Current cholera projects

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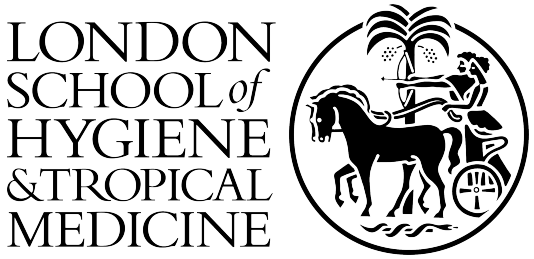
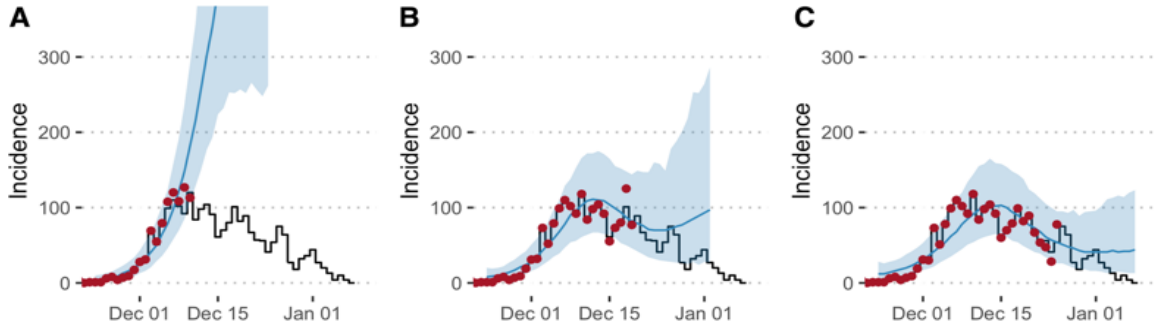
GTFCC, Annecy, 17 April 2019



Operational short-term forecasting

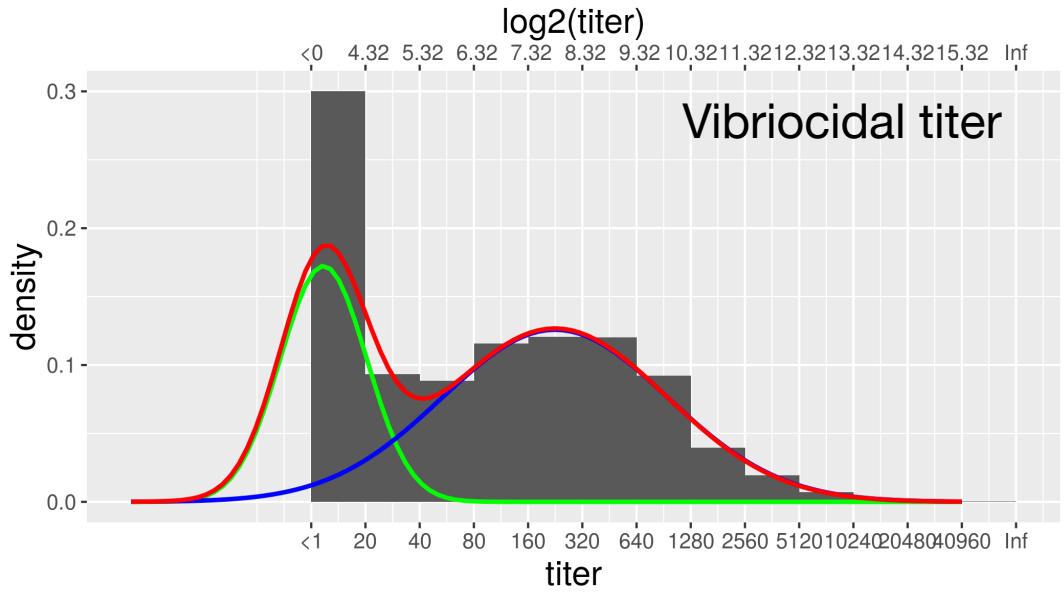
- Forecasts have to be evaluated to be useful
- Simple models that can be used in real-time during outbreaks to project future cases for short forecast horizons (~15 days)
- Spatial scale is important for transmission dynamics
- Apply model to several incidence datasets at different spatial scales



- How does forecast performance change with
  - Forecast horizon
  - Spatial scale
  - R
  - Population
  - Epidemic phase (growing vs peak vs declining)
  - Model complexity

Estimating underreporting

- Under-reporting is a major problem to understand cholera dynamics
- What is the role of asymptomatic and lowly symptomatic cases in transmission?
- Do they deplete the susceptible pool?
- Idea: combine cross-sectional serological data with incidence data to estimate the reporting to infection ratio



- Grande Saline, Haiti, October 2010 – April 2011
- Attack rate according to reported incidence: 17%
- Attack rate according to serology
  - fixed cutoff (320*): 42%
  - gaussian mixture model: 32 (29 – 36)%
- Next: Bayesian model of reporting process and titer dynamics
- Data: Sero-survey in Grande Saline, Haiti, 2011 by Jackson et al., Am. J. Trop. Med. Hyg., 2013
- Collaborators: Andrew Azman (JHU), Brendan Jackson, Stanley Juin (both CDC)

*cutoff from Azman et al., Science Translational Medicine, 2019