

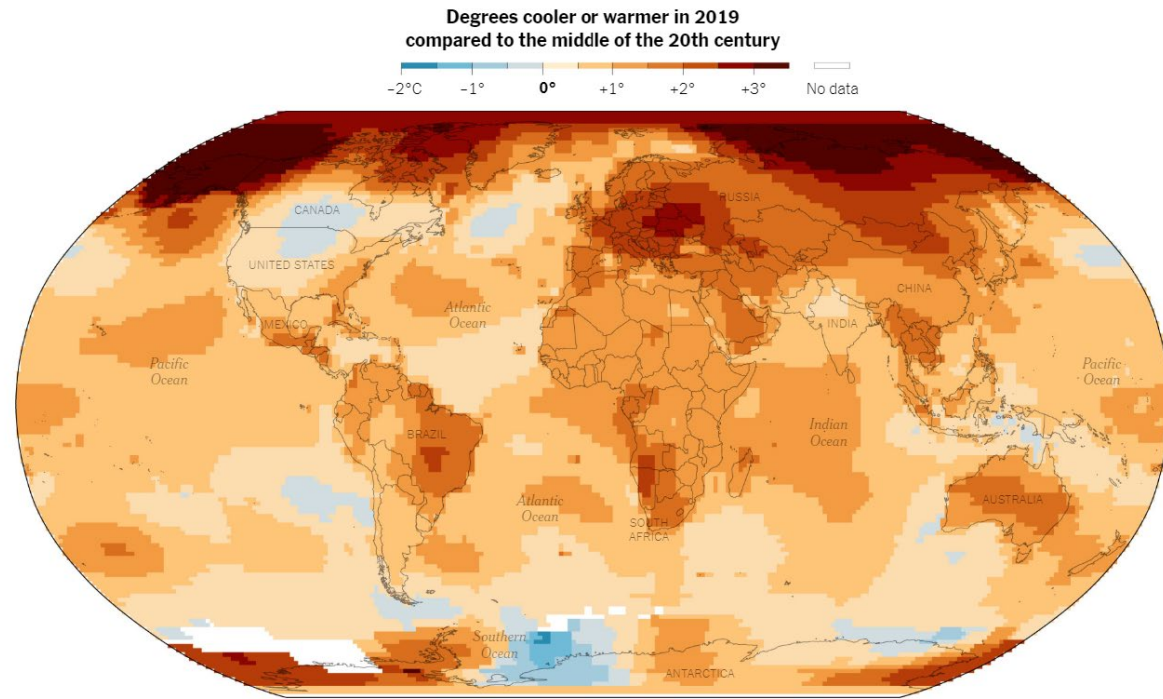


Hussein H Twabi, MBBS, MSc Epi

PhD Student University of Liverpool; Research Fellow Kamuzu University of Health Sciences

Cyclone Freddy and its impact on maternal health service utilisation: Cross-sectional analysis of data from a national maternal surveillance platform in Malawi



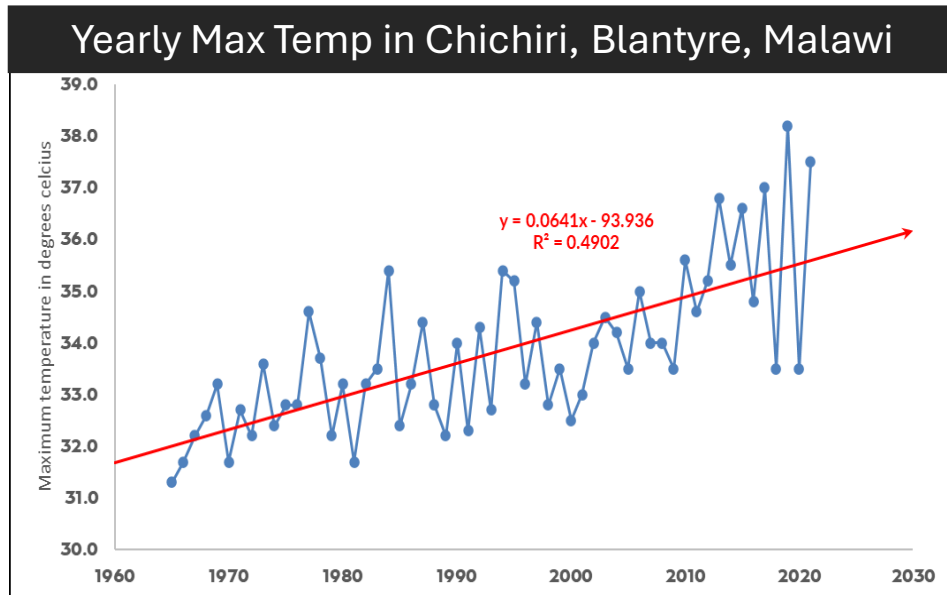


CLIMATE CHANGE IS ONE OF THE MOST PRESSING CHALLENGES OF OUR TIME!

The mean temperature rise per day globally from the 20th century to date is approximately
0.004 degrees Celsius

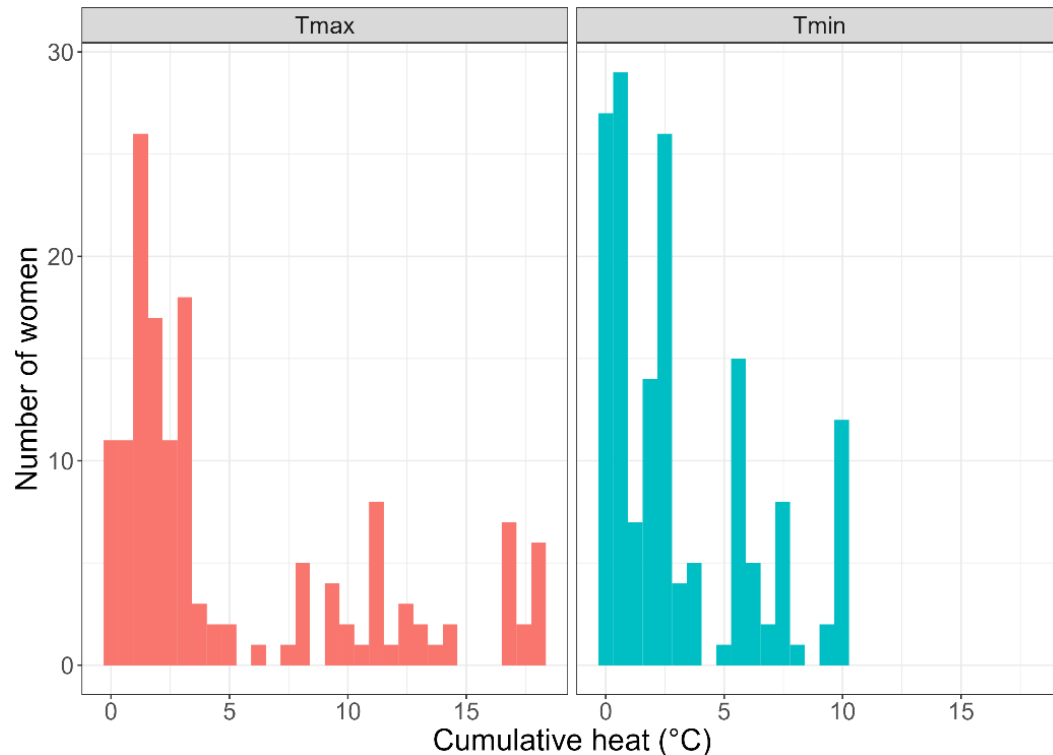
This means that the average temperature of the Earth has increased by about
0.14 degrees Celsius per decade
since 1880.

The rate of warming has accelerated in recent decades, with the average rate of increase since 1981 being more than twice as fast:
0.32 degrees Celsius per decade

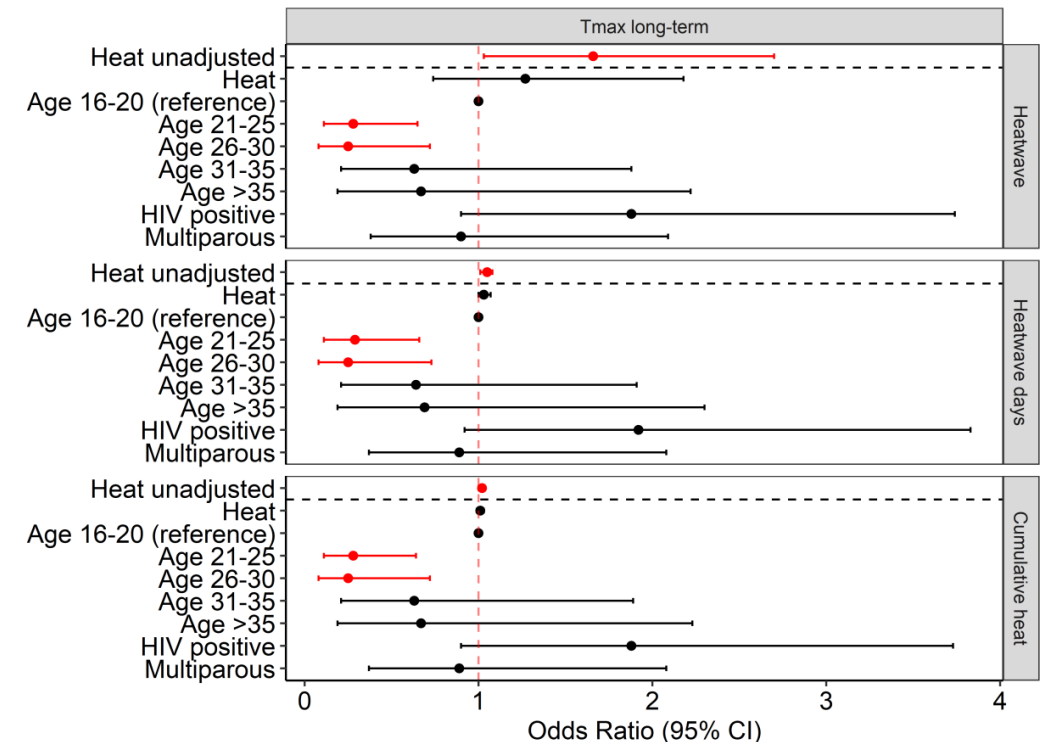


Climate Change and Maternal Health

Climate change may exacerbate the challenges faced by women in low-income settings and marginalized areas resulting in worsening of maternal health outcomes

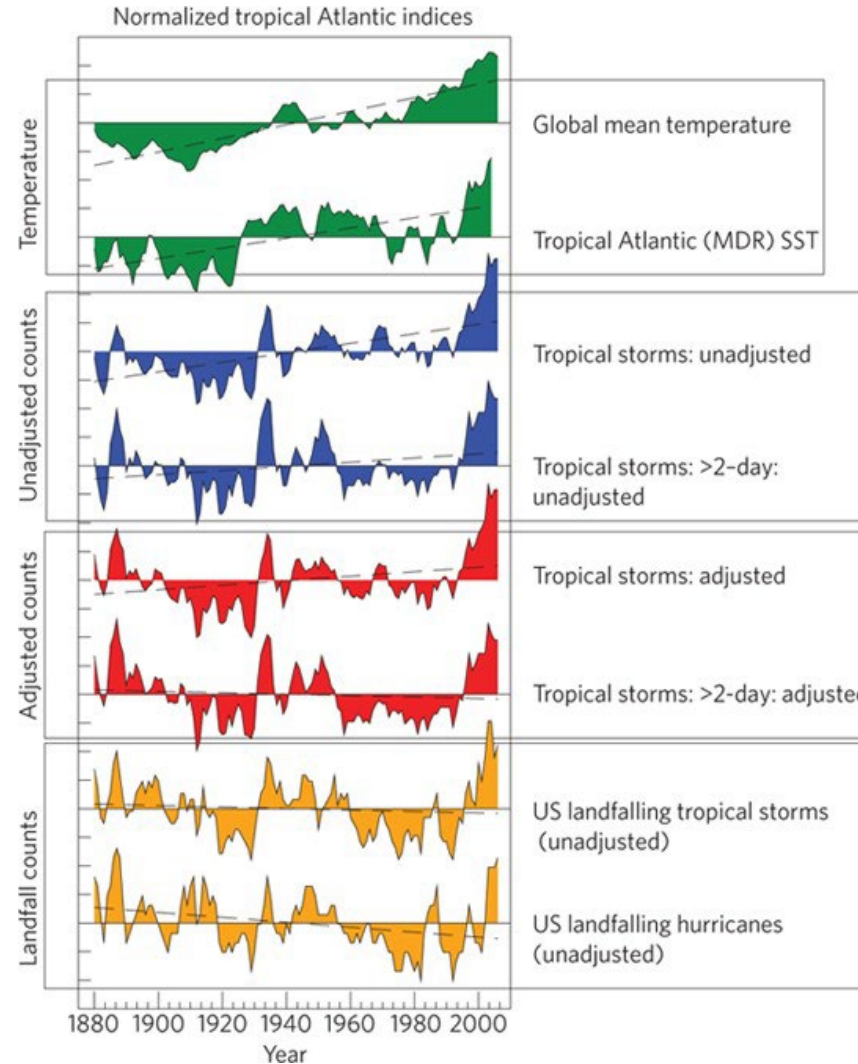
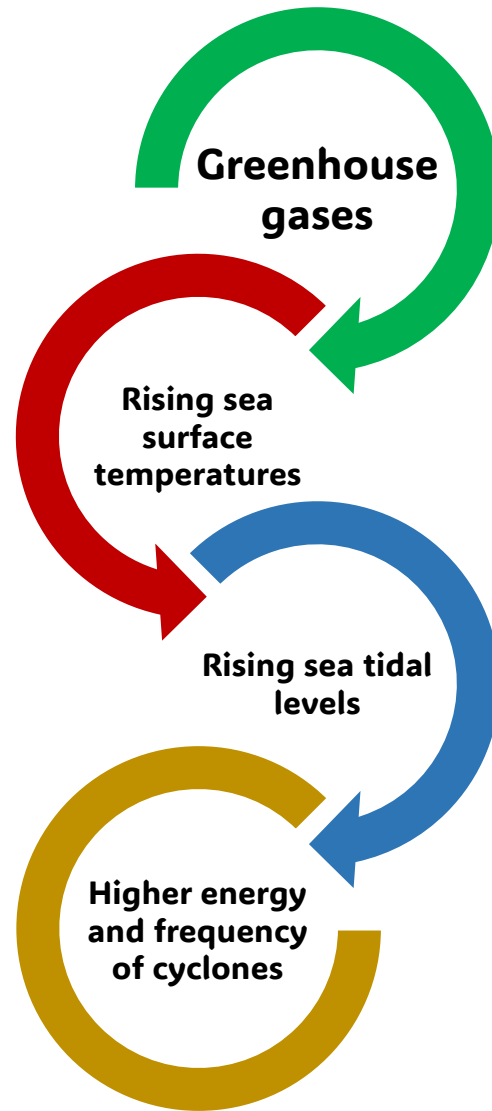


Short-term exposure of pregnant women (up to 1 week) to heat waves in Blantyre shown as cumulative heat above the **Tmax (32.1°C)** and **Tmin (20.6 °C)**



Odds of infection in pregnant women if exposed to one or more heatwaves, per heatwave day and per 1°C above the **Tmax (32.1°C)** throughout pregnancy

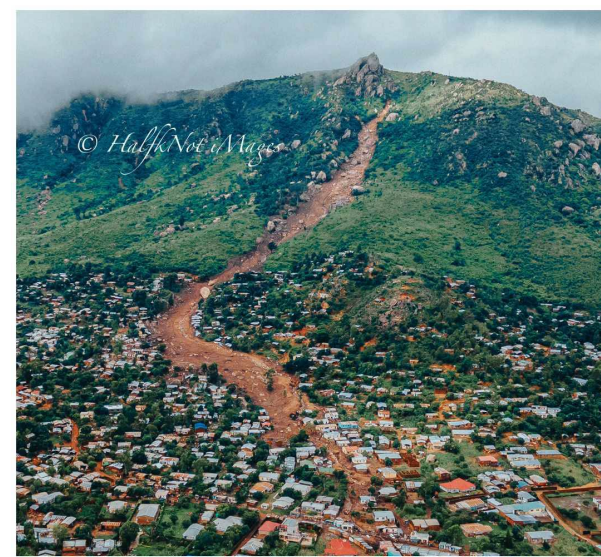
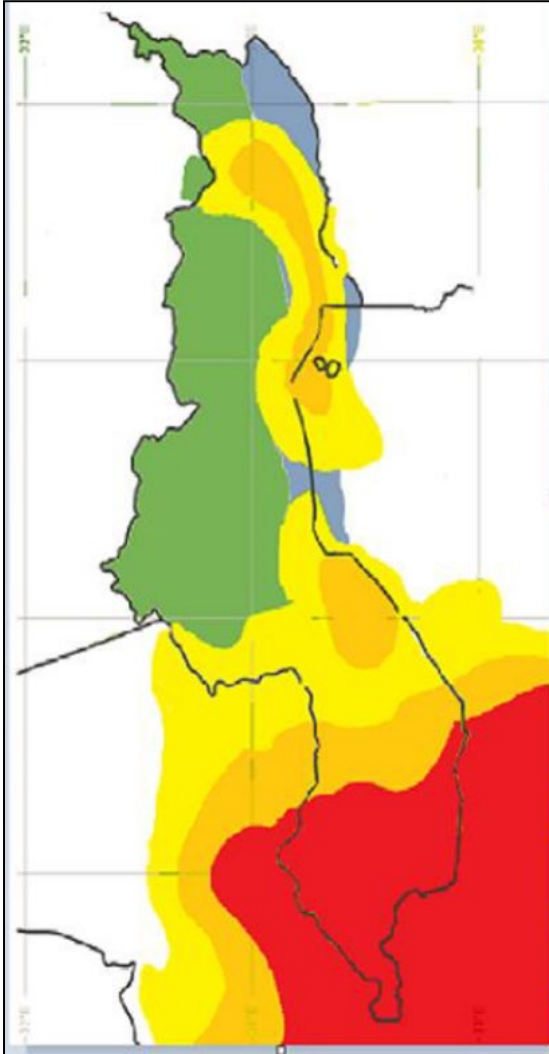
Relationship between Climate change and Cyclones



Knutson et al. 2010

Cyclone Freddy

Cyclone Freddy was the longest-lasting category 5 cyclone recorded worldwide, and its effects were first experienced in Malawi from 19 February 2023, and again from 12 March 2023

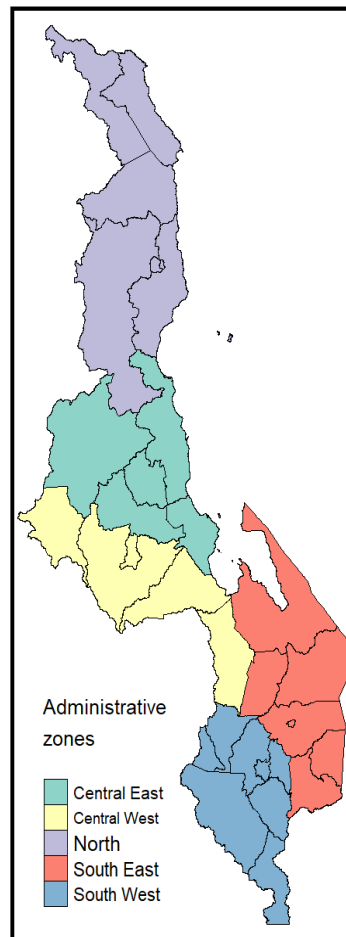
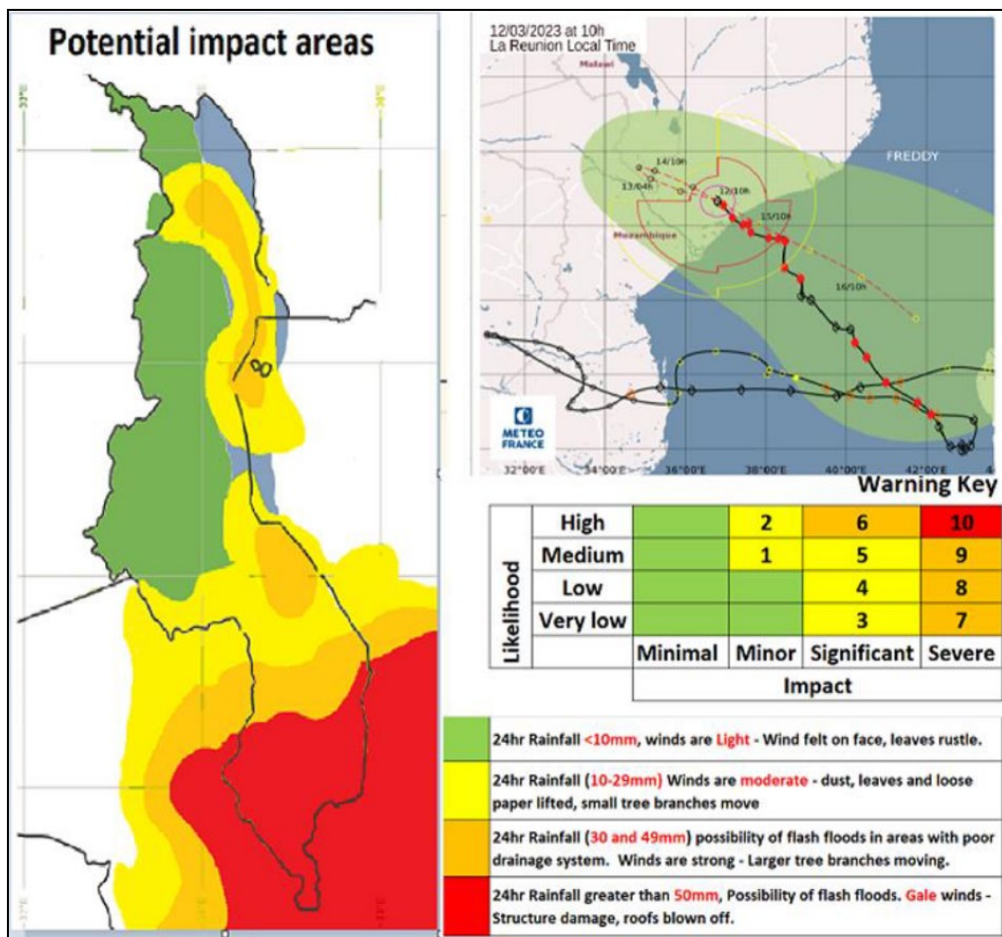




Methods

We investigated the immediate effects of Cyclone Freddy on maternal and reproductive health care service indicators using an existing national maternal surveillance platform in Malawi.

Data sources and period of observation



Data for this analysis was obtained from a Maternal Surveillance platform (Matsurvey) that reports aggregate facility data for 33 facilities across the country.

We included data for six weeks leading up to the cyclone (1st January 2023, to 19th of February 2023) and the six weeks following the cyclone (19th of February to 30th of March 2023).

Cyclone Freddy was the longest-lasting intense cyclone recorded worldwide, reaching peak intensity on **19 February 2023**, and moving inland to Malawi on the **12th of March 2023**, where it caused the most devastation.

Study Design and Data Analysis

Interrupted time series design using a negative binomial approach with the following model equation

$$Y_i \sim NB(\mu_i, r)$$

$$\log(\mu_i, r) = \beta_0 + \beta_1 \text{Period} + \beta_{2k} \text{Zone}$$

- Y_i is the count of service utilization indicator for the i^{th} observation.
- μ_i is the expected count of the service utilization indicator for the i^{th} observation.
- r is the dispersion parameter for the negative binomial distribution.
- β_0 is the intercept, the adjusted log of rate in the pre-cyclone period.
- β_1 is the adjusted log of rate ratio comparing the post cyclone period against the pre-cyclone period
- β_{2k} is the log of rate ratio for geographical zone K against the reference zone.

DID tests were conducted to compare the period of observation with the same period for the previous year for each service indicator



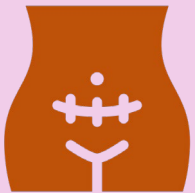
Results

Summary Statistics

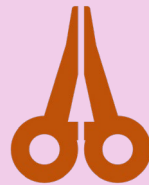


total
number of
live births

37,445



7,108 (19.0%)
Caesarean
deliveries



545 (1.5%)
Instrumental
deliveries



Total antenatal attendance
50,048
Total postnatal attendance
23,250



84
Maternal
deaths

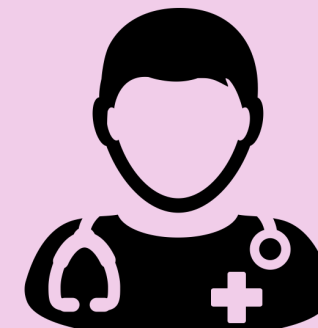
1,166
Neonatal
deaths



18
Medical
doctors

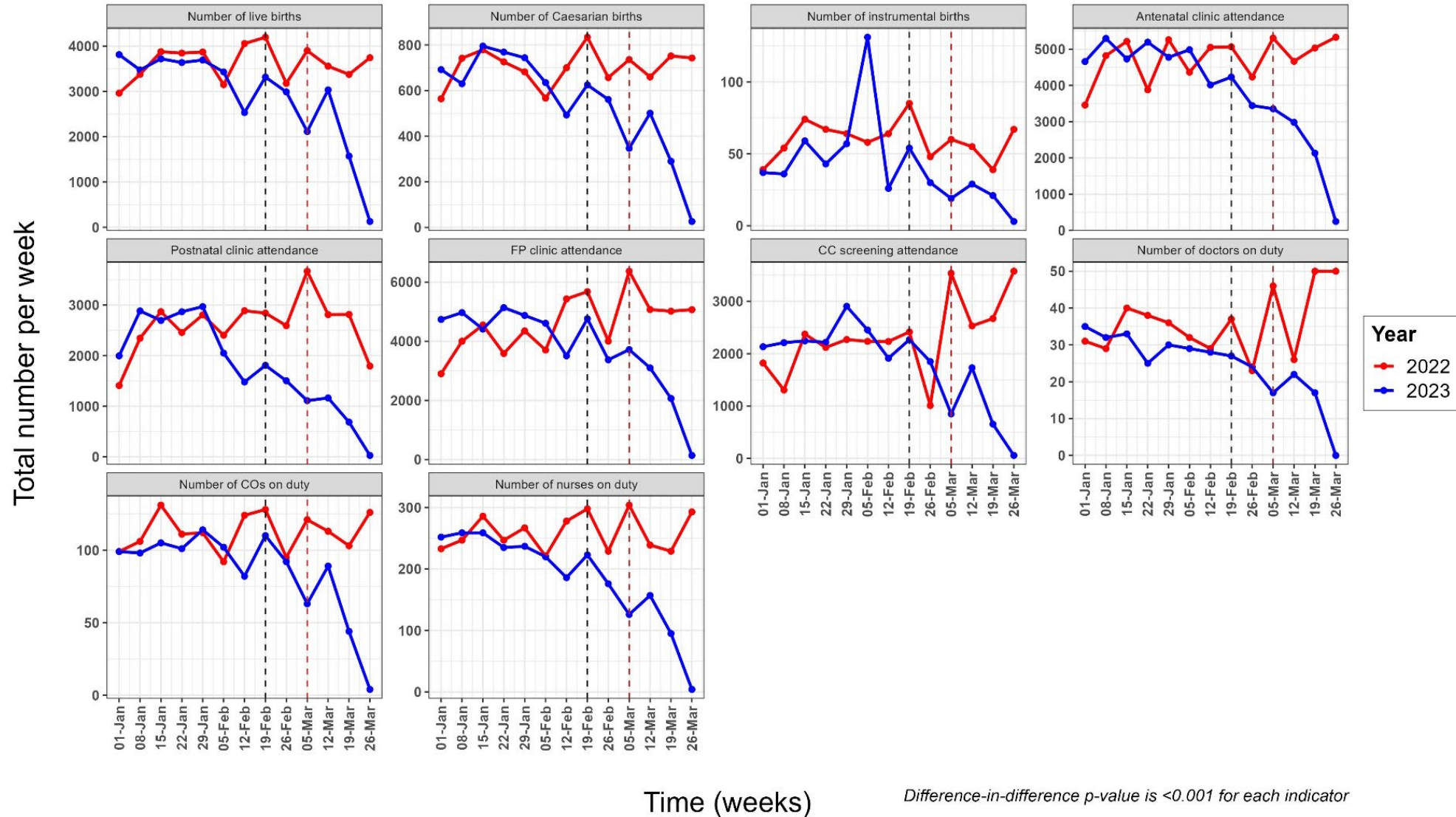


76
Trained
Nurses

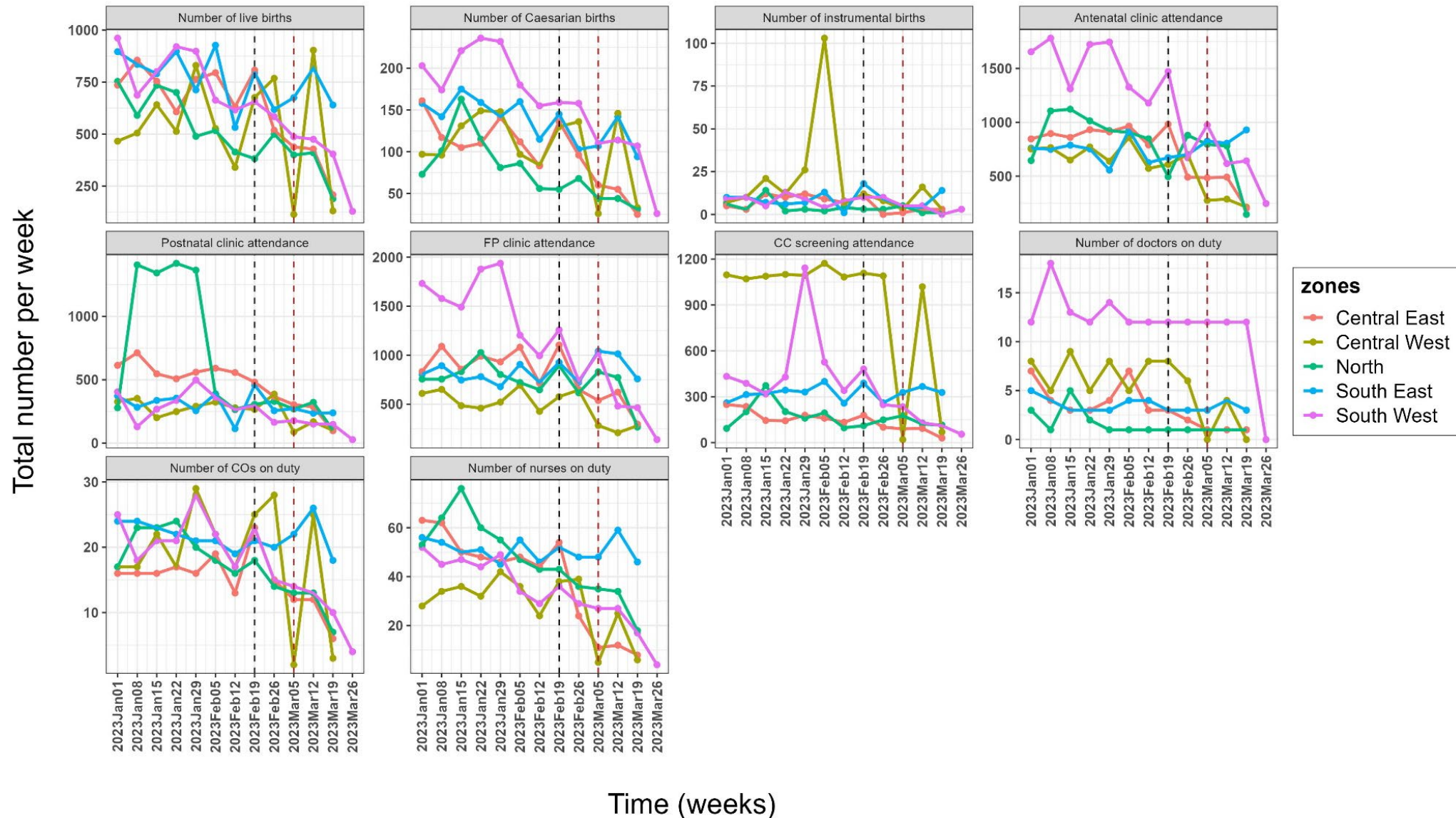


29
Clinical
Officers

Temporal trends in weekly maternal health service utilisation from 1 January to 30 March for 2022 and 2023.

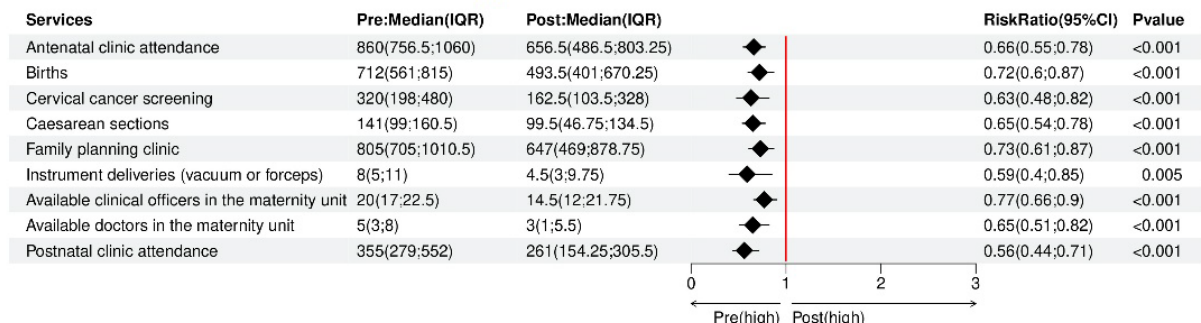


Temporal trends in weekly maternal health service utilization by administrative zone from 1 January to 30 March 2023

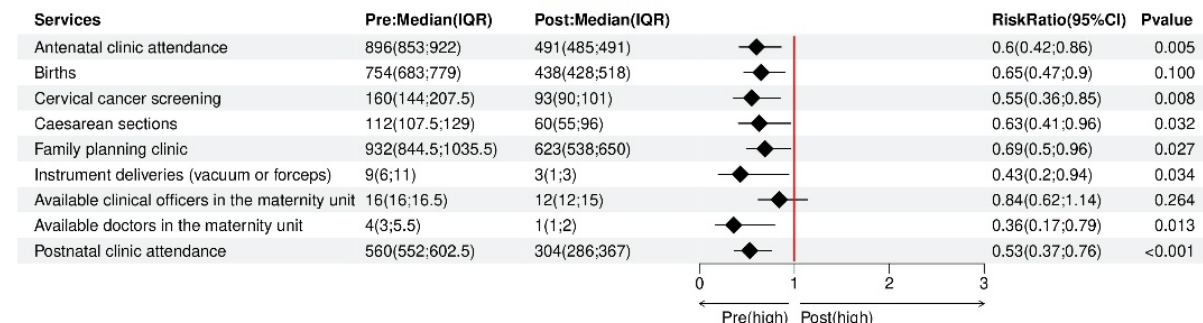


Stratified negative binomial model of effect of cyclone period on maternal health service utilisation

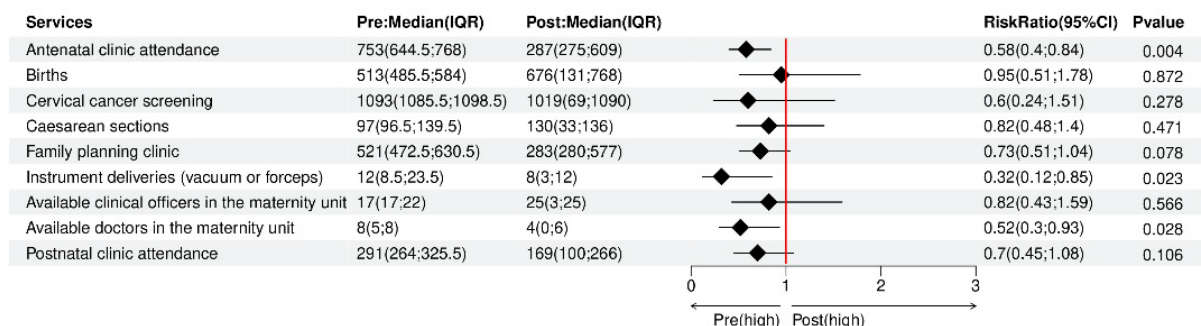
All



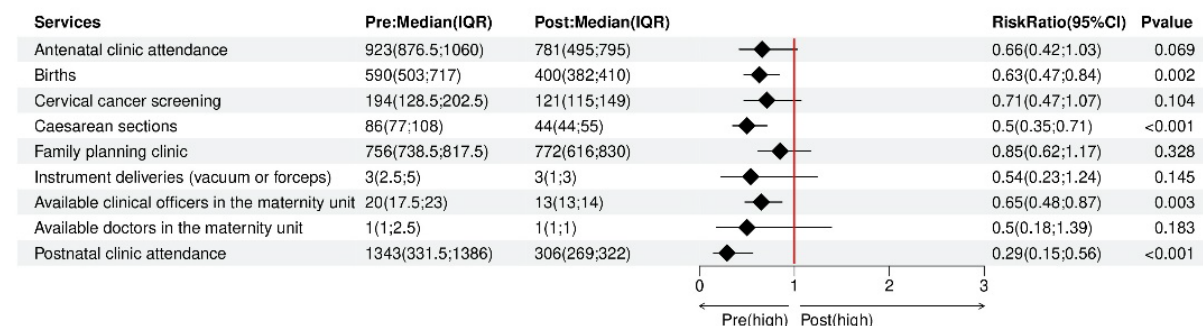
Central East



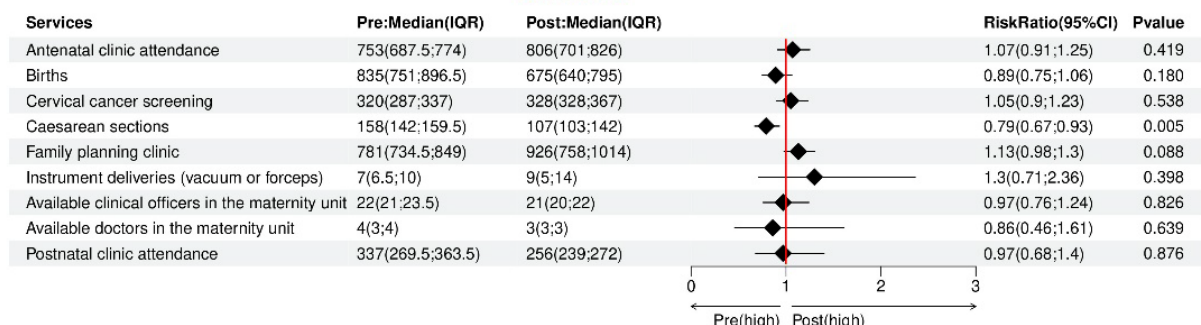
Central West



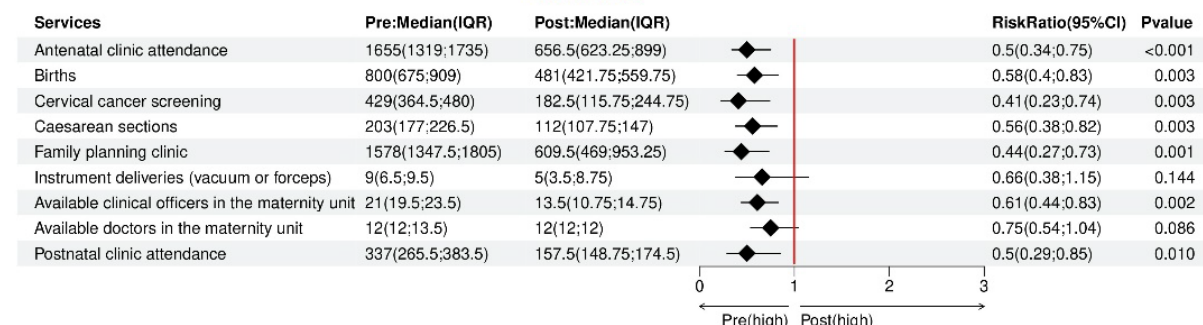
North



South East

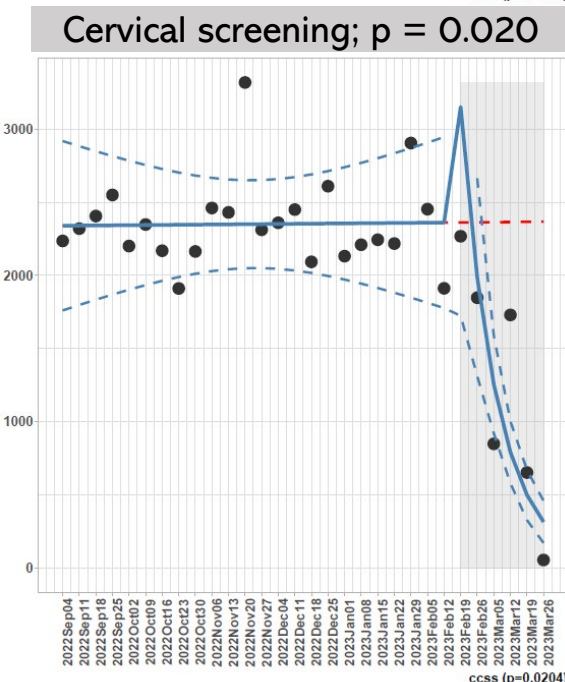
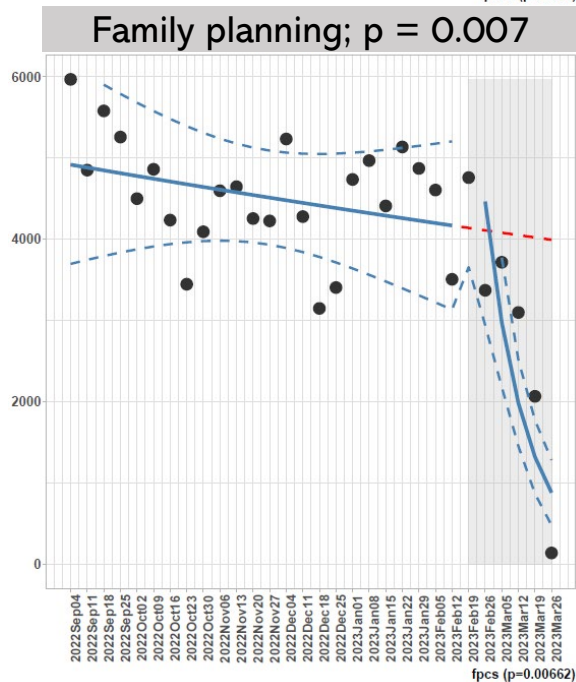
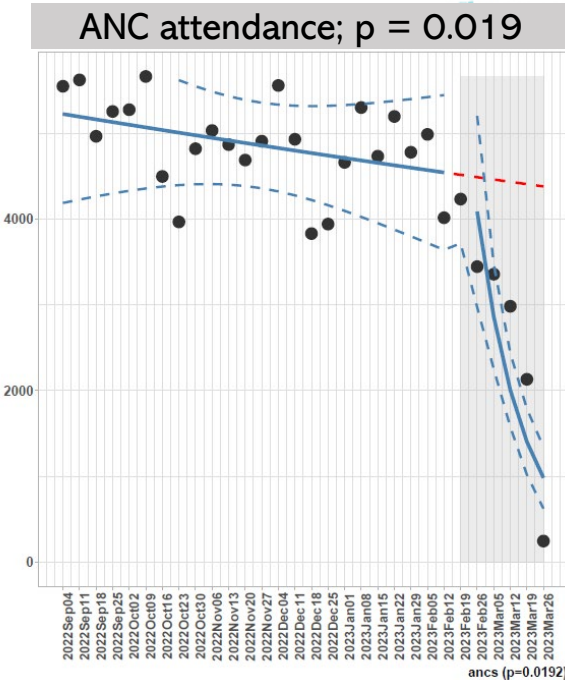
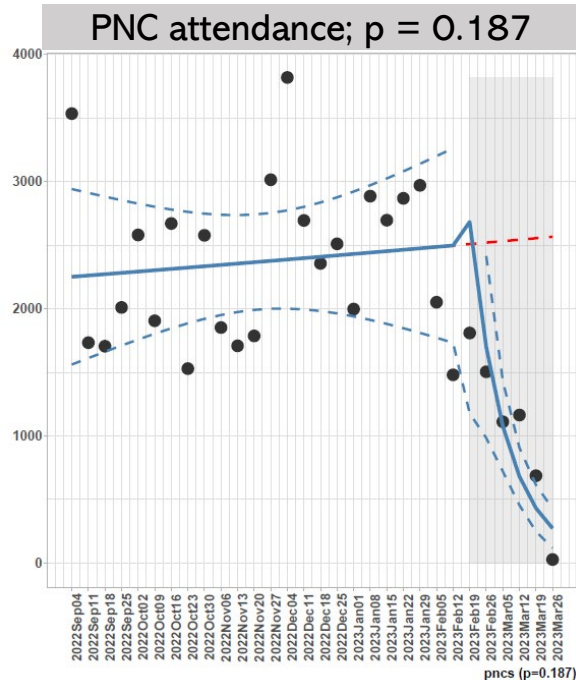


South West



Predicted trends in attendance to key maternal and reproductive health services from September 2022 to March 2023.

Significant **reduction** in attendance is observed after the cyclone, with no return to normal.





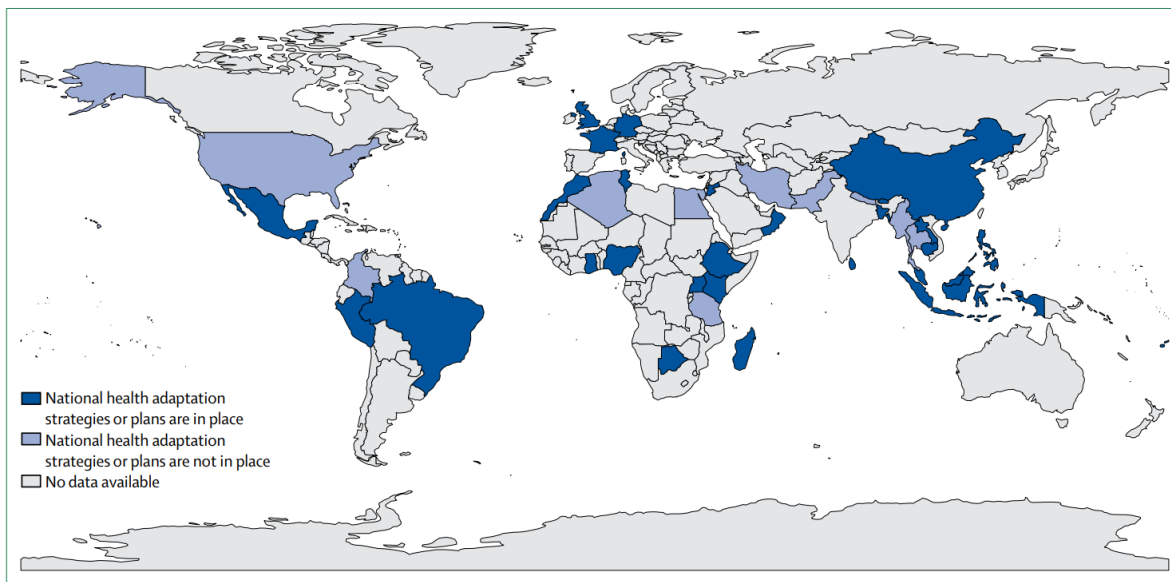
Discussion

There was a significant decrease in maternal and reproductive healthcare utilisation in the cyclone-affected regions of Malawi in the five weeks following Cyclone Freddy.

Further analyses with longer lag time is required

Policies and interventions should be tailored to emphasise the critical role of **maternal and reproductive health services** within disaster response frameworks.

Countries with National Health Climate Adaptation Strategies or Plans



Framework for ongoing disaster preparedness and response in the context of climatic events



There is need for robust methodologies to facilitate the surveillance, documentation and reporting of health effects of climate change



Acknowledgements

Institutions: MLW, KUHeS, UoL

Co-authors and collaborators

Communities and villages in Blantyre and Mangochi