CSIGN
COVID Surveillance Intensification Ghana Network
Reference: RIA2020EF–2983
EDCTP COVID–19 Webinar
Zoom, 18–19 Mar 2021

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Rationale and objectives

- Alongside traditional surveillance, most high-income countries routinely utilise modelling and whole genome-sequencing as part of surveillance.
- There is traditionally less capacity in these elements in LMIC settings
- We aim to build the Ghana COVID-19 surveillance and response system by:
  - Expansion of COVID-19 testing across the existing National Influenza Surveillance Network
  - Integration of whole-genome sequencing into surveillance
  - Country specific mathematical modelling

Study design

- Multi-component observational study to enhance COVID-19 surveillance in Ghana
  - COVID-19 Surveillance across all National Influenza Surveillance Network sites
    - Individuals with ILI/SARI will be tested at Noguchi Memorial Institute for Medical Research
  - Integrate WGS into analysis pipeline

Study design

- Multi-component observational study to enhance COVID-19 surveillance in Ghana
  - Utilise line-list, mobile phone & other data sources to develop country specific modelling
  - Analyse the uptake of 'COVID-Hotlines' established in Ghana
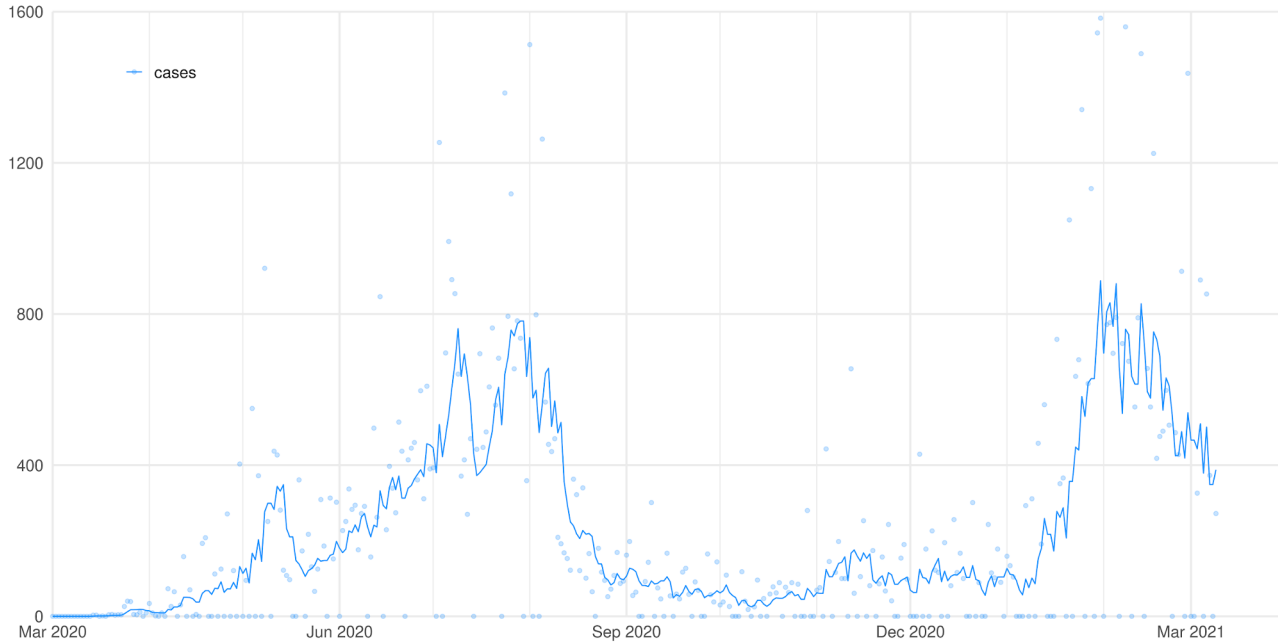 - Developing a prediction market for COVID-19 in Ghana

Surveillance and Response

Key Questions
- Can we utilise existing ILI platforms for surveillance
  - Has flu gone away?

- What SARS–CoV–2 strains are circulating in Ghana

- What impact have public health measures had on COVID–19 transmission?
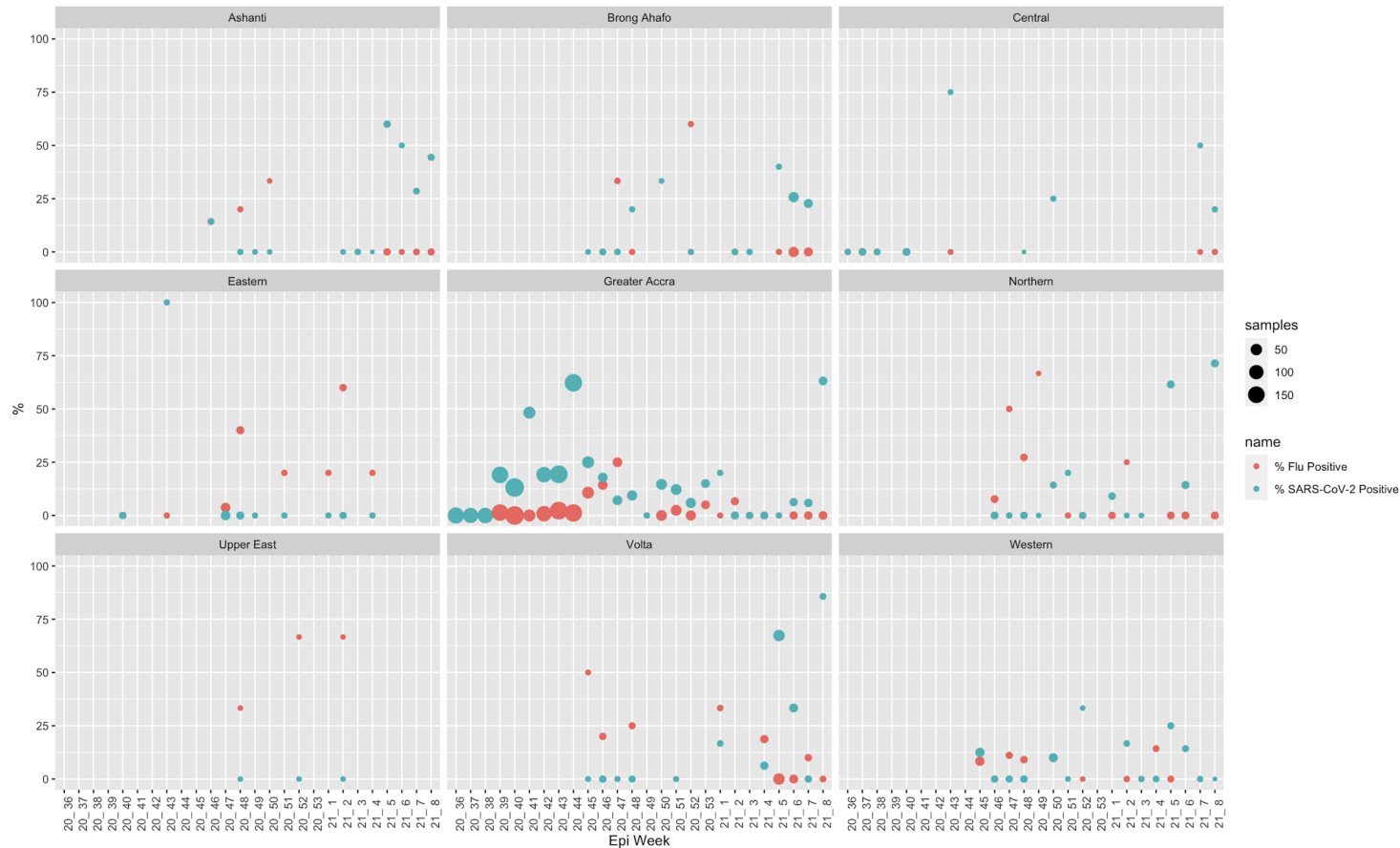
Preliminary findings: Situation overview
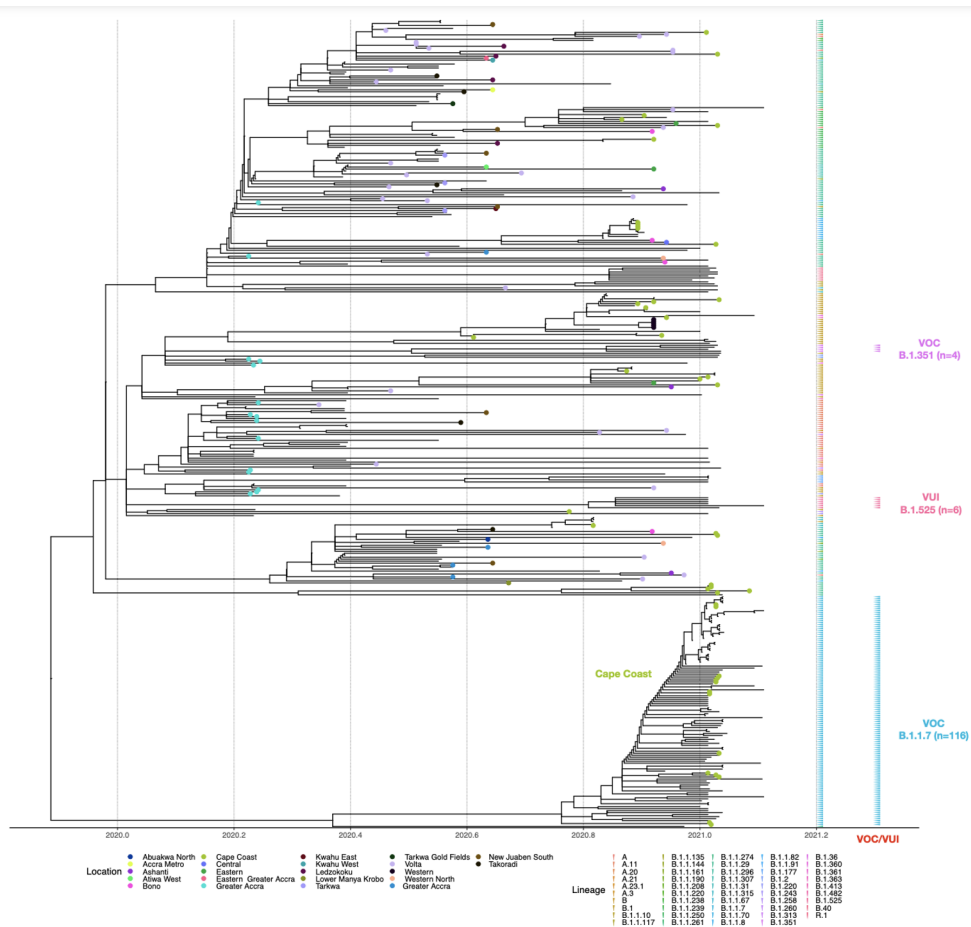
Preliminary findings: Influenza Surveillance
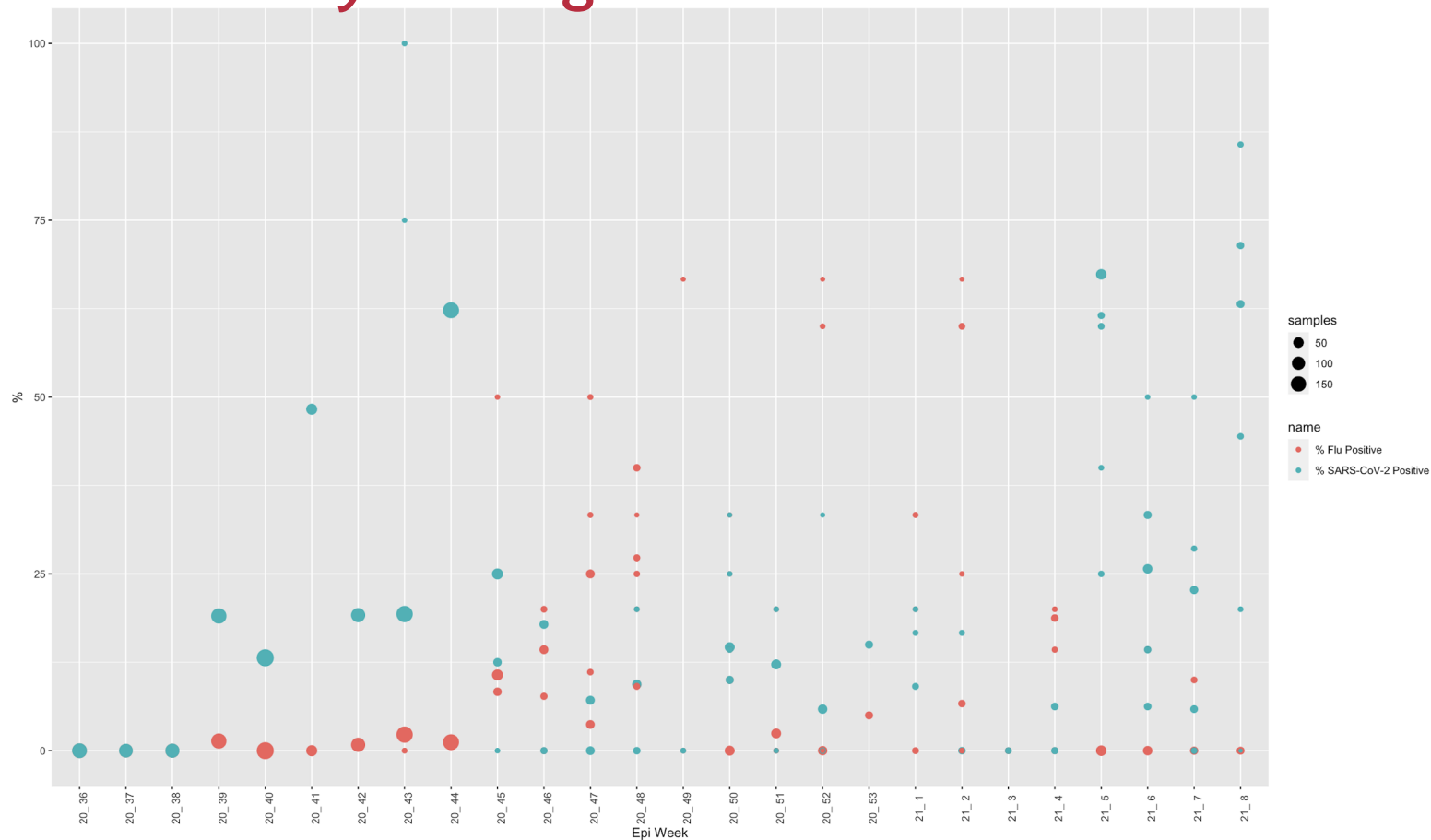
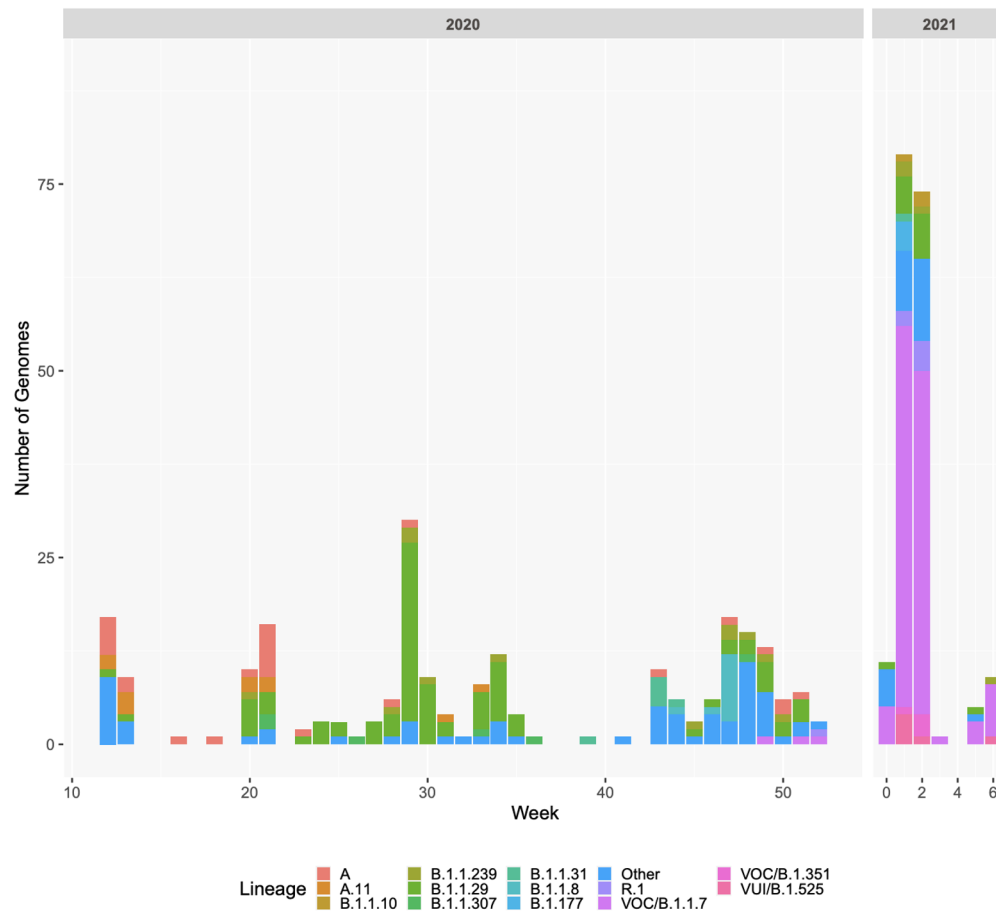# Preliminary findings: Influenza Surveillance
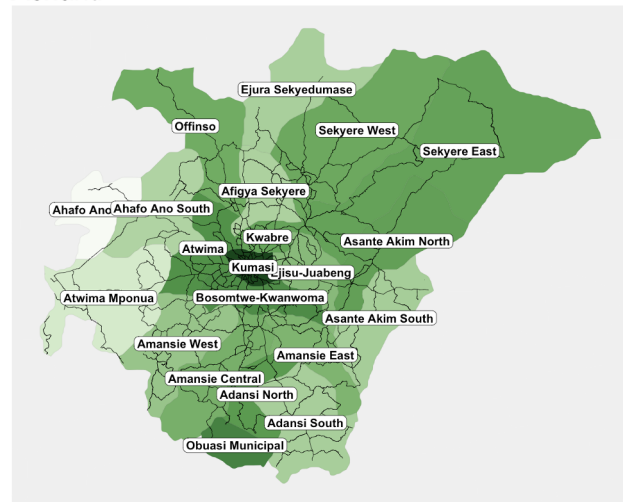
Preliminary findings: Sequencing

Preliminary findings: Sequencing

Preliminary Findings: Modelling
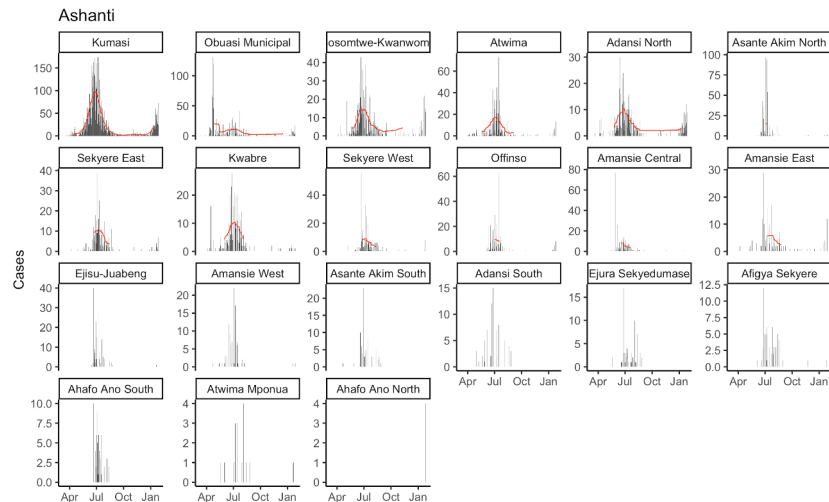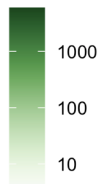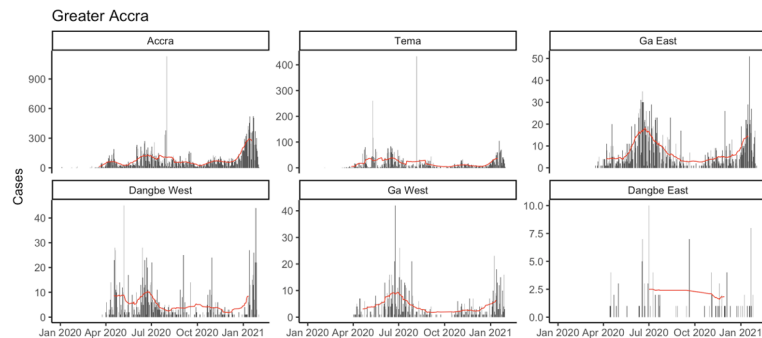

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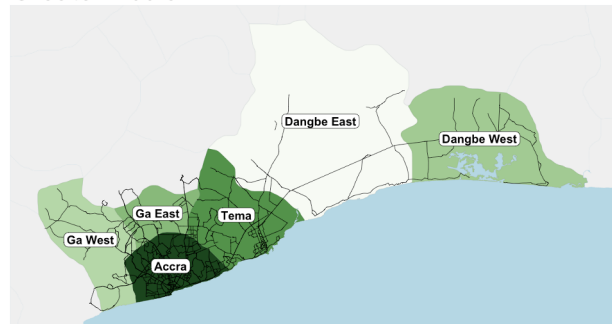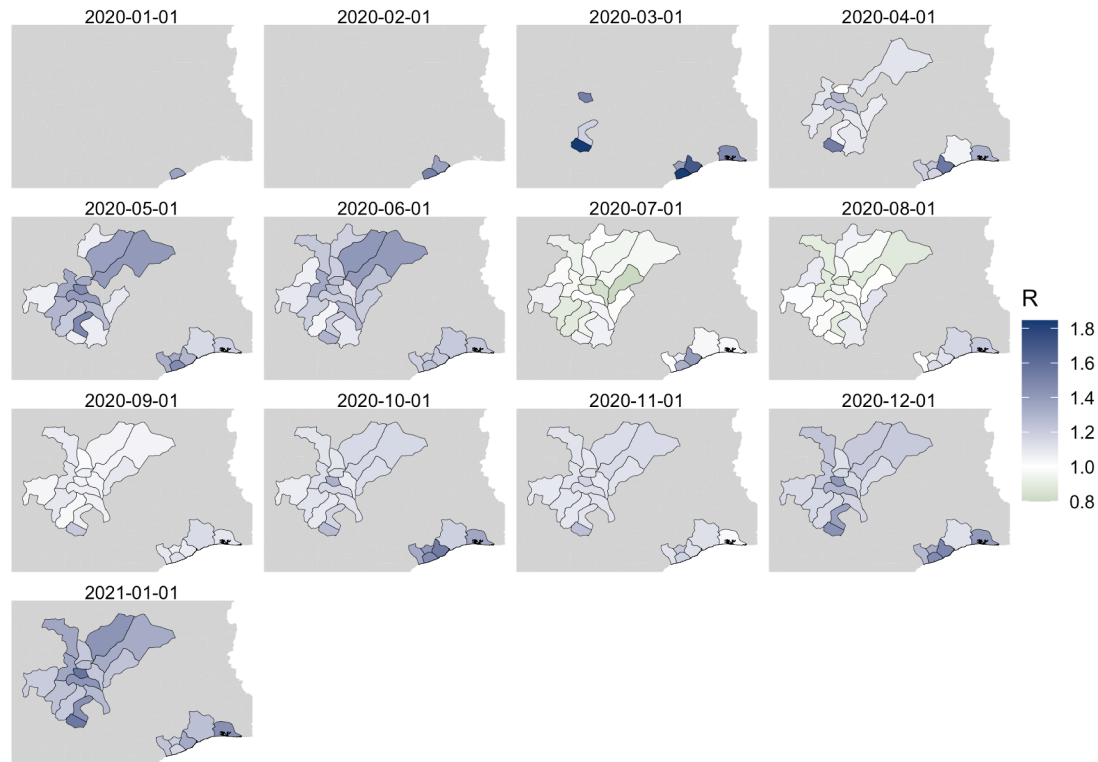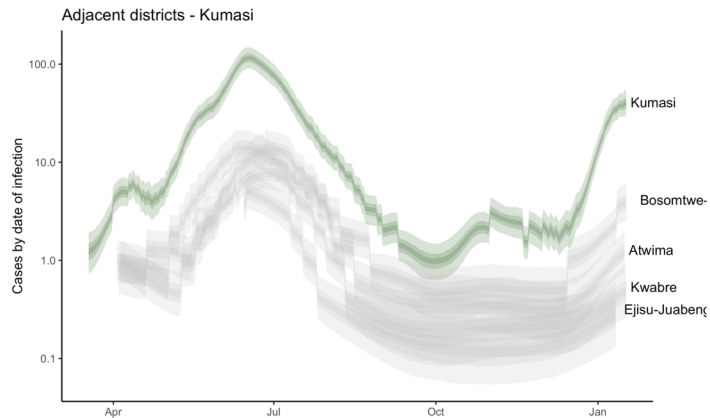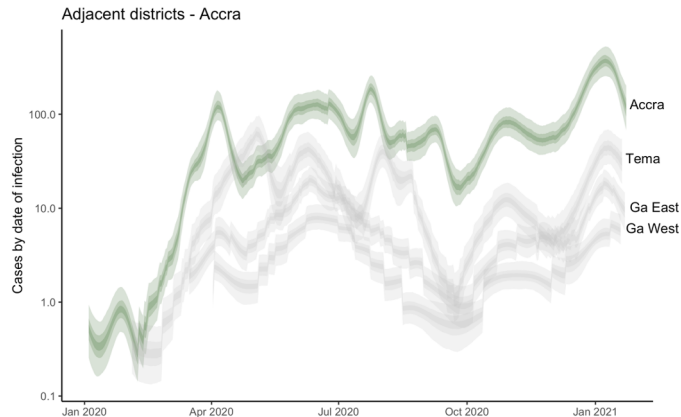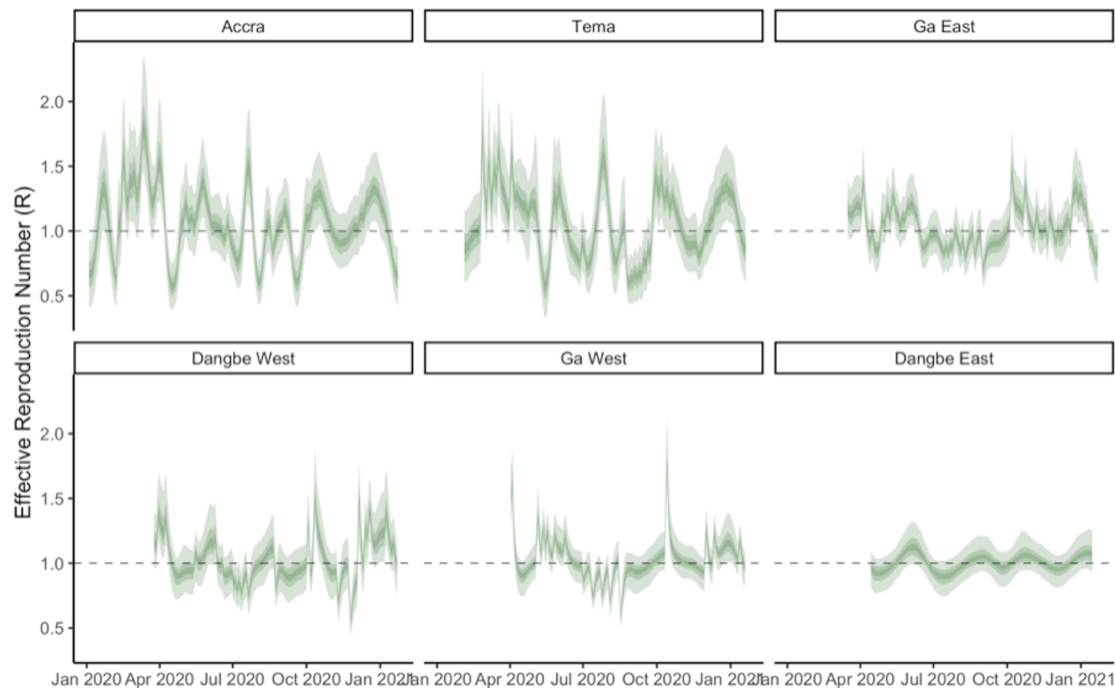Greater Accra

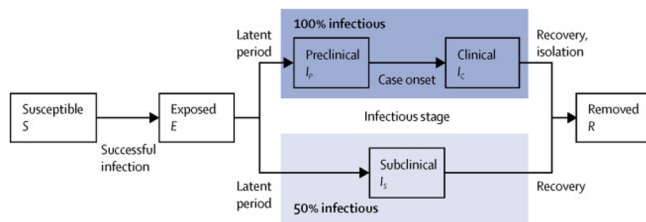# Preliminary Findings: Modelling

Preliminary Findings: Modelling

- The reproduction number gives an indication of growing or shrinking epidemic.
- Early estimates are very subject to changes in case reporting, so we are working to refine methods to account for these changes
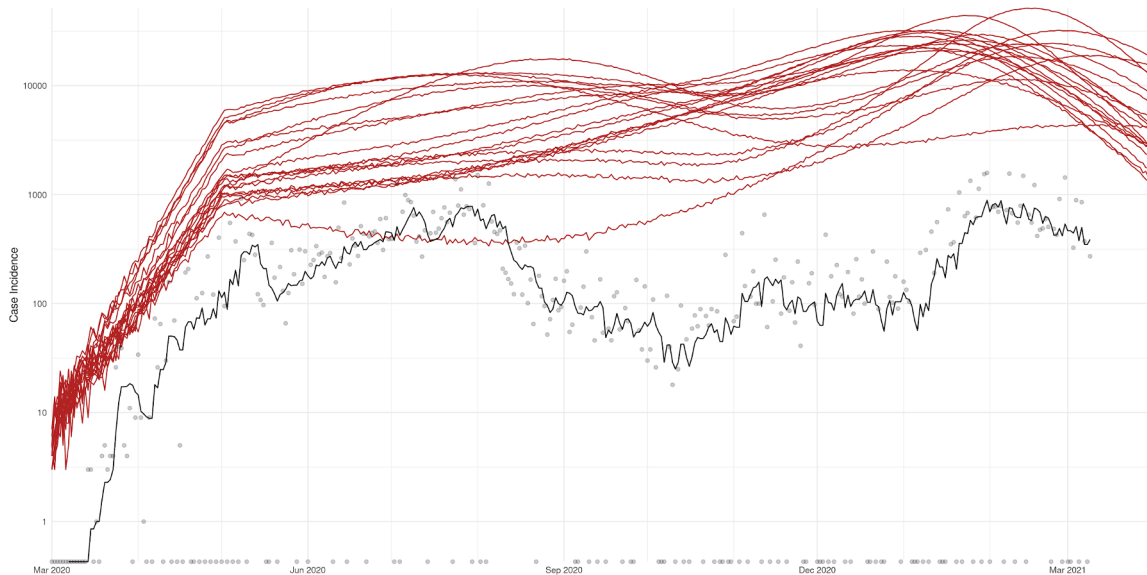
Preliminary findings: Modelling

- Age-stratified transmission (published) model calibrated to the observed epidemic.
- Age-varying susceptibility and probability of showing symptoms.
- Gives matching time-varying reproduction number while altering different components of the mixing matrix (e.g. school, work, home, and other contacts) to represent non-pharmaceutical interventions.
- Allows for underreporting and estimates the fraction of the population infected so far.
- Currently developing this framework and using it to make projections with and without vaccination.

Preliminary findings: Modelling
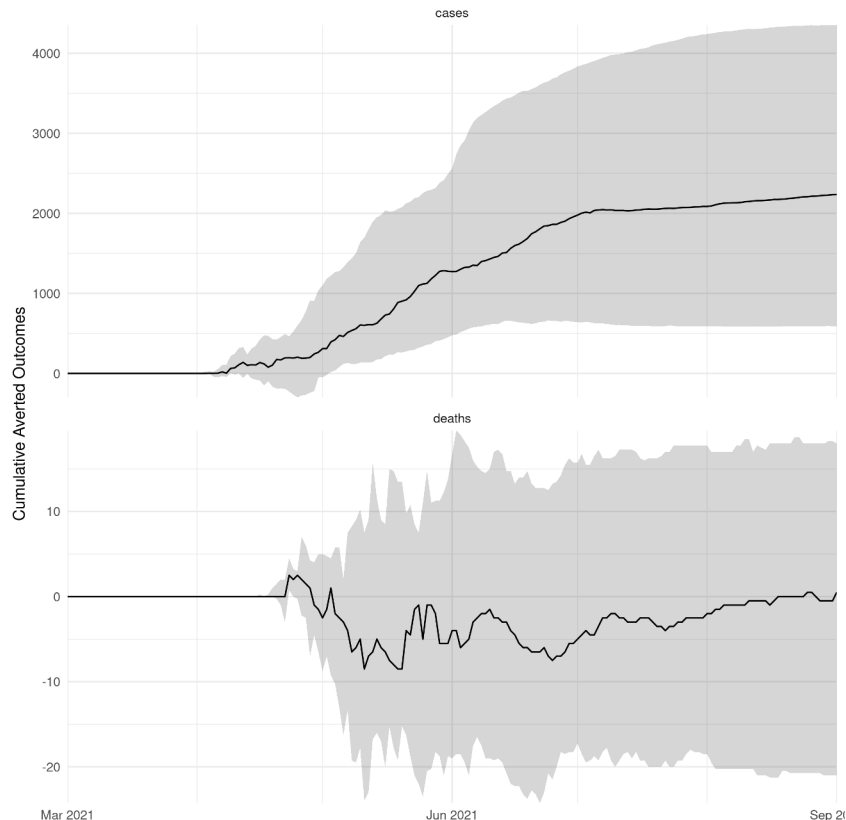
- Figure shows cumulative averted cases and deaths in forward projections including a vaccination campaign starting 1 April of 4000 doses per day, distributed evenly to 15+ population.
- In the presence of current NPIs in place during wave 2.
- Uncertainty envelope shown in grey.
- Relatively large benefit in cases.
- No net benefit in deaths and a large amount of stochastic noise.
- This is very early work to demonstrate the planned outputs, and we are actively working on refining vaccine assumptions and improving fitting given the new variants.

Expected impact

- Improved national real–time data collection will allow
  - Targeted enhanced surveillance in response to localised outbreaks
  - Real–time assessment of interventions by government

- Project is delivered in conjunction with the Ghana Health Service
  - Direct link through to policy & implementation informed by our results

Acknowledgements