CHALLENGES IN MODELLING AND FORECASTING THE ONGOING HAITIAN EPIDEMIC

Joseph Lemaitre, Damiano Pasetto, Andrea Rinaldo

COLLABORATORS

EPFL Damiano Pasetto, Javier Perez-Saez, Flavio Finger, Andrea Rinaldo.
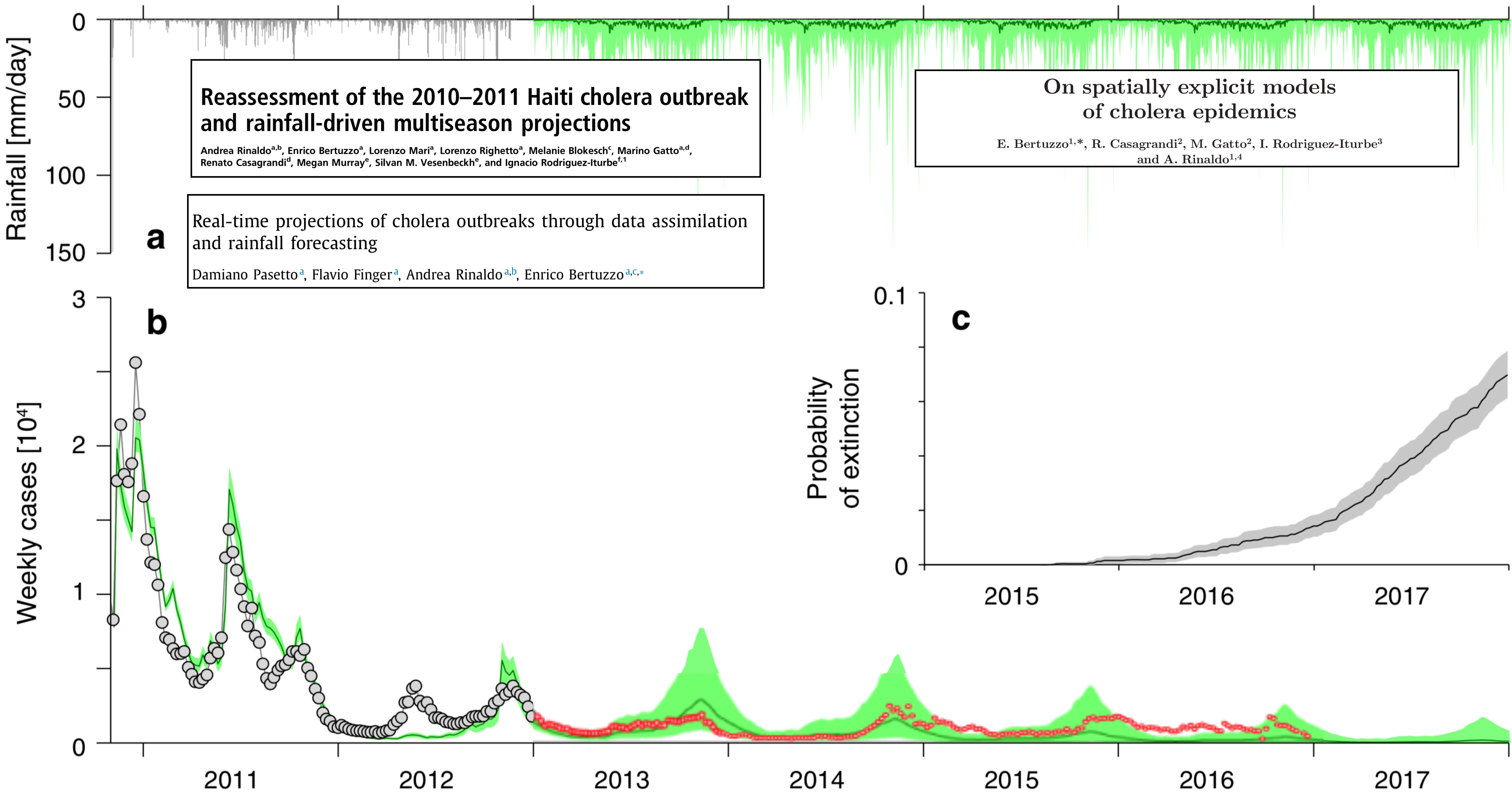
JHU Elizabeth C. Lee, Justin Lessler, Andrew Azman.

FredHutch Laura Matrajt, Betz Halloran, Ira Longini.

IDM Denis Chao.

PIH Louise Ivers, Ralph Ternier.

Haïti MSPP Patrick Dely.

**Reassessment of the 2010–2011 Haiti cholera outbreak
and rainfall-driven multiseason projections**

Andrea Rinaldo[a,b], Enrico Bertuzzo[a], Lorenzo Mari[a], Lorenzo Righetto[a], Melanie Blokesch[c], Marino Gatto[a,d],
Renato Casagrandi[d], Megan Murray[e], Silvan M. Vesenbeckh[e], and Ignacio Rodriguez-Iturbe[f,1]

On spatially explicit models
of cholera epidemics

E. Bertuzzo[1,*], R. Casagrandi[2], M. Gatto[2], I. Rodriguez-Iturbe[3]
and A. Rinaldo[1,4]

Real-time projections of cholera outbreaks through data assimilation
and rainfall forecasting

Damiano Pasetto[a], Flavio Finger[a], Andrea Rinaldo[a,b], Enrico Bertuzzo[a,c,*]

Bertuzzo et al., Stochastic Environmental Research and Risk Assessment, 2016.

MULTIMODELLING STUDY

*Can mass synchronised vaccine-induced immunity eliminate cholera in Haiti ?*

Insights from 4 computational models

- Four different models: from **JHU**, **IDM**, **UF/FredHutch** and **EPFL.**

- Teams work independently sharing common assumptions.

- Compare forecasts without vaccination and with different vaccination scenarios.
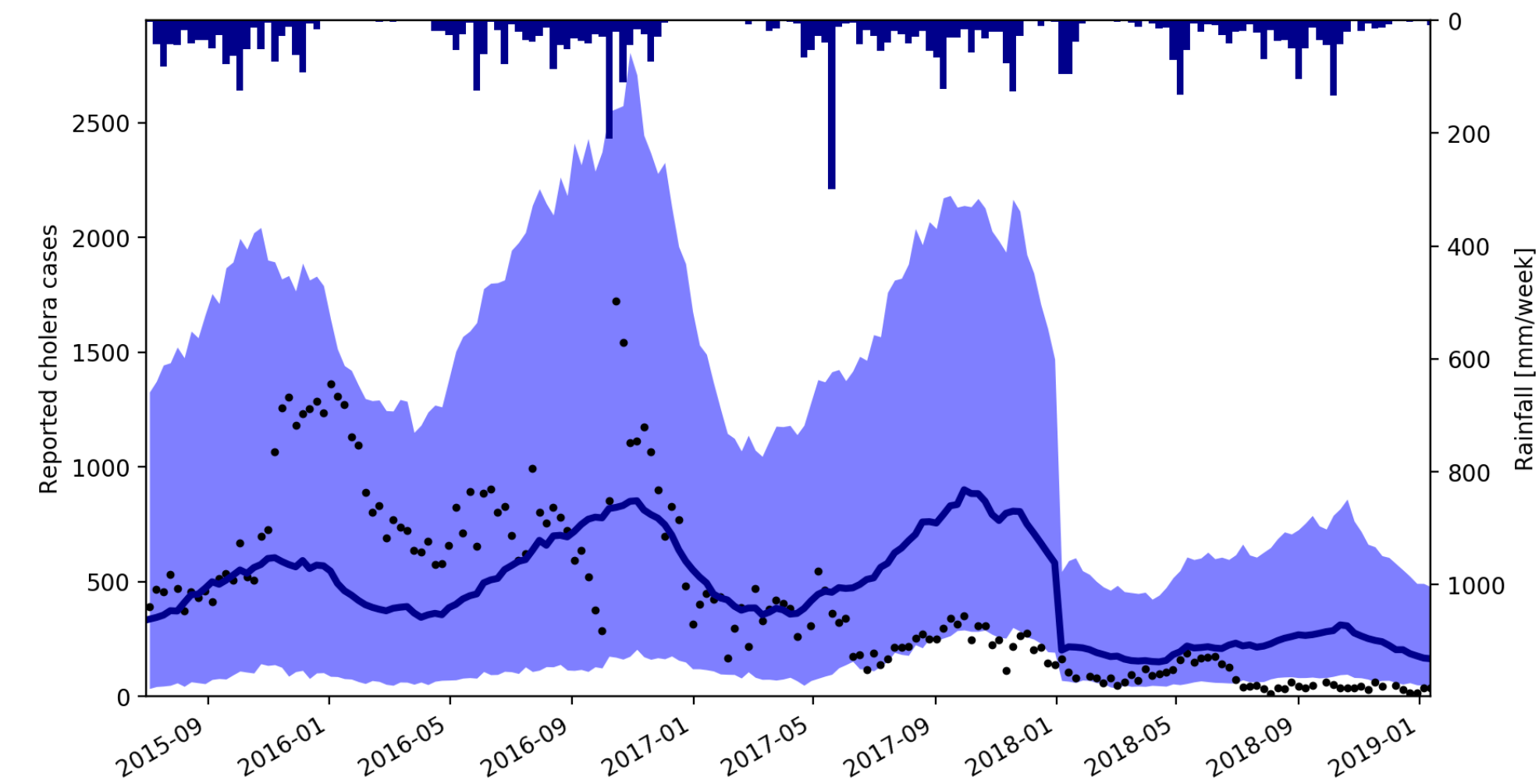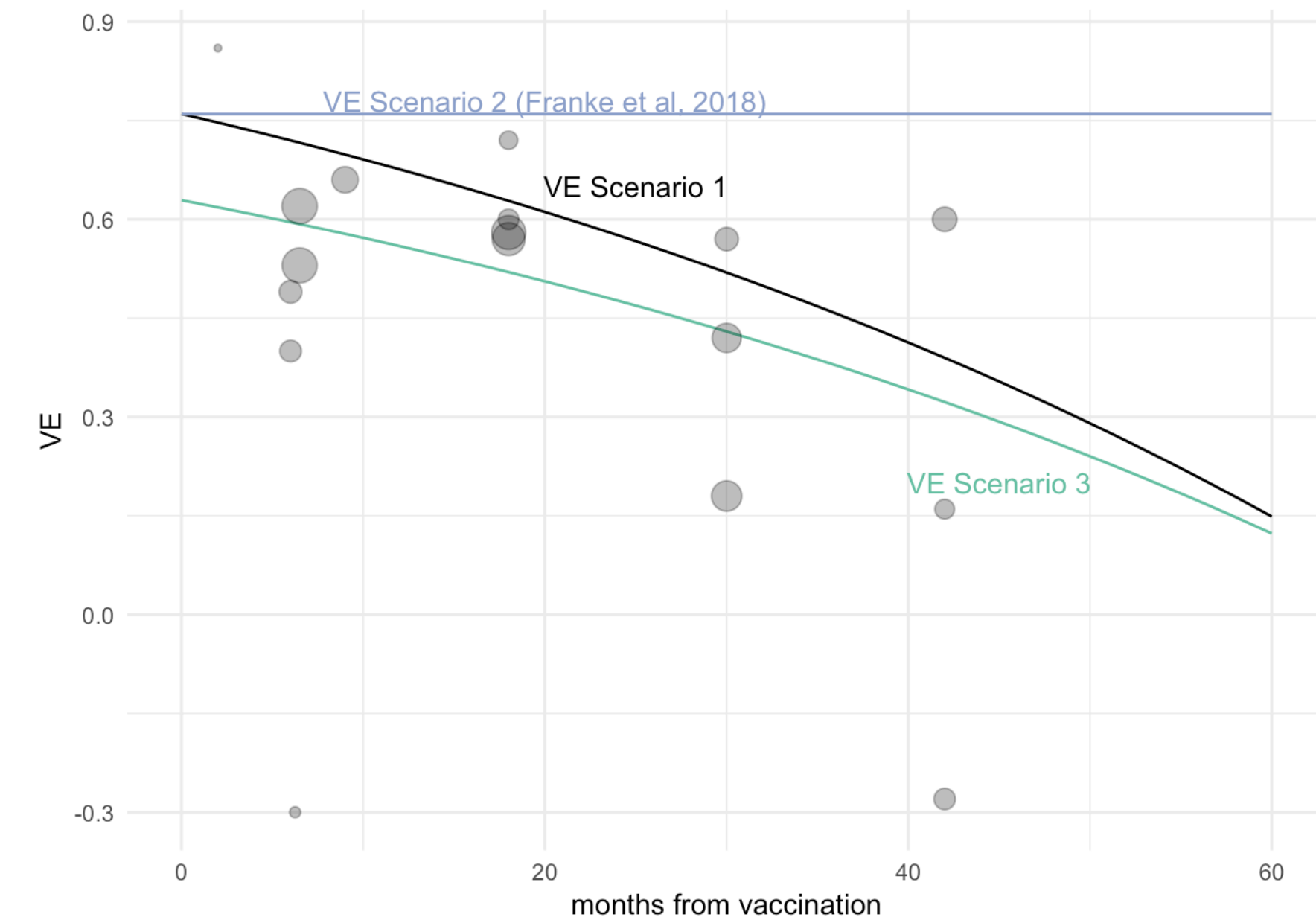
MULTIMODELLING STUDY

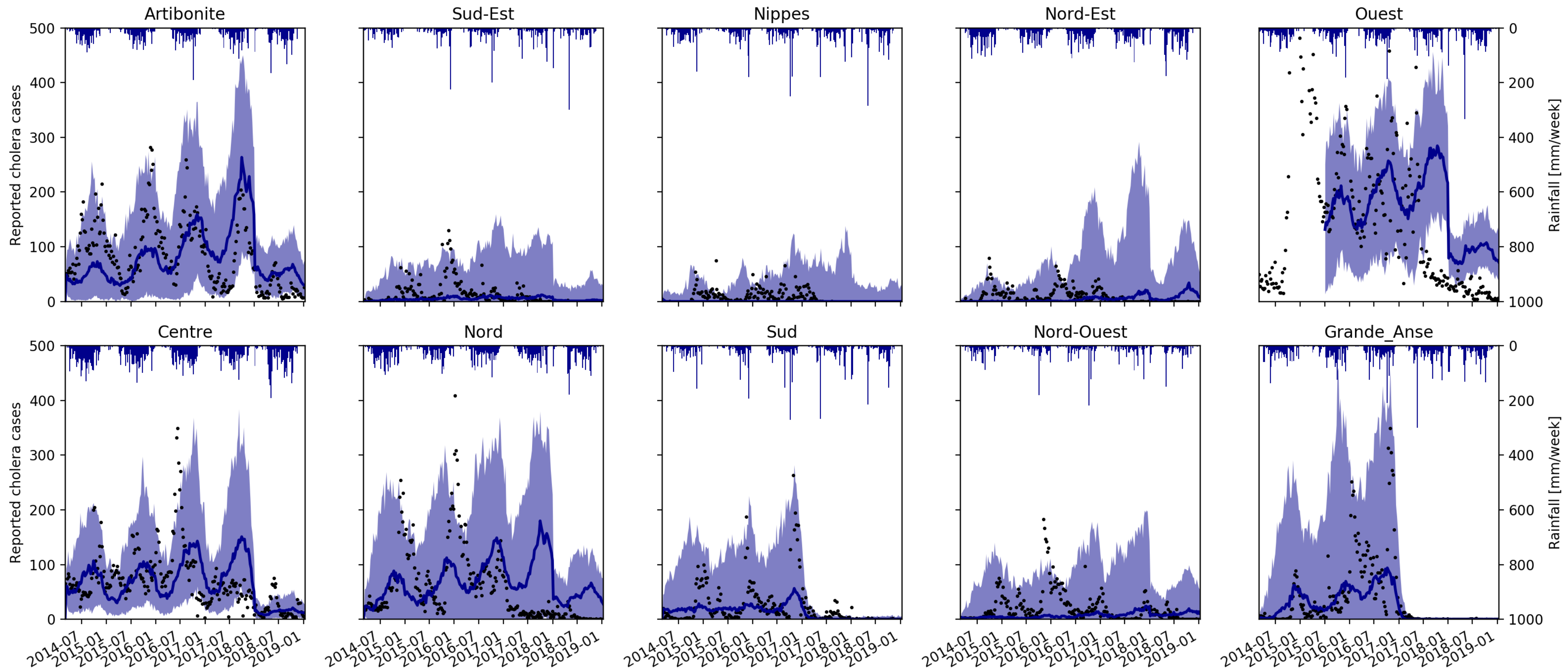| Model	Type	Spatial Scale	Environmental Compartment	Covariates	Age Structure
JHU	Stochastic	National	No	—	No
IDM	Stochastic	1 km x 1 km	Yes	Precipitation	Yes
FredHutch	Deterministic	Departemental	Yes	—	No
EPFL	Stochastic	Departemental	Yes	Precipitation	No

WHAT CHANGED SINCE 2012 ?
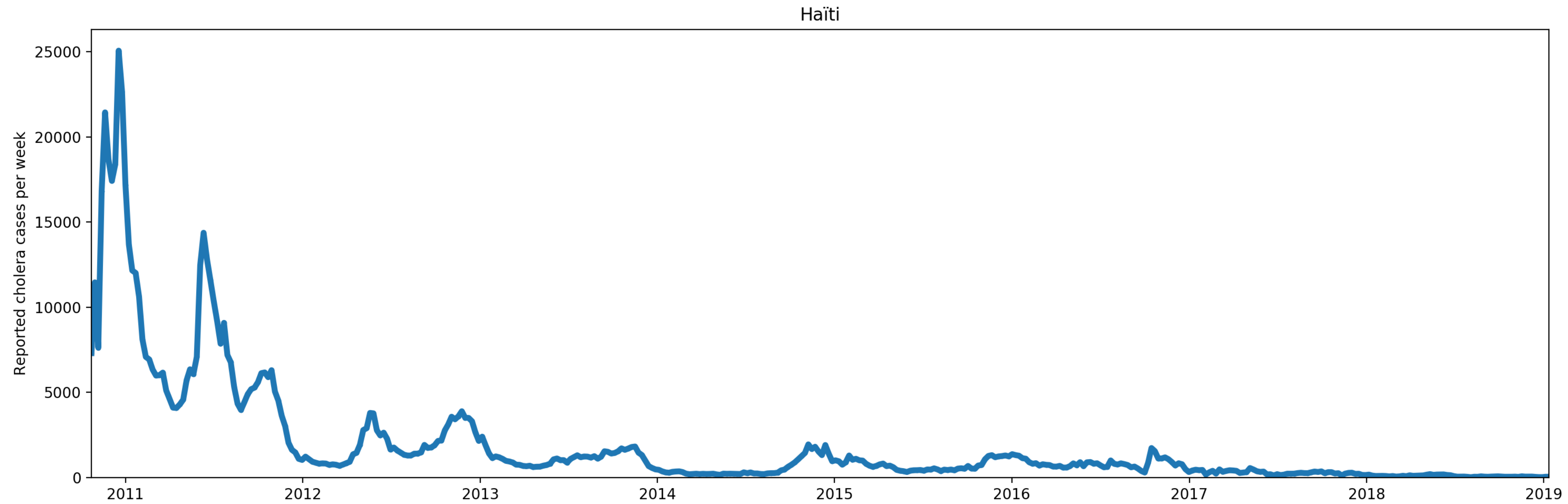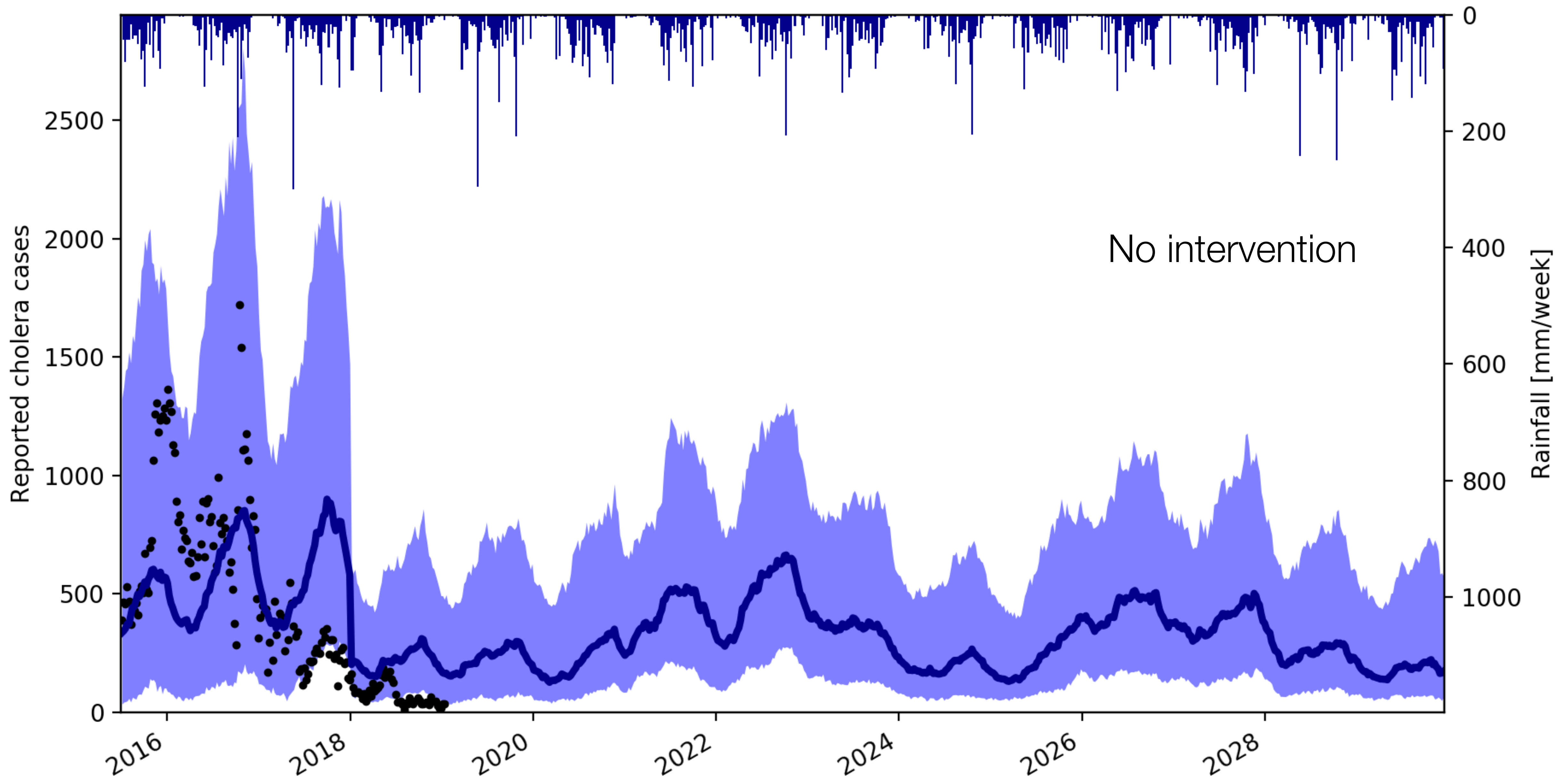
Haïti

NEW COMPARTMENTAL MODEL

- Departmental scale, the same resolution as data.

- Fitted with data from March 2014 to January 2019.

- Past dynamics are taken into account.
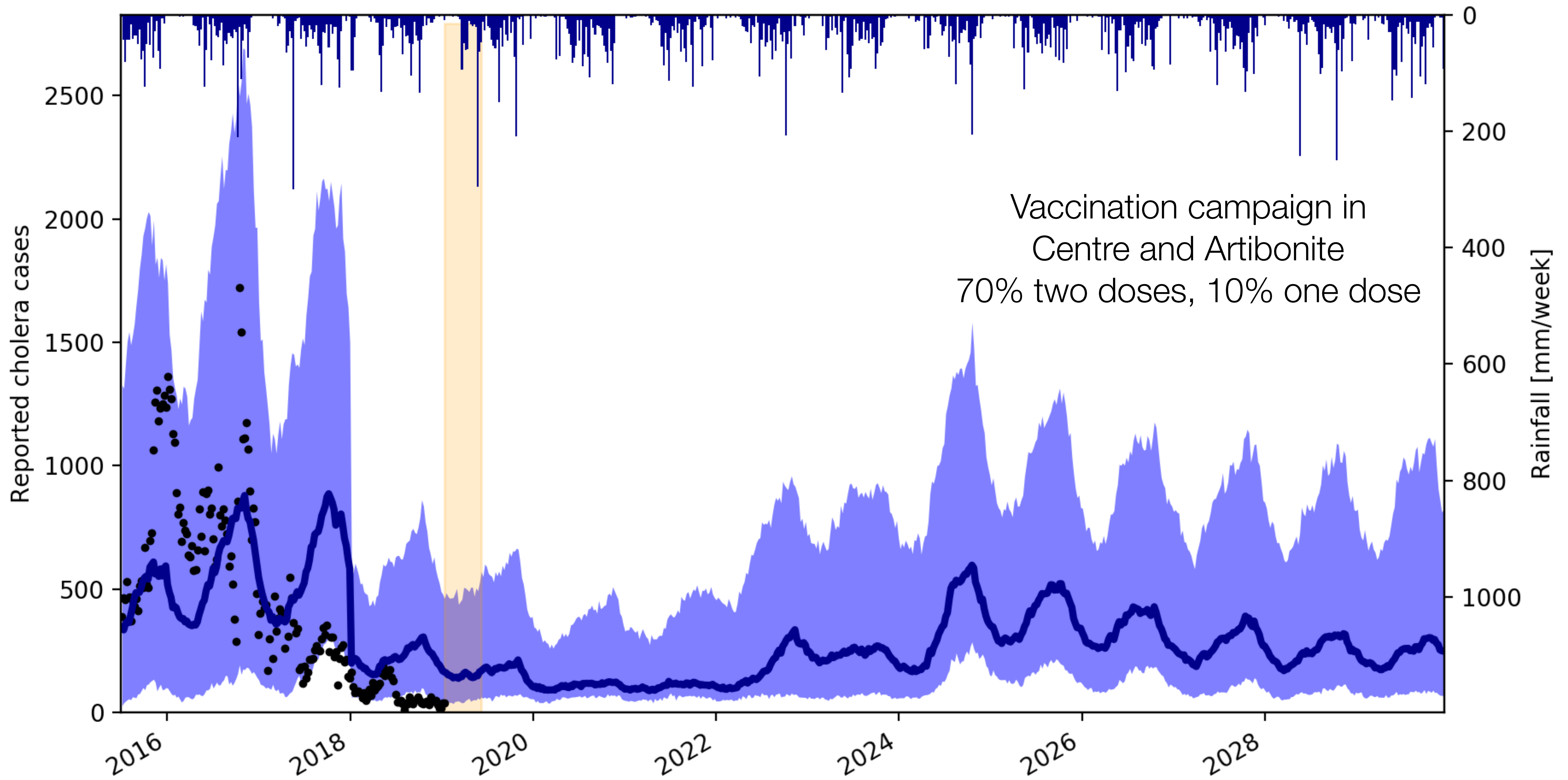
- Stochastic POMP model.

- Vaccination dynamics.

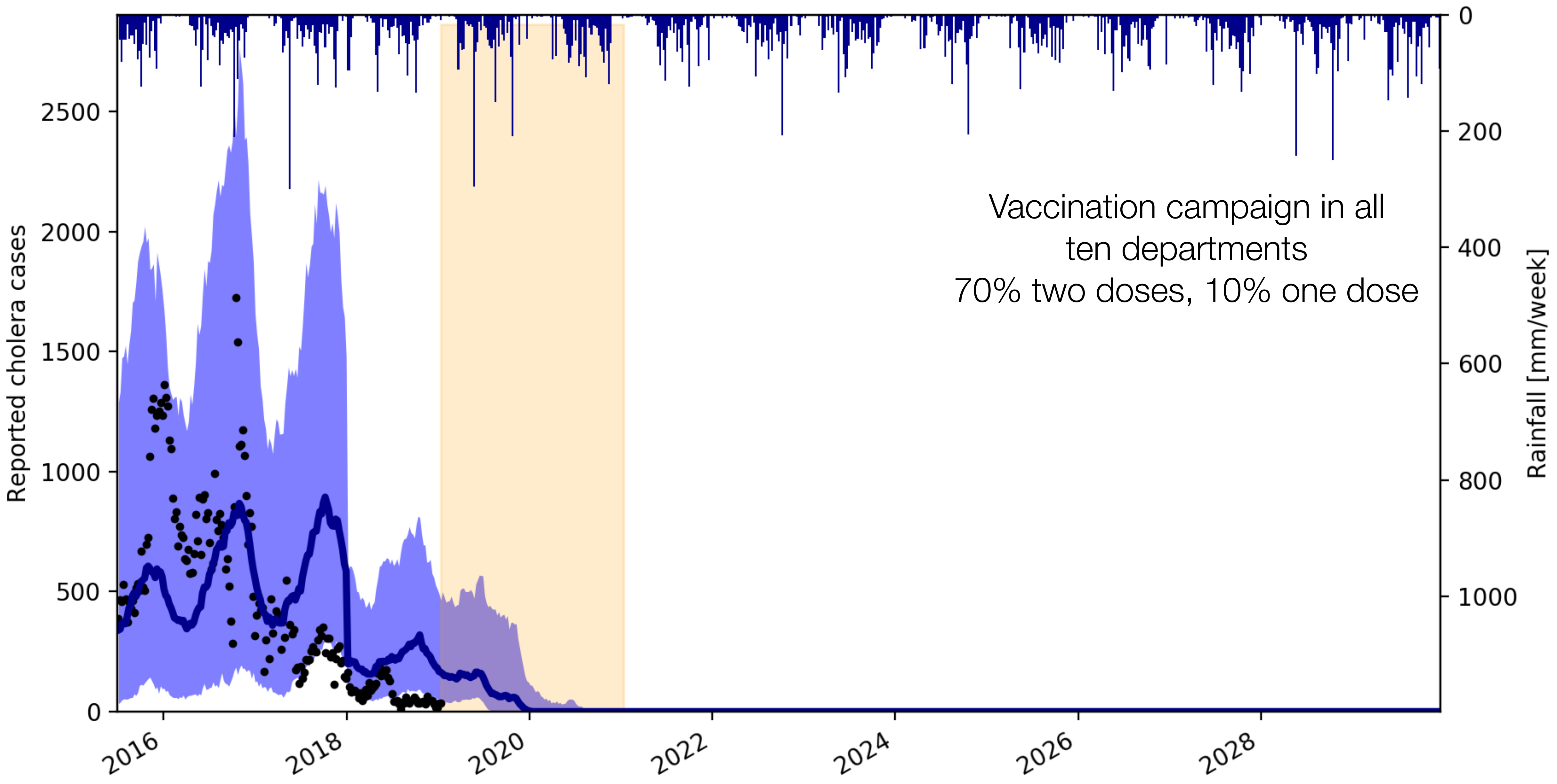*In each Haitian department department:*

No intervention

Preliminary results

Vaccination campaign in
Centre and Artibonite
70% two doses, 10% one dose

Preliminary results

Vaccination campaign in all
ten departments
70% two doses, 10% one dose

Preliminary results