimensions of access. In D. McIntyre & G. Mooney (Eds.), *The Economics of Health Equity* (pp. 103-123). Cambridge: Cambridge University Press. doi:10.1017/CBO9780511544460.007

<sup>8</sup> National Statistical Office. (2014). *Malawi Labour Force Survey 2013*. Zomba: National Statistical Office.

<sup>9</sup> Phiri-Makwakwa E, Bamuya C, Bunn C, Gadama L, Grant L, Kachale F, Stock S, Whyte S, Crampin A and Reynolds R (2020). Assessing the impact of Covid-19 on maternity services in Malawi: Preliminary findings from a rapid qualitative study. Lilongwe: Malawi Epidemiology and Intervention Research Unit

<sup>10</sup> Burt JF, Ouma J, Lubyayi L, et al. Indirect effects of Covid-19 on maternal, neonatal, child, sexual and reproductive health services in Kampala, Uganda. *BMJ Global Health* 2021;6:e006102. doi:10.1136/bmjgh-2021-006102

## Appendices

**Appendix 1. CES List of Specific Questions**

**Appendix 2. CES Study Secondary Data Review**

## 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. Secondary data review: All graphs and descriptions/conclusions

### A. Indicator detailed analysis report

#### Indicators

1. Proportion of women delivering who were administered immediate postpartum uterotonic (oxytocin) (for postpartum haemorrhage prevention)
2. Percentage of mothers who had preeclampsia who received anticonvulsants in a facility
3. Fresh stillbirth per 1,000 deliveries in health facilities
4. Institutional Neonatal Mortality Rate (per 1000)
5. Institutional Still Birth Rate (per 1000)
6. Proportion of women delivering with direct obstetric complications (i.e. 10-15 per cent) who were treated for direct obstetric complications at a CEmONC facility (Met need for CEmONC)
7. Percentage of Under 1 year children fully immunized
8. Percentage of Children that have been fully Immunized
9. Proportion of Under 5 children treated for diarrhoea
10. Proportion of Under 1 Diarrhoea cases treated
11. Proportion of Under 1 children treated for pneumonia
12. Proportion of Under 5 children treated for pneumonia
13. Confirmed Malaria Cases <5 Years (per 1000)
14. Malaria Cases <5 (Malaria)
15. Percentage of women starting ANC in first Trimester
16. Percentage of Women completing at least 4 ANC Visits
17. ANC - women tested for syphilis
18. Institutional delivery coverage (percentage of expected deliveries)
19. # Mother Checked in 2x in 7 Days
20. # Mother Checked in <48 Hours
21. # Baby Checked in 2x in 7 Days
22. # Baby Checked in <48 Hours
23. Number of babies initiated on facility-based KMC
24. # of HIV Positive Women Treated for PMTCT

#### Data quality:

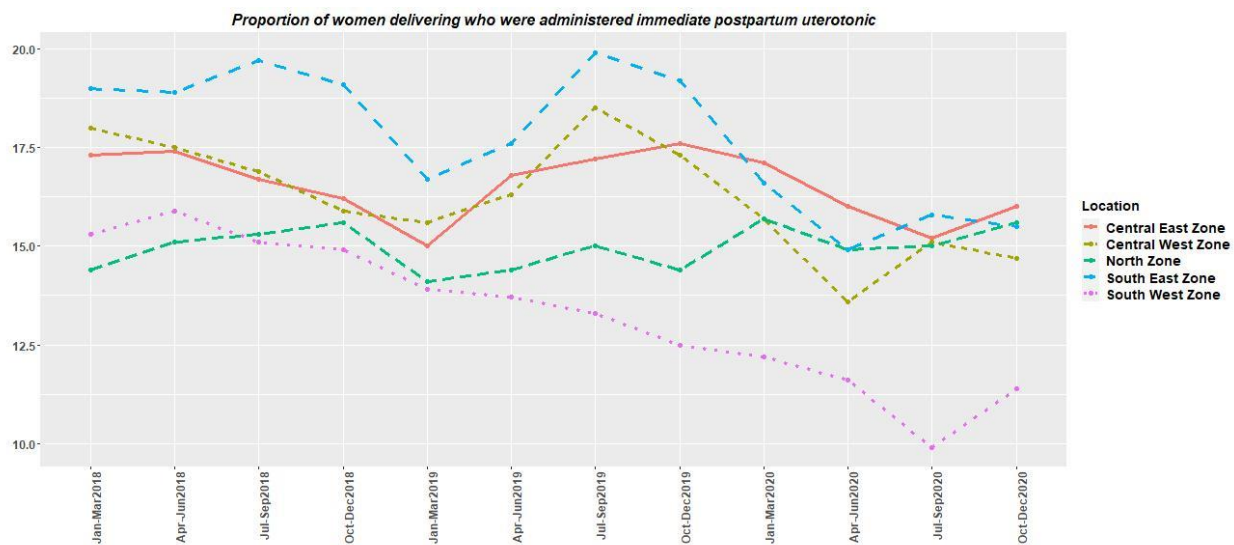
The final three data points in each graph reflect the 'Covid era', while earlier data points illustrate the extent of background variation from quarter to quarter and between zones in relation to the selected indicators since the start of 2018. It should be noted that qualitative field work was undertaken in two of the five zones: the Central West zone and the South West zone.

Jan–March 2021 has been excluded from the analysis due to the spike in most indicators suggestive of wrong data input.

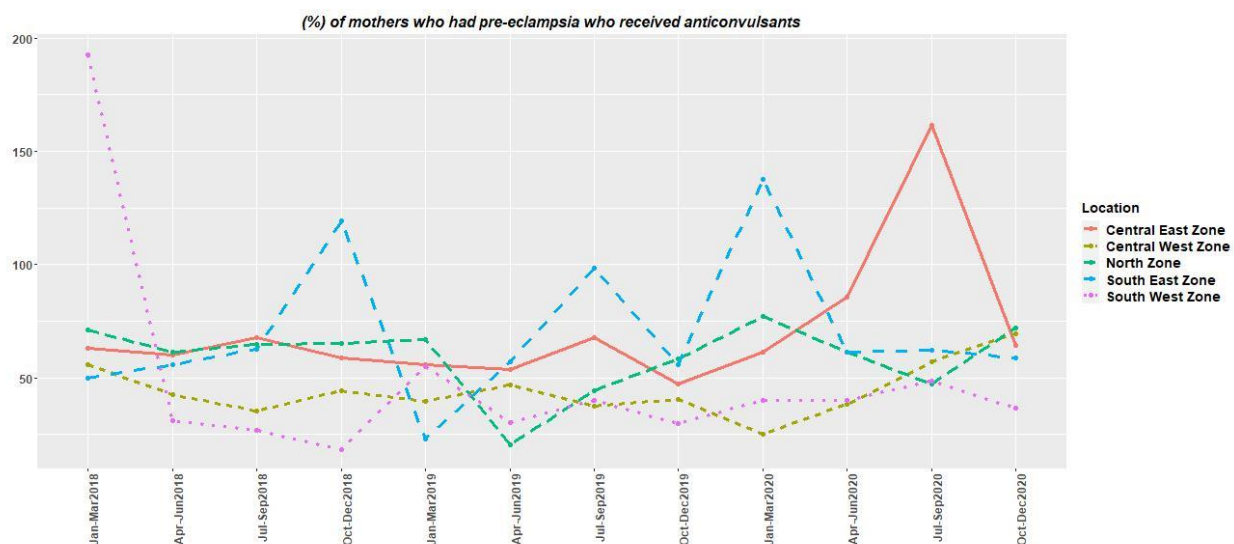
### Analysis plan

- Interrupted time series analysis (segmented regression)
- Looking at average differences

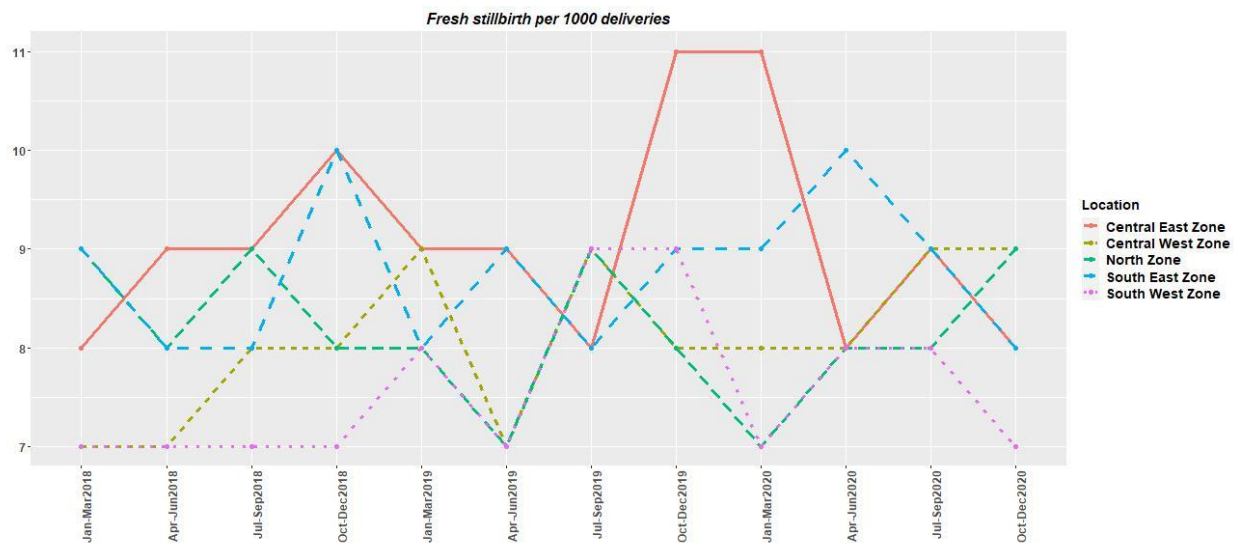
#### 1. Proportion of women delivering who were administered immediate postpartum uterotonic (oxytocin) (for postpartum haemorrhage prevention)



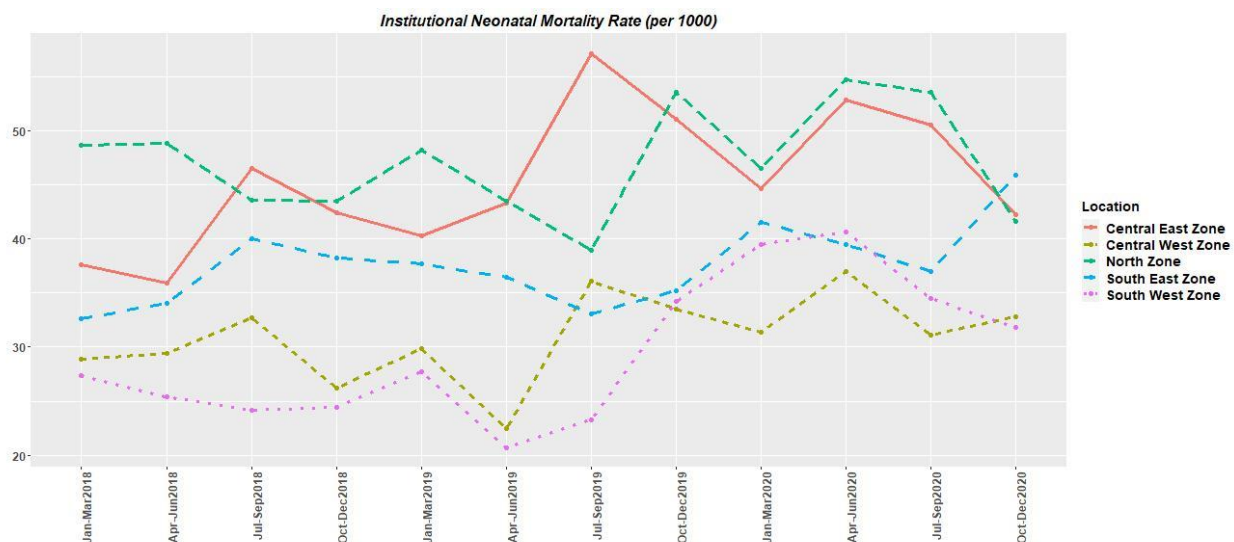
#### 2. Percentage of mothers who had pre(ecl) Eclampsia who received anticonvulsants in a facility



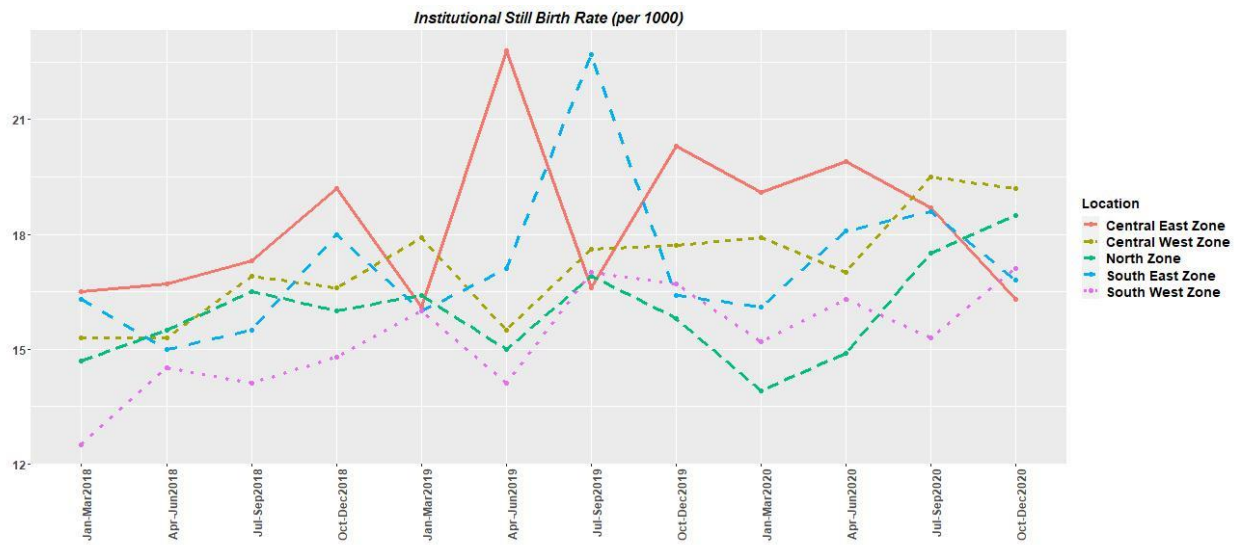
### 3. Fresh stillbirth per 1,000 deliveries in health facilities



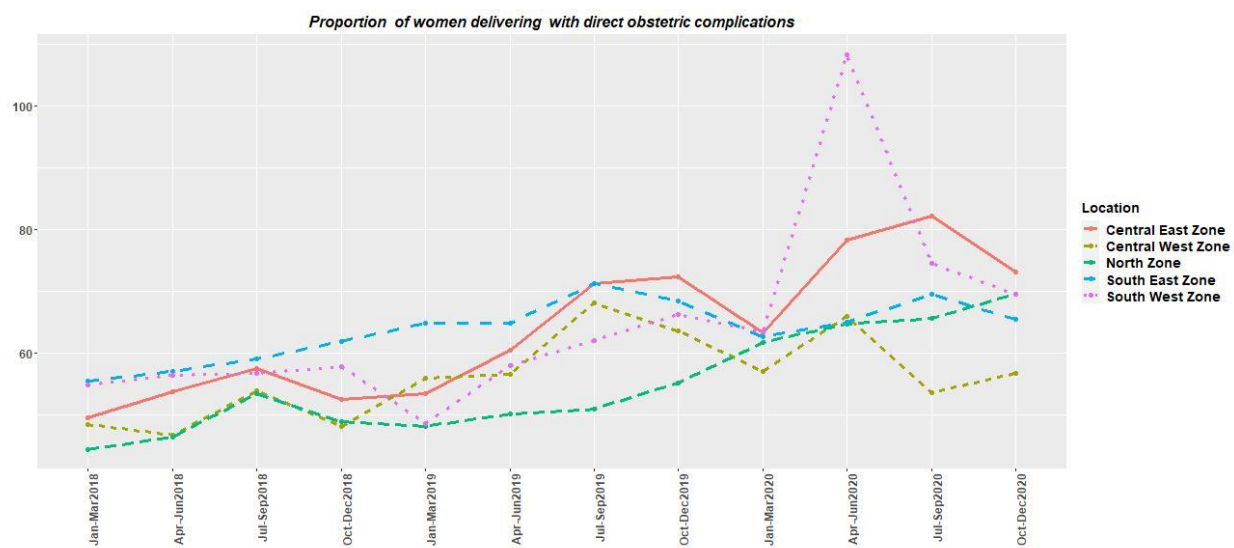
### 4. Institutional Neonatal Mortality Rate (per 1,000)



5. Institutional Stillbirth Rate (per 1,000)

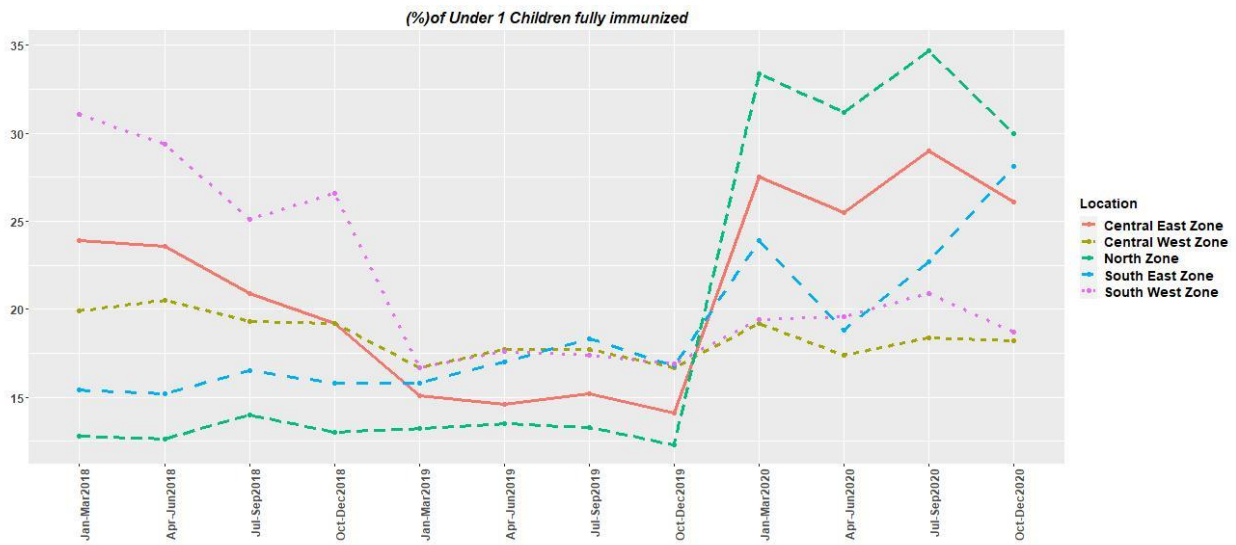


6. Proportion of women delivering with direct obstetric complications (i.e. 10-15 per cent) who were treated for direct obstetric complications at a CEMOC facility (Met need for CEMONC)

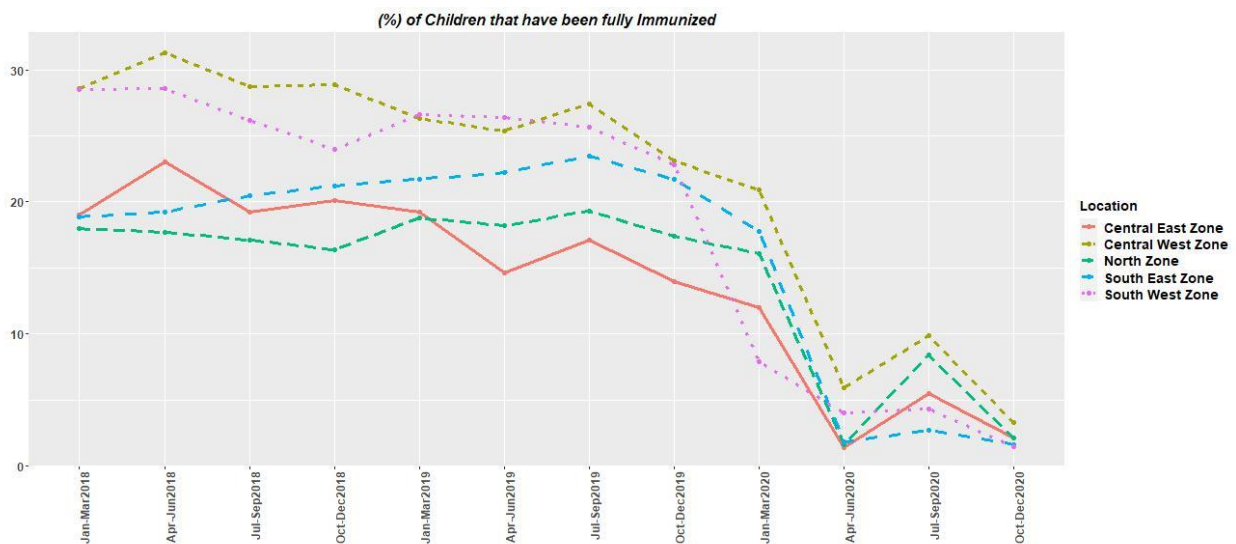




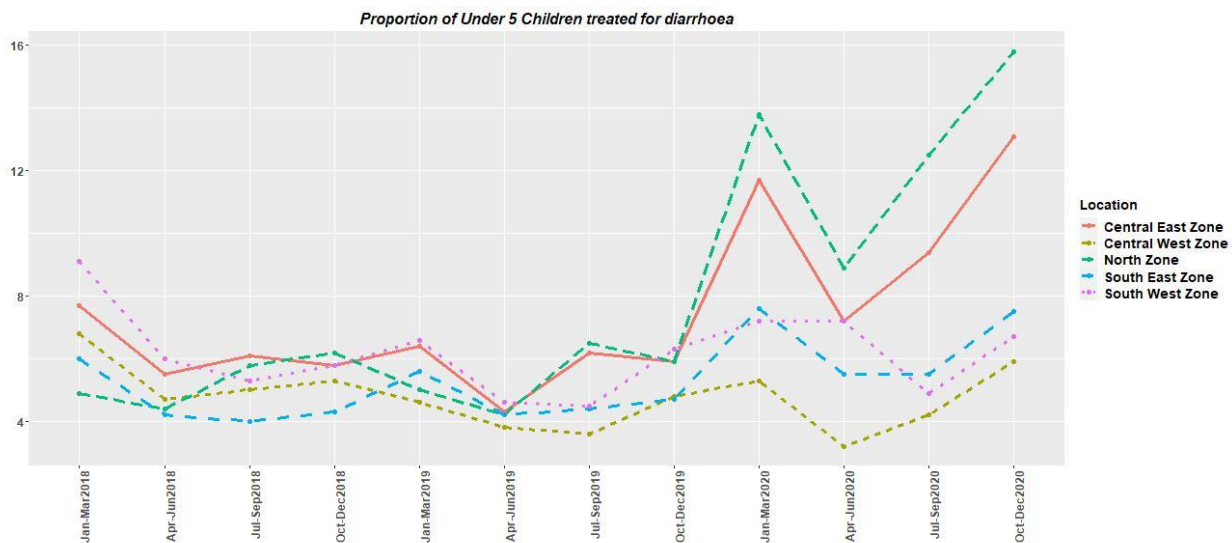
## 7. Percentage of Under 1 year children fully immunized



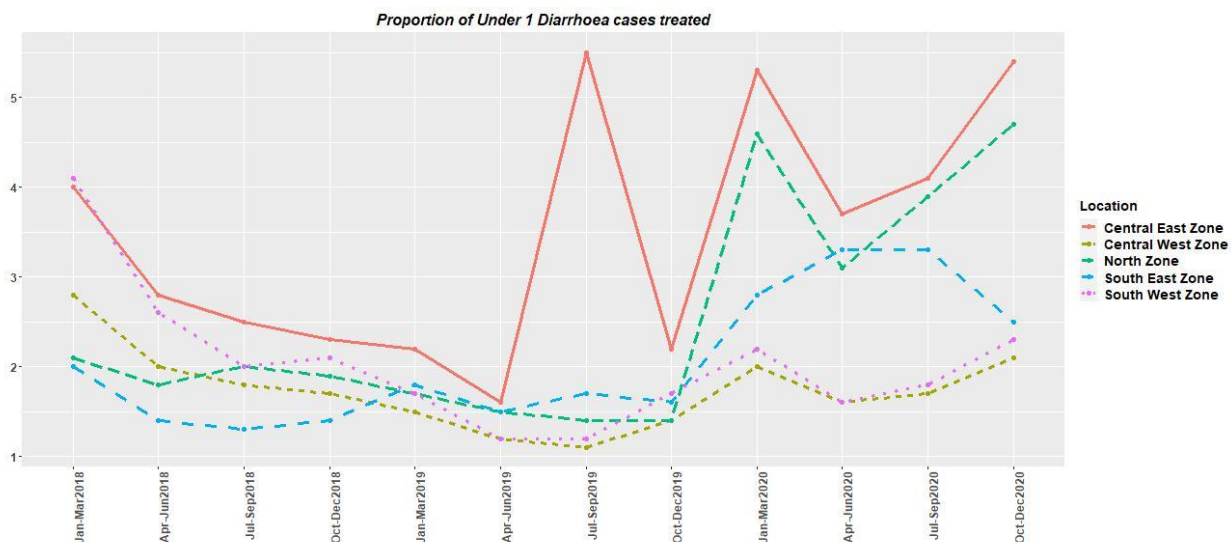
## 8. Percentage of Children that have been fully Immunized



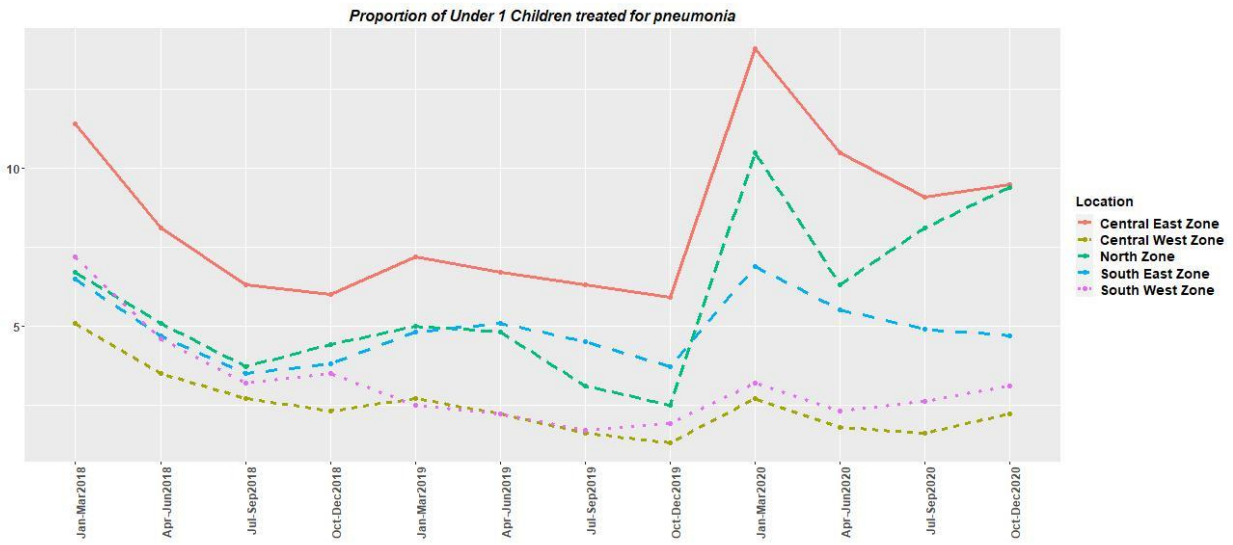
9. Proportion of Under 5 children treated for diarrhoea



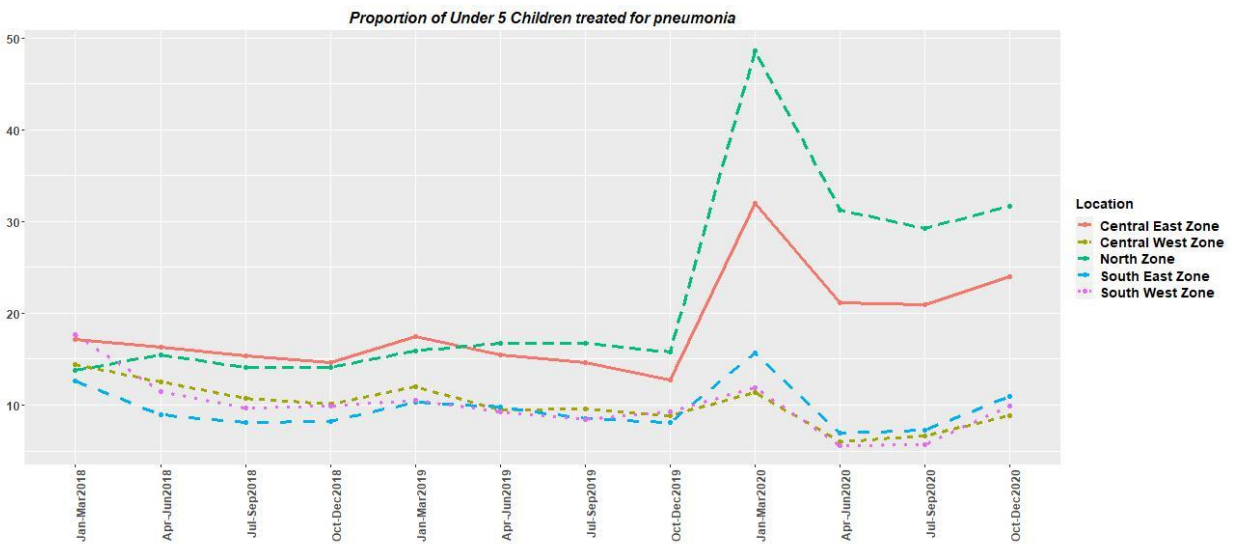
10. Proportion of Under 1 Diarrhoea cases treated



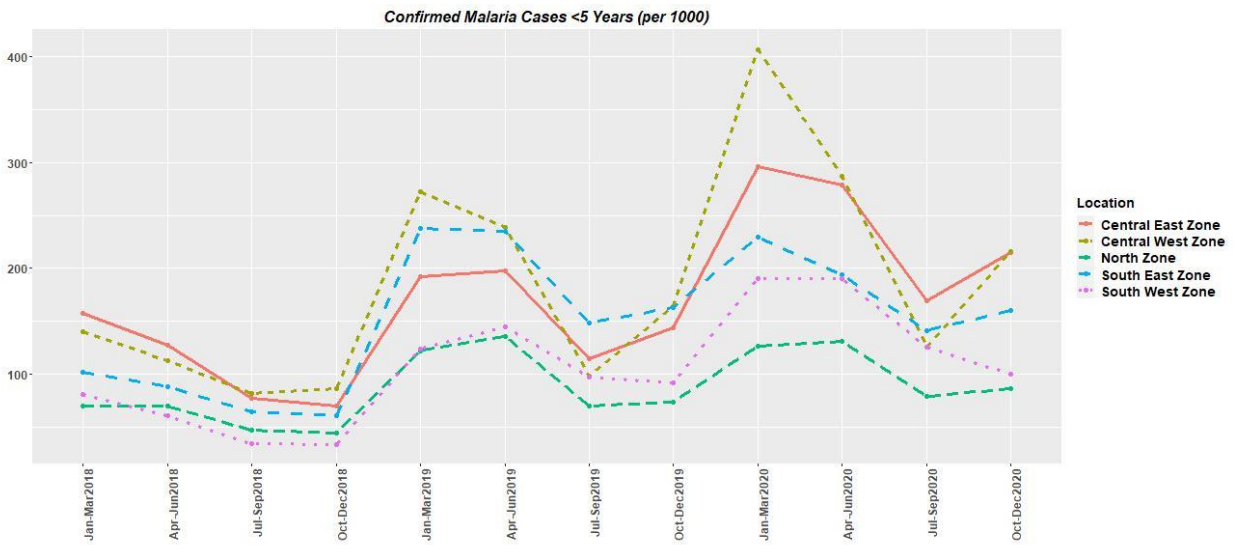
### 11. Proportion of Under 1 children treated for pneumonia



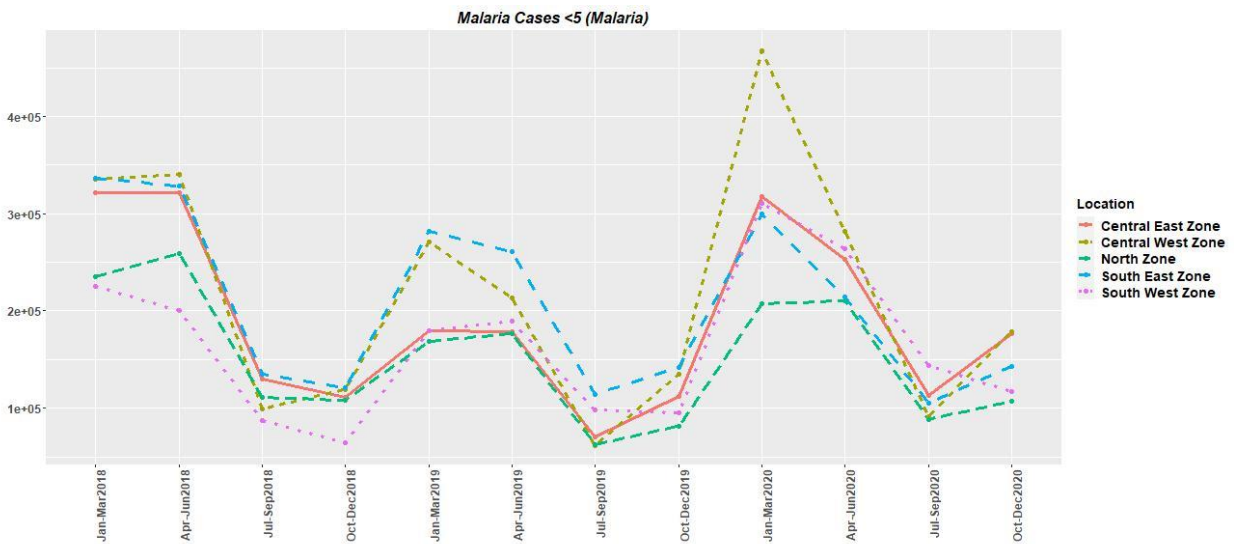
### 12. Proportion of Under 5 children treated for pneumonia



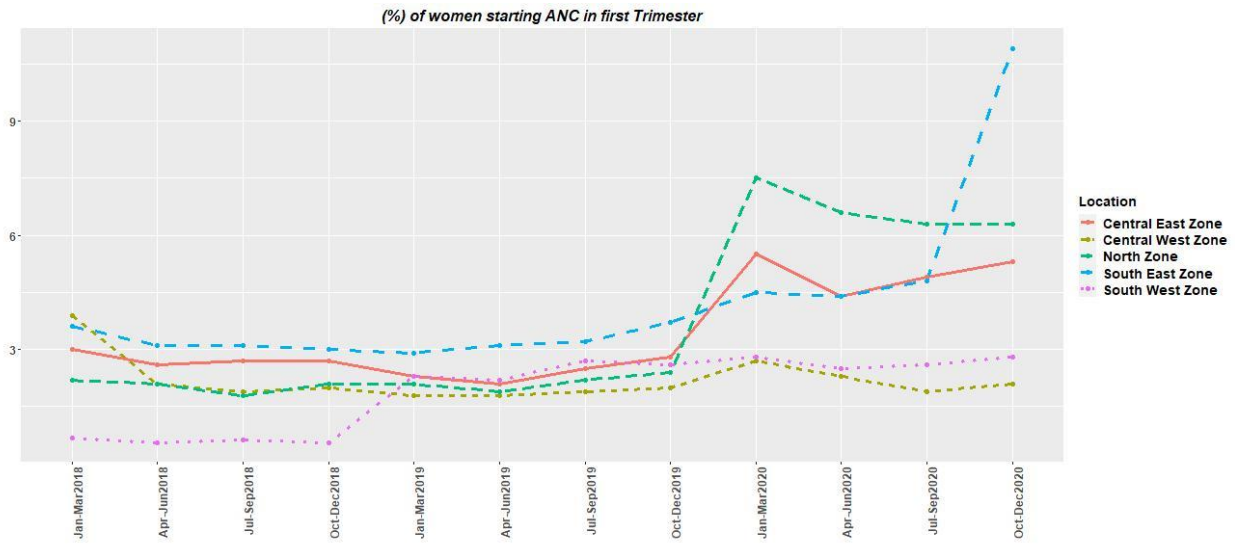
13. Confirmed Malaria Cases <5 Years (per 1000)



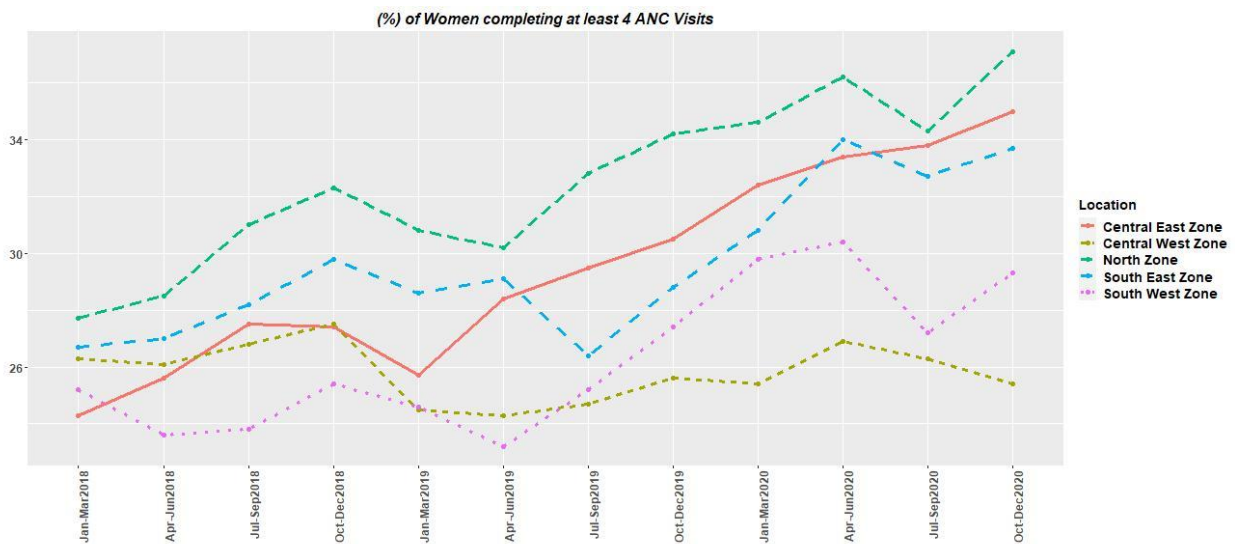
14. Malaria Cases <5 (Malaria)



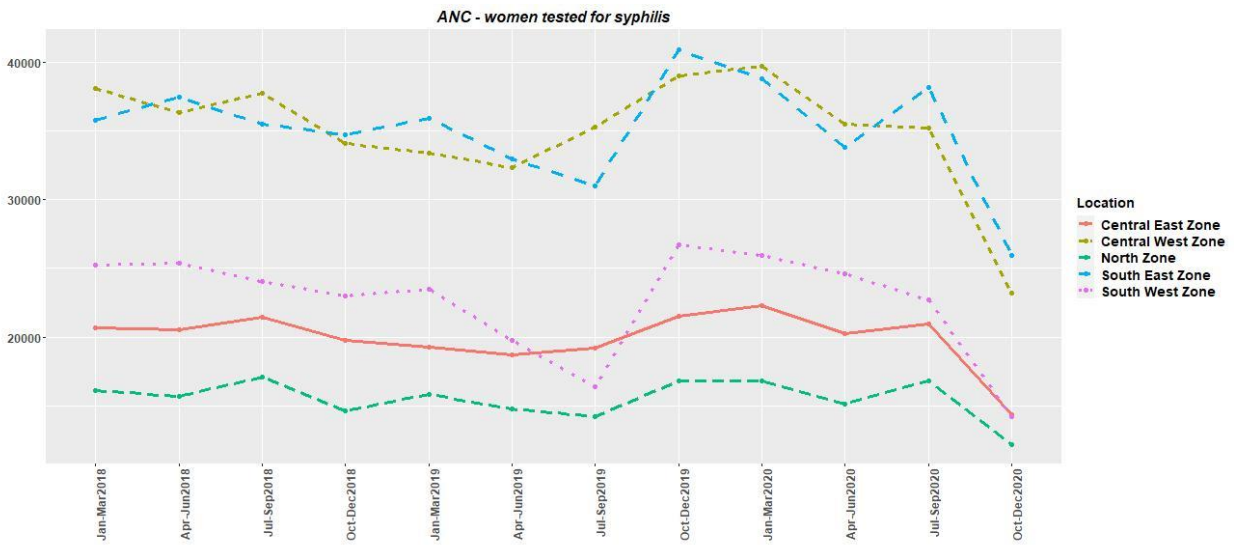
### 15. Percentage of women starting ANC in first Trimester



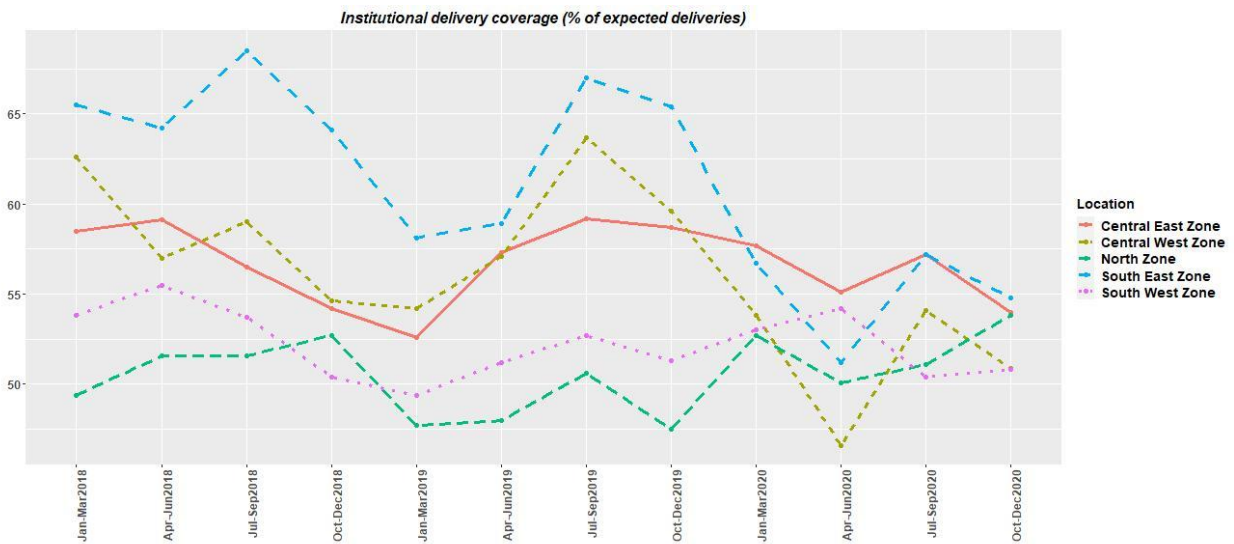
### 16. Percentage of Women completing at least 4 ANC Visits



17. ANC - women tested for syphilis

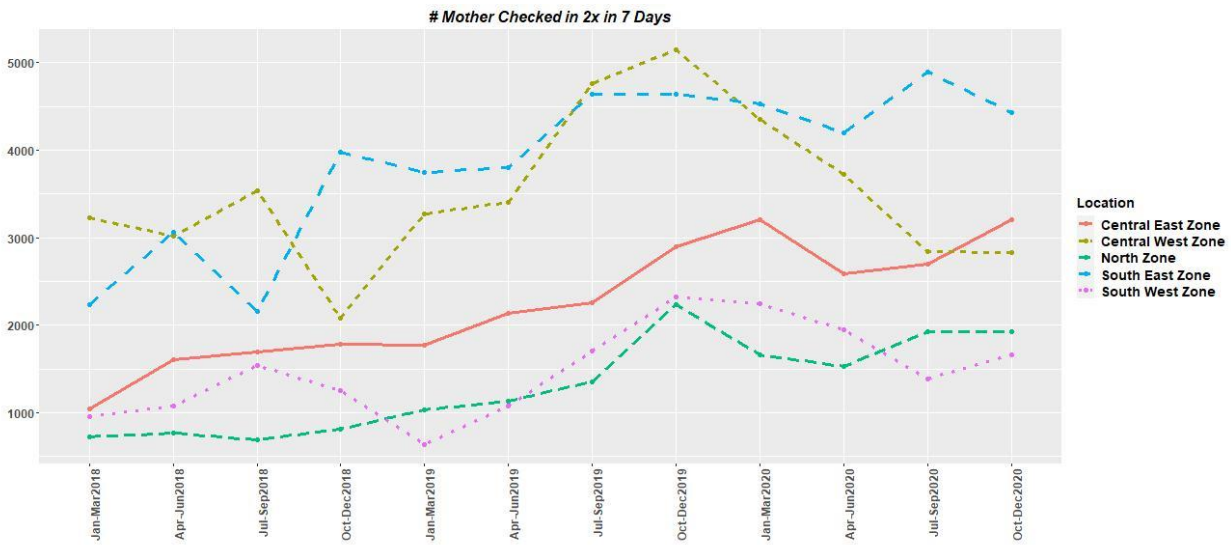


18. Institutional delivery coverage (Percentage of expected deliveries)

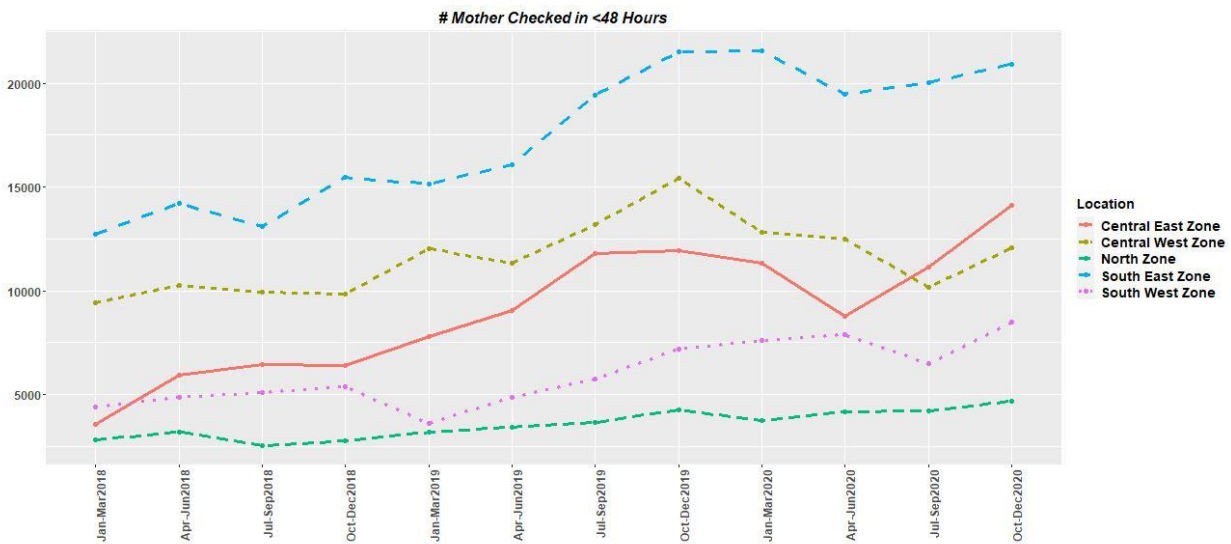




19. # Mother Checked in 2x in 7 Days

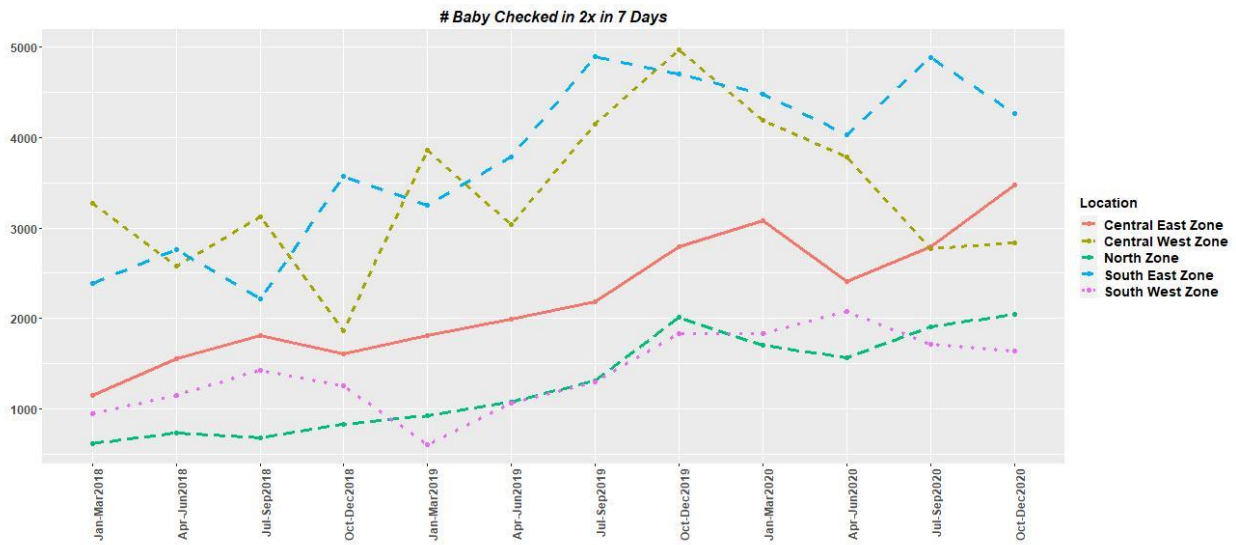


20. # Mother Checked in <48 Hours

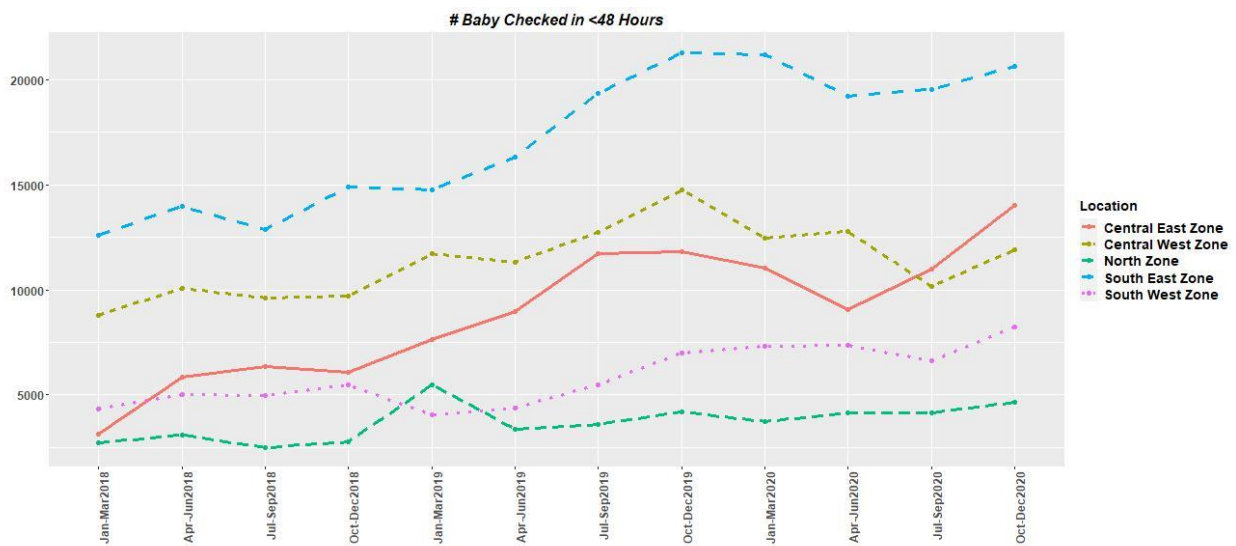




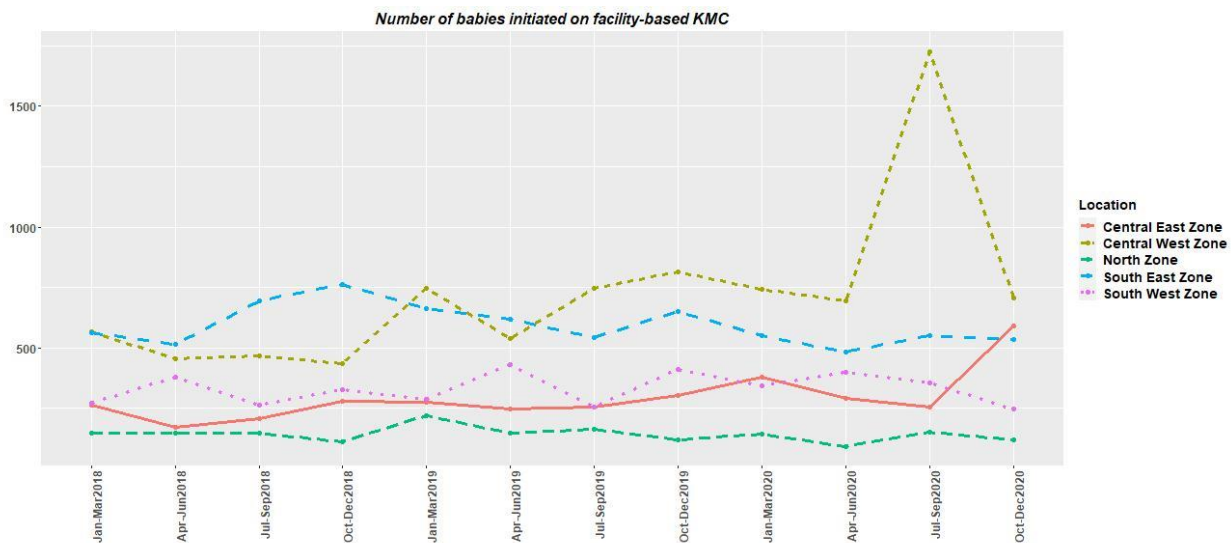
## 21. Baby Checked in 2x in 7 Days



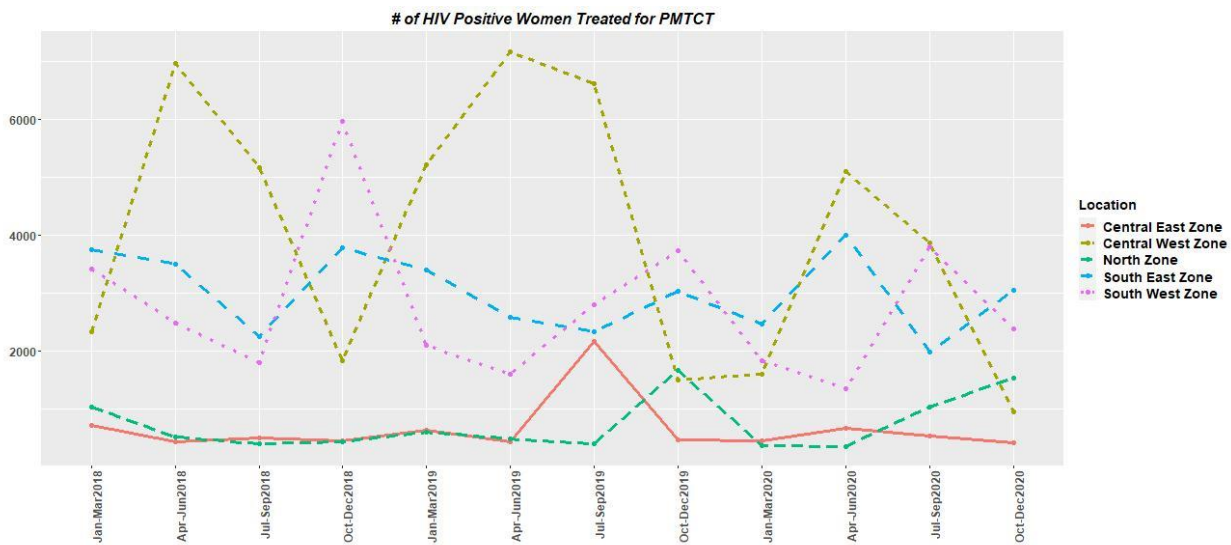
## 22. # Baby Checked in <48 Hours



23. Number of babies initiated on facility-based KMC



24. # of HIV Positive Women Treated for PMTCT



## B. 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).

### 1. Proportion of women delivering who were administered immediate postpartum uterotonic (oxytocin) (for postpartum haemorrhage prevention)

#### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	0.02	-1.17	-0.02
Central West Zone	-0.10	-3.08	0.65
North Zone	0.02	-0.51	0.33
South East Zone	-0.16	-3.07	0.46
South West Zone	-0.46*	-1.10	0.36

Note: \*  $P$  value < 0.05

#### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for Central West, South East and South West indicating that the proportion of women delivering who were administered immediate postpartum uterotonic decreases over time before Covid-19. South West was statistically significant.
- Positive for Central East and North indicating that the proportion of women delivering who were administered immediate postpartum uterotonic increases over time before Covid-19.

#### Immediate effect ( $b_2$ )

- Negative for all the zones indicating that Covid-19 from April 2020 – June 2020 decreased the proportion of women delivering who were administered immediate postpartum uterotonic.

#### Sustained effect, since Covid-19 ( $b_3$ )

- Negative for Central East indicating that the proportion of women delivering who were administered immediate postpartum uterotonic decreases for each quarter after April 2020.
- Positive for Central West, North, South East and South West indicating that the proportion of women delivering who were administered immediate postpartum uterotonic increases for each quarter after April 2020.

## 2. Percentage of mothers who had pre(ecl) Eclampsia who received anticonvulsants in a facility

### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	-0.83	69.11	-9.92
Central West Zone	-2.04*	-8.73	17.54*
North Zone	-1.16	-4.84	6.61
South East Zone	6.02	-34.22	-7.22
South West Zone	-9.60	32.42	7.70

Note: \*  $P$  value < 0.05

### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for Central East, Central West, North., and South West indicating that the percentage of mothers who had pre-eclampsia who received anticonvulsants decreases over time before Covid-19. Central West was statistically significant.
- Positive for South East indicating that the percentage of mothers who had pre-eclampsia who received anticonvulsants increases over time before Covid-19.

### Immediate effect ( $b_2$ )

- Negative for Central West, North and South East indicating that Covid-19 from April 2020 – June 2020 decreased the percentage of mothers who had pre-eclampsia who received anticonvulsants.

### Sustained effect, since Covid-19 ( $b_3$ )

- Negative for Central East and South East indicating that the percentage of mothers who had pre-eclampsia who received anticonvulsants decreases for each quarter after April 2020.
- Positive for Central West, North and South West indicating that the percentage of mothers who had pre-eclampsia who received anticonvulsants increases for each quarter after April 2020. Central West was statistically significant.

## 3. Fresh stillbirth per 1000 deliveries in health facilities

### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	0.25	-2.00	-0.25
Central West Zone	0.13	-0.76	0.37
North Zone	-0.15	-0.18	0.65
South East Zone	0.03	2.20	-1.03
South West Zone	0.17	0.44	-0.67

Note: \*  $P$  value < 0.05

#### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for North indicating that fresh stillbirth per 1000 deliveries decreases over time before Covid-19.
- Positive for Central East, Central West, South East and South West indicating that fresh stillbirth per 1000 deliveries increases over time before Covid-19.

#### Immediate effect ( $b_2$ )

- Negative for Central East, Central West and North indicating that Covid-19 from April 2020 – June 2020 decreased the fresh stillbirth per 1000 deliveries.
- Positive for South East and South West indicating that Covid-19 from April 2020 – June 2020 increased the fresh stillbirth per 1000 deliveries.

#### Sustained effect, since Covid-19 ( $b_3$ )

- Negative for Central East, South East and South West indicating that fresh stillbirth per 1000 deliveries decreases for each quarter after April 2020.
- Positive for Central West and North indicating that fresh stillbirth per 1000 deliveries increases for each quarter after April 2020.

#### 4. Institutional Neonatal Mortality Rate (per 1000)

##### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	1.59*	8.44	-6.89
Central West Zone	0.42	6.07	-2.52
North Zone	-0.06	17.16*	-6.49

<b>South East Zone</b>	<b>0.39</b>	<b>-3.70</b>	<b>2.81</b>
<b>South West Zone</b>	<b>1.16</b>	<b>12.39</b>	<b>-5.56</b>

Note: \* *P* value < 0.05

#### **Time coefficient, before Covid-19 ( $b_1$ )**

- Negative for North indicating that the institutional neonatal mortality rate decreases over time before Covid-19.
- Positive for Central East, Central West, South East and South West indicating that the institutional neonatal mortality rate increases over time before Covid-19. Central East was statistically significant.

#### **Immediate effect ( $b_2$ )**

- Negative for South East indicating that Covid-19 from April 2020 – June 2020 decreased the institutional neonatal mortality rate.
- Positive for Central East, Central West, North and South West indicating that Covid-19 from April 2020 – June 2020 increased the institutional neonatal mortality rate. North Zone was statistically significant.

#### **Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for Central East, Central West, North and South West indicating that the institutional neonatal mortality rate decreases for each quarter after April 2020.
- Positive for South East indicating that the institutional neonatal mortality rate increases for each quarter after April 2020.

### **5. Institutional Still Birth Rate (per 1000)**

#### **Overall Coefficients**

<b>County</b>	<b>Time (<math>b_1</math>)</b>	<b>Covid-19 (<math>b_2</math>)</b>	<b>Time Since Covid-19 (<math>b_3</math>)</b>
<b>Central East Zone</b>	<b>0.39</b>	<b>2.05</b>	<b>-2.19</b>
<b>Central West Zone</b>	<b>0.30*</b>	<b>-1.57</b>	<b>0.80</b>
<b>North Zone</b>	<b>-0.04</b>	<b>-2.10</b>	<b>1.84*</b>
<b>South East Zone</b>	<b>0.28</b>	<b>1.00</b>	<b>-0.93</b>
<b>South West Zone</b>	<b>0.37*</b>	<b>-1.06</b>	<b>0.03</b>

Note: \* *P* value < 0.05

### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for North indicating that the institutional still birth rate decreases over time before Covid-19.
- Positive for Central East, Central West, South East and South West indicating that the institutional still birth rate increases over time before Covid-19. Central West and South West were statistically significant.

### Immediate effect ( $b_2$ )

- Negative for Central West, North and South West indicating that Covid-19 from April 2020 – June 2020 decreased the institutional still birth rate.
- Positive for Central East, and South East indicating that Covid-19 from April 2020 – June 2020 increased the institutional still birth rate.

### Sustained effect, since Covid-19 ( $b_3$ )

- Negative for Central East and South East indicating that the institutional still birth rate decreases for each quarter after April 2020.
- Positive for Central West, North and South West indicating that the institutional still birth rate increases for each quarter after April 2020. North Zone was statistically significant.

## 6. Proportion of women delivering with direct obstetric complications (i.e. 10-15 per cent) who were treated for direct obstetric complications at a CEmONC facility (Met need for CEmONC)

### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	2.44*	13.90	-4.99
Central West Zone	2.04*	4.52	-6.69
North Zone	1.53*	4.63	0.92
South East Zone	1.52*	-2.64	-1.32
South West Zone	1.25	59.68*	-20.65*

Note: \*  $P$  value < 0.05

### Time coefficient, before Covid-19 ( $b_1$ )

- Positive for all the zones indicating that the proportion of women delivering with direct obstetric complications increases over time before Covid-19. Central East, Central West, North and South East were statistically significant.

### Immediate effect ( $b_2$ )



- Negative for South East indicating that Covid-19 from April 2020 – June 2020 decreased the proportion of women delivering with direct obstetric complications.
- Positive for Central East, Central West, North and South West indicating that Covid-19 from April 2020 – June 2020 increased the proportion of women delivering with direct obstetric complications. South West was statistically significant.

**Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for Central East, Central West, South East and South West indicating that the proportion of women delivering with direct obstetric complications decreases for each quarter after April 2020. South West was statistically significant.
- Positive for North indicating that the proportion of women delivering with direct obstetric complications increases for each quarter after April 2020.

**7. Percentage of Under 1year children fully immunized**

**Overall Coefficients**

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	-0.50	8.93	0.80
Central West Zone	-0.32	-0.08	0.72
North Zone	1.34	12.45	-1.94
South East Zone	0.73*	-6.20	3.92*
South West Zone	-1.81*	5.64	1.36

Note: \*  $P$  value < 0.05

**Time coefficient, before Covid-19 ( $b_1$ )**

- Negative for Central East, Central West and South West indicating that the percentage of under 1 year children fully immunized decreases over time before Covid-19. South West was statistically significant.
- Positive for North and South East indicating that the percentage of under 1 year children fully immunized increases over time before Covid-19. South East was statistically significant.

**Immediate effect ( $b_2$ )**

- Negative for Central West and South East indicating that Covid-19 from April 2020 – June 2020 decreased the percentage of under 1 year children fully immunized.
- Positive for Central East, North and South West indicating that Covid-19 from April 2020 – June 2020 increased the percentage of under 1 year children fully immunized.

**Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for North indicating that the percentage of under 1 year children fully immunized decreases for each quarter after April 2020.
- Positive for Central East, Central West, South East and South West indicating that the percentage of under 1 year children fully immunized increases for each quarter after April 2020. South East was statistically significant.

## 8. Percentage of Children that have been fully Immunized

### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	-1.08*	-10.96*	1.43
Central West Zone	-1.03*	-13.67*	-0.27
North Zone	-0.04	-13.98*	0.29
South East Zone	0.17	-19.18*	-0.27
South West Zone	-1.64*	-11.75	0.39

Note: \*  $P$  value < 0.05

### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for Central East, Central West, North and South West indicating that the percentage of children that have been fully immunized decreases over time before Covid-19. Central East, Central West and South West were statistically significant.
- Positive for South East indicating that the percentage of children that have been fully immunized increases over time before Covid-19.

### Immediate effect ( $b_2$ )

- Negative for all the zones indicating that Covid-19 from April 2020 – June 2020 decreased the percentage of children that have been fully immunized. Central East, Central West, North and South East were statistically significant.

### Sustained effect, since Covid-19 ( $b_3$ )

- Negative for Central West and South East indicating that the percentage of children that have been fully immunized decreases for each quarter after April 2020.
- Positive for Central East, North and South West indicating that the percentage of children that have been fully immunized increases for each quarter after April 2020.

## 9. Proportion of Under 5 children treated for diarrhoea

### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	0.27	-3.68	2.69
Central West Zone	-0.17	-2.48	1.52*
North Zone	0.66	-3.43	2.79
South East Zone	0.14	-1.41	0.86
South West Zone	-0.16	1.24	-0.09

Note: \*  $P$  value < 0.05

### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for Central West and South West indicating that the proportion of under 5 children treated for diarrhoea decreases over time before Covid-19.
- Positive for Central East, North and South East indicating that the proportion of under 5 children treated for diarrhoea increases over time before Covid-19.

### Immediate effect ( $b_2$ )

- Negative for Central East, Central West, North and South East indicating that Covid-19 from April 2020 – June 2020 decreased the proportion of under 5 children treated for diarrhoea.
- Positive for South West indicating that Covid-19 from April 2020 – June 2020 increased the proportion of under 5 children treated for diarrhoea.

### Sustained effect, since Covid-19 ( $b_3$ )

- Negative for South West indicating that the proportion of under 5 children treated for diarrhoea decreases for each quarter after April 2020.
- Positive for Central East, Central West, North and South East indicating that the proportion of under 5 children treated for diarrhoea increases for each quarter after April 2020. Central West was statistically significant.

## 10. Proportion of Under 1 Diarrhoea cases treated

### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	0.15	-1.04	0.71
Central West Zone	-0.12	0.04	0.37

<b>North Zone</b>	<b>0.12</b>	<b>-0.22</b>	<b>0.68</b>
<b>South East Zone</b>	<b>0.08</b>	<b>1.80*</b>	<b>-0.48</b>
<b>South West Zone</b>	<b>-0.21*</b>	<b>-0.04</b>	<b>0.56</b>

Note: \* *P* value < 0.05

#### **Time coefficient, before Covid-19 ( $b_1$ )**

- Negative for Central West and South West indicating that the proportion of under 1 children treated for diarrhoea decreases over time before Covid-19. South West was statistically significant.
- Positive for Central East, North and South East indicating that the proportion of under 1 children treated for diarrhoea increases over time before Covid-19.

#### **Immediate effect ( $b_2$ )**

- Negative Central East, North and South West indicating that Covid-19 from April 2020 – June 2020 decreased the proportion of under 1 children treated for diarrhoea.
- Positive for Central West and South East indicating that Covid-19 from April 2020 – June 2020 increased the proportion of under 1 children treated for diarrhoea. South East was statistically significant.

#### **Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for South East indicating that the proportion of under 1 children treated for diarrhoea decreases for each quarter after April 2020.
- Positive for Central East, Central West, North and South West indicating that the proportion of under 1 children treated for diarrhoea increases for each quarter after April 2020.

### **11. Proportion of Under 1 children treated for pneumonia**

#### **Overall Coefficients**

<b>County</b>	<b>Time (<math>b_1</math>)</b>	<b>Covid-19 (<math>b_2</math>)</b>	<b>Time Since Covid-19 (<math>b_3</math>)</b>
<b>Central East Zone</b>	<b>0.06</b>	<b>2.49</b>	<b>-0.56</b>
<b>Central West Zone</b>	<b>-0.31*</b>	<b>0.02</b>	<b>0.51</b>
<b>North Zone</b>	<b>0.11</b>	<b>-0.70</b>	<b>1.44</b>
<b>South East Zone</b>	<b>0.03</b>	<b>0.87</b>	<b>-0.43</b>
<b>South West Zone</b>	<b>-0.47*</b>	<b>0.43</b>	<b>0.87</b>

Note: \* *P* value < 0.05

### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for Central West and South West indicating that the proportion of under 1 children treated for pneumonia decreases over time before Covid-19. Central West and South West were statistically significant.
- Negative for Central East, North and South East indicating that the proportion of under 1 children treated for pneumonia increases over time before Covid-19.

### Immediate effect ( $b_2$ )

- Negative for North indicating that Covid-19 from April 2020 – June 2020 decreased the proportion of under 1 children treated for pneumonia.
- Positive for Central East, Central West, South East and South West indicating that Covid-19 from April 2020 – June 2020 increased the proportion of under 1 children treated for pneumonia.

### Sustained effect, since Covid-19 ( $b_3$ )

- Negative for Central East and South East indicating that the proportion of under 1 children treated for pneumonia decreases for each quarter after April 2020.
- Positive for Central West, North and South West indicating that the proportion of under 1 children treated for pneumonia increases for each quarter after April 2020.

## 12. Proportion of Under 5 children treated for pneumonia

### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	0.79	-1.26	0.61
Central West Zone	-0.43*	-5.04*	1.88
North Zone	2.47	1.32	-2.22
South East Zone	0.20	-6.41	1.80
South West Zone	-0.55	-5.94	2.70

Note: \*  $P$  value < 0.05

### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for Central West and South West indicating that the proportion of under 5 children treated for pneumonia decreases over time before Covid-19. Central West was statistically significant.

- Positive for Central East, North and South East indicating that the proportion of under 5 children treated for pneumonia increases over time before Covid-19.

**Immediate effect ( $b_2$ )**

- Negative for Central East, Central West, South East and South West indicating that Covid-19 from April 2020 – June 2020 decreased the proportion of under 5 children treated for pneumonia. Central West was statistically significant.
- Positive for North indicating that Covid-19 from April 2020 – June 2020 increased the proportion of under 5 children treated for pneumonia.

**Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for North indicating that the proportion of under 5 children treated for pneumonia decreases for each quarter after April 2020.
- Positive for Central East, Central West, South East and South West indicating that the proportion of under 5 children treated for pneumonia increases for each quarter after April 2020.

**13. Confirmed Malaria Cases <5 Years (per 1000)**

**Overall Coefficients**

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	13.41	78.50	-45.51
Central West Zone	23.43	9.13	-59.08
North Zone	6.26	33.78	-28.26
South East Zone	17.95*	-20.31	-35.10
South West Zone	12.89*	82.20	-57.99

Note: \*  $P$  value < 0.05

**Time coefficient, before Covid-19 ( $b_1$ )**

- Positive for all the zones indicating that the confirmed malaria cases (<5 years) increases over time before Covid-19. South East and South West were statistically significant.

**Immediate effect ( $b_2$ )**

- Negative for South East indicating that Covid-19 from April 2020 – June 2020 decreased the confirmed malaria cases (<5 years).
- Positive for Central East, Central West, North and South West indicating that Covid-19 from April 2020 – June 2020 increased the confirmed malaria cases (<5 years).

**Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for all the zones indicating that the confirmed malaria cases (<5 years) decreases for each quarter after April 2020.
- Positive for Central West, North, South East and South West indicating that the proportion of women delivering who were administered immediate postpartum uterotonic increases for each quarter after April 2020.

#### 14. Malaria Cases <5 (Malaria)

##### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	-11606.68	110209.40	-26594.32
Central West Zone	-1161.17	64881.11	-50318.33
North Zone	-11164.85	126833.84	-40591.15
South East Zone	-10161.38	41635.76	-25407.12
South West Zone	2793.97	148975.02	-76101.97

Note: \*  $P$  value < 0.05

##### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for all the zones indicating that the malaria cases (<5 years) decreases over time before Covid-19.

##### Immediate effect ( $b_2$ )

- Positive for all the zones indicating that Covid-19 from April 2020 – June 2020 increased the malaria cases (<5 years).

##### Sustained effect, since Covid-19 ( $b_3$ )

- Negative for all the zones indicating that the malaria cases (<5 years) decreases for each quarter after April 2020.

#### 15. Percentage of women starting ANC in first Trimester

##### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	0.16	0.42	0.29



<b>Central West Zone</b>	<b>-0.09</b>	<b>0.42</b>	<b>-0.01</b>
<b>North Zone</b>	<b>0.38</b>	<b>2.49</b>	<b>-0.53</b>
<b>South East Zone</b>	<b>0.10</b>	<b>-3.54*</b>	<b>3.16*</b>
<b>South West Zone</b>	<b>0.34*</b>	<b>-0.70</b>	<b>-0.19</b>

Note: \* *P* value < 0.05

#### **Time coefficient, before Covid-19 ( $b_1$ )**

- Negative for Central West indicating that the percentage of women starting ANC in first trimester decreases over time before Covid-19.
- Positive for Central East, North, South East and South West indicating that the percentage of women starting ANC in first trimester increases over time before Covid-19. South West was statistically significant.

#### **Immediate effect ( $b_2$ )**

- Negative for South East and South West indicating that Covid-19 from April 2020 – June 2020 decreased the percentage of women starting ANC in first trimester. South East was statistically significant.
- Positive for Central East, Central West and North indicating that Covid-19 from April 2020 – June 2020 increased the percentage of women starting ANC in first trimester

#### **Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for Central West, North and South West indicating that the percentage of women starting ANC in first trimester decreases for each quarter after April 2020.
- Positive for Central East and South East indicating that the percentage of women starting ANC in first trimester increases for each quarter after April 2020. South East was statistically significant.

### **16. Percentage of Women completing at least 4 ANC Visits**

#### **Overall Coefficients**

<b>County</b>	<b>Time (<math>b_1</math>)</b>	<b>Covid-19 (<math>b_2</math>)</b>	<b>Time Since Covid-19 (<math>b_3</math>)</b>
<b>Central East Zone</b>	<b>0.87*</b>	<b>1.07</b>	<b>-0.07</b>
<b>Central West Zone</b>	<b>-0.21</b>	<b>2.84</b>	<b>-0.54</b>
<b>North Zone</b>	<b>0.77*</b>	<b>0.54</b>	<b>-0.32</b>
<b>South East Zone</b>	<b>0.29</b>	<b>4.22</b>	<b>-0.44</b>

<b>South West Zone</b>	<b>0.51</b>	<b>2.68</b>	<b>-1.06</b>
------------------------	-------------	-------------	--------------

Note: \* *P* value < 0.05

#### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for Central West indicating that the percentage of women completing at least 4 ANC visits decreases over time before Covid-19.
- Positive for Central East, North, South East and South West indicating that the percentage of women completing at least 4 ANC visits increases over time before Covid-19. Central East and North were statistically significant.

#### Immediate effect ( $b_2$ )

- Positive for all the zones indicating that Covid-19 from April 2020 – June 2020 increased the percentage of women completing at least 4 ANC visits.

#### Sustained effect, since Covid-19 ( $b_3$ )

- Negative for all the zones indicating that the percentage of women completing at least 4 ANC visits decreases for each quarter after April 2020.

### 17. ANC - women tested for syphilis

#### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	63.72	3762.36	-2995.22*
Central West Zone	134.02	6844.71	-6280.02*
North Zone	6.30	1857.58	-1472.30
South East Zone	195.52	3807.93	-4117.52
South West Zone	-190.93	8303.96	-4982.57

Note: \* *P* value < 0.05

#### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for South West indicating that the number of women tested for syphilis decreases over time before Covid-19.
- Positive for Central East, Central West, North and South East indicating that the number of women tested for syphilis increases over time before Covid-19.

#### Immediate effect ( $b_2$ )

- Positive for all the zones indicating that Covid-19 from April 2020 – June 2020 increased the number of women tested for syphilis.

**Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for all the zones indicating that the number of women tested for syphilis decreases for each quarter after April 2020. Central East and Central West were statistically significant.

**18. Institutional delivery (percentage of expected deliveries)**

**Overall Coefficients**

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	0.07	-0.83	-0.62
Central West Zone	-0.26	-10.69	2.41
North Zone	-0.10	-1.85	1.95
South East Zone	-0.66	-9.70	2.46
South West Zone	-0.28	4.00	-1.42

Note: \*  $P$  value < 0.05

**Time coefficient, before Covid-19 ( $b_1$ )**

- Negative for Central West, North, South East and South West indicating that the coverage of institutional deliveries (percentage of expected deliveries) decreases over time before Covid-19.
- Positive for Central East indicating that the coverage of institutional deliveries (percentage of expected deliveries) increases over time before Covid-19.

**Immediate effect ( $b_2$ )**

- Negative for Central East, Central West, North and South East indicating that Covid-19 from April 2020 – June 2020 decreased the coverage of institutional deliveries (percentage of expected deliveries).
- Positive for South West indicating that Covid-19 from April 2020 – June 2020 increased the coverage of institutional deliveries (percentage of expected deliveries).

**Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for Central East, Central West, North and South East indicating that the coverage of institutional deliveries (percentage of expected deliveries) decreases for each quarter after April 2020.
- Positive for South West indicating that the coverage of institutional deliveries (percentage of expected deliveries) increases for each quarter after April 2020.

**19. # Mother Checked in 2x in 7 Days**

**Overall Coefficients**

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	233.83*	-762.22	74.17
Central West Zone	244.67*	-590.89	-694.17
North Zone	163.87*	-407.80	32.13
South East Zone	311.03*	-611.24	-195.03
South West Zone	150.42*	-81.11	-291.92

Note: \*  $P$  value < 0.05

**Time coefficient, before Covid-19 ( $b_1$ )**

- Positive for all the zones indicating that the number of mother checked in 2 times in 7 days' increases over time before Covid-19. All zones were statistically significant.

**Immediate effect ( $b_2$ )**

- Negative for all the zones indicating that Covid-19 from April 2020 – June 2020 decreased the number of mothers checked in 2 times in 7 days'.

**Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for Central West, South East and South West indicating that the number of mothers checked in 2 times in 7 days' decreases for each quarter after April 2020.
- Positive for Central East and North indicating that the number of mothers checked in 2 times in 7 days' increases for each quarter after April 2020.

**20. # Mother Checked in <48 Hours**

**Overall Coefficients**

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	1040.25*	-6409.56*	1638.25*
Central West Zone	618.50*	-2050.00	-824.00
North Zone	165.05*	-122.42	93.95

<b>South East Zone</b>	<b>1177.25*</b>	<b>-2616.89</b>	<b>-445.25</b>
<b>South West Zone</b>	<b>343.72*</b>	<b>209.47</b>	<b>-27.72</b>

Note: \* *P* value < 0.05

**Time coefficient, before Covid-19 ( $b_1$ )**

- Positive for all the zones indicating that the number of mother checked in < 48 hours increases over time before Covid-19. All zones were statistically significant.

**Immediate effect ( $b_2$ )**

- Negative for Central East, Central West, North and South East indicating that Covid-19 from April 2020 – June 2020 decreased the number of mothers checked in < 48 hours. Central East was statistically significant.
- Positive for South West indicating that Covid-19 from April 2020 – June 2020 increased the number of mothers checked in < 48 hours.

**Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for Central West, South East and South West indicating that the number of mothers checked in < 48 hours decreases for each quarter after April 2020.
- Positive for Central East and North indicating that the number of mothers checked in < 48 hours increases for each quarter after April 2020. Central East was statistically significant.

**21. # Baby Checked in 2x in 7 Days**

**Overall Coefficients**

<b>County</b>	<b>Time (<math>b_1</math>)</b>	<b>Covid-19 (<math>b_2</math>)</b>	<b>Time Since Covid-19 (<math>b_3</math>)</b>
<b>Central East Zone</b>	<b>208.95*</b>	<b>-1017.91*</b>	<b>329.55</b>
<b>Central West Zone</b>	<b>234.43*</b>	<b>-301.73</b>	<b>-711.93</b>
<b>North Zone</b>	<b>161.83*</b>	<b>-390.11</b>	<b>80.17</b>
<b>South East Zone</b>	<b>330.05*</b>	<b>-723.76</b>	<b>-211.05</b>
<b>South West Zone</b>	<b>85.65</b>	<b>647.07</b>	<b>-308.15</b>

Note: \* *P* value < 0.05

**Time coefficient, before Covid-19 ( $b_1$ )**

- Positive for all the zones indicating that the number of babies checked in 2 times in 7 days' increases over time before Covid-19. Central East, Central West, North and South East were statistically significant.

**Immediate effect ( $b_2$ )**

- Negative for Central East, Central West, North and South East indicating that Covid-19 from April 2020 – June 2020 decreased the number of babies checked in 2 times in 7 days'.
- Positive for South West indicating that Covid-19 from April 2020 – June 2020 increased the number of babies checked in 2 times in 7 days'.

**Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for Central West, South East and South West indicating that the number of babies checked in 2 times in 7 days' decreases for each quarter after April 2020.
- Positive for Central East and North indicating that the number of babies checked in 2 times in 7 days' increases for each quarter after April 2020.

**22. # Baby Checked in <48 Hours**

**Overall Coefficients**

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	1051.52*	-5857.96*	1422.48
Central West Zone	608.48*	-1184.29	-1040.98
North Zone	172.67	-372.67	84.33
South East Zone	1177.08*	-2694.56	-462.08
South West Zone	297.52*	-9.96	149.98

Note: \*  $P$  value < 0.05

**Time coefficient, before Covid-19 ( $b_1$ )**

- Positive for all the zones indicating that the number of babies checked in < 48 hours increases over time before Covid-19. Central East, Central West, South East and South West were statistically significant.

**Immediate effect ( $b_2$ )**

- Negative all zones indicating that Covid-19 from April 2020 – June 2020 decreased the number of babies checked in < 48 hours. Central East was statistically significant.

**Sustained effect, since Covid-19 ( $b_3$ )**

- Negative for Central West and South indicating that the number of babies checked in < 48 hours decreases for each quarter after April 2020.

- Positive for Central East, North and South West indicating that the number of babies checked in < 48 hours increases for each quarter after April 2020.

### 23. Number of babies initiated on facility-based KMC

#### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	15.70	-247.24	133.80*
Central West Zone	40.57	254.18	-34.07
North Zone	-0.38	-54.91	13.38
South East Zone	-1.45	-143.64	28.45
South West Zone	7.73	122.73	-82.73

Note: \*  $P$  value < 0.05

#### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for North and South East indicating that the number of babies initiated on facility-based KMC decreases over time before Covid-19.
- Positive for Central East, Central West and South West indicating that the number of babies initiated on facility-based KMC increases over time before Covid-19.

#### Immediate effect ( $b_2$ )

- Negative for Central East, North and South East indicating that Covid-19 from April 2020 – June 2020 decreased the number of babies initiated on facility-based KMC.
- Positive for Central West and South West indicating that Covid-19 from April 2020 – June 2020 increased the number of babies initiated on facility-based KMC.

#### Sustained effect, since Covid-19 ( $b_3$ )

- Negative for Central West and South West indicating that the number of babies initiated on facility-based KMC decreases for each quarter after April 2020.
- Positive for Central East, North and South East indicating that the number of babies initiated on facility-based KMC increases for each quarter after April 2020. Central East was statistically significant.

### 24. # of HIV Positive Women Treated for PMTCT

#### Overall Coefficients



County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
Central East Zone	38.63	-52.53	-166.63
Central West Zone	-185.02	3928.07	-1888.98
North Zone	14.58	-922.33	577.42
South East Zone	-126.72	1460.42	-349.28
South West Zone	-82.17	-1046.44	597.17

Note: \*  $P$  value < 0.05

#### Time coefficient, before Covid-19 ( $b_1$ )

- Negative for Central West, South East and South West indicating that the number of HIV positive women treated for PMTCT decreases over time before Covid-19.
- Positive for Central East and North indicating that the number of HIV positive women treated for PMTCT increases over time before Covid-19.

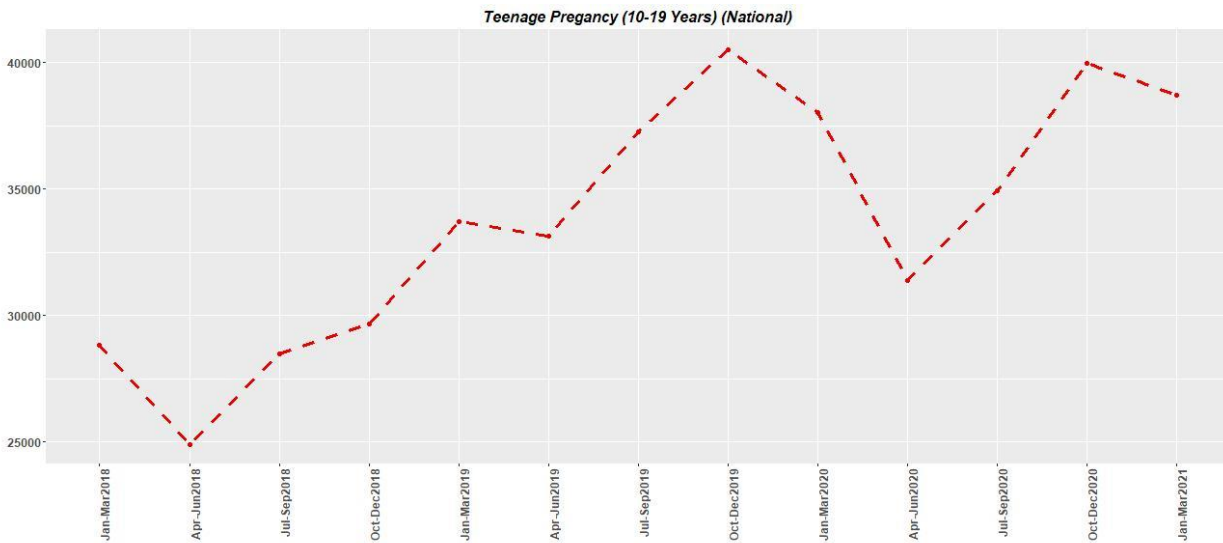
#### Immediate effect ( $b_2$ )

- Negative for Central East, North and South West indicating that Covid-19 from April 2020 – June 2020 decreased the number of HIV positive women treated for PMTCT.
- Positive for Central West and South East indicating that Covid-19 from April 2020 – June 2020 increased the number of HIV positive women treated for PMTCT.

#### Sustained effect, since Covid-19 ( $b_3$ )

- Negative for Central East, Central West and South East indicating that the number of HIV positive women treated for PMTCT decreases for each quarter after April 2020.
- Positive for North and South West indicating that the number of HIV positive women treated for PMTCT increases for each quarter after April 2020.

## 25. # of Adolescent Pregnancies presenting in ANC



### Teenage Pregnancy 10–19 Years

#### Overall Coefficients

County	Time ( $b_1$ )	Covid-19 ( $b_2$ )	Time Since Covid-19 ( $b_3$ )
National	1743.72*	-10192.20*	951.58

Note: \*  $P$  value < 0.05

#### Time coefficient, before Covid-19 ( $b_1$ )

- Positive and statistically significant indicating that the number of teenage pregnancies 10-19 years increases over time before Covid-19.

#### Immediate effect ( $b_2$ )

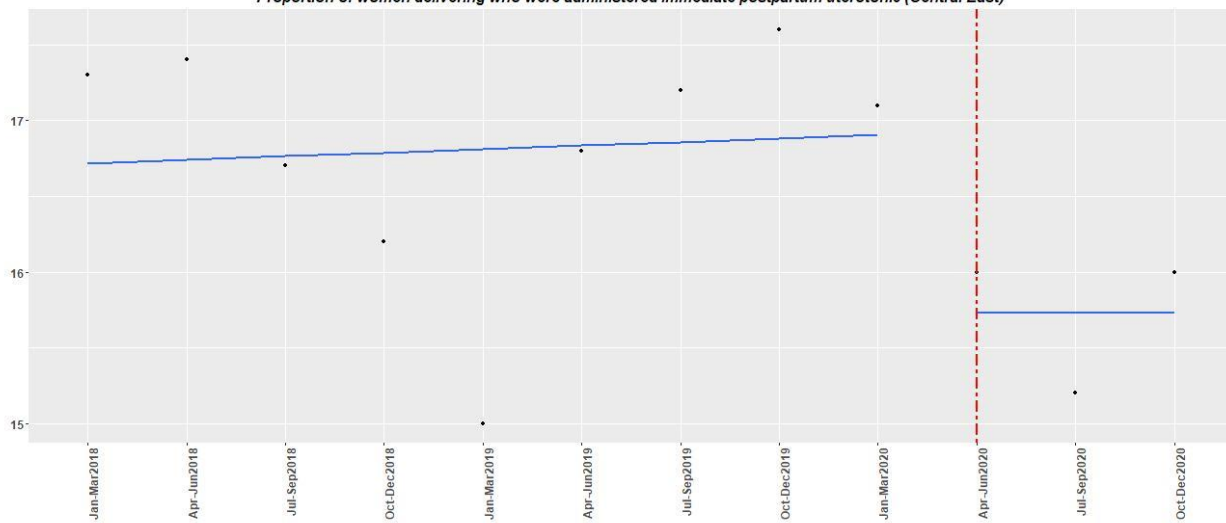
- Negative and statistically significant indicating that Covid-19 in March 2020 decreased the number of teenage pregnancies 10-19 years.

#### Sustained effect, since Covid-19 ( $b_3$ )

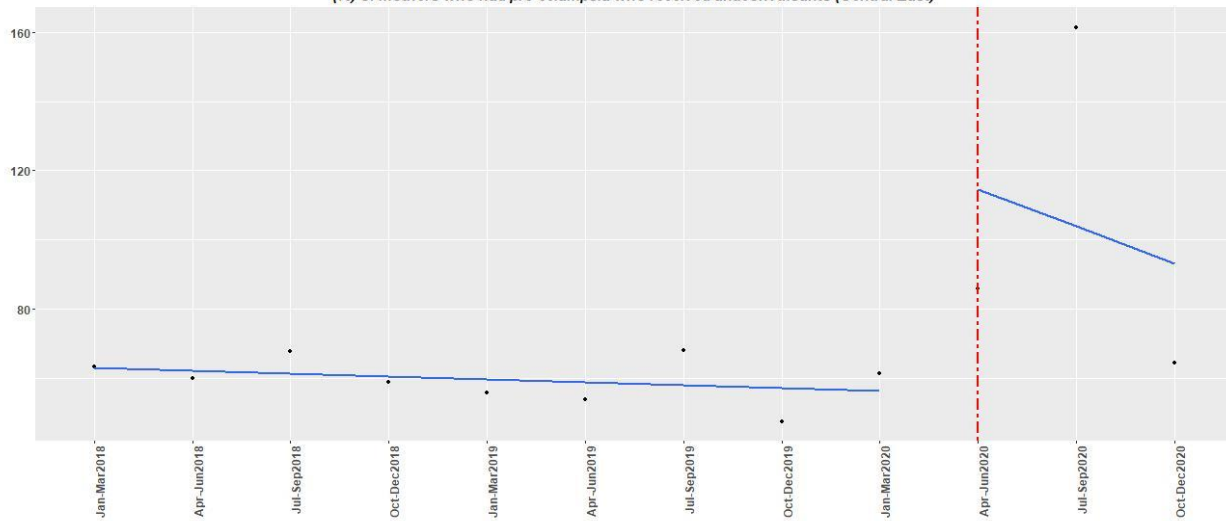
- Positive indicating that the number of pregnancies 10-19 years increases for each month that passes from March 2020.

## CENTRAL EAST ZONE

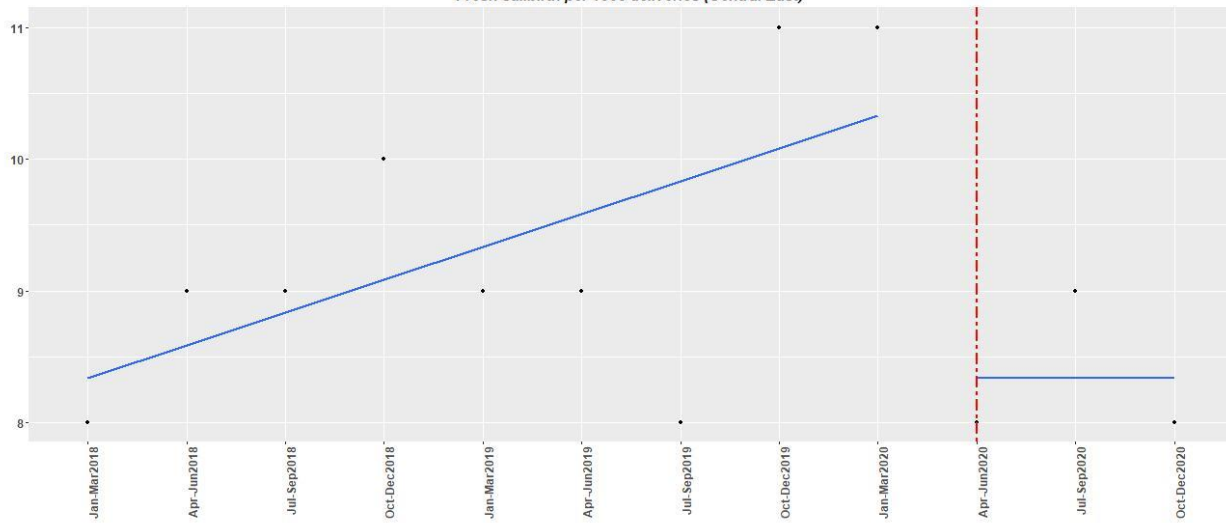
*Proportion of women delivering who were administered immediate postpartum uterotonic (Central East)*



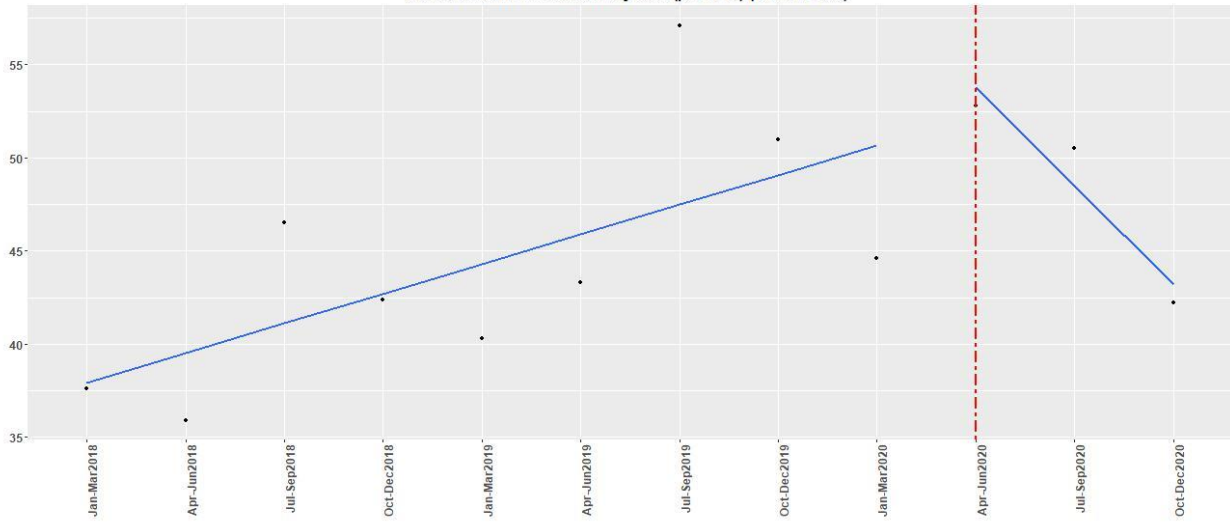
*(%) of mothers who had pre-eclampsia who received anticonvulsants (Central East)*



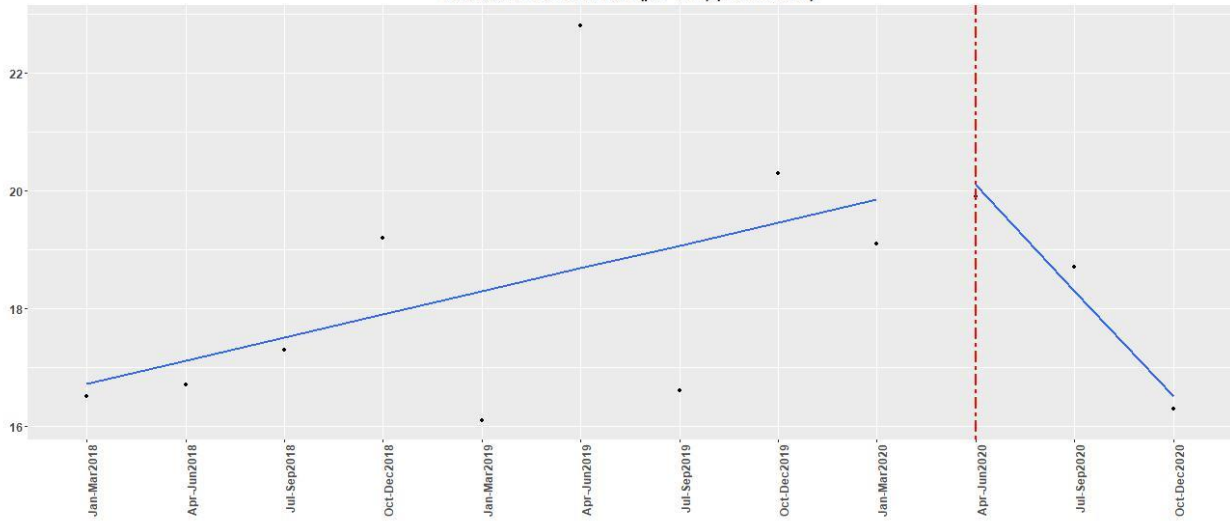
*Fresh stillbirth per 1000 deliveries (Central East)*



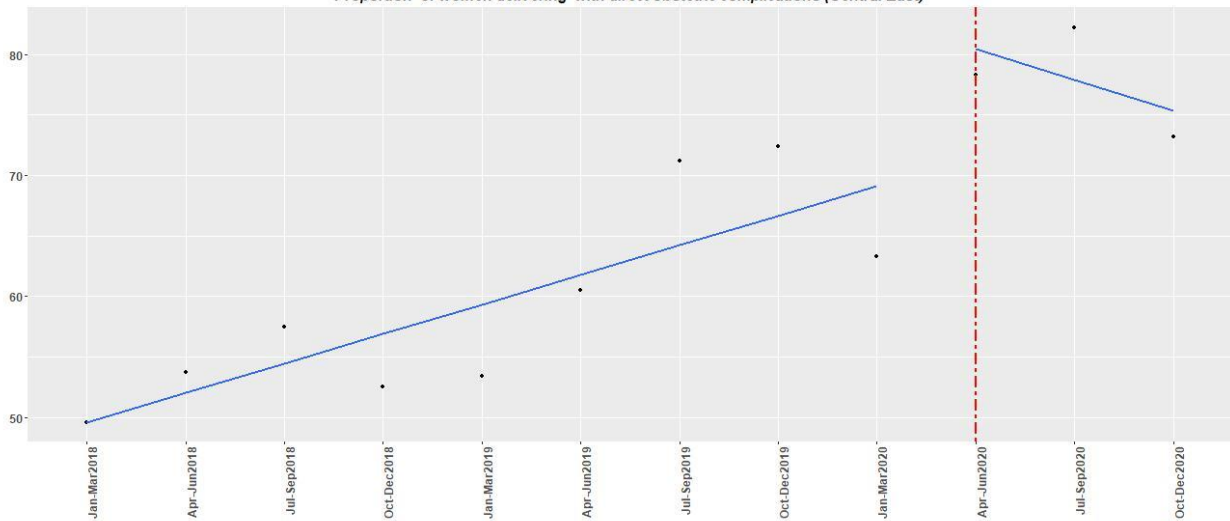
**Institutional Neonatal Mortality Rate (per 1000) (Central East)**



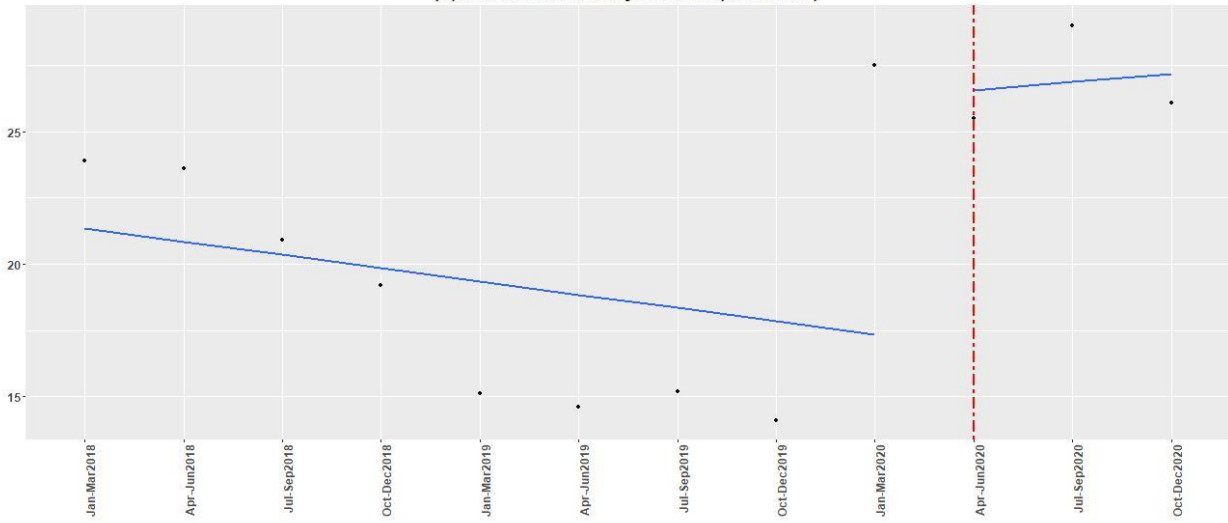
**Institutional Still Birth Rate (per 1000) (Central East)**



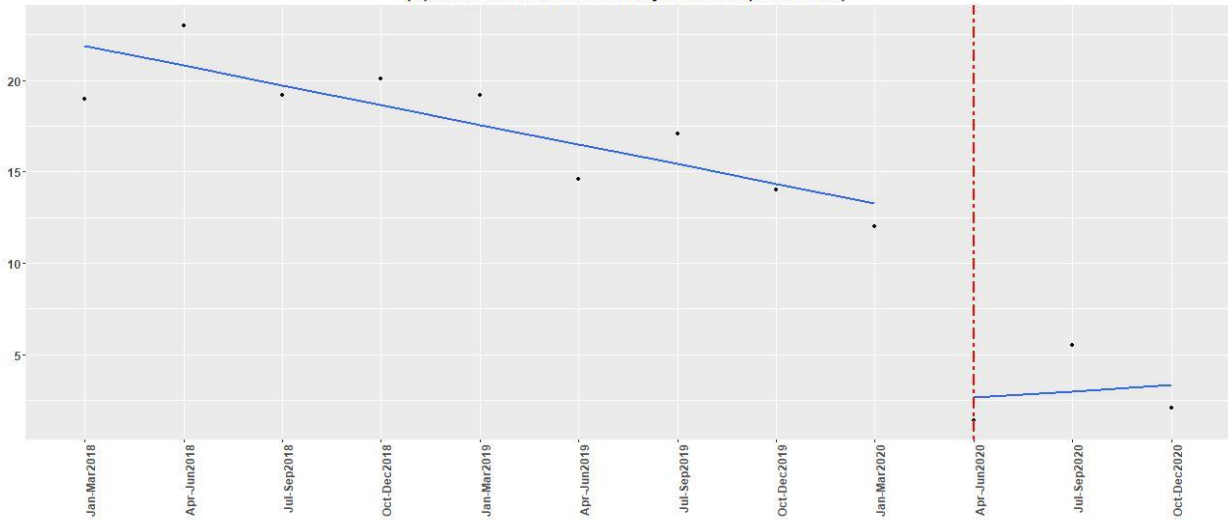
**Proportion of women delivering with direct obstetric complications (Central East)**



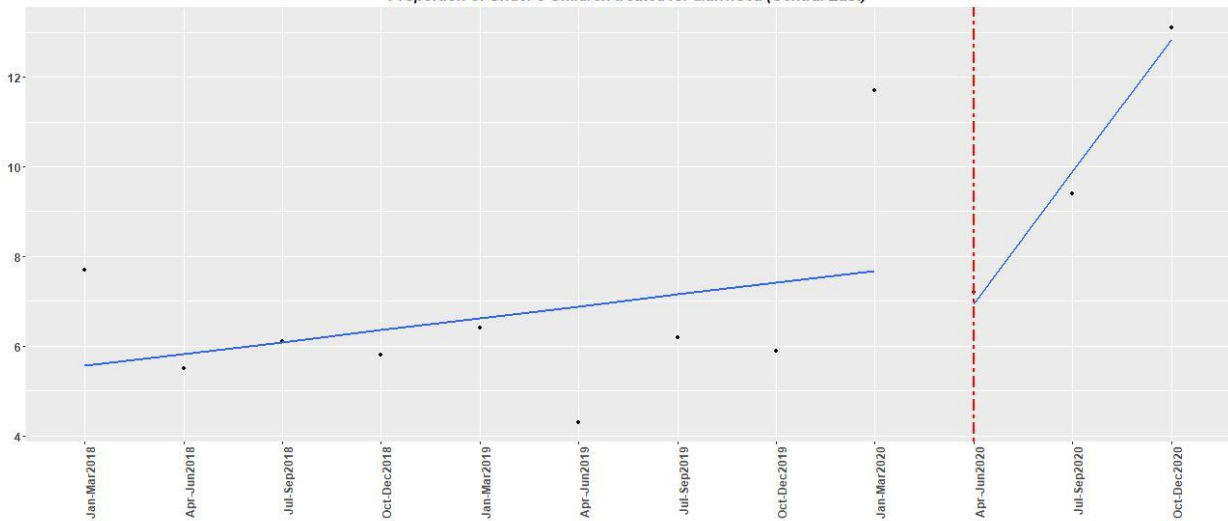
**(%) of Under 1 Children fully immunized (Central East)**



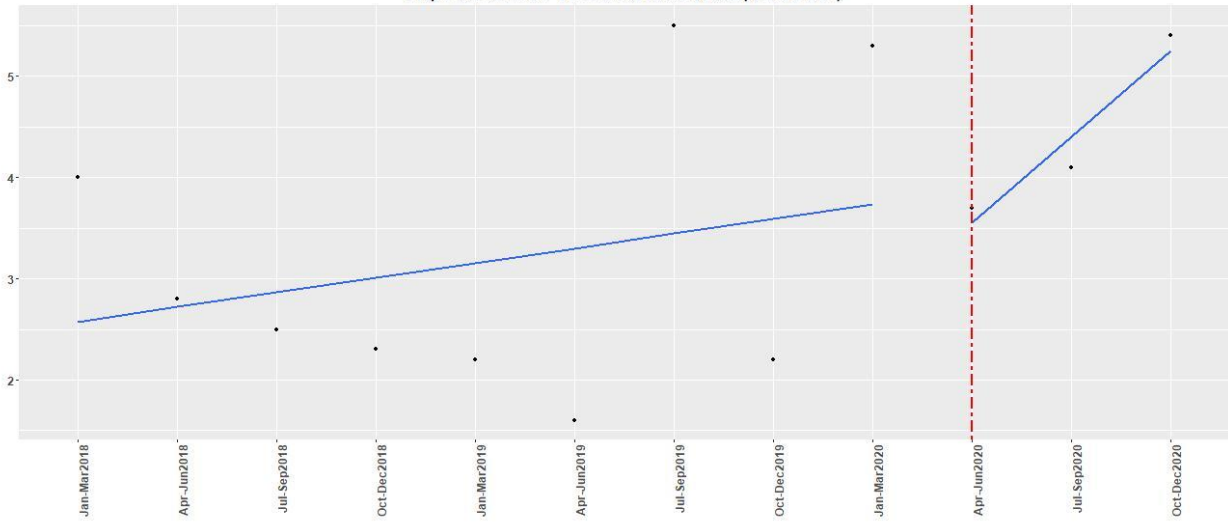
**(%) of Children that have been fully Immunized (Central East)**



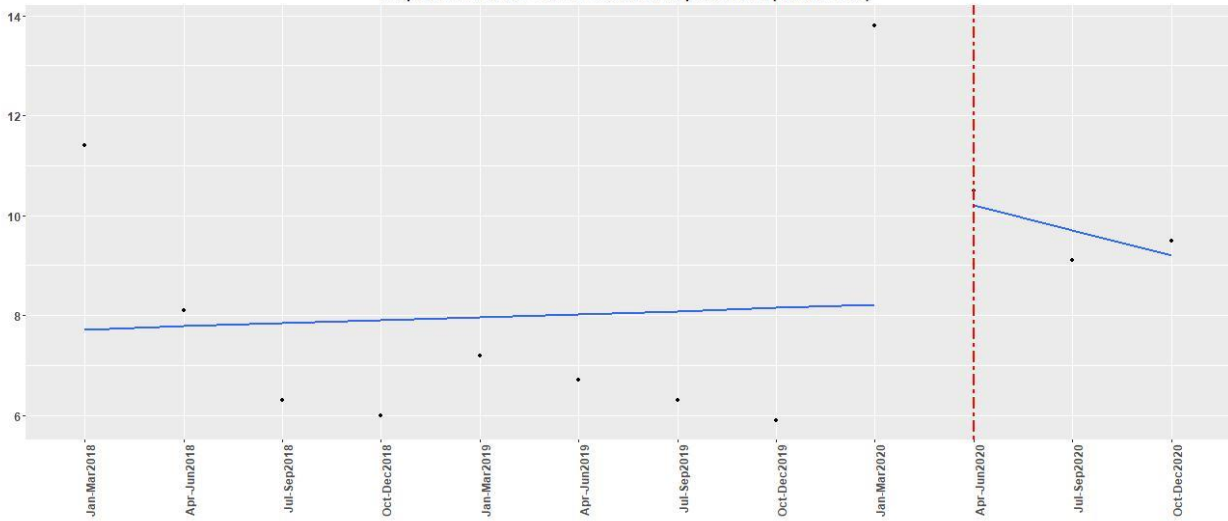
**Proportion of Under 5 Children treated for diarrhoea (Central East)**



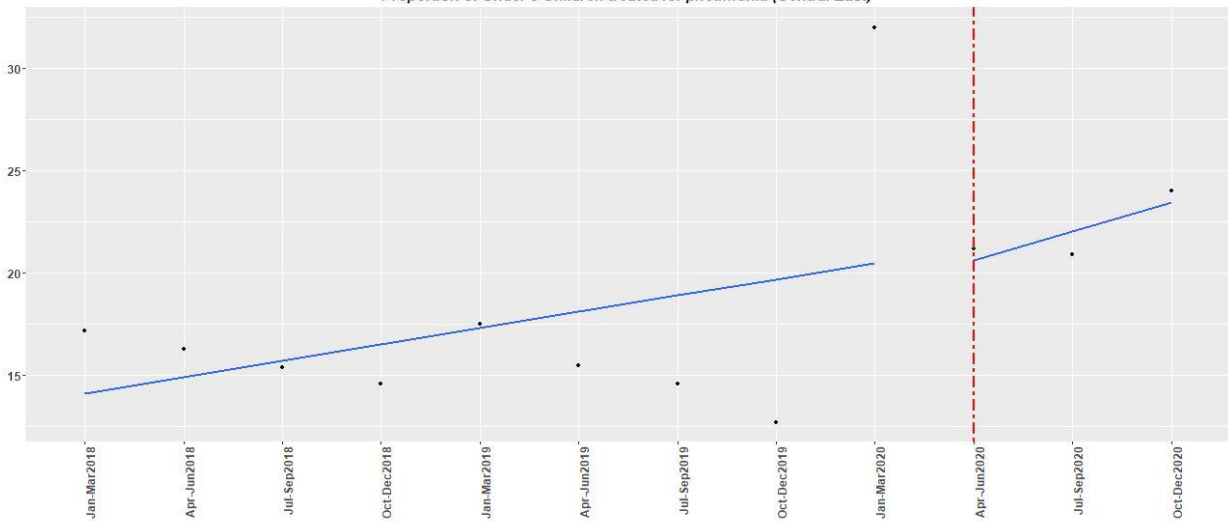
**Proportion of Under 1 Diarrhoea cases treated (Central East)**



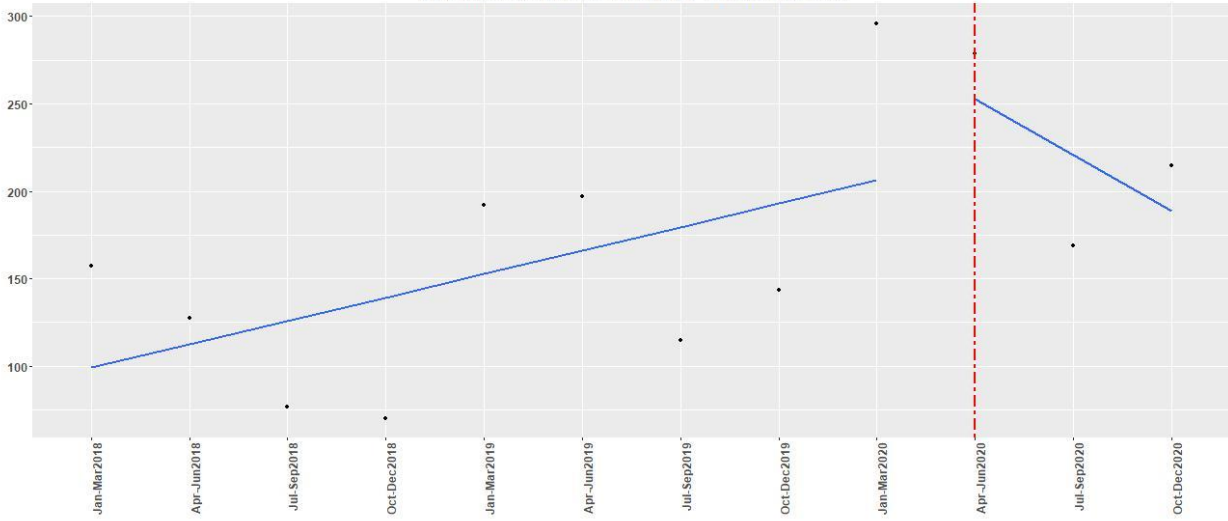
**Proportion of Under 1 Children treated for pneumonia (Central East)**



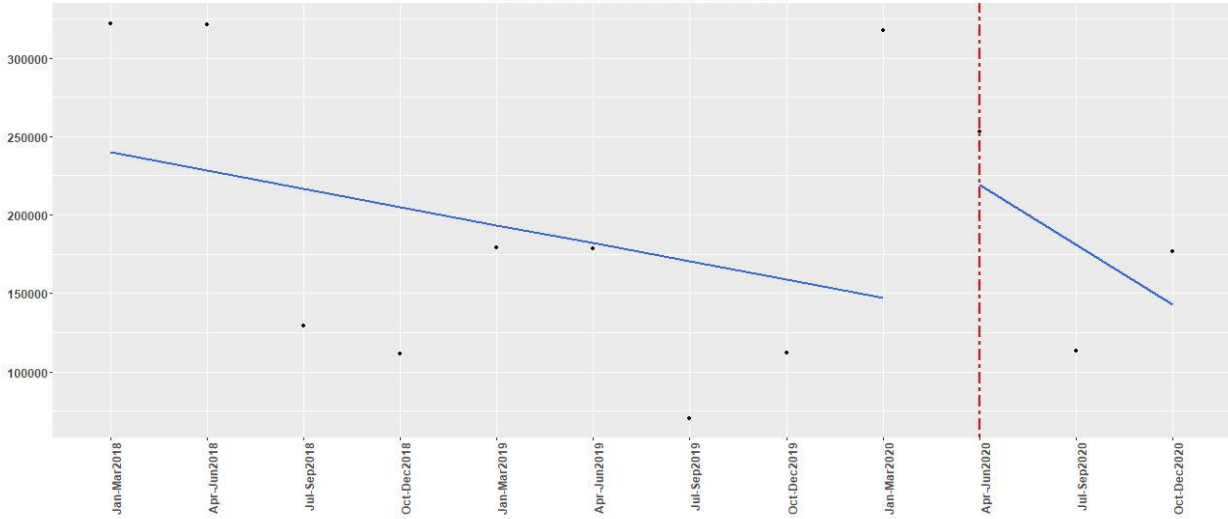
**Proportion of Under 5 Children treated for pneumonia (Central East)**



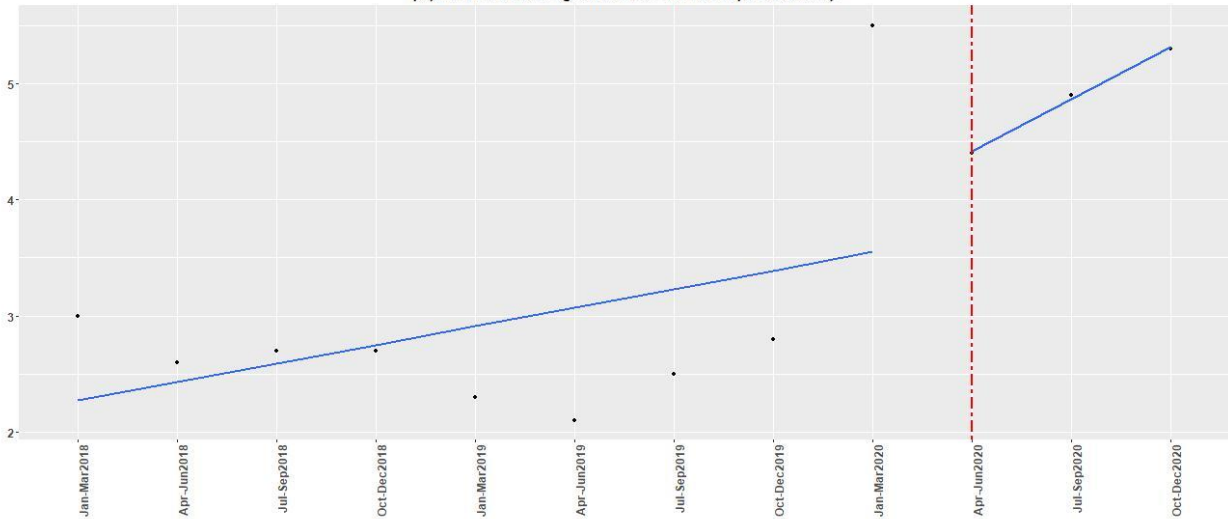
**Confirmed Malaria Cases <5 Years (per 1000) (Central East)**



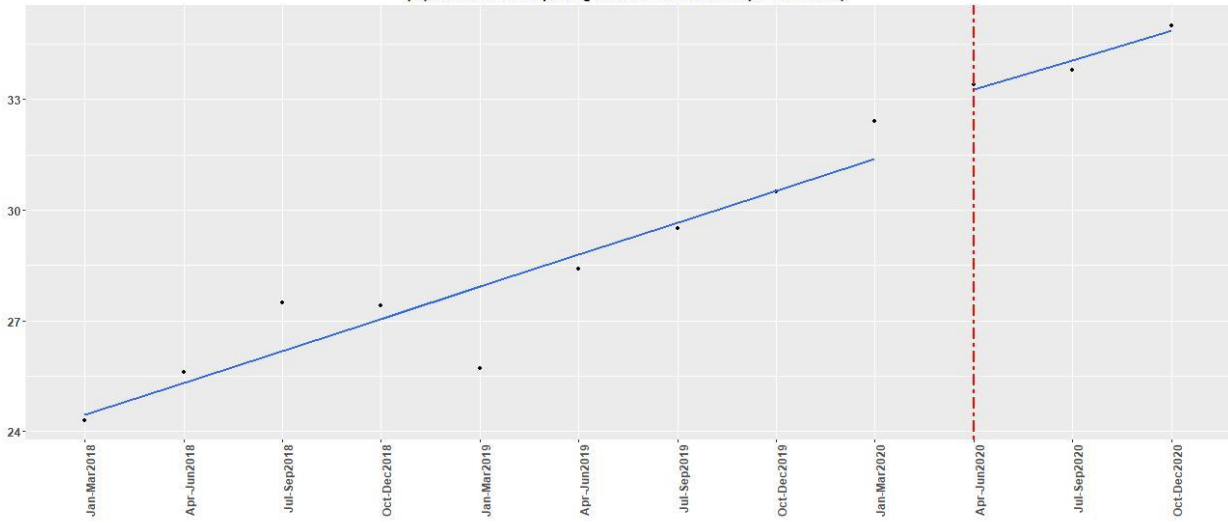
**Malaria Cases <5 (Malaria) (Central East)**



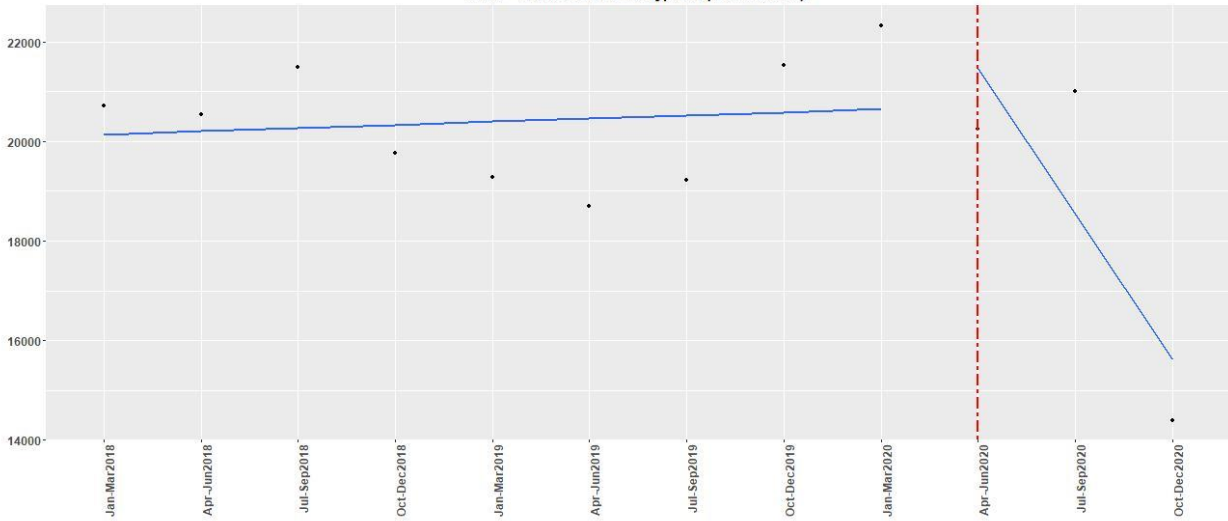
**(%) of women starting ANC in first Trimester (Central East)**



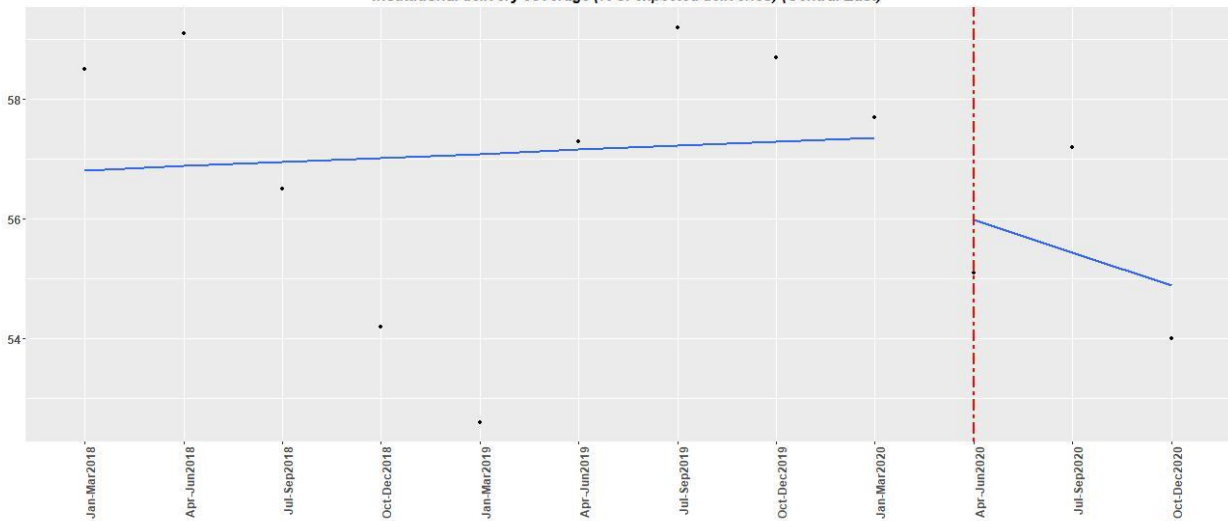
**(%) of Women completing at least 4 ANC Visits (Central East)**



**ANC - women tested for syphilis (Central East)**

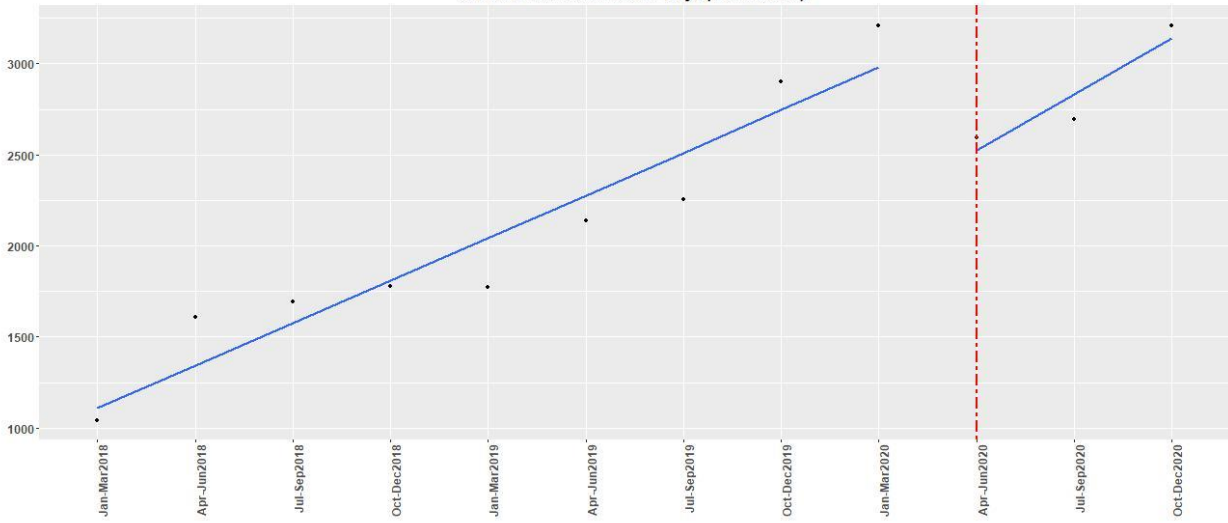


**Institutional delivery coverage (% of expected deliveries) (Central East)**

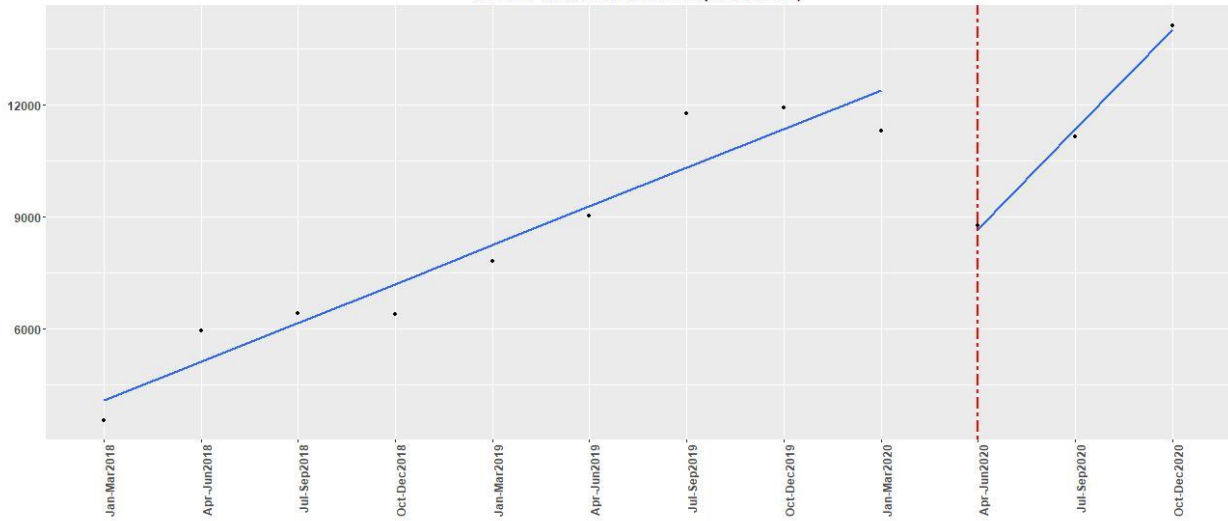




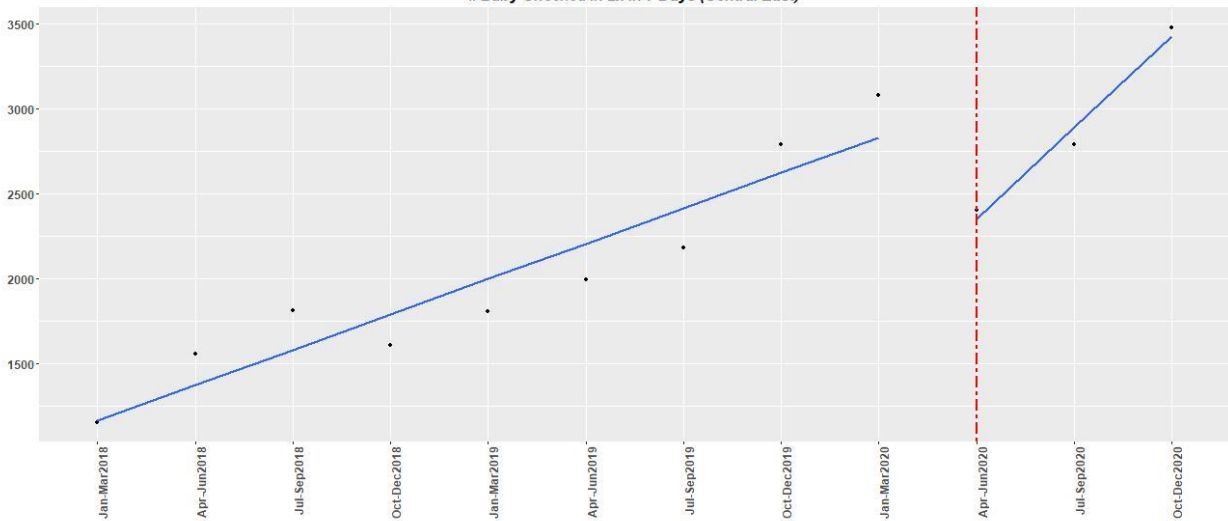
# Mother Checked in 2x in 7 Days (Central East)



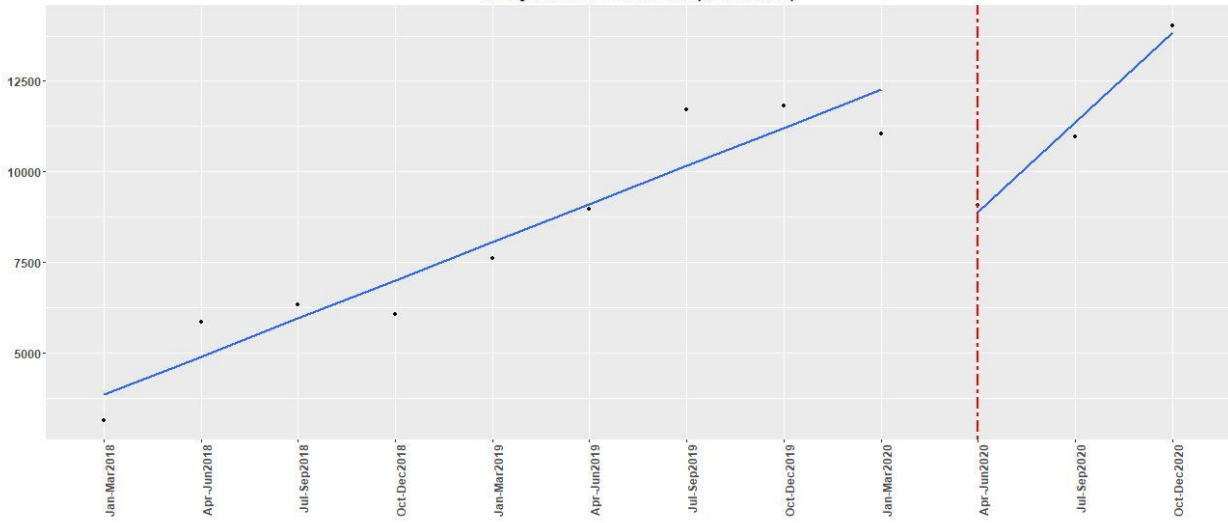
# Mother Checked in <48 Hours (Central East)



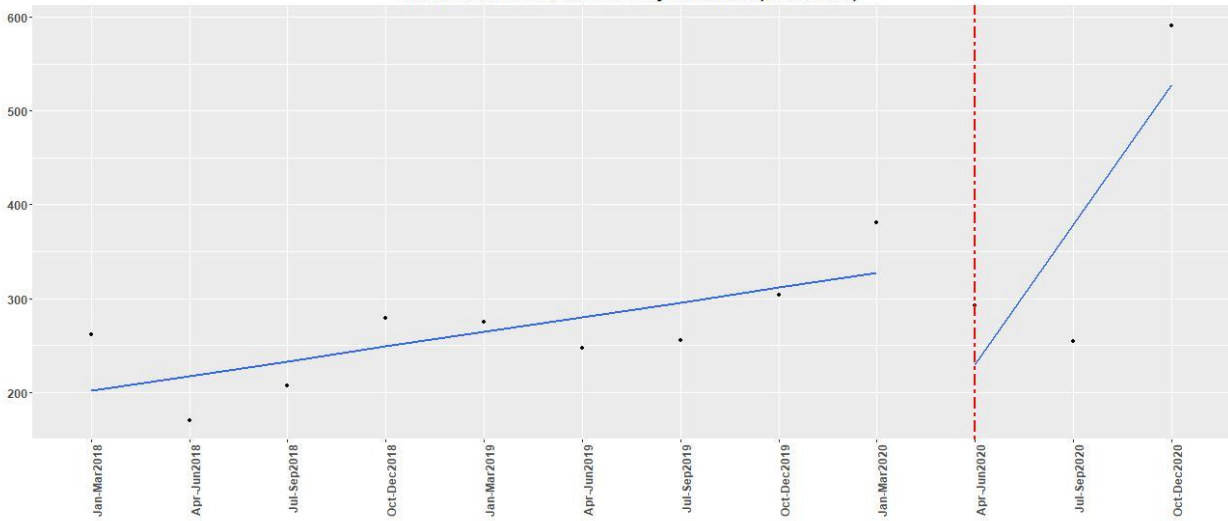
# Baby Checked in 2x in 7 Days (Central East)



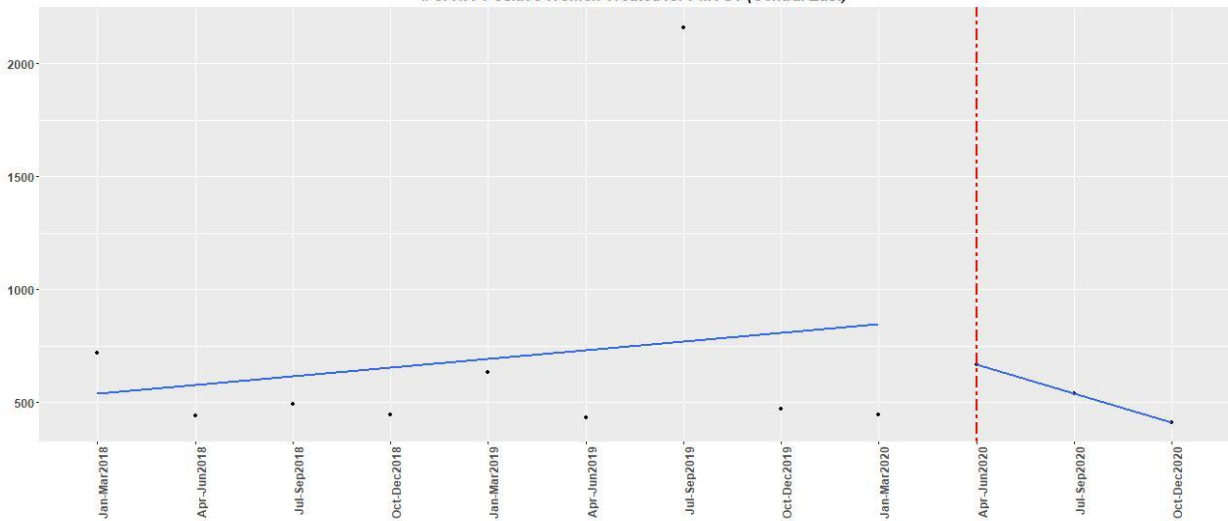
# Baby Checked in <48 Hours (Central East)



Number of babies initiated on facility-based KMC (Central East)

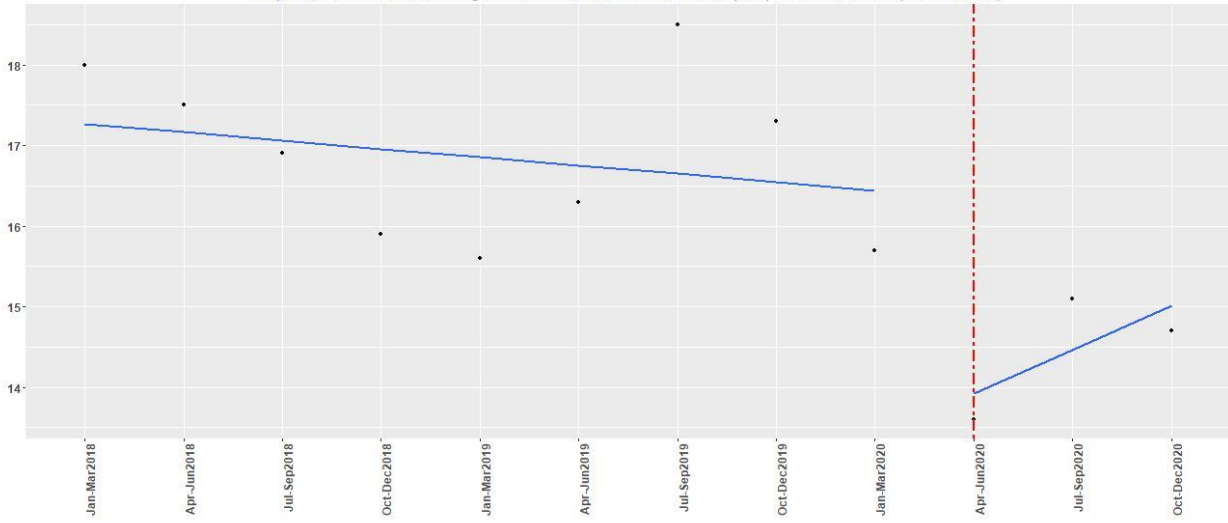


# of HIV Positive Women Treated for PMTCT (Central East)

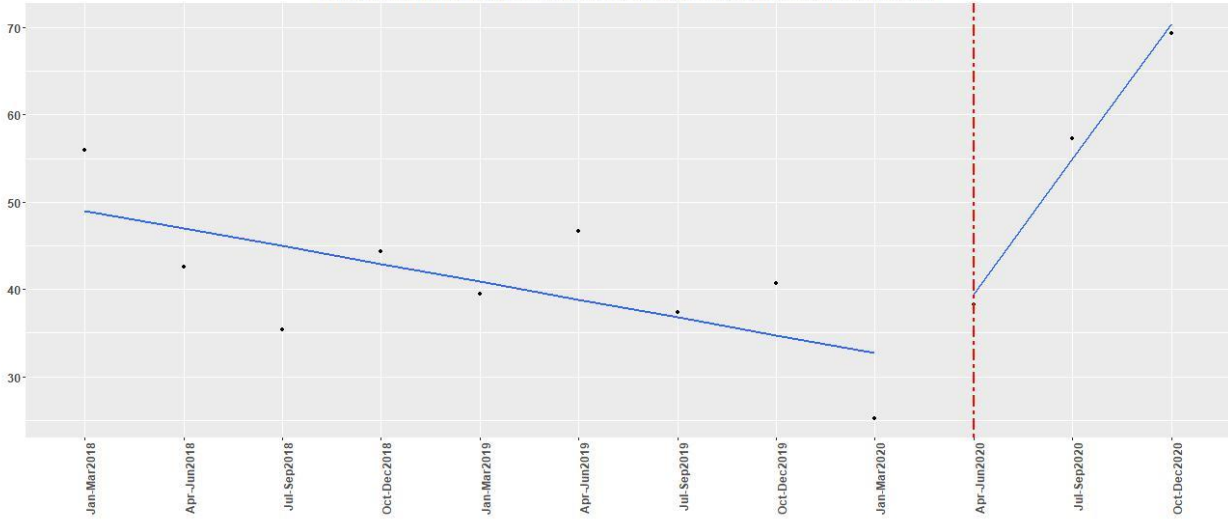


# CENTRAL WEST ZONE

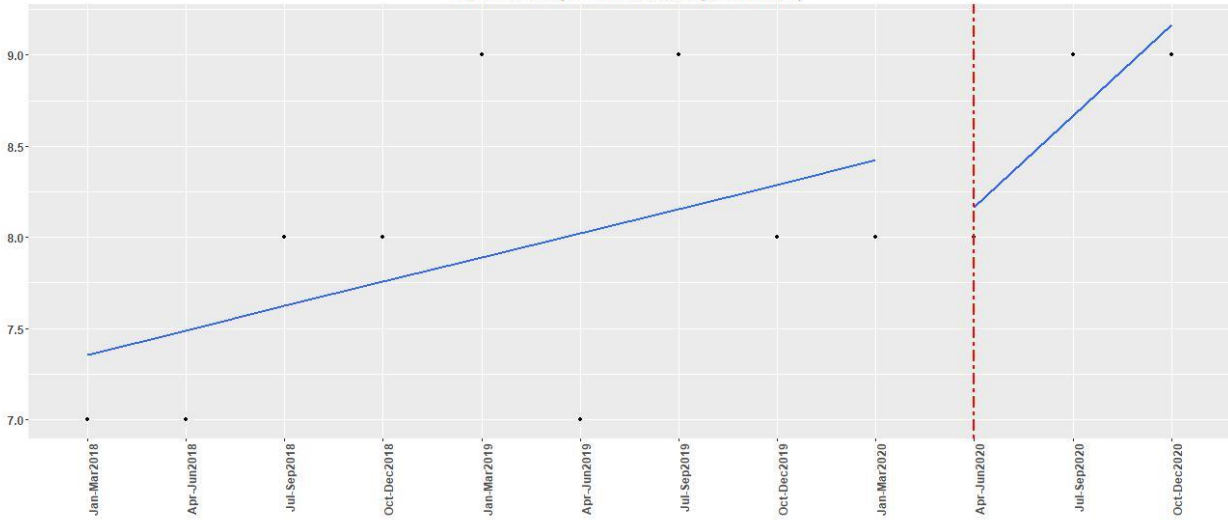
*Proportion of women delivering who were administered immediate postpartum uterotonic (Central West)*



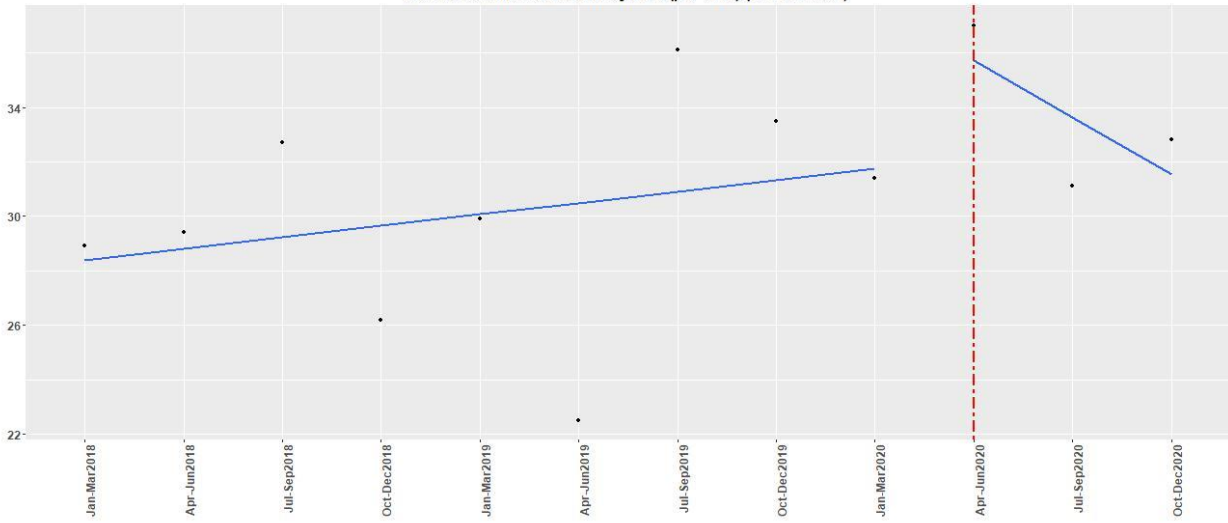
*(%) of mothers who had pre-eclampsia who received anticonvulsants (Central West)*



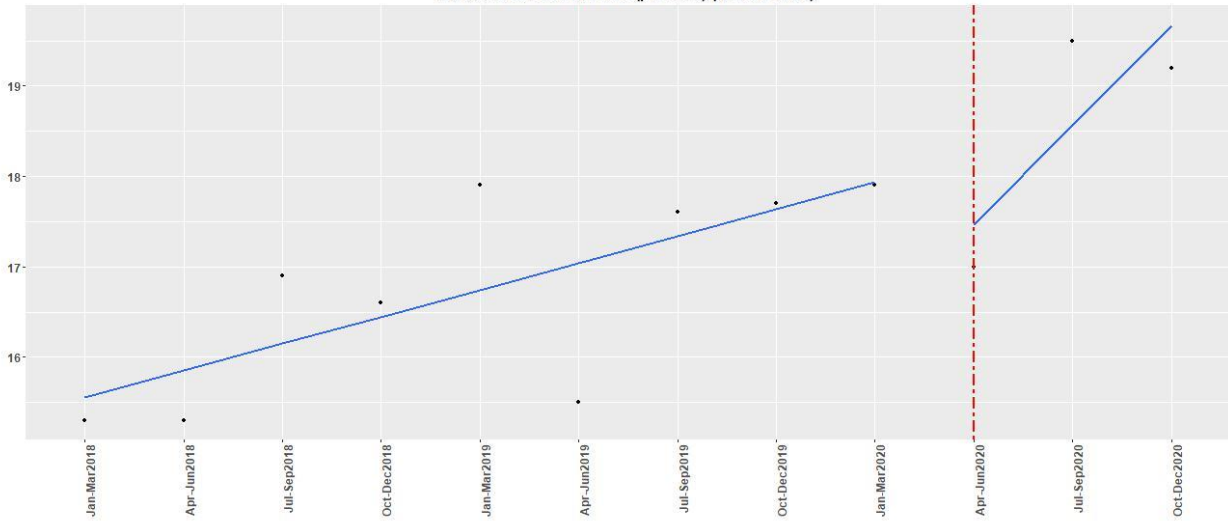
*Fresh stillbirth per 1000 deliveries (Central West)*



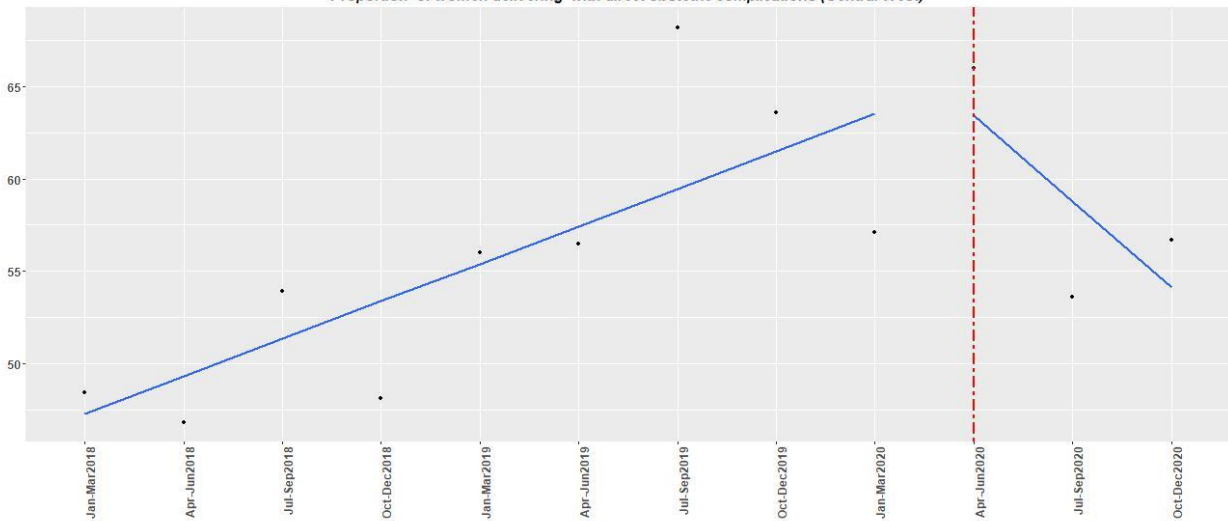
**Institutional Neonatal Mortality Rate (per 1000) (Central West)**



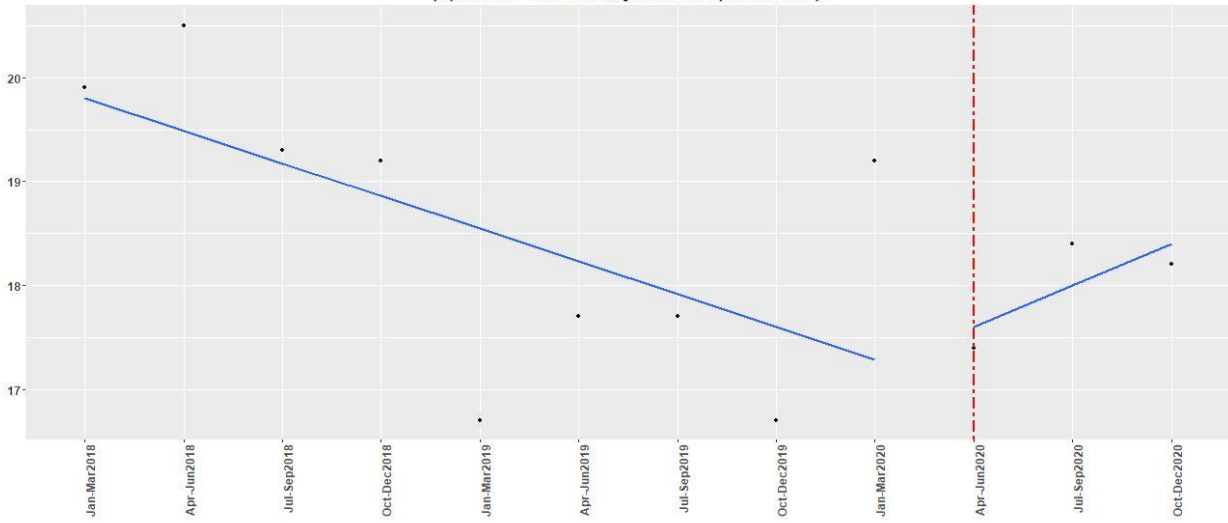
**Institutional Still Birth Rate (per 1000) (Central West)**



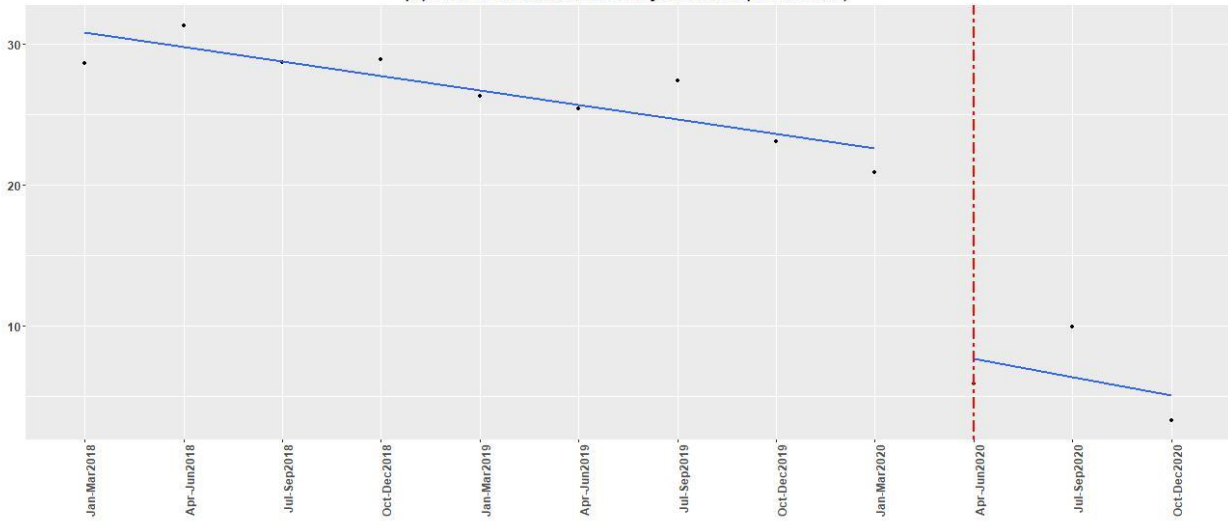
**Proportion of women delivering with direct obstetric complications (Central West)**



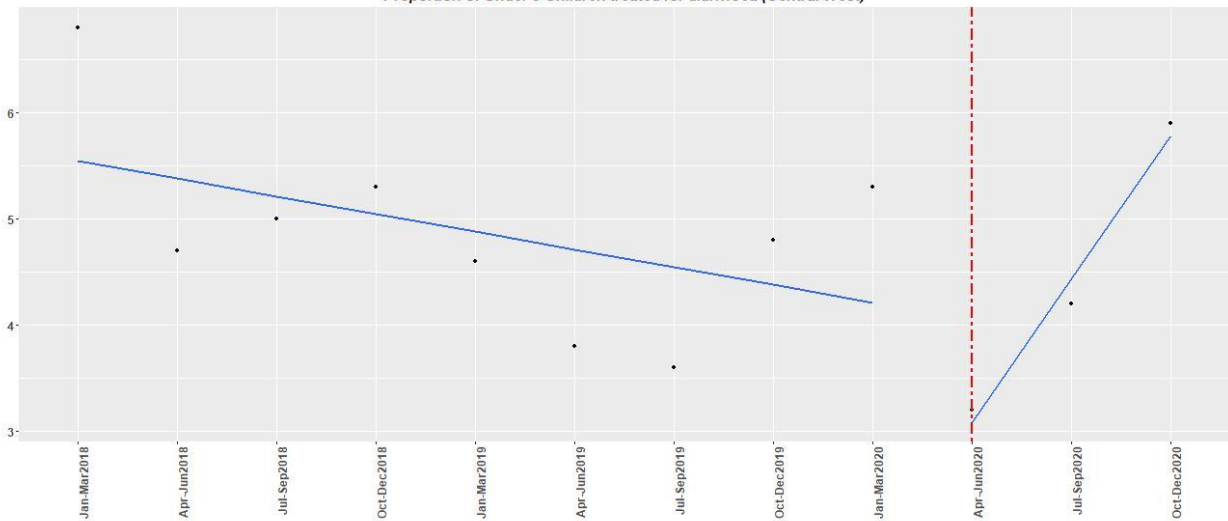
**(%) of Under 1 Children fully immunized (Central West)**



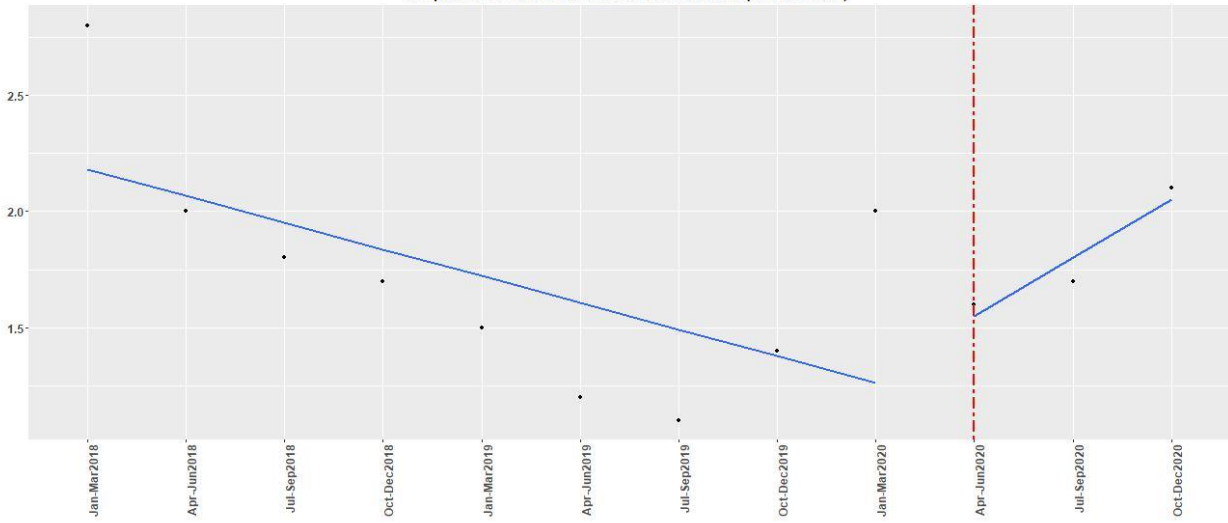
**(%) of Children that have been fully Immunized (Central West)**



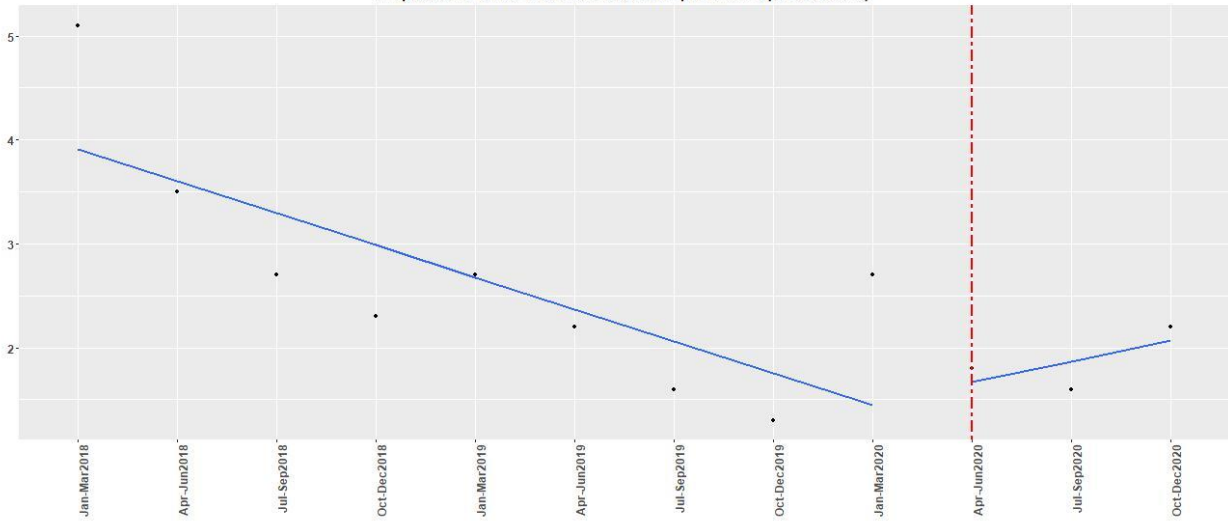
**Proportion of Under 5 Children treated for diarrhoea (Central West)**



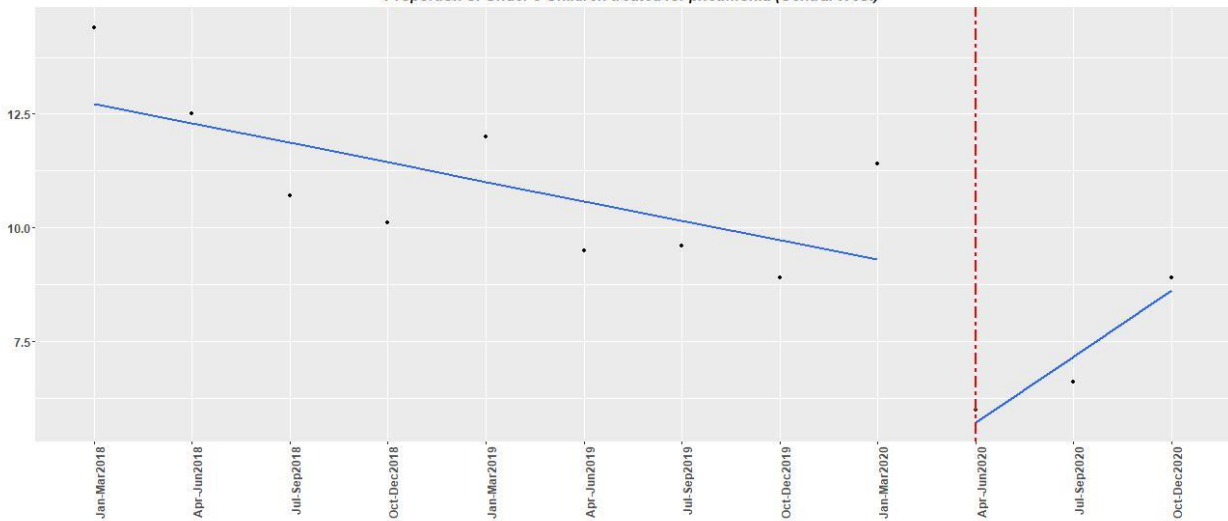
**Proportion of Under 1 Diarrhoea cases treated (Central West)**



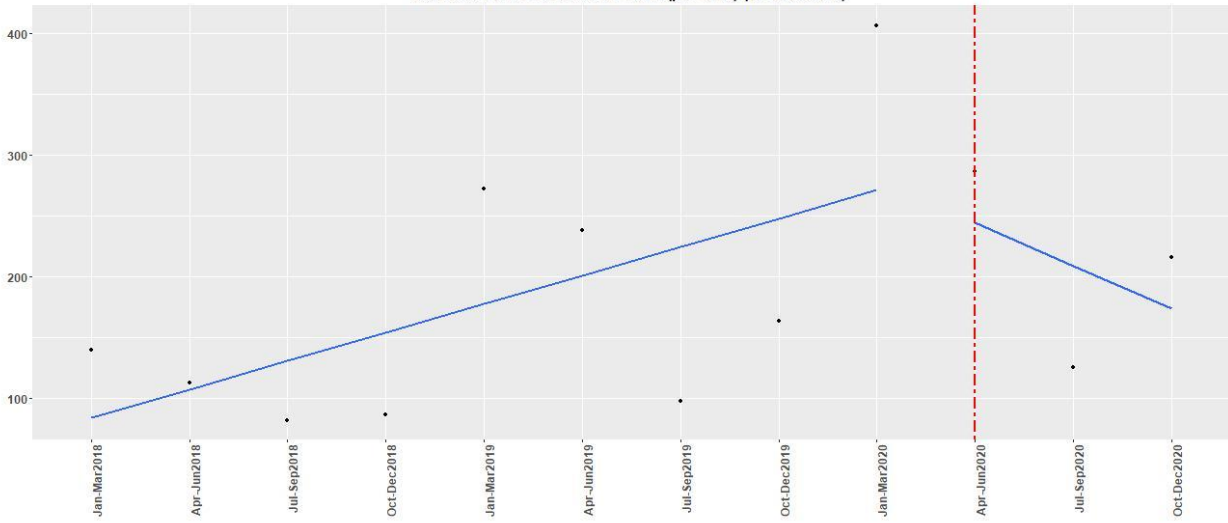
**Proportion of Under 1 Children treated for pneumonia (Central West)**



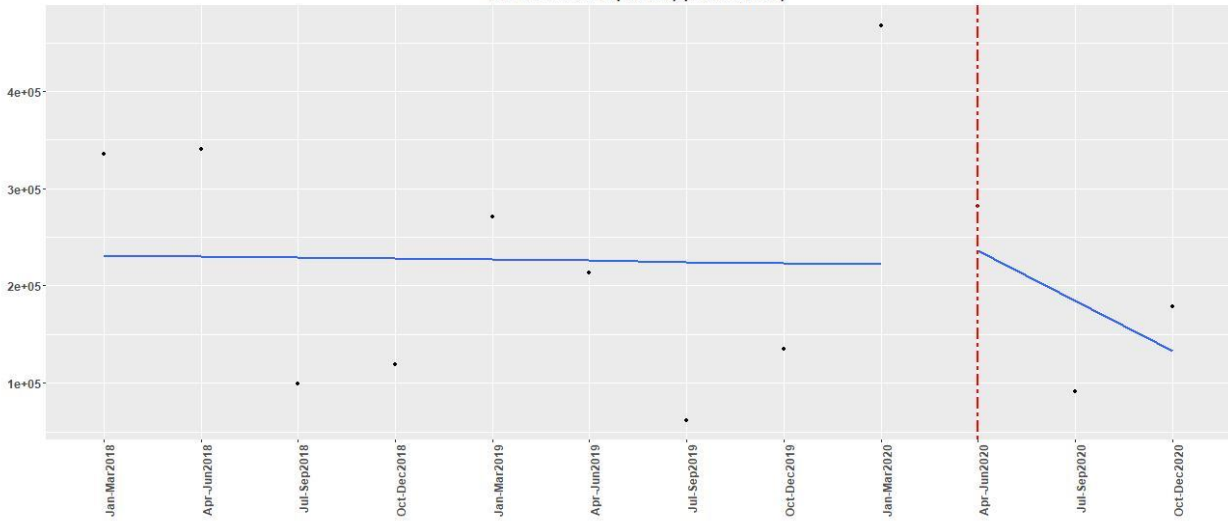
**Proportion of Under 5 Children treated for pneumonia (Central West)**



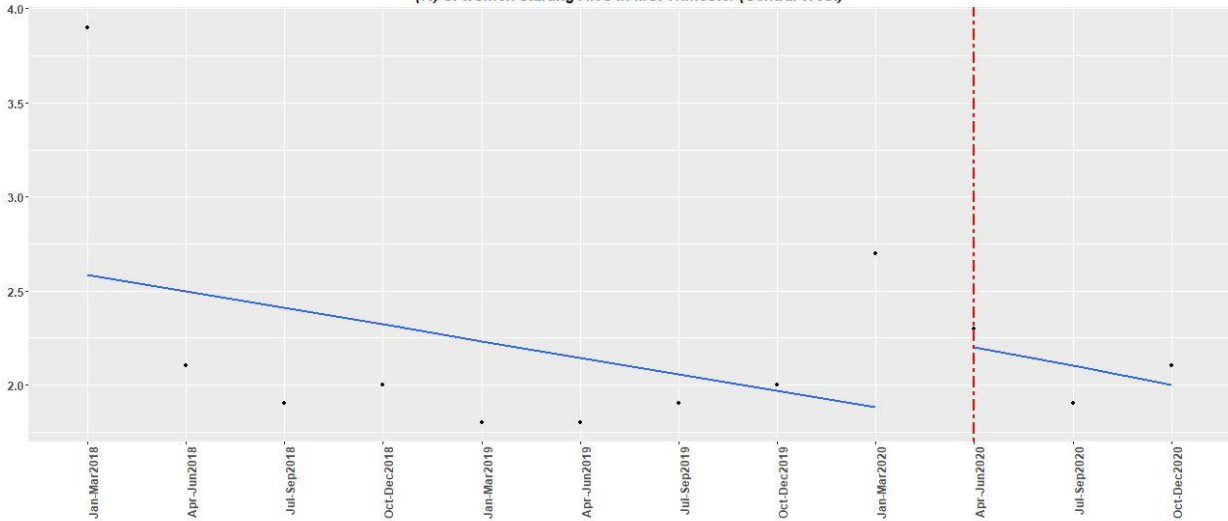
**Confirmed Malaria Cases <5 Years (per 1000) (Central West)**



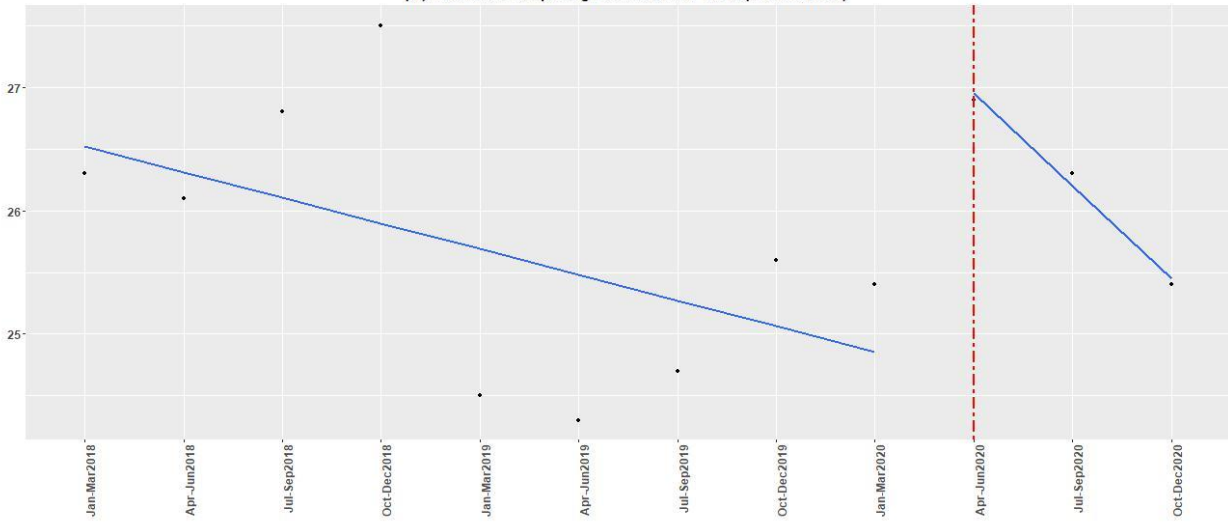
**Malaria Cases <5 (Malaria) (Central West)**



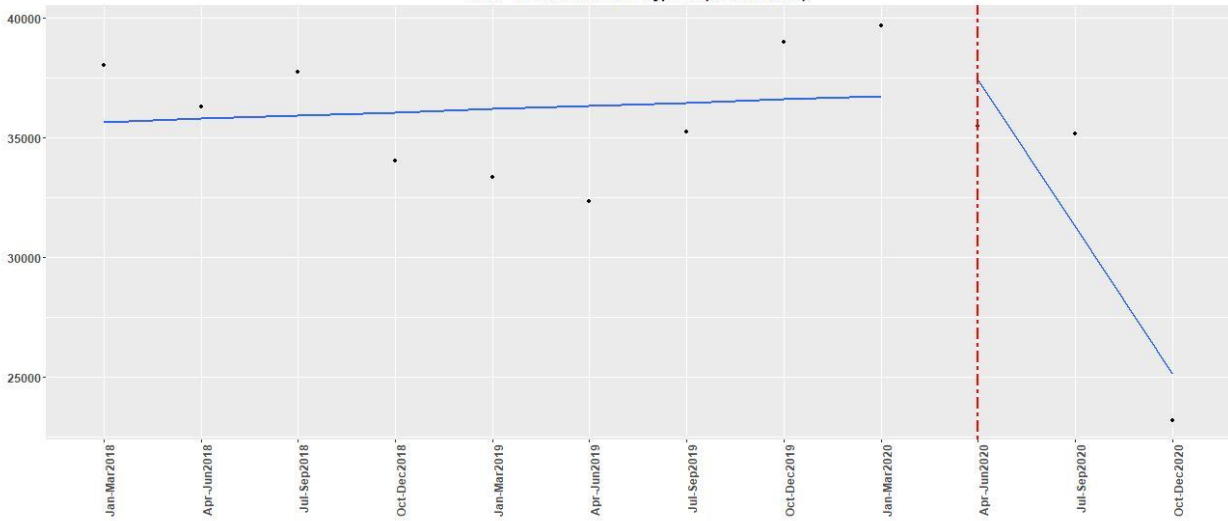
**(%) of women starting ANC in first Trimester (Central West)**



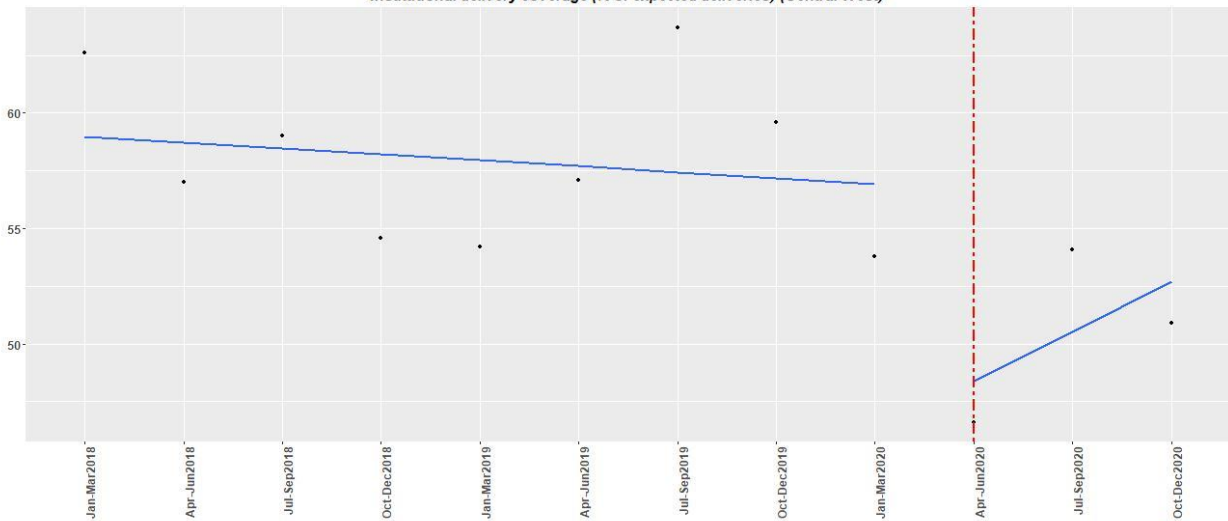
**(%) of Women completing at least 4 ANC Visits (Central West)**



**ANC - women tested for syphilis (Central West)**

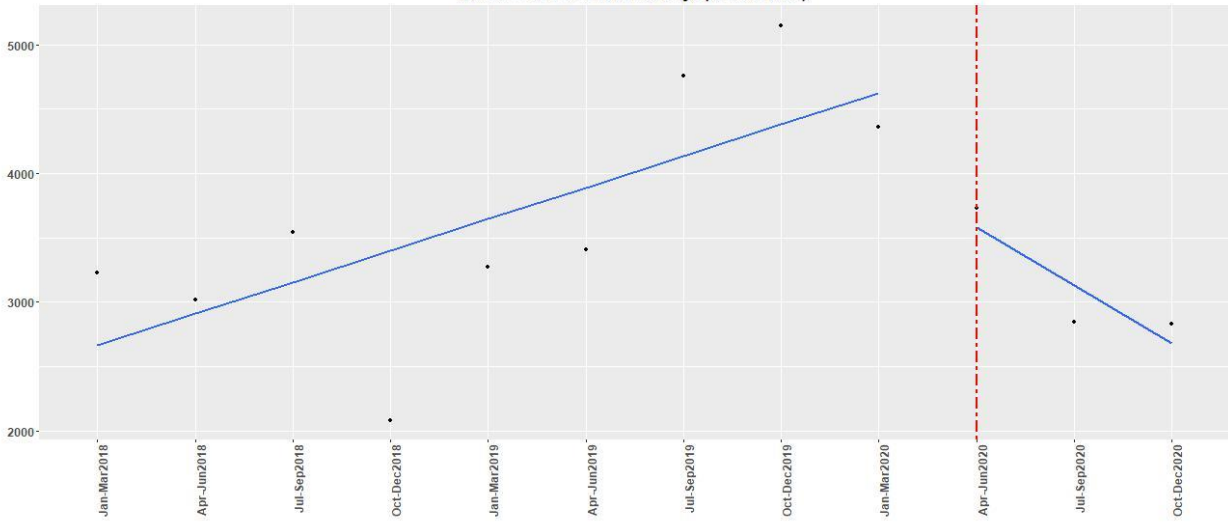


**Institutional delivery coverage (% of expected deliveries) (Central West)**

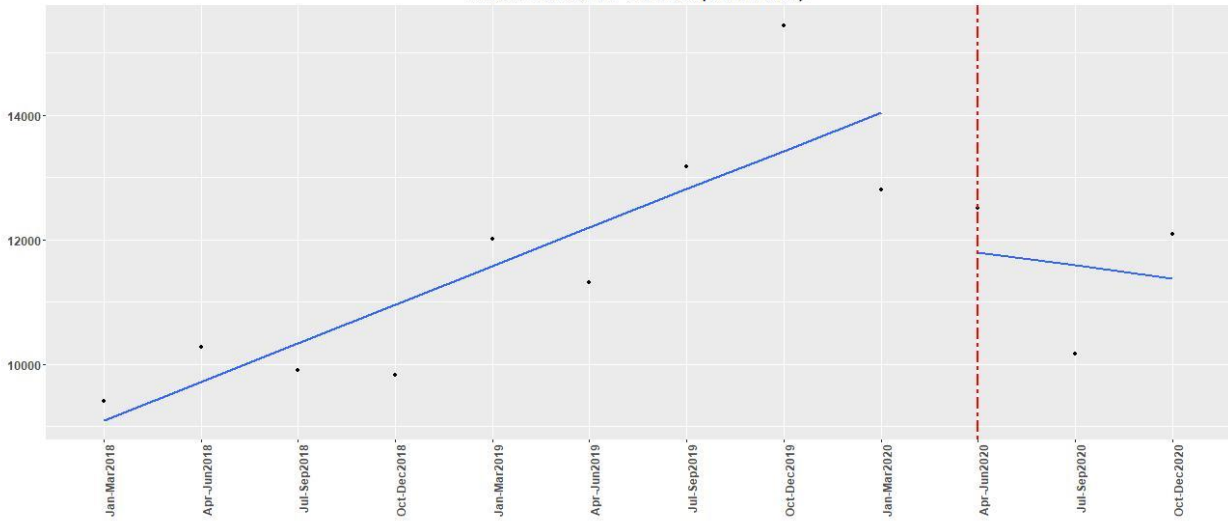




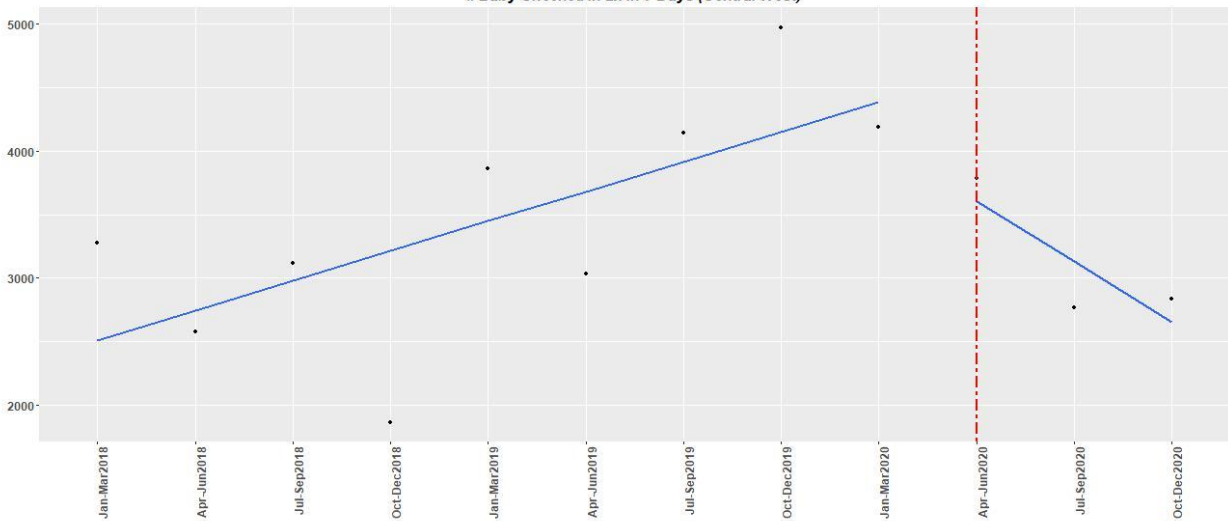
# Mother Checked in 2x in 7 Days (Central West)



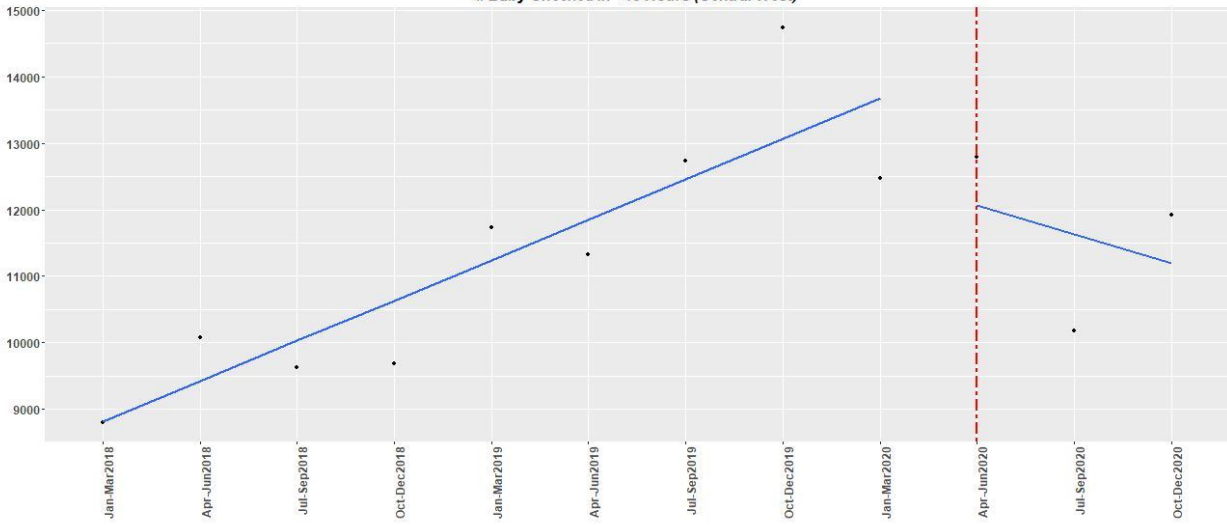
# Mother Checked in <48 Hours (Central West)



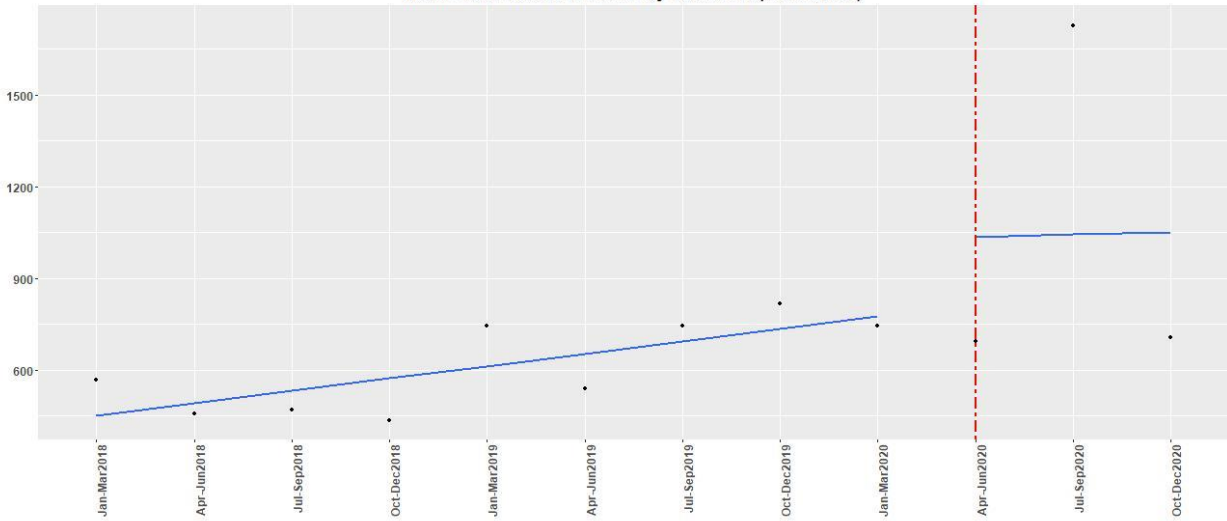
# Baby Checked in 2x in 7 Days (Central West)



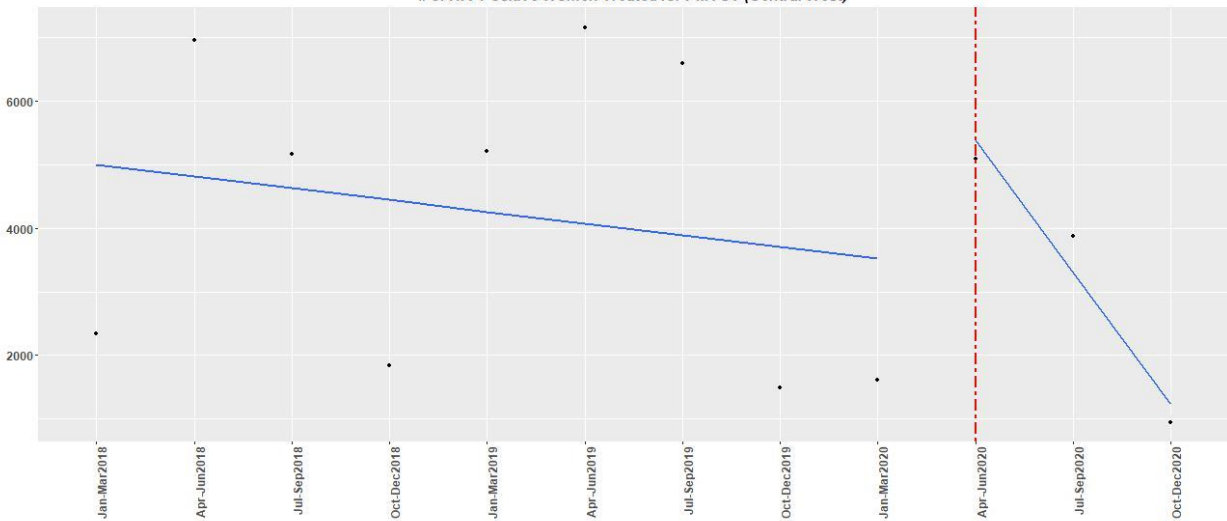
# Baby Checked in <48 Hours (Central West)



Number of babies initiated on facility-based KMC (Central West)

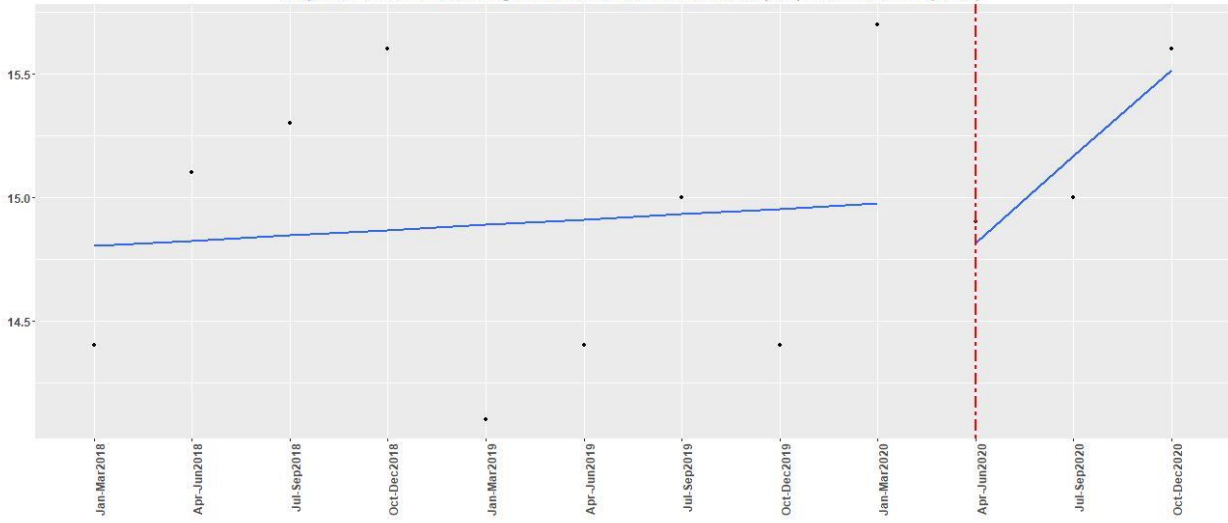


# of HIV Positive Women Treated for PMTCT (Central West)

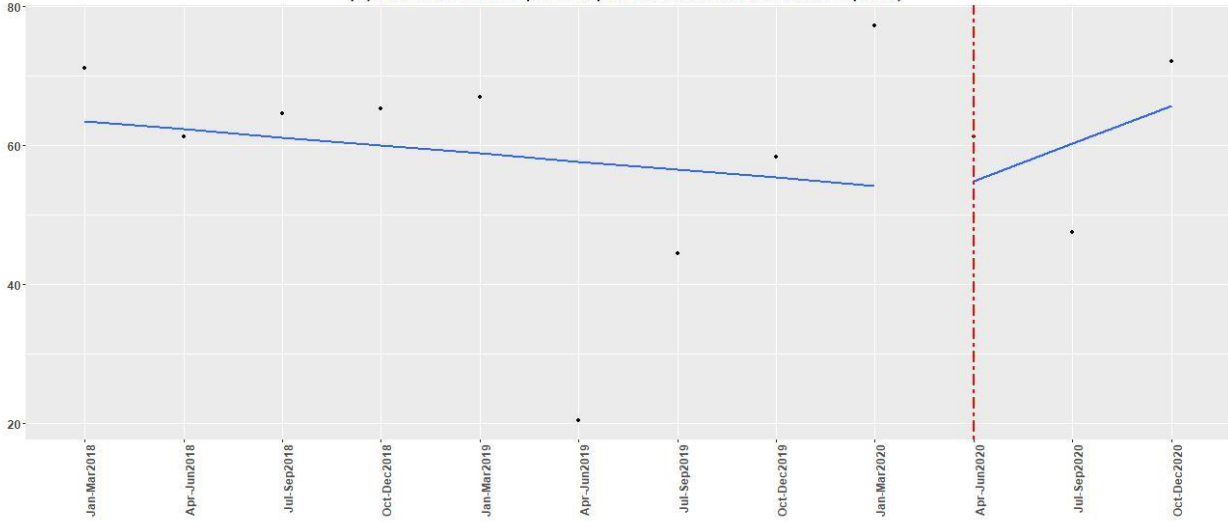


# NORTH ZONE

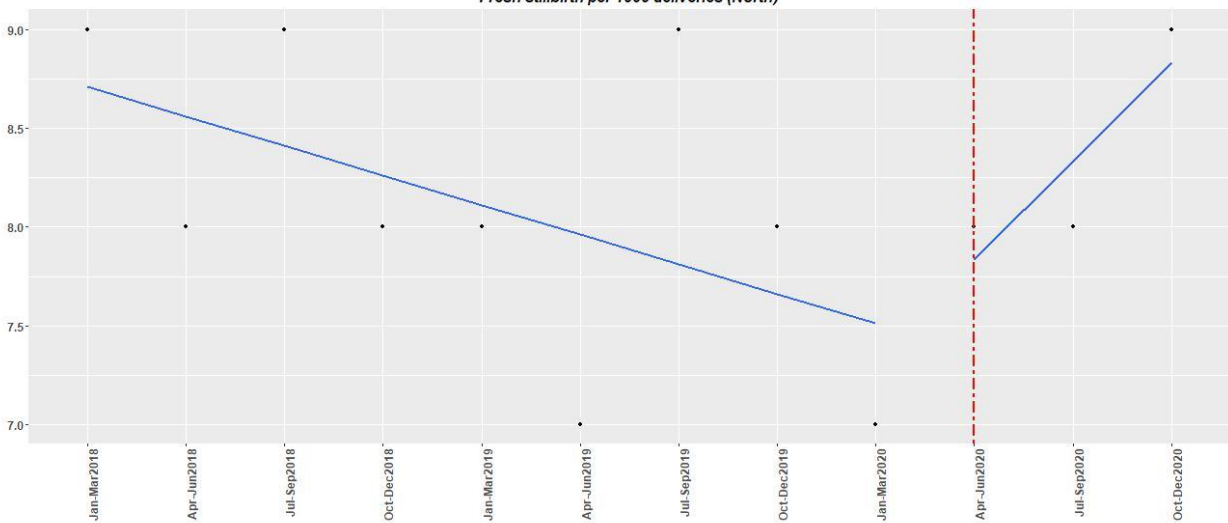
*Proportion of women delivering who were administered immediate postpartum uterotonic (North)*



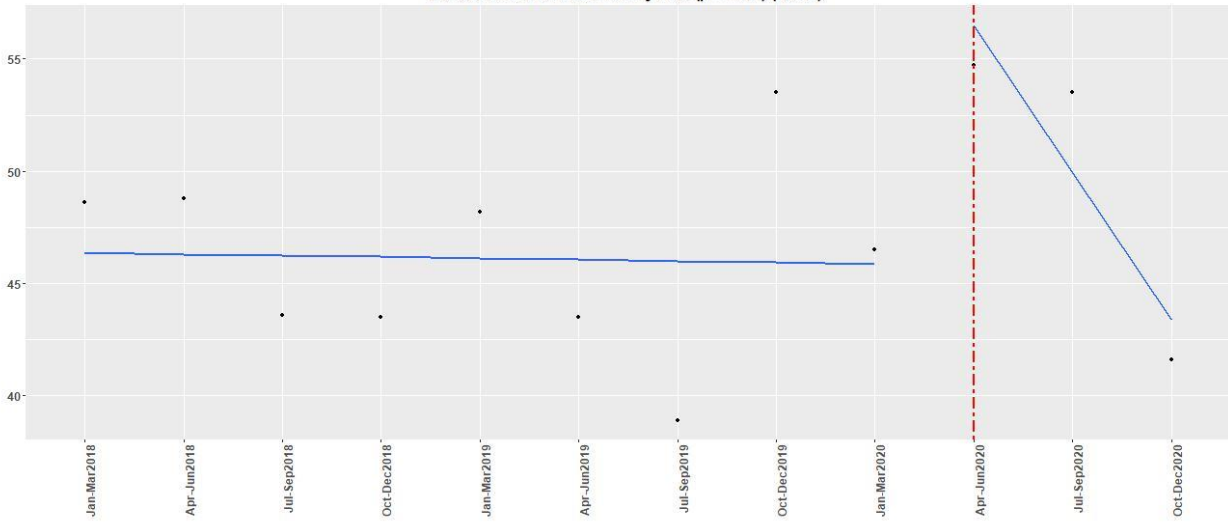
*(%) of mothers who had pre-eclampsia who received anticonvulsants (North)*



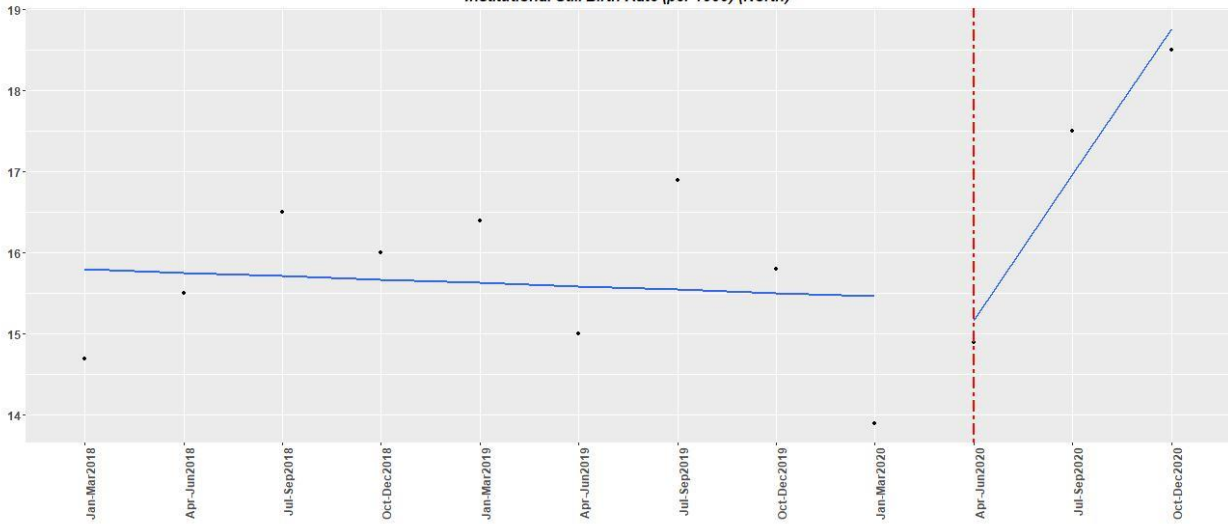
*Fresh stillbirth per 1000 deliveries (North)*



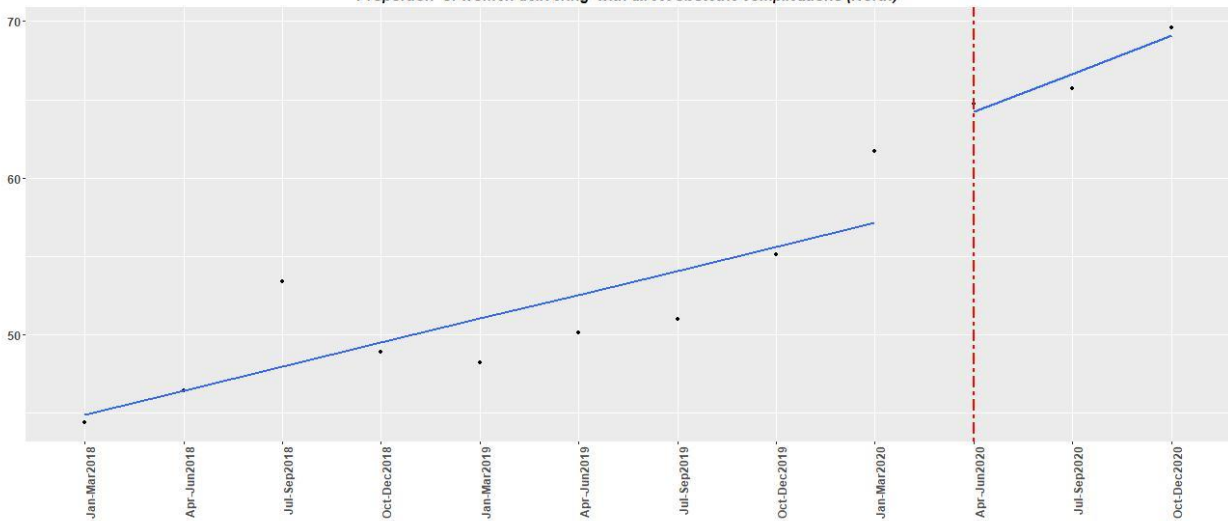
**Institutional Neonatal Mortality Rate (per 1000) (North)**



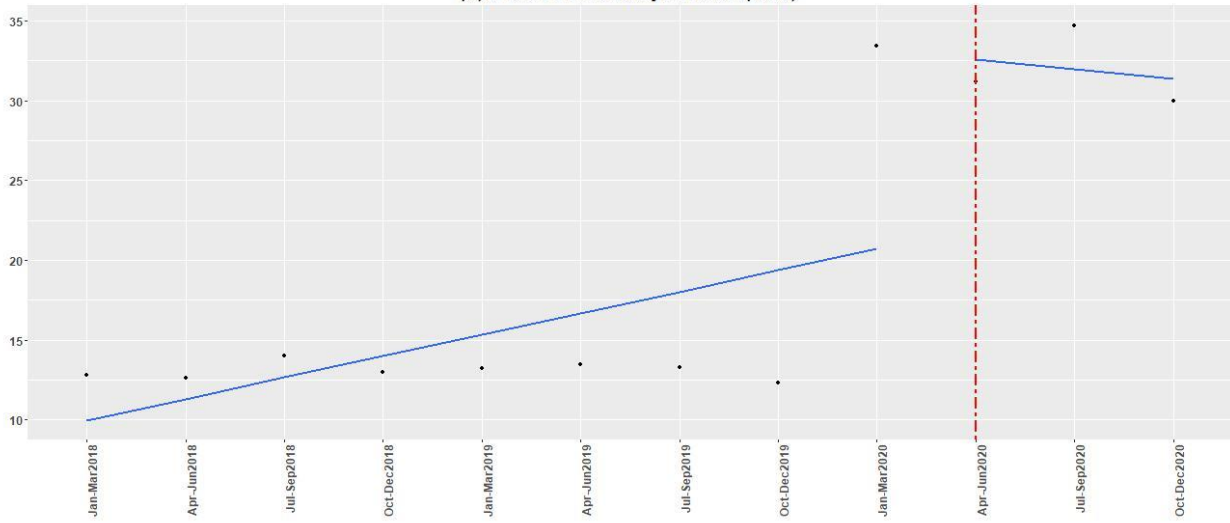
**Institutional Still Birth Rate (per 1000) (North)**



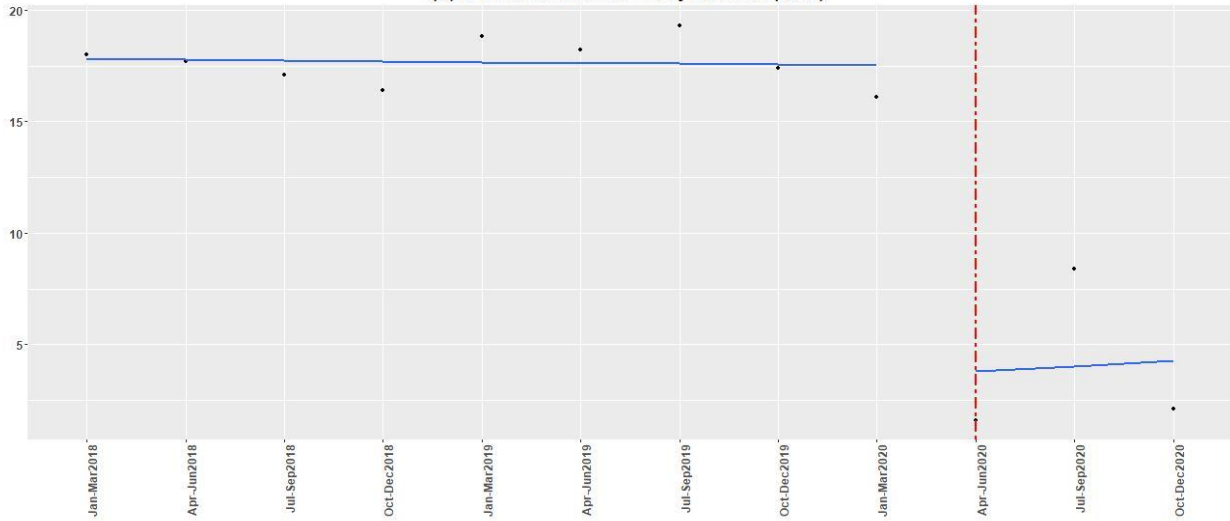
**Proportion of women delivering with direct obstetric complications (North)**



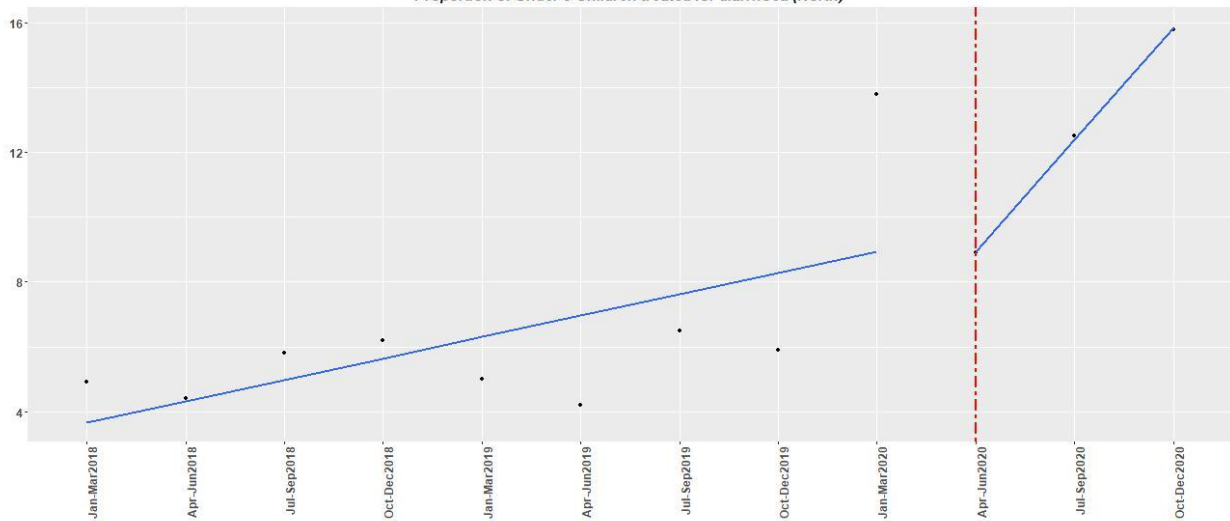
**(%) of Under 1 Children fully immunized (North)**



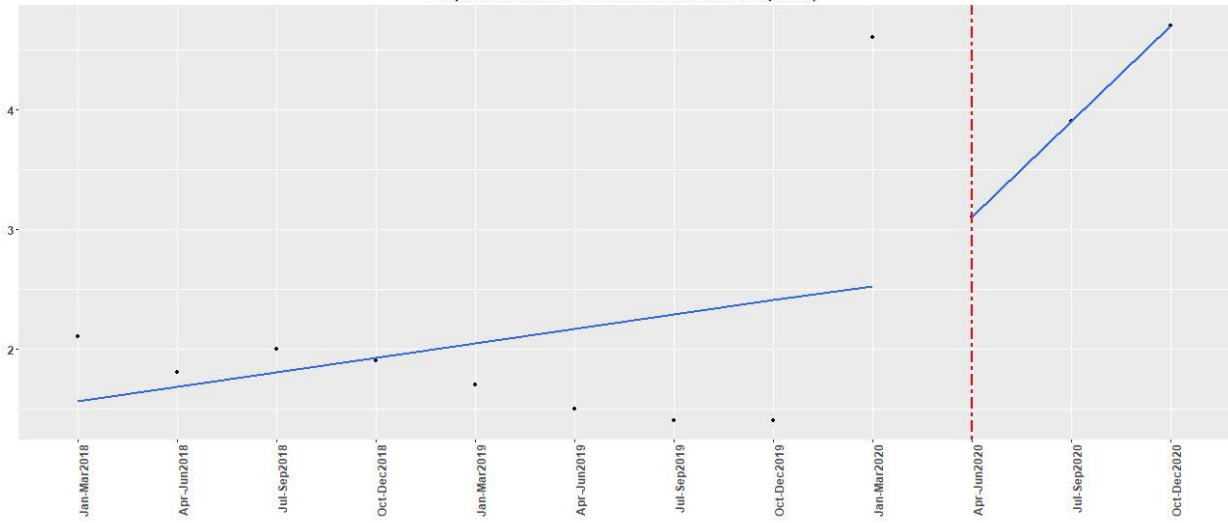
**(%) of Children that have been fully Immunized (North)**



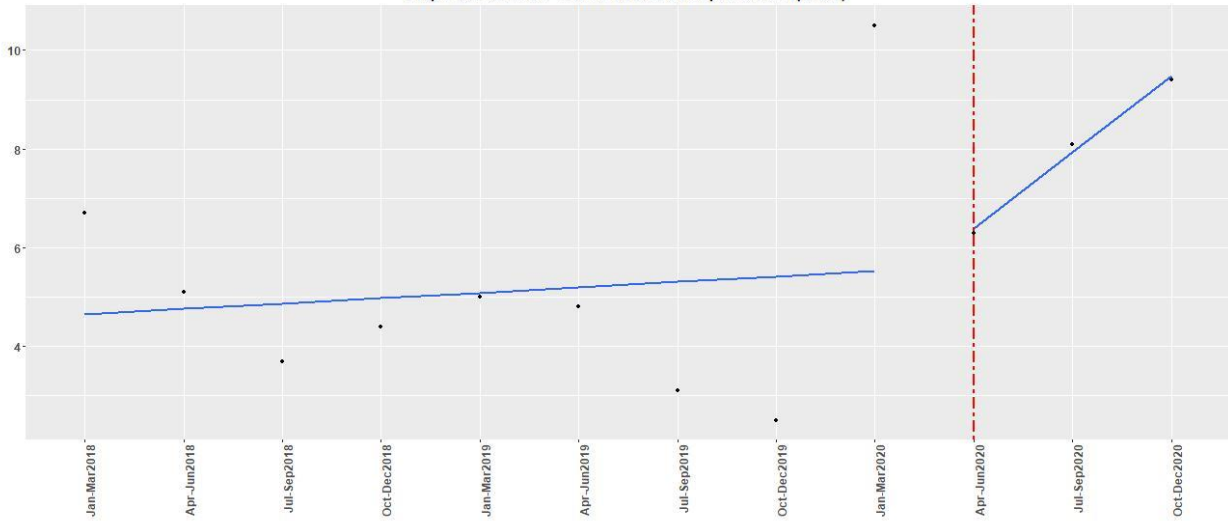
**Proportion of Under 5 Children treated for diarrhoea (North)**



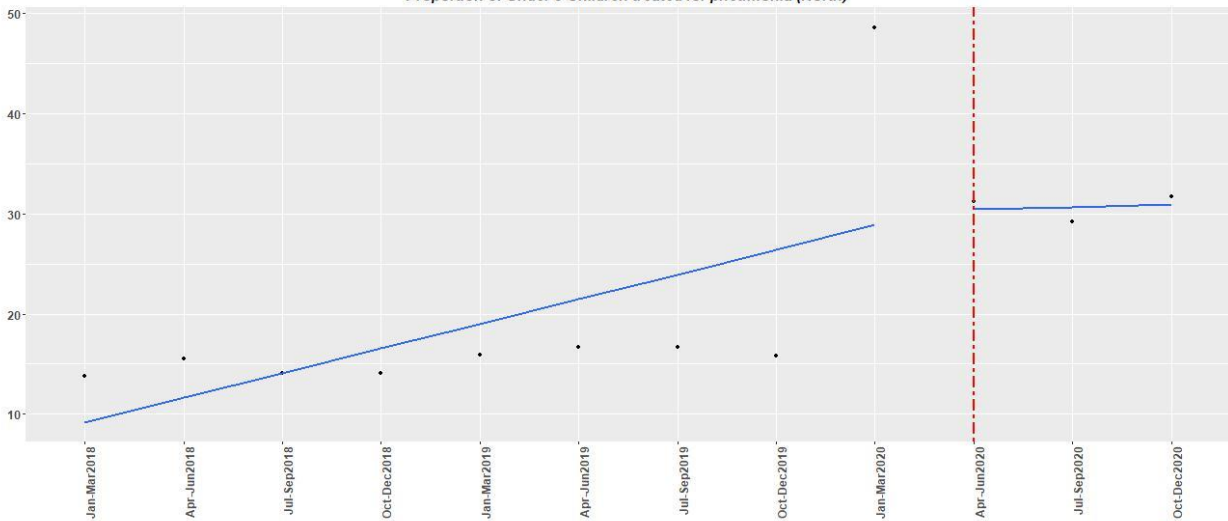
Proportion of Under 1 Diarrhoea cases treated (North)



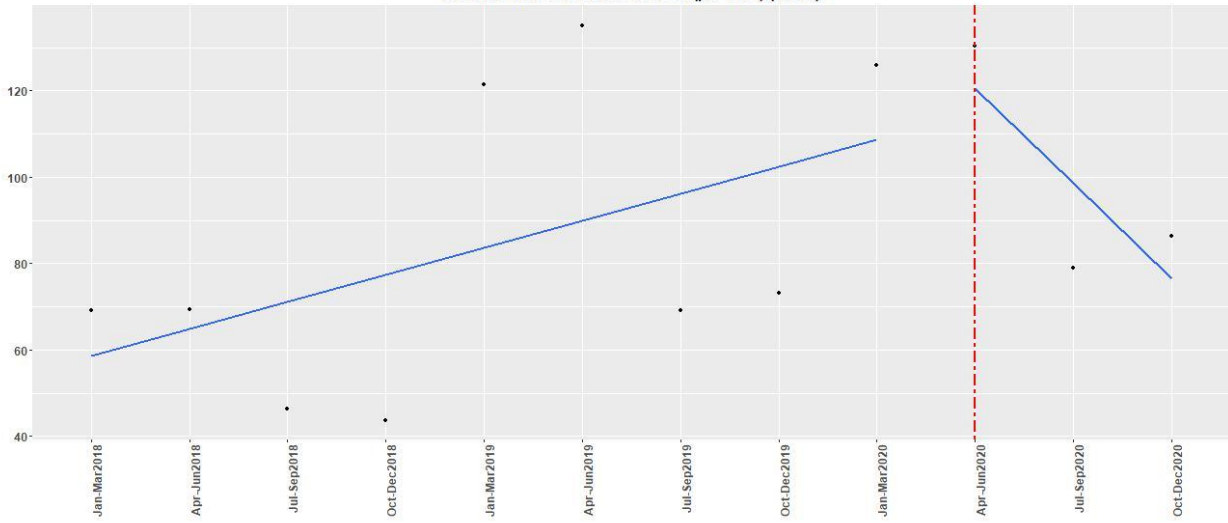
Proportion of Under 1 Children treated for pneumonia (North)



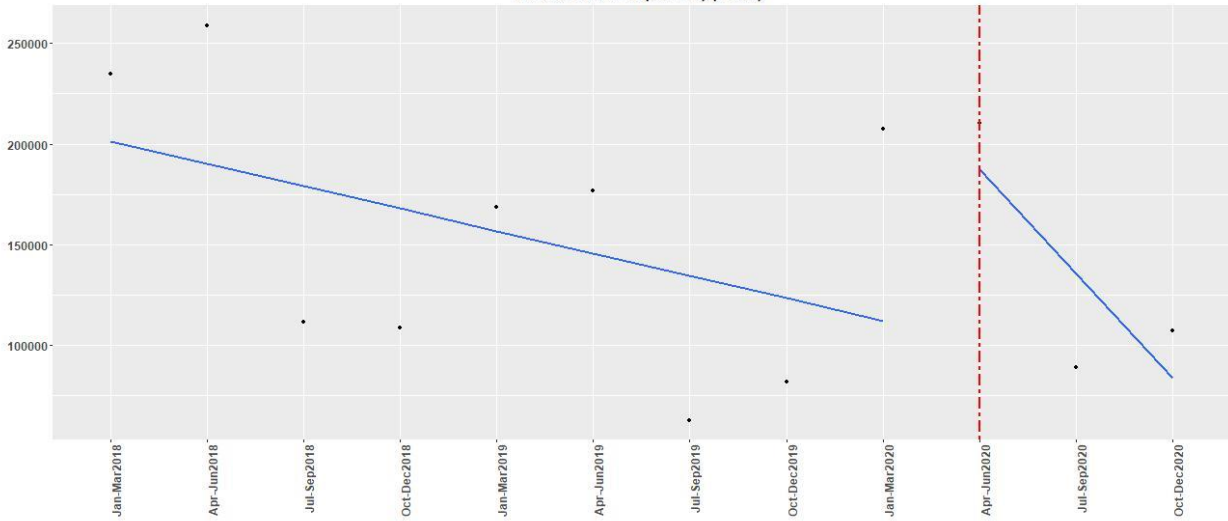
Proportion of Under 5 Children treated for pneumonia (North)



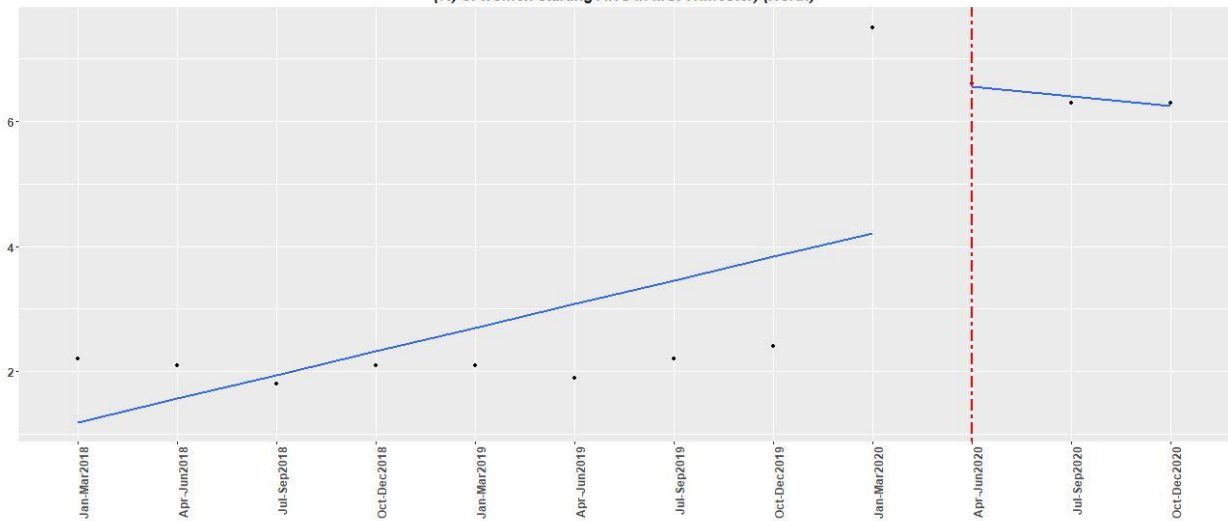
**Confirmed Malaria Cases <5 Years (per 1000) (North)**



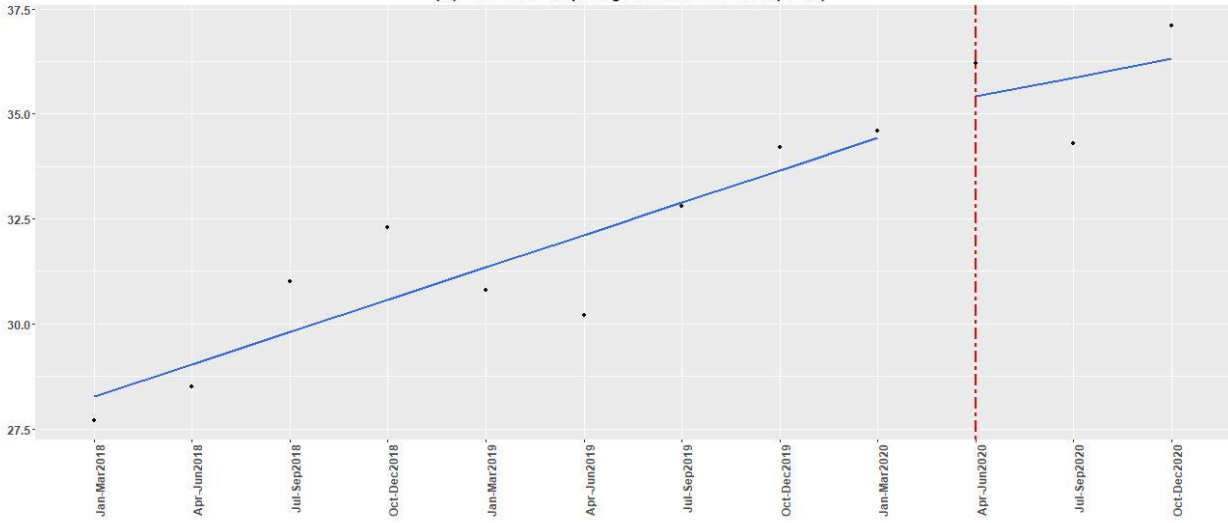
**Malaria Cases <5 (Malaria) (North)**



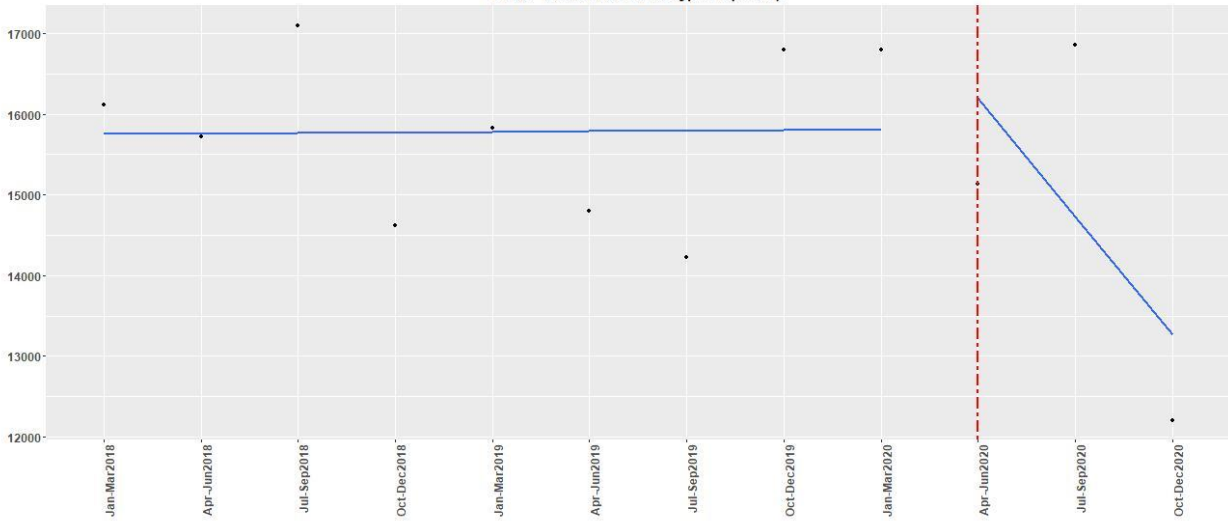
**(%) of women starting ANC in first Trimester (North)**



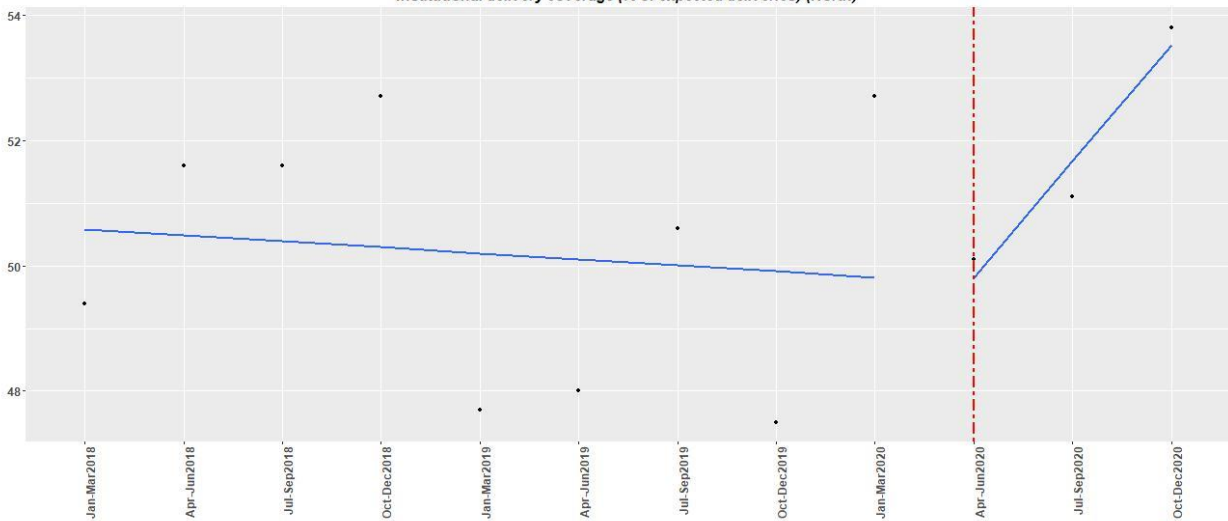
**(%) of Women completing at least 4 ANC Visits (North)**



**ANC - women tested for syphilis (North)**

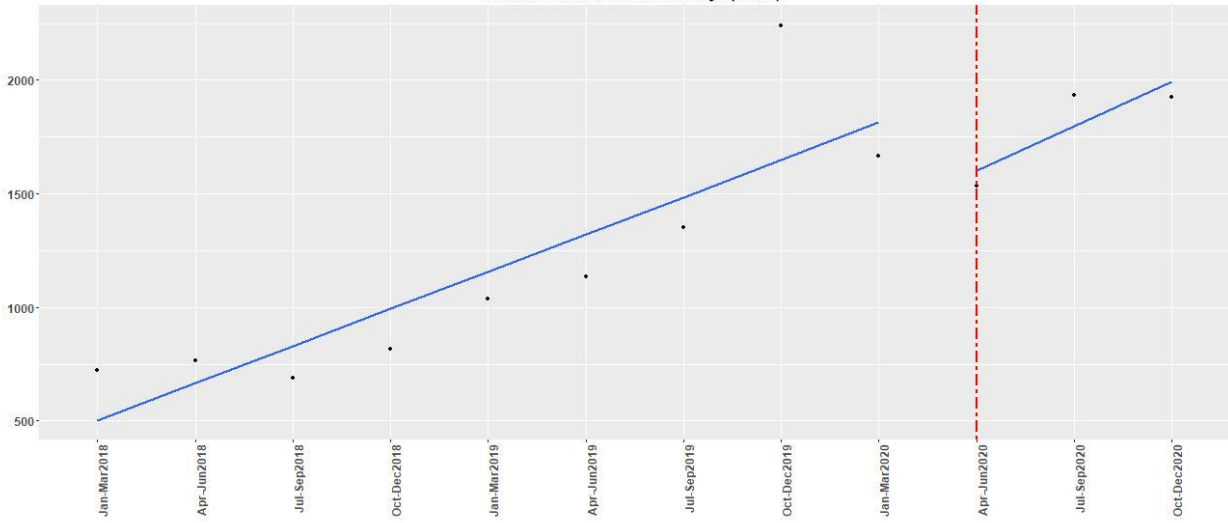


**Institutional delivery coverage (% of expected deliveries) (North)**

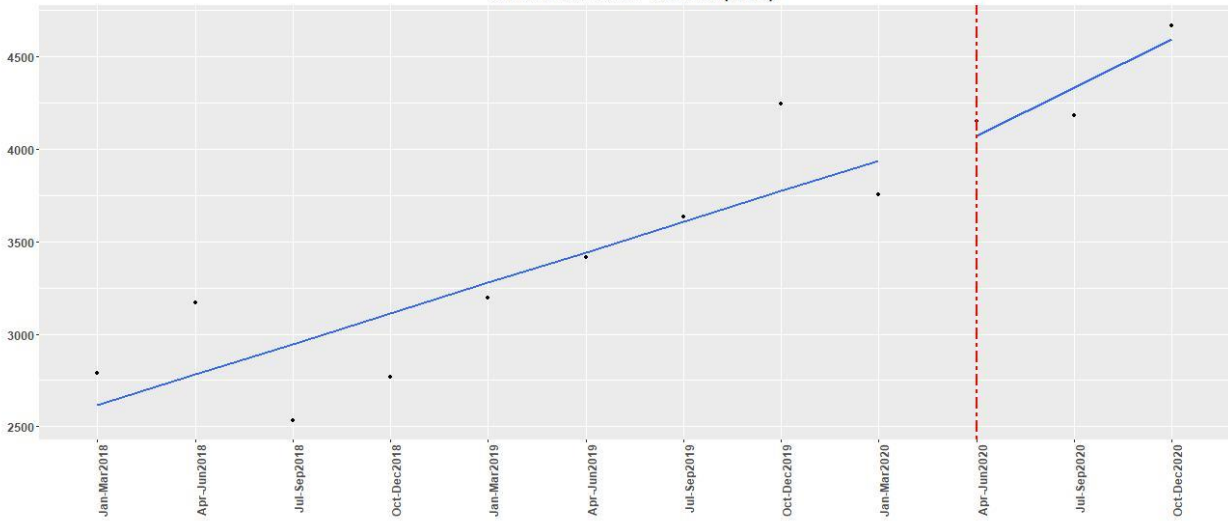




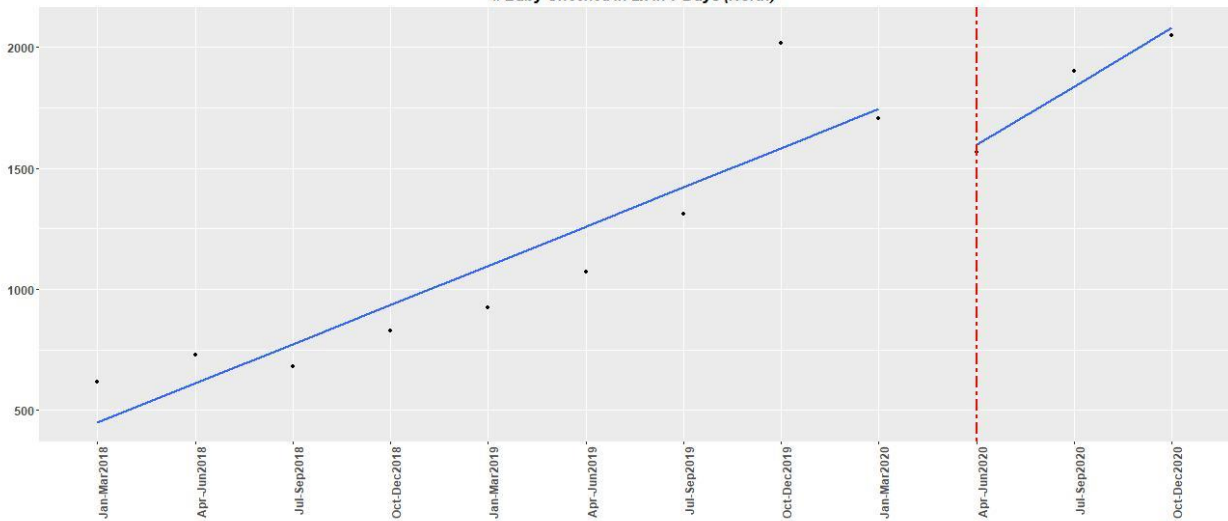
# Mother Checked in 2x in 7 Days (North)



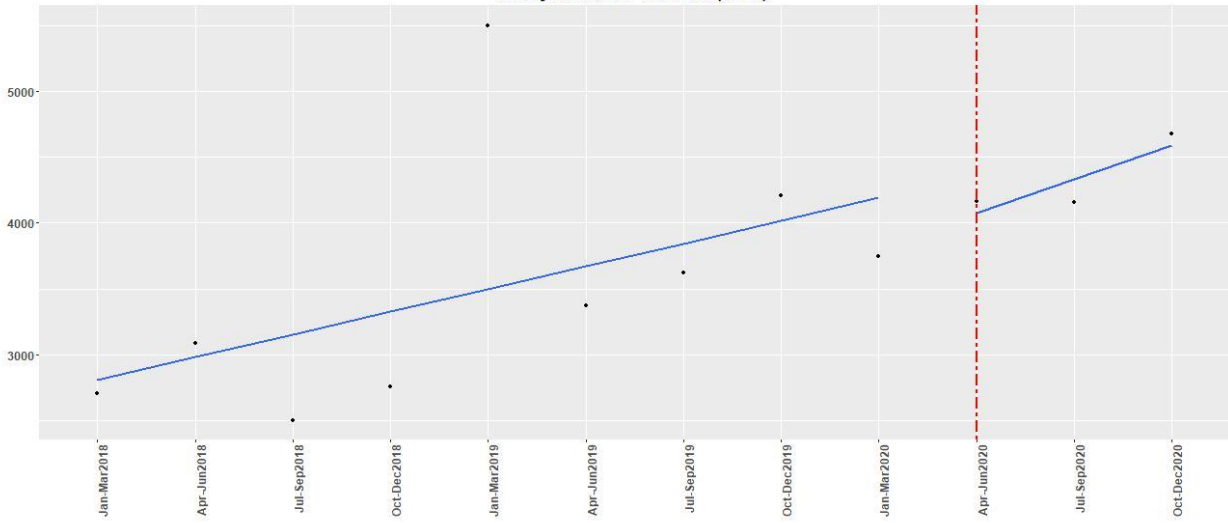
# Mother Checked in <48 Hours (North)



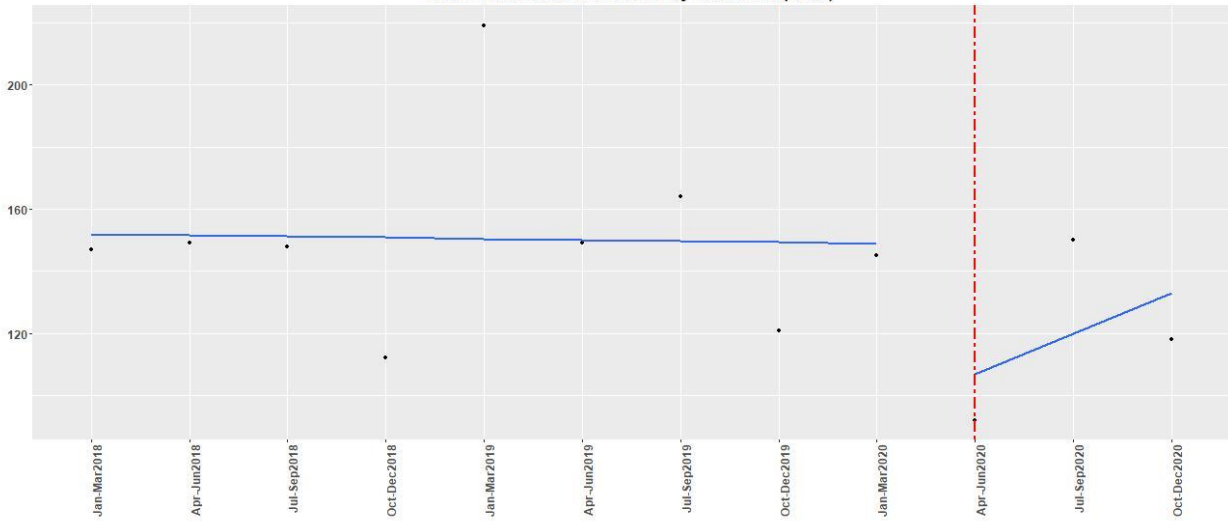
# Baby Checked in 2x in 7 Days (North)



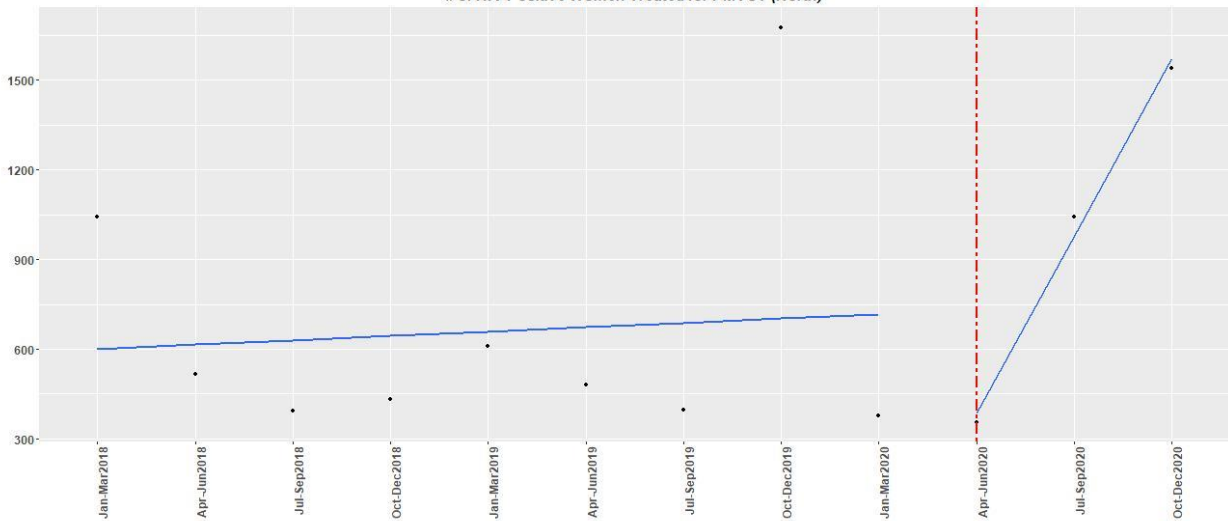
**# Baby Checked in <48 Hours (North)**



**Number of babies initiated on facility-based KMC (North)**

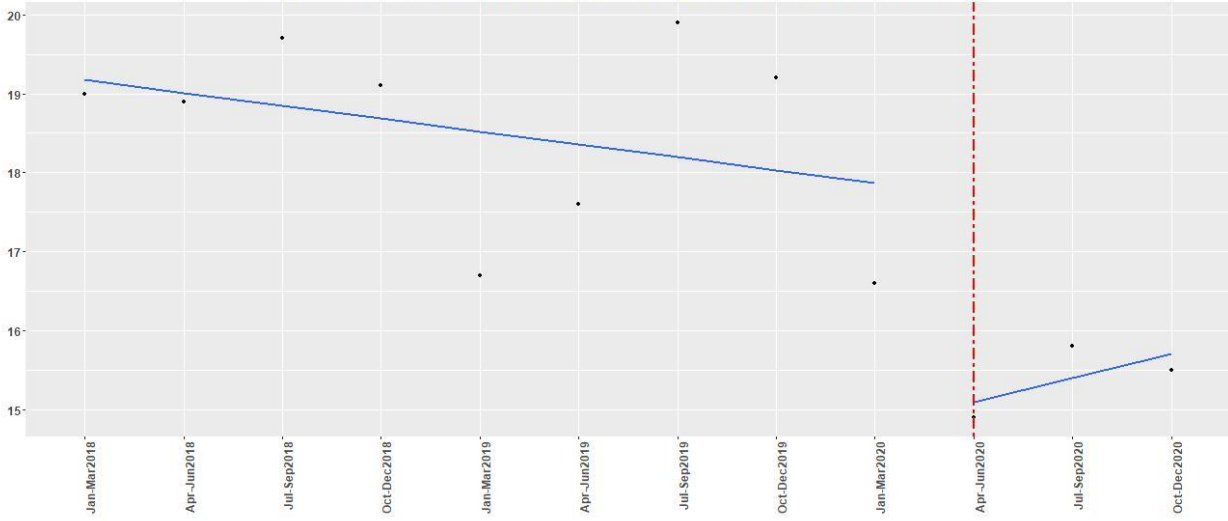


**# of HIV Positive Women Treated for PMTCT (North)**

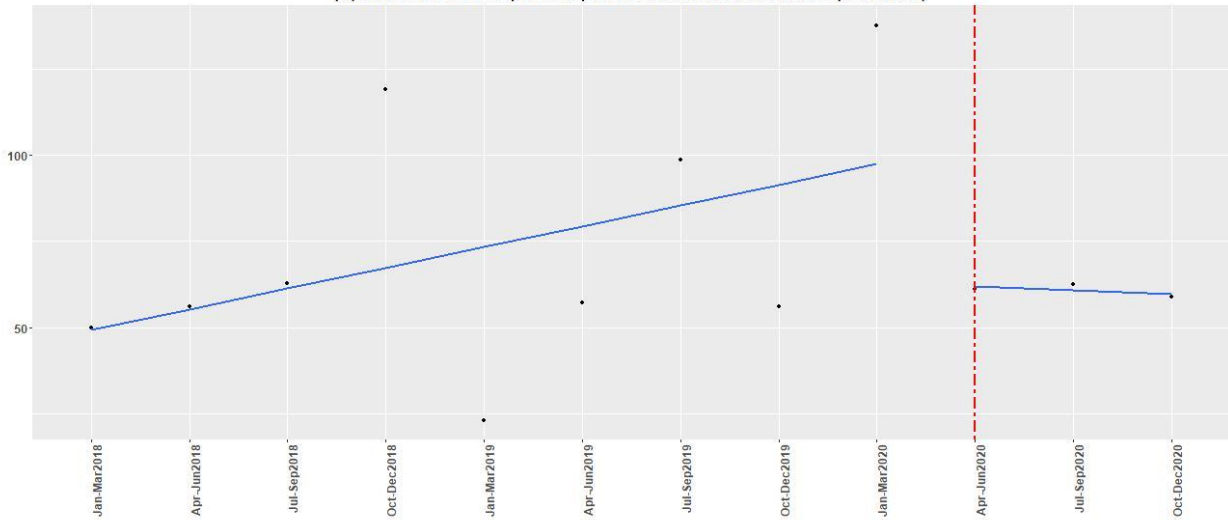


# SOUTH EAST ZONE

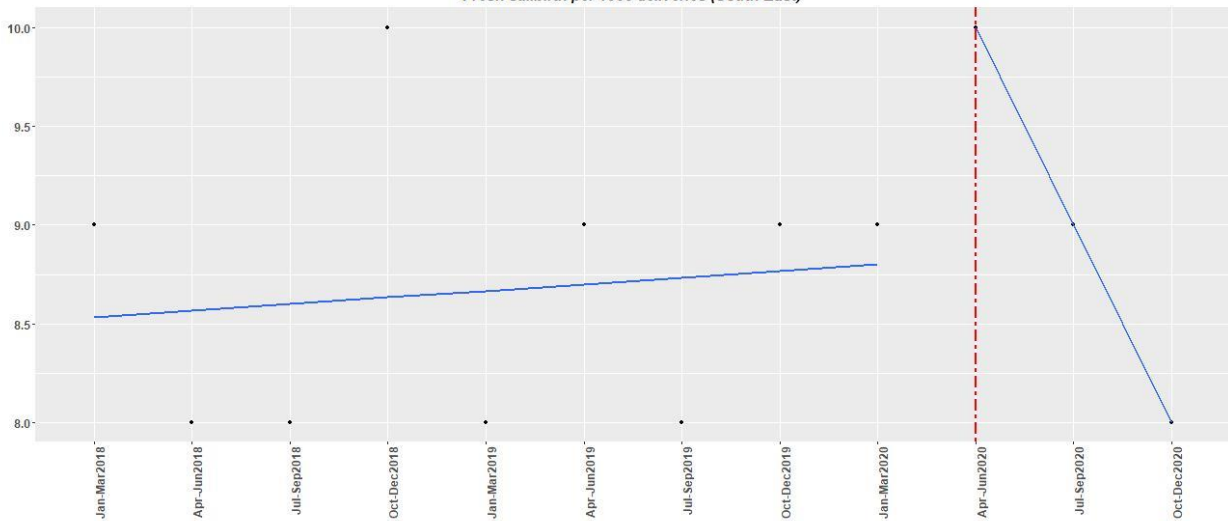
*Proportion of women delivering who were administered immediate postpartum uterotonic (South East)*



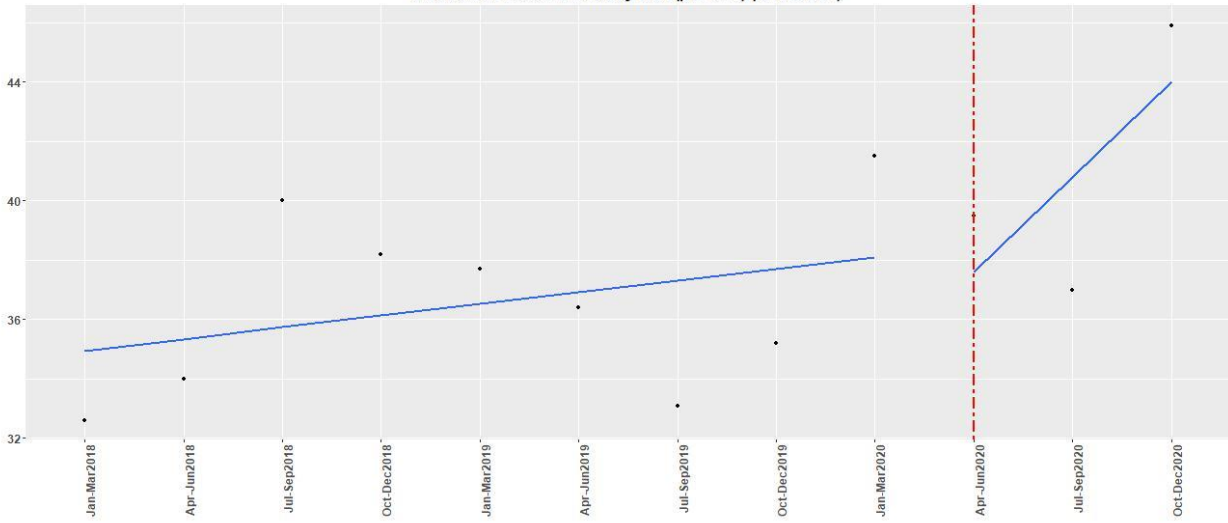
*(%) of mothers who had pre-eclampsia who received anticonvulsants (South East)*



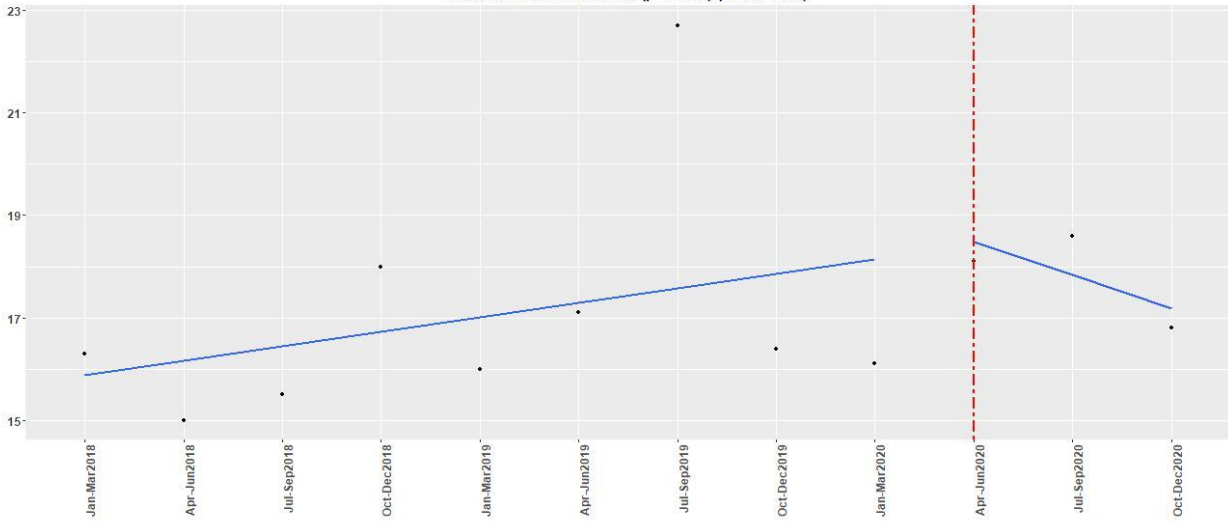
*Fresh stillbirth per 1000 deliveries (South East)*



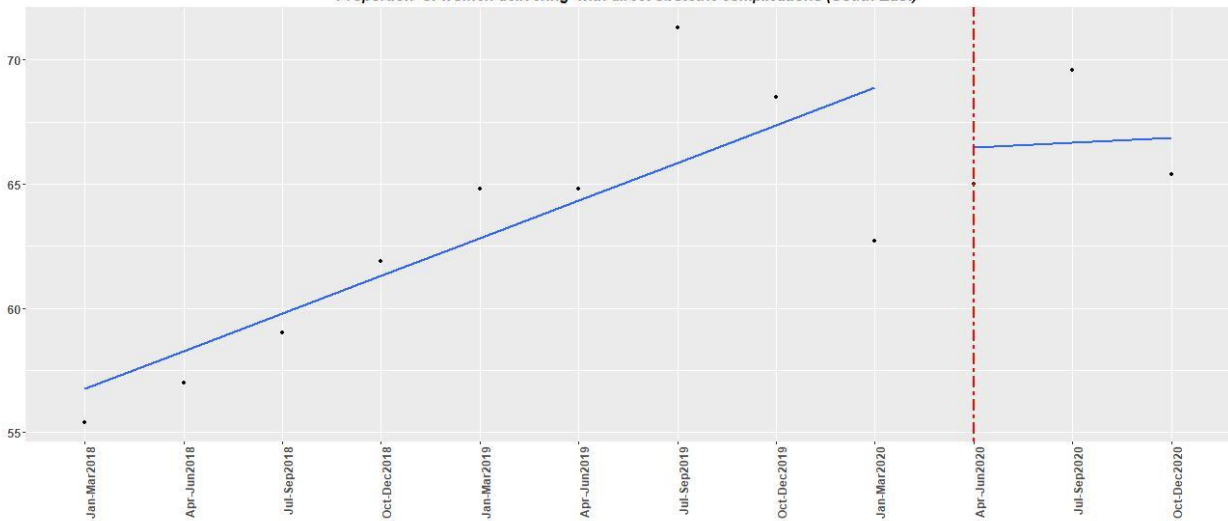
**Institutional Neonatal Mortality Rate (per 1000) (South East)**



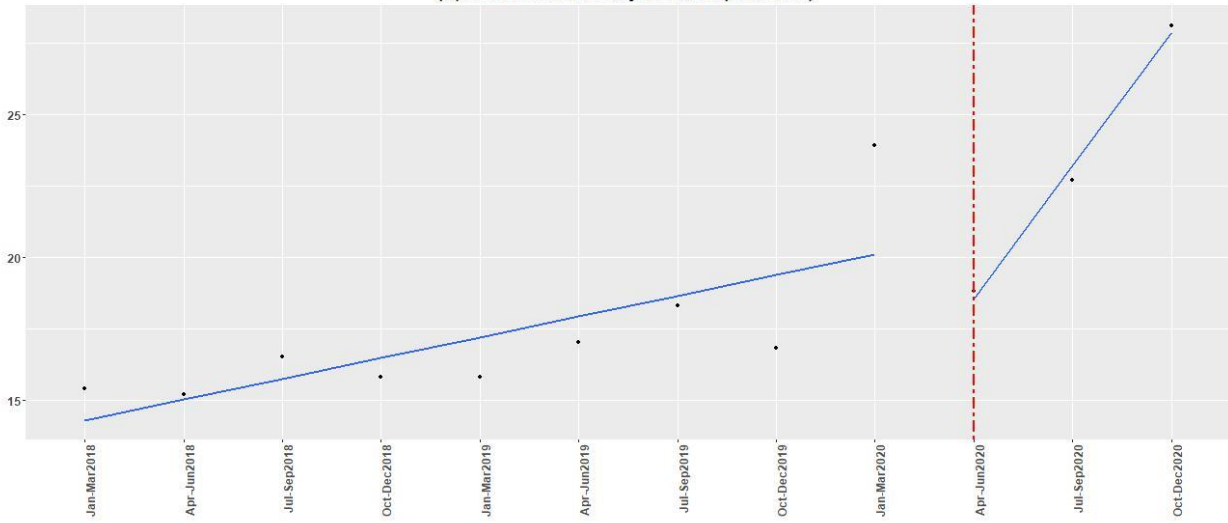
**Institutional Still Birth Rate (per 1000) (South East)**



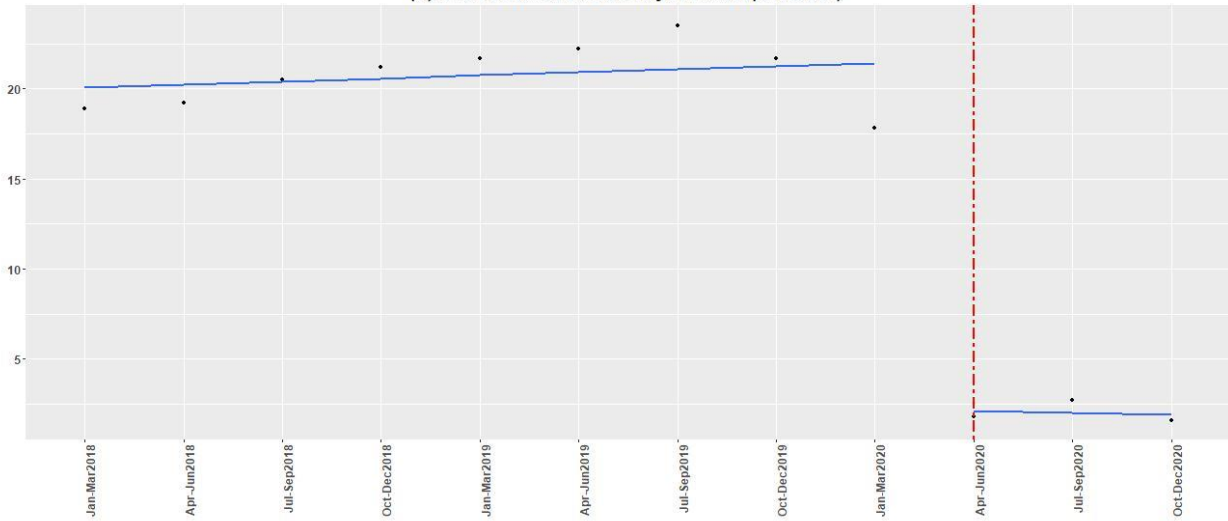
**Proportion of women delivering with direct obstetric complications (South East)**



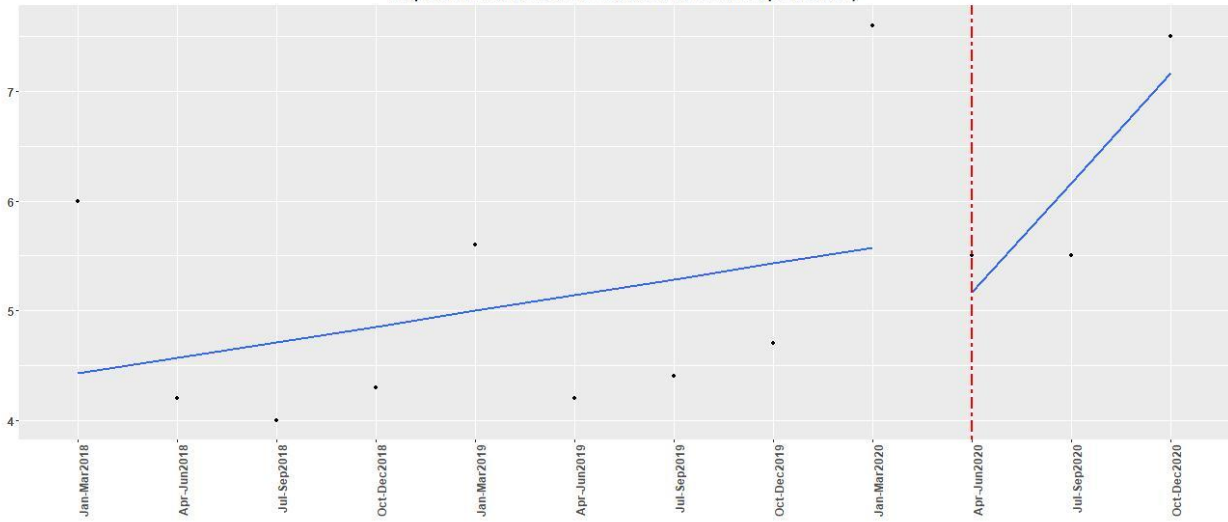
**(%) of Under 1 Children fully immunized (South East)**



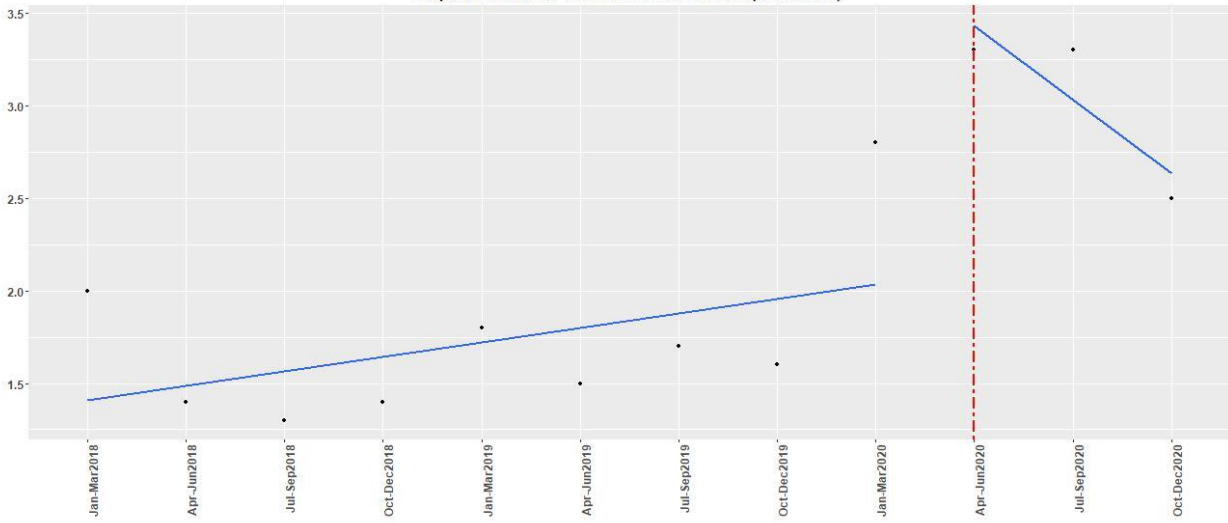
**(%) of Children that have been fully immunized (South East)**



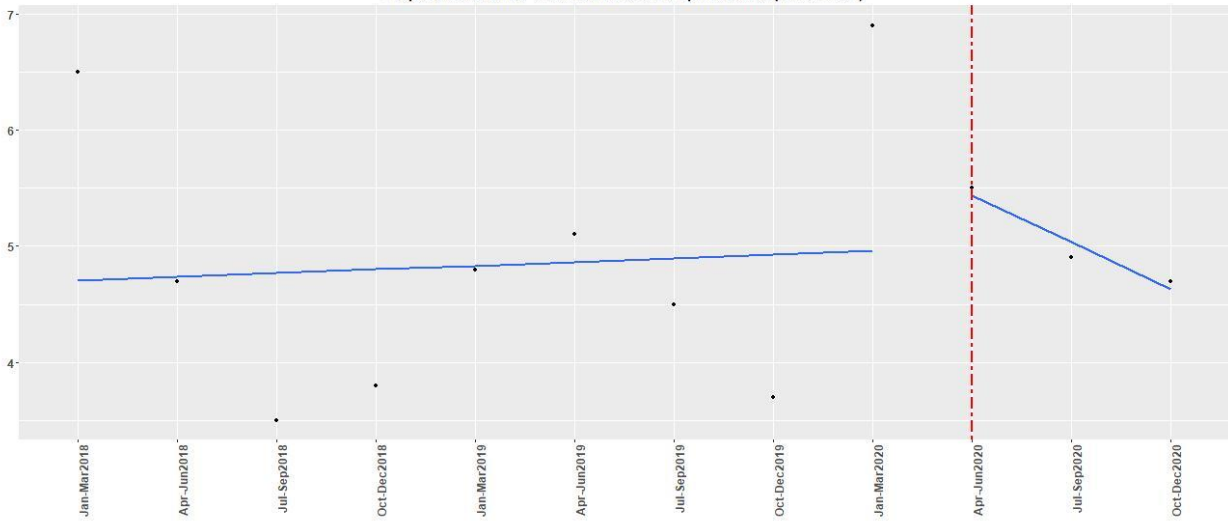
**Proportion of Under 5 Children treated for diarrhoea (South East)**



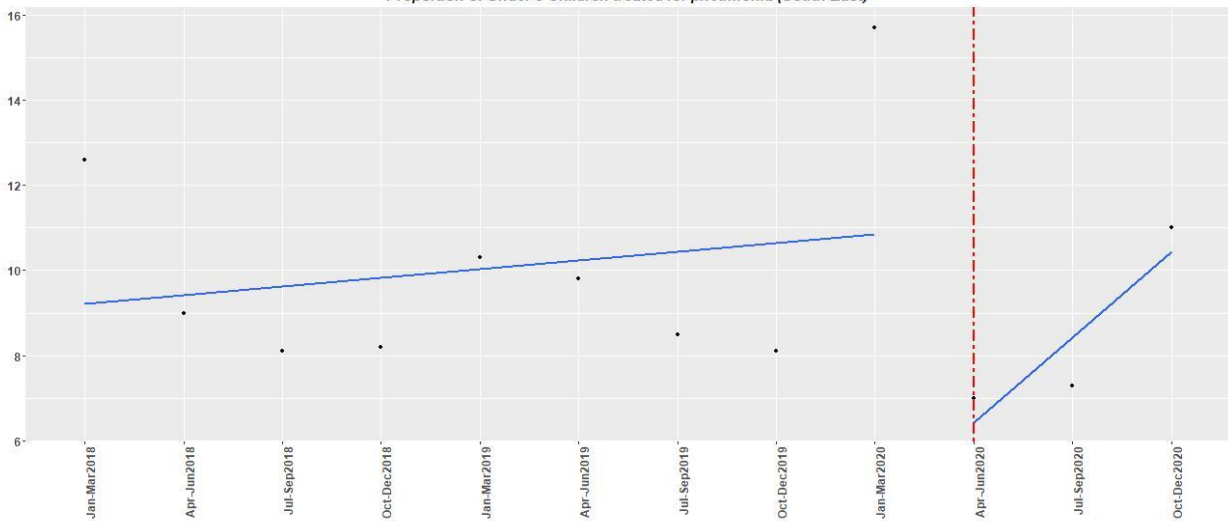
**Proportion of Under 1 Diarrhoea cases treated (South East)**



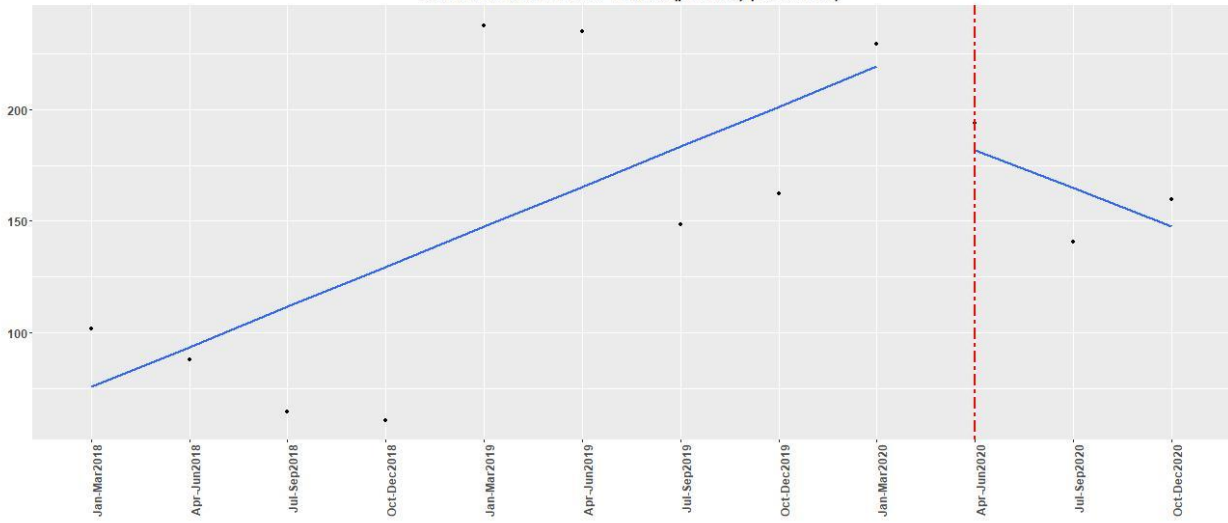
**Proportion of Under 1 Children treated for pneumonia (South East)**



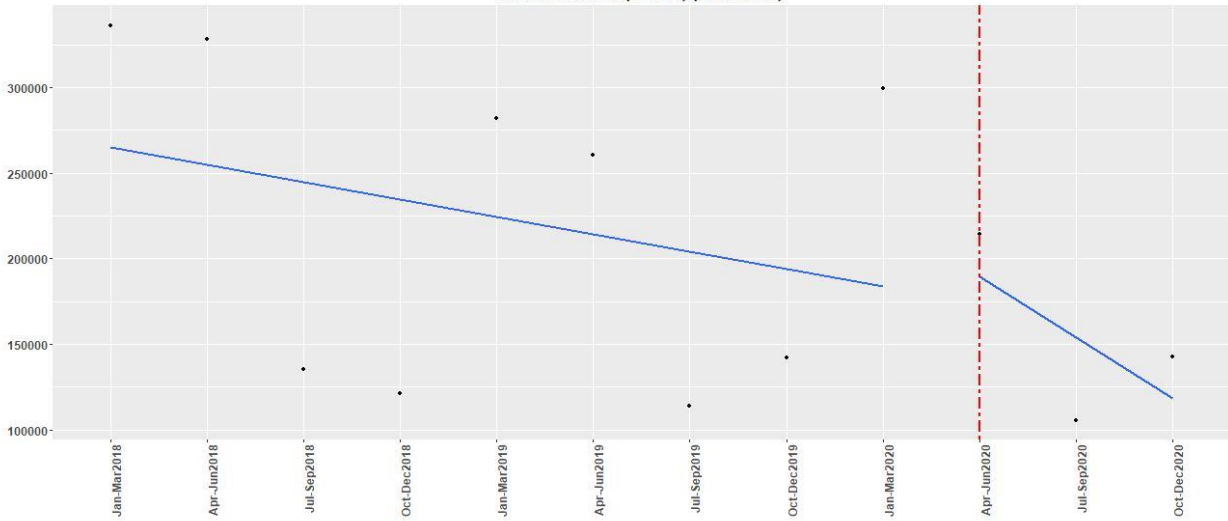
**Proportion of Under 5 Children treated for pneumonia (South East)**



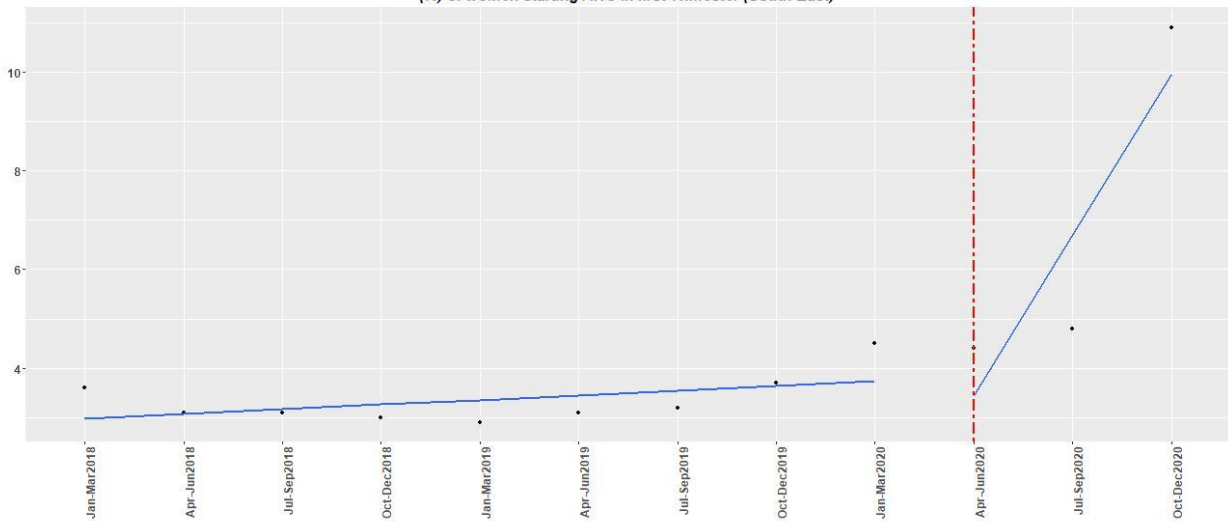
**Confirmed Malaria Cases <5 Years (per 1000) (South East)**



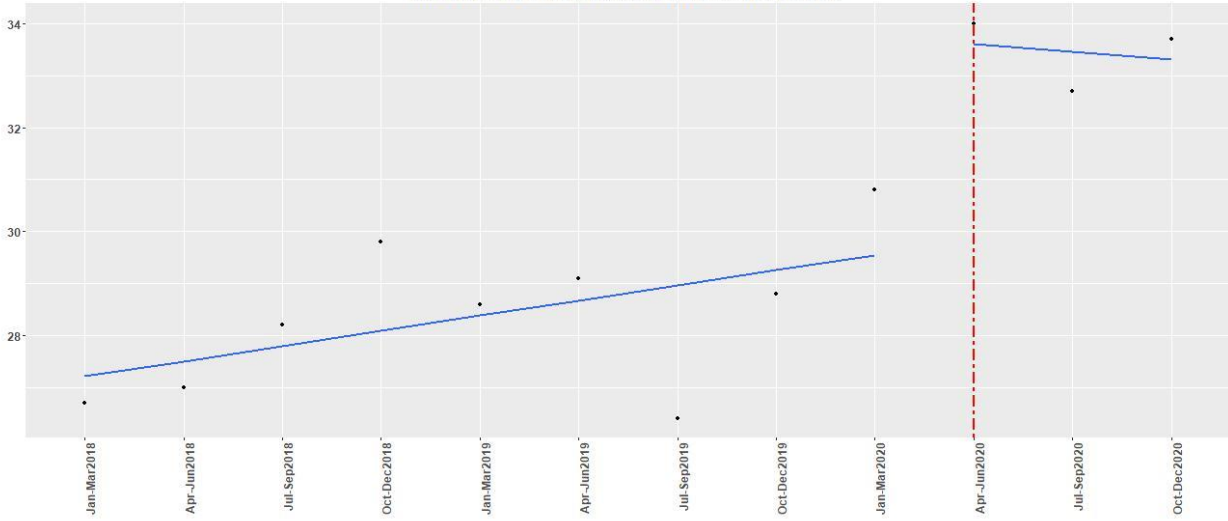
**Malaria Cases <5 (Malaria) (South East)**



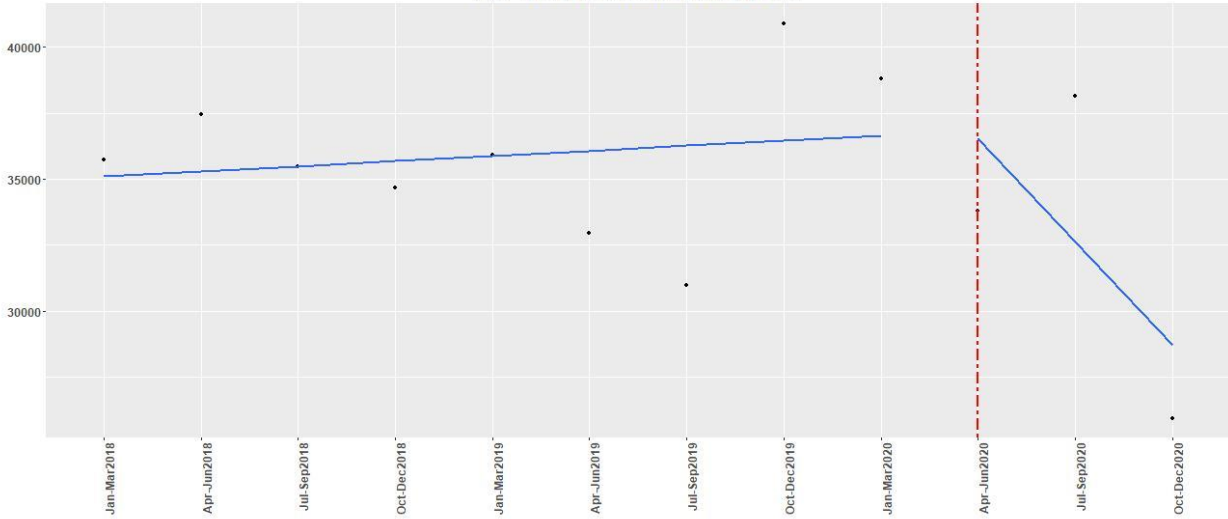
**(%) of women starting ANC in first Trimester (South East)**



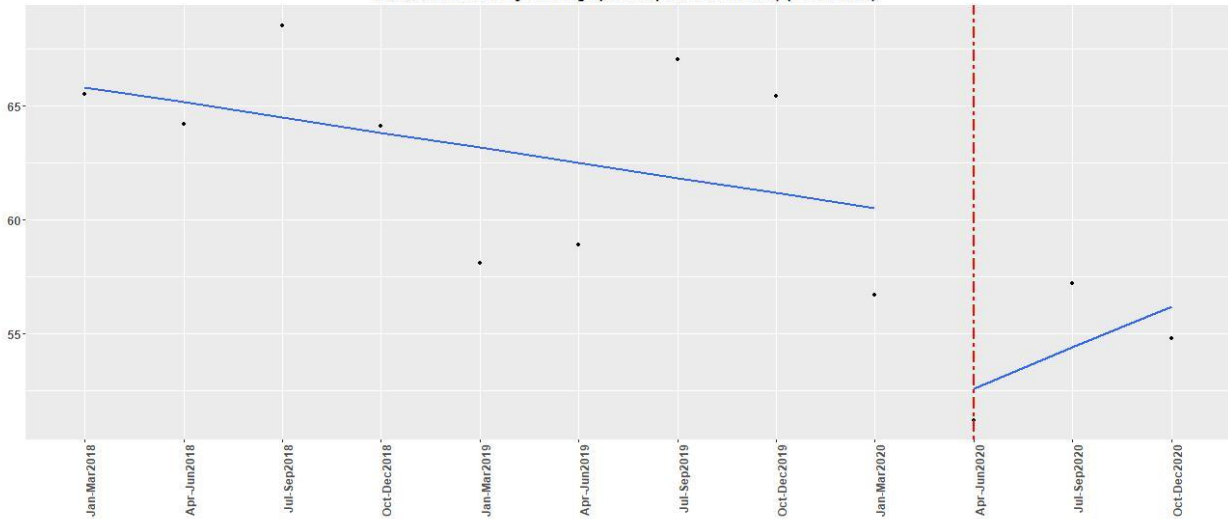
**(%) of Women completing at least 4 ANC Visits (South East)**



**ANC - women tested for syphilis (South East)**

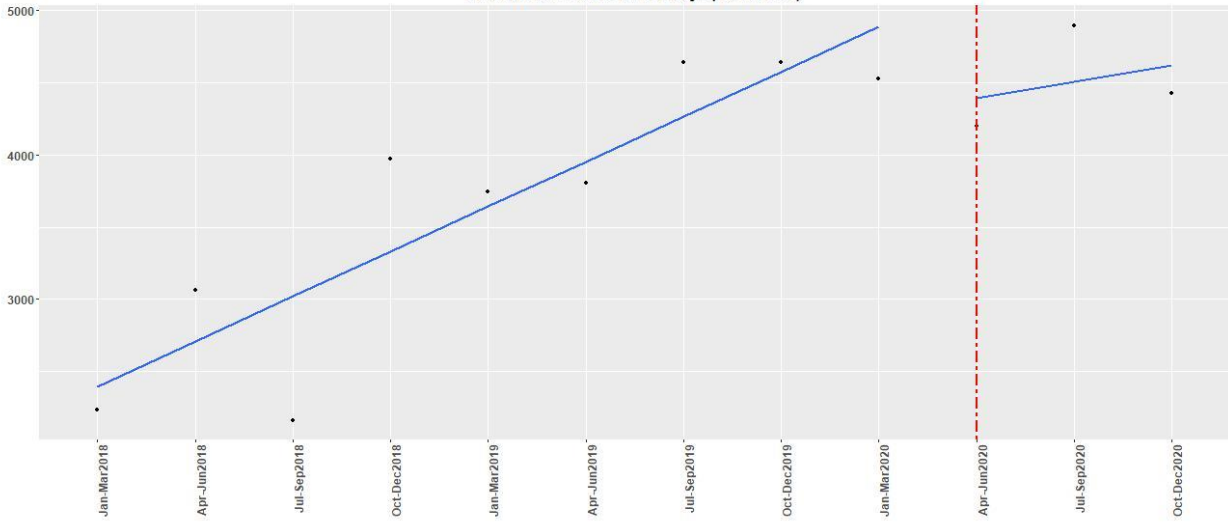


**Institutional delivery coverage (% of expected deliveries) (South East)**

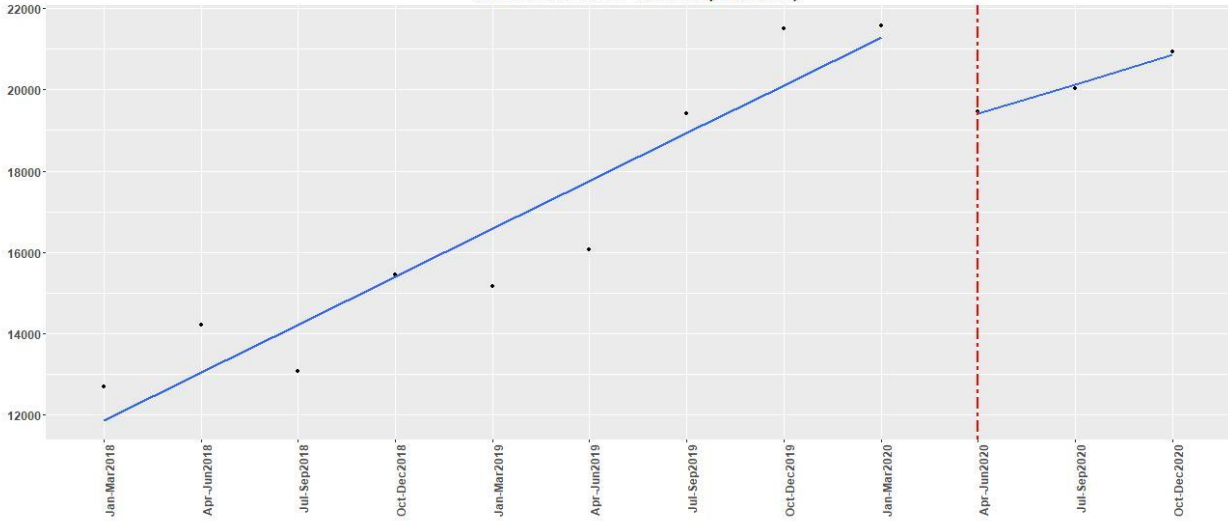




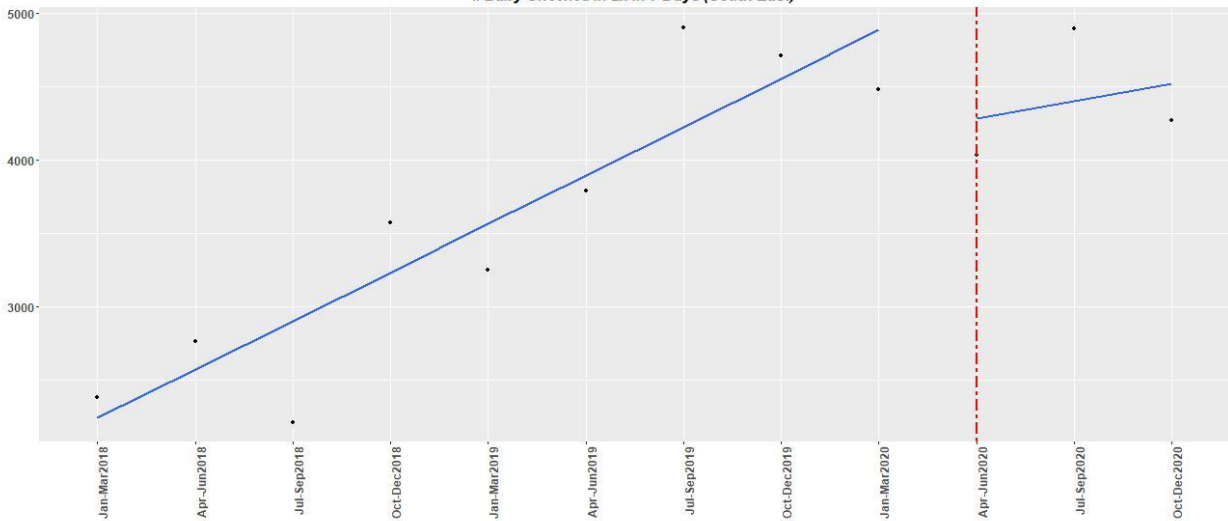
# Mother Checked in 2x in 7 Days (South East)



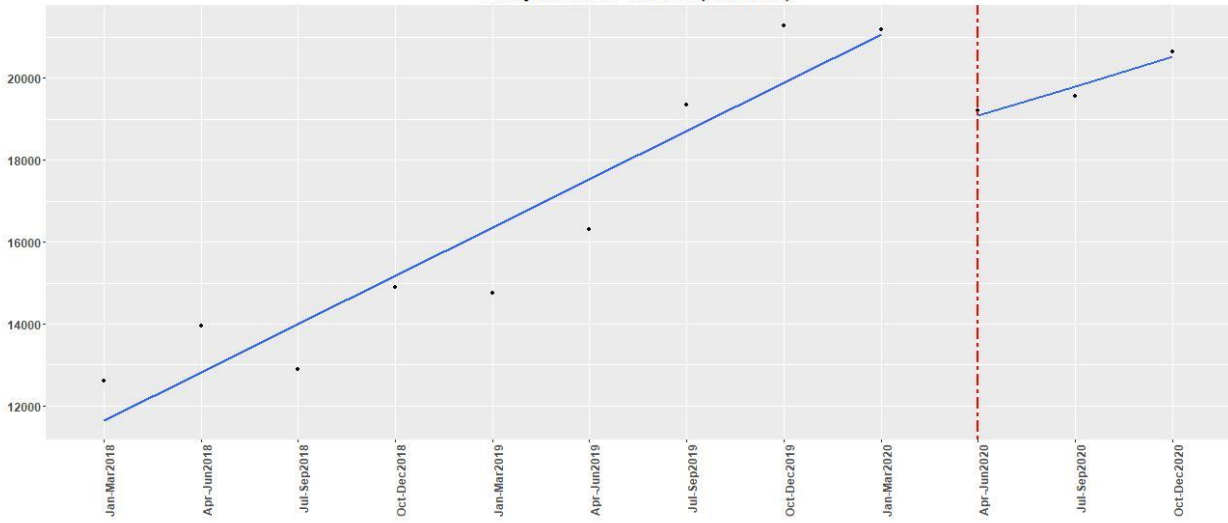
# Mother Checked in <48 Hours (South East)



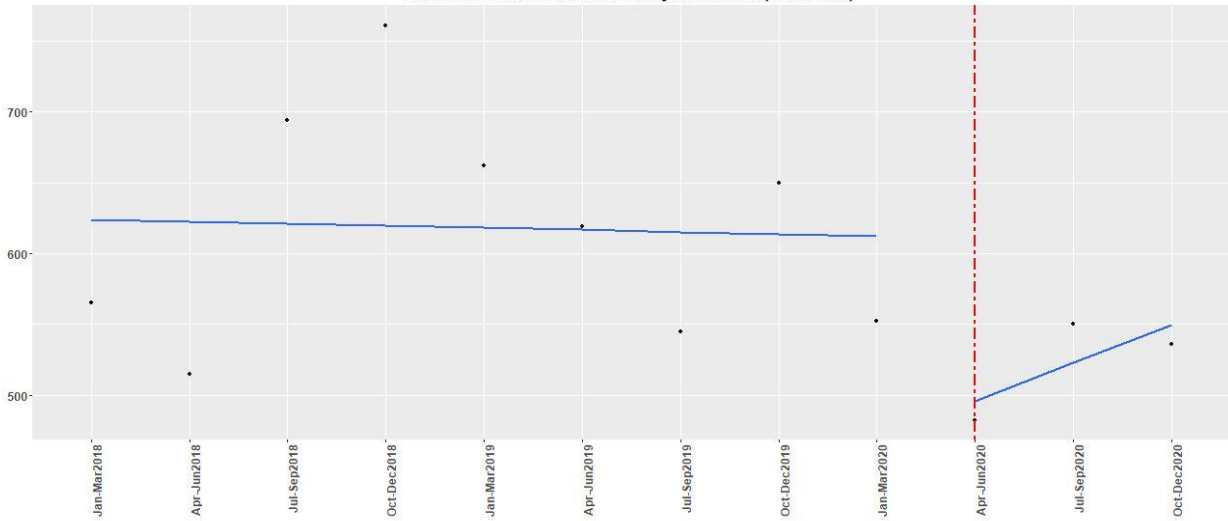
# Baby Checked in 2x in 7 Days (South East)



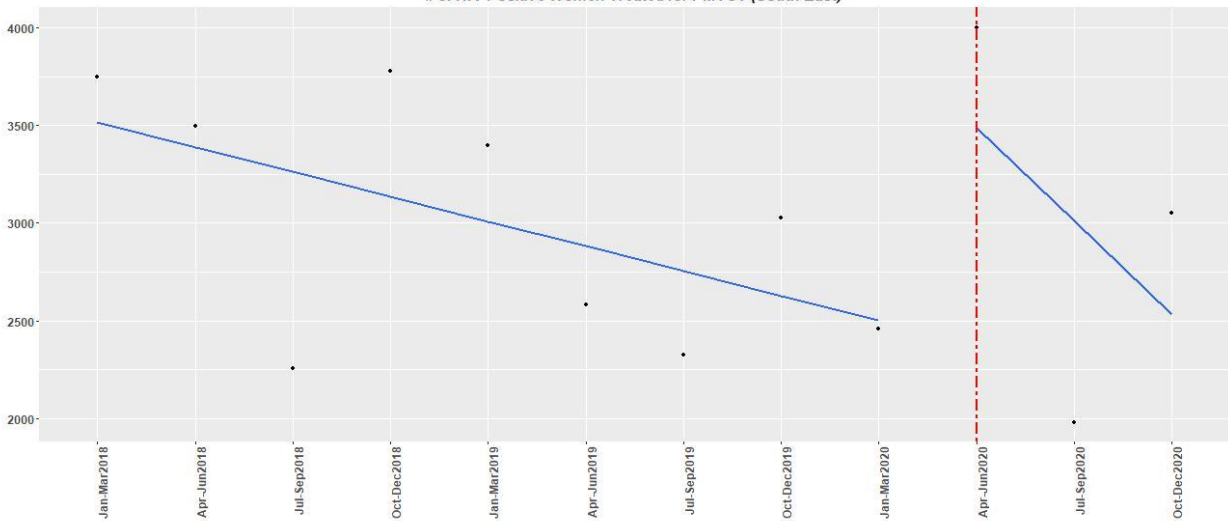
# Baby Checked in <48 Hours (South East)



Number of babies initiated on facility-based KMC (South East)

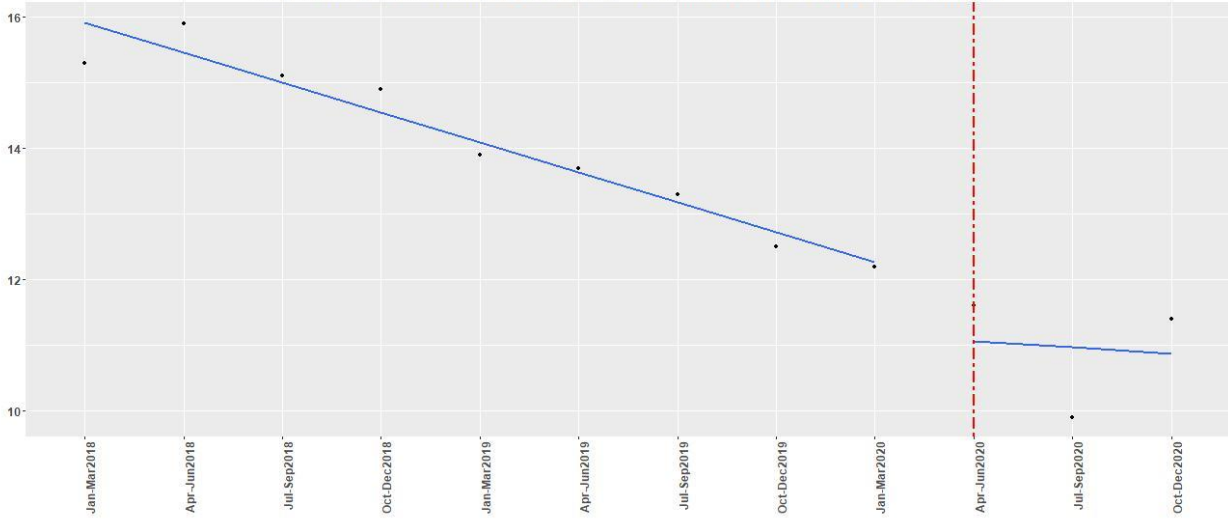


# of HIV Positive Women Treated for PMTCT (South East)

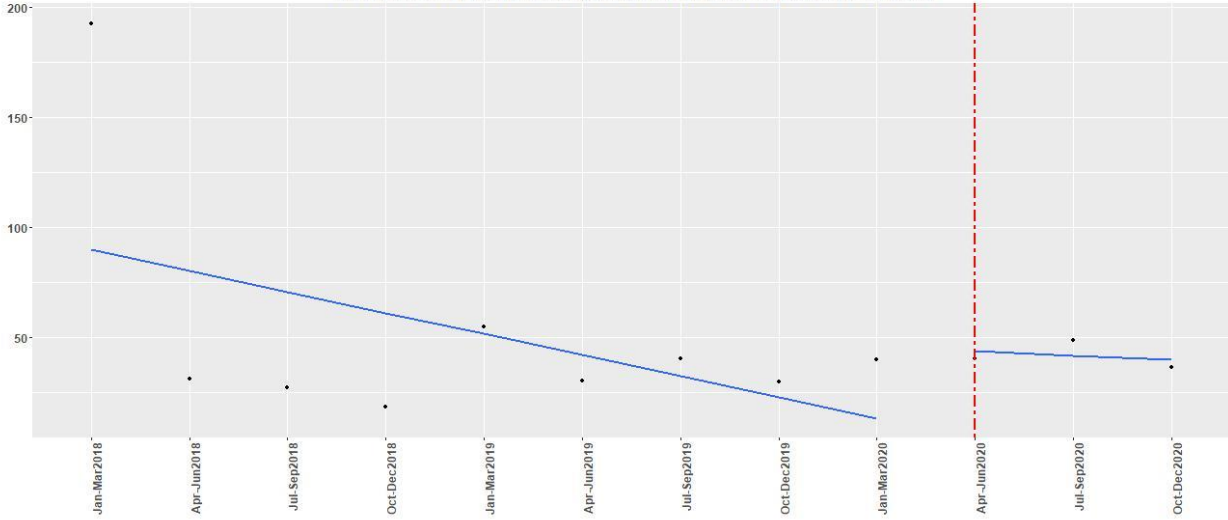


# SOUTH WEST ZONE

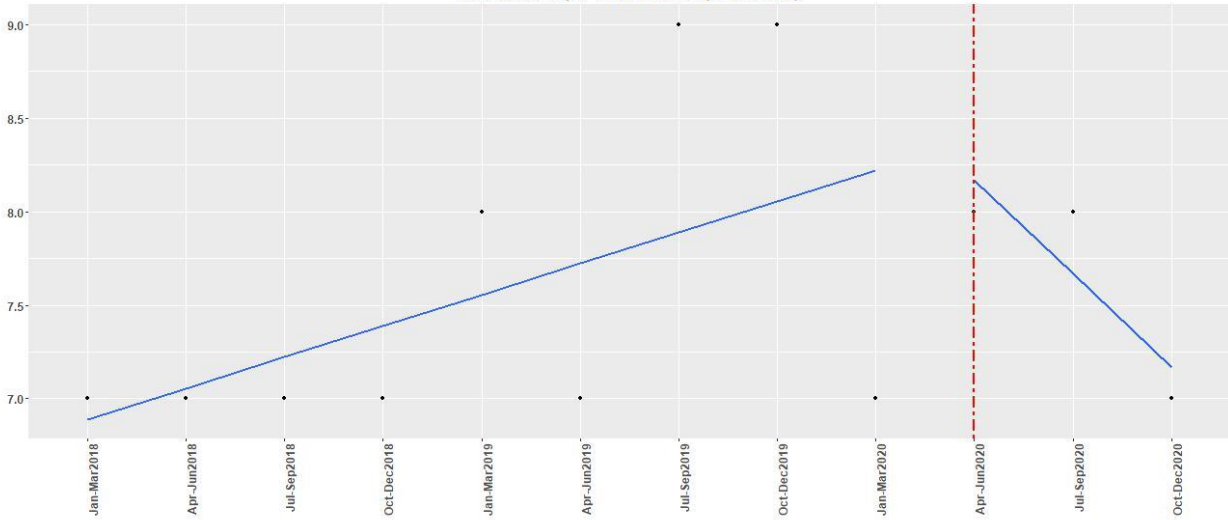
*Proportion of women delivering who were administered immediate postpartum uterotonic (South West)*



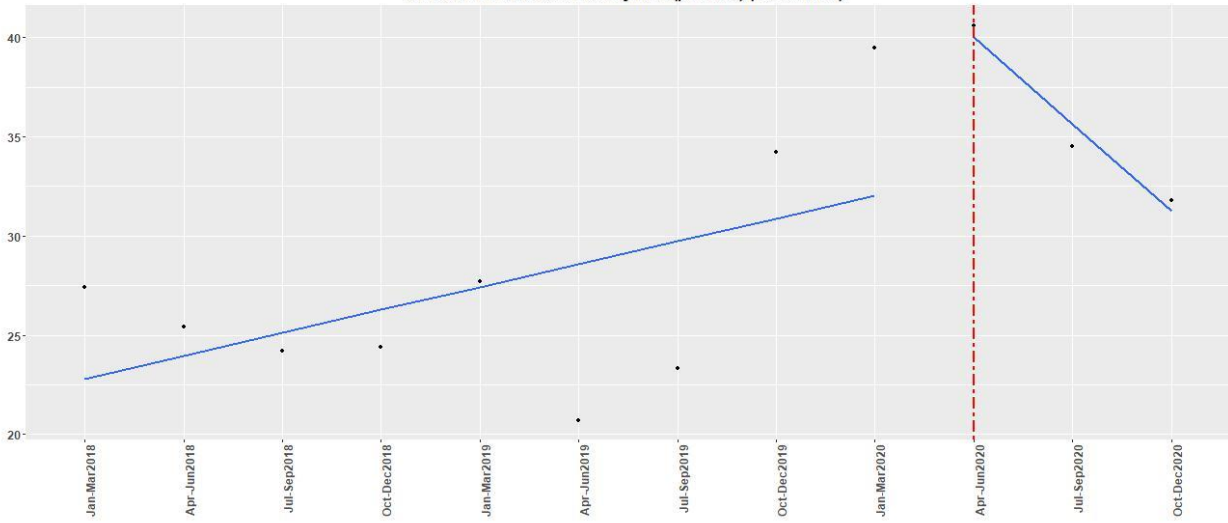
*(%) of mothers who had pre-eclampsia who received anticonvulsants (South West)*



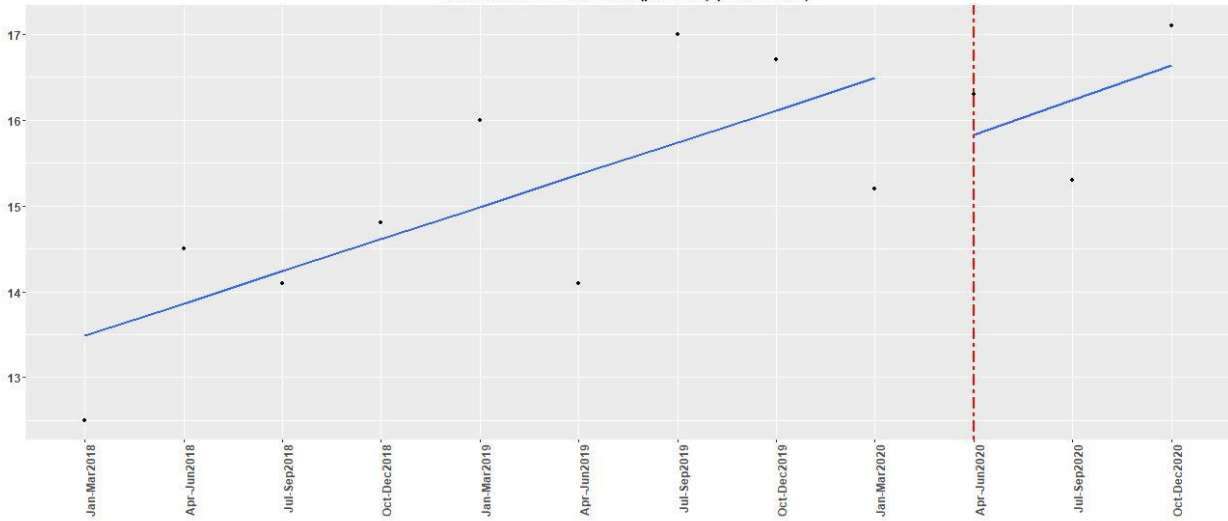
*Fresh stillbirth per 1000 deliveries (South West)*



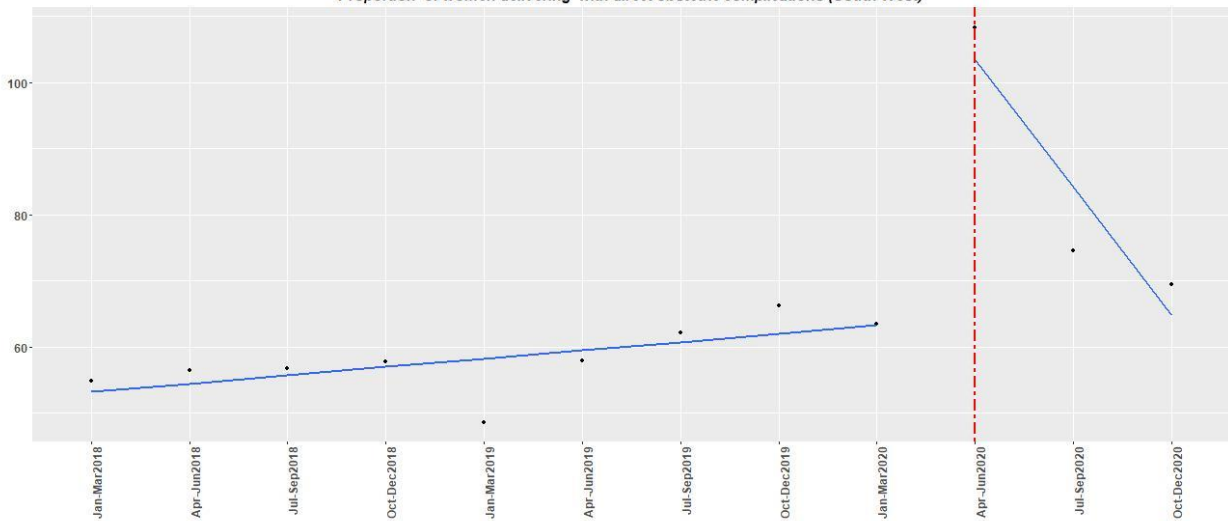
**Institutional Neonatal Mortality Rate (per 1000) (South West)**



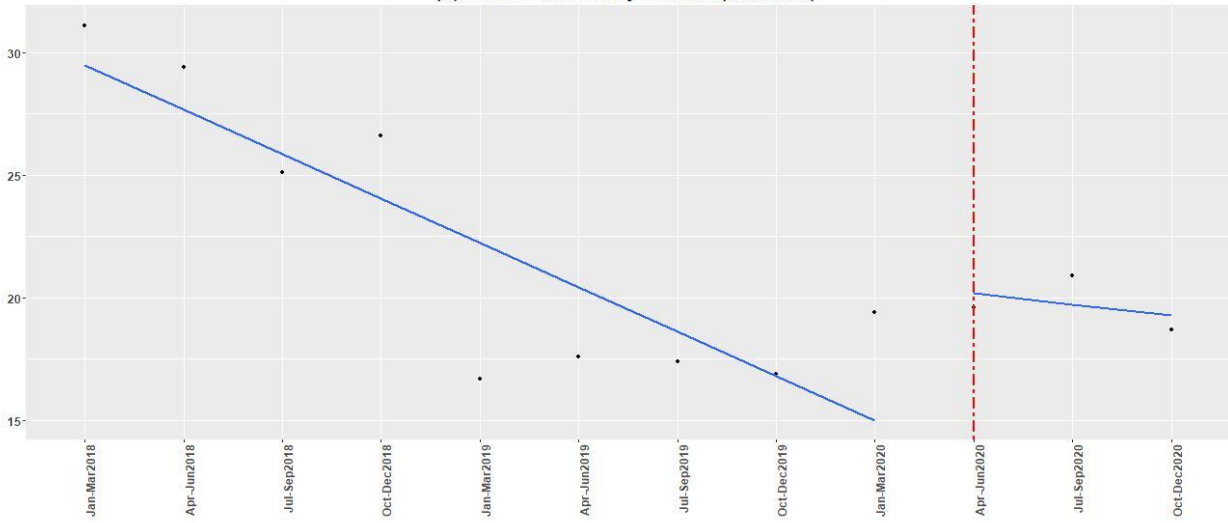
**Institutional Still Birth Rate (per 1000) (South West)**



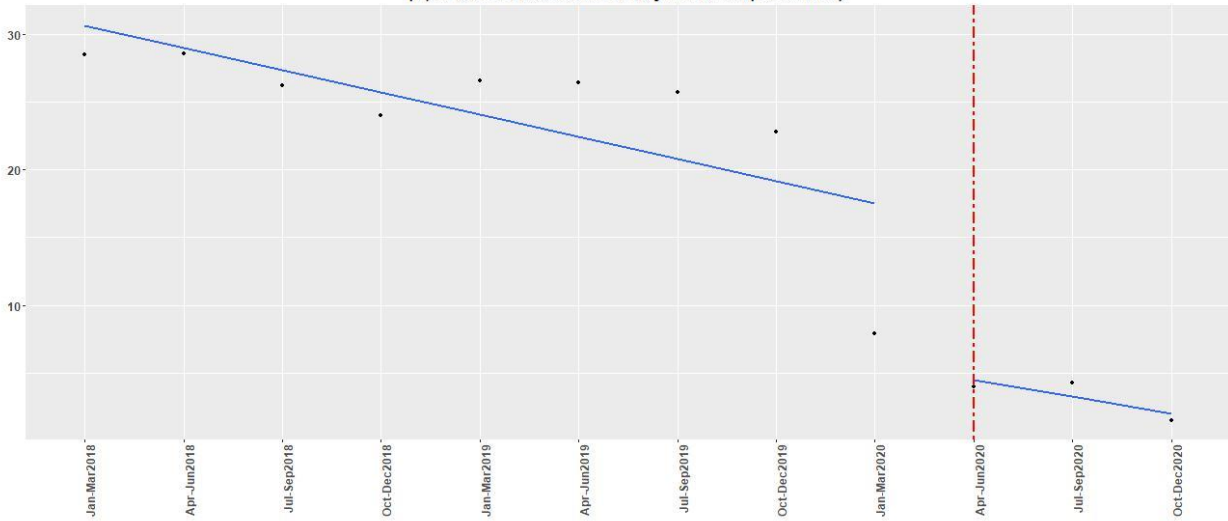
**Proportion of women delivering with direct obstetric complications (South West)**



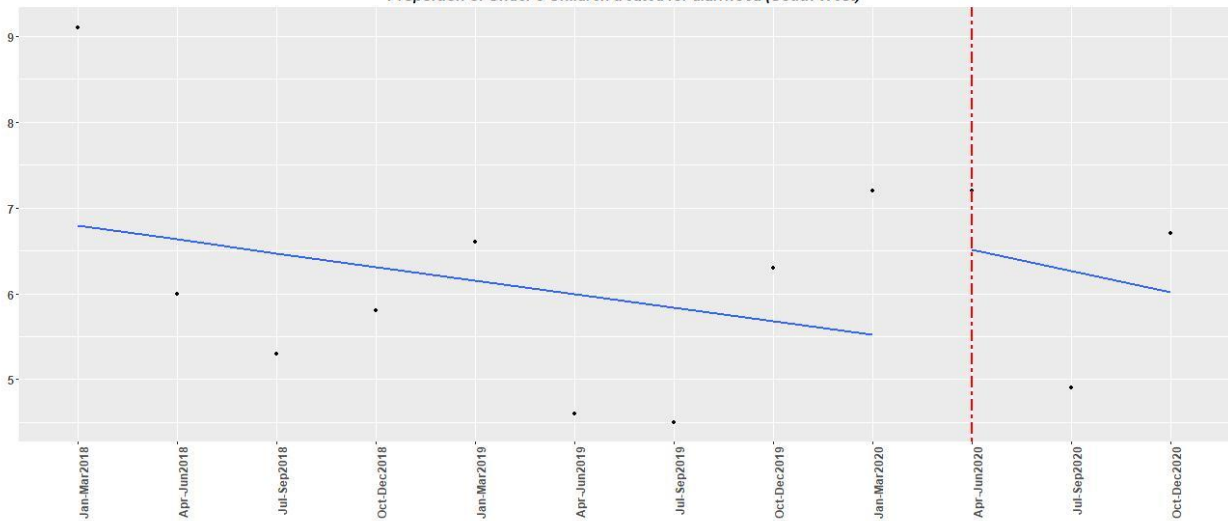
**(%) of Under 1 Children fully immunized (South West)**



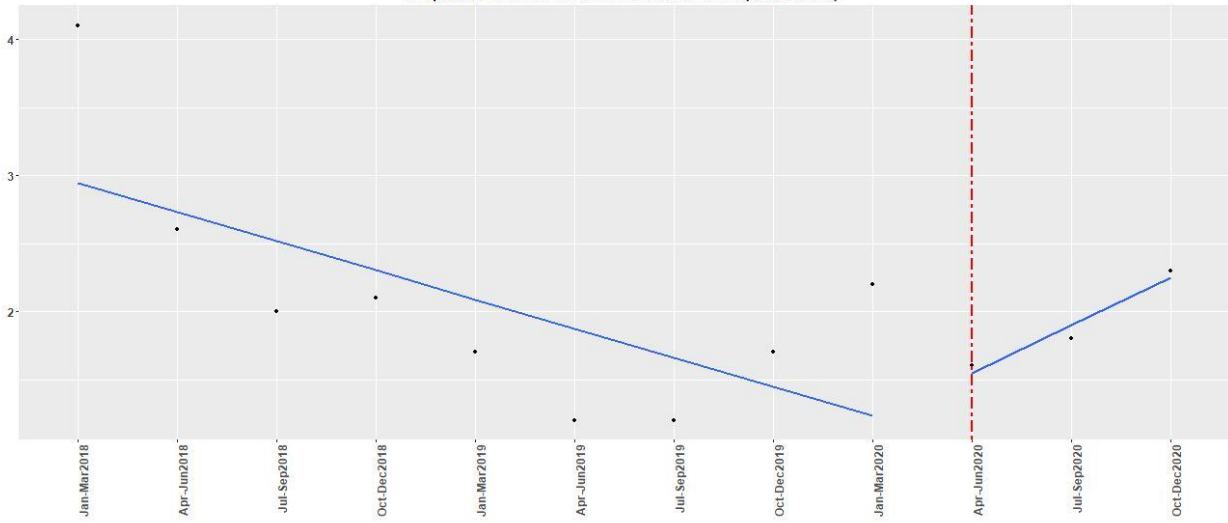
**(%) of Children that have been fully Immunized (South West)**



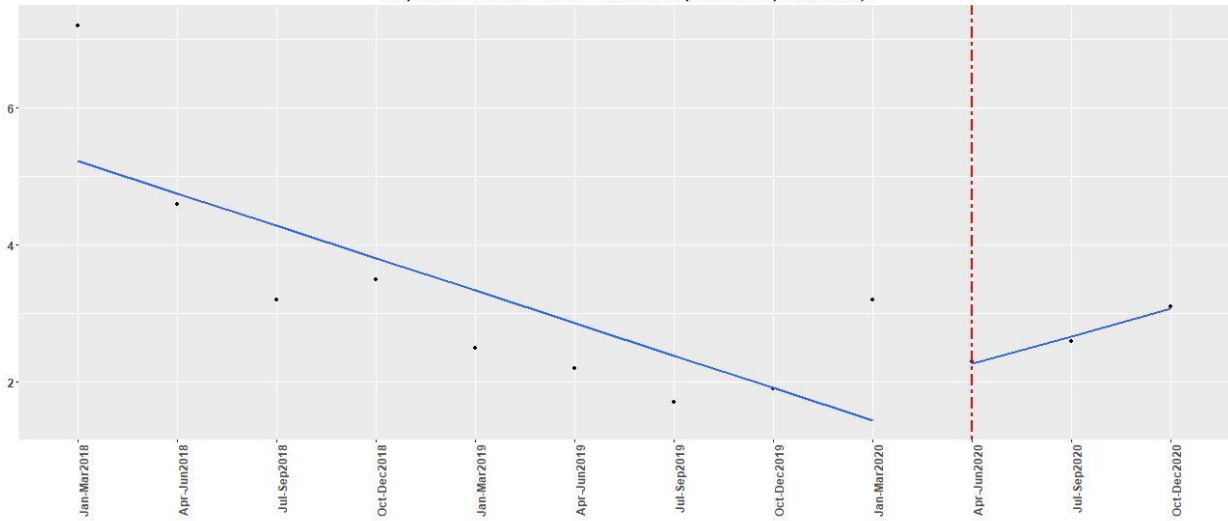
**Proportion of Under 5 Children treated for diarrhoea (South West)**



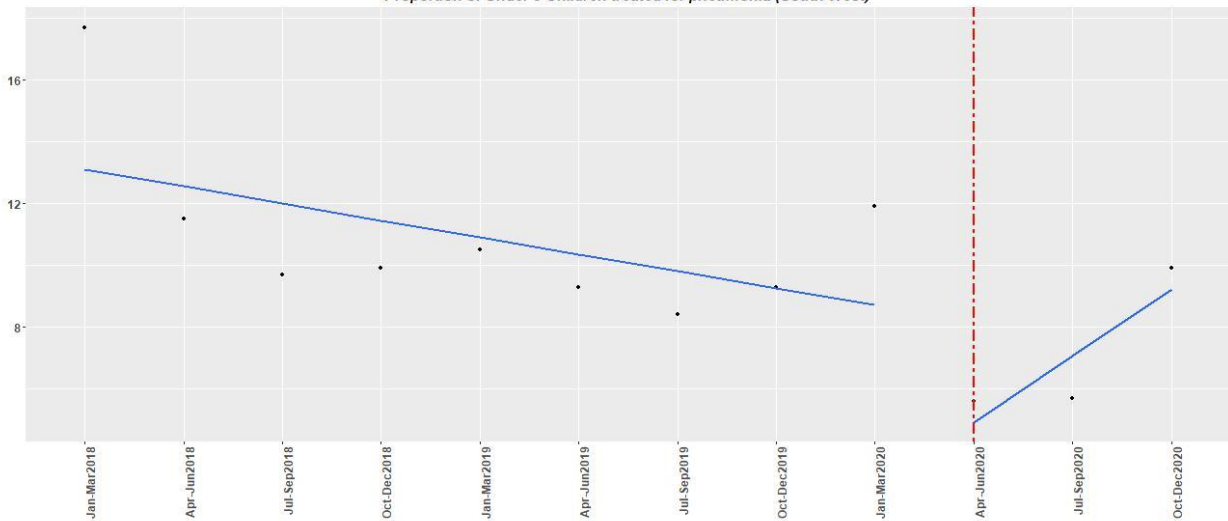
**Proportion of Under 1 Diarrhoea cases treated (South West)**



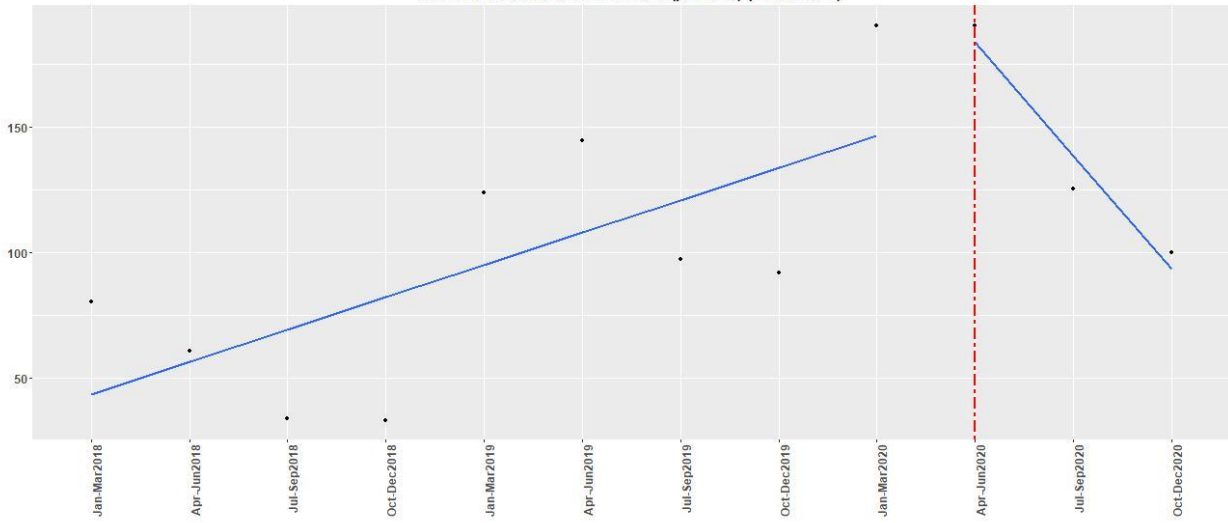
**Proportion of Under 1 Children treated for pneumonia (South West)**



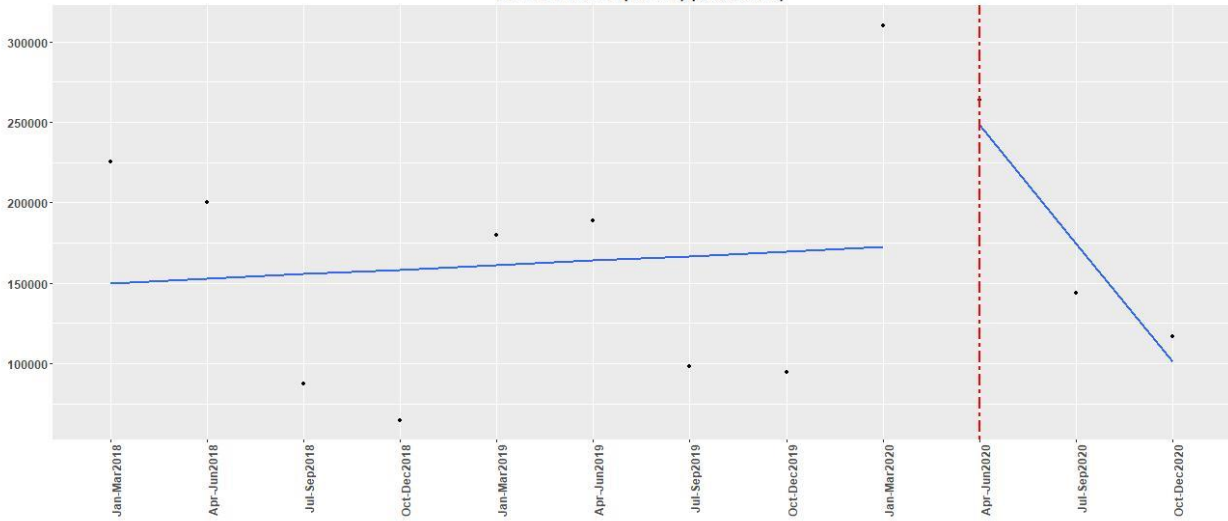
**Proportion of Under 5 Children treated for pneumonia (South West)**



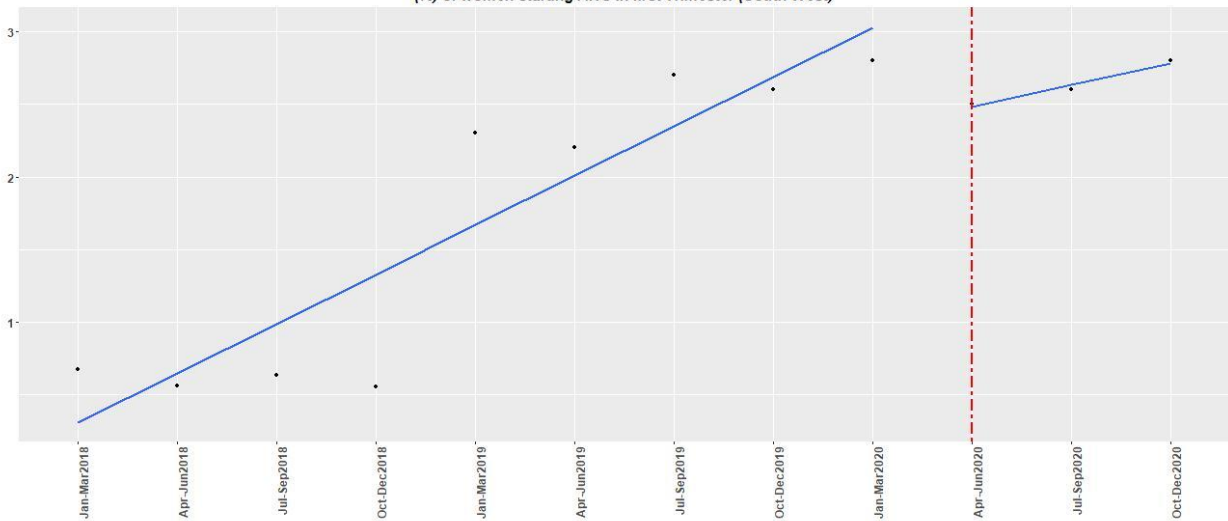
**Confirmed Malaria Cases <5 Years (per 1000) (South West)**



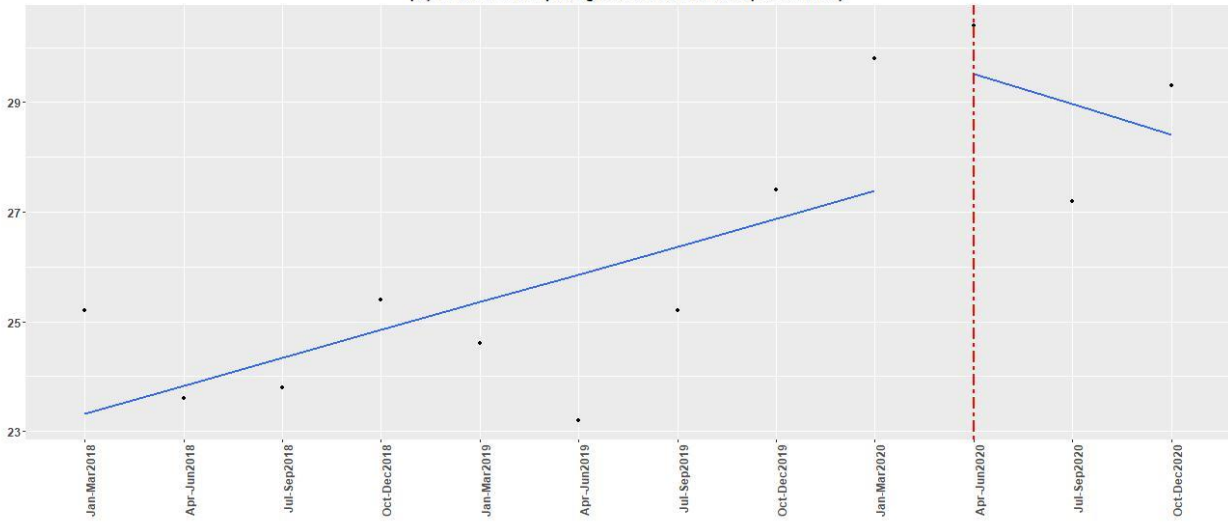
**Malaria Cases <5 (Malaria) (South West)**



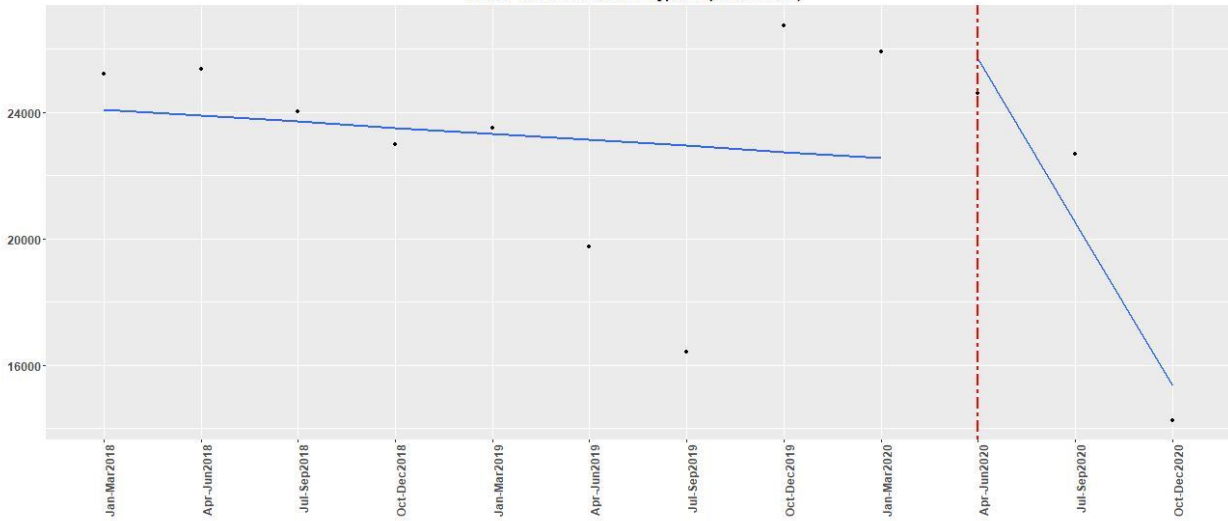
**(%) of women starting ANC in first Trimester (South West)**



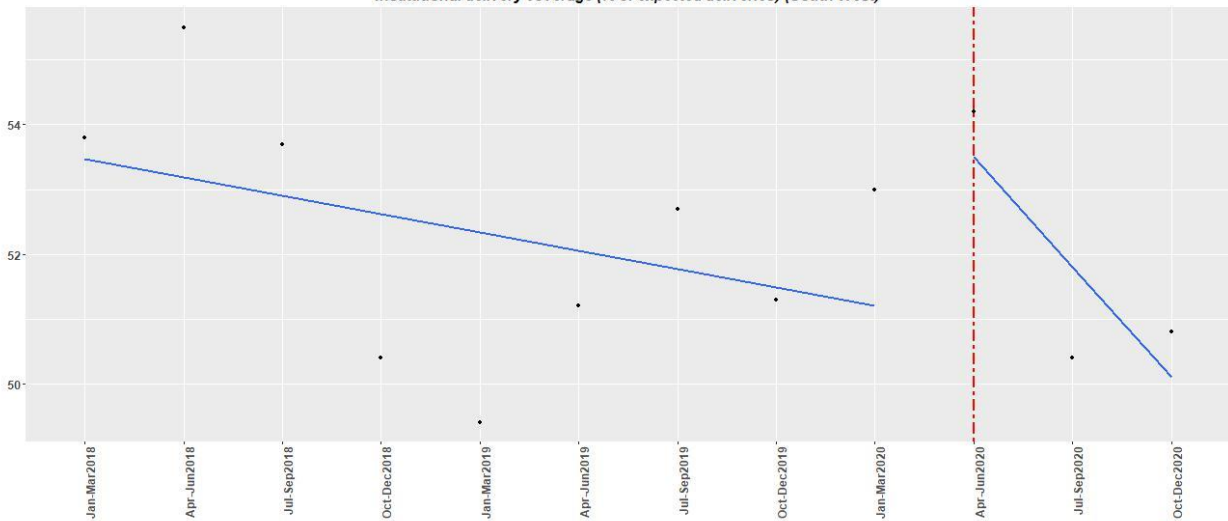
**(%) of Women completing at least 4 ANC Visits (South West)**



**ANC - women tested for syphilis (South West)**

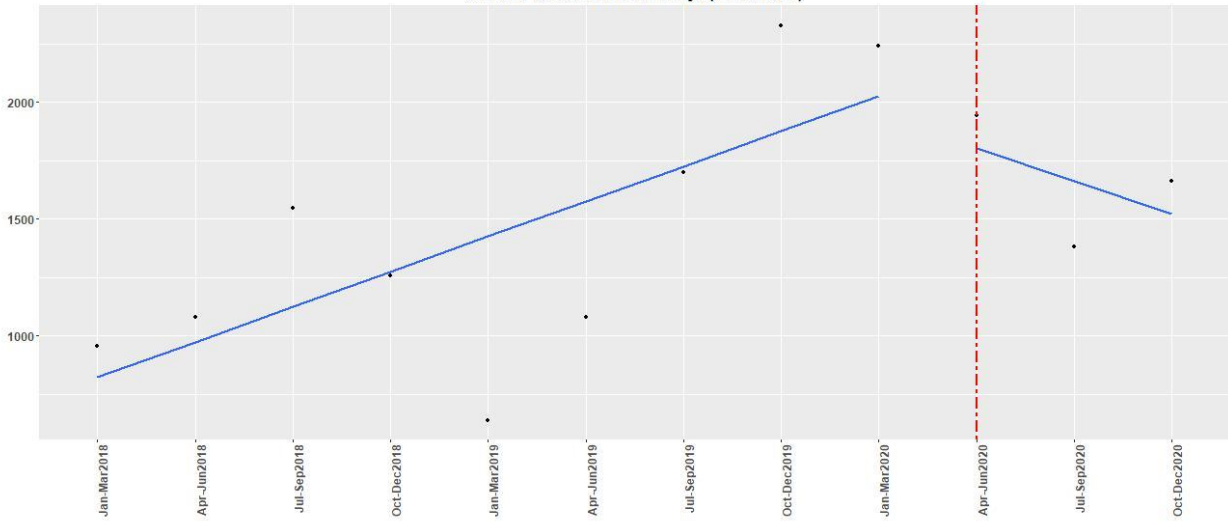


**Institutional delivery coverage (% of expected deliveries) (South West)**

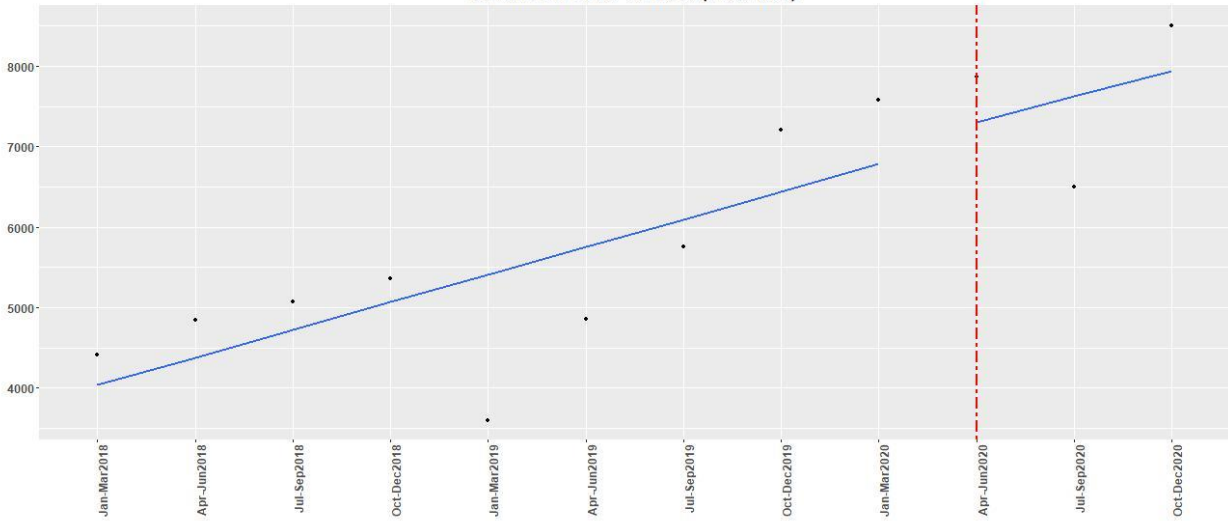




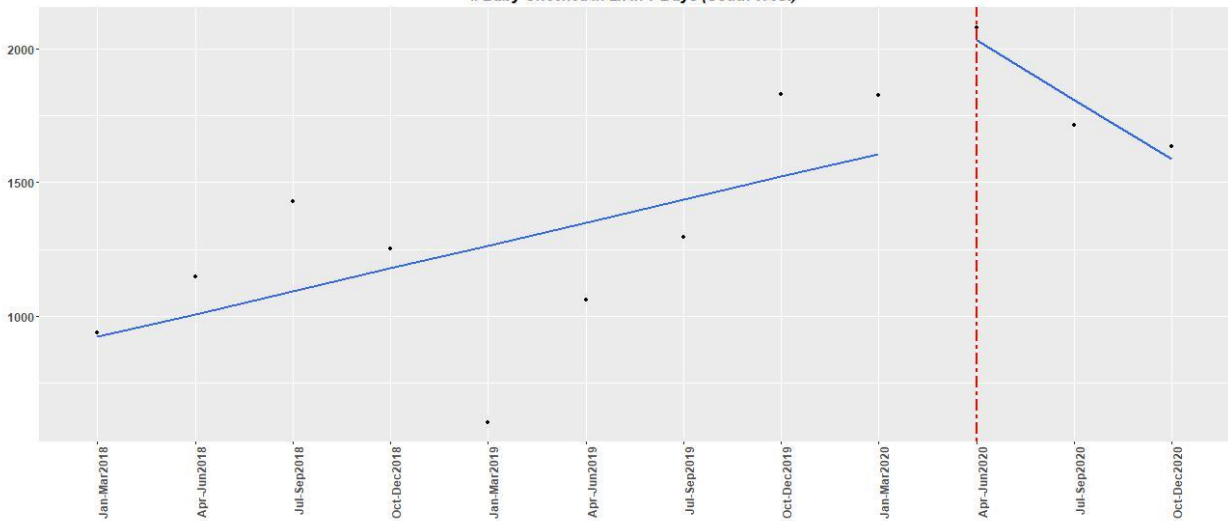
# Mother Checked in 2x in 7 Days (South West)



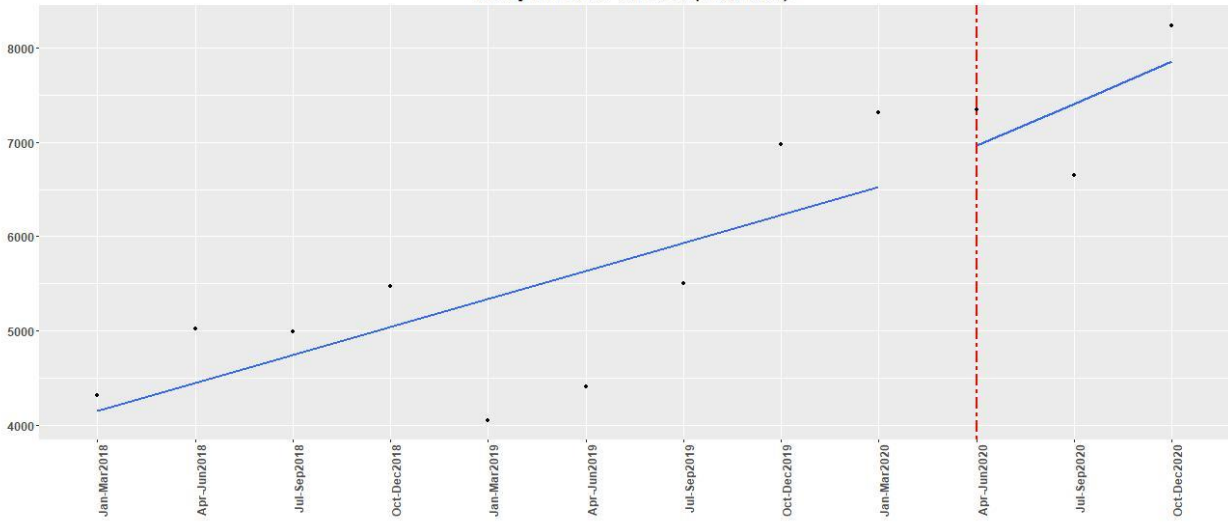
# Mother Checked in <48 Hours (South West)



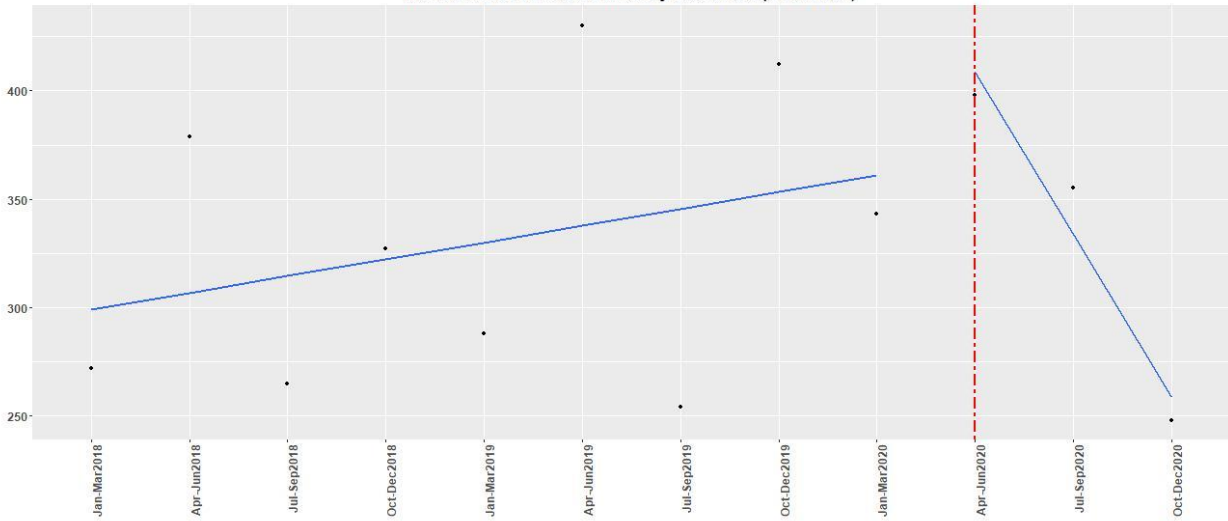
# Baby Checked in 2x in 7 Days (South West)



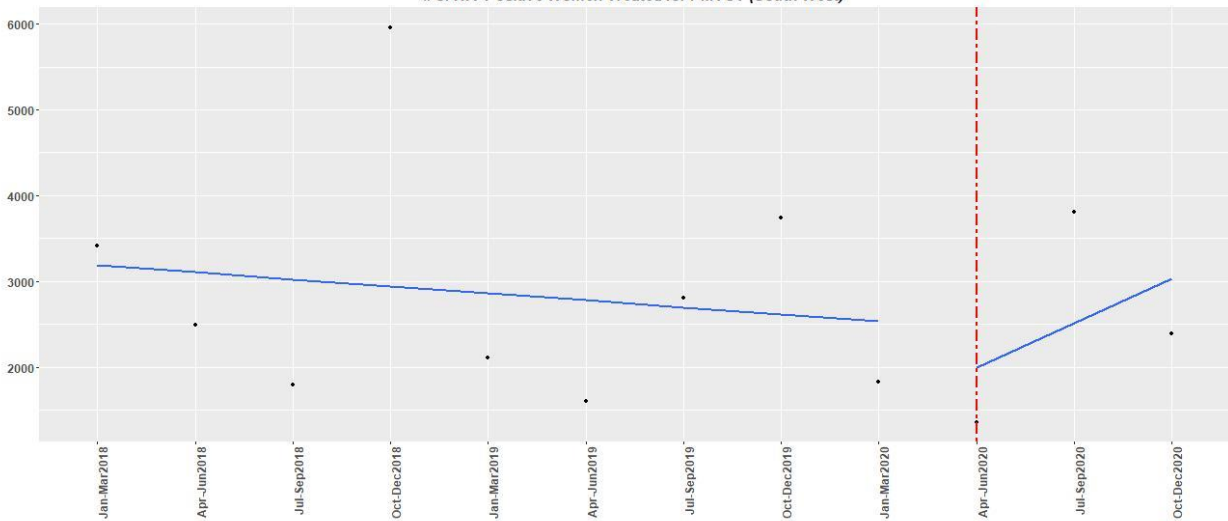
# Baby Checked in <48 Hours (South West)



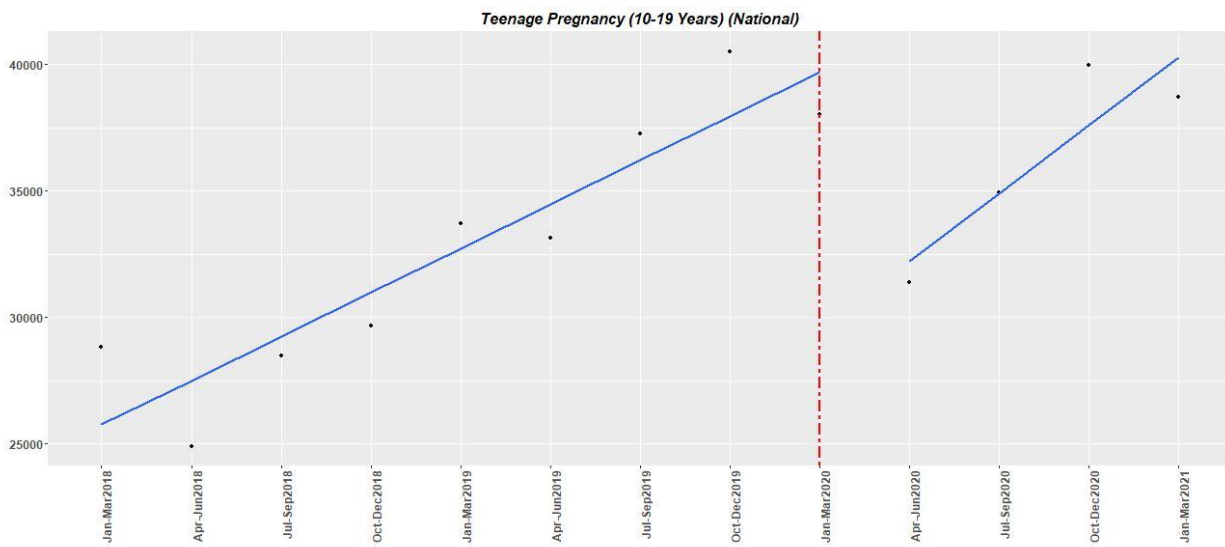
Number of babies initiated on facility-based KMC (South West)



# of HIV Positive Women Treated for PMTCT (South West)



## NATIONAL



Kruskal–Wallis P Value = 0.217

There was an increase in adolescent pregnancies after April 2020.

Aveg: Jan 2018 – March 2020 = 32723

Aveg: Apr 2020 – March 2021 = 36244

For every child  
Whoever she is.  
Wherever he lives.  
Every child deserves a childhood.  
A future.  
A fair chance.  
That's why UNICEF is there.  
For each and every child.  
Working day in and day out.  
In 190 countries and territories.  
Reaching the hardest to reach.  
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  
P.O. Box  
44145 Nairobi  
Kenya 00100  
© United Nations Children's Fund (UNICEF) December 2021