

Mapping the Risk of International Infectious Disease Spread (MRIIDS)

Funded through USAID's 'Combating Zika and Future Threats: A Grand Challenge for Development' program

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Big Brother Is Watching



Problem statement

MRIIDS

PROBLEM STATEMENT

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Subject: PRO/AH/EDR> Undiagnosed illness - Brazil: (Northeast, RJ) Zika virus susp, RFI

Archive Number: 20150501.3334749

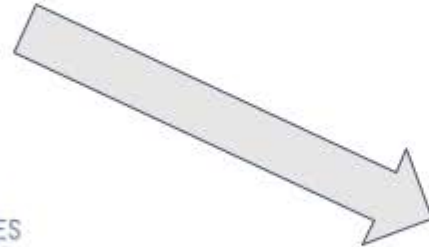
UNDIAGNOSED ILLNESS - BRAZIL: (NORTHEAST, RIO DE JANEIRO) ZIKA VIRUS SUSPECTED, REQUEST FOR INFORMATION

A ProMED-mail post

<http://www.promedmail.org>

ProMED-mail is a program of the
International Society for Infectious Diseases

<http://www.isid.org>



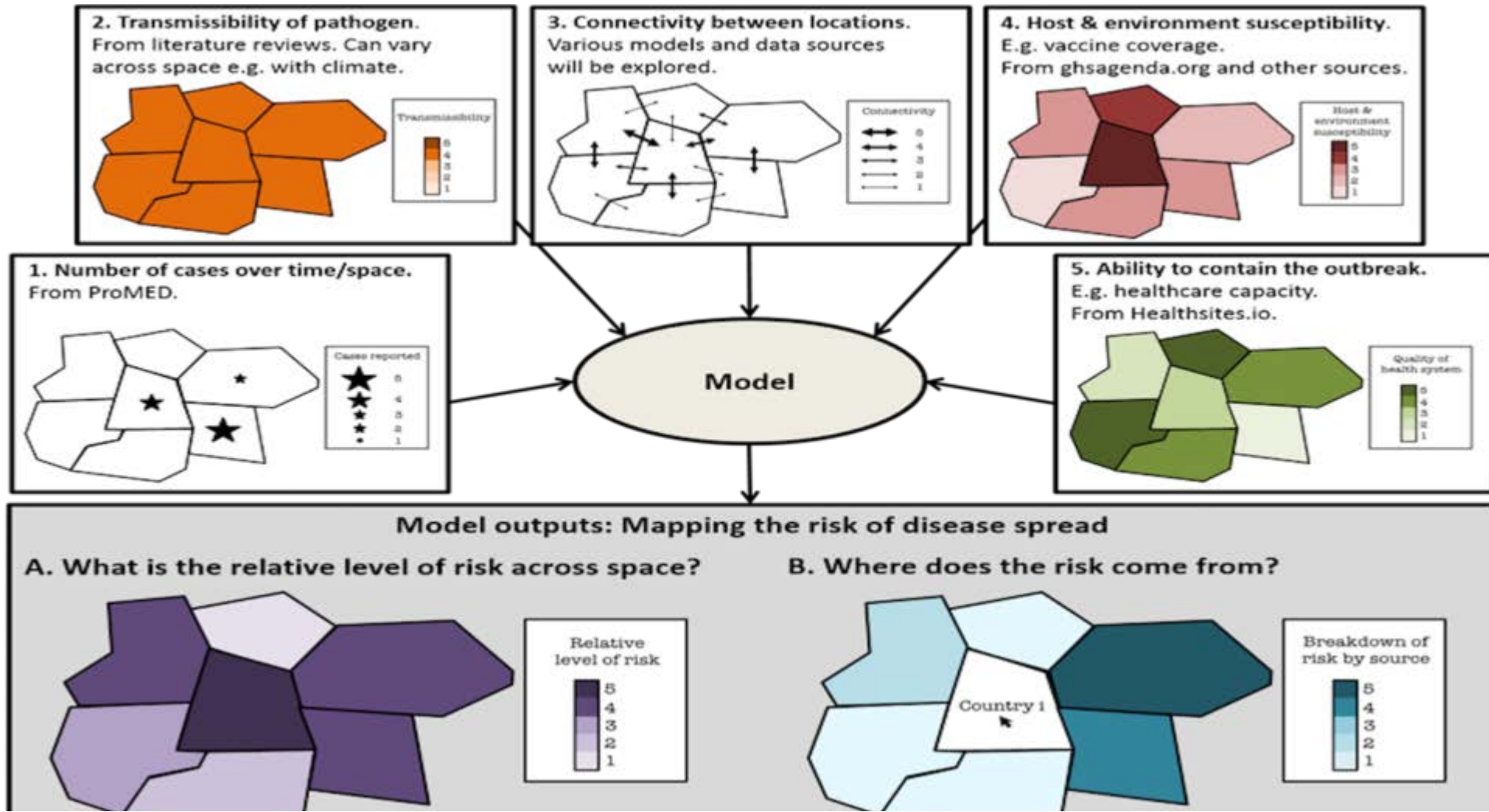
Project partners



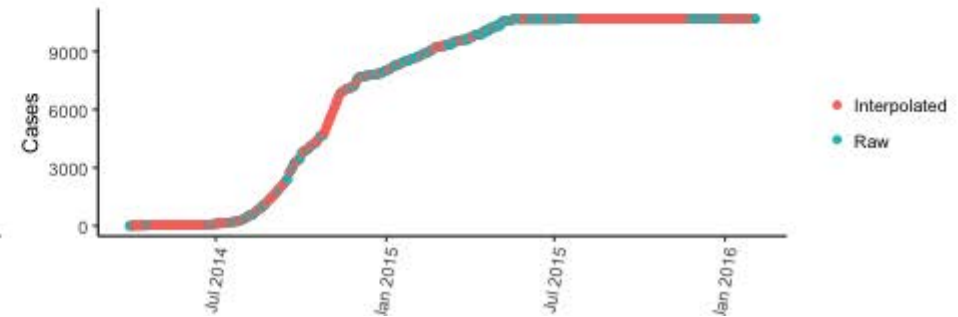
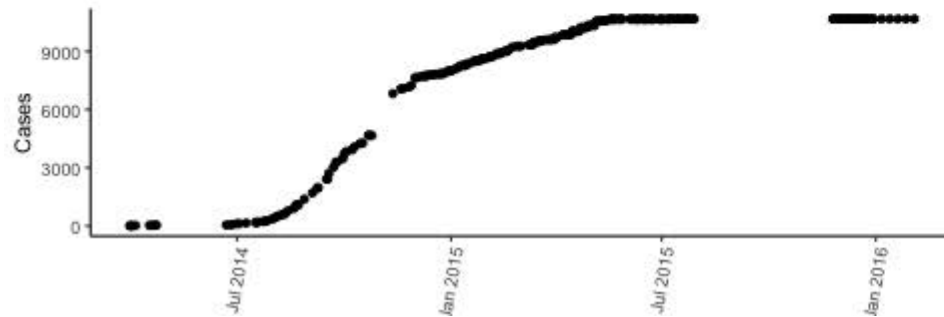
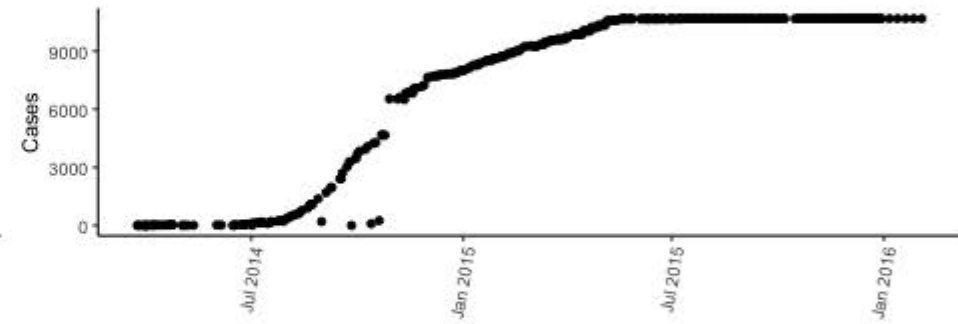
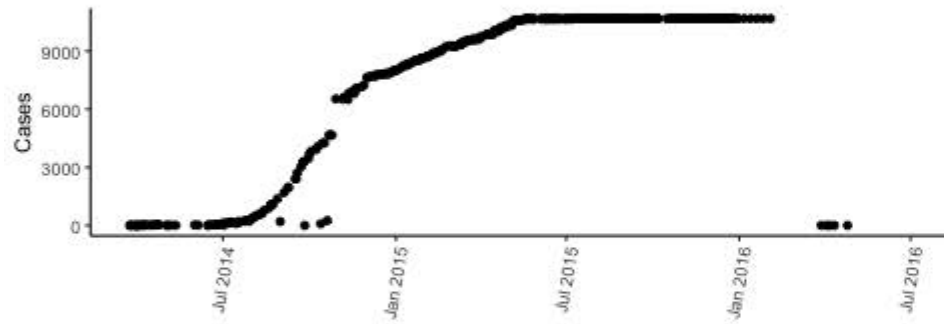
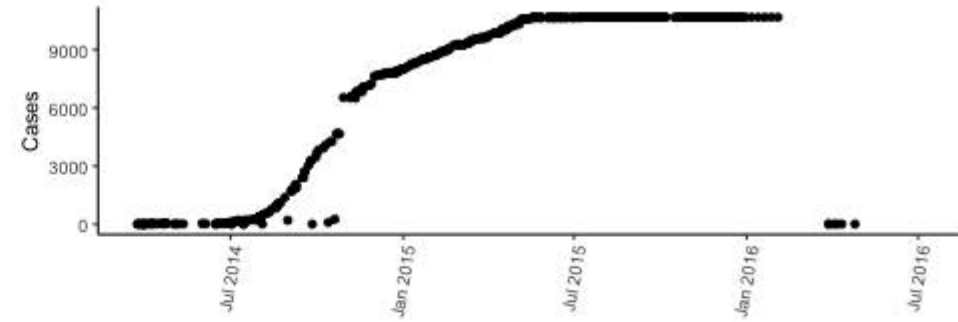
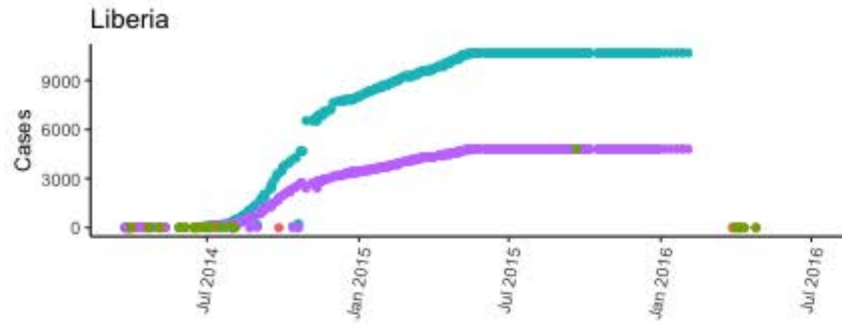
Imperial College
London



Project Schematic



HealthMap and ProMed data pre-processing



Data stream 1: case numbers

Example of the 2013-16 West African Ebola epidemic

Innovative Diseases

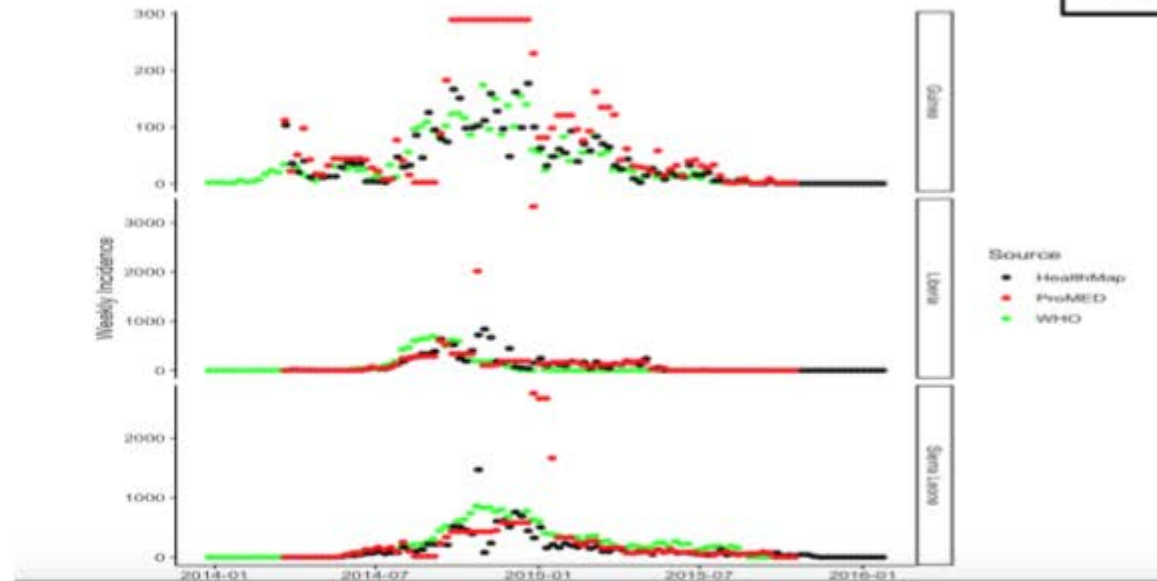
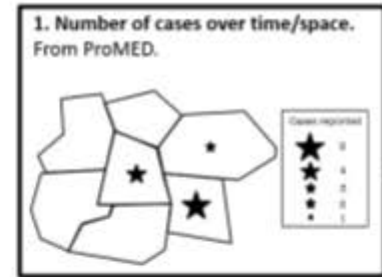
Surveillance:

- ProMED
- HealthMap

Traditional Disease

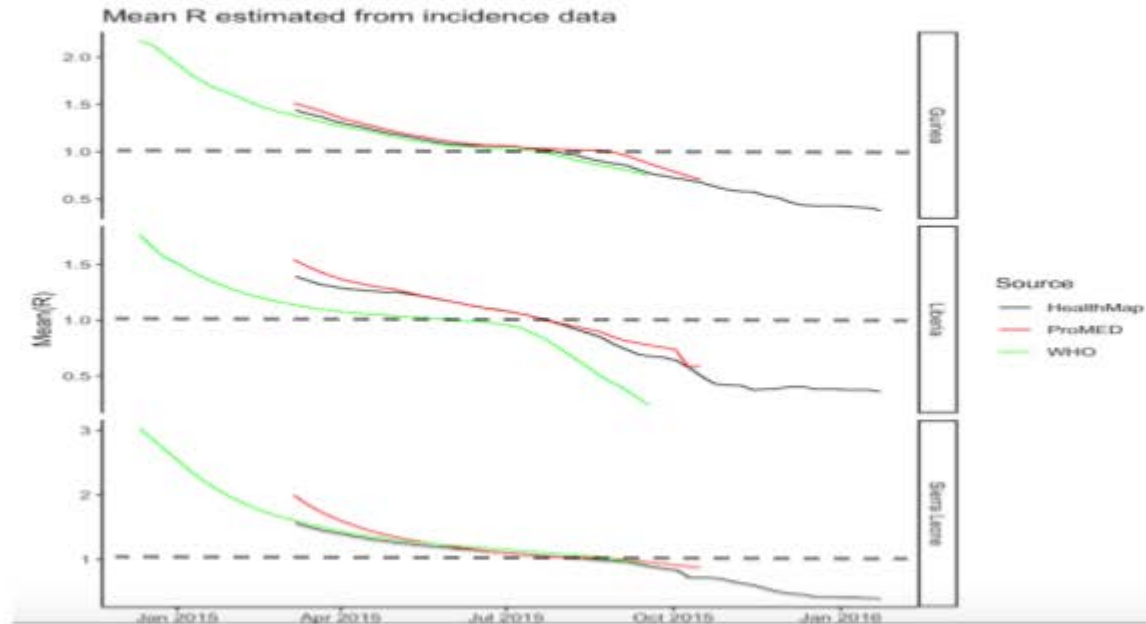

Surveillance:

- WHO



Comparing transmissibility based on different data sources

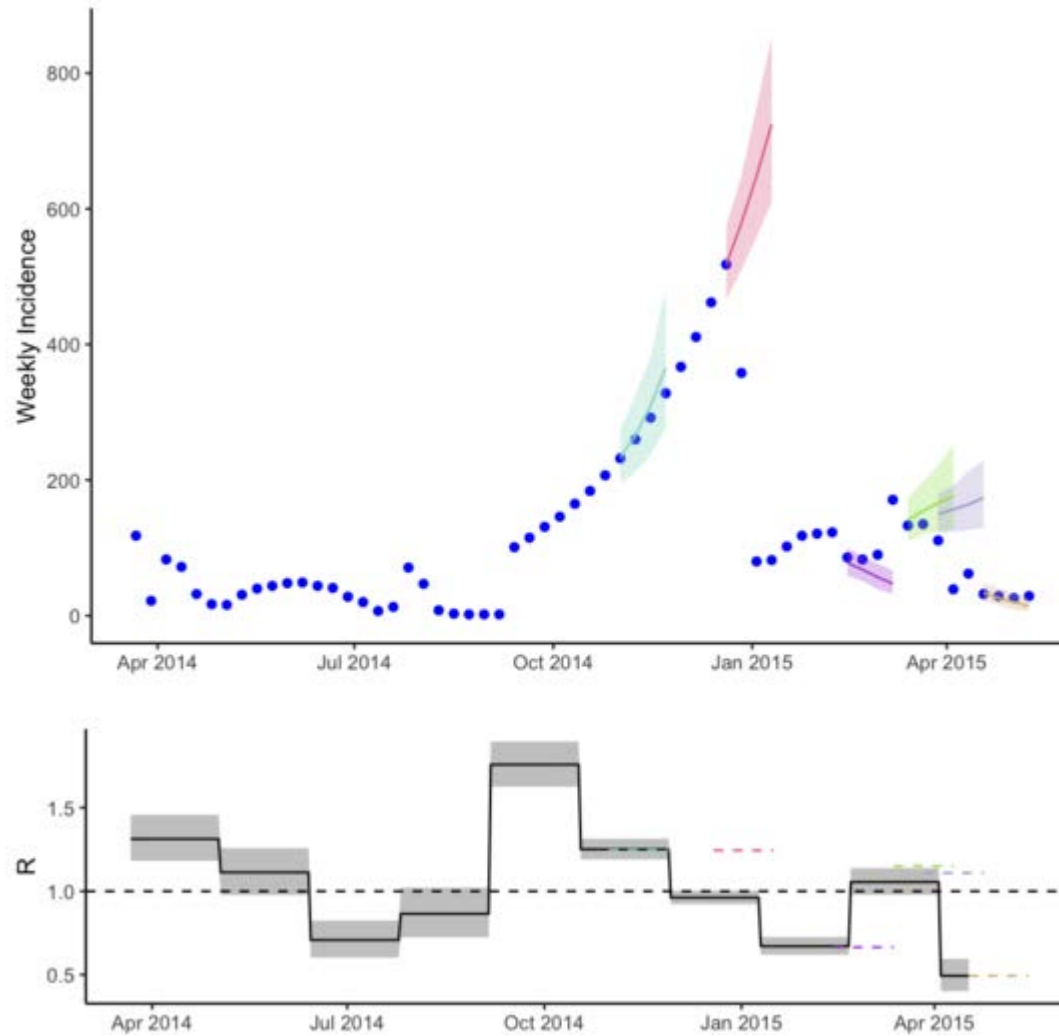
2. Transmissibility of pathogen.
From literature reviews. Can vary across space e.g. with climate.



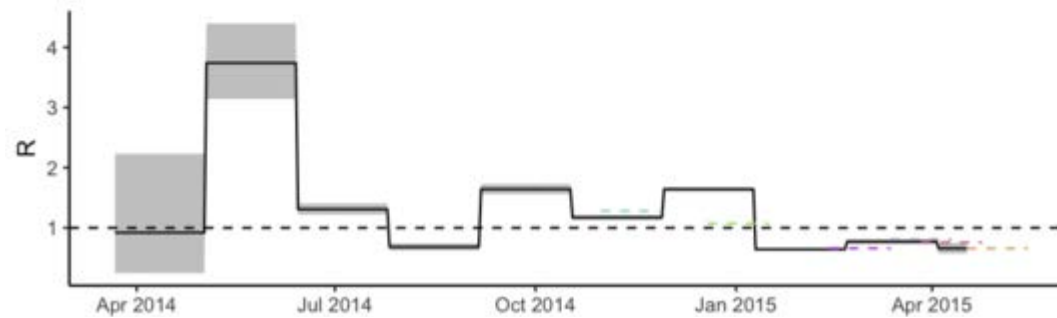
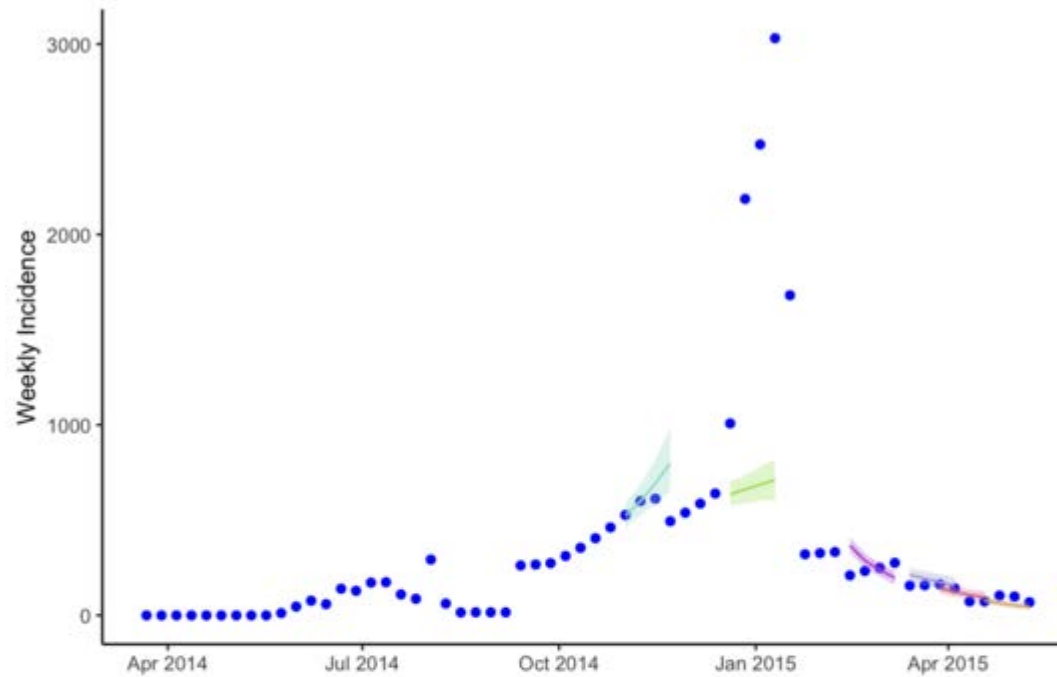
Models of movement (Gravity model)

- Movement between places modeled by a gravity like attraction of large population centers.
- Flow of people is proportional to the product of population sizes and decreases with the distance (with some power).

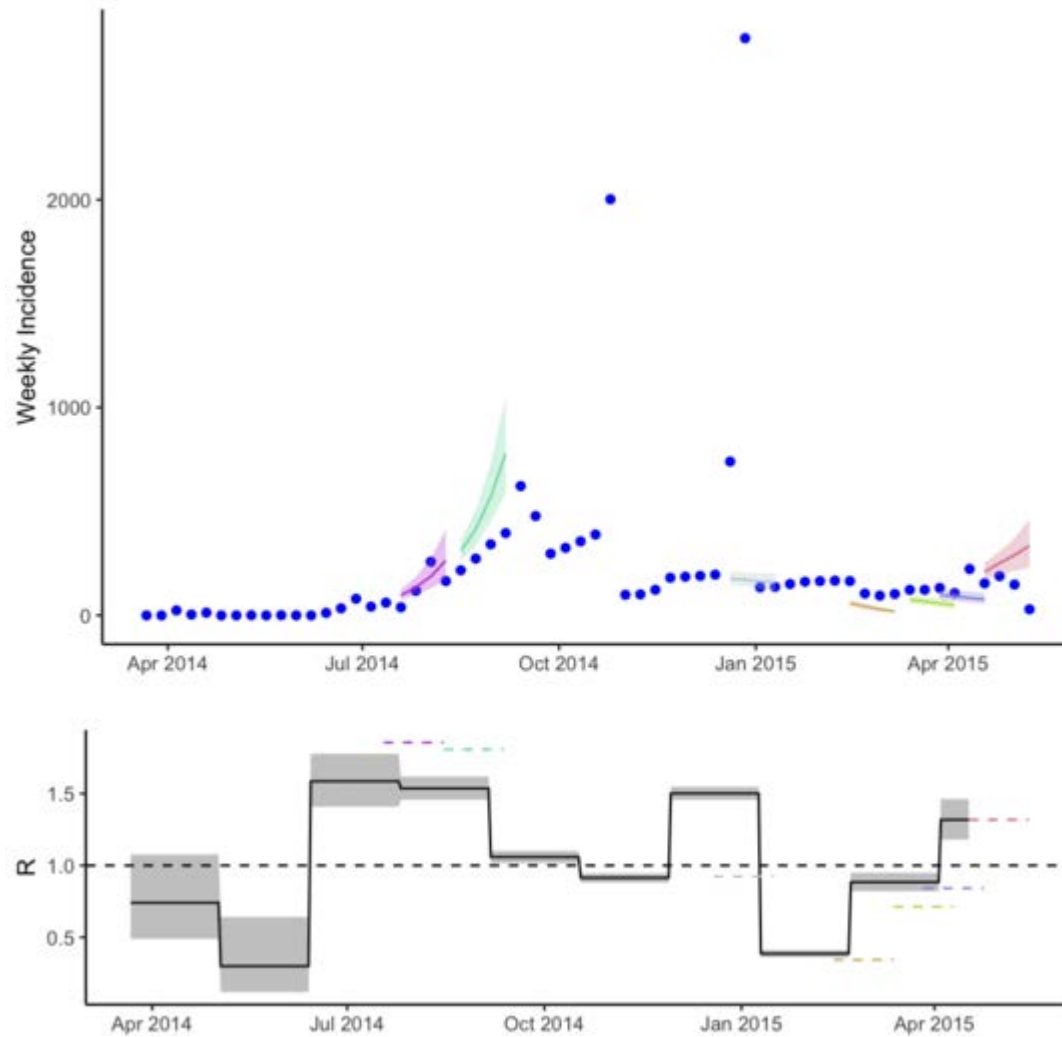
Prediction using data from ProMED (Guinea)



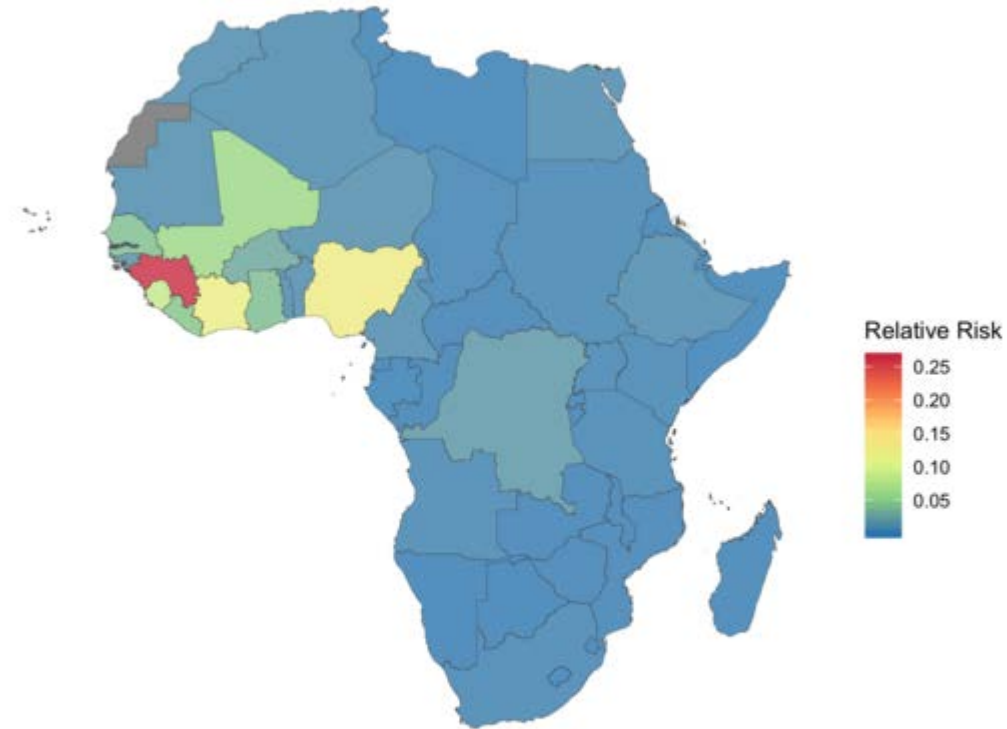
Prediction using data from ProMED (Sierra Leone)



Prediction using data from ProMED (Liberia)



Relative risk of spread (estimated on 21st November 2014)



Performance Metrics

- Bias
- Sharpness
- Mean absolute error
- Proportion of observations in 50% CI
- Others ??

Next steps and Issues

- Include health care capacity in the model.
- Informative priors for model parameters.
- Model averaging to account for model uncertainty.
- How best to choose the window for estimating the reproduction number?
- What is a good way to assess model performance?
- Issues : What publicly available data sources can we use for spatial information (population movement, latest census data, updated shapefiles)?
- Issues : Good proxy for healthcare capacity?

Get in touch



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<http://www.repidemicsconsortium.org>

<https://github.com/annecori/mRIIDSprocessData>