Stephen Eghelakpo Akar,
Department of Eco-epidemiology,
Institute of Tropical Medicine,
Nagasaki University, Nagasaki, Japan.
steve.eghelakpo.akar@gmail.com

Socio-demographic, climatic, ecological and clinical predictors of Lassa fever virus positivity in Nigeria: Analysis of multi-year national surveillance data, 2018-2021

Background

- Lassa fever , a re-emerging zoonotic viral hemorrhagic disease caused by the LASV remains a major public health concern in Nigeria
- Effective prevention and control of LF is dependent on addressing potential drivers of LASV transmission across the human-environment-animal interface.
- The objective of this study was to describe the epidemiological profile, trend, and factors associated with LASV positivity in Nigeria from 2018 to 2021

Methods

- We retrospective analyzed national Lassa fever surveillance data abstracted from the Surveillance, Outbreak, Response, Management, and Analysis System (SORMAS) platform of the Nigeria Centre for Disease Control and conducted multivariable binary logistic regression analysis to identify factors associated with LASV positivity
- Variables abstracted from SORMAS include : epidemiological number, socio-demographic information (age, sex, education, occupation), vaccination status, clinical information (date of onset, date of admission, symptoms), location (State), travel history, and laboratory test status (negative, positive, unconfirmed)
- We summarized categorical variables using frequencies and percentages, while numerical variables were summarized using the median and interquartile range
- To estimate the strength of the association between explanatory variables and the outcome variable, we calculated prevalence odds ratios with their corresponding 95% confidence intervals and p-values

Results
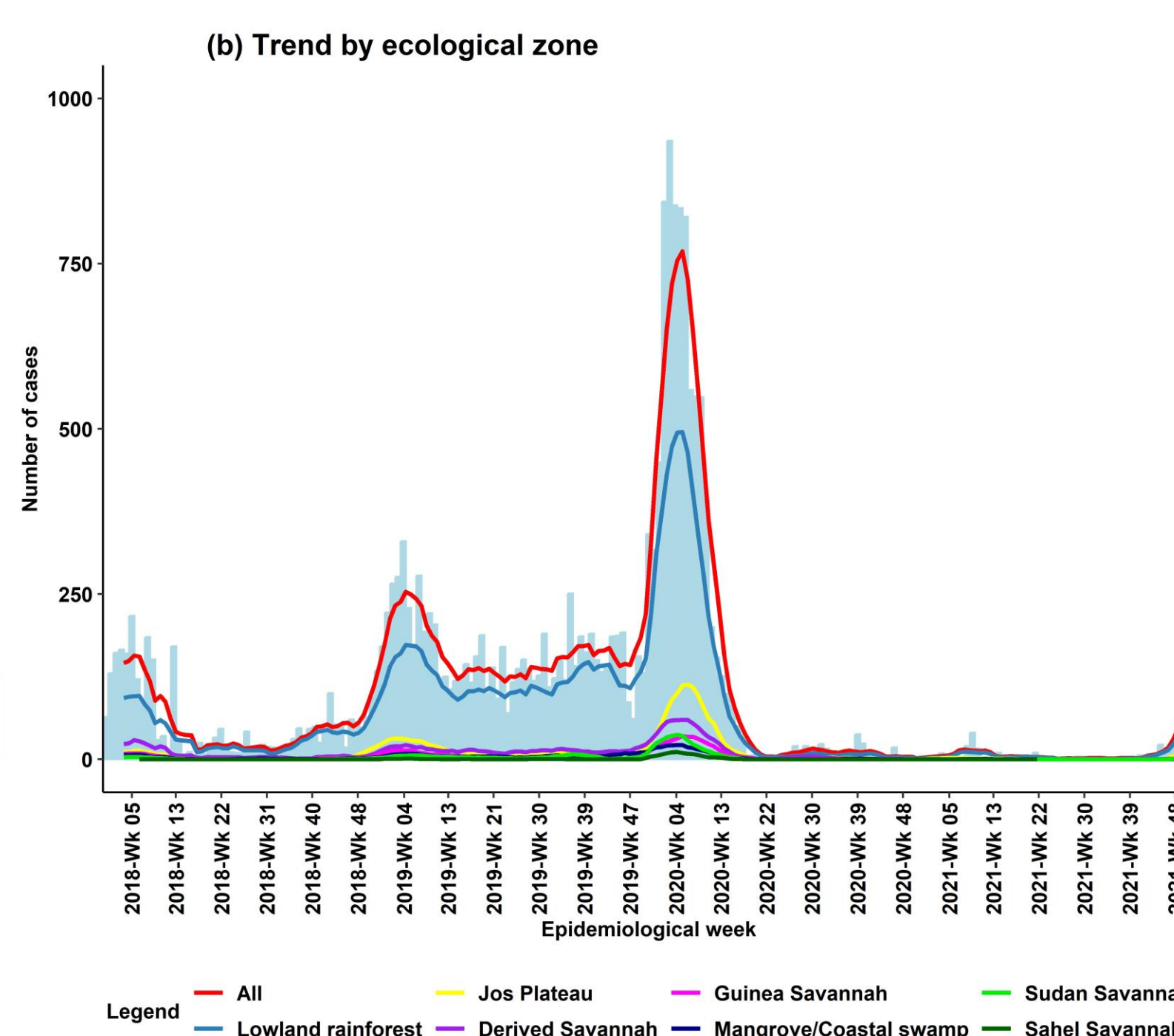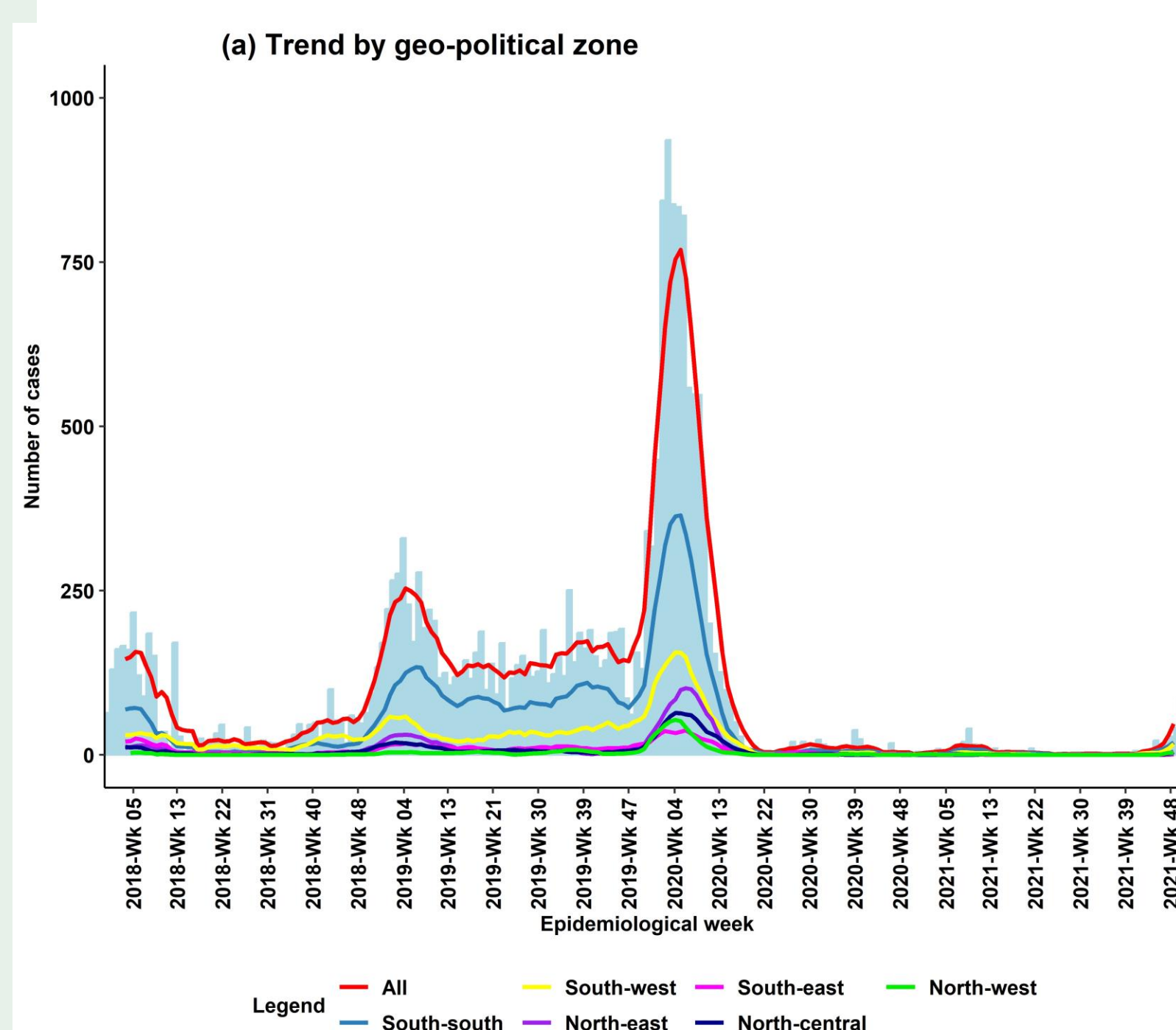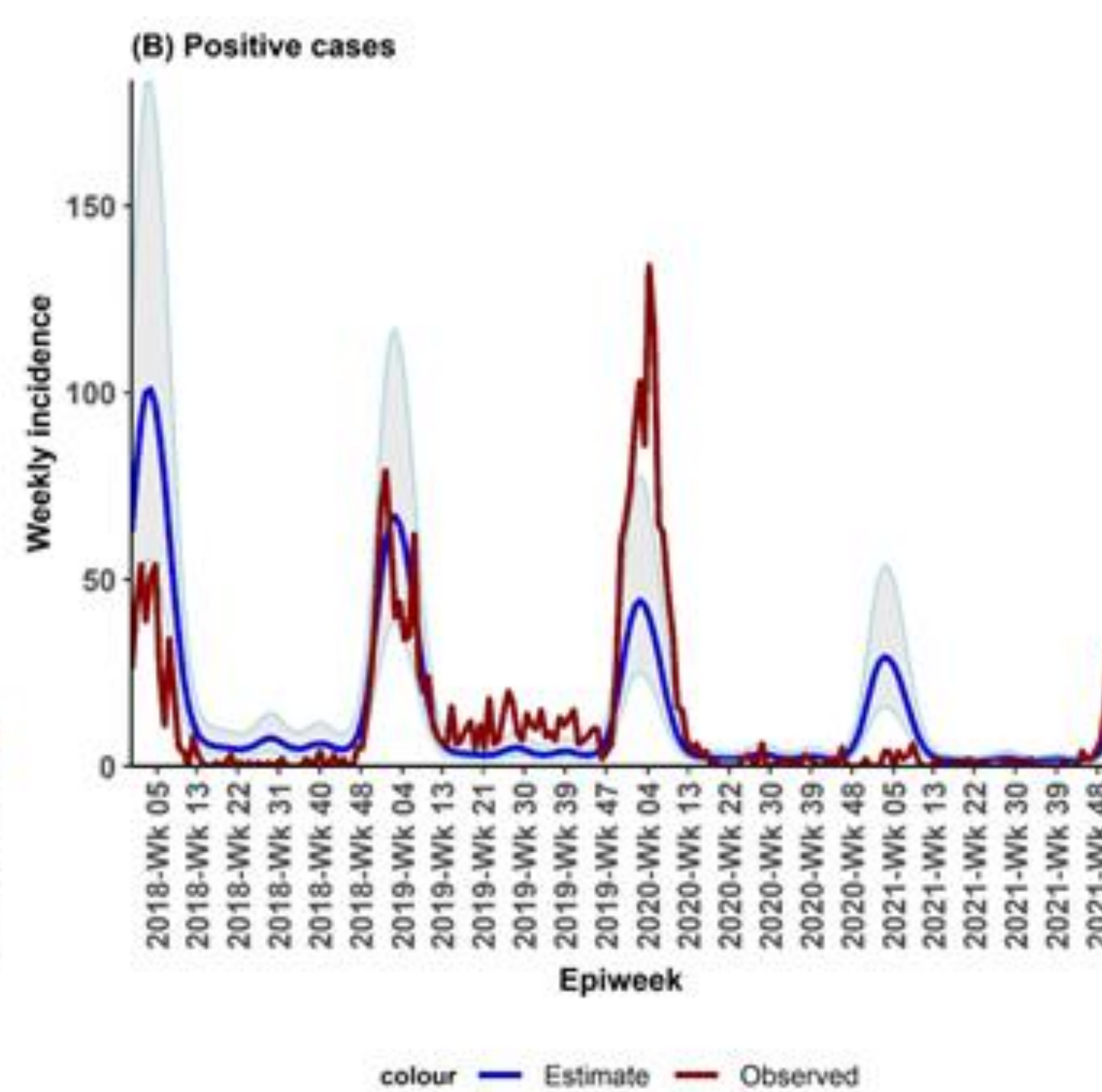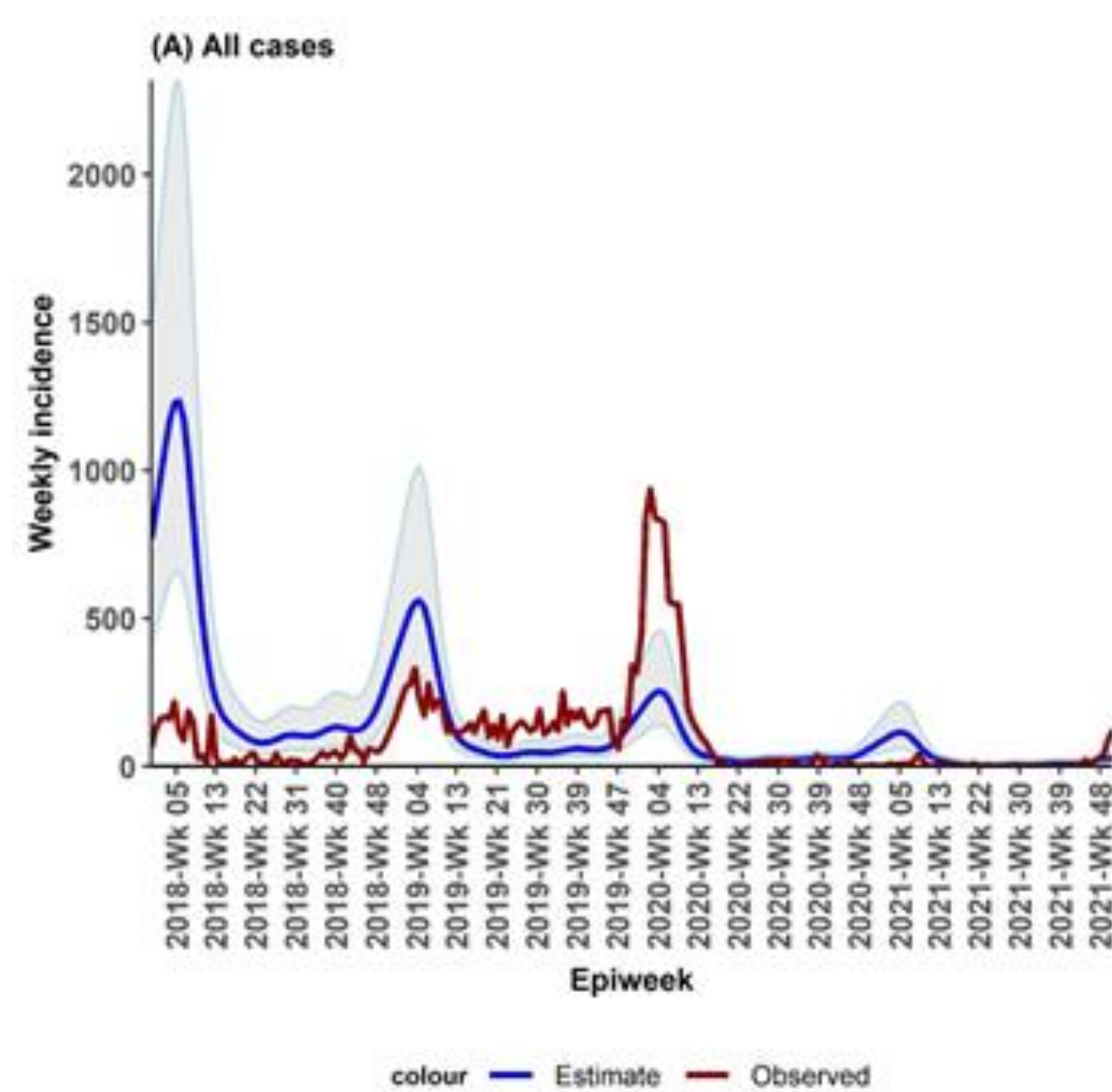
- Between January 2018 and December 2021 Nigeria recorded a total of 20,167 suspected LF cases with an overall viral positivity of 16.3%.
- LASV confirmed cases were mostly males (56.0%) with a median age of 30.0 (IQR: 20.0-42.0) years, seen mostly in states occupying the temperate-humid climatic zone (72.0%), and the Lowland rainforest ecological zone (69.6%)
- **Time-oriented predictors of LASV positivity were the:**
  - first (aOR=2.86, 95% CI: 2.42-3.41),
  - third (aOR=1.41, 95% CI: 1.12-1.77), and
  - fourth (aOR=1.77, 95% CI: 1.44-2.18) quarters of the year compared to the second;
- **Climatic predictors were:**
  - the temperate climatic zones (aOR= 1.44, 95% CI: 1.16-1.78) compared to the hot climatic zones;
- **Ecological predictors were the:**
  - Jos Plateau (aOR= 1.66, 95% CI: 1.36-2.03),
  - Derived Savannah (aOR= 1.44, 95% CI: 1.15-1.81),
  - Guinea Savannah (aOR= 2.65, 95% CI: 2.08-3.35),
  - Freshwater/Mangrove forest 0.75(0.51-1.10),
  - Sudan Savannah 1.35 (0.88-2.02),
  - Sahel Savannah 0.25 (0.04-0.64)
  - Lowland rainforest (aOR= 1.86, 95% CI: 1.37-2.59) compared to the Lowland rainforest ecological zone;
- **Socio-demographic predictors were:**
  - Male sex (aOR= 1.23, 95% CI: 1.12-1.35) compared to female;
  - Age group 15-44 (aOR= 1.33, 95% CI: 1.13-1.58) and 45-59 years (aOR=1.34, 95% CI: 1.10-1.63) compared to 60+ years; and
  - Artisan or trader (aOR= 1.17, 95% CI: 1.01-1.36) compared to the unemployed
- **Clinical predictors were**
  - Abdominal pain (aOR=1.49, 95% CI: 1.33-1.66);
  - Anorexia (aOR= 1.56, 95% CI: 1.32-1.84);
  - Chest pain (aOR= 1.40, 95% CI: 1.16-1.67);
  - Diarrhea (aOR= 1.19, 95% CI: 1.01-1.40);
  - Fatigue (aOR= 1.25, 95% CI: 1.10-1.40);
  - Fever (aOR= 1.15, 95% CI: 1.02-1.30);
  - Muscle pain (aOR= 1.55, 95% CI: 1.20-2.00);
  - Nausea (aOR= 1.33, 95% CI: 1.09-1.62);
  - Vomiting (aOR= 2.25, 95% CI: 1.99-2.54);
  - Confused or disoriented (aOR= 2.61, 95% CI: 1.60-4.25);
  - Malaise (aOR: 1.60, 95% CI: 1.24-2.06)

Conclusions and Recommendations

- Since 2018, outbreaks of Lassa fever have continued to occur in Nigeria with majority of cases seen in the temperate humid climatic zones and the lowland rainforest ecological zone
- Higher odds of LASV positivity were associated with the first and fourth quarters of the year
- The missing epidemic peak seen during the 2020/2021 season is suggestive of the disruptive effect of the COVID-19 pandemic on LF surveillance activities
- Socio-demographic, climatic, and ecological factors drive LASV transmission in Nigeria.
- As the clinical predictors of Lassa fever are also symptoms of other endemic febrile illnesses, we recommend that clinicians should be aware of the predictors identified in this study to raise the index of suspicion, especially amongst the high-risk age groups identified in this study

Contact: +2348161669216; steve.eghelakpo.akar@gmail.com